Research Report
2005-2009
~
Télécom ParisTech / LTCI

juillet 2009

Laboratoire Traitement et Communication de l'Information - UMR 5141
Télécom ParisTech - CNRS

Research Report 2005–2009

Télécom ParisTech / LTCI
Institut Télécom, Télécom ParisTech & CNRS

Jul 2009

Contents

Chapter 1

General Survey of Research Activities

This report presents the activities of Télécom ParisTech in research between 1 January 2005 et 31 July 2009. A general outline of research is given in the first chapter along with consolidated figures giving resources allotted and the results obtained collectively. In the four following chapters are listed and analysed the scientific achievements of each of the research teams of the four departments of Télécom ParisTech. A separate document will develop what is projected in research over the next four years.

1.1 Background

Successor to the Ecole Supérieure de Télégraphie (EST), founded in 1878, Télécom ParisTech's names were, in order, the Ecole professionnelle supérieure des postes & télégraphes (EPSPT) and later on, the Ecole supérieure des postes & télégraphes (ESPT), the Ecole nationale supérieure des postes, télégraphes et téléphones (ENSPTT), Ecole nationale supérieure des télécommunications (ENST), Télécom Paris, and to emphasize its connection with ParisTech, of which it is a founding member since 1991, Télécom ParisTech, when ParisTech became a "PRES"[1] in 2008.

Télécom ParisTech has occupied its current site on rue Barrault in the 13^{th} arrondissement of Paris since 1934. A unit of the school was set up within EURECOM in Sophia Antipolis in 2003. A number of its departments and services later migrated to two annexes on the rue Dareau (in the 14^{th} arrondissement).

Under the authority of the Direction générale des telélécommunications (part of the Ministry of PTT), and later of France Télécom in 1991, ENST became part of the Groupe des Ecoles des Télécommunications (GET) in 1996, which had the status of an "établissement public administratif" (EPA), and which was placed under the minister responsible for telecommunications. The GET became Institut Télécom in 2008.

Up to 1968, ENST did not develope its own research labs, taking advantage of the Ministry's facilities. In 1968, C. Gueguen opened the first lab rue Barrault.

In 1982, the signal processing and digital communications teams made the first joint ERA (Equipe de Recherche Associée) with CNRS. It has become an URA (Unité de Recherche Associée) and then an UMR (Unité Mixte de Recherche) by progressively associating reserch teams in computer science, networking, applied physics for telecoms, image processing and, at last, management and social sciences. Today the UMR 5141 LTCI (see Section 1.2.3) covers all the research activity of Télécom ParisTech.

[1] PRES= "Pôle de Recherche et d'Enseignement Supérieur" is a regional cluster of institutes and universities for research in higher education

1.2 Administration and Organization

1.2.1 Télécom ParisTech As a Member of Institut Télécom

The Institut Télécom, which in addition to Télécom ParisTech, includes Télécom Bretagne and Télécom & Management SudParis, federates and coordinates its research activities in the separate schools within a "Comité Directeur de la Recherche" (= Research Management Committee). This body is under the authority of the Research Director of the Institut (Francis Jutand) and includes Télécom ParisTech's own Research Director and Director of Innovation and Development.

A "Conseil Scientifique" (scientific council) has also been set up within the Institut Télécom to examine at regular intervals the research carried out in the Institut's programmes. For example, in October 2008 the "Conseil Scientifique" took up research carried out within the programme "Contents and Multimedia Services". In November 2009 it will be the turn of research done within the area "Réseaux du Futur" (Future Networks). All the research activities of the Institut are thereby brought up for review every four years.

The "Comité Directeur de la Recherche" (Research Management Committee) has also set up for the researchers within the Institut Télécom various "alliance projects" to bring the schools together on a limited number of keynote subjects: these are called the "Future Communication Labs". Three such institutes are currently functioning: *Network of the Future Lab*, *Digital Health Lab*, *Digital Life Lab* anda fourth in in preparation on Multimedia. These will be taken up below when treating individual themes.

Within the Institut Télécom research has been structured by thematic projects in such a way as to bring together every two years all of the researchers working in a particular area so as to redefine future work. The size and the scope of these projects varies greatly, sometimes including an entire group (e.g., TII, see Chapter 13, and AAO, see Chapter 10), sometimes only one or two teachers. This report takes up such projects whenever this is pertinent.

The Fondation Télécom supports research at the Institut Télécom by providing financing, most notably in calls made for projects (for example, the various projects under the name of "Futur and Ruptures" (the future and breaks with tradition). The Institut Télécom has also concluded framework agreements with some major partners: Orange, Alcatel-Lucent, Thalès, all of these agreements directly serving the interests of Télécom ParisTech. Lastly, the Institut Télécom (with EURECOM) was certified as an Institut Carnot from the very first year of Carnot campaigns and as such makes regular returns to the member schools (Télécom ParisTech included). These points will be taken up in Section 1.4.4.

The Institut Télécom has set up its research strategy for the five years from 2008 to 2012, where it claims its intent to become one of the major actors of research in IT in the field of communications (and more specifically on the topics of Telecommunications, Contents and Usages), as well as its engagement to serve for the economic and innovation development in these domains.

1.2.2 The Organization of Research Within Télécom ParisTech

Within Télécom ParisTech, research is basically within the purview of the Director of Research (Henri Maître) and the Director of Innovation and Development (Armand Lévy), but also of the Director of Research Courses (Bernard Robinet) who is responsible for the Ecole doctorale (ED 130 Edite), thanks to which Télécom ParisTech is entitled to deliver its own doctoral diploma.

Research activities are discussed by a "commission interne de la recherché" (a local research commission) and examined by a "Comité de la recherche" (research committee), an official body containing an equal number of representatives of the school's administration and of researchers themselves, plus outside personalities. The "Comité de la recherche" meets three times a year[2].

[2]The present external experts of the Comité de la Recherche are: Olivier Audouin (Alcatel-Lucent), Michel Beaudouin-Lafon (LRI, Orsay), Jean-Marc Chassery (Gipsa-Lab, Grenoble), Dominique Cotte (IDIST, Lille), Cédric Demeure (Thalès), Claude Girault (LIP6, Paris), Michel Lemonier (OSEO), Alain Rallet (ADIS-Orsay).

Télécom ParisTech contributed to the research strategy of the Institut. It will be presented in the ”Project” booklet of this report. Its main objectives are to compensate for some heterogeneity of the different teams, to increase our international action and, therefore our recognition outside French borders, to take the best from our flexible administrative context to increase our ability to react.

Télécom ParisTech takes benefit from its favourable environment: the ParisTech PRES (a founding member of which we are) and the Universities from Paris area (and overall UPMC, our closest neighbour), which are elected partners for teaching and research as well (cf. Paragraph 1.4.4).

1.2.3 LTCI (Laboratory for Communication and Processing of Information) as a CNRS Lab

The UMR[3] 5141 or LTCI is part of the INST2I, ”Institut des sciences et technologies de l'information et de l'ingénierie” of CNRS and also of the ”INSMI” (Institut des sciences mathématiques et de leurs interactions).

The LTCI is attached administratively to the Paris-A delegation of the CNRS.

The LTCI is a firm actor of CNRS life. Its participation to the GdRs[4] (and especially to GdR ISIS) to expert committees (M. Riguidel for Security, O. Cappé for Signal and Image, C. Licoppe for Social Sciences), and to governing boards (H. Maître, E. Moulines and I. Bloch served as members of the Section 07 of the National Committee, and C. Pélachaud of the CID 45), and the animation of the department and then of the Institut INST2I (E. Moulines), is constant and resolute.

The evolution of the LTCI with respect to the evolution of the CNRS structure will be developed in the prospective part of this report.

1.2.4 The Organization of LTCI

As said, the LTCI at the same time covers all the research of Télécom ParisTech, and only it. It is a rather singular situation in the national framework. It favours a strong synergy between teams and allows a good coordination of the alloted means, focusing all the ressources on a single objective: the advancement of the modern techniques of communication. However it constrains that efforts be made to reduce double commands in the management, to share the long term objectives and to coordinate the decisions.

The Director of the UMR (Henri Maître) is aided by a Deputy Director (Olivier Cappé). The ”Conseil de Laboratoire” (laboratory council) is an official body in which all members are represented equally. It takes up all aspects concerning everyday activities of the UMR. Attention is paid to keep the Conseil de Laboratoire and the Commission de la Recherche well informed of their respective conclusions and many opportunities are found for them to work together.

Although at the starting times of the LTCI, different scientific structures were living in LTCI and in Télécom ParisTech, the organization of LTCI is nowdays exactly the same as Télécom ParisTech's, i.e. the department structure.

1.2.5 The Organization by Departments

Research is carried out within the four departments of Télécom ParisTech, each of which includes all those playing a role in research:

- Department of Communications and Electronics (Comelec), headed by Bruno Thédrez,

[3] UMR = ”Unité Mixte de Recherche”, joint research unit between CNRS and an education or research centre.
[4] GdR = Groupement de Recherche = French thematic research network under the aegis of CNRS

- Department of Computer Science and Networks (Infres), headed up to May 2009 by Michel Riguidel, then by Gérard Memmi,
- Department of Economics and Social Sciences (SES), headed up to end of 2008 by Laurent Gille, then by Christian Licoppe,
- Department of Signal and Image Processing (TSI), headed by Yves Grenier.

Department heads are members of the "Comité de la Recherche", of the "Commission de la Recherche" and of the "Conseil de Laboratoire". It is within the departments that the thematic organization of research at Télécom ParisTech is worked out. Interdisciplinary activities are the result of initiatives started by researchers, the "Instituts de communication du futur" (Future Communication Labs) and the direction of Télécom ParisTech.

The report that follows adheres to the organization by departments except for this chapter, which takes up some interdisciplinary activities.

1.3 Resources in the Service of Research

1.3.1 Personnel

The official status of those contributing to research at Télécom ParisTech can be very varied ; permanent employees of Institut Télécom or of the CNRS, teaching staff, researchers or research assistants. Among non-permanent staff can be found professors on sabbatical or on assignment, post-docs, thesis students, engineers on short-term contracts and trainees (cf. Table 1.1).

Permanent Members of the Staff

In January 2009, contributing to research were the following permanent members of the staff:

- **141 Teachers** ("enseignants-chercheurs" or EC) of the Institut Télécom: these members of the teaching staff contribute significantly to research, as is attested by regular submissions to international journals or conferences that include editorial committees and proceedings: 47 Professors, 73 Associate Professors, 10 Directors of Studies, 5 Assistant Directors of Studies, 6 Lecturers.
- **15 Teachers** ("enseignants-chercheurs") of the Institut Télécom who have expressed the desire to take part in research projects (participation in working groups, managing trainees, developing software) but who do not publish regularly.
- **10 Engineers or technicians of the Institut Télécom**: permanent members of the staff (Directors of Studies, Deputy Directors of Studies, Lecturers) who have chosen to take part in the research activities of the LTCI within a department by contributing to the development or maintenance of scientific or technical units (including equipment and software).
- **26 Permanent researchers from the CNRS** (8 Research Directors, 18 Research Assistants), representing various sections of the CNRS' National Commitee: 07 (7 researchers), 34 (3), 01 (2), 08 (2), 27 (2);
- **2 Engineers of the CNRS** both of them assigned to functions on the computer and networking systems.
- **2 Researchers from INRIA** (1 Director of Research and 1 Research Assistant, assigned to work on research in the social sciences;

- **5 Outside adjunct researchers:** these researchers belong neither to the Institut Télécom or the CNRS but nonetheless carry out most of their research with teams working within Télécom ParisTech. They often co-author articles with members of the permanent staff of the Institut Télécom and members of the CNRS working within our institution.

Télécom ParisTech				**CNRS (+INRIA)**		
Prof + Dir Studies	Ass. Prof + Ass. Dir. S.	supporting Ass. Prof.	Engineers	CR	DR	Engineers
57	78	15	10	18	8	2

Table 1.1: Numbers of teachers and researchers in January 2009

Research at Télécom ParisTech draws on the extensive indirect support it receives from the technical and administrative staff of the institution (infrastructures, human resources, missions, library and documentation, printing shop, etc.). This will be taken up in Section 1.3.2.

Thesis Students

The doctoral students constitute an important part of Télécom ParisTech's research potential. The institution currently has 270 doctoral students working on a thesis under the direction of one of the school's teachers. 250 of these doctoral students are enrolled in the "EDITE de Paris" doctoral school (and thereby will receive their doctorate from Télécom ParisTech). 50 other students will receive their doctorate from Télécom ParisTech but are carrying out their thesis at EURECOM. Two hundred of our doctoral students are working on their thesis in laboratories of Télécom ParisTech and their results will be presented within this report. The other students, often because of a "Cifre agreement", carrying out their research in the laboratories of our industrial partners, their work will be presented in this report only to the extent that there is a significant connection with the research programmes of Télécom ParisTech.

A relatively small number of our doctoral students receive institution funding (23 holding ministerial bursaries, 31 on contract with research institutes or agencies, 15 receiving scholarships from foreign governments). The other students are often engaged on contracted research projects or are financed by our various partners.

Post-Docs, Engineers on Short-Term Contracts, Sabbatical Professors, Visiting and Associate Professors

These people are mainly assigned to contracted research done by Télécom ParisTech and principally with the status of employees of Télécom ParisTech or, occasionally, of the CNRS. They are taken up in Table 1.2, which gives both the numbers of people employed and the months per man during which they are present at Télécom ParisTech.

	2006	2007	2008	2009
Sabbatical professors		1 (12)	2 (22)	
Post-docs	12 (106)	20 (227)	18 (197)	
Short term Engineers	35 (380)	23 (254)	28 (296)	
Technicians	2 (5)	5 (21)	1 (3)	

Table 1.2: Short term personnel: numbers and (numbers of man x month).

Recent Developments

The world of information and communication technologies is changing rapidly. Rather great demands have been made on the school both for teaching and for research and it has been necessary to make considerable additions in staffing during the period running from 2005 through 2009. This increase has also appeared on the side of the CNRS, a very attractive source of recruitment for the young researchers coming in by the CNRS' competitive recruitment examination and by transfers: 4 "Directeurs de Recherche" from the CNRS, 1 "Directeur de Recherche" from INRIA, 2 "CR" from the CNRS and 1 "CR" from INRIA (see Table 1.3).

	Telecom ParisTech					**CNRS (+INRIA)**				
	Ass. Prof + Ass Dir Stud.		Prof. + Dir Studies		promoted	CR		DR		promoted
	leav.	enter.	leav.	enter.	Prof.	leav.	enter.	leav.	enter.	DR
2006	6	5	1	2	2		1	1		
2007	7	10	3	3	3	1	3	1	1	1
2008	7	8	2	4	3		3 (+1)		1 (+1)	
2009		2	1	1					2	
Total	20	25	7	10	8	1	8	2	5	1
Balance	+ 5		+ 3			+ 7		+ 3		

Table 1.3: Evolution of the numbers of faculties during the period. From 2006 through 2009, Télécom ParisTech has had 8 promoted Associate Professors to Professors (for each of them the above table shows +1 for leaving Ass. Prof and +1 for entering Prof).

Summary About Research Personnel

Table 1.4 indicates the average distribution of the personnel by team and department, depending on its origin over the last five years. For the purpose of measuring the personnel present in the lab, the PhD candidates which are mostly not in the lab (for instance because they are in a company) are counted for $1/2$ only. Table 1.4 also proposes a "Full time research equivalent" (FTRE) to measure the personnel available for research in each team. It counts teachers for one half (since they should participate to teaching), and PhD candidates for two thirds, since they spend a part of their time for their education.

1.3.2 Services of Télécom ParisTech Providing Support for Research

Nearly 500 people all told are involved in research at Télécom ParisTech, 200 of these engaged in research on a permanent basis. To carry out its mission, the effort in research draws on an institution (Télécom ParisTech) with a permanent staff of 340. It also draws on the resources made available basically by the "Direction Scientifique" of the Institut Télécom (division of research management plus some support services) and those of the "Paris-A Delegation" of the CNRS (human resources, contracts, financial services). The divisions of Télécom ParisTech most closely associated with research are described in the following lines.

Computers, Network, Audio-Visual and Information Systems

Télécom ParisTech has a centralized computer centre that, outside of its role in management and administration and the resources it provides for students (classrooms set up for courses in computer science, aid to users, audiovisual materials, etc.) offers to all units of the institution involved in research certain shared services (network, internet, e-mail, security, large-scale

Dept	Team	Personnel				
		teacher Institut Télécom	researcher CNRS (and INRIA)	PhD students	Post doc, Eng, Sabb.	total FTRE
TSI	AAO	7,5	1,5	10	1,5	13,4
	MM	7	2,3	11	2	15,1
	TII	12	2,5	27,4	3,5	30,3
	STA	5,5	5,3	7,2	1,4	14,3
	total	32	11,6	55,6	8,4	73,1
INFRES	MIC2	9,5	2,5	13	2	17,9
	RMS	14		30,9	5,3	32,9
	IC2/S3	14,3	0,7	12,6	7	23,3
	total	37,8	3,2	56,5	14,3	74,1
COMELEC	GTO	6		13,8	1,5	13,7
	COMNUM	5,8	0,7	13	1,25	13,5
	ELECRF	9,5		13,8	2,5	16,5
	SEN	8,5	2	8	5,5	17,1
	total	29,8	2,7	48,6	10,75	60,8
SES	total	19,7	1,8	17	19	42,0
Total		119,3	19,3	177,7	52,5	249,9

Table 1.4: Distribution of personnel in the different teams and departments. The figures are average man.year. The column FTRE (”Full time research equivalent”) is the weighted sum of the 4 previous columns, with the following coefficients: teachers are weighted with $.5$, researchers, postdocs, engineers and sabbatical are weighted with 1, PhD students are weighted with $2/3$. PhD students in a company are weighted with $2/3 \times 1/2 = 1/3$.

contract agreements, etc.). The departments have their own separate networks, that can work entirely independently but that can, of course, be coordinated when need be.

A centralized information system is being set up to make it possible to more easily follow research projects at different levels of responsibility (top management of the institution, individual departments, groups, project leaders) by offering consolidated views of resources, allotments made, expenditures and timetables, all of this contract by contract. This information system is under the responsibility of the Institut Télécom.

Technology Transfer, Relations with Industry and Intellectual Property

The Director of Innovation and Development relies on a team assigned to relations with industry, technology transfer, and the defense of intellectual property of Télécom ParisTech’s teachers and researchers. This division of Télécom ParisTech provides the administrative and legal follow-up of all the agreements and contracts made by the institution and that guarantees the conformity of financial agreements with the policies and practices of the Institut Télécom. This division maintains close contact with the Paris-A delegation of the CNRS.

General Services of Télécom Paristech: Finances, Human Resources, Logistics (Norms of Security and Hygiene) and Communication

The general services of Télécom ParisTech are closely intertwined with research programmes, as for example with the management of non-permanent members of the institution (a notable instance would be the assistance provided to foreigners for their various dealings with the national administration), dealings with financial matters, billing, missions, inventories. The logistics unit of Télécom ParisTech is responsible for the maintenance and security of the buildings and meeting the norms of security and hygiene.

The service of communication promotes various research activities of Télécom ParisTech.

The service of documentation is entrusted with providing documentation (in paper and electronically) for all those working in research at Télécom ParisTech. It relies for parts on the resources provided by the French consortium Couperin around CNRS (the portals of INST2I and

INSHS). Staff and students alike can consult the online resources of the major scientific journals of our domains or nearly a total of 20000 journals available from their desk[5]. The service of documentation is also responsible for publicizing the theses done at Télécom ParisTech via the portal Pastel of ParisTech. It also publishes on line the various annual reports issued from various services of Télécom ParisTech.

1.3.3 Budget

Research at Télécom ParisTech depends on two sources: the Institut Télécom and the CNRS. In both cases, the budgets are coordinated.

Institut Télécom provides the most extensive support and the main sources of resources. The total expenses of Télécom ParisTech for 2008 amount at 44 Meuros to fulfil its four main missions: (i) Undergraduate and Graduate Education, (ii) Life Long Learning Studies, (iii) Research, (iv) Entrepreneurship.

A fine analytical accounting allows to dispatch these expenses to the missions. When only direct expenses are taken into consideration, Research counts for 41.8 % of the total expenses. When the costs of indirect services are distributed over the missions, this part rises to 43.3 %, because of the impact of research on Human Resources and Financial Services.

When consolidated expenses are taken into account (i.e. with salaries of permanent staff), the distribution of Research costs is the following:

wages and personnel budget	77.7 %
operating budget	15.0 %
capital budget	7.3 %

1.3.4 Budgetary Allotments and Basic Support

Télécom ParisTech supports its research in part by the salaries given to its teaching and research staff, by the various services described above and by covering expenditures common to the entire infrastructure (electricity, water, telephone, networks, maintenance, etc.) but does not however contribute to the regular annual budgets of research teams for investments or standard expenses. Budgetary allocations for these teams are made by the coordinated effort of the Direction of Research and the Direction of Innovation and Development, these resources coming from the returns due to our participation in the Institut Carnot and programmes of the ANR[6]. Such sums are dependent on the amount of contracted research and can vary greatly, too, according to policy decisions made nationally. Télécom ParisTech also supports research by encouraging the stays of sabbatical professors and the organization of research seminars at school. On occasion, specific appeals are made when extensive investment is necessary (as, for example, in 2006 and 2007 for quantum communications, in 2008 for investment in infrastructures for scientific computation and in 2009 for platforms).

The Institut Télécom plays an active role financially in launching appeals for projects (incentive fund research initiatives or for the programme ”Futur et Ruptures” (the future and breaks with tradition) that was supported by the Fondation Télécom. The Institut Télécom finances most notably doctoral dissertations, sabbatical stays, postdocs and also investment in specific campaigns (as in 2009 for platforms).

The CNRS contributes to the activities of the LTCI with a basic allotment of 192 keuros (for 2009 as for 2008) of which 162 comes from the INST2I, 20 keuros from the INSHS and 10 keuros

[5] the IEEE, ACM, OSA, Science Direct, Mathscinet, Kluwer-Springlink, SJSTORE, Factiva, Le Kompass, les Techniques de l’Ingénieur, Safari and Netlibrary, etc.

[6] the so-called ”abondement Carnot” and ”Preciput ANR.

from the INMSI. The CNRS pays the salaries of its researchers who are assigned to our laboratories and provides administrative backup (human resources, managing contracts, intellectual property).

Contracted Resources

Table 1.5 presents the net annual product of contracted resources over the period. This table will be discussed in Section 1.4.2.

Télécom ParisTech attributes to its research teams the free use of contracted monies received, apart from a small standard withdrawal (5 % in mean) that is redistributed later on to research teams via specific appeals. These contracted ressources are most notably used for non-permanent staff hiring (about 75 % to cover salaries or scholarships for some PhD students and post-docs, all the engineers and master's internships), then two equal parts cover the travelling expenses and the technical investment).

Contracted resources (in Meuros)	managed by Télécom ParisTech	managed by CNRS	Total
2005	4,42	0,55	4,97
2006	5,63	0,62	6,25
2007	7,30	0,65	7,95
2008	7,79	0,47	8,26

Table 1.5: Contracted resources: net annual research products.

The employment of contracted resources is the following:

wages, studentships, salaries, ...	65.1 %
travels and conferences	12.3 %
furnitures (books, software consumables, ...)	11.8 %
investment	11.8 %

1.4 Scientific Ranking and Figures

1.4.1 Publications and Scientific Communication

The evolution of our scientific output in scientific media is presented in Table 1.6 for a general view of our scientific production and in Table 1.7 for distributed view over the teams. It appeals some remarks here. At first these figures are not the exact sum of the team figures, since, for instance, a joint paper may be claimed simultaneously by 2 teams. On the contrary, the total number of doctoral theses is higher than the cumulated number of theses by teams, because we count here the total number of diplomas which have been awarded by Télécom ParisTech, some being made outside the lab (in particular, those at Eurecom).

In the recent years, the Lab payed attention to the way its scientific production impacts the scientific literature. This attention is expressed from one side by an active incitation to publish in the best journals, and from the other by imposing a fixed referencing of the Lab in every publication. As a result, the average reference to our work is steadily increasing as expressed in Table 1.8.

	2005	2006	2007	2008	2009	Total
Journals	118	165	191	190	60	724
Peer reviewed conferences with proceedings	355	355	457	386	103	1656
Books	5	8	10	16	5	44
Edition of Proceedings or a Collection of Papers	21	15	27	16	7	86
Parts or Chapters of a Book	8	23	20	24	20	103
Theses	59	55	50	76	38	271
Patents	4	4	6	15	9	38
Proposition to normalisation	4	15	7	10	9	45

Table 1.6: Scientific production in the last five years (year 2009 ends at 1 July).

Dept	Team	Scientific diffusion						contracts in k€			
		defended PhD	defended HdR	Journals	conferences	books & chapters	patents & softwares	public	private	Europe	total
TSI	AAO	18	2	58	136	10	2	560	755	356	1671
	MM	16	2	42	135	15	3	1778	833	1322	3933
	TII	37	1	86	302	26	1	2705	662	97	3464
	STA	19	3	105	140	1	2	822	497	7	1326
	total	90	8	291	713	52	8	5865	2747	1782	10394
INFRES	MIC2	7	1	77	62	15	1	318	71	585	974
	RMS	26	3	45	273	19	9	1700	1600	1700	5000
	IC2/S3	11	1	33	273	32	4	852	793	449	2094
	total	44	5	155	608	66	14	2870	2464	2734	8068
COMELEC	GTO	22		73	101	1	2	808	512	120	1440
	COMNUM	22	1	44	98	3	10	377	512	95	984
	ELECRF	19	2	25	125	3	9	799	420	38	1257
	SEN	7	1	19	86	3	13	2747	458	164	3369
	total	70	4	161	410	10	34	4731	1902	417	7050
SES	total	7	3	145	72	60		1715	2748	196	4659
Total		211	20	752	1803	188	56	15181	9861	5129	30171

Table 1.7: Distribution of the scientific production in the different teams and departments. The figures are the sums over the 4.5 years of reference.

1.4.2 Research Contracts and Technology Transfer

The school has an important contractual activity. For instance, in 2008, 91 new contracts have been signed 57 of which are bilateral[7] (22 of which are for PhD students) and 34 are contracts with public administrations (ANR, Clusters, FUI[8], Region) or European. The financial support obtained by the contracts in 2008 amounts at 8.26 Meuros (16 % for European, 37 % for public and 47 % for bilateral). It must be pointed out that in recent years this last ratio is fastly growing. Table 1.5 presents the consolidated figures of the last five years. After an important growth in 2006 and 2007, our contracted ressources are now more stable.

European Projects

Mid 2009, we are partners of 30 FP6 European projects, for a cumulated amount of 6,2 Meuros, distributed in: 13 Networks of Excellence, (one of which we are prime), 6 Integrated Projects, 4 STREPs, 5 Coordination Actions, 1 Specific Support Action et 1 Marie Curie Fellowship. We are involved in 10 of the Call 1 and 2 FPT7 program (for 3 Meuros). Figure 1.1 displays the distribution of resources in the 5 last years.

ANR (National Research Agency)

We participated with 62 answers to the 2009 ANR Calls, 21 of which have been selected for a total (provisional) amount of 4 Meuros. Among them, 3 supported by program VERSO, 6 by

[7] bilateral contract = direct contract with a company
[8] FUI = "Fonds Unique Interministériel"

date	nunber of h-index ≥ 10	maximum h-index	average of 10 best h-index
December 2007	27	32	19.6
July 2009	50	35	25.4

Table 1.8: Evolution of the impact of our publications as expressed in Google Scholar. This table presents the number of scientists from our lab, whose h-index is greater or equal to 10, the highest h-index, and the average of the top 10 h-index.

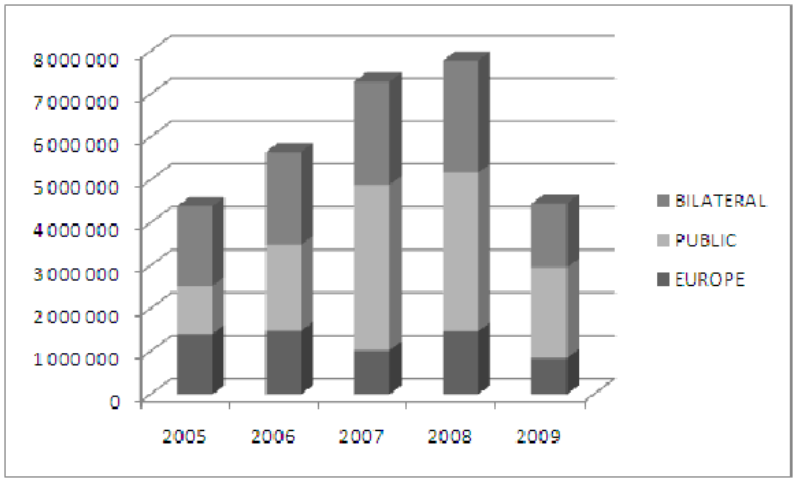

Figure 1.1: Distribution of resources on time.

CONTINT, 2 by ARPEGE, 7 Non-Thematic, 2 for Young Researchers and 1 International Junior Chair.

French Clusters ("Pôles de Compétitivité")

As an engineering school and part of Institut Télécom, Télécom ParisTech plays an important role in the French Clusters. Well armed in software engineering, networks, embedded systems, it was a partner of *System@tic* in Ile de France and of *Solutions Communicantes Sécurisées* in the Provence Côte d'Azur. It contributed to the emergence of *Cap Digital* in the field of Multimedia, games, data management and usages in Ile de France too, where it participates to its management. It also conducts actions in several other clusters (as for instance *Transactions Economiques Sécurisées* in Normandy) as shown in Table 1.9.

Cluster	Region	Number of awarded projects	Financial supports (Meuros)
System@tic	Ile de France	11	2,46
Cap Digital	Ile de France	11	4,72
SCS	PACA	2	0,45
TES	Normandy	2	0,42
Medicen-Santé	Ile de France	1	0,19
Aerospace Valley	Midi-Pyrénées	1	0,12
Total		28	8,37

Table 1.9: Participations to French Clusters (*Pôles de Compétitivité*).

1.4.3 Joint Scientific Activities

Joint scientific activities are carried out essentially within the separate departments in the inhouse seminars that they organize, on a regular basis or from time to time depending on those outside visitors who can attend. These seminars are often open to colleagues in other laboratories in Paris working in the same or related fields.

There are currently active seminars in the following fields:

- seminar in analog and mixed integrated systems,
- the ”Monday workshop” in sociology and information and communication sciences,
- mathematics seminar for those working in Computer Science and Networks,
- seminar in medical imagery and fuzzy logic,
- seminar in encoding and video compression,
- seminar in synthetic aperture radar image processing,
- seminar on information theory and statistics,
- the ”Business Intelligence” seminar of BILab,
- seminar on audio signal processing,
- seminar on perception, indexing and learning
- introductory seminar to a quantum treatment of information,
- interdisciplinary research seminar in management, social sciences and the sciences of information technology,
- seminar in digital communications,
- a seminar in economics and management.

Research teams from Télécom ParisTech participate very actively in the following seminars held in Paris and the Paris area:

- the Paris seminar in statistics
- the Machine Learning reading group of ParisTech (along with ENS)
- the LEOS (Laser and Electro-Optics Society) of the IEEE France chapter
- the MeFoSyLoMa (”Méthodes Formelles pour Les Systèmes Logiciels et Matériels” = Formal Methods for Logical Systems and Materials) with the CNAM, IBISC, LIP6 and Lamsade,
- the Quantum Information in Paris ”QuPa” seminar with ENS, Paris 7, LRI, IOGS.

Télécom ParisTech is also one of the favourite meeting places for the GdR ”Groupement de recherche” (research group) ISIS (Information, Signal and Images) which holds more than 20 meetings a year here, meetings at which our researchers play a very active part.

Lectures in scientific or general areas are regularly organized at Télécom ParisTech and are open to all our teachers and research staff, to our doctoral students and students in general[9].

Lastly, Télécom ParisTech as a laboratory of the CNRS has an annual general meeting at which new members of the staff are introduced.

[9] Among the prestigious speakers we have received: Benoît Mandelbrot, Jacques Attali, Pascal Lamy, Claude Berrou, Joseph Stiglitz, Charles Benett, Michael Leyton, etc.

1.4.4 Partnerships

Member Schools of the Institut Télécom

Within the network that makes up the Institut Télécom, Télécom ParisTech is a privileged partner of our sister schools of Evry, Brest and Sophia-Antipolis. This often takes the concrete form of collaborative activities on European projects or within the "ANR". As members of the same Institut Carnot, the sister schools make joint proposals to the business partners that are members of the Fondation Télécom: Orange, SFR, Alcatel-Lucent and BNP-Parisbas most notably.

With the arrival of associate schools within the Institut Télécom, Télécom ParisTech has extended its partnerships, most notably with the ENSPS in Strasbourg (particularly in the field of medical robotics) and with Télécom Saint Etienne.

ParisTech as a "PRES"

Télécom Paris Tech is an active (and founding) member of the PRES ParisTech[10], which is made up of 12 "grandes écoles" in the region of "Ile-de-France". With a potential in teaching and in research very much like that of a technological university, possessing as well resources in economics and management, ParisTech coordinates the actions of its constituent institutions, among other things in the field of doctoral studies and research activities. ParisTech constitutes most notably a means for providing coordinated responses to the KIC (Knowledge Innovation Communities) of Europe. ParisTech has proposed major projects in themes that are transversal within member institutions (energy, the environment, etc.). In this respect, Télécom ParisTech is responsible for activities in the field of information science and technology. It also participates to programs in Economy (PIMREP project: ParisTech Innovation Management Research and Education Programme launched in June 2008), in bio-engineering (with University Paris 5) and in Machine Learning (with ENS Ulm).

The GIS: e-Sys and PariStic

Télécom ParisTech is a founding member of two GIS[11] with an active regional role.

There is, first of all, the **GIS PariStic**, in partnership with the LIP6 (Pierre et Marie Curie University) and the CNRS. This GIS unites more than 300 permanent researchers and teachers working in Paris in the the fields of computer science, networks, information processing and multimedia, and about 400 thesis students. The GIS PariStic has been the opportunity for a huge number of collaborative activities ranging from teaching to advanced research. The GIS PariStic has made it possible to draw together in shared projects the personnel of member institutions and the financial support that they provided and to present a united approach to information and communication sciences and technologies in the Ile-de-France region[12]. PariStic is deeply involved in the Cap Digital cluster that both laboratories helped to create.

Télécom ParisTech is also a member of the **GIS eSys**[13] created to favour collaborative efforts between teams working in electronical systems[14]. eSys' scientific domain is devoted to hybrid electronics system conception and microsystems in order to feel the gap from sensors to actuators, with an internal stage of smart digital decision. This GIS is developing in narrow collaboration with the System@tic cluster taking advantage of its exceptional industrial IT context (Thales, NXP, EdF, Schlumberger, TI).

[10] site of ParisTech: http://www.paristech.fr/en/index.html
[11] GIS = "Groupements d'intérêt scientifique", scientific interest groups
[12] site of GIS PariStic: http://www.gis-paristic.fr/
[13] aside with Supélec, Esiee, Isep and the University Paris Sud
[14] site of GIS eSys: http://www.esys.fr/

Long Term Collaborations

In several fields, Télécom ParisTech, in order to establish stronger collaborations with its most faithful partners, has built joint labs or chairs which are guaranteeing living exchanges on a period from 3 to 5 years. The present agreed collaborations are shown in Table 1.10, two or three more being yet to be signed.

Name	Academic Partners	Companies
ComNum joint lab in digital communications		Altran
BILab, Business Intelligence Lab	INRIA	EDF & Orange
Chaire Economie des Médias et des Marques	Ecole des Mines ParisTech	Vivendi
Chaire Innovation & Régulation	Polytechnique	Orange
Chaire TIC et développement durable	Télécom & Mangt SudParis	Orange & CDC
CoC Centre of Competence		CNES & DLR
Wave-Human Interaction & Telecom Interface	Télécom Bretagne	Orange
UbiMedia Lab	Institut Télécom	Alcatel-Lucent

Table 1.10: Long term collaborations with industrial partners or agencies: CoC is the Center Of Competence on Information Extraction and Image Understanding for Earth Observation. It is both a chair and a lab. DLR is the "Deutsches Zentrum für Luft- und Raumfahrt" i.e. the German Aerospace Center. Ubi Media Lab is a joint lab dedicated to the development of the next generation medias.

1.4.5 Recent Remarkable Results

In June 2009, Clément Genzmer, prepared by Pierre Senellart, wins the SIGMOD/Pods First Annual Programming Contest.

In January 2009, a joint laboratory is created by Alcatel-Lucent and Institut Télécom, on Multimedia over the Net. Télécom ParisTech plays an important role in this Lab.

In December 2008, Isabelle Bloch, received the Blondel Medal from SEE, for her original work on mathematical morphology, fuzzy sets, data fusion, spatial reasonning and brain imaging.

In October 2008, inauguration of the COM'NUM joint laboratory between Altran and Télécom ParisTech

In April 2008, the European Bugyo project, dedicated to secure platforms for e-business, received the Excellence Award from the Eureka CELTIC Agency for outstanding performance and excellent results.

In December 2007, Ghaya Rekaya-Ben Othman received the Young Woman Scientist Award from the Ville de Paris for her contribution to the invention of Golden Codes.

In December 2007, Jean-Claude Belfiore, received the Blondel Medal from SEE, for his contribution to digital communications, information theory and error-correcting codes.

In August 2007, was created the EDF - Télécom ParisTech BiLAB (Business Intelligence Laboratory), joint laboratory devoted to the management of large flow of data issued from warehouses.

In October 2007, Lucille Denoeud-Belgacem received the Simon-Régnier Prize from the French Classification Society for her work on distance defined over partitions of a finite set.

In October 2007 was inaugurated the TélécomParisTech - Polytechnique - FranceTelecom Chair on *Innovation and Regulation of Digital Services*.

In December 2005, Jean-Sébastien Lantz received the Turgot Prize for the Best 2005 book on Financial Economy.

in June 2005, creation of the CNES - DLR - Télécom ParisTech Centre of Competence and Chair on *Information Extraction and Image Understanding for Earth Observation*.

1.5 An Overview on Research

1.5.1 In the Departments

As said before, research is mostly done within the departments. Departments being in charge of both research and education are designed to cover four broad thematic fields without too much overlap. The thematic research provided by departments will be presented in details in the rest of this report. It is distributed in the following way.

Communication and Electronics: COMELEC

This department is dedicated to a domain going from Applied Physics to Electrical Engineering. A part of its developments is based on laboratory experiments either made in its own laboratories or in partners' facilities. Physics is concerned with microwaves, antenna, propagation, opto-electronics, guided optical systems, optical devices and quantum cryptography. An important part of its research is devoted to the conception of electronic devices and systems, in analogical, digital or hybrid technologies, systems on chips, software radio and nano-technolgy. Its favourite constraints are for low energy devices, secure architectures, efficient packaging and of course with high bit rates. It also has a long research tradition in information and coding theories.

The COMELEC department consists of four teams:

- digital communications (COMNUM),
- complex digital electronic systems (SEN),
- electronics and radio frequencies systems (ELECRF),
- optical communication systems (GTO).

Computer Science and Networks: INFRES

The Computer Science and Networks department covers fields from software and system engineering (component modelling, middleware, reconfigurability, adaptability) to network technologies (internet, optical networks, administration, traffic modelling, QoS) and from artificial intelligence (natural languages processing, databases, semantic web) to security (critical infrastructure protection, quantic networks, ad hoc and active network security, privacy, cryptology, PKIs, protection of services).

Its presentation is structured around three teams:

- interaction, cognition and complexity, systems, software and services (IC2&S3),
- mathematics of information, communications and computation (MIC2),
- optical network, mobility and security (RMS).

Economics and Social Sciences: SES

This department is the last one created to cover the various fields of humanities, social sciences and management related to high technologies. The domains of interest are related to industrial economics of information systems, analysis of competition in leading edge industries, critical studies of interpersonal communication models and analysis of situations and strategies in communication.

This department is presented as one team only, with three main directions of research:

- regulation and innovation,
- industry evolution and cultural creation,
- interaction, technology and activity.

Signal And Image Processing: TSI

This department is mostly concerned with processing the new medias: audio signals (with a specific interest to music), biomedical signals, images (mostly for remote sensing, medical and cultural heritage applications), graphics and video. It also pays attention to the statistical aspects of signal processing, to machine learning and to signal and image modelling.

The TSI department consists of four teams:

- audio, acoustical and optical waves (AAO),
- multimedia (MM),
- statistics and applications (STA)
- image processing and interpretation (TII).

1.5.2 Multidisciplinary

Apart from the disciplinary research, Télécom ParisTech also develops an important activity in the transdisciplinary domains, activity which, by nature will not be so much evidenced in the next chapters written team by team. Therefore a brief presentation is made here emphasizing the active exchanges between the departments, and underlining existing links.

Pervasive Digital Life

The role of computer technologies in the society is growing in a seemingly unbounded way thanks to the impressive progress of networking, mobile communications, protocols and middlewares. But the contribution of technological components (antennas, RFID, contactless connexions, sensors and actuators, . . .) should not be underestimated when evaluating the progress of the *Internet of things*. In this domain, a continuity of research may be found in the INFRES and COMELEC departments, and these two departments share with TSI a similar interest for the field of multisensor networking which obviously links together the various *smart* objects and guarantees their inter-operability.

Moreover, the SES department is interested in analyzing the acceptability of these pervasive technologies in a society which is more and more aware of ethics, health and welfare. As a consequence of interdepartemental discussions, Télécom ParisTech is proposing solutions in the public's best interest, even if those solutions oppose technological progresses.

Security

Here again exists a continuity of actions between the COMELEC department (the research of which is strongly focussed on the security of devices and components) and the INFRES departement which is concerned with cryptography, protocols, networks and infrastructure safety. The physical aspects of security are taken into account with thermal and electromagnetic manifestations of computing (the so called *hidden-channel effects*) for smart cards, processors and devices in the COMELEC/SEN team, while privacy, cryptology, PKIs, authentication and protection of services are the core research of the INFRES/RMS team. TSI department intervenes when biometry as well as when watermarking (with audio signals, images, video or objects) are concerned. Again the SES department is an unreplaceable partner because privacy and security are major components of the business model of any novel technology entering the market.

Quantum Communication

Because they are based on the physical foundations of quantum information, quantum communications are treated at Télécom ParisTech by the two departments who maintain optical facilities: COMELEC and TSI. Because of the specific problem of elaborating a protocol competing with usual cryptographic approaches, they are also developed in INFRES department. Collaborations between teams are intense and diverse going to models of bipartite or multipartite links, to the construction of memories, establishment of protocols, construction of specific quantum codes on networks.

Data Management in the Knowledge Society

Information management systems are developed both in INFRES department where their connexions with data bases and with knowledge representation are exploited, and in TSI department where machine learning mechanisms are applied in narrow relationship with media processing: analysis and description of audio-signal, images or video. Here again comes the SES department, concerned with efficient interactions, ergonomy and user-centered developments.

Part I

Communications and Electronics

Communications and Electronics (COMELEC)

The research led in the **Communications and Electronics** department is devoted to the physical layer of ICT (Information and Communication technology). A useful concept for depicting the department main research concern is that of "physical information", where the information content is actually reached through some physical properties and manipulated using physical laws such as Maxwell electromagnetic equations or Quantum Hamiltonians. The department covers both the field of communication and that of information processing (electronics).

The department accounts for 36 permanent research staff and hosts about 90 non permanent researchers, including PhD students. The research activity is covered by four different teams. While fixed communications are dealt with by the **Optical communication group**, the **Electronics and RF systems team** concentrate on the transformation from analog to digital information and to its transmission through wireless means. The **Digital communications team** works on the digital coding of the information, and prepare for the future digital communication breakthrough in MIMO system, multi-hop communications or multi-users wireless communications. Processing information requires extremely sophisticated Silicon chips (processors, FPGAs, SOCs), the architecture of which is central to the **Complex Digital Electronics system team**. Transverse to all these activities, one may also find security as a main topic.

The department research policy claims for a research effort that spreads from fundamental physics to applied results. One may for example note the use of quantum dots for optical clock recovery (see the optical communication team) or that of photonic crystal (also called metamaterial) for advanced antennas (Electronics and RF Systems team). The balance between exploratory research and market oriented results is well expressed by the 1:4 ratio between our private partners funding and our total research contract income (7 Meuros cumulated over the period). Because of an innovation minded research taking its roots in fundamental theories, the department was granted 29 patents while publishing over 550 papers in journals and conferences in the evaluation period.

The department is also strongly involved in educating students for research. This is reflected by the 70 defended PhD thesis over the period. A budget of about 75 keuros is also spent yearly for master student internships in the department research groups, with a total of about 150 man.month of internship generated every year. Besides its contribution to the "ingenieur courses" of TELECOM ParisTech, the department researcher's participate to master courses with ParisVI, ParisXI, as well with the University of Nice.

In terms of outreach, the department was strongly involved in a number of initiatives both at local, national and international levels. Among other actions, one may notice the Electronics and RF systems team involvement in the creation of the GIS Esys "Groupement pour l'Electronique des Systèmes" led by Supelec. The Complex Digital Electronics system team initiated the Sophia-Antipolis Formal Analysis group SAFA and recently animated its first workshop. The Electronics and RF systems team was also a recognized actor in the launching of the joint IEEE NewcasTAISA conference. Of interest, a world open contest on electronics attacks was launched by the Complex Digital Electronics system team at the CHESS meeting. In order to help for a better European visibility, the department head created and chaired the IDEA League (Imperial College,

Delft University, Eth Zurich, Aachen RWTH) ICT cluster. As an international impact indicator, the department teams are currently involved into two European STREPS, three European NOE's, one Eureka program and lead a Carnot-Fraunhofer project.

Faculty [IT, CNRS]	[29.75, 2.75]
PhD students	48.5
Post-docs, engineers and sabbaticals	10.75
Defended PhD theses	70
Defended HDR	4
Journal papers [published, in press]	[143, 18]
Papers in conference proceedings	410
Chapters and books	10
Patents and software	[29, 5]
Grants [public, private, european] (k€)	[4731, 1902, 417]

Chapter 2

Digital Communications (COMNUM)

Team leader Jean-Claude Belfiore (P).

Faculty

Jean-Claude Belfiore (P), Joseph Boutros (MC, –07/07), Philippe Ciblat (MC), Walid Hachem (CR CNRS), Ghaya Rekaya-Ben Othman (MC), Olivier Rioul (MC), Georges Rodriguez (MC), Aslan Tchamkerten (MC, 09/08–).

PhD students

H. Dubreil (01/02–06/05), A. Cipriano (01/02–07/05), S. Calvanese (05/02–12/05), E. Jandot Dit Danjou (10/02–12/06), G. Kraidy (10/02–09/07), A. Ghaith (11/02–06/06), S. Chtourou (11/02–03/07), A. Le Poupon (11/02–11/05), A.L. Deleuze (12/02–02/06), F. Kharrat (12/02–10/06), A. Zaidi (12/02–12/05), M. Muck (01/03–05/06), S. Dubouloz (10/03–06/08), C. Abou Rjeily (10/03–10/06), I. Andriyanova (11/03–12/06), M. Tlich (11/03–06/06), A. Alloum (12/03–09/08), S. Yang (10/04–11/07), M. Sarkiss (12/04–02/09), A. Mahmood (01/05–07/08), R. Ourtany (01/06–12/08), M. Pischella (03/06–03/09), C. Hucher (01/06–), K.K. Patel (07/06–), M. Badr (09/06–), E. Bouton (09/06–), R. Ayadi (10/06–), L. Mroueh (10/06–), A. Salah (10/06–), A. Bouzegi (11/06,–), A. Le Duc (01/07–), M. Nahas (09/07–), C. Abgrall (02/08–), A. Osmane (10/08–), C. Valencia Cordero (10/08–), C. Aki (11/08–), M. Plainchault (11/08–).

Post-docs and engineers

E. Calvanese Strinati (05/05–12/05), I. Krikidis (02/06–12/06), A. Klein (02/06–12/06), F. Kharrat (09/07–10/08), L. Luzzi (10/07–), M. Sarkiss (02/09–).

Sabbaticals

M. Burnashev (Russian Academy of Sciences;03/09–04/09),
M. Ghogho (Univ. of Leeds;09/08–10/08).

External collaborators

E. Viterbo (Univ. of Calabria),
O. Damen (Univ. of Waterloo),
F. Oggier (EPFL).

Faculty [IT, CNRS]	[5.8, 0.7]
PhD students	13
Post-docs, engineers and sabbaticals	1.3
Defended PhD theses	22
Defended HDR	1
Journal papers [published, in press]	[38, 6]
Papers in conference proceedings	98
Chapters and books	3
Patents	10
Grants [public, private, european] (k€)	[377, 512, 95]

2.1 Objectives

The Digital Communication team is traditionaly working in what is called the physical layer of a network, that is, how to reliably transmit data from one point to another one. In order to achieve that, many techniques are used,

- Information theory to establish the fundamental limits of the system
- Signal processing to address problems related to synchronisation, channel estimation, modulation techniques such as OFDM or Ultra WideBand
- Channel Coding covering two aspects. One of them is the traditional channel coding with redundancy and the other one uses tools from number theory in order to find the right geometrical transforms that will give diversity in wireless systems.

During the last years many evolutions of this area have given rise to the study of a more complex problem than the point-to-point communication. It has started with the use of multiple antennas at both the transmitter and the receiver, the so-called MIMO systems.

Starting from this problem, many other ones appeared among which cooperative communications, multi-user communication systems or more generally, wireless networks. Many nodes in a wireless network want to communicate data to other nodes helped by a third group of nodes (through multihop communication). The digital communications team has followed this evolution by working on MIMO systems, on cooperative systems and on multi-user communications where we consider many data flows instead of a single one.

A last part is devoted to statistics for communication seen as a tool for analysis and for parameter estimation.

Notice that our research activities are always supported by national, european or industrial fundings. In addition to these activities, the team has an intense activity in terms of teaching for the Engineering school as well as for Research Masters. We especially are the leader for the Research Master, called ESCO/STN, in collaboration with Université Pierre et Marie Curie.

2.2 Main Results

The main research results obtained during the period 2005-2009 are presented below.

2.2.1 Coding and Decoding for MIMO Systems

Faculty J.-C. Belfiore, J. Boutros (–07/07), G. Rekaya - Ben Othman

Main events Organisation of NEWCOM Autumn School on "Space-Time Coding" which took place in Turin in 2006 with 25 attendees. Jean-Claude Belfiore was the recipient of "Médaille Blondel" in 2007 for the invention of "Golden Codes". Ghaya Rekaya Ben Othman was the recipient of "Jeune Chercheuse parisienne" award in 2006.

Projects ANR XCODES, CIFRE MITSUBISHI, CIFRE THOMSON

Space-Time Coding Space-Time coding techniques have been successful and widely used these last years. Some Space-Time codes have been integrated in several standards like the 3GPP (HSDPA), the Wifi (standard IEEE 802.11n) and Wimax (standard IEEE 802.16e). Our team is widely recognized in the world for its works on Space-Time codes. After the celebrated "Golden Code", proposed for 2 transmit antennas MIMO systems, we have extended this construction to a larger number of transmit antennas, using the fantastic tool of cyclic division algebras [148]. Thess new codes have been called "Perfect Codes" [36], and include the Golden Code as a special case. In the context of impulse Ultra WideBand (UWB), the complex envelope of the transmitted signals is real. We have developed real Space-Time codes adapted to the UWB context [3, 1, 5, 4]. A new space-Time code called the "Silver Code" has been recently proposed for the 2×2 MIMO channel. This code has a low decoding complexity compared to the Golden code. We have found the algebraic structure of this code (an ideal of an order of a cyclic division algebras) [118].

Variations on the Golden Code Space-Time codes were constructed to exploit all the degrees of freedom of the MIMO channel, in terms of diversity and multiplexing gain. In practical applications, these codes are concatenated with error correcting codes such as turbo-codes or LDPC. To analyze the performance of these codes in a practical context, we have studied the integration of the Golden Code in the MIMO-HSDPA [108] and in the WiFi 802.11n [101]. For the MIMO-HSDPA, it was proven that the Golden code offers the best performance compared to the best scheme having the same rate and the same diversity order. For the Wifi, the Golden code have almost the same performance as the other codes, this is explained by the high frequency diversity provided by the convolutional code compared to the diversity provided by Space-Time Code. We have also considered the case of correlated antennas at the emission side. The performance of the Golden code in this context are deteriorated. We have so proposed a linear precoder taken into account the correlation [122]. We have also studied the use of the Golden code and the 4×4 Perfect code in the case of very slow fading channel (channel constant during more than 50 time slots). We have proposed a partition of the Golden code and the 4×4 Perfect code function of the minimum determinant, and a coding and decoding scheme concatenating the Space-Time Code with Treillis codes [127, 23]. These partitions provide an important gain compared to the simple Golden Code. We was also interested to the use of the Golden code in the case of slow fading channel (channel constant during less than 50 time slot). We have propose in this case a coded modulation scheme combining the Reed-Solomon code and the Golden code that maximize the minimum determinant [33]. Very good performance was obtained compared to the simple Golden code.

MIMO Decoding Algorithms MIMO (even distributed) schemes with or without linear Space-Time codes have a lattice representation which allow their decoding using lattice decoders. The most known and used lattice decoders in the literature are the sphere decoder and the Schnorr-Euchner algorithm. Both decoders offer ML performance but have a complexity which dramatically increases with the lattice dimension and constellation size. We have studied the sequential algorithm called "stack decoder", which is a tree search algorithm under a cost function constraint, originally proposed in the literature to decode convolutional code. We have proposed a

new decoder, called "SB-stack", which uses the tree search strategy of the stack decoder (best first search strategy) and the search region of the sphere decoder (a sphere centered on the received signal). This new algorithm have ML performance, but is 30% less complex than the sphere decoder. By introducing a bias parameter (b) in the cost function, the SB-stack offers a range of performance going from ML ($b = 0$) to ZF-DFE ($b \to \infty$), with decreasing complexity. We also modified the SB-stack to get soft outputs, necessary if the Space-Time code is concatenated with channel coding. A patent on the SB-Stack has been registered [159]. In practical application, a variable decoding time could be a big problem, for example for real-time applications. To solve this problem we have proposed an adaptive decoding scheme, giving rise to another patent [158]. The idea of this adaptive decoding is to choose the most appropriate decoder (optimal or sub-optimal) as a function of the channel quality and the desired performance. We observed, through simulation results, that the decoding complexity remains constant for all channel realizations and for all signal to noise ratios.

Up to now, decoding of algebraic space-time codes has been performed using their lattice representation. The algebraic structure of the code has completely been ignored at the receiver side. We have been able to exploit the algebraic structure of the code even at the decoding side. We have proposed a new decoding method for 2×2 space-time codes constructed from quaternion algebras (like the Golden code) which directly exploits the multiplicative structure of the space-time code in addition to the lattice structure [120]. This method, called "algebraic reduction", consists in making the code absorbing most of the channel. This is done by approximating the channel matrix by a unit of a maximal order of the associated quaternion algebra. In the quaternionic case, the Swan algorithm can be used to find a finite set of generators of the unit group, by considering its action on the hyperbolic 3-space H_3. Supposing that this set is known, we develop a searching algorithm to find the best approximation of the channel matrix as a product of these generators. For the Golden Code case, simulation results show that using MMSE-GDFE left preprocessing, the performance of algebraic reduction with ZF decoding is within 3dB of the ML. However the complexity of the algebraic reduction is negligible compared to the ML decoder. A patent on this algebraic reduction has been registered [157].

2.2.2 Multihop Communications

Faculty J.-C. Belfiore, P. Ciblat, W. Hachem, G. Rekaya - Ben Othman

Main events Jean-Claude Belfiore was Technical Track Chairman for conference IEEE PIMRC in 2008. Jean-Claude Belfiore was Publications Chairman for conference IEEE ISIT in 2007.

Projects ANR RADIC-SF, ANR ORIANA, Pôle SYSTEMATIC/ URC Project, CRE FRANCE TELECOM, CIFRE FRANCE TELECOM

New Protocols for Relaying Schemes In the literature two main kinds of relaying protocols exist: Amplify-and-Forward (AF), and Decode-and-Forward (DF). Some other approaches, such as Dynamic DF (DDF) or Compress-and-Forward (CF), have been introduced in the literature, but we did not consider them in our work because of their high computational load. We remind that the relay only applies a linear operator on the receive signal before to re-transmit it in AF based protocols. In DF based protocols, the relay attemps to decode the data, and re-encodes them if data have been decoded. We have proposed two significant improvements to such protocols.

Amplify-and-forward cooperation is an attractive scheme probably because of its low relaying complexity and its nature of linearity. We have shown that it is indeed efficient and optimal in various scenarios as far as the diversity is concerned. Using the diversity-multiplexing tradeoff (DMT) as our evaluation tool, two scenarios are considered : the large network scenario and the small network scenario. In small networks, the non-orthogonal amplify-and-forward (NAF) scheme has been first studied. It has been generalized to the MIMO case, where upper and lower bounds on the DMT the NAF scheme have been derived [43]. The same NAF has been successfully used on UWB systems [6]. All the known half-duplex cooperation schemes, including

both the class of decode-and-forward and amplify-and-forward schemes, are inefficient in the high multiplexing gain regime. With multiple relays, we have shown that the diversity gain can be improved by letting as much the source signal as possible be forwarded by the relays. A simple sequential slotted amplify-and-forward scheme has been proposed [44]. It is shown that this scheme tends to the cut-set bound in some particular cases when the number of slots goes to infinity. The proposed AF cooperation schemes have equivalent MIMO or parallel MIMO channels representation. Both construction criterion and implementation of approximately universal codes have been developed [43, 138].

Concerning DF, we propose a half-duplex single-relay protocol called *Decode or Quantize and Forward* (DoQF). The added quantification step occurs when the relay did not succeed to decode its receive signal. Instead of being silent, the relay sends a quantized version of its receive signal to the destination. The new protocol has been analysed over slowly fading wireless channels. In this context, a relevant performance index is the so-called Diversity gain-Multiplexing gain Tradeoff (DMT). We proved that the DMT of the proposed DoQF relaying protocol, which is a static protocol characterized by a practical receiver structure, achieves the 2×1 Multiple Input Single Output (MISO) upperbound for small multiplexing gains. DoQF protocol thus outperforms the classical non orthogonal Decode-and-Forward (NDF) protocol in terms of DMT. To prove the benefit of the proposed method, we also derived the outage gain which is defined as follows: the term $\rho^2 P_o$ converges to a constant ξ when the SNR ρ tends to infinity and N represents the number of relays. This constant ξ will be referred to as the outage gain. We showed that the DoQF protocol is optimal in terms of outage gain in a wide class of half-duplex relaying protocols [58]. We also studied the outage probability behavior in the context of multi hop communications where the relays are not synchronized. AF as well as DF protocols were considered [105].

Power and Time Optimisation in Relaying Schemes In the context of cooperative wireless networks that convey data on slow fading channels, several protocols that define how the source the relays and the destination have to operate, have been proposed in the literature. One can mention, as already done above, AF, NAF, SAF (proposed by our team), DF, NDF, DoQF (proposed by our team), DDF, etc. When the channels realization are unknown at transmitter sides, these protocols have been extensively analysed in terms of DMT. Nevertheless DMT criterion does not provide insights about the total power distribution between the source and the relays since this criterion is insensitive to that distribution. Moreover each frame defined in any protocol is divided into several time slots. Often these time slots have equal durations for sake of simplicity. Our main contribution was to provide solutions to the optimization problem of power distribution and time slots durations. To do that, as DMT criterion is not efficient, we suggested to only focus on the outage probability P_{o} when the required data rate is fixed. However, it is often hard to derive a closed-form expression for P_{o} valid for any value of the Signal to Noise Ratio (SNR). The problem can be simplified by studying the behavior of P_{o} in the asymptotic regime where the SNR ρ converges to infinity. In this regime, usually $\rho^{N+1} P_{\mathrm{o}}$ converges to a constant ξ where N is the number of relays. We have proposed a simple and general method for deriving and minimizing ξ with respect to the power distribution between the source and the relays, and with respect to the time slots durations specified by the relaying protocol when transmitters only have a statistical knowledge of propagation channels. While the proposed approach is designed for the high SNR regime, we showed that outage probability is reduced in a similar proportion at moderate SNR. Notice that AF, NAF, DF, NDF, and DoQF have been handled. Moreover the method applies to a general class of radio channels that includes the Rayleigh and the Rice channels as particular cases. Last but not the least, we proved that ξ is convex with respect to the design parameters which leads to a simple optimization algorithm [22].

Analysis of Multi-Hop Communication Schemes Without Direct Link Notice that all previous works have done under the assumption that a link (even weak) exists between the source and the destination. When this assumption is not satisfied, a lot of previous works fall down, and a new analysis has to be done. In large networks, requiring the relay terminals to decode the source

message imposes a harsh constraint and limits the achievable multiplexing gain in general, especially when the source and the destination have multiple antennas. A naive amplify-and-forward scheme is space-only processing that achieves the maximum multiplexing gain but suffers from diversity loss. By introducing a simple temporal processing, a flip-and-forward scheme achieves both the maximum diversity and maximum multiplexing gain provided by the channel. It is the best known cooperative scheme in this scenario, in terms of the DMT [46].

2.2.3 Multi-User Communications

Faculty J.-C. Belfiore, P. Ciblat, W. Hachem, G. Rekaya - Ben Othman

Main events Philippe Ciblat served as Associate Editor for IEEE Communications Letters during the period 2004-2007.

Projects ANR RISC, CIFRE THALES, CIFRE MOTOROLA, CRE FRANCE TELECOM, Network of Excellence NEWCOM and NEWCOM++

Analysis of Impulse Radio UWB in Multi-User Environment In multi-user environment, the rake receiver for UWB modulated signals offers poor performance because of the multi-user interference which may be significant. One mean to reduce the level of multi-user interference is to design the multi-user codes properly. Therefore, we have focused intensively on the characterization of the "good" multi-user codes and of the "bad" multi-user codes in impulse radio UWB based on either time-hopping (TH) or direct sequence (DS) multiple access.

First of all, we showed that the multi-user interference assuming fixed multiple access codes can be well approximated by a Generalized-Gaussian Distribution whatever the multipath channel model. Then, thanks to this approximation, we derived an accurate closed-form expression for an approximation of the error probability in both TH and DS multiple access context. Note that the analytical expression for the error probability depends on the real multiple access code.

Secondly, from this error probability approximation, we were able to characterize and to select the set of codes minimizing the error probability for both multiple access techniques. Notice that the set of codes minimizing the power of the multi-user interference is an upperset of the set of codes minimizing the error probability. The merit of each multiple access technique has been then analyzed: we especially proved that the probability to find an optimal pair of codes goes to one when increasing the number of chips per symbol with TH technique whereas this probability goes to zero with DS technique. Therefore we advocated to employ TH technique rather than DS technique [92]. The study of a MIMO multiuser system has been proposed in [4].

Analysis of OFDMA Based Systems in Multi-Cell Environment In the context of Frequency-Hopping OFDMA with a frequency reuse factor equal to one, we have analysed the influence of the multi-cell interference on the performance for the downlink situation. We have assumed that the channel is unknown at the transmitter, but that the channel statistics are available. Furthermore, as frequency-hopping scheme is carried out, we have considered that the ergodic capacity was a accurate approximation of the achievable data rate. Firstly, under the assumption that the base stations combat the multi-cell interference by increasing their own power in order to satisfy the target data rate of their users, we have shown that it exists one power value for which the multi-cell system is stable if the target data rate are lower than a certain value playing the role of a "capacity". Moreover the subcarrier and power assignment per user has been optimized [16]. Secondly, to be more realistic and to satisfy the recommendation of Wimax forum, we then assumed that a certain part of the available bandwidth may be reused by different base stations (and is thus subject to multicell interference) and that an other part of the bandwidth is used by one base station only (and is thus "protected" from multicell interference). In such a context, we proved that all the subcarriers of one user will be either on the protected bandwidth or on the shared bandwidth. We thus proved that the naive idea of separating bandwidth into two classes

is optimal ! Thanks to an asymptotic analysis for which the number of users was considered to tend to infinity, we were also able to characterize the optimal frequency reuse factor in closed-form [95].

We have studied power and frequency allocation in a distributed OFDMA cellular context [38]. We have established a convergence criterion in the SISO case [37], which has been extended to the MIMO case [114], for rate constrained users. This study has been done for perfect Channel Side Information at transmitters (**CSIT**), but also for statistical CSIT, for which a new expression of the outage probability has been derived. Then, the case of Best efforts users has been considered, still for OFDMA distributed cellular networks. In the literature, only the case of the high SNR regime has been considered. We gave a new method for.

Resource Allocation in OFDMA Based Systems Multi-user systems based on OFDM are frequently used in powerline or quasi-static wideband wireless channels. Typical scenarios assume that precise channel state information can reasonably be obtained at the transmitter and at the receiver. In downlink, a spectral mask constraint is usually imposed too. In such previous context, we assumed two multiple access schemes, MC-DS-CDMA and a simpler OFDMA, and we have investigated their achievable-rate regions. In particular, we studied the so-called "balanced rate criterion", in order to select a point of the achievable-rate region which guarantees fairness among all the active users. We proposed simplified algorithms to calculate an approximate balanced rate solution for the OFDMA case. The loss of the OFDMA solution with respect to the MC-DS-CDMA solution is shown to be acceptable [68].

Analysis of Broadcast Channel and Multiple Access Channel for Slowly Varying Channels We have been the first to design space-time codes for the multiple access channel with non cooperative transmitters and no channel side information at the transmitters. These codes have been found, first for single antennas transmitters [53], and then they have been generalized to the case of multiple antenna transmitters [55]. These codes have been shown to achieve between 6-9 dBs gain compared to time sharing. There are based on number fields and show a non zero minimum determinant when considering all users in error. Finally, the Multiple Access codes have been extended to the case of the Multiple Access Relay Channel (**MARC**) [54].

2.2.4 Statistics for Communications

Faculty P. Ciblat, W. Hachem, A. Tchamkerten

Main events Organisation of NEWCOM Autumn School on "Estimation Theory for Wireless Communications" which took place in Paris in 2005 with 85 attendees. Walid Hachem and Philippe Ciblat have been Associate Editor for IEEE Transactions on Signal Processing since 2007 and 2008 respectively.

Projects ANR DEMAIN, CNRS/ACI MALCOM, CIFRE THALES, ANR SESAME, Royal Society fellowship

Optimal Training for Channel and Frequency Offset Estimation In the context of digital communications, in order to estimate the channel impulse response and also the Carrier Frequency Offset (CFO), a training sequence is sent periodically by the transmitter to the receiver. Of interest is the statistical description of the best training sequence and this can be done by minimizing the Cramer-Rao Bound (CRB). In this situation, most existing works proposed to average the CRB associated with the CFO over the channel statistics. But these works assumed that the channel components are independent and identical distributed (iid), which is a rather restrictive assumption. With this assumption, they established that the best training sequence is the pseudo-random white sequence. But, in practice, the iid hypothesis is often restrictive. We first

revisited the problem of training design for CFO estimation (considering correlated channel components) in the context of OFDM systems. In this situation, we unveiled the trade-offs that govern the optimum training sequence design, and showed that there exist training power profiles which are better than the uniform profile [17, 39]. We then addressed the more difficult problem of designing training sequence for joint estimation of the channel and the carrier frequency offsetjoint but in a single-carrier setting. Since in general the training sequence optimizing CFO estimation is not optimum for channel estimation, we have designed the training sequence that minimizes the Mean-Square Error on the soft estimates of the data symbols obtained using a Wiener equalizer after CFO compensation and averaged over channel statistics. We thus found an "optimal" training sequence, relevant for channel estimation and CFO estimation. Correlated and/or Ricean channel taps have been considered. We showed an significant gain on Bit Error Rate when using the proposed training scheme in lieu of white training [10].

System Recognition for Cognitive Radio In the context of cognitive/opportunistic radio, the signal central frequency does not characterize the used system any more since a system may choose its band in an opportunistic manner. In order to reduce latency, only short signal record has to be considered which may be unfortunately preamble-free. Therefore it is a crucial task to distinguish blindly various OFDM based systems (e.g., Wifi, Wimax, 3GPP/LTE, DVB-T) from each others. We have proposed two main approaches to fix the above-mentioned problem.

First of all, recognition algorithms can be based on the subcarrier spacing value, a quantity which is in general specific to a given OFDM system. Standard approaches rely on the detection of the cyclic prefix which directly provides subcarrier spacing value. Nevertheless these approaches fail when either the cyclic prefix duration is small or the channel impulse response is almost as large as the cyclic prefix. We have thus proposed four new subcarrier spacing estimation algorithms robust to short cyclic prefix and multipath channel [63, 61, 60, 62]. Secondly, we have presented two new OFDM system identification methods based on the structure (not the deterministic value) of the pilot tones. The first proposed scheme relies on the cyclostationarity property induced by the existing structure in time/frequency of the pilot tones. The second one is based on the characteristic of various maximum length sequences used to generate the pilot tones [129, 130].

Channel Estimation Performance for UWB Based Systems In the context of impulse radio UWB, we have addressed the CRB calculation for channel parameter estimation. We have considered a time-hopping code scheme with binary pulse position or pulse amplitude modulation formats. We derived in closed-form the (resp. modified) Cramer-Rao bound for the multipath channel parameters in the data-aided (resp. non-data-aided) context. Unlike existing methods, the calculations have been derived by taking into account the overlapping between signal echoes due to multipath. We showed that it is important to consider the overlapping assumption on realistic channel propagation environment since the Cramer-Rao bound using the non-overlapping assumption clearly overestimated the performance [11].

Tracking Stopping Times Through Noisy Observations Here we investigated a decision problem, the tracking stopping time (TST) problem, whose range of applications spans communication, detection, forecasting, quality control, and finance. The problem is stated as follows. Consider a sequence (X_i, Y_i) of pairs of random variables. At time i Alice observes X_i and Bob observes Y_i only. At a certain time that depends on her previously observed symbols, Alice makes a decision. The goal of Bob is to estimate at best Alice's decision time based only on his observations. In spite of the simplicity of its statement, the TST problem admits no general solutions. In collaboration with Marat Burnashev from the Russian Academy of Sciences in Moscow, we investigate decision time estimates that are provably close to optimal when the X and the Y sequences are highly correlated Brownian motions. Recent related results can be found in [35] and [106].

Large Random Matrix Theory and Wireless Communications The study of the spectral behavior of random matrices when both matrix dimensions converge to infinity at the same pace leads to a deeper understanding of the performance of MIMO systems, multi user receivers, and wireless radio networks. In this context, we studied the distribution of the eigenvalues of a class of large matrices with non centered and correlated entries, and based on this study we characterized the Shannon mutual information of a general class of Ricean correlated MIMO channels [19]. We also proposed an optimization technique for the transmitter covariance matrix in order to attain these channels Shannon's capacity [76]. We also studied the convergence behavior of the $\log\det$ functional (Shannon's mutual information of MIMO channels) [20, 21], as well as the Signal to Noise Ratio at the output of multi user receivers [26], mostly under the form of Central Limit Theorems. These theorems lead to pertinent outage probability approximations.

Performance Detection for Wireless Sensor Networks In the context of wireless randomly located sensor networks intended to detect a 1D or 2D signal (temperature, moisture, ...) often the detection error probability decreases exponentially in the number of sensors. The characterization of the error exponent leads to interesting guidelines as regards the optimum sensor distribution given a correlation structure of the field to be detected. Beginning with the 1D case (detecting a signal by performing a random sampling) we characterized these exponents when the continuous parameter signal is described by a class of scalar or vector stochastic differential equations. We are currently seeking to generalize these findings to the 2D case (detection of a random field).

2.3 References

2.3.1 ACL: Articles in ISI-Indexed Journals

[1] C. Abou Rjeily and J.-C. Belfiore. A Space-Time Coded MIMO TH-UWB Transceiver with Binary Pulse Position Modulation. *IEEE Communications letters*, 11(6):522–524, June 2007.

[2] C. Abou Rjeily, N. Daniele, and J.-C. Belfiore. Distributed algebraic space time codes for ultra wideband communications. *Kluwer special issue on cooperation in wireless networks*, Nov. 2006.

[3] C. Abou Rjeily, N. Daniele, and J.-C. Belfiore. A 2x2 antennas Ultra-Wideband system with biorthogonal pulse position modulation. *IEEE Communications Letters*, 10(5):366–368, May 2006.

[4] C. Abou Rjeily, N. Daniele, and J.-C. Belfiore. Space-time coding for multiuser Ultra-Wideband communications. *IEEE Transactions on Communications*, 54(11):1960–1972, Nov. 2006.

[5] C. Abou Rjeily, N. Daniele, and J.-C. Belfiore. On Space-Time coding with pulse position and amplitude modulations for time-hopping ultra-wideband systems. *IEEE Transactions on Information Theory*, 53(7):2490–2509, July 2007.

[6] C. Abou Rjeily, N. Daniele, and J.-C. Belfiore. On the amplify-and-forward cooperative diversity with time-hopping ultra-wideband communications. *IEEE Transactions on Communications*, 56(4):1–12, Apr. 2008.

[7] J.-C. Belfiore, G. Rekaya, and E. Viterbo. The golden code: a 2x2 full-rate space-time code with nonvanishing determinants. *IEEE Transactions on Information Theory*, 51(4):1432–1436, Apr. 2005.

[8] P. Ciblat and M. Ghogho. Blind NLLS carrier frequency-offset estimation for QAM, PSK, and PAM modulations : performance at low SNR. *IEEE Transactions on Communications*, 54(10):1725–1730, Oct. 2006.

[9] P. Ciblat, M. Ghogho, P. Larzabal, and P. Forster. Harmonic retrieval in the presence of non-circular gaussian multiplicative noise : Performance bounds. *Signal Processing (EURASIP)*, 85(4):737–749, Apr. 2005.

[10] P. Ciblat, P. Bianchi, and M. Ghogho. Training sequence optimization for joint channel and frequency offset estimation. *IEEE Transactions on Signal Processing*, 56(8):3424–3436, Aug. 2008.

[11] P. Ciblat, A.-L. Deleuze, and C. Le Martret. Cramer-Rao bound for Channel Estimation in UWB Impulse Radio. *EURASIP Signal Processing*, 88(4):924–933, Apr. 2008.

[12] J. Dumont, S. Lasaulce, W. Hachem, P. Loubaton, and J. Najim. On the capacity achieving covariance matrix for rician MIMO channels: An asymptotic approach. *IEEE Transactions on Information Theory*, (submitted), Nov. 2007.

[13] G. Feideropoulou, M. Trocan, J. E. Fowler, B. Pesquet-Popescu, and J.-C. Belfiore. Joint source-channel coding with partially coded index assignment for robust scalable video. *IEEE Signal Processing Letters*, 13(4):201–204, Apr. 2006.

[14] G. Feideropoulou, M. Trocan, J. E. Fowler, B. Pesquet-Popescu, and J.-C. Belfiore. Rotated constellations for video transmission over rayleigh fading channels. *IEEE Signal Processing Letters*, 14(9):629–632, Sept. 2007.

[15] S. Gault, W. Hachem, and P. Ciblat. Joint sampling clock offset and channel estimation for OFDM signals : Cramer-rao bound and algorithms. *IEEE Transactions on Signal Processing*, 54(5):1875–1885, May 2006.

[16] S. Gault, W. Hachem, and P. Ciblat. Performance of OFDMA on rayleigh fading channels in a multi-cell environment. *IEEE Transactions on Communications*, 55(4):740–751, Apr. 2007.
[17] M. Ghogho, P. Ciblat, A. Swami, and P. Bianchi. Training Design for Repetitive-Slot-based CFO estimation in OFDM. *IEEE Transactions on Signal Processing*, 2009. To appear.
[18] N. Gresset, J. J. Boutros, and L. Brunel. Multidimensional mappings for iteratively decoded BICM on multiple-antenna channels. *IEEE Transactions on Information Theory*, 51(9):3337–3346, Sept. 2005.
[19] W. Hachem, P. Loubaton, and J. Najim. Deterministic equivalents for certain functionals of large random matrices. *Annals of Applied Probability*, 17(3), 2007.
[20] W. Hachem, O. Khorunzhiy, P. Loubaton, J. Najim, and L. Pastur. A new approach for capacity analysis of large dimensional multi-antenna channels. *IEEE Transactions on Information Theory*, 54(9):3987–4004, Sept. 2008.
[21] W. Hachem, P. Loubaton, and J. Najim. A CLT for information theoretic statistics of gram random matrices with a given variance profile. *Annals of Applied Probability*, 18(6):2071–2130, 2008.
[22] W. Hachem, P. Bianchi, and P. Ciblat. Outage probability based power and time optimization for relay networks. *IEEE Transactions on Signal Processing*, 57(2):764–782, Feb. 2009.
[23] Y. Hong, E. Viterbo, and J.-C. Belfiore. Golden Space-Time trellis coded modulation. *IEEE Transactions on Information Theory*, 53(5):1689–1705, May 2007.
[24] C. Hucher, G. Rekaya-Ben Othman, and J.-C. Belfiore. How to solve the problem of bad performance of cooperative protocols at low SNR? *EURASIP Journal on Advances in Signal Processing.*, 2008, Jan. 2008.
[25] E. Jandot Dit Danjou and J.-C. Belfiore. A 2/spl times/2 antennas bluetooth system. *IEEE Communications Letters*, 9(9):784–786, Sept. 2005.
[26] A. Kammoun, M. Kharouf, W. Hachem, and J. Najim. BER and outage probability approximations for LMMSE detectors on correlated MIMO channels. *IEEE Transactions on Information Theory, accepted for publication*, 2008.
[27] I. Kammoun, A. M. Cipriano, and J.-C. Belfiore. Non coherent codes over the grassmannian. *IEEE Transactions on Wireless Communications*, 6(10):3657–3667, Oct. 2007.
[28] M. A. Khalighi and J. Boutros. Data-aided channel estimation for turbo PIC-MIMO detectors. *IEEE Communications Letters*, 2006.
[29] I. Krikidis and J.-C. Belfiore. Three scheduling schemes for amplify-and-forward relay environments. *IEEE Communications letters*, 11(5):414–416, May 2007.
[30] I. Krikidis and J.-C. Belfiore. Scheduling for amplify-and-forward cooperative networks. *IEEE Transactions on Vehicular Technology*, 56(6):3780–3790, Nov. 2007.
[31] C. Le Martret, A.-L. Deleuze, and P. Ciblat. Optimal time-hopping codes for multi-user interference mitigation in Ultra-Wide Bandwidth impulse radio. *IEEE Transactions on Wireless Communications*, 5(6):1516–1525, June 2006.
[32] A. Le Poupon and O. Rioul. An optimal algorithm for resource allocation with concave objective functions. *RAIRO Operations Research, EDP Sciences*, June 2007.
[33] L. Luzzi, G. Rekaya-Ben Othman, J.-C. Belfiore, and E. Viterbo. Golden space-time block coded modulation. *IEEE Transactions on Information Theory*, 55(2):584–595, Feb. 2009.
[34] B. Mouhouche, P. Loubaton, and W. Hachem. Asymptotic analysis of reduced-rank chip-level MMSE equalizers in the downlink of CDMA systems. *IEEE Transactions on Signal Processing*, 55(6):3048–3060, June 2007.
[35] U. Niesen and A. Tchamkerten. Tracking stopping times through noisy observations. *IEEE Transactions on Information Theory*, 55(1):422–432, Jan. 2009.
[36] F. Oggier, G. Rekaya, J.-C. Belfiore, and E. Viterbo. Perfect space time block codes. *IEEE Transactions on Information Theory*, 52(9):3885– 3902, Sept. 2006.
[37] M. Pischella and J.-C. Belfiore. Distributed resource allocation for rate-constrained users in multi-cell ofdma networks. *IEEE Communications Letters*, 12(4):250–252, Apr. 2008.
[38] M. Pischella and J.-C. Belfiore. Power Control in Distributed Cooperative OFDMA Cellular Networks. *IEEE Transactions on Wireless Communications*, June 2008.
[39] S. Sezginer, P. Bianchi, and W. Hachem. Asymptotic Cramér-Rao bounds and training design for MIMO-OFDMA uplink transmissions with frequency offset. *IEEE Transactions on Signal Processing*, 55(7, part II):3606 – 3622, July 2007.
[40] G. Shamir and J. Boutros. Non systematic low-density parity check codes for nonuninform sources. *IEEE International Symposium on Information Theory*, Sept. 2005.
[41] K. Shi, E. Serpedin, and P. Ciblat. Decision-directed fine synchronization in OFDM systems. *IEEE Transactions on Communications*, 53(3):408–412, Mar. 2005.
[42] A. Tchamkerten, V. Chandar, and G. Wornell. Communication under strong asynchronism. *IEEE Transactions on Information Theory*, Apr. 2009.
[43] S. Yang and J.-C. Belfiore. Optimal Space-Time codes for the MIMO Amplify-and-Forward cooperative channel. *IEEE Transactions on Information Theory*, 53(2):647–663, Feb. 2007.
[44] S. Yang and J.-C. Belfiore. Towards the optimal Amplify-and-Forward cooperative diversity scheme. *IEEE Transactions on Information Theory*, 53, Sept. 2007.

2.3.2 INV: Invited Talks

[45] J.-C. Belfiore, M. Badr, S. Yang, and G. Rekaya. DMT achieving distributed space time codes for the multiple access channel,. In *Asilomar Conference on Signals, Systems, and Computers, Invited Talk*, pages 810 – 813,

Monterey, CA, Oct. 2007.
[46] S. Yang and J.-C. Belfiore. (Distributed) Space-Time Codes for the MIMO Multihop Channel via Partitions of the Channel. In *IEEE Information Theory workshop, Invited Talk*, Bergen, Norway, July 2007.

2.3.3 ACTI: Articles in Proceedings of International Conferences

[47] R. Abdelfattah, O. Rioul, and P. Duhamel. Linear scalar quantization of wavelet image decomposition using joint optimization. In *12th IEEE Conference on Electronics, Circuits and Systems (ICECS'05)*, Gammarth, Tunisia, Dec. 2005.
[48] C. Abou Rjeily, N. Daniele, and J.-C. Belfiore. A new family of space-time codes for pulse amplitude and position modulated UWB systems. In *2006 IEEE International Symposium on Information Theory*, July 2006.
[49] C. Abou Rjeily, N. Daniele, and J.-C. Belfiore. A new full rate full diversity st code with nonvanishing determinant for th-uwb systems. In *2006 International Zurich Seminar on Communications*, pages 198 – 201, Mar. 2006.
[50] C. Abou Rjeily, N. Daniele, and J.-C. Belfiore. MIMO UWB communications using modified hermite pulses. In *2006 IEEE 17th International Symposium onPersonal, Indoor and Mobile Radio Communications*, Sept. 2006.
[51] C. Abou Rjeily, N. Daniele, and J.-C. Belfiore. Distributed space-time coding with ultra-wideband systems. In *2006 IEEE 17th International Symposium on Personal, Indoor and Mobile Radio Communications*, Sept. 2006.
[52] C. Abou Rjeily, N. Daniele, and J.-C. Belfiore. On the decode-and-forward cooperative diversity with coherent and non coherent UWB systems. In *IEEE International conference on Ultra-wideband*, 2006.
[53] M. Badr and J.-C. Belfiore. Distributed space-time block codes for the non cooperative multiple access channel. In *IEEE International Zurich Seminar on Communications, 2008*, pages 132 – 135, Zürich, Switzerland, Mar. 2008.
[54] M. Badr and J.-C. Belfiore. Distributed space time codes for the amplify-and-forward multiple-access relay channel. In *IEEE International Symposium on Information Theory*, pages 2543 – 2547, Toronto, Canada, July 2008.
[55] M. Badr and J.-C. Belfiore. Distributed space-time block codes for the mimo multiple access channel. In *IEEE International Symposium on Information Theory*, pages 2553 – 2557, Toronto, Canada, July 2008.
[56] M. Badr, E. Calvanese Strinati, and J.-C. Belfiore. Optimal power allocation for hybrid amplify-and-forward cooperative networks. In *IEEE Vehicular Technology Conference, VTC Spring 2008*, pages 2111 – 2115, Singapore, May 2008.
[57] P. Bianchi and P. Ciblat. Training sequence design for joint channel and frequency offset estimation with partial channel state information. In *IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, Helsinki, Finland, June 2007.
[58] P. Bianchi, P. Ciblat, and W. Hachem. Outage performance of a novel relaying protocol: Decode or Quantized and Forward. In *International Symposium on Information Theory and its Applications (ISITA)*, Auckland, New Zealand, Dec. 2008.
[59] J. Boutros, A. Alloum, and G. Shamir. Enhanced channel decoding via em source-channel estimation. In *2nd International Symposium on Communications, Control and Signal Processing*, Marrakech (Maroc), Mar. 2006.
[60] A. Bouzegzi, P. Ciblat, and P. Jallon. Maximum likelihood based method for intercarrier spacing characterization. In *IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC)*, Cannes, France, Sept. 2008.
[61] A. Bouzegzi, P. Ciblat, and P. Jallon. Matched filter based algorithm for blind recognition of OFDM systems. In *IEEE Vehicular Technology Conference (VTC)*, Calgary, Canada, Sept. 2008.
[62] A. Bouzegzi, P. Jallon, and P. Ciblat. A second order statistics based algorithm for blind recognition of OFDM based systems. In *IEEE Global Telecommunications Conference (GLOBECOM)*, New Orleans, USA, Nov. 2008.
[63] A. Bouzegzi, P. Jallon, and P. Ciblat. A fourth-order based algorithm for characterization of OFDM signals. In *IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, Recife, Brazil, July 2008.
[64] E. Calvanese Strinati, S. Yang, and J.-C. Belfiore. Adaptive modulation and coding for hybrid cooperative networks. In *IEEE International Conference on Communications, 2007. ICC '07*, pages 4191 – 4195, June 2007.
[65] D. Champion, J.-C. Belfiore, G. Rekaya, and E. Viterbo. Partitionning the golden code : A framework to the design of space-time coded modulation. In *Canadian Workshop on Information Theory*, Montreal, Canada, June 2005.
[66] P. Ciblat and M. Ghogho. Ziv-zakai bound for harmonic retrieval in multiplicative and additive gaussian noise. In *IEEE Workshop on Statistical Signal Processing (SSP'2005)*, Bordeaux (France), July 2005.
[67] P. Ciblat, P. Bianchi, and M. Ghogho. Optimal training for frequency offset estimation in correlated-rice frequency-selective channel. In *IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, Recife, Brazil, July 2008.
[68] A. Cipriano, P. Ciblat, S. Gault, and W. Hachem. Balanced allocation strategy in multi-user OFDM with channel state information at the transmitter. In *EURASIP European Signal Processing Conference (EUSIPCO)*, Florence, Italy, Sept. 2006.
[69] A. M. Cipriano, I. Kammoun, and J.-C. Belfiore. Simplified decoding for some non-coherent codes over the grassmannian. In *ICC 2005*, volume 2, pages 757–761, Seoul Corée, May 2005.
[70] A.-L. Deleuze, P. Ciblat, and C. Le Martret. Inter-symbol/inter-frame interference in time-hopping ultra wideband impulse radio system. In *IEEE International Conference on Ultra-Wideband (ICU'2005)*, Zürich (Suisse), Sept. 2005.
[71] A.-L. Deleuze, P. Ciblat, and C. Le Martret. Rake receiver improvement for residual interference cancellation in UWB context. In *IEEE Vehicular Technology Conference (VTC)*, Dublin, Irland, Apr. 2007.
[72] B. Denis, M. Pezzin, S. De Rivaz, S. Dubouloz, M. Sambuq, L. Ouvry, and G. Rodriguez. A ldr ir-uwb receiver architecture based on 1-bit direct sampling. In *IST Mobile Summit 2006*, June 2006.

[73] S. Dubouloz, M. Pelissier, B. Denis, M. Sambuq, L. Ouvry, and G. Rodriguez. Energy characteristics of uwb channel models applied to system design. In *IEEE International Conference on Ultra-Wideband*, Sept. 2005.
[74] S. Dubouloz, S. De Rivaz, M. Sambuq, L. Ouvry, and G. Rodriguez. Effects of hard decision on the detection of preambles for uwb non-coherent communications. In *IEEE International Conference on Ultra-Wideband*, 2006.
[75] S. Dubouloz, A. Rabbachin, B. Denis, S. De Rivaz, L. Ouvry, and G. Rodriguez. Performance analysis of low complexity solutions for uwb low data rate impulse radio. In *IEEE International Symposium on Circuits and Systems - ISCAS*, May 2006.
[76] J. Dumont, W. Hachem, S. Lasaulce, P. Loubaton, and J. Najim. High SNR approximations of the capacity of MIMO correlated rician channels: a large system approach. In *ISIT*, June 2007.
[77] S. Gault, W. Hachem, and P. Ciblat. An OFDMA based modem for powerline communications over the low voltage distribution network. In *IEEE International Conference on Powerline Communications and its Applications (ISPLC'2005)*, Vancouver (Canada), Apr. 2005.
[78] S. Gault, W. Hachem, and P. Ciblat. Performance of a resource allocation strategy for an FH-OFDMA based system in a multi-cell environment. In *IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, Cannes, France, July 2006.
[79] M. Ghogho, A. Swami, and P. Ciblat. Training design for CFO estimation in OFDM over correlated multipath fading channels. In *IEEE Global Telecommunications Conference (GLOBECOM)*, Washington, USA, Nov. 2007.
[80] W. Hachem, P. Bianchi, and P. Ciblat. Outage probability based power and time optimization for relay networks. In *IEEE Information Theory Workshop (ITW)*, Porto, Portugal, May 2008.
[81] W. Hachem, P. Loubaton, and J. Najim. On the fluctuations of the mutual information of large dimensional MIMO channels. In *ITW*, Mar. 2008.
[82] W. Hachem, E. Moulines, J. Najim, and F. Roueff. On the error exponents for detecting randomly sampled noisy diffusion processes. In *ICASSP*, Taipei, Taiwan, Apr. 2009.
[83] Y. Hong, E. Viterbo, and J.-C. Belfiore. High rate golden space-time trellis coded modulation. In *Fortieth Asilomar Conference on Signals, Systems and Computers*, pages 2087 – 2091, Oct. 2006.
[84] Y. Hong, E. Viterbo, and J.-C. Belfiore. A space-time block coded multiuser mimo downlink transmission scheme. In *2006 IEEE International Symposium on Information Theory*, July 2006.
[85] Q. Huang, M. Ghogho, J. Wei, and P. Ciblat. Time and frequency synchronization for OFDM based cooperative systems. In *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Taipei, Taiwan, Apr. 2009.
[86] C. Hucher, G. Rekaya-Ben Othman, and J.-C. Belfiore. Adaptive amplify-and-forward cooperative channel. In *International Symposium on Information Theory*, Nice, France, July 2007.
[87] C. Hucher, G. Rekaya-Ben Othman, and J.-C. Belfiore. AF and DF Protocols based on Alamouti ST Code. In *IEEE International Symposium on Information Theory*, Nice, France, July 2007.
[88] C. Hucher, G. Rekaya-Ben Othman, and A. Saadani. A new partial decode-and-forward protocol. In *IEEE Wireless Communications and Networking Conference*, Las Vegas, USA, Apr. 2008.
[89] C. Hucher, G. Rekaya-Ben Othman, and A. Saadani. New protocols for the cooperative mac. In *Asilomar Conference on Signals, Systems and Computers*, California, USA, Oct. 2008.
[90] A. Kammoun, M. Kharouf, W. Hachem, and J. Najim. Fluctuations of the SNR at the Wiener filter output for large dimensional signals. In *SPAWC*, Recife, Brazil, 2008.
[91] A. Kammoun, M. Kharouf, W. Hachem, and J. Najim. Outage probability approximation for the wiener filter SINR in MIMO systems. In *SPAWC*, Recife, Brazil, 2008.
[92] F. Kharrat-Kammoun, P. Ciblat, and C. Le Martret. Error probability approximation and codes selection in the presence of multi-user interference for IR-UWB. In *IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC)*, Cannes, France, Sept. 2008.
[93] M. Kobayashi, M. Debbah, and J.-C. Belfiore. Outage efficient strategies for network mimo with partial csit. In *2009 IEEE International Symposium on Information Theory*, Seoul, Korea, July 2009.
[94] G. Kraidy, N. Gresset, and J. Boutros. Information theoretical versus algebraic constructions of linear unitary prcoders for non-ergodic multiple antenna channels. In *Canadian Worshop on Information Theory*, Montreal Canada, June 2005.
[95] N. Ksairi, P. Bianchi, P. Ciblat, and W. Hachem. Optimal reuse factor and resource allocation for downlink OFDMA with multicell interference. In *Workshop on Signal Processing Advances for Wireless Communications (SPAWC)*, Recife, Brazil, July 2008.
[96] N. Ksairi, P. Bianchi, W. Hachem, and P. Ciblat. Resource allocation for downlink OFDMA 2D-cellular networks with partial frequency reuse. In *ISITA*, Auckland, New Zealand, 2008.
[97] A. Le Duc, P. Ciblat, and C. Le Martret. Closed-form expressions for Packet Error Rate and Efficiency in cross-layer HARQ schemes. In *IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, Perugia, Italy, June 2009.
[98] A. Le Poupon and O. Rioul. An optimal algorithm for resource allocation with concave cost functions. In *5th ALIO/EURO Conference on Combinatorial Optimization*, Paris, France, Oct. 2005.
[99] L. Luzzi, G. Rekaya-Ben Othman, J.-C. Belfiore, and E. Viterbo. Golden space-time block coded modulation. In *IEEE Workshop on Information Theory (ITW)*, Porto, Portugal, May 2008.
[100] A. Mahmood and J.-C. Belfiore. Improved 3-db subgroup based algorithm for optimal discrete bit-loading. In *2008 IEEE Sarnoff Symposium*, Apr. 2008.
[101] L. Mroueh, S. Rouquette-Léveil, G. Rekaya-Ben Othman, and J.-C. Belfiore. On the performance of the Golden code in BICM-MIMO and IEEE 802.11n cases. In *Asilomar Conference on Signals, Systems and Computers*, California, USA, Nov. 2007.

[102] L. Mroueh, M. O. Damen, S. Rouquette-Léveil, G. Rekaya-Ben Othman, and J.-C. Belfiore. Code construction for the selective tdma cooperative broadcast channel. In *IEEE International Symposium on Personal Indoor and Mobile Radio Communications (PIMRC)*, Cannes, France, Sept. 2008.

[103] L. Mroueh, S. Rouquette-Léveil, G. Rekaya-Ben Othman, and J.-C. Belfiore. Dmt of weighted parallel channels : Application to broadcast channels. In *IEEE International Symposium on Information Theory (ISIT),*, Toronto, Canada, July 2008.

[104] L. Mroueh, S. Rouquette-Léveil, G. Rekaya-Ben Othman, and J.-C. Belfiore. Dmt achieving schemes for the isotropic fading vector broadcast channel. In *IEEE International Symposium on Personal Indoor and Mobile Radio Communications (PIMRC)*, Cannes, France, Sept. 2008.

[105] M. Nahas, A. Saadani, and W. Hachem. On the outage probability of asynchronous wireless cooperative networks. In *VTC Fall*, 2008.

[106] U. Niesen and A. Tchamkerten. Detection of a stopping time through noisy observations. In *International Workshop on Sequential Methodologies*, June 2009.

[107] F. Oggier, P. Solé, and J.-C. Belfiore. Codes over m_2(f_2) and applications to golden space-time coded modulation. In *IEEE International Symposium on Information Theory*, Seoul, Korea, July 2009.

[108] R. Ouertani, A. Saadani, G. Rekaya-Ben Othman, and J.-C. Belfiore. On the Golden code performance for MIMO-HSDPA systems. In *IEEE Vehicular Technology Conference*, Montreal, Canada, Sept. 2006.

[109] R. Ouertani, G. Rekaya-Ben Othman, and A. Salah. The spherical bound stack decoder. In *IEEE International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob)*, Avignon, France, Oct. 2008.

[110] R. Ouertani, G. Rekaya-Ben Othman, and J.-C. Belfiore. An adaptive mimo decoder. In *Vehicular Technology Conference (VTC)*, Barcelone, Espagne, Apr. 2009.

[111] M. Pischella and J.-C. Belfiore. Optimal power allocation for downlink cooperative cellular networks. In *VTC-Spring*, 2007.

[112] M. Pischella and J.-C. Belfiore. Distributed weighted sum throughput maximization in multi-cell wireless networks. In *IEEE 19th International Symposium on Personal, Indoor and Mobile Radio Communications, 2008*, Cannes, France, Sept. 2008.

[113] M. Pischella and J.-C. Belfiore. Distributed weighted sum throughput maximization in multi-cell wireless networks. In *International Workshop on Cross-Layer Design*, Palma de Mallorca Spain, June 2009.

[114] M. Pischella and J.-C. Belfiore. Distributed resource allocation in mimo ofdma networks with statistical csit. In *IEEE International Workshop on Signal Processing Advances in Wireless Communications*, Perugia, Italy, June 2009.

[115] M. Pischella and J.-C. Belfiore. Optimal power allocation for downlink cooperative cellular networks. In *IEEE 65th Vehicular Technology Conference, 2007. VTC2007-Spring*, pages 2864 – 2868, Apr. 2007.

[116] M. Pischella and J.-C. Belfiore. Qos-based resource allocation with cooperative diversity in ofdma. In *IEEE Vehicular Technology Conference, VTC Spring 2008*, pages 1896 – 1900, Singapore, May 2008.

[117] M. Pischella and J.-C. Belfiore. Achieving a frequency reuse factor of 1 in ofdma cellular networks with cooperative communications. In *IEEE Vehicular Technology Conference, VTC Spring 2008*, pages 653 – 657, Singapore, May 2008.

[118] A. Ray, K. Vinodh, G. Rekaya-Ben Othman, and V. Kumar. Ideal structure of the silver code. In *IEEE International Symposium on Information Theory (ISIT)*, Seoul, Corée, June 2009.

[119] G. Rekaya, J.-C. Belfiore, and E. Viterbo. Rectangular algebraic space-time block codes. In *Canadian Workshop on Information Theory*, Montreal, Canada, June 2005.

[120] G. Rekaya-Ben Othman, L. Luzzi, and J.-C. Belfiore. Algebraic reduction for the golden code. In *IEEE International Conference on Communications (ICC)*, Dresden, Allemagne, June 2009.

[121] O. Rioul. A simple proof of the entropy-power inequality via properties of mutual information. In *IEEE International Symposium on Information Theory (ISIT 2007)*, pages 46–50, Nice, France, June 2007.

[122] A. Salah, A. Saadani, and G. Rekaya-Ben Othman. On the linear precoding of non-orthogonal STBC for MIMO systems. In *IEEE International Symposium on Personal Indoor and Mobile Radio Communications*, Athens, Greece, Sept. 2007.

[123] A. Salah, G. Rekaya-Ben Othman, R. Ouertani, and S. Guillouard. New soft stack decoder for mimo channel. In *Asilomar Conference on Signals, Systems and Computers*, California, USA, Oct. 2008.

[124] A. Salah, G. Rekaya-Ben Othman, and S. Guillouard. Parallel stack decoding for mimo schemes. In *IEEE Vehicular Technology Conference (VTC)*, Barcelone, Espagne, Apr. 2009.

[125] M. Sarkiss, J.-C. Belfiore, and Y. Yuan. Performance comparison of different golden code detectors. In *IEEE 18th International Symposium on Personal, Indoor and Mobile Radio Communications, 2007. PIMRC 2007*, Sept. 2007.

[126] M. Sarkiss, M. O. Damen, and J.-C. Belfiore. 2×2 delay-tolerant distributed space-time codes with non-vanishing determinants. In *IEEE 19th International Symposium on Personal, Indoor and Mobile Radio Communications, 2008*, Cannes, France, Sept. 2008.

[127] M. Sarkiss, G. Rekaya-Ben Othman, and J.-C. Belfiore. 4x4 perfect space-time code partition. In *Asilomar Conference on Signals, Systems and Computers*, California, USA, Oct. 2008.

[128] G. Shamir, L. Wang, and J. Boutros. High rate non systematic ldpc codes for nonuniform sources. In *4th International Symposium on Turbo Codes and Related Topics*, Munich, Allemagne, Apr. 2006.

[129] F.-X. Socheleau, S. Houcke, A. Aissa El Bey, and P. Ciblat. OFDM system identification based on m-sequence signature in cognitive radio context. In *IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC)*, Cannes, France, Sept. 2008.

[130] F.-X. Socheleau, P. Ciblat, and S. Houcke. OFDM system identification for cognitive radio based on pilot-induced cyclostationarity. In *IEEE Wireless Communications and Networking Conference (WCNC)*, Budapest, Hungary, Apr. 2009.
[131] A. Tchamkerten and G. Avoine. An efficient distance bounding rfid authentication protocol: Balancing false-acceptance rate and memory requirement. In *Information Security Conference*, Pisa, Italie, June 2009.
[132] S. Yang and J.-C. Belfiore. The impact of channel estimation error on the DPC region of the two-user gaussian broadcast channel. In *43rd Allerton Conference*, Allerton (IL) USA, Sept. 2005.
[133] S. Yang and J.-C. Belfiore. Optimal space-time codes for the amplify-and-forward cooperative channel. In *43rd Allerton Conference*, Allerton (IL) USA, Sept. 2005.
[134] S. Yang and J.-C. Belfiore. A novel two-relay three-slot amplify-and-forward cooperative scheme. In *40th Annual Conference on Information Sciences and Systems*, pages 1329 – 1334, Mar. 2006.
[135] S. Yang and J.-C. Belfiore. On slotted amplify-and-forward cooperative diversity schemes. In *2006 IEEE International Symposium on Information Theory,*, pages 2446 – 2450, July 2006.
[136] S. Yang and J.-C. Belfiore. On the diversity of rayleigh product channels. In *IEEE International Symposium on Information Theory, 2007. ISIT 2007*, pages 1276 – 1280, Nice, France, June 2007.
[137] S. Yang and J.-C. Belfiore. Optimal space-time codes for the mimo amplify-and-forward cooperative channel. In *2006 International Zurich Seminar on Communications*, pages 122 – 125, Mar. 2006.
[138] S. Yang, J.-C. Belfiore, and G. Rekaya-Ben Othman. Perfect Space-Time Block codes for parallel MIMO channels. In *IEEE International Symposium on Information Theory*, Seatle, USA, Sept. 2006.
[139] Z. Zhipeng and J.-C. Belfiore. Application of cooperative diversity in 802.11a ad-hoc networks. In *Proceedings of 16th International Conference onComputer Communications and Networks, 2007. ICCCN 2007*, pages 1016 – 1021, Aug. 2007.

2.3.4 ACTN: Articles in Proceedings of French Conferences

[140] P. Ciblat and P. Bianchi. Séquence d'apprentissage optimale pour l'estimation conjointe du canal et du résidu de fréquence. In *GRETSI*, Troyes, France, Sept. 2007.
[141] P. Ciblat and M. Ghogho. Probabilité de décrochement d'un estimateur autodidacte du résidu de porteuse. In *GRETSI*, Louvain-la-Neuve (Belgique), Sept. 2005.
[142] J. Dumont, W. Hachem, S. Lasaulce, P. Loubaton, and J. Najim. Quelques propriétés d'un approximant de l'information mutuelle des canaux MIMO de rice bi-corrélés. In *GRETSI*, Sept. 2007.
[143] W. Hachem, P. Loubaton, and J. Najim. Sur les fluctuations de l'information mutuelle des canaux MIMO de grandes dimensions. In *GRETSI*, Sept. 2007.
[144] A. Le Duc, C. Le Martret, P. Ciblat, and H. Labiod. Procédé de retransmission à redondance incrémentale adapté aux paquets IP fragmentés. In *GRETSI*, Troyes, France, Sept. 2007.

2.3.5 COM: Talks in Conferences Which Do Not Publish Proceedings

[145] J. Boutros. A tutorial on iterative probabilistic decoding and channel estimation. In *IAP Motion plenary meeting, Ghent university*, Ghent Belgium, June 2005.
[146] G. Shamir, J. Boutros, A. Alloum, and L. Wang. Non-systematic ldpc codes for redundant data. In *Inaugural Worshop for the Center of Information Theory and its applications, UCSD , and the Jacobs School of Engineering*, San Diego, California, Feb. 2006.

2.3.6 OS: Books and Book Chapters

[147] J.-C. Belfiore and A. M. Cipriano. Space-Time coding for non coherent channels. In H. Boelcskei, D. Gesbert, C. Papadias, and A. J. van der Veen, editors, *Space-Time Wireless Systems: From Array Processing to MIMO Communications*, chapter 10. Cambridge University Press, 2005.
[148] F. Oggier, J.-C. Belfiore, and E. Viterbo. *Cyclic Division Algebra: A tool for Space-Time Coding*. Foundations and Trends in Communications and Information theory, NowPublishers, Boston, MA (USA), 2007.
[149] O. Rioul. *Théorie de l'Information et du Codage*. Hermes Science - Lavoisier, Paris, 2007.

2.3.7 AP: Other Productions: Database, Registred Software, Registred Patent, . . .

[150] A. Bouzegzi, P. Jallon, and P. Ciblat. Méthode d'estimation aveugle de paramètres de modulation OFDM. (DD10194), 2008.
[151] A. Bouzegzi, P. Jallon, and P. Ciblat. Méthode d'estimation aveugle de paramètres de modulation OFDM selon un critère de maximum de vraisemblance. (DD10949), 2008.
[152] A. Bouzegzi, P. Jallon, and P. Ciblat. Méthode d'estimation aveugle de paramètres de signal OFDM par filtrage adapté. (DD10950), 2008.

[153] A. Bouzegzi, P. Jallon, and P. Ciblat. Méthode de détection et d'identification aveugle des signaux ofdm par recherches successives. (DD11099ST), Feb. 2009.
[154] P. Ciblat. Synchronisation et Allocation des ressources en télécommunications sans fil, HDR. Technical report, Université de Marne-la-Vallée, July 2007.
[155] A.-L. Deleuze, C. Le Martret, and P. Ciblat. Communication à accès multiple basée sur une couche physique ultra-large bande par impulsion. (WO/2007/090851), Feb. 2007.
[156] C. Hucher, G. Rekaya-Ben Othman, and A. Saadani. Codage spatio-temporel pour système coopératif. (0757576), Sept. 2007.
[157] G. Rekaya-Ben Othman, L. Luzzi, and J.-C. Belfiore. Procédé de décodage dun signal ayant subi un codage espace/temps avant émission, dans un système multi-antennaires, produit programme dordinateur et dispositif de décodage correspondant. (FR 08/55882), Sept. 2008.
[158] G. Rekaya-Ben Othman, R. Ouertani, and J.-C. Belfiore. Procédé de décodage d'un signal transmis dans un système multi-antennes, produit programme d'ordinateur et dispositif de décodage correspondants. (08/50690), Feb. 2008.
[159] G. Rekaya-Ben Othman, A. Salah, and S. Guillouard. Procédé de décodage d'un signal mettant en oeuvre une construction progressive d'un arbre de décodage, produit programme d'ordinateur et signal correspondants. (0852985), May 2008.

Chapter 3

Complex Digital Electronic Systems (SEN)

Team leaders J-L Danger (DE), R. Pacalet (DE).

Faculty

L. Apvrille (MC), R. Ameur-Boulifa (MC), S. Coudert (MC),
G. Duc (MC, 04/09–), T. Graba (MC, 10/07–), S. Guilley (MC, –11/08),
P. Hoogvorst (CR CNRS), P. Matherat (CR CNRS), Y. Mathieu (DE),
L. Alves De Barros Naviner(MC), A. Polti (IE).

PhD students

I. Krikidis (12/03–12/05), D. Cardoso De Sousa (10/03–12/06), S. Guilley (10/03–01/07)
S. Chaudhuri (11/05–12/08), W. Muhammad (10/05–12/08), D. Teixeira Franco (11/05–12/08),
S. Mekki (01/06–06/09), Z. Larabi (10/06–), L. Su (10/06–),
N. Muhammad (10/06–), C. Jaber (11/07–), N. Selmane (11/07–),
E. Amador (03/08–), D. Knorreck (07/08–), S. Bhasin (11/08–),
O. Meynard (11/08–), Y. Souissi (11/08–), P. Bernal (01/09–),
M. Nassar (01/09–), G. Pedroza (01/09–), J. Torras Flaquer (01/09–),
G. Barbu (02/09–), G. Gonzalvez Dos Santos (05/09–), J. Gonzalez (06/09–),
M. Slimani (06/09–).

Post-docs, engineers

M. El Harhar (–05/06), F. Khefelian (–05/06), L. Toli (–03/07),
C. LeDuc (04/06–08/07), M. Chevalier (01/07–09/07), V. Vong (01/07–02/08),
Y. Zhuang (01/07–02/08), Z. Zou (11/06–02/08) R. Rasheed (10/06–),
L. Sauvage (06/07–), D. Comalrena (05/07–), S. Cerdan (10/07–),
G. Letourneux (01/08–), F. Flament (06/08–), H. Gouiaa (06/09–),
S. Somasavady (06/09–)

Associate Researchers

H. Chabanne ((P) Chef du pôle Recherche Sécurité et Cryptographie, Sagem Sécurité, 12/08–),
S. Guilley ((MC) Corps Interministériel Des Mines, 12/08–)

Sabbaticals

N. Homma (Associate Professor, Tohoku University Japan, 06/09–),

Faculty [IT, CNRS]	[8.5 , 2]
PhD students	8
Post-docs, engineers and sabbaticals	5.5
Defended PhD theses	7
Defended HDR	1
Journal papers [published, in press]	[17, 2]
Papers in conference proceedings	86
Chapters and books	3
Patents and software	[9, 4]
Grants [public, private, european] (k€)	[2747, 458, 164]

3.1 Objectives

The "Complex Digital Electronic System" team research topics are oriented towards efficient design of digital electronic systems. The team's research is based on the development of new algorithms, new architectures and new methods taking into account recent and future integrated technologies evolutions. The objectives are closely linked to the study of cutting edge techniques which allows electronic designers to meet ever growing constraints like complexity management, reliability, consumption, speed, and flexibility. Application focus on wireless digital communications, multimedia processing and security (trusted computing hardware).

The team has regular research collaborations with well known companies of the area such has STMicroelectronics, NXP, Freescale, ST-Ericsson, CEA, Orange or TexasInstruments. Among the academic laboratories the most representative are the CNRS laboratories LIP6 (UMR7606), LIRMM (UMR5506), GIPSA-Lab (UMR5216) or TIMA (UMR51599). We are also highly involved in the CIM (Centre Intégré de Microélectronique) PACA regional framework and the SAME (Sophia Antipolis MicroElectronics) association, two very important academic-industrials French consortiums. In order to balance industrials concerns and advanced academic research, we increased during the two past years our effort for PhD supervision. We focused our research towards four main themes. Design methodologies are coverered by the **Design Space exploration and assisted refinement of integrated systems** theme. Architectures interaction whith technologies are covered by the **Optimal architectures for complex algorithms implementations** theme, with a recent growing activity on reliability. Specific architectures for wireless digital communication are handled by the **Software defined radio** theme with internal collaboration with other teams of Telecom-ParisTech. The **Trusted computed hardware** theme, aiming at protection of hardware for security, has started seven years ago. It has now reached a mature status, with national and international recognition, as stated by the sabbatical of Pr Homma (Tohoku University), and the association of industrial researcher H. Chabanne from Sagem.

Team members, located in the sites of Paris and Sophia-Antipolis (LabSoC), have a strong teaching activity in the undergraduate and Master level at Telecom–ParisTech. Lectures are in the fields of digital electronic design, embedded systems design, SoC (Systems–on–Chip) design and embedded systems security. An important part is given to practical aspects which are covered by supervisions of numerous student projects. The latest research results feeds our teaching activity, for example, ANR SoCLib project methods are directly used in the "System-On-Chip Design" track of our Master of engineering. Team members have teaching activities and responsabilities at Master level in several others institutions such as Eurecom, Nice Sophia-Antipolis University or Paris-6 University.

3.2 Main Results

The main research results obtained during the period 2005-2009 are presented below for the research areas of the Complex Digital Electronic System team.

3.2.1 Design Space Exploration and Assisted Refinement of Integrated Systems

Faculty L. Apvrille, R. Pacalet, S. Coudert, R. Boulifa

Main events Release of the TTool[1] Open Source toolkit, creation and animation of the SAFA (Sophia-Antipolis Formal Analysis Group) workshop.

Projects Industrial contracts with Texas Instruments (CASA I to V) and UDcast, Cifre PhD with Freescale, FP7 european project EVITA.

The increasing complexity of Systems-on-Chip requires new design and verification methodologies. The approach developed at LabSoC relies on modeling at a very high level and on early verifications in the design cycle. A strong separation between control and data processing is introduced. At the highest levels data processing is completely abstracted away. Control–oriented tasks exchange abstract and valueless samples, allowing ultra-fast simulations and static formal verification. This approach is supported by a dedicated UML profile (DIPLODOCUS) and a software toolkit (TTool). For the period 2005–2009 the main achievements are:

System-level Design Space Exploration (DSE): definition of a three-step methodology, comprising application modeling, architecture modeling and mapping of the former on the latter [228]. Simulation and formal verification are used in the first and second steps [194]. THe current focus is on the post-mapping verification.

Fast simulation techniques: design and SystemC-Based implementation if a speculative, transaction-based simulaiton framework [232].The current focus is on concurrent exploration of different simulation traces.

Formal verification: formal definition of the sets of primitives used in application and architecture modelling. Formal description of the mapping phase [194]. To overcome limitations of reachability analysis (e.g. combinatorial explosion, lack of refinement techniques), an formal verification scheme based on Description Logics has been investigated [195].

The TTool toolkit: design and open–source release of a toolkit. This toolkit shares several features with related works of the team, on distributed systems [161] [160] and requirement capture [194]. TTool is supported by Freescale. The whole framework is currently used in the context of the European project EVITA for security modelling and analysis ou automotive security.

IP abstraction: proposal of abstraction techniques of fully detailed existing virtual components to allow high level verification. IPs at Register Transfert Level are raised at Bus Cycle Accurate Level [286] for verification. Data values are abstracted and replaced by data “presence” and dependency calculus replaces value computation. We then verify by model checking that outputs are produced at the expected dates with respect to the arrival dates of the corresponding inputs. This data dependency analysis also leads to control and data separation: [248] control or data labels are propagated from the primary inputs to the primary outputs and the module is sliced in two disjoined regions, allowing data abstraction and fast verification of the control slice. This work is theoretically founded. It relies on a rigorous approach of semantic data dependency at propositional logic level (and thus gate level). Approximations and complementary techniques (such as data bundling) are introduced to mitigate the complexity through accuracy-runtime tradeoffs. This work also impacts our research activity on security.

[1] http://labsoc.comelec.enst.fr/turtle/ttool.html

3.2.2 Trusted Computing Hardware

Faculty J-L Danger, T. Graba, S. Guilley, P. Hoogvorst, Y. Mathieu, R. Pacalet

Main events DPA Contest organisation at CHES'09.

Projects ACI MARS, ANR SAFE, ANR SeFPGA, ANR ICTER, System@tic Pôle "Secure Algorithm", TES Pôle "EPOMI" STMicroelectronics "PACA Lab" projects SecMat, SecBus, SecKer, CALMOS, Cifre PhD with STMicroelectronics.

Cryptoprocessor implementations can be attacked by taking advantage of physical emanations when the ciphering operations are executed or by injecting faults to modify its behaviour. The attack goal is to recover the secret key of the known algorithm, or to modify the code stored in external memories. The research challenge is to provide countermeasures able to thwart all kind of attacks. The passive attacks also called "Side Channel Attacks" are based on the analyzis of the physical activity which can be made either by observing the power lines or the electromagnetic field radiation. The active attacks consist in injecting faults. They can be generated by methods like underpowering the power supply, parasitic glitches emissions or laser shots. The attacks and therefore their protections are done at circuit level or board level. At circuit level they aim at recovering the ciphering key or even the algorithm. They can be performed on any circuit from the smartcard to the big VLSI devices.
Board-level probing attacks use external memories and memory buses as natural targets. Adversaries can acquire confidential data and even corrupt the execution of critical programs by much simpler means than what is required for silicon-level attacks.

Protection at logical and physical level: These protections have been carried out on customized prototypes ASIC circuits and FPGAs in order to understand the attack mechanisms and devise efficient countermeasures. Four ASIC chips have been designed in 130nm STM technology. They embed a complete System–on–Chip including cryptoprocessors implementing DES and AES algorithms with different level of protections. Passive attacks [220] and active attacks [253] have been performed successfully on unprotected cryptoprocessors [165]. New attacks have been devised. Some of them take advantage of the Electromagnetic acquisition [177]. Countermeasures based on differential logic [278] have been evaluated and their efficiency has been demonstrated [164, 166]. Protections against attacks have been carried out on both embedded and commercial FPGAs. A custom fully reconfigurable embedded FPGA has been designed [205] to allow dynamic reconfiguration of the cryptoprocessor in case of attacks [206]. Asynchronous logic in a custom FPGA has been investigated as a countermeasure against passive attacks. The architecture has been studied at both the interconnexion level [209] and the programmable cell [263]. A versatile cell with multi-style capability has been studied in order to increase the robustness [199]. Many protections have been devised and evaluated in commercial FPGAs. They are based either on "Hiding" techniques [224, 221] by using differential Logic or "masking" techniques [226] by using a random variable. Their complexity and computation performances have been optimized [225]. Innovative structures to protect cryptoprocessors have been patented [276, 275, 279, 274]. Fault attacks have been studied by simple and efficient methods like underpowering the power supply on an AES cryptoprocessor [231]. The random number generation which is critical to obtain a good entropy has been studied with a high speed constraint. A novel open loop TRNG structure based on a latch chain has been devised and tested [162].

Protection at board level: In close partnership with the Advanced Systems Technology division of STMicroelectronics[2] we are working on a secure architecture [255] dedicated to medium to low end embedded systems and without any modification of the CPU nor the software design tools (which is considered unrealistic in this market). A strong cooperation between a trusted micro-kernel or hypervisor and a cryptographic peripheral (nicknamed SecBus) allows us to apply cryptographic functions only when needed and to select the less expensive among a set of candidate primitives for a given context. Our recent performance evaluations show that the SecBus

[2] Industrial contract PACA Lab 2004-2009, Cifre PhD of Lifeng SU

architecture is a very promising and cost effective solution to guarantee the nominal utilization of consumer equipments, and prevent the appearance of modchips or software jailbreaks.

3.2.3 Optimal Architectures for Complex Algorithms Implementations

Faculty J.L. Danger, P. Matherat, Y. Mathieu, L. Naviner, R. Pacalet, A. Polti

Main events NXP Semiconductor demonstrates Triscope project results at "Salon Européen de la Recherche & de l'Innovation". Invited conference at the Schloss Dagstuhl für Informatik GmbH.

Projects ANR SocLiB, ANR Asturies, ANR Telma, ANR Triscope, Bilateral Contract with STMicroeletronics for estimation of SER in Complex Systems, Bilateral contract with EDF for reliability improvement of systems implemented on FPGA

Architectures for image and multimedia processing: Video and image processing are more and more useful and required for numerous emerging services and applications but are often too computational expensive to reach real time on consumer devices (PCs, mobiles). On PCs platforms, we explored the usage a GPGPU (General Purpose Graphics Processing Unit) for a hardware accelerated multi-resolution and multi-prediction motion estimation algorithm used in real time video compression. This study led to very good performances [236] which are now confirmed by the success of the Compute Unified Device Architecture proposed by NVIDIA. Another weakness to note in the image processing on general purpose architectures is the inadequacy of cache memories architectures to the structured data organisation of multidimensional images. Furthermore, reconfigurable architectures (FPGA) designs are not well suited for complex cache management and leads to tedious developpement of ad-hoc memory management units. We proposed (ANR project Telma) a low-cost n-dimensional generic cache architecture for FPGA-Base image processing systems on chip exploiting spatial and temporal locality in a smarter manner than classical associative caches [234, 235]. Recent advances on high resolution LCD displays lead to emerging applications with 3D lenticular screens. In close partnership with NXP Semiconductor (granted through ANR project Triscope) we developed a real time hardware renderer for 3D LCD screens aimed to be the base for a full featured demonstrator for mobile 3D. For this purpose we designed a highly-integrated high-computational power embedded system (SHiX), featuring an embedded SuperH processor and a state of the art FPGA.

Architectures for communications: This activity is based on the global concept of reconfigurability. We defined a formal multilayer approach for reconfigurability in 3G systems. This formal framework was successfully applied to the DS-CDMA downlink detection giving a set of reconfigurable receivers appropriate for terminal implementations [168, 169, 268]. Time Interleaved High-Pass Sigma Delta converter (TIHP-$\Sigma\Delta$) assures the reconfigurability required by multistandard applications, but the digital processing inherent to this approach remains a bottleneck to achieve the ADC expected performances. We proposed a solution for signal reconstruction combining Comb-filter and decimation that reduces considerably computational requirements. Digital post-processing implementation based on our approach needs only a couple of integrators and differentiators [198].

Energy consumption of digital circuits and clockless systems: This research activity aims at modeling interactions between energy consumption of digital circuits, asynchronous circuits (with no global clock) and questions about algorithmic complexity. An initial work on dissipation of computation showed to us the links between language (computation) and matter (physical dissipation). This lead to the definition of "logical dissipation", and showed that a minimal dissipation is linked to modularity, on one hand modularity in space (composition of complex circuits from primitive gates), on the other hand modularity in time (questions about "synchronization"). A better practical knowledge of the dissipation question for the design of VLSIs could come from a better formalization of asynchronous circuits, seen as a general frame for defining digital electronic components [171].

Reliable architectures: The semiconductor scaling process is reaching some important limits that reflect negatively in the reliability of the integrated circuits. Some of these are manufacturing imprecision, improved susceptibility to environmental factors and physical parameters variability [172]. Our work deals with challenges related to such reliability decrease and has been developped in collaboration with the "Electronics and RF systems" team. During the period concerned by this report, we focused on development of efficient algorithms and tools for reliability assessment, which is crucial to establish cost-quality trade-offs related to different reliability improvement schemes [383].

Using a new 2×2 matrix signal representation, we proposed a method for reliability analysis based on the cumulative effect of errors in the signals of the circuit [163]. The proposed *Signal Probability Reliability* (SPR) model embeds the contribution of multiple simultaneous faults to the reliability of the circuit. We registered the developped software implementing the SPR algorithm [289]. We also developped a new approach to obtain the reliability information based on the circuit's capacity of logical masking. This *Probabilistic Binomial Reliability* (PBR) method associates fault-injection and simulation to determinate an analytical equation for the reliability [211]. With the reliability equation available, many types of analysis can be done, like the susceptibility of the circuit to single and multiple faults, the reliability of the circuit for any particular value of individual gates reliability [210, 173].

Both proposed PBR and SPR approaches give accurate reliability values while requiring less computation power than state-of-the art methods. Futhermore, the proposed methods allow several trade-offs between accuracy and computation complexity for reliability assessment.

3.2.4 Software Defined Radio

Faculty J-L Danger, R. Pacalet

Projects IDROMEL(ANR) , Low cost UWB (Orange Labs contract), PFMM (French cluster SCS, DGE)

Flexible architecture for the Software Defined Radio (SDR)

Nowadays mobile communication systems, operate in different radio spectrum, radio access technologies, and protocol stacks depending on the network being utilized. This gives rise to the need of a flexible hardware platform that would be capable of supporting all the different standards in the entire wireless communication frequency range. This platform shall of course be extremely power efficient.

In a large multi-projects[3] context we propose a generic baseband prototype architecture for SDR applications[250], subdivided into a high level control module and a digital signal processing engine.This architecture can be used, for instance, in cognitive radio contexts[227]. The DSP engine is a composition of highly configurable processing blocks, like a "Fourier transform/vector processing" block [243, 242] or a generic channel decoder [188, 187, 243, 251], each dedicated to specific algorithms based on the analysis of different standards. Most existing works in the field are based on specialized micro-processors (vector processors, VLIW, ASIP, etc.) and on advanced interconnects (Networks on Chip). Unfortunately these solutions are still usually above the maximum power budget for such applications. Our approach mainly consists in identifying a small set of very complex hardwired processing blocks that will take in charge 90 to 95% of the total baseband processing power in a very power-efficient way. Each block is highly parametrizable and is assisted by a minimal 8 bits micro-controller that allows it to run sequences of operations (e.g. channel estimation) from basic commands (Fourier transforms, component-wise products, etc.) The platform is open and the whole project will be distributed under the French equivalent of the GPL-LGPL open source licenses, both for hardware models and embedded software.

Low cost UWB receiver

In order to meet the low-cost constraints and be Software Defined Radio compliant, the studied Ultra Wide Band communication systems is based on "Impulse-radio" protocols. The analog

[3] IDROMel ANR/RNRT, PFMM (French cluster SCS, DGE), OpenAirInterface

part is made up of an antenna a Low noise amplifier and an energy detector which allows to meet the low cost requirement. The research challenge is to study complex algorithms to check the possibility to obtain high bit rate (around 100Mbps) even with a simple radio front end. In the frame of a collaboration with Orange Labs, the studies lead to three main results.
The first one is the probablistic equalizer which is based on accurate energetic channel model. This function runs jointly with an iterative channel decoder to improve the bit error rate [241].
The second result is the development of a new algorithm to estimate the energetic coefficients. This function takes advantage of the Expectation-Maximization algorithm (EM) to provide accurate energetic coefficients to the equalizer [240]. A simpler method based on a novel training sequence has been proposed [277]. The final result is an optimal architecture in a fixed point precision. The optimisation is partly based on a chi-square law approximation with a gaussian distribution. This implementation allows to meet the low-cost constraint of the digital implemenation [239, 238].

3.3 References

3.3.1 ACL: Articles in ISI-Indexed Journals

[160] L. Apvrille, P. De Saqui-Sannes, and F. Khendek. TURTLE-P: a UML profile for the formal validation of critical and distributed systems. *Journal on Software and Systems Modeling*, pages 1–18, July 2006.

[161] L. Apvrille, P. De Saqui-Sannes, R. Pacalet, and A. Apvrille. Un environnement de conception de systèmes distribués basé sur UML. *Annals of the Telecommunications*, 61(11/12):1347–1368, Nov. 2006.

[162] J.-L. Danger, S. Guilley, and P. Hoogvorst. High Speed True Random Number Generator based on Open Loop Structures in FPGAs. *Elsevier Microelectronics Journal*, 2009.

[163] D. Franco, M. Vasconcelos, L. Naviner, and J. F. Naviner. Signal probability for reliability evaluation of logic circuits. *Microelectronics Reliability Journal*, 48:1586–1591, Sept. 2008.

[164] S. Guilley, F. Flament, R. Pacalet, P. Hoogvorst, and Y. Mathieu. Secured CAD Backend Flow for Power-Analysis Resistant Cryptoprocessors. *IEEE Design & Test of Computers*, 24(6):546–555, Nov. 2007.

[165] S. Guilley, P. Hoogvorst, and R. Pacalet. A Fast Pipelined Multi-Mode DES Architecture Operating in IP Representation. *Integration, the VLSI Journal*, 40(4):479–489, July 2007.

[166] S. Guilley, S. Chaudhuri, L. Sauvage, P. Hoogvorst, R. Pacalet, and G. M. Bertoni. Security Evaluation of WDDL and SecLib Countermeasures against Power Attacks. *IEEE Transactions on Computers*, 57(11):1482–1497, Nov. 2008.

[167] F. Guilloud, E. Boutillon, J. Tousch, and J.-L. Danger. Generic Description and Synthesis of LDPC Decoders. *IEEE Transactions on Communications*, 55(11):2084–2091, Nov. 2007.

[168] I. Krikidis, J.-L. Danger, and L. Naviner. Flexible and reconfigurable receiver architecture for WCDMA systems with low spreading factors. *IEE Electronic Letters*, 41(1):22–24, Jan. 2005.

[169] I. Krikidis, J.-L. Danger, and L. Naviner. An iterative reconfigurability approach for WCDMA high-data-rate communications. *IEEE Wireless Communications Magazine*, 13(3):8–14, June 2006.

[170] L. B. S. Lima, F. M. De Assis, and L. A. B. Naviner. Arquitetura para um decodificador de códigos de hermite pela solução de uma equação chave. *Journal of Communications and Information Systems*, 21(1):1–14, Apr. 2006.

[171] P. Matherat. Où en est-on de la dissipation du calcul ? Retour à Bennett. *Annales des Télécommunications*, 62 (5-6):690–713, 2007.

[172] D. Teixeira Franco, J. F. Naviner, and L. Naviner. Yield and reliability issues in nanoelectronics. *Annals of Telecommunications*, 61(11-12), Nov. 2006.

[173] M. Vasconcelos, D. Franco, L. Naviner, and J. F. Naviner. Relevant metrics for evaluation of concurrent error detection schemes. *Microelectronics Reliability Journal*, 48:1601–1603, Sept. 2008.

3.3.2 ACLN: Articles in Other Refereed Journals

[174] P. Matherat. Notre façon moderne de voir est conditionnée par la camera obscura - Réflexion sur les fondements logiques de la perception et de la mesure. *Intellectica*, 2007/1(45):167–191, Dec. 2007.

[175] P. Matherat. Des doubles parenthèses de Jacques Lacan et des triples d'Alain Didier-Weill. *Insistance*, Sept. 2007.

[176] S. Mekki, J.-L. Danger, and B. Miscopein. On the implementation of a probabilistic equalizer for low-cost impulse radio uwb in high data rate transmission. *Scientific Research Publiching (SciRes), Wireless Sensor Network*, June 2009.

[177] L. Sauvage, S. Guilley, and Y. Mathieu. ElectroMagnetic Radiations of FPGAs: High Spatial Resolution Cartography and Attack of a Cryptographic Module. *TRETS (ACM Transactions on Reconfigurable Technologies and Systems)*, 2(1):1–24, Mar. 2009.

3.3.3 ASCL: Articles in journals without editorial commitee

[178] F. Flament. Les systèmes embarqués sont ils sûrs. *Telecom*, (152):126–127, Jan. 2009.

[179] P. Matherat. Qu'est-ce que voir ? Ou comment notre vision est conditionnée par la camera obscura. *HAL, archives-ouvertes du CNRS*, Oct. 2006.

[180] P. Matherat. Où en est-on de la dissipation du calcul ? retour à bennett. *HAL, archives-ouvertes du CNRS*, June 2006.

[181] P. Matherat. Le temps du calcul et le temps des ordinateurs. *HAL, archives-ouvertes du CNRS*, Aug. 2006.

[182] P. Matherat. Clockless components and relativity. *HAL*, May 2009.

[183] P. Matherat. Une histoire de la microélectronique. *CEL - Archives ouvertes*, June 2007.

[184] J. F. Naviner and L. Naviner. La sûreté de fonctionnement de systèmes nanoélectroniques : de nouveaux défis. *TELECOM*, (152), Jan. 2009.

3.3.4 ACTI: Articles in Proceedings of International Conferences

[185] S. Ahumada, L. Apvrille, T. Barros, A. Cansado, E. Madelaine, and E. Salageanu. Specifying Fractal and GCM Components With UML. In *XXVI International Conference of the Chilean Computer Science Society (SCCC'07)*, Iquique, Chile, Nov. 2007.

[186] L. Alves De Barros Naviner, M. Correia De Vasconcelos, D. Teixeira Franco, and J. F. Naviner. Efficient computation of logic circuits reliability based on probabilistic transfer matrix. In *IEEE DTIS2008 - Design and Technology of Integrated Systems*, Tozeur, Tunisie, Mar. 2008.

[187] E. Amador, R. Pacalet, and V. Rezard. Optimum LDPC Decoder: A Memory Architecture Problem. In *Design Automation Conference - DAC 2009*, San Fransisco, USA, July 2009.

[188] E. Amador, V. Rezard, and R. Pacalet. Energy Efficiency of SISO Algorithms for Turbo-Decoding Message-Passing LDPC Decoders. In *VLSI-SoC*, Florianopolis, Brazil, Oct. 2009. To appear.

[189] L. Apvrille. Ttool for diplodocus: An environment for design space exploration. In *8th annual international conference on New Technologies of Distributed Systems (NOTERE'2008)*, Lyon, France, June 2008.

[190] L. Apvrille and P. De Saqui-Sannes. Adding a methodological assistant to a protocol modeling environment. In *8th annual international conference on New Technologies of Distributed Systems (NOTERE'2008)*, Lyon, France, June 2008.

[191] L. Apvrille and P. De Saqui-Sannes. Making formal verification amenable to real-time uml practitioners. In *12th European Workshop on Dependable Computing*, Toulouse, France, May 2009.

[192] L. Apvrille, P. De Saqui-Sannes, and A. Apvrille. Une méthodologie de conception des systèmes distribués basée sur UML. In *NOuvelles TEchnologies de la REpartition (NOTERE) 2005*, Gatineau, Canada, Aug. 2005.

[193] L. Apvrille, P. De Saqui-Sannes, and F. Khendek. Synthèse d'une conception UML temps-réel à partir de diagramme de séquences. In *Colloque Francophone sur l'Ingéniérie des Protocoles*, Bordeaux, France, Mar. 2005.

[194] L. Apvrille, W. Muhammad, R. Ameur-Boulifa, S. Coudert, and R. Pacalet. A UML-based Environment for System Design Space Exploration. In *13th IEEE International Conference on Electronics, Circuits and Systems (ICECS'2006)*, Nice, France, Dec. 2006.

[195] L. Apvrille, S. Coudert, and C. Leduc. A framework for the formal verification of infinite systems. In *The 18th IEEE International Symposium on Software Reliability Engineering (ISSRE 2007)*, Trollhättan, Sweden, Nov. 2007.

[196] L. Apvrille, A. Mifdaoui, and P. De Saqui-Sannes. Nouvelle approche turtle pour le dimensionnement et la validation de systemes répartis temps réel. In *9th annual international conference on New Technologies of Distributed Systems (NOTERE'2009)*, Montreal, Canada, July 2009.

[197] D. Beautemps, L. Girin, N. Aboutabit, G. Bailly, L. Besacier, G. Breton, T. Burger, A. Caplier, M.-A. Cathiard, D. Chêne, J. Clarke, F. Elisei, O. Govokhina, C. Jutten, V. B. Le, M. Marthouret, S. Mancini, Y. Mathieu, P. Perret, B. Rivet, P. Sacher, C. Savariauw, S. Schmerber, J.-F. Sérignat, M. Tribout, and S. Vidal. TELMA : Telephony for the Hearing-Impaired People. from models to user tests. In *ASSISTH'2007*, Toulouse (France), Nov. 2007.

[198] A. Beydoun, V. T. Nguyen, L. Alves De Barros Naviner, and P. Loumeau. A 65 nm cmos digital processor for multi-mode time interleaved high-pass sigma-delta a/d converters. In *IEEE International Symposium on Circuits and Systems (ISCAS'09)*, Taipei, Taiwan, May 2009.

[199] T. Beyrouthy, A. Razafindraibe, L. Fesquet, M. Renaudin, S. Chaudhuri, S. Guilley, P. Hoogvorst, and J.-L. Danger. A Novel Asynchronous e-FPGA Architecture for Security Applications. In *ICFPT'07*, pages 369–372, Kokurakita, Kitakyushu, JAPAN, Dec. 2007.

[200] T. Beyrouthy, L. Fesquet, A. Razafindraibe, S. Chaudhuri, S. Guilley, P. Hoogvorst, J.-L. Danger, and M. Renaudin. A Secure Programmable Architecture with a Dedicated Tech-mapping Algorithm: Application to a Crypto-Processor. In *DCIS*, Grenoble, France, Nov. 2008.

[201] S. Bhasin, N. Selmane, S. Guilley, and J.-L. Danger. Security evaluation of different aes implementations against practical setup time violation attacks on fpgas. In *HOST (Hardware Oriented Security and Trust)*, pages 15–21, San Francisco, CA, USA, July 2009.

[202] D. Cardoso De Souza, I. Krikidis, L. Naviner, J.-L. Danger, M. De Barros, and B. Aguiar. Heterogeneous implementation of a rake receiver for DS-CDMA communication systems. In *IEEE International Conference on Electronics, Circuits and Systems (ICECS'05)*, pages 450–453, Gammarth, Tunisia, Dec. 2005.

[203] D. Cardoso De Souza, I. Krikidis, L. Naviner, J.-L. Danger, M. De Barros, and B. Aguiar. Implementation of a digital receiver for DS-CDMA communication systems using HW/SW codesign. In *IEEE Midwest Symposium on Circuits and Systems*, Cinccinati, Ohio, USA, Aug. 2005.

[204] M. Chami and Y. Mathieu. Etude d'accélération Matérielle pour Traitement Video: La norme h.264. In *Systèmes Electroniques - Informatiques & Traitement de l'Information*, pages 140–145, Mohammedia, Maroc, Jan. 2007.

[205] S. Chaudhuri, J.-L. Danger, S. Guilley, and P. Hoogvorst. FASE: An Open Run-Time Reconfigurable FPGA Architecture for Tamper-Resistant and Secure Embedded Systems. In *IEEE 3rd international conference on reconfigurable computing and FPGAs (ReConFig 2006)*, pages 1–9, San Luis Potosi, Mexico, Sept. 2006.

[206] S. Chaudhuri, J.-L. Danger, and S. Guilley. Efficient Modeling and Floorplanning of Embedded-FPGA Fabric. In *FPL*, pages 665–669, Amsterdam, Netherlands, Aug. 2007.

[207] S. Chaudhuri, J.-L. Danger, P. Hoogvorst, and S. Guilley. Efficient Tiling Patterns for Reconfigurable Gate Arrays. In *SLIP'08*, pages 11–18, Newcastle University, UK, Apr. 2008.

[208] S. Chaudhuri, S. Guilley, F. Flament, P. Hoogvorst, and J.-L. Danger. An 8x8 Run-Time Reconfigurable FPGA Embedded in a SoC. In *DAC*, pages 120–125, Anaheim, CA, USA, June 2008.

[209] S. Chaudhuri, S. Guilley, P. Hoogvorst, J.-L. Danger, T. Beyrouthy, A. Razafindraibe, L. Fesquet, and M. Renaudin. Physical Design of FPGA Interconnect to Prevent Information Leakage. In *ARC (Applied Reconfigurable Computing), Proceedings in LNCS Springer-Verlag Berlin Heidelberg*, volume 4943, pages 87–98, London, UK, Mar. 2008.

[210] M. Correia De Vasconcelos, D. Teixeira Franco, L. Naviner, and J. F. Naviner. On the output events in concurrent error detection schemes. In *IEEE International Conference on Electronics, Circuits, and Systems*, Malte, Sept. 2008.

[211] M. Correia De Vasconcelos, D. Teixeira Franco, L. Naviner, and J. F. Naviner. Reliability Analysis of Combinational Circuits Based on a Probabilistic Binomial Model. In *IEEE-NEWCAS and TAISA Conference*, Montréal, Canada, June 2008.

[212] M. Correia De Vasconcelos, D. Teixeira Franco, L. Naviner, and J. F. Naviner. Relevant metrics for evaluation of concurrent error detection schemes. In *European Symposium on Reliability of Electron Devices, Failure Physics and Analysis*, Maastricht - The Netherlands, Oct. 2008.

[213] J.-L. Danger, S. Guilley, and P. Hoogvorst. Fast True Random Generator in FPGAs. In *IEEE MWSCAS/NEWCAS'07*, pages 506–509, Montréal, Canada, Aug. 2007.

[214] B. Fontan, L. Apvrille, P. De Saqui-Sannes, and J.-P. Courtiat. Real-time and embedded system verification based on formal requirements. In *Industrial Embedded Systems 2006 (IES'2006)*, Antibes, France, Oct. 2006.

[215] B. Fontan, P. De Saqui-Sannes, and L. Apvrille. Génération automatique d'observateurs pour la vérification formelle d'exigences temporelles. In *7ème Conférence Internationale sur les NOuvelles TEchnologies de la REpartition, 7th International Conference on New Technologies of Distributed Systems, NOTERE 2007*, pages 541–542, Marrakech, Maroc, June 2007.

[216] B. Fontan, P. De Saqui-Sannes, and L. Apvrille. Timing requirement description diagrams for real-time system. In *4th International Conference on Embedded and Real Time Software (ERTS 2008)*, Toulouse, France, Jan. 2008.

[217] B. Fontan, P. De Saqui-Sannes, and L. Apvrille. Synthèse d'observateurs à partir d'exigences temporelles. In *14ème colloque International sur les Langages et Modèles à Objets (LMO 2008), Revue des Nouvelles Technologies de l'Information (RNTI-L-1)*, pages 187–203, Montreal, Canada, Feb. 2008.

[218] S. Guilley and P. Hoogvorst. The proof by $2^m - 1$: a low-cost method to check arithmetic computations. In *SEC 2005*, volume IFIP 181, pages 589–600, Chiba, JAPAN, May 2005.

[219] S. Guilley, P. Hoogvorst, Y. Mathieu, and R. Pacalet. The "Backend Duplication" Method. In *Workshop on Cryptographic Hardware and Embedded Systems*, volume LNCS 3659, pages 383–397, Edinburgh, Scotland, Aug. 2005.

[220] S. Guilley, P. Hoogvorst, R. Pacalet, and J. Schmidt. Improving Side-Channel Attacks by Exploiting Substitution Boxes Properties. In *International Conference on Boolean Functions: Cryptography and Applications (BFCA)*, pages 1–25, Paris, France, May 2007.

[221] S. Guilley, S. Chaudhuri, L. Sauvage, T. Graba, J.-L. Danger, P. Hoogvorst, V.-N. Vong, and M. Nassar. Place-and-Route Impact on the Security of DPL Designs in FPGAs. In *HOST (Hardware Oriented Security and Trust), IEEE; collocated with DAC'08*, volume ISBN = 978-1-4244-2401-6, pages 29–35, Anaheim, CA, USA, June 2008.

[222] S. Guilley, S. Chaudhuri, L. Sauvage, T. Graba, J.-L. Danger, P. Hoogvorst, V.-N. Vong, M. Nassar, and F. Flament. Shall we trust WDDL? In *Future of Trust in Computing*, volume 2, pages 208–215, Berlin, Germany, June 2008.

[223] S. Guilley, F. Flament, Y. Mathieu, and R. Pacalet. Security Evaluation of a Balanced Quasi-Delay Insensitive Library. In *DCIS*, Grenoble, France, Nov. 2008.

[224] S. Guilley, L. Sauvage, J.-L. Danger, T. Graba, and Y. Mathieu. Evaluation of Power-Constant Dual-Rail Logic as a Protection of Cryptographic Applications in FPGAs. In *SSIRI*, pages 16–23, Yokohama, Japan, July 2008.

[225] S. Guilley, L. Sauvage, J.-L. Danger, and P. Hoogvorst. Area Optimization of Cryptographic Co-Processors Implemented in Dual-Rail with Precharge Positive Logic. In *FPL (18th IEEE International Conference on Field-Programmable Logic and Applications)*, pages 161–166, Heidelberg, Germany, Sept. 2008.

[226] S. Guilley, L. Sauvage, J.-L. Danger, N. Selmane, and R. Pacalet. Silicon-level solutions to counteract passive and active attacks. In *FDTC, 5th workshop on Fault Tolerance and Detection in Cryptography, IEEE-CS*, pages 3–17, Washington, DC, USA, Aug. 2008.

[227] A. M. Hayar, R. Pacalet, and R. Knopp. Cognitive radio Research and Implementation Challenges. In *Asilomar Conference on Signals, Systems and Computer*, Monterey, USA, Nov. 2007.

[228] C. Jaber, A. Kanstein, L. Apvrille, A. Baghdadi, P. Le Moenner, and R. Pacalet. High-level system modeling for rapid hw/sw architecture exploration. In *20th IEEE/IFIP International Symposium on Rapid System Prototyping (RSP'2009)*, Paris, France, June 2009.

[229] H. Jouve, P. Le Gall, and S. Coudert. An automatic off-line method for interaction detection by static analysis of graphic feature specifications. In *8th International Conference on Feature Interactions in Telecommunications and*

Software Systems, ICFI'05, Leicester, UK, June 2005.

[230] M. Kafi, S. Guilley, S. Marcello, and D. Naccache. Deconvolving Protected Signals. In *ARES/CISIS - IEEE Computer Society*, pages 687–694, Fukuoka, Kyushu, Japan, Mar. 2009.

[231] F. Khelil, M. Hamdi, S. Guilley, J.-L. Danger, and N. Selmane. Fault Analysis Attack on an FPGA AES Implementation. In *NTMS*, pages 1–5, Tangier, Morocco, Nov. 2008.

[232] D. Knorreck, L. Apvrille, and R. Pacalet. Fast simulation techniques for design space exploration. In *47th International Conference Objects, Models, Components, Patterns*, volume 33, pages 308–327, Zurich, Switzerland, June 2009.

[2566] I. Krikidis, J.-L. Danger, and L. Naviner. Reconfigurable implementation issues of a detection scheme for DS-CDMA high data rate connections. In *IEEE International Symposium on Personal Indoor and Mobile Radio Communications (PIMRC'05)*, Berlin, Germany, Sept. 2005.

[234] Z. Larabi, Y. Mathieu, and S. Mancini. High Efficiency Reconfigurable Cache for Image Processing. In *Engineering of Reconfigurable Systems and Algorithms*, Las Vegas, USA, July 2009.

[235] Z. Larabi, Y. Mathieu, and S. Mancini. Efficient data access management for fpga-based image processing socs. In *20th International Symposium on Rapid System Prototyping (RSP'2009)*, Paris France, June 2009.

[236] S. Mazaré, R. Pacalet, and J.-L. Dugelay. Using GPU for fast block-matching. In *14th European Signal Processing Conference / EUSIPCO'06*, Florence, Italy, Sept. 2006.

[237] S. Mekki, J. Boutros, J.-L. Danger, B. Miscopein, and J. Schwoerer. EM algorithm development for M-PPM UWB Demodulation based on Energy Detection. In *UWB 2007*, Grenoble, May 2007.

[238] S. Mekki, J.-L. Danger, and B. Miscopein. A simplified implementation of a probabilistic equalizer for impulse radio uwb in high data rate transmission. In *ICSPCS*, Goald coast (Australia), Dec. 2008.

[239] S. Mekki, J.-L. Danger, B. Miscopein, and J. J. Boutros. Chi-squared distribution approximation for probabilistic energy equalizer implementation in impulse-radio uwb receiver. In *ICCS 2008*, Guangzhou, Nov. 2008.

[240] S. Mekki, J.-L. Danger, B. Miscopein, and J. J. Boutros. Em channel estimation in a low-cost uwb receiver based on energy detection. In *ICWCS*, Reykjavik, Oct. 2008.

[241] S. Mekki, J.-L. Danger, B. Miscopein, J. Schwoerer, and J. Boutros. Probabilistic equalizer for ultra-wideband energy probabilistic equalizer for ultra-wideband energy. In *VTC 2008*, Singapore, May 2008.

[242] N. Muhammad, K. Khalfallah, R. Knopp, and R. Pacalet. Reconfigurable DSP Architectures for SDR Applications. In *14th IEEE International Conference on Electronics, Circuits and Systems - ICECS'2007*, Marrakech, Morocco, Dec. 2007.

[243] N. Muhammad, R. Rasheed, R. Pacalet, R. Knopp, and K. Khalfallah. Flexible Baseband Architectures for Future Wireless Systems. In *DSD 2008, 11th EUROMICRO CONFERENCE on DIGITAL SYSTEM DESIGN. Architectures, Methods and Tools*, Parma, Italy, Sept. 2008.

[244] R. Muhammad, L. Apvrille, and R. Pacalet. Application specific processors for multimedia applications. In *11th IEEE International Conference on Computational Science and Engineering (CSE 2008)*, pages 109–116, Sao Paulo, Brazil, July 2008.

[245] R. Muhammad, L. Apvrille, and R. Pacalet. Evaluation of asips design with lisatek. In *8th International Workshop SAMOS*, volume 5114/2008, pages 177–186, Samos, Greece, July 2008.

[246] W. Muhammad, L. Apvrille, R. Ameur-Boulifa, S. Coudert, and R. Pacalet. Abstract Application Modeling for System Design Space Exploration. In *Euromicro Conference on Digital System Design*, Dubrovnik, Croatia, Aug. 2006.

[247] W. Muhammad, S. Coudert, R. Ameur-Boulifa, and R. Pacalet. Semantic Preserving RTL Transformation for Control-Data Slicing in Virtual IPs. In *11th IEEE International Multitopic Conference - INMIC 2007*, Lahore, Pakistan, Dec. 2007.

[248] W. Muhammad, S. Coudert, R. Ameur-Boulifa, and R. Pacalet. A Static Verification Technique based on Boolean Data Dependency Analysis in Hardware Modules. In *DASIP 2009*, Sophia-Antipolis, France, Sept. 2009. To appear.

[249] L. Naviner and K. Lenz. A new decoding architecture for algebraic-geometry codes. In *IEEE Midwest Symposium on Signal and Systems*, Cinccinati, Ohio, USA, Aug. 2005.

[250] D. Nussbaum, C. Moy, J. Martin, B. Mercier, and R. Pacalet. Open Platform for Prototyping of Advanced Software Defined Radio and Cognitive Radio Techniques. In *12th Euromicro Conference on Digital System Design, DSD 2009*, Patras, Greece, Aug. 2009. To appear.

[251] R. Rasheed, A. Menouni, and R. Pacalet. Reconfigurable Viterbi Decoder for Mobile Platform. In *7th IFIP International Conference on Mobile and Wireless Communications Networks (MWCN)*, Marrakech, Maroc, Sept. 2005.

[252] L. Sauvage, S. Guilley, J.-L. Danger, Y. Mathieu, and M. Nassar. Successful attack on an FPGA-based WDDL DES cryptoprocessor without place and route constraints. In *DATE*, pages 640–645, Nice, France, Apr. 2009.

[253] N. Selmane, S. Guilley, and J.-L. Danger. Practical Setup Time Violation Attacks on AES. In *EDCC, The seventh European Dependable Computing Conference*, pages 91–96, Kaunas, Lithuania, May 2008.

[254] N. Selmane, S. Bhasin, S. Guilley, T. Graba, and J.-L. Danger. Wddl is protected against fault attacks. In *FDTC (IEEE Fault Diagnosis and Tolerance in Cryptography)*, Lausanne, Switzerland, Sept. 2009. To appear.

[255] L. Su, S. Courcambeck, P. Guillemin, C. Schwarz, and R. Pacalet. SecBus: Operating System Controlled Hierarchical Page-Based Memory Bus Protection. In *Design Automation & Test in Europe - DATE 2009*, Nice, France, Apr. 2009.

[256] D. Teixeira Franco, M. Correia De Vasconcelos, R. De Vasconcelos, L. Alves De Barros Naviner, and J. F. Naviner. Reliability of logic circuits under multiple simultaneous faults. In *IEEE Midwest Symposium on Circuits and Systems*, Knoxville, TN, Etats-Unis, Aug. 2008.

[257] D. Teixeira Franco, M. Correia De Vasconcelos, L. Naviner, and J. F. Naviner. Signal probability for reliability evaluation of logic circuits. In *European Symposium on Reliability of Electron Devices, Failure Physics and Analysis*, Maastricht - The Netherlands, Oct. 2008.
[258] D. Teixeira Franco, M. Correia De Vasconcelos, L. Naviner, and J. F. Naviner. Reliability analysis of logic circuits based on signal probability. In *IEEE International Conference on Electronics, Circuits, and Systems*, Malte, Sept. 2008.
[259] D. Teixeira Franco, M. Correia De Vasconcelos, L. Naviner, and J. F. Naviner. Spr tool: Signal reliability analysis of logic circuits. In *Design, Automation and Test in Europe, DATE*, Nice, France, Apr. 2009.

3.3.5 ACTN: Articles in Proceedings of French Conferences

[260] L. Apvrille and P. De Saqui-Sannes. TURTLE: a UML-based environment for the codesign of embedded systems. In *SAME Sophia-Antipolis MicroElectronics*, Sophia-Antipolis, france, Sept. 2005.
[261] P. Matherat. L'écriture et le réchauffement de la Terre. In *Écritures: sur les traces de Jack Goody*, Lyon, Jan. 2008.

3.3.6 COM: Talks in Conferences Which Do Not Publish Proceedings

[262] L. Alves De Barros Naviner. Error and fault-tolerance in vlsi. In *Fault-Tolerant Distributed Algorithms in VLSI Chips*, Dagstuhl, Germany, Sept. 2008.
[263] P. Hoogvorst, S. Guilley, S. Chaudhuri, J.-L. Danger, A. Razafindraibe, T. Beyrouthy, L. Fesquet, and M. Renaudin. A Reconfigurable Cell for a Multi-Style Asynchronous FPGA. In *ReCoSoC*, pages 15–22, Montpellier, France, June 2007.
[264] Z. Larabi, Y. Mathieu, and S. Mancini. Optimization of the nD-AP Cache memory hierarchy. In *System On Chip - System In Package*, Paris France, June 2008.
[265] P. Matherat. Chambre noire et topologie. In *L'enclave à l'épreuve de la clinique*, Paris, Apr. 2009.

3.3.7 AFF: Posters in Conferences

[266] S. Chaudhuri, J.-L. Danger, P. Hoogvorst, and S. Guilley. Efficient Tiling Patterns for Reconfigurable Gate Arrays (poster session 1). In *FPGA*, page 257, Monterey, California, USA, Feb. 2008.

3.3.8 OS: Books and Book Chapters

[267] I. Krikidis, L. Naviner, and J.-L. Danger. *Approche Itérative pour la Réconfigurabilité Matérielle : Exemple du Récepteur RAKE*, chapter 5. Hermès, Paris, 2005.
[268] I. Krikidis, L. Naviner, and J.-L. Danger. *Iterative approach for hardware reconfigurability: the RAKE receiver*, chapter 5. ISTE, GB, 2007.
[269] L. A. B. Naviner, J. F. Naviner, D. T. Franco, and M. R. Vasconcelos. Methods and metrics for reliability assessment. In J. E. B. Charron-Bost, S. Dolev and U. Schmid, editors, *Fault-Tolerant Distributed Algorithms on VLSI Chips*, chapter 4, pages 1–14. Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, Germany, Dagstuhl, Germany, 2009.

3.3.9 DO: Journal or Proceedings Edition

[270] L. apvrille, K. Drira, P. de Saqui-Sannes, and T. Villemur, editors. *NOTERE'2006, Nouvelles Technologies de la Répartition*, 2006. Hermès, Lavoisier. ISBN 2-7462-1588-X.

3.3.10 AP: Other Productions: Database, Registred Software, Registred Patent, . . .

[271] L. Alves De Barros Naviner. Architectures Numériques pour les Télécommunications, HDR. Technical report, Université Pierre et Marie Curie, Paris, France, Nov. 2006.
[272] L. Apvrille. Procédé de mise à jour d'au moins un espace personnel de publication, terminal de communication, serveur intermédiaire et produit programme d'ordinateur correspondants. (06/11345), Nov. 2006.
[273] L. Apvrille. Ttool, 2005.
[274] J.-L. Danger and S. Guilley. Circuit de cryptographie protege contre les attaques en observation, notamment d'ordre eleve. (FR0950341), Jan. 2009.
[275] J.-L. Danger, S. Guilley, and F. Flament. Procede de detection d'anomalies dans un circuit de cryptographie protege par logique differentielle et circuit mettant en oeuvre un tel procede. (FR 08/55537), Aug. 2008.

[276] J.-L. Danger, S. Guilley, and P. Hoogvorst. Procédé de protection de circuit de cryptographie programmable et circuit protégé par un tel procédé. (FR 08 51904), Mar. 2008.
[277] J.-L. Danger, S. Mekki, and B. Miscopein. Procédé d'émission d'impulsions dans un canal de transmission. (FR08/58123), Nov. 2008.
[278] S. Guilley. *Contre-mesures Géométriques aux Attaques Exploitant les Canaux Cachés*. PhD thesis, École Nationale Supérieure des Télécommunications, ENST07E003, Jan. 2007.
[279] S. Guilley and J.-L. Danger. Circuit de cryptographie, protege notamment contre les attaques par observation de fuite d'information par leur chiffrement. (FR0950342), Jan. 2009.
[280] S. Guilley and J.-L. Danger. Test de circuits cryptographiques par analyse différentielle de consommation. (FR 08 51184), Mar. 2008.
[281] S. Guilley and A. D. Dao. Logiciel "genlut", Apr. 2008.
[282] S. Guilley and A. D. Dao. Logiciel "vDuplicate", Apr. 2008.
[283] S. Guilley, J.-L. Danger, and L. Sauvage. Procede de protection du decryptage des fichiers de configuration de circuits logiques programmables et circuit mettant en oeuvre le procede. (FR 08/55536), Aug. 2008.
[284] P. Hoogvorst, S. Guilley, and T. Graba. Logiciel "fpgasbox", July 2008.
[285] C. Leduc, S. Coudert, and L. Apvrille. Vérification de spécifications lotos basée sur la logique de description. Technical Report FR-0451844, ENST, Mar. 2007.
[286] W. Muhammad. *Assistance à l'Abstraction de Composants Virtuels pour la Vérification Rapide de Systèmes Numériques*. PhD thesis, Université de Nice Sophia-Antipolis, Jan. 2009.
[287] L. Naviner. State of the art in sensor networks (hardware issues for sensor network design). Technical Report CaptAdHoc, Groupe des Ecoles de Télécommunications, Mar. 2006.
[288] B. Russell and P. Matherat. Conséquences philosophiques de la relativité, 2008. Traduction en français par Philippe Matherat, de l'article original de Bertrand Russell (1926).
[289] D. Teixeira Franco, L. Naviner, and J. F. Naviner. Signal probabililty reliability analysis tool. (IDDN FR.001.450011.000.S.P.2008.000.20700), Nov. 2008.

Chapter 4

Electronics and RF Systems (ELECRF)

Team leaders B. Huyart (P), P.Loumeau (P).

Faculty

X. Begaud (MC), E. Bergeault (P), J.C. Cousin (MC)
P. Desgreys (MC), B.Huyart (P), A.C. Lepage (MC,09/07–),
P. Loumeau (P), J.F. Naviner (MC), V.T. Nguyen (MC,04/05–),
H. Petit (MC)

PhD students

A.C. Lepage (01/02–06/05), S. Bensmida (01/02–08/05), A.J.B. Braga (10/02–09/06),
V.Y. Vu (10/02–12/05), L. Schreider (11/02–04/06), N. Ksentini (12/02–11/07),
H. Ghannoum (10/03–12/06), G.L. Abib (10/03–09/07), D. Camarero De La Rosa (11/03–06/07),
E. Rebeyrol (01/04–10/07), M. Ben Romdane (02/04–02/09), I. Masri (04/04–04/07),
F. Ziade (06/04–04/08), A. Latiri (07/04–06/08), M. Vahdani (10/04–10/08),
C. Mohamed (01/05–09/08), R. Mina (03/05–12/08), S. Martinez Lopez (09/05–09/08),
K. Mabrouk (12/05–12/08), M. Bahouche (02/06–), H. Khushk (09/06–),
W. Altabban (12/06–), M. Grelier (10/07–), C. Jabbour (10/07–),
F. Linot (11/07–), R. Mogharini (11/07–), F. Targino Vidal (12/07-),
D. Bibiano Brito (10/08–), A. Gruget (10/08–), P. Maris Ferreira (10/08–),
R. Mohellebi (10/08–), A. Thior (10/08–), Q. Chu (11/08–),
S. Kowlgi Srinivasan (04/09–), A. Maalej (01/09–).

Post-docs, engineers and sabbaticals

G.L. Abib (10/07–03/08), S. Bensmida (10/05–10/06), D. Camarero De La Rosa (07/07-12/08),
R. Guelaz (09/07–03/09), S. Hamieh (06/07–02/08), H. Fakhoury (06/08–06/09),
A. Beydoun (02/08–), A. Khy (05/05–).

Faculty IT	9.5
PhD students	13.8
Post-docs, engineers and sabbaticals	2.5
Defended PhD theses	19
Defended HDR	2
Journal papers [published, in press]	[23, 2]
Papers in conference proceedings	125
Chapters and books	3
Patents and software	[8, 1]
Grants [public, private, european] (k€)	[799, 420, 38]

4.1 Objectives

Our research deals with the integration of radiofrequencies devices for wireless mobile communication systems. The activity is supported by public and industrial fundings. The current developments are made in close interaction with companies like STMicroelectronics, NXP, CEA, Thales, Thales Alenia Space, Thales Airborne Systems, LNE, Orange Labs or Schneider Electric.

From reconfigurable RF front–end to software defined radio: The goal of the software defined radio is to shift the processing of the received signal into the digital domain with the analog to digital conversion immediately after the antenna. The “software defined radio” main interest is to facilitate standard reconfigurability using numerical processing and simple software downloading. Yet, the software defined radio calls for analog to digital conversion performances that are not currently achievable. Our work concentrates on the joint optimisation of analog and digital functions that would match the software radio feasibility criteria. Novel concepts of electronics architectures are demonstrated through the design, fabrication and test of innovative CMOS circuitries. The long term goal is the building of a software defined radio platform.

Nanoelectronics architectures and circuits: New applications require an increased level of hardware and software integration at chip level if one wants to keep a moderate manufacturing cost. The evolution towards nanoscale technologies for a higher transistor density is therefore essential in a highly competitive environment. However, at decananometric or nanometric scale, new physical phenomena must be taken into account and modelized. Our research covers the modeling and the evaluation of new nanodevices as well as the study of smart acquisition interfaces satisfying the requirements of performance and portability.

RF metrology: Increasing communication rates as well as more demanding requests on wireless systems calls for improved RF metrologies. Our work involves:

- The new definition of standards for the measurements of both RF power and RF scattering parameters in the frequencey range 1-18 GHz.
- The non-linear characterisation of power amplifiers in the frequency band 900 MHz - 10 GHz using numerical pre-distortion and source&load pull techniques.
- The sounding of indoor radio propagation channel in the ISM band 2.4 GHz.

Wireless communication systems technology: Our work on wireless communication systems technology concentrates on the so-called “RF front-end” which is one of the most sensitive part of communicating objects. It involves improved modulation/demodulations schemes as well as the study of novel antenna technologies applied to several wireless communication standards from 800 MHz to 40 GHz. The design of circuits for RF “Front-end” using MMIC or hybrid technology on GaAs or dielectric substrates is based on the three-phase “Zero IF” receiver. Concerning

the antenna design, the demand is currently on wideband and discrete structures in many application areas. Our research topics are focused on wideband and low-profile antennas and arrays. In the last few years, we developed and applied novel artificial materials for the antenna's reflector which has led to innovative and performant antennas. These materials are also used to reduce the coupling factor between the elements of an antenna array.

4.2 Main Results

The main research results obtained during the period 2005-2009 are presented below for the research areas of the "Electronics and RF systems" team.

4.2.1 From Reconfigurable RF Front-End to Software Defined Radio

Faculty P.Desgreys, V.T.Nguyen, H.Petit, J.F.Naviner, P.Loumeau

Main events Technical chairman of NEWCAS-TAISA09 IEEE International Conference, Coordinator of the project TEROPP between 6 Carnot Institutes and 3 Fraunhofer institutes, creation of the GIS eSys "Groupement pour l'Electronique des Systèmes".

Projects Versanum ANR-05-RNRT-010-01, TEROPP ANR-07-P2IC-O11 01, HyperSCAN ANR-06-TCOM-023-06.

Direct RF sampling and signal processing: Direct analog to digital conversion of the radio frequency (RF) signal is still unfeasible at present time, due to the high requirements imposed on the analog to digital converter. This motivates the need for a highly flexible RF front-end that can be fully integrated in low cost digital deep-submicron CMOS processes. Different techniques for shifting the RF and analog circuit design complexity to a digitally intensive domain were developed recently. A collaborative project with STMicroelectronics [299] was launched on direct RF sampling and discrete-time analog signal processing. The goal was greater flexibility and reduction of cost and power consumption in a reconfigurable design environment. To validate the flexibility and reconfigurability of the receiver, GSM and 802.11g communication standards have been addressed and adopted during system level study. The frequency plan and filtering scheme were made different for each standard to fully analyze and validate the flexibility of the architecture. A circuit designed and fabricated in 90nm CMOS technology was able to demonstrate the functionality of the receiver.

Non-uniform sampling: In the previous project, the first CMOS anti-alias filtering stage was improved but the costly discrete RF filter could not be suppressed. To deal with the suppression of RF anti-alias filtering, Non Uniform Sampling (NUS) based receiver architectures have been studied in a collaborative project with SUP'COM Tunis. We have demonstrated relaxed constraints on both RF filter and ADC dynamic power consumption using appropriate NUS architecture [307].

Analog to Digital Phase Locked Loop (ADPLL) : An RF synthesizer is another challenging block of a RF analog front-end. By replacing analog blocks, it allows simpler reconfigurability in the case of wideband and high resolution applications. In this context, an ADPLL architectures has been studied and modeled in order to minimize the jitter noise and facilitate the design reuse [290]. The architecture was then proposed to NXP who has fabricated a successful demonstration circuit in 65nm CMOS technology in a collaborative project with TELECOM ParisTech. The collaboration will continue with a new CIFRE thesis.

Software defined radio: The development of the software radio concept is still very much limited by the available resolution and speed of the analog-to-digital conversion stage. Parallel analog-to-digital converters (ADCs) seem to be the best suited way of increasing analog-to-digital conversion rates in complementary metal-oxide-semiconductor (CMOS) technologies. To demonstrate the feasibility of such a goal, a four-channel time-interleaved (TI) SD ADC has been implemented in an advanced 65 nm CMOS process [198]. The objective was an EDGE/UMTS/WLAN

tri-mode TI ADC with signal bandwidth from 135 KHz to 12,5 MHz and resolution from 8 bits to 13 bits. Three intrinsic problems must be overcome: gain-mismatch, offset-mismatch and clock-skew. Among these problems, clock-skew is the more challenging one. We have implemented and demonstrated experimentally a new Mixed-Signal Clock-Skew Calibration Technique based on a digitally trimmable multiphase sampling clock generator. This demonstrator can correct an initial clock skew of thousands of picoseconds with a granularity of 1.8 ps [294]. Three patents have been filed like [440], [448].

Opportunistic Radio: Cognitive radio systems are aiming at seamless mobile connectivity and optimum spectrum management. The ultimate evolution is the *opportunistic radio* where the intelligence and decision power are mostly on the terminal side. Ideally, a wide band RF front-end for future mobile opportunistic terminals must cover multiple standards and bands (from 400 MHz to 5 GHz), and is able to scan the spectrum to detect un-used bands. In this context the team coordinates the TEROPP project - Technologies for terminals in opportunistic radio applications - that associates six Carnot Institutes and three Fraunhofer Institutes. The team is implied in the co design and optimization of the wide band front end elements. This project started in January 2008 and the end will be in September 2011.

Disruptive technologies Disruptive technologies offer new ways to accomplish breakthroughs in cognitive and opportunistic radio. Based on superconductivity physics, the RSFQ (Rapid Single Flux Quantum) logic is a very low power consumption and ultra-fast electronic logic which is considered as the best alternative to CMOS in the ITRS for ultra high frequency applications. The team has proposed an RFSQ Analog to Digital architecture in a work conducted within the ANR Hyperscan project. The goal is a 2x8 bits and 500 MHz BW Sigma-Delta analog-to-digital converter (ADC or CAN) circuit with performance specifications to achieve space telecoms at 30 GHz carrier frequency. To verify the project feasibility, we have developped a model that implements superconductivity physics into the RFSQ ADC circuit simulation [433].

4.2.2 Nanoelectronics Architectures and Circuits

Faculty P.Desgreys, J.F.Naviner

Projects NANOSYS “Action Concertée Incitative CNRS”, NANO-RF (Institute Telecom incentive project), French-Brazilian project supported by CAPES and COFECUB.

Currently developped technologies in electronics have all entered the nanoscale area, and low dimension physical phenomena which need not be taken into account in the past cannot be anymore neglected in the design process. Disruptive technologies are emerging and may become alternatives or complements to the massively used CMOS technologies in the future [172].

In 2004, we began to study novel nanoscale technologies in order on one hand to propose new methods in the architecture and circuit design process and on the other hand to evaluate potentialities of emerging technologies compared to MOS technology. More precisely, the following axis were considered:

- portability of mixed-signal architectures to CMOS nanoscale technologies (collaboration with STMicroelectronics);
- reliability of mixed-signal architectures and circuits;
- device modelling, performance assessment and the comparison with MOS.

Note that the last two axis were initiated in the frame of the national Action Concertée Incitative NANOSYS whose objective was “Architectures pour l’intégration des nanocomposants moléculaires”.

Device modelling, performance assessment and comparison with MOS: Both fundamental and economical CMOS limits generate the need for complementary and alternative technologies, with molecular electronics among the most promising ones. In the framework of two projects NANOSYS (ACI) and NANO-RF (Institute Telecom incentive project) in 2006 and 2007, a compact model of Carbon Nanotubes Field-Effect Transistors (CNTFET) was developed in VHDL-AMS language [336] to explore the high-frequency performance of CNTFET. We have shown

that the cut-off frequency expected for a MOSFET-like CNTFET is well below the performance limit, due to the large parasitic capacitance between electrodes. Our model demonstrates that an array of parallel nanotubes combined in finger geometry to produce a single transistor channel significantly reduces the parasitic capacitance per tube and, thereby, improves the high-frequency performance.

Architectures for sensor devices: Supported by a French Brazilian CAPES/COFECUB project, we have developed research activities on the reconfigurability of sensor acquisition interfaces. Reconfigurability is needed to adapt the interface characteristics to those of a particular sensor, to those of the environment and to the particular type of measurement. These objectives are in some way a generalization of the calibration or self-calibration problems.
Our main target was the biomedical area where each patient's impedance is different. Yet, the measurement accuracy must be kept unchanged to allow for rigorous diagnosis and appropriate medical decisions. Our main result was the development of an automatic compensation method that deals with the impedance mismatch of electrodes in applications like ECG, EEG, etc. This thematic has now been integrated in the researches on reliability considering the convergent problematics [379], [380].

Reliability of mixed-signal architectures and circuits: Works on reliability of analog or mixed-signal architectures were initiated in Oct. 2008 with a PhD thesis. Considering that many circuits are today Systems-on-Chip (SoC), that they include often various analog or mixed-signal sub-circuits and that the reliability level of a SoC results from both the reliability of each sub-parts and the connections/interactions between them, our main objectives are:

- to assess the reliability of basic functions considering the physical causes of failures (ageing effects or other causes),
- to assess the reliability of an architecture working at an abstracted behavioural level,
- to compare basic functions circuitries and architectures on both performance and reliability criteria,
- to define methods of architecture/circuit design that includes the reliability in the design criteria.

The present work is focusing on the reliability of radio-frequency front-ends. After studying the causes of degradation and failures in nanoscale integrated circuits with ageing, we have been working on the reliability assesment of a Low-Noise Amplifier (LNA) given the reliability model of the constituting devices [362].

4.2.3 RF Metrology

Faculty X.Begaud, E.Bergeault, J.C. Cousin, B.Huyart

Main Events Organization of European Microwave Week in Paris on October 2005, Invited seminar on Radar Systems at Universidade Federal do Rio Grande de Norte Natal Brazil, October 2008.

Projects Bilateral project with LNE, Bilateral project with Orange Labs, Bilateral project with Schneider Electric, French-Brazilian project supported by CAPES and COFECUB, ANR Smartvision (Système multi senseur de détection d'objets cachés).

Power Standards: In the HF domain, the power standard is made of a calorimeter including a bolometric fixture. A power standard has been designed and fabricated in coplanar (CPW) waveguide technology with low return losses up to 8 GHz. A 3D electromagnetic simulation and measurements using TRL (Thru, Reflect, Line) calibration were performed. It allowed us to set the entire electrical model, including :

- the transition from the SMA connector to the CPW line
- the radiation
- the γ constant of propagation and the Zc characteristic impedance of the CPW line

- the DC-blocks

The obtained average deviation between the computed and measured efficiency by a micro calorimeter is less than 1.2%. The computed and the measured values are sufficiently close to open the way for a programmable HF power standard using our technology. [394], [395].

Standard Impedances for S-parameters measurements by a probe station: In the context of the design of Microwave Monolithic Integrated Circuits (MMIC), the devices characterisations should be performed on wafer for optimising the reliability and reducing the manufacturing cost. Valid S-parameters measurements with a probe station is however an open metrological challenge. In collaboration with the LNE institute, we realised and tested calibration kits associated to a TRA (Thru, Reflect, Attenuator) calibration method for probe station measurements [398, 395]. The main advantage of the TRA method in comparison with usual LRL (Line Reflect Line) method is the small size of the new standards. In that way, the manufacturer may add standards on the tested devices wafer to get the same electromagnetic propagation conditions between the calibration step and the test step.

Non-linear characterisation of power amplifier: Non linearities at the RF front-end level(power amplifiers for example) are a known source of impairment in wireless digital communications. It causes spectral spreading over adjacent channels and distorts the base band data. To reduce the distortion effects due to power amplifiers in the case of FSK, QPSK or 16 QAM modulated signals, we have successfully exploited a linearisation technique using a memoryless computed predistortion of the base band signals [314]. In order to study the impact of source and load impedances at the fundamental, the second harmonic and the low (base band) frequencies on the linearity, the efficiency and the level of transistors output power, a “sourcepull”-“load-pull” characterisation bench involving base band predistortion has been demonstrated [292, 315, 326, 293].

Radio communications channel sounding: The performances of a wireless propagation channel are strongly dependent on the propagation environment between the emitter and the receiver. A real time propagation channel sounder operating both in the time domain and the spatial domain is highly desirable for the complete characterisation of the channel specificities. Most sounders consist of virtual antenna array or actual antenna array with switches and few emitting elements. Furthermore, the output of the antenna is generally connected to a Vector Network Analyzer (VNA).
In contrast, we developed a sounder designed for non stationary MIMO channel. The sounder is formed by a linear array of 4 antennas at the emitter side and a linear array of 16 antennas at the receiver side. Each antenna is connected to a low cost zero IF receiver designed by our lab (see next section). The number of emitting elements permits to increase the range of Doppler frequency measurement and the precision on the AOA of the waves.
The current version of our sounder measures the angles of arrival (AOA) of impinging waves in the azimuth and elevation plans altogether with their time delays in indoor environments. In the case of non stationary channels, a chirp signal (FMCW) is used instead of step CW in order to reduce the acquisition time of the sounder [303]. To demonstrate the unique accuracy of the sounder in time-varying environments, we carried out an experimentation with an emitter moving at a speed of 1.1m/s along a rail parallel to the receiver antenna array. The Doppler frequency was measured with a precision of 0.2 Hzs [363].
The angles of departure of the emitted waves are determined using a virtual array of a 4 antennas. In that case, the channel is assumed to be stationary [364]. The sounder operates in the frequency range 2.1-2.8 GHz which is the bandwidth of the quasi Yagi antenna we have designed. The time and angle resolutions of the sounder are respectively 0.5ns and 2° using sub space methods (MUSIC, ESPRIT).
The correlation between the orthogonally polarized waves must also be characterized if the designer wants to exploit polarisation diversity. The quasi Yagi antennas have been replaced by a home designed array of 4 double patch antennas which covers up to 500 MHz around 2.45 GHz with double polarisation capability. A 2-paths scenario was emulated in an anechoic chamber and joint time delay, direction of arrival and polarization estimation were performed. The discrepancies between theoretical and experimental values are less than 0.2 ns and 10° [365].

A second research activity concerns the design of a channel sounder for Ultra Wide Band (UWB) applications. A UWB RF receiver using microstrip technology on FR4 substrate and UWB antennas have been codesigned in the frequency range 6-8.5-GHz [338]. Presently, the SIMO channel sounder consists of 8 receivers. Preliminary experimental results performed in an anechoic chamber demonstrate an accuracy of 2° for the AOA (Angle of Arrival) azimuth and 0.1 ns for the delay [339].

A third research activity was the realisation of a MIMO platform which was derived from the sounder by replacing the FMCW source by 2 modulated sources of same frequency 2.4 GHz. Beamforming was used in order to recover the signal of each source and improve the link quality in a spatial multiplexing mimo system [319].

Radar Applications: The aim was the design of a short range (1 m) radar operating in the 2.45 Ghz ISM band for low cost operation. The challenges for such radar are the detection of close targets using a signal of limited frequency bandwidth (80 MHz) and the rejection of unwanted signals in a widely used electromagnetic band. Using our work on demodulation techniques, a new radar architecture was designed based on a coded BPSK signal and the phase difference detection of successive carrying signals) [367]. This work has been done in collaboration with Schneider Electric and protected by two patents [442].

4.2.4 Wireless Communication Systems Technology

Faculty X.Begaud, B. Huyart, A.C.Lepage

Main events PhD Award of the Thales AirBorne Systems (2006, L. Schreider); UWB Autumn's School: Communications, Localization and Radar (23th-27th October 2006, Valence, France) in the framework of GDR ONDES, CNRS with X.Begaud (General Chairman).

Projects CONRAHD/OPTIMUM (CONnexion Radio sans fil Haut Débit) from the French Cluster "SYSTEM@TIC PARIS-REGION", bilateral projects with Thales Airborne Systems (2) and Thales Air Systems (1); PUMA (Produit Ultra haut débit sur bande millimétrique) from the French Cluster "SYSTEM@TIC PARIS-REGION"

MMIC design for RF "front-end":

Within the framework of CONRAHD/OPTIMUM, we realised the design and the tests of an integrated mixer circuit on GaAs in the 40.5-43.5 GHz frequency bandwidth. This resistive up-converter mixer is dedicated to Local Multipoint Distribution Service (LMDS) applications for short ranges, multi users, multi applications or multi communication standards. The mixer is the most linear device reported so far in this bandwidth in the up-converter mode [356].

For software defined radio applications, we have designed a Zero-IF three-phase demodulator in MMIC technology operating in the 1-24 GHz bandwidth to solve the problems of multi standards management [414, 443]. The main contributions were in the design of phase shifters and distributed mixers which can operate in such very large bandwidth.

Another three-phase demodulator and a classical IQ demodulator using Gilbert cell have also been designed and compared around 40 GHz [439]. They demonstrated direct demodulation of high frequencies signals (upper than 40 GHz) to base band signals. We proved that the use of Zero-If three-phase demodulator cancelled naturally the DC offsets as well as many damaging non linearities effects for the reception sensibility of a Zero-If demodulator [441]. An original calibration algorithm, based on blind technique using an unknown signal for homodyne receivers, was developed to reduce significantly the physical and signal processing stresses in the case of software radio applications [302]. The results were further improved using a bytes synchronisation method for blind-calibrating the demodulator and taking into account the defaults introduced by the propagation channel [360].

Wide band antennas design: The RF team's research is devoted to the design of wideband antennas and arrays. We initially focused our work on UWB (UltraWideBand) applications. While most UWB studies concentrate on omnidirectional antennas, we developed a unique compact,

directive UWB antenna with excellent performance both in frequency-domain and time-domain between 3.1 and 6 GHz [301]. The directive UWB antenna enables a 6 dB improvement in the budget link, a key feature in UWB considering the low power level of the emitted signal.

Following these results, we concentrated on the design of novel artificial materials to reduce the thickness of wideband antennas. The developed materials exploit periodic structures in order to exhibit the behaviour of an Artificial Magnetic Conductor (AMC) as well as that of an electromagnetic band-gap (EBG) structure. We designed a novel reflector that could demonstrate a wideband AMC behaviour (no phase shift on the reflected electric field) over a decade. By placing a radiating element very close to this reflector, we conceived the world's first antenna which is able to work over a decade with a thickness of one hundredth of the wavelength of the lowest frequency. This work has led to a patent [450] and has received the Thales Aerospace Division's PhD Award in 2006.
Our current challenge is to improve the radiation efficiency and the gain of these antennas. We are developing a new methodology that takes into account the interaction between the radiating element and its artificial ground plane. We are also considering refined characterizations of the artificial material itself, a necessary step for improving our control on the phenomena occurring in these metamaterials [343, 384]. Finally, we are applying our artificial materials to the problem of reducing the coupling between elements in a wideband antennas array, with a focus on analytical models [358].

Most wideband antennas, eg. spiral or sinuous antennas, require a balanced feeder which is generally bulky. Recently, we demonstrated a compact wideband coplanar balun for dual polarized compact antennas. We proved in this work that it is possible to design a small size feeder closed with a radiating surface [451].

4.3 References

4.3.1 ACL: Articles in ISI-Indexed Journals

[290] W. Altabban, P. Desgreys, and H. Petit. Behavioral model of LC VCO with LTV phase noise in VHDL-AMS. *Transactions on Systems, Signals and Devices*, 3(4):445–468, Dec. 2008.

[291] S. Ben Salem, M. Fakhfakh, D. Masmoudi, M. Loulou, P. Loumeau, and N. Masmoudi. A high performances CMOS CCII and high frequency applications. *Analog Integrated Circuits and Signal Processing*, 49(1):71 – 78, Oct. 2006.

[292] S. Bensmida, E. Bergeault, G. I. Abib, and B. Huyart. Power amplifier characterization : An active load-pull system based on six-port reflectometer using complex modulated carrier. *IEEE Transactions on Microwave Theory and Techniques*, 54(6):2707–2712, June 2006.

[293] S. Bensmida, E. Bergeault, and G. Berghoff. Measurements under pulsed rf and complex modulated signals using six-port reflectometers. *IEEE Transactions on Instrumentation and Measurement*, 56:pp. 2164–2168, Dec. 2007.

[294] D. Camarero, K. B. Kalaia, J. F. Naviner, and P. Loumeau. Mixed-signal clock-skew calibration technique for time-interleaved adcs. *IEEE Transactions on Circuits and Systems I : Regular Papers*, 55(11):3676 – 3687, Dec. 2008.

[295] F. R. De Sousa, B. Huyart, and S. Y. Catunda. A to d converters and look-up tables dimensioning for systems based on six-or five-port interferometers. *IEEE Transactions on Instrumentation and Measurement*, 54(3):1254–1259, June 2005.

[296] H. Ghannoum, C. Roblin, and X. Begaud. Investigation and Modeling of the UWB On-Body Propagation Channel. *Wireless Personal Communications Journal*, May 2008.

[297] A. Kazemipour and X. Begaud. Calculable dipole antenna for EMC measurements with low-loss wide-band balun from 30mhz to 2ghz. *Electromagnetics*, 25(3):187–202, Apr. 2005.

[298] A. Kazemipour and X. Begaud. Analytical study of printed dipoles with closed-form impedance formulas. *Microwave and Optical Technology Letters*, 45(4):345–347, Apr. 2005.

[299] A. Latiri, L. Joet, P. Desgreys, and P. Loumeau. A Reconfigurable RF Sampling Receiver for Multistandard Applications. *Comptes Rendus Physique*, 7(7):785 – 793, Sept. 2006.

[300] A. Latiri, L. Joet, P. Desgreys, and P. Loumeau. Passive second-order anti-aliasing filter for RF sampling based receivers. *ELECTRONICS LETTERS*, 43(1), Jan. 2007.

[301] A. C. Lepage, X. Begaud, G. Le Ray, and A. Sharaiha. UWB directive triangular patch antenna. *International Journal of Antennas and Propagation*, Jan. 2008.

[302] K. Mabrouk and G. Neveux. Three-dimensional aspect in the five-port technique for zero-if receivers and a new blind calibration method. *IEEE MTT*, 56(6):1389–1396, June 2008.

[303] S. Martinez Lopez, A. Judson Braga, H. Elarja, B. Huyart, and J. C. Cousin. High-Resolution Estimation using a Chirp Signal for Mobile Wideband MIMO Channel Sounding. *European Transactions on Telecommunications*, 2007.
[304] S. Martinez Lopez, J. Braga, B. Huyart, and J. C. Cousin. Multiplexing technique for dod and doa estimation. *IET Microwaves, Antennas & Propagation*, Dec. 2008.
[305] C. Mohamed, A. Khy, and B. Huyart. A (1-20 ghz broadband mmic demodulator for low if receivers in multi-standard applications. *IEEE Microwave Theory and Techniques*, Jan. 2009.
[306] F. Rangel De Sousa and B. Huyart. Five port receiver with improved sensitivity. *Microwave and Optical Technology Letters*, 50(11):2945–2947, Nov. 2008.
[307] C. Rebai, M. Ben Romdhane, P. Desgreys, P. Loumeau, and A. Ghazel. Pseudorandom signal sampler for relaxed design of multistandard radio receiver. *Microelectronics Journal*, 40:991–999, June 2009.
[308] L. Schreider, X. Begaud, M. Soiron, B. Perpere, and C. Renard. Broadband archimedean spiral antenna above a loaded electromagnetic band gap substrate. *IET Microwaves, Antennas & Propagation*, 1(1):212–216, Feb. 2007.
[309] A. Sibille, C. Roblin, S. Bories, and A. C. Lepage. A channel-based statistical approach to antenna performance in uwb communications. *IEEE Transactions on Antennas and Propagation*, 54(11):3207–3215, Nov. 2006.
[310] M. Vahdani and X. Begaud. Wideband integrated cps-fed dual polarized quasi bow-tie antenna. *Microwave and Optical Technology Letters*, 51(9), Sept. 2009. To appear.
[311] V. Y. Vu, A. J. Braga, X. Begaud, and B. Huyart. Measurement of direction-of-arrival of coherent signals using five-port reflectometers and quasi-yagi antennas. *IEEE Microwave and Wireless Component Letters*, 15(9):558–560, Sept. 2005.
[312] V. Y. Vu, A. Kohmura, J. Braga, X. Begaud, and B. Huyart. Simplified propagation channel characterization considering the disturbance of antennas in the case of a multi-path cluster. *Microwave and Optical Technology Letters*, 50(10):2604–2608, Oct. 2008.
[313] S. Zouari, H. Daoud, M. Loulou, P. Loumeau, and N. Masmoudi. High order cascade multibit ΣΔ modulator for wide bandwidth applications. *INTERNATIONAL JOURNAL OF ELECTRONICS, CIRCUITS AND SYSTEMS*, 1(1):60 – 66, 2007.

4.3.2 ACTI: Articles in Proceedings of International Conferences

[314] G. I. Abib, E. Bergeault, S. Bensmida, and B. Huyart. A source-pull/load-pull measurement system including power amplifier linearization using simple instantaneous memoryless polynomial base-band predistortion. In *EUropean Microwave Week*, Manchester, Sept. 2006.
[315] G. I. Abib, S. Bensmida, E. Bergeault, and B. Huyart. Experimental characterization of power transistors for linearity optimization. In *EUMW 2008*, Amsterdam, Oct. 2008.
[316] W. Altabban, P. Desgreys, and H. Petit. Time dependent phase noise model for LC VCO using VHDL-AMS. In *IEEE Int. Conf. on Sensors, Circuits and Instrumentation Systems*, Hammamet, Tunisia, Mar. 2007.
[317] M. Bahouche, D. Allal, and E. Bergeault. A simple impedance correction for on-wafer tan calibration techniques. In *Conference on Precision Electromagnetic Measurement (CPEM)*, Broomfield, USA, June 2008.
[318] X. Begaud. Ultra wideband wide slot antenna with band-rejection characteristics. In *Eucap 2006*, Nice France, Nov. 2006.
[319] H. Ben Maad, S. Sallem, K. Mabrouk, and B. Huyart. Improvement of the link quality in a spatial multiplexing mimo system using beamforming. In *EUMC*, Amsterdam, Oct. 2008.
[320] M. Ben Romdhane, C. Rebai, A. Ghazel, P. Desgreys, and P. Loumeau. Non-Uniform Sampling Schemes for IF Sampling Radio Receiver. In *Design and Test of Integrated Systems*, Tunis, Tunisia, Sept. 2006.
[321] M. Ben Romdhane, P. Desgreys, P. Loumeau, C. Rebai, and A. Ghazel. Intérêt et applications de l'echantillonnage non-uniforme pour les récepteurs radio multistandard. In *TAISA*, Lyon France, Oct. 2007.
[322] M. Ben Romdhane, C. Rebai, K. Grati, A. Ghazel, G. Hechmi, P. Desgreys, and P. Loumeau. NON-UNIFORM SAMPLED SIGNAL RECONSTRUCTION FOR MULTISTANDARD WiMAX/WiFi RECEIVER. In *IEEE Int. Conf. on Signal Processing and Communications*, Dubaï, United Arab Emirates, Nov. 2007.
[323] M. Ben Romdhane, C. Rebai, A. Ghazel, P. Desgreys, and P. Loumeau. Low power data conversion based on non uniform sampling for multistandard receiver. In *IEEE DTIS2009*, Cairo, Egypt, Apr. 2009.
[324] M. Ben Romdhane, C. Rebai, A. Ghazel, P. Desgreys, and P. Loumeau. Pseudorandomly controlled adc characterization towards multistandard receiver. In *IEEE Int. Conf. on Sensors, Circuits and Instrumentation Systems SSD'09*, Djerba, Tunisia, Mar. 2009.
[325] S. Bensmida, E. Bergeault, G. I. Abib, and B. Huyart. Power amplifier characterization : An active load-pull system based on six-port reflectometer using complex modulated carrier. In *EUropean Microwave Week*, Paris, Oct. 2005.
[326] S. Bensmida, F. M. Ghannouchi, and E. Bergeault. An original setup for power amplifier am-am and am-pm characterization. In *nstrumentation and Measurement Technology Conference Proceedings,IMTC 2008*, Vancouver, Canada, May 2008.
[327] A. J. Braga, V. Y. Vu, B. Huyart, and J. C. Cousin. Wideband spatio-temporal channel sounder using music and enhanced 2d-ss. In *European Conference of Propagation and Systems*, Brest, Mar. 2005.
[328] A. J. Braga, V. Y. Vu, B. Huyart, and J. C. Cousin. Beamforming system using five-port discriminator. In *European Conference on Wireless Technology 2005*, Paris, Oct. 2005.
[329] A. J. Braga, V. Y. Vu, B. Huyart, and J. C. Cousin. Smart antennas using five-port reflectometer. In *International Microwave and Optoelectronics Conference*, Brasilia (Brésil), July 2005.

[330] D. Camarero, J. F. Naviner, and P. Loumeau. Calibration of sampling instants in a multiple channel time-interleaved. In *IEEE International Conference on Electronics, Circuits and Systems*, La Marsa, Tunisie, Dec. 2005.
[331] D. Camarero, K. Ben Kalaia, J. F. Naviner, and P. Loumeau. Mixed-signal clock-skew calibrator for time-interleaved analog-to-digital converters. In *Design, Automation and Test in Europe, DATE*, Nice, France, Apr. 2007.
[332] D. Camarero De La Rosa, J. F. Naviner, and P. Loumeau. Calibration of sampling instants in a multiple channel time-interleaved analog-to-digital converter. In *IEEE International Conference on Electronics, Circuits and Systems, ICECS 2005.*, Gammarth, Dec. 2005.
[333] S. Y. C. Catunda, J. F. Naviner, R. C. S. Freire, and G. A. L. Pinheiro. Programmable gain and dc level shift analog signal conditioning circuit: Microcontroller based implementation. In *IMTC 2005 IEEE Instrumentation and Measurement Technology Conference*, Ottawa, Canada, May 2005.
[334] J. C. Cousin, N. Samama, and A. Vervisch-Picois. An indoor positioning system using GPS repeaters and AOA measurements. In *ION GNSS 2005*, Long Beach (USA), Sept. 2005.
[335] J. I. S. De Oliveira, S. Y. C. Catunda, A. K. Barros, and J. F. Naviner. Multi-layer level measurement using adaptive filtering. In *IMTC 2005 - IEEE Instrumentation and Measurement Technology Conference*, Ottawa, Canada, May 2005.
[336] P. Desgreys, J. Gomes Da Silva, and D. Robert. Dispersion Impact on Ballistic CNTFET N+-I-N+ Performances. In *European Nano Systems 2006*, Paris, France, Dec. 2006.
[337] P. Desgreys, R. Guelaz, and P. Loumeau. Band-pass sigma-delta adc design in rsfq technology. In *6ème journées " Dispositifs supraconducteurs " Journées SUPRA 2009*, Fréjus, France, May 2009.
[338] H. El Arja, K. Mabrouk, B. Huyart, and X. Begaud. Wideband demodulator for uwb channel sounder. In *38th European Microwave Conference 2008*, Amsterdam Pays-Bas, Oct. 2008.
[339] H. El Arja, K. Mabrouk, B. Huyart, and x. begaud. Joint toa/doa measurements for uwb indoor propagation channel using music algorithm. In *European Microwave Conference 2009, EUMC*, Rome , Italie, Sept. 2009.
[340] H. Fakhoury, C. Jabbour, H. Khushk, V. T. Nguyen, and P. Loumeau. A 65nm cmos edge/umts/wlan tri-mode four-channel time-interleaved sd adc. In *Joint Conference IEEE NEWCAS - TAISA'09*, Toulouse France, June 2009.
[341] H. Ghannoum, C. Roblin, and X. Begaud. Investigation of the UWB On-Body Propagation Channel.
[342] H. Ghannoum, R. D'Errico, C. Roblin, and X. Begaud. Characterization of the UWB on-body propagation channel. In *Eucap 2006*, Nice France, Nov. 2006.
[343] M. Grelier, X. Begaud, and L. Schreider. Loaded electromagnetic band gap reflector with a thin film resistor. In *META'08 & NATO ARW*, Marrakesh, Maroc, May 2008.
[344] R. Guelaz, P. Desgreys, and P. Loumeau. A sigma-delta bandpass ADC modelling in superconducting rsfq technology with VHDL-AMS. In *Forum On Design and Languages 2008*, Stuttgart-Allemagne, Sept. 2008.
[345] R. Guelaz, P. Desgreys, P. Loumeau, and P. Febvre. RSFQ comparator behaviour modelling for sigma-delta bandpass ADC. In *Conference on Design of Circuits and Integrated Systems*, Grenoble-France, Nov. 2008.
[346] R. Guelaz, P. Desgreys, and P. Loumeau. Superconducting circuits design tool: Application to high frequency sigma delta ad. In *University Booth at DATE09*, Nice, Apr. 2009.
[347] Y. Hervé and P. Desgreys. "Functional Virtual Prototyping Design Flow and VHDL-AMS. In *Forum on specification & Design Languages*, Darmstadt, Germany, Sept. 2006.
[348] C. Jabbour, D. Camarero, V. T. Nguyen, and P. Loumeau. Optimizing the number of channels for time-interleaved sample-and-hold circuits. In *IEEE NEWCAS-TAISA'08 Conference*, pages 245 – 248, Montréal, Canada, June 2008.
[349] A. Kazemipour and X. Begaud. Novel bi-polarization broadband wire antenna. In *2006 IEEE APS International Symposium*, Albuquerque USA, July 2006.
[350] A. Kazemipour and X. Begaud. Simple closed-form formula for the impedance of printed dipole. In *2005 IEEE AP-S International Symposium*, Washington DC, July 2005.
[351] A. Kazemipour and X. Begaud. Standard electromagnetic compatibility (emc) measurements, feasibility of a wide-band calculable antenna. In *2008 URSI General Assembly*, Chicago, USA, Aug. 2008.
[352] A. Kazemipour, D. Allal, and X. Begaud. Roughness of the ground-plane and its effect on the antenna calibration in an open-field site. In *URSI GA 2005*, New Delhi, Inde., Oct. 2005.
[353] A. Kazemipour, X. Begaud, and D. Allal. E-Field Measurement, Accuracy and Uncertainties. In *Electromagnetic Compatibility and Electromagnetic Ecology, 2007 7th International Symposium on*, pages 189–191, Saint-Petersburg Russia, June 2007.
[354] H. A. Khushk, V. T. Nguyen, and P. Loumeau. Improved cascaded delta-sigma architecture with high signal to noise ratio and reduced distortion. In *IEEE NEWCAS-TAISA'08 Conference*, pages 201 – 204, Montréal, Canada, June 2008.
[355] A. Khy and B. Huyart. A 94 GHz radar using a six-port reflectometer as a phase/frequency discriminator. In *EuRad2005*, Paris, Oct. 2005.
[356] A. Khy, B. Huyart, and H. Teillet. A highly linear (40.5 - 43.5) ghz mmic single balanced phemt resistive up-converter mixer for lmds applications. In *EUMC 2008*, Amsterdam , Pays Bas, Oct. 2008.
[357] A. Latiri, L. Joet, P. Desgreys, and P. Loumeau. Récepteur à échantillonnage RF reconfigurable pour applications multistandards. In *Journées scientifiques "vers des radiocommunications reconfigurables et cognitives"*, Paris, France, Mar. 2006.
[358] F. Linot, X. Begaud, M. Soiron, C. Renard, and B. Perpere. Mutual coupling reduction using a thin modified electromagnetic band gap. In *META'08 & NATO ARW*, Marrakesh, Maroc, May 2008.
[359] K. Mabrouk, C. Mohamed, B. Huyart, X. Begaud, and S. Abou Chakra. A practical DIDO communication platform.

In *European Conference on Wireless Technology 2006 IEEE*, Manchester UK, Sept. 2006.

[360] K. Mabrouk, B. Huyart, X. Begaud, and A. Belhadjmohamed. Baseband to baseband calibration for MIMO wireless system. In *European Conference on Wireless Technology 2007 IEEE*, Munich, Allemagne, Oct. 2007.

[361] P. Maris Ferreira, H. Petit, and J. F. Naviner. Conception de circuit rf pour la fiabilité. In *Journées Nationales du Réseau Doctoral de Microélectronique*, Lyon, France, May 2009.

[362] P. Maris Ferreira, H. Petit, and J. F. Naviner. Cmos 65nm wideband lna reliability estimation. In *IEEE NEWCAS - TAISA*, Toulouse, France, June 2009.

[363] S. Martinez Lopez, J. A. Braga, H. Elarja, B. Huyart, and J. C. Cousin. High-resolution estimation using a chirp signal for wideband MIMO channel sounding. In *13th European Wireless 2007*, Paris, Apr. 2007.

[364] S. Martinez Lopez, B. Huyart, and H. Elarja. A novel method for direction of departure estimation using a linear frequency modulated signal. In *EuMc 2007*, Munich, Oct. 2007.

[365] S. Martinez Lopez, A. Judson Braga, B. Huyart, and J. C. Cousin. Polarization measurement results for wideband multi-target RADAR using five-port receivers. In *IEEE Radarcon 2008*, Rome (Italie), May 2008.

[366] S. Masmoudi, M. Fakhfakh, M. Loulou, N. Masmoudi, and P. Loumeau. A CMOS 80 MHz Low-Pass Switched-Current Fourth Order Sigma Delta Modulator. In *IEEE Int. Conf. on Sensors, Circuits and Instrumentation Systems*, Hammamet, Tunisia, Mar. 2007.

[367] I. Masri, B. Huyart, J. C. Cousin, and T. Boudet. Short range detector of static or mobile targets in the 2.45 GHz ISM band. In *EUMW / EURAD*, Manchester (Angleterre), Sept. 2006.

[368] R. Mina, J. C. Grasset, and J. F. Naviner. Impact of charge injection on system-level performance of a discrete-time GSM Receiver. In *IEEE International Conference on Electronics, Circuits and Systems*, Nice, France, Dec. 2006.

[369] C. Mohamed, K. Mabrouk, S. Abou Chakra, and B. Huyart. Interference rejection in a five-port homodyne receiver. In *Eumc 2006*, Manchester (Angleterre), Sept. 2006.

[370] V. T. Nguyen, P. Loumeau, and J. F. Naviner. VHDL-AMS behavioral modelling and simulation of high-pass delta-sigma modulator. In *BMAS*, San Jose, Californie, Etats Unis, Sept. 2005.

[371] V. T. Nguyen, P. Desgreys, J. F. Naviner, and P. Loumeau. Noise analysis in high-pass delta sigma modulator. In *IMTC 2006*, Sorrente, Italie, Apr. 2006.

[372] V. T. Nguyen, J. F. Naviner, and P. Loumeau. High-pass delta sigma modulator: From system analysis to circuit design. In *ISCAS 2006*, Kos, Grèce, May 2006.

[373] V. T. Nguyen, J. F. Naviner, and P. Loumeau. A CMOS implementation of time-interleaved high-pass delta sigma modulator. In *ISCAS 2006*, Kos, Grèce, May 2006.

[374] V. T. Nguyen, H. Petit, P. Loumeau, and J. F. Naviner. High-pass sigma-delta modulator. In *Design, Automation and Test in Europe, DATE*, Nice, France, Apr. 2007.

[375] S. Peychet, P. Desgreys, and C. Ware. Simulation of jitter in an optoelectronic PLL with VHDL-AMS. In *XX Conference on Design of Circuits and Integrated Systems*, Lisboa - Portugal, Nov. 2005.

[376] A. Riaz, J. F. Naviner, and V. T. Nguyen. A novel approach to non‐coherent UWB reception. In *IMTIC'08, International MultiTopic Conference*, Mehran, Pakistan, Apr. 2008.

[377] L. Schreider, X. Begaud, M. Soiron, and B. Perpere. Thickness reduction of unidirectional spiral antennas. In *Antenna technology and applied electromagnetics 2005*, St Malo, June 2005.

[378] L. Schreider, X. Begaud, M. Soiron, and B. Perpere. Design of a broadband archimedean spiral antenna above a thin modified electromagnetic band gap substrate. In *Eucap 2006*, Nice France, Nov. 2006.

[379] I. S. S. Silva, J. F. Naviner, and R. C. S. Freire. Compensation of electrodes impedances mismatch in biopotential measurement. In *MeMeA 2006 - International Workshop on Medical Measurement and Applications*, Benevento, Italie, Apr. 2006.

[380] I. S. S. Silva, J. F. Naviner, and R. C. S. Freire. Cmos integrated circuit for power-line interference reduction in biopotential measurements. In *MeMeA 2006 - International Workshop on Medical Measurement and Applications*, Benevento, Italie, Apr. 2006.

[381] S. Souari, P. Loumeau, M. Loulou, and N. Masmoudi. High order cascade multibit ΣΔ modulators for wide bandwidth applications. In *IEEE International Conference on Electronics, Circuits and Systems*, La Marsa, Tunisie, Dec. 2005.

[382] D. Teixeira Franco, J. F. Naviner, and L. Naviner. Chemins de données robustes pour les systèmes de traitement du signal. In *Journées Nationales du Réseau Doctoral en Microélectronique, JNRDM*, Lille, France, May 2007.

[383] D. Teixeira Franco, J. F. Naviner, and L. Naviner. Convolution blocks based on self-checking operators. In *14th International Conference Mixed Design of Integrated Circuits and Systems - Mixdes*, Ciechocinek, Pologne, June 2007.

[384] A. Thior, A. C. Lepage, and X. Begaud. Low profile, directive and ultra wideband antenna on a high impedance surface. In *Eucap 2009*, Berlin Allemagne, Mar. 2009.

[385] M. Troudi, S. Zouari Krichen, P. Loumeau, M. Loulou, and N. Masmoudi. Conception d'un convertisseur n/a à capacités commutées linéarisé par la méthode dwa. In *Journées Scientifiques des Jeunes Chercheurs rn Génie Electrique et Informatique*, pages 375 – 382, Hammamet, Tunisie, Mar. 2006.

[386] M. Vahdani and X. Begaud. A directive ultra wideband sinuous slot antenna. In *Eucap 2006*, Nice France, Nov. 2006.

[387] M. Vahdani and X. Begaud. Sinuous antenna fed by a microstrip-to-cps balun. In *Eucap 2009*, Berlin Allemagne, Mar. 2009.

[388] V. Y. Vu, A. J. Braga, X. Begaud, and B. Huyart. Direction of arrival and time of arrival measurements using five-port reflectometers and quasi-yagi antennas. In *Antenna Technology and Applied Electromagnetics (ANTEM)*, St Malo, June 2005.

[389] V. Y. Vu, A. J. Braga, X. Begaud, and B. Huyart. Direction of arrival and time delay measurements for multi-path signals using five-port reflectometers. In *2005 IEEE AP-S International Symposium*, Washington DC, July 2005.
[390] V. Y. Vu, A. J. Braga, X. Begaud, and B. Huyart. Narrow band direction of arrival measurements using five-port reflectometers and quasi-yagi antennas. In *European Conference on Propagation and Systems*, Brest - France, Mar. 2005.
[391] V. Y. Vu, A. J. Braga, X. Begaud, and B. Huyart. Joint TOA/DOA measurements for spatio-temporal characteristics of 2.4 GHz indoor propagation channel. In *European Conference on Wireless Technology 2005*, Paris, Oct. 2005.
[392] J. Zbitou, C. Minot, X. Begaud, and B. Huyart. Bow-tie wideband antenna design for CW Thz photonic transmitters. In *PIERS 2008 in Cambridge*, Cambridge, USA, July 2008.
[393] F. Ziadé, A. Kazemipour, D. Allal, and E. Bergeault. Optimized time-domain simulator for a calculable RF power standard. In *AMCTM VII*, lisbone, June 2005.
[394] F. Ziadé, A. Kazemipour, E. Bergeault, D. Allal, and M. Bourghes. TOWARD A CALCULABLE RF POWER STANDARD. In *Conference on Precision Electromagnetic Measurement s(CPEM)*, Turin, Italie, July 2006.
[395] F. Ziadé, A. Kazemipour, E. Bergeault, D. Allal, and M. Bourghes. Rf power measurement, calculable primary standard. In *Conference on Precision Electromagnetic Measurement (CPEM)*, Broomfield, USA, June 2008.

4.3.3 ACTN: Articles in Proceedings of French Conferences

[396] G. I. Abib, S. Bensmida, E. Bergeault, and B. Huyart. Banc de mesure source-pull / load-pull pour amplificateurs de puissance. In *JNM 2007*, Toulouse, May 2007.
[397] W. Altabban, P. Desgreys, and H. Petit. Implémentation et simulation d'un modèle LTV du bruit de phase dans un VCO. In *TAISA*, Lyon France, Oct. 2007.
[398] M. Bahouche, D. Allal, E. Bergeault, and B. Huyart. évaluation de la technique de calibrage tra (thru reflect attenuator) pour la traçabilité des mesures sous pointes. In *JNM 2007*, Toulouse, May 2007.
[399] X. Begaud. Antenne large bande et métamatériaux. In *Journées d'études SEE - ANTENNES NON STANDARD*, Villebon sur Yvette, Jan. 2009.
[400] S. Bensmida, E. Bergeault, G. I. Abib, and B. Huyart. Banc de caractérisation fonctionnelle de transistor de puissance en présence de signaux modulés. In *Journées Nationales des Micro ondes*, Nantes, May 2005.
[401] A. J. Braga, V. Y. Vu, B. Huyart, and J. C. Cousin. Système de formation de faisceaux utilisant des réflectomètres cinq-port. In *Journées Nationales de Microondes*, Nantes, May 2005.
[402] E. Colin and J. F. Naviner. Spécifications des blocs d'un récepteur à partir des spécification globales : L'exemple de l'UMTS. In *Colloque sur le Traitement Analogique de l'Information, du Signal et ses Applications*, Marseille, France, Oct. 2005.
[403] E. Colin, P. Desgreys, and H. Petit. Simulation d'un Frontal de Réception RF. In *Colloque sur l'Enseignement des Technologies et des Sciences de l'Information et des Systèmes*, Nancy, France, Oct. 2005.
[404] J. C. Cousin. Radar multistatique d'aide à la conduite pour le positionnement 2D de cible à courtes distances par la technique FMCW associée à l'interférométrie. In *JNM 2007*, Toulouse, May 2007.
[405] P. Desgreys, J. Gomes Da Silva, and D. Robert. Impact de la dispersion sur les performances du CNTFET n+-i-n+ balistique. In *Traitement Analogique de l'Information, du Signal et ses Applications*, Strasbourg, France, Oct. 2006.
[406] H. El Arja, B. Huyart, and X. Begaud. Estimation conjointe des retards et des directions d'arrivées dans un canal ulb par la méthode music. In *JNM*, Grenoble France, May 2009.
[407] A. Judson Braga, V. V. Yem, S. Martinez Lopez, B. Huyart, and J. C. Cousin. Mesure des angles d'élévation et d'azimuth utilisant des réflectomètres cinq-port. In *CNFRS-URSI*, Paris, Mar. 2006.
[408] H. A. Khushk, V. T. Nguyen, and P. Loumeau. Novel architecture for high-pass cascaded delta-sigma modulator. In *TAISA 2007*, Lyon, France, Oct. 2007.
[409] A. Latiri, M. Ben Romdhane, P. Desgreys, and P. Loumeau. Impact du bruit de phase sur les performances de l'échantillonnage RF. In *Colloque sur le Traitement Analogique de l'Information, du Signal et ses Applications*, Marseille, France, Oct. 2005.
[410] F. Linot, X. Begaud, M. Soiron, C. Renard, and M. Labeyrie. Caractérisation d'une surface haute impédance chargée par des résistances. In *JNM*, Grenoble France, May 2009.
[411] m. bahouche, E. Bergeault, and D. Allal. Calibrage de l'analyseur de réseau vectoriel sur wafer avec la méthode d'auto-calibrage lar (line attenuator reflect). In *JNM 2009*, Grenoble, May 2009.
[412] K. Mabrouk, B. Huyart, X. Begaud, and A. Belhadjmohamed. Auto-calibrage du récepteur homodyne cinq-port. In *JNM 2007*, Toulouse, May 2007.
[413] S. Martinez Lopez, H. Elarja, B. Huyart, and J. C. Cousin. Sondage de canal haute-résolution utilisant un signal chirp. In *JNM 2007*, Toulouse, May 2007.
[414] C. Mohamed and B. Huyart. Conception d'un récepteur 15 GHz Low IF en technologie MMIC utilisant la technique " 5 port ". In *JNM 2007*, Toulouse, May 2007.
[415] r. mohellebi, S. Manga, H. El Arja, and B. Huyart. Télécommunications sans fils par retournement temporel. In *JNM 2009*, Grenoble, May 2009.
[416] S. Souari, P. Loumeau, M. Loulou, and N. Masmoudi. Modulateur Sigma Delta mash 2-1-1 multi-bits linéarisé par "DWA" pour application radiomobile large bande. In *Colloque sur le Traitement Analogique de l'Information, du Signal et ses Applications*, Marseille, France, Oct. 2005.
[417] V. Y. Vu, A. J. Braga, X. Begaud, and B. Huyart. Estimation des directions d'arrivée et des retards de propagation

par utilisation de la technique cinq-port. In *14èmes Journées Nationales Micro-ondes JNM 2005*, Nantes, May 2005.
[418] F. Ziadé, A. Kazemipour, D. Allal, and E. Bergeault. Faisabilité d'un étalon calculable de puissance hf. In *JNM 2005*, Nantes, May 2005.
[419] F. Ziadé, A. Kazemipour, E. Bergeault, M. Bourghes, and D. Allal. Wattmètre en technologie coplanaire, applicartion métrologique. In *JNM 2007*, Toulouse, May 2007.

4.3.4 COM: Talks in Conferences Which Do Not Publish Proceedings

[420] G. I. Abib, S. Bensmida, E. Bergeault, and B. Huyart. Linéarisation d'amplificateurs de puissance dans un environnement. In *Journée des Doctorants, AREMIF*, Paris, Mar. 2007.

4.3.5 AFF: Posters in Conferences

[421] W. Altabban, P. Desgreys, and H. Petit. Modélisation comportementale d'une ADPLL en VHDL-AMS. In *Colloque National du GDR SOC-SIP*, Paris France, June 2007.
[422] W. Altabban, P. Desgreys, and H. Petit. Modèle comportemental de l'adpll en vhdl-ams. In *Colloque National du GDR SoC-SiP*, Paris, France, June 2008.
[423] M. Ben Romdhane, P. Desgreys, P. Loumeau, C. Rebai, K. Grati, and A. Ghazel. Vers les convertisseurs analogiques numériques à echantillonnage non-uniforme. In *Colloque du GRD SoC-SiP*, Paris, France, June 2007.
[424] D. Camarero, K. Ben Kalaia, J. F. Naviner, and P. Loumeau. Mixed-signal clock-skew calibration for time-interleaved analog-to-digital converters. In *Colloque National du GDR SOC-SIP*, Paris, June 2007.
[425] R. Guelaz, P. Desgreys, and P. Loumeau. RSFQ comparator modelling for superconducting sigma-delta bandpass ADC. In *Colloque National du GDR SoC-SiP*, Paris-France, June 2008.
[426] H. A. Khushk, V. T. Nguyen, and P. Loumeau. Novel approach for cascade delta sigma modulator. In *GDR SOC-SIP 2007*, June 2007.
[427] A. Latiri, P. Desgreys, and P. Loumeau. A Reconfigurable GSM-WIFI Radio Receiver Based on RF Sampling. In *Colloque du GDR SoC-SiP*, Paris, France, June 2007.
[428] S. Masmoudi, P. Loumeau, and J. F. Naviner. Mise en oeuvre d'un réseau de capteurs RF. In *Journées Pédagogiques du CNFM*, Saint-Malo, France, Nov. 2006.
[429] A. I. Najam, J. F. Naviner, and V. T. Nguyen. Receiver Architecture for Low Data Rate Ultra-Wideband (UWB) Communications. In *Colloque National du GDR SOC-SIP*, Paris, June 2007.
[430] J. F. R. Negrão, J. F. Naviner, I. S. S. Silva, and R. C. S. Freire. Circuit mixte dinterface reconfigurable pour applications en instrumentation médicale. In *Journées Nationales du Réseau Doctoral de Microélectronique*, Rennes, France, May 2006.
[431] D. Teixeira Franco, J. F. Naviner, and L. Naviner. Architectures reconfigurables pour les systèmes de traitement du signal. In *Colloque National du GDR SOC-SIP*, Paris, June 2007.
[432] D. Teixeira Franco, M. Correia De Vasconcelos, L. Naviner, and J. F. Naviner. Evaluating signal reliability of logic circuits by signal probability. In *Colloque National du GDR SoC-SiP*, Paris, France, June 2008.

4.3.6 OS: Books and Book Chapters

[433] R. Guelaz, P. Desgreys, and P. Loumeau. *Wide-Band Sigma-Delta ADC Design in Superconducting Technology*, chapter 7, pages 101–112. Springer, 2009. To appear.
[434] B. Huyart. *Dispositifs hyperfréquences actifs et passifs, chapitre Dispositifs passifs réciproques*. Ed. Hermes, Collection EGEM, Paris 2006, 2006.
[435] P. Loumeau, L. Naviner, and J. F. Naviner. *La Conversion Analogique-numérique pour la Radio Logicielle*, chapter 7. Hermès, Paris, 2005.
[436] P. Loumeau, L. Naviner, and J. F. Naviner. *Analog-to-digital conversion for software radio*. Iste Publishing Company, GB, 2007.

4.3.7 AP: Other Productions: Database, Registred Software, Registred Patent, . . .

[437] T. Boudet, C. Guichard, B. Huyart, J. C. Cousin, and I. Masri. Détecteur de proximité hyperfréquence. (FR-04-03459), Oct. 2005.
[438] B. Huyart and F. Rangel De Sousa. démodulateur /modulateur par conversion directe de fréquence. (FR 04 10644), Dec. 2005.
[439] A. Khy and B. Huyart. Conhrad. Technical Report CPV711, 2008.
[440] P. Loumeau, V. T. Nguyen, D. Camarero, and A. Latiri. Dispositif et procédé de traitement du signal utilisant plusieurs voies en parallèle. (FR 08/54846), July 2008.

[441] K. Mabrouk and B. Huyart. Dispositif analogique pour la calibration des récepteurs zéro-if cinq-port et triphasé. (FR: 08/04460), July 2008.
[442] I. Masri, T. Boudet, J. C. Cousin, A. Guillot, and B. Huyart. Méthode de détection hyperfréquence et détecteur utilisant cette méthode. (FR 06 50462), Aug. 2007.
[443] C. Mohamed. *Conception d'un circuit démodulateur direct de signaux R.F. dans la bande de fréquence 1-24 GHz*. PhD thesis, Ecole Nationale Supérieure des Télécommunications, Apr. 2008.
[444] J. F. Naviner. Architectures radiofréquences pour l'émission de signaux impulsionnels à ultra large bande- etat de l'art. Technical Report 46 131 221, École Nationale Supérieure des Télécommunications, Apr. 2007.
[445] J. F. Naviner. Contribution à la recherche en microélectronique analogique et numérique : Cao, circuits et architectures reconfigurables. Technical report, Université Pierre et Marie Curie, Nov. 2008.
[446] V. T. Nguyen, D. Camarero, P. Loumeau, and J. F. Naviner. Sigma-delta avec l'entrelacement temporel. Technical Report 2K CPR606, Ecole Nationale Supérieure des Télécommunications, Sept. 2006.
[447] V. T. Nguyen, P. Loumeau, and P. Benabes. Convertisseur sigma-delta. (FR 08/53213), May 2008.
[448] V. T. Nguyen, P. Loumeau, and H. Fakhoury. Convertisseur sigma-delta. (FR 08/58632), Dec. 2008.
[449] H. Petit. logiciel PLLXPLORE, 2008.
[450] L. Schreider, M. Soiron, B. Perpere, and x. begaud. Dispositif de structure à bande interdite électromagnétique et dispositif d'émission et de réception d'ondes électromagnétiques. (FR 05 11966), Dec. 2005.
[451] M. Vahdani. *Low-profile, Ultra Wideband and Dual Polarized Antennas and Feeding Systems*. PhD thesis, TELECOM ParisTech, Oct. 2008.
[452] x. Begaud. Contribution à la recherche d'un système antennaire pour la radio logicielle. Technical report, Université Pierre et Marie Curie, June 2007.

Chapter 5

Optical Telecommunications Group (GTO)

Team leader Didier Erasme (P).

Faculty

G. Debarge (MC), D. Erasme (P), R. Gabet (MC),
P. Gallion (P), Y. Jaouën (P), C. Ware (MC).

PhD students

F. Saibi (10/01–01/05), M. Lourdiane(10/00–01/05), G.Bouquet(11/01–03/05),
A. Guernache (11/01–04/05), M. Valla (*/*–06/05), S. Agnolini (10/01–04/07),
E. Gueorguiev (11/01-07/09), S. Grot (10/02–03/06), G. Canat (10/02–12/06),
F Kéfélian (10/02–12/05), B. Bristiel (11/02–03/06), J. Renaudier (11/02–05/06),
L. Yi (*/*–02/07), I. Fsaifes (11/03–06/07), H. Teimoori (10/04–09/07),
S. Jiang (10/04–02/08), J. Zhou (*/*–10/08), F. Gómez Agis (02/05–10/08),
V. Lanticq (05/06–06/09), P. Hamel (10/05–03/09), Q. Xu (10/05–04/09),
M. Sabban (11/05–04/09), D. Fafchamps (10/05–), J. Petit (10/05–),
W. Akhtar (10/06–), A. Farhat (10/06–), M. Gharaei (10/06–),
S. Hocquet (10/06–), B. Bennai (11/06–), S. Cordette (12/06–),
O. Bertràn Pardo (05/07–), F. Saliou (07/07–), C. Caillaud (10/07–),
S. Mumtaz (10/07–), J.C. Antona (12/07–), M. Selmi (10/08–),
G. de Valicourt (10/08–), H. Brahmi (12/08–).

Post-docs, engineers and sabbaticals

M. Costa E Silva (03/05–01/09),
C. Gosset (09/08–08/09),
F. Mendieta (Prof. Sabbatical, CICESE) (08/05–03/08).

External collaborators

J-C. Bouley (prof. associé) (07/04–).

Faculty IT	6
PhD students	13.8
Post-docs, engineers and sabbaticals	1.5
Defended PhD theses	22
Journal papers [published, in press]	[65, 8]
Papers in conference proceedings	101
Chapters and books	1
Patents	2
Grants [public, private, european] (k€)	[808, 512, 120]

5.1 Objectives

The evolution of optical communication systems represents a particularly challenging guideline for research activities taking place in the GTO group of Télécom ParisTech. In addition to the topics directly relevant to the upgrading of optical networking techniques, architectures, devices, components, etc., our field of activity expands both to subjects that use similar methods and technologies and to characterization systems for telecommunication devices.

The last four years have represented an important transition period for the field of optical communications. In the early 2000s, the strong development of the “copper” access techniques (ADSL, Cable) and the remaining overcapacity of metro and core optical network opened a new development window for the next technology step strongly relying on optical technology: The transition of the fixed access network onto an optical medium (FTTH), convergence techniques for carrying mobile communication signals over optical fibre (RoF), access-metro convergence and finally the new requirement for capacity and connectivity in the metro and core networks due to the explosion of the data exchanges for domestic (HDTV, VoD, P2P) and professional (data storage) applications. Presently, the three traditional fixed-network segments are all going through a strong evolution process:

- with the deployment of FTTH (Fibre-to-the-home) the optical access network has had to enter the industrial world with some rather traditional solution while more advanced solutions which would better take advantage of optical technology are still under strong competitive development (WDM PON, OCDMA, ...)
- the metropolitan network has to cope with an enhanced connectivity and some constraints related to equipment cost which requires new technical solutions;
- in order to cope with the increase in the capacity demand, the core network is migrating toward higher individual channel bit-rates up to 40 Gbit/s (leading to new transmission impairments) in a rather traditional way. However, it is now quite clear that further evolution, which requires a better usage of the fiber optics bandwidth, has to rely on new paradigms. These are bound to make use of the somehow under-considered knowledge in digital communication that has been the key development tool of RF mobile communication.

In this wide panorama, the GTO group relies on its theoretical competence and its modeling and experimental know-how for developing new concepts and for participating in advanced collaborative research on optical systems.

A first research axis concerns the development of new optical signal processing techniques and functional analysis of new components for communication systems. This field covers several

related studies gravitating around non-linear optical effects and behaviors concerning light emission, light amplification, light transmission and new reception techniques. Although a number of applications lie in the field of telecommunication, the activity expands to other application areas such as energy, industrial process and defense.

The second research axis lies closer to the actual networks and transmission systems structures, approaching multiplexing techniques, high bit rate communication, new optical network architectural topics.

Finally, a specific research axis is related to quantum communications in particular to quantum key distribution for cryptography systems.

These research axes usually associate theoretical investigation and modelling activities, simulation using internal or commercial software and experimental activities. The latter rely on a rather well-equiped optical laboratory which includes a 10Gbit/s transmission platform, picosecond optical facilities allowing some 40Gbit/s experiments and dedicated characterisation and sensor set-ups.

The reporting period has been characterized by many national initiative interactions, (ANR, Cifre) and an enhanced activity on the European landscape. Through FP6-e-Photon/ONe$^+$ and FP7-BONE and FP7-EURO-FOS Networks of Excellence our international activity has been pushed to a high level. In addition to project review papers involving many teams, we can count journal publications with laboratories representing as many as 7 different countries (Denmark, Japan, USA, UK, Mexico, China, Greece).

5.2 Main Results

The main research results obtained during the period 2005-2009 are presented below for the research areas of the GTO team.

5.2.1 Optical Functionalities and Novel Devices for Communication Systems and Networks

Faculty G. Debarge, D. Erasme, R. Gabet, P. Gallion, Y. Jaouën, C. Ware.

Projects RNRT-ROTOR (01/04–12/07), Pôle System@tic-CARRIOCAS (10/06–09/09), ANR AROME (01/07–12/09), ANR L2CP, FP7-EUROFOS (05/08–04/12), trilateral projet with EDF and LCPC, Bilateral project with ONERA and with CEA, 2 cifre PhD.

The widespread introduction of broadband at all levels of communication networks, the ubiquity of data exchange, the wired network infrastructure increasingly using the optical medium, and its being extended over the last mile all the way to the end-users, are changing the deal on signal processing functions implemented directly in the optical domain, giving them a foremost place in system design. These *optical functionalities* aim at keeping, as best can be done, the optical signal's integrity, avoiding optical-to-electrical conversions. The intrinsically high speed of the physical phenomena to be used allows them to take over processes which were traditionally implemented in the electrical domain, and the development of devices adapted to these applications.

Clock Recovery

Clock recovery of a high-bit-rate digital signal (10, 40, 160 Gbit/s) is a required functionality at transmission end or in a routing node. Two techniques have been studied: self-pulsating lasers and opto-electronic phase-locked loops.

On the former, the ROTOR RNRT project[1] to point out the interest in quantum dot lasers structures for optical engineering and radio frequency signals in general has demonstrated ultra

[1] Partners: CNRS LPN Laboratory, Alcatel Thales III-V Lab, Alcatel Lucent, ENSSAT, EUROPTEST, Highwave

low self-pulsating line width and the superiority of all-optical techniques over the electrical ones for clock recovery at 43 Gbit/s [638, 499, 500].

Second, a phase locked-loop can use a nonlinear optical device (SOA or PPLN) as an ultra-fast phase comparator. It allows clock recovery of RZ signals—and NRZ in some cases—as well as OTDM demultiplexing by recovering the "sub-clocks". Collaborating with the Technical University of Denmark and the National Institute for Materials Sciences of Japan, we demonstrated sub-clock recovery [513] and full 1/64 OTDM demultiplexing at 640 Gbit/s. [469]. This was the second-ever demonstration of clock recovery at that high a bit rate, and the first involving a PPLN device, which was announced among record-setting postdeadline papers in OFC'2008.

This activity, in the framework of e-Photon/ONe$^+$ and now EURO-FOS[2], was rewarded by an invited paper in the Journal of Lightwave Technology [490] and the "Letter of the Month" of Electronics Letters. It is now part of the topic of a franco-german PICF grant application and a Joint Experimental Activity in EURO-FOS.

New Semiconductor Sources and Devices

The recent evolution of the optical communication network led to a large demand for new low-cost and high-performance components. The CARRIOCAS project[3] is dedicated to setting up an experimental 40Gbit/s network for high capacity data exchanges, included a task related to the development of low cost front end optical sources. In collaboration with GIE Alcatel-Thales III-V lab, we were able to demonstrate how "dual modulation", consisting in modulating simultaneous the laser and the modulator of an EML source, leads to an extended transmission span (from 80 to 160 km) at 10Gbit/s [547]. Our involvment in the ANR project AROME[4] is dedicated to the evaluation of the very large spectral bandwitdth semiconductor optical amplifiers fabricated in GIE Alcatel-Thales III-V lab. The group is involved in other devices development through 2 new Cifre theses with III-V lab (on 100G receivers and reflective SOA modules for access networks).

Distributed Amplification

The distributed amplification based on the Raman effect, appears as an alternative or an additional technique to the doped fiber amplifier for optical telecommunications. However noise transfer from the pump noise to the signal, the pump polarization fluctuation and the double Rayleigh scattering strongly impact the noise figure [455, 479, 521, 539] and constrain their use. A new mechanism of noise associated with the fluctuation of the pump polarization induced by spatial fluctuation of the birefringence has been identified and allows interpretation of experimental reports [477]. As for the Brillouin effect, when it does not limit the power injected into a fiber, it is an irreplaceable tool in the design of optical sensors [522].

Brillouin Effect Applications

Given its low required power threshold, the Brillouin effect in optical fiber is one of the most promising nonlinear effect to design new all-optical processing. A self-referenced technique for measuring the Brillouin gain in an optical fiber has been recently proposed; and the importance of acousto-optic effective area in place of optical effective area on the Brillouin efficiency has been

[2] Partners: Institute of Communication & Computer Systems/ National Technical University of Athens (leader), Heinrich-Hertz Institute, University of Essex, Universitat Politecnica de Catalunya, ACREO AB, Technical University of Eindhoven, Research and Educational Laboratory in Information Technology, Chalmers University of Technology, University of Karlsruhe, Politechnico di Torino, University College Cork, Scuola Superiore Sant'Anna, Universidad Polytecnica de Valencia, Interuniversitair Micro-Elektronica Centrum IMEC, Instituto de Telecomunicaoes, Technical University of Denmark

[3] Partners: Bull, CGG-Veritas, Draka Comteq, EDF, France Telecom, GIE Alcatel Thales III-V lab, Hewlett Packard, Renault, Kylia, Medit, N2Nsoft, Oxalya, CEA, CNRS, Ecole centrale de Paris, IEF (université Paris-Sud 11), INRIA, Marben products, Prism (Université de Versailles Saint-Quentin), Supélec, Telecom et Management SudParis

[4] Partners: Alcatel Thales III-V Lab (leader), FTR&D, ENIB, INSA Toulouse, IEMN

confirmed for the first time [484]. The slow-light concept has been changed from a scientific curiosity to a rapidly growing field with many potential applications. We have demonstrated simultaneous demodulation and slow-light delay of DPSK signals at flexible bit rates using Brillouin based optical filtering effect. A record delay-time of 81.5ps with error-free operation (BER$< 10^{-9}$) has been obtained for 10Gb/s [518]. The delay and BER performance of 10Gb/s signal in Brillouin-based slow-light delay line have been evaluated in terms of NRZ, PSBT and DPSK modulations formats [517]. The distributed Brillouin-based optical sensors appear to be one of the most promising techniques for temperature and strain measurement. Under a collaboration with EDF, our contribution is focused on fiber design, especially in terms of Brillouin spectrum [541].

High-Power Fiber Lasers

The technology of rare-earths doped optical fibers (Ytterbium (Yb^{3+}) for amplification at 1µm and Erbium/Ytterbium (Er^{3+}/Yb^{3+}) at 1.55µm) represents a strong contender for applications requiring high optical power. Our contribution is carried out mainly through collaborations with external laboratories and companies: ONERA, Keopsys and CEA [475, 537], PhLAM laboratory of University of Lille. With ONERA we have participated in the design of LMA fiber amplifiers [458, 460], in the analysis of Brillouin spectrum of doped fibers in connection with doping [459], and more recently the combination of coherent fiber amplifiers [481, 565]. The collaboration with PhLAM concerns the design of Ytterbium-doped solid core photonic bandgap fiber laser operating around 980nm [495].

Optical Low Coherence Reflectometry

The optical low-coherence reflectometer (OLCR) developed in our laboratory has been upgraded over the years and has proven to be a unique investigation tool for the study and the characterization of new photonic components. Through collaboration with component makers, we have been able to measure some otherwise inaccessible parameters in optical wavelength mux-demux, speciality optical fibers, fiber Bragg gratings, semiconductor devices, including semiconductor optical amplifiers... Our state-of-the-art phase-sensitive OLCR spatially resolves internal reflections of the device under test, and allows measurement of different polynomial terms of dispersion, birefringence, loss / gain material coefficient, phase/amplitude coupling coefficients. It has attracted many national and international collaborations, industrial and academic. The latest results concern the study of photonic bandgap semiconductor waveguides under the ANR-L2CP[5] project [461, 492, 536, 546] in collaboration with Thalès R&T and specialty fibers characterization [467, 474] for which the OLCR provides incomparable elements of analysis.

5.2.2 Optical Network Evolutions

Faculty D. Erasme, P. Gallion, Y. Jaouën, C. Ware.

Projects ANR-Supercode (10/06–11/09), ANR-TCHATER (10/07–12/10), FP6-e-Photon/ONe$^+$, FP7-BONE (1/08–12/10), FP7-EUROFOS (05/08–04/12), research project Orange labs, 3 Cifre PhD.

Fast development of bandwidth-consuming services like high-definition/on-demand television, network gaming, grid computing, makes stringent the need to further network capacity. The objective to provide broadband to a maximum of users (“broadband-for-all”) has been leading research and development in the field of fibre-to-the-home (FTTH) technology for the deployment of high bit-rate access networks. The optical networks must manage interfaces with the copper links and radio access technologies (fixed or mobile) or eventually replace other solutions to provide unmatched performances. Deployment of FTTH will significantly impact the capacity requirement

[5] Partners: Thales R&T (leader), CNRS/LPN, IEMN

carried by metro and core transport networks in a medium-term future. The fiber capacity must also be maximized through the deployment of new techniques such as new multi-level modulation formats eventually combined with coherent detection, new techniques for multiplexing and routing (packet switching).

Optical Access and Code-Division Multiple Access

Wide adoption of optical access network requires upgrading existing PONs to share bandwidth among more users. An important access to research in PON architecture and components exists through collaboration and Cifre Thesis with FT-Orange labs on new generation PON including extended PON, WDM PON, etc.

On the other hand, we have developed a research activity on a more prospective access network possible evolution namely OCDMA multiplexing techniques. CDMA (Code Division Multiple Access) in the optical access networks allows scrambling and a flexible bandwidth resource sharing between users. For the direct optical detection channel, we have pointed out that the prime sequences (PS) appear as a good compromise between the length and the weight of the code and the number of users [464] Implementation of all-optical encoders and decoders using Bragg gratings recorded in photo-optical fibers (made in collaboration with the laboratory PhLAM of the University of Lille) has been analyzed for different code structures [466].

Additionnally, the ANR-SUPERCODE[6] project combines WDM and OCDMA by designing a supercontinuum pulsed source which can be shared among many users by being sliced into WDM channels [586, 597], each of which supports multiple users through all-optical encoding and decoding. This last work has started building on direct-sequence codes (DS-OCDMA), now with the extended quadratic congruence (EQC) code family for better multiuser performance.

However, this is still an amplitude-only coding scheme; as in the long-haul context, using the phase of the optical field would unlock the full bandwidth of the optical fiber, if it can be done in a cost-effective way for the access network. This is SUPERCODE's final objective: using spectral-phase coding thanks to enhanced FBG-based encoders using phase-shifted chirped Bragg gratings. This technique, which could either complement or even supersede WDM, should yield a much lower crosstalk between users on the same channel, thus supporting more users for a lower penalty.

Radio-Over-Fiber

The interface between the radio and optical fiber networks (radio-on-fiber), remote antennas for radar, introduce new challenges for fiber optic transmissions, which should preserve the dynamics and the linearity of the signal even in the presence of attenuation, GVD and PMD dispersion, non linearity transmission impairments and all optical signal processing. An original approach based on optical injection allows the heterodyne generation, transmission and remote control of radio frequency signals with high spectral quality [462, 635]. A generalization on injection locking optical phase synchronization has been proposed by using the Green function approach [482, 642, 580].

Metropolitan and Long-Haul Systems

Today's processing capability allows to perform digital signal processing for optical communication systems at high bit rates. In close collaboration with the Digital Communications group, the potential and future trends of electrical signal processing techniques to mitigate e.g. noise accumulation, linear and nonlinear distortions are beginning to be investigated.

Under the project ANR-ECOFRAME[7] we have modeled and simulated the physical channel of an optical ring WDM network architecture. We provide the parameters of the statistical distribution

[6] Partners: Institut Carnot de Bourgogne (leader), CNRS PhLAM, XLIM
[7] Partners: Alcatel, Orange, Prism Laboratories, XLIM

χ^2 and estimate the performance in collaboration with XLIM working on FEC implementation [528, 501]. An extension of the concept to mesh networks has been proposed.

On the other hand, the project ANR-TCHATER[8] concerns the design of a real-time coherent receiver at 40Gbit/s using a FPGA implementation. Our contribution concerns the design of hard and soft FEC solutions adapted to optical coherent systems. Differential encoding is required for PSK transmission systems but leads to higher BER because each transmission error corrupts multiple consecutive bits. A new construction of the codeword has been proposed, allowing performance enhancement and complexity decrease [544, 645].

Finally, we have begun to explore higher spectral efficiency modulation formats, such as M-QAM and OFDM, that can allow enhanced bit-rate while reducing electronic circuits speed [551]. In collaboration with Orange labs, a comparison of 40Gb/s ultra-long haul WDM transmission system performances has been realized [493, 494].

Optical Packet Switching

The evolution of optical networks toward more efficient and more flexible architectures has led research work to wonder how the network could transmit and route optical packets or optical bursts directly on the optical layer. Studying the routing of optical packets requires an analysis of techniques allowing label recognition and transparent packet forwarding. On the basis of our knowledge of all-optical signal processing devices, we have developed several elements required for the design of a switching node, including an optical half-adder [502], a time-to-wavelength (series-to-parallel) converter [503] and an all-optical decoder [504]. Finally, in collaboration with partners teams of the FP6-ePhoton/One NoE, we have proposed an entire packet-switching node whose optical elements had all been demonstrated experimentally by one of the participating groups [505].

5.2.3 Quantum Communications and Cryptography

Faculty P. Gallion.

Main events Organisation of the CLEO Focus Meeting on “Nonlinear, Quantum and Chaotic Optics: New Directions in Photonics and Optical Communications” in ECOC’06 conference.

Projects ANR-HQNet (12/06–11/09).

Quantum key distribution (QKD) is the only known way to achieve cryptographic keys distribution with unconditional security. Quantum security first results from the impossibility to duplicate the signals received (non-cloning principle) or to take away a significant part of the signal without making the intervention known through a major change to the error rate of received signals. The security is based secondly on the disturbing or destroying character of any observation and the errors resulting from incompatible observations of a single quantum object.

Quantum cryptography is today leaving the promises of the physics of the last century for the trial implementations. The unconditional security range is obviously limited by optical channel and device impairments. Quantum cryptography must now prove its worth with the technological reality and deal with the algorithms and hardware securities, in a rich multi discipline problem including digital communications, optical communications, information theory, electronics signal processing and computing. In collaboration with our Electronics group and the Computer Science Department we have developed a validation platform for quantum cryptography gathering these various skills and involved in various projects such as the “High bit-rate and versatile Quantum Network” (ANR-HQNETfootnotePartners: FEMTO, Georgia Tech Lorraine, Smart Quantum, Photline) including also efforts from the FEMTO Laboratory of Besançon, the Georgia Tech Lorraine Laboratory and Smart Quantum and Photline companies.

[8] Partners: Alcatel-Lucent France (Leader), E2V semiconductors, INRIA Lyon, ENS Lyon

The compatibility of QKD with optical networks requires an operation at telecommunication wavelengths and does not allows polarization encoding. We proposed and validated the use of a QPSK phase modulation, turning to PSK signals after the Bob choice of basis, in association with a homodyne optical detection. As long as single-photon sources remain unavailable, we have to deal with non-orthogonal signals from quantum level coherent fainted pulses. We conducted the theoretical and experimental comparison of a balanced homodyne receiver with a high local oscillator level using PIN photodiodes with an unconditionally hypothesis-canceling interferometrical receiver on one of 2 photon counters [515]. Our homodyne receiver appears as a good alternative to the photon counters technique in view of its closeness to a quantum efficiency of 1, its thermal-effect-free operation and speed compatible with the key rate required by today applications. An intrinsic error rate resulting from the vacuum fluctuations entering through the signal port leads to a theoretical quantum bit error rate (QBER) which is approached quite easily in practice, the standard quantum limit (SQL). The use of a multiple-threshold decision allows for the optimization of the quality and the rate of the key generation. The mandatory recovery of both optical and data phases is provided by a time-multiplexed reference signal transmission and phase-tracking loop. We have shown the possibility of recovering the phase with performances very close to the quantum limit by sequential steps on both quadratures of the field received [514] and undertaken the study of security under different types of attack.

We have been among the first contributors to the apparition of quantum cryptography in IEEE optical communication journals and world largest conferences [526, 555, 557, 556, 487]. Finally, we have been invited by Emil Wolf to write a review chapter in the prestigious series “Progress in Optics” [640] and we have proposed a new general formulation for the Quantum macroscopic nonlinear optics [478].

5.3 References

5.3.1 ACL: Articles in ISI-Indexed Journals

[453] D. Armand, Y. Todorov, F. Garet, C. Minot, and J. L. Coutaz. Study of the transmission of subwavelength metallic grids in the tHz frequency range. *IEEE Journal of Selected Topics in Quantum Electronics*, 14(2):513–520, Apr. 2008.

[454] B. Bennai, L. Lombard, V. Jolivet, C. Delezoide, E. Pourtal, P. Bourdon, G. Canat, O. Vasseur, and Y. Jaouën. Brightness scaling based on 1.55µm fiber amplifiers coherent combining. *Fibers and Integrated Optics*, July 2008.

[455] B. Bristiel, S. Jiang, P. Gallion, and E. Pincemin. New model of noise figure and RIN transfer in fiber Raman amplifiers. *IEEE Photonics Technology Letters*, 18(8):980–982, Apr. 2006.

[456] G. Canat, J.-C. Mollier, and Y. Jaouën. Evidence of thermal effects in a high-power er3+-yb3+ fiber laser. *Optics letters*, 30(22):3030–3032, Nov. 2005.

[457] G. Canat, G. Williams, Y. Jaouën, J.-C. Mollier, B. Cole, L. Goldberg, G. Kulscar, and J. P. Bouzinac. Dynamics of high power erbium-ytterbium amplifiers. *Journal of Optical Society of America B*, 22(11):2308–2318, Nov. 2005.

[458] G. Canat, Y. Jaouën, and J.-C. Mollier. Performances and limitations of high brightness Er3+-Yb3+ fibers sources. *Comptes Rendus Physique de l'Académie des Sciences*, 7(2):177–186, Mar. 2006.

[459] G. Canat, A. Durecu, G. Lesueur, L. Lombard, P. Bourdon, V. Jolivet, and Y. Jaouën. Structure of the Brillouin spectra in Erbium-Ytterbium fiber. *Optics Express*, 16:3212–3222, Feb. 2008.

[460] G. Canat, L. Lombard, A. Dolfi, B. Augere, C. Besson, Y. Jaouën, S. Jetschke, S. Unger, E. Gueorguiev, and C. Vitre. High brightness 1.5µm pulsed fibre laser for lidar: from fibres to systems. *Fibers and Integrated Optics*, July 2008.

[461] S. Combrié, N. V. Q. Tran, E. Weidner, A. De Rossi, S. Cassette, P. Hamel, Y. Jaouën, R. Gabet, and A. Talneau. Investigation of group delay, loss and disorder in a photonic crystal waveguide by low-coherence reflectometry. *Applied Physics Letters*, 90:231104, June 2007.

[462] F. Dross, F. Van Dijk, and P. Gallion. Improvement of opto-RF link properties by using a cascade laser source. *IET Optoelectronics, (formely IEE Proc. part J, Optoelectronics)*, 1(1):1–15, Feb. 2007.

[463] J. Fatome, S. Pitois, P. Tchofo Dinda, D. Erasme, and G. Millot. Comparison of conventional and dense dispersion managed systems for 160 Gb/s transmissions. *Optics Communications*, 260(2):548–553, Apr. 2006.

[464] I. Fsaifes, C. Lepers, A.-F. Obaton, and P. Gallion. DS-OCDMA encoder/decoder performance analysis using optical low coherence reflectometry. *IEEE/OSA Journal of Lightwave Technology*, Vol 24(6):3121–3128, Aug. 2006.

[465] I. Fsaifes, C. Lepers, M. Lourdiane, P. Gallion, V. Beugin, and P. Guignard. Source coherence impairments in a direct detection direct sequence optical-code division multiple-access system. *Applied Optics*, 46(4):456–462, Feb. 2007.

[466] I. Fsaifes, C. Lepers, R. Gabet, M. Douay, and P. Gallion. Performance analysis of quadratic congruence codes using superstructured fiber bragg gratings for a flexible data rate coherent ds-ocdma system. *Journal of Optical Networking*, 7(7):692–703, July 2008.

[467] R. Gabet, P. Hamel, Y. Jaouën, A.-F. Obaton, V. Lanticq, and G. Debarge. Versatile characterization of specialty fibres using phase-sensitive olcr technique. *Lightwave Technology*, Mar. 2009.

[468] F. Gómez Agis, C. Ware, D. Erasme, R. Ricken, V. Quiring, and W. Sohler. 10-GHz Clock Recovery Using an Optoelectronic Phase-Locked Loop Based on Three-Wave Mixing in Periodically Poled Lithium Niobate. *IEEE Photonics Technology Letters*, 18(13):1460 – 1462, July 2006.

[469] F. Gómez Agis, L. K. Oxenløwe, S. Kurimura, C. Ware, H. C. Hansen Mulvad, M. Galili, and D. Erasme. Ultra-fast phase comparator for optoelectronic clock recovery PLL-based systems. *Journal of Lightwave Technology*, 27 (13):2439–2448, July 2009.

[470] S. K. Goudos, Z. D. Zaharis, P. I. Lazaridis, and P. Gallion. Optimization of integrated circuits placement for electric field reduction inside telecommunications equipment using Monte Carlo Simulation and Parallel Recombinative Simulated Annealing. *Microwave and Optical Technology Letters*, 49(12):3049–3055, Dec. 2007.

[471] S. K. Goudos, Z. D. Zaharis, M. Salazar-Lechuga, P. I. Lazaridis, and P. B. Gallion. Dielectric Filter Optimal Design Suitable for Microwave Communications by Using Multi-Objective Evolutionary Algorithms. *Microwave and Optical Technology Letters,*, 49(9):2324–2329, Oct. 2007.

[472] A. Guernache, V. Voiriot, D. Locatelli, F. Legrand, R. M. Capella, P. Gallion, and J. Jaquet. Experimental demonstration of spatial hole burning reduction leading to 1480-nm pump lasers output power improvement. *IEEE Photonics Technology Letters*, 17(10):2023–25, Oct. 2005.

[473] A. Guernache, V. Voiriot, F. Legrand, R. M. Capella, P. Gallion, and J. Jaquet. New Design Rules and Experimental Study of Slightly Flared 1480-nm Pump Lasers. *IEEE Photonics Technology Letters*, 18(6):792, Mar. 2006.

[474] P. Hamel, Y. Jaouën, R. Gabet, and S. Ramachandran. Optical low coherence reflectometry for complete chromatic dispersion characterization of few-mode fibers. *Optics Letters*, 32(9):1029–1031, May 2007.

[475] S. Hocquet, D. Penninckx, E. Bordenave, C. Gouédard, and Y. Jaouën. Fm-to-am conversion in high-power lasers. *Applied Optics*, 47(18):3338–3349, June 2008.

[476] Y. Jaouën, G. Canat, and S. Grot. Power limitations induced by nonlinear effects in high power fiber amplifiers. *Comptes Rendus Physique de l'Académie des Sciences*, 7(2):163–169, Mar. 2006.

[477] S. Jiang and P. Gallion. Theoretical analysis on the pmd-assisted pump-to-signal noise transfer in distributed fiber raman amplifiers. *IEEE Journal of Lightwave Technology*, 25(10):3185 – 3192,, Oct. 2007.

[478] S. Jiang and P. Gallion. A general formulation for the quantum macroscopic nonlinear optics. *Journal of the Optical Society of America JOSA B*, 26(5):902–909, May 2009.

[479] S. Jiang, B. Bristiel, Y. Jaouën, P. Gallion, and E. Pincemin. Bit-Error Rate Evaluation of the Distributed Raman Amplifiers Based Transmission Systems with the Double Rayleigh Backscattering Noise. *IEEE Photonics Technology Letters*, 19(7), Apr. 2007.

[480] S. Jiang, B. Bristiel, Y. Jaouën, P. Gallion, and E. Pincemin. Full characterization of modern transmission fibers for Raman amplified-based communication systems. *Optics Express*, 19(4):468–470, Apr. 2007.

[481] V. Jolivet, P. Bourdon, B. Bennai, L. Lombard, D. Goular, E. Pourtal, G. Canat, Y. Jaouën, P. Moreau, and O. Vasseur. Wavefront shaping and coherent combining of fiber amplifiers through atmmospheric turbulences. *J. Selected Topics in Quantum Electronics*, 15(2):257–268, Mar. 2009.

[482] F. Kefelian and P. Gallion. Locking and quantum noise properties of multisection semiconductor lasers with opical injection. application to fabry-perot and dfb cavities. *IEEE J. Quantum Electron.*, Vol. 44-6:pp.547–560, June 2008.

[483] F. Kefelian, R. Gabet, and P. Gallion. Characteristics of the phase noise correlation of injection locked lasers for RF signal generation and transmission. *Optical and Quantum Electronics*, 38(4-6):467–478, Mar. 2006.

[484] V. Lanticq, S. Jiang, R. Gabet, Y. Jaouën, F. Taillade, G. Moreau, and G. P. Agrawal. Self-referenced and single-ended method to measure Brillouin gain in monomode optical fibers. *Optics Letters*, 34(7):1018–1020, Apr. 2009.

[485] P. Lazaridis, G. Debarge, P. Gallion, Z. Zaharis, D. Kampitaki, A. Hatzigaidas, A. Papastergiou, and G. Grammatikopoulos. Comparative study of the discrete cosine transform and the discrete orthogonal Gauss-Hermite transform for biomedical signal compression. *WSEAS Transactions on Information Science and Applications*, 3 (11):2264–2269, Nov. 2006.

[486] C. Minot. Golden rules for coherent transport relaxation rates in semiconductor superlattices in the field-induced localization regime. *Physica Status Solidi (c)*, 4(2):347–349, 2007.

[487] H. S. Mousavi and P. Gallion. Decoy state quantum key distribution using homodyne detection. *Phys. Rev. A*, 80 (1):012327–1–4, July 2009.

[488] A.-F. Obaton, C. Palavicini, Y. Jaouën, E. Kerrinckx, Y. Quiquempois, and M. Lievre. Characterization of Fiber Bragg Gratings by Phase-Sensitive Optical Low-Coherence Reflectometry. *IEEE Transactions on Instrumentation and Measurement*, 55(5):1696–1703, Oct. 2006.

[489] L. K. Oxenløwe, F. Gómez Agis, C. Ware, S. Kurimura, H. C. H. Mulvad, M. Galili, K. Kitamura, H. Nakajima, J. Ichikawa, D. Erasme, A. T. Clausen, and P. Jeppesen. 640 gbit/s clock recovery using periodically poled lithium niobate. *Electronics Letters*, 44(5):370–371, Feb. 2008.

[490] L. K. Oxenløwe, F. Gómez Agis, C. Ware, S. Kurimura, H. C. Hansen Mulvad, M. Galili, K. Kitamura, H. Nakajima, J. Ichikawa, D. Erasme, A. T. Clausen, and P. Jeppesen. 640 Gbit/s data transmission and clock recovery using an ultra-fast periodically poled Lithium Niobate device. *Journal of Lightwave Technology*, 27(3):205–213, Feb. 2009. Invited paper.

[491] C. Palavicini, Y. Jaouën, G. Debarge, E. Kerrinckx, Y. Quiquempois, M. Douay, C. Lepers, A.-F. Obaton, and G. Melin. Phase-sensitive optical low-coherence reflectometry technique applied to the characterization of pho-

tonic crystal fiber properties. *Optics Letters*, 30(4):361–363, Feb. 2005.
[492] A. Parini, P. Hamel, A. De Rossi, S. Combrié, N. V. Q. Tran, Y. Gottesman, R. Gabet, A. Talneau, Y. Jaouën, and G. Vadala. Time-wavelength reflectance maps of photonic crystal waveguides: a new on disorder-induced scattering. *J. Lightwave Technology*, 26(23):3794–3802, Dec. 2008.
[493] E. Pincemin, A. Tan, A. Tonello, S. Wabnitz, J. D. Ania-Castanon, V. Mezentsev, S. K. Turitsyn, Y. Jaouën, and L. Gruner-Nielsen. Performance comparison of 40 Gb/s ULH transmissions using CSRZ-ASK or CSRZ-DPSK modulation formats on UltraWave fiber. *Optics Express*, 15:11142–11153, Sept. 2007.
[494] E. Pincemin, A. Tan, A. Tonello, S. Wabnitz, J. D. Ania-Castanon, V. Mezentsev, S. K. Turitsyn, Y. Jaouën, and L. Gruner-Nielsen. Performance comparison of SSMF and UltraWaveTM fibers for ultra-long haul 40-Gb/s WDM transmission. *IEEE Photonics Technology Letters*, 19(10):1613–1615, Oct. 2007.
[495] V. Pureur, L. Bigot, G. Bouwmans, Y. Quiquempois, M. Douay, and Y. Jaouën. Ytterbium-doped solid core photonics bandgap fibre for laser operation around 980nm. *Applied Physic Lettes*, 92:061113, Feb. 2008.
[496] J. Renaudier, R. Brenot, B. Dagens, F. Lelarge, B. Rousseau, F. Poingt, O. Le Gouezigou, F. Pommereau, A. Accard, P. Gallion, and G. H. Duan. 45 GHz self-pulsation with narrow linewidth in quantum dots fabry-perot semiconductor lasers at 1.5-µm. *Electronics Letters*, 41(18):1007–1008, Sept. 2005.
[497] J. Renaudier, G. H. Duan, J.-G. Provost, H. Debregeas-Sillard, and P. Gallion. Phase correlation between longitudinal modes in semiconductor self-pulsating DBR lasers. *IEEE Photonics Technology Letters*, 17(04):741–743, Apr. 2005.
[498] J. Renaudier, G. H. Duan, P. Landais, and P. Gallion. Study of phase noise properties and timing jitter of 40 ghz all-optical clock recovery using self-pulsating semiconductor lasers. *IEEE/OSA Journal of Lightwave Technology*, 24(10):3734 – 3742, Oct. 2006.
[499] J. Renaudier, B. Lavigne, F. Lelarge, M. Jourdran, B. Dagens, O. Le Gouezigou, P. Gallion, and G. H. Duan. Standard-Compliant Jitter Transfer Function of All-optical Clock Recovery at 40 GHz Based on a Quantum-Dot Self-Pulsating Semiconductor Laser. *IEEE Photonics Technology Letters*, 18(11):1249–1251, June 2006.
[500] J. Renaudier, G. H. Duan, P. Landais, and P. Gallion. Phase Correlation and Linewidth Reduction of 40 GHz Self-Pulsation in Distributed Bragg Reflector Semiconductor Lasers. *IEEE J. Quantum Electron., Vol 43 -2, pp.147-156 , Feb. 2007.*, 43(2):47–156, Feb. 2007.
[501] S. Sahuguede, D. Fafchamps, A. Julien-Vergonjanne, G. Rodriguez, J.-P. Cances, and P. Gallion. Ldpc code design and performance analysis on ook chi-square based optical channels. *IEEE PhotonicsTechnology Letters*, 2009. To appear.
[502] H. Teimoori, J. D. Topomondzo, C. Ware, H. Soto, and D. Erasme. All-optical half-adder using a single UNI gate. *Journal of Optical Communications*, 27(6):301–304, Dec. 2006.
[503] H. Teimoori, J. D. Topomondzo, C. Ware, and D. Erasme. Optical packet header processing using time-to-wavelength mapping in semiconductor optical amplifiers. *Journal of Lightwave Technology*, 25(8), Aug. 2007.
[504] H. Teimoori, J. D. Topomondzo, C. Ware, R. Gabet, and D. Erasme. All-Optical Packet-Switching Decoder Design and Demonstration at 10 Gbit/s. *Photonics Technology Letters*, 19(10):738 – 740, May 2007.
[505] H. Teimoori, D. Apostolopoulos, K. Vlachos, C. Ware, D. Petrantonakis, L. Stampoulidis, H. Avramopoulos, and D. Erasme. Optical-logic-gate aided packet-switching in transparent optical networks. *Journal of Lightwave Technology*, 26(16):2848 – 2856, July 2008.
[506] C. Thibon, F. Dross, A. Marceaux, and N. Vodjdani. Discussion on RIN improvement using a standard coupler. *IEEE Photonics Technology Letters*, 17(6):1283–1285, June 2005.
[507] Y. Todorov and C. Minot. A modal method for conical diffraction on rectangular slit metallic grating in a multilayer structure. *JOSA A*, 24(10):3100–3114, Oct. 2007.
[508] Y. Todorov, I. Abram, and C. Minot. Dipole emission into rectangular metallic gratings with subwavelength slits. *Physical Review B*, 71(7):075116 (13 pages), Feb. 2005.
[509] Y. Todorov, I. Sagnes, I. Abram, and C. Minot. Purcell Enhancement of Spontaneous Emission from Quantum Cascades inside Mirror-Grating Metal Cavities at THz Frequencies. *Physical Review Letters*, 99(22):223603–1, 223603–4, Nov. 2007.
[510] Y. Todorov, I. Sagnes, U. Gennser, N. Coron, C. Minot, and I. Abram. Spontaneous emission enhancement in quantum cascade structures in the terahertz domain. *Physica Status Solidi (c)*, 4(2):524–527, 2007.
[511] P. Viale, S. Février, P. Leproux, Y. Jaouën, and A.-F. Obaton. Modal properties of a large mode area Bragg fiber. *Photonics and Nanostructures - Fundamentals and Applications*, 4(2):116–122, May 2006.
[512] K. Vlachos, C. Raffaelli, S. Aleksic, N. Andriolli, D. Apostolopoulos, H. Avramopoulos, D. Erasme, D. Klonidis, M. Nordal Petersen, M. Scaffardi, K. Schulze, M. Spiropoulou, S. Sygletos, I. Tomkos, C. Vazquez, O. Zouraraki, and F. Neri. Photonics in switching: enabling technologies and subsystem design. *OSA/ J. Optical Networking*, 8 (5):404–428, 2009.
[513] C. Ware, L. K. Oxenløwe, F. Gómez Agis, H. C. H. Mulvad, M. Galili, S. Kurimura, H. Nakajima, J. Ichikawa, D. Erasme, A. T. Clausen, and P. Jeppesen. 320 Gbps to 10 GHz sub-clock recovery using a PPLN-based opto-electronic phase-locked loop. *Optics Express*, 16(7):5007–5012, Mar. 2008. test.
[514] Q. Xu, A. Arvizu, P. Gallion, and F. J. Mendieta. Homodyne in-phase and quadrature detection of weak coherent states with carrier phase tracking. *IEEE Journal of Selected Topics in Quantum Electronics*, 2009. To appear.
[515] Q. Xu, M. B. Costa E Silva, M. Sabban, P. Gallion, and F. J. Mendieta. Dual-threshold balanced homodyne detection at 1550nm optical fiber quantum key distribution system. *IEEE /OSA Journal of Ligthtwave Technology*, 27(15):3202–3211, Aug. 2009. To appear.
[516] Q. Xu, M. Sabban, and P. Gallion. Homodyne detection of weak coherent optical pulse with selection of descision opportunity: Applications to quantum cryptography. *Microwave and Optical Technology Letters*, 51(8):1934–1939, Aug. 2009.

[517] L. L. Yi, Y. Jaouën, R. Gabet, W. Hu, Y. Su, and S. Bigo. Improved 10-Gb/s Slow-Light Performances Based on Broadband Stimulated Brillouin Scattering in Optical Fiber. *Optics Express*, 15:16972–16979, Dec. 2007.
[518] L. L. Yi, Y. Jaouën, W. Hu, J. Zhou, Y. Su, and E. Pincemin. Simultaneous Demodulation and Slow-light of DPSK Signals using SBS-based Optical Filtering in Fiber. *Optics Letters*, 32:3182–3184, Nov. 2007.
[519] Z. D. Zaharis, D. G. Kampitaki, P. I. Lazaridis, A. I. Papastergiou, A. T. Hatzigaidas, and P. Gallion. Improving the radiation characteristics of a base station antenna array using a particle swarm optimizer. *Microwave and Optical Technology Letters,*, 49(7):1690–1698, July 2007.
[520] Z. D. Zaharis, G. Kampitaki, P. I. Lazaridis, A. I. Papastergiou, and P. Gallion. On the design of multi-frequency dividers suitable for GSM/DCS/PCS/UMTS applications by using a particle swarm optimization based technique. *Microwave and Optical Technology Letters*, 49(9):2138–2144,, Sept. 2007.
[521] J. Zhou, J. Chen, Y. Jaouën, L. Yi, X. Li, and P. Gallion. A new frequency model for sbs pump to signal rin transfer in billouin fiber amplifiers. *IEEE Photonics Technology Letters*, 19(13):978–980, July 2007.
[522] J. Zhou, Y. Jaouën, L. Yi, X. Li, and P. Gallion. Pump to stokes noise transfer in cascaded brillouin lasers. *IEEE Photonics Technology Letters*, 20:912–914, June 2008.

5.3.2 ACTI–A: Articles in Proceedings of Major International Conferences

[523] L. Bigot, V. Pureur, Y. Jaouën, Y. Quiquempois, and G. Bouwmans. Ytterbium-doped 2D solid core photonic bandgap fiber for laser operation at 980nm. In *ECOC 2007*, volume paper Mo1.4.6, Berlin, Sept. 2007.
[524] C. Canat, J.-C. Mollier, J. P. Bouzinac, Y. Aubry, G. Loas, and Y. Jaouën. 100 µj generation using a narrow linewidth er^{3+}-yb^{3+} doped fiber mopa and its modeling. In *CLEO'05*, number paper JWB67, Anheim, July 2005.
[525] G. Canat, A. Duceru, Y. Jaouën, S. Bordais, and R. Lebref. Fiber composition influence on spontaneous Brillouin scattering properties in double-clad fiber amplifiers. In *Conference on Lasers and Electro-Optics*, number paper CTuQ4, Long Beach, CA, USA, May 2006.
[526] M. B. Costa E Silva, Q. Xu, S. Agnolini, S. Guilley, J.-L. Danger, P. Gallion, and F. J. Mendieta. Integrating a QPSK Quantum Key Distribution Link. In *European Conference on Optical Communication ECOC'06, CLEO Focus Meeting on Nonlinear, Quantum and Chaotic Optics*, Cannes (France), Sept. 2006.
[527] A. De Rossi, S. Combrié, N. V. Q. Tran, S. Casette, P. Hamel, Y. Jaouën, R. Gabet, and A. Talneau. Structural disorder induced polarization and mode scrambling in photonic crystals. In *Cleo Europe 2007*, volume paper CK10-1-Thu, Munich, June 2007.
[528] D. Fafchamps, G. Rodriguez Guisantes, and P. Gallion. Chi-square statistical models as a good base for the optimisation of optical systems. In *International Conference on Photonics in Switching*, Aug. 2008.
[529] J. Fatome, S. Pitois, P. Tchofo Dinda, D. Erasme, and G. Millot. Experimental comparison of classical and dense dispersion managements for 160-gb/s transmission systems. In *European Conference on Lasers and Electro-Optics (CLEO/Europe 2005)*, number CI3-6-MON, Munich (Germany), May 2005.
[530] I. Fsaifes, C. Lepers, M. Lourdiane, R. Gabet, and P. Gallion. Pulsed laser source coherence time impairments in a direct detection DS-OCDMA system. In *Conference on Lasers and Electro-optics CLEO*, Conference on Lasers and Electro-optics CLEO, May 2006.
[531] R. Gabet, P. Hamel, A.-F. Obaton, E. Burov, G. Melin, and Y. Jaouën. Modal analysis and spatial dispersion evolution in PCF fibres. In *ECOC 2006*, number paper Th1.5.7, Cannes, Sept. 2006.
[532] F. Gómez Agis, C. Ware, D. Erasme, R. Ricken, V. Quiring, and W. Sohler. 10 GHz clock recovery using an opto-electronic phase-locked loop based on three-wave mixing in periodically-poled lithium niobate. In *CLEO*, number JWB34, Long Beach, CA, USA, May 2006.
[533] F. Gómez Agis, C. Ware, and D. Erasme. Sub-clock extraction of optical signals at high rates using an opto-electronic phase-locked loop based on three-wave mixing in periodically-poled lithium niobate. In *CLEO*, number JTuA131, Baltimore, MD, USA, May 2007. Poster.
[534] F. Gómez Agis, C. Ware, D. Erasme, S. Kurimura, and H. Nakajima. Opto-electronic phase-locked loop using adhered-ridge-waveguide periodically poled lithium niobate for high-bit-rate clock recovery. In *Optical Fiber Conference*, number JWA72, San Diego, CA, USA, Feb. 2008.
[535] P. Hamel, Y. Jaouën, R. Gabet, and S. Ramachandran. Chromatic dispersion measurements of few-mod fibres using OLCR technique. In *ECOC 2006*, number paper Th1.5.3, Cannes, Sept. 2006.
[536] P. Hamel, Y. Jaouën, R. Gabet, S. Combrié, N. V. Q. Tran, E. Weidner, A. De Rossi, and A. Talneau. Investigation of group delay and disorder in a photonic crystal waveguide using low-coherence reflectometry. In *CLEO 2007*, number papier CTuG4, Baltimore (USA), May 2007.
[537] S. Hocquet, D. Penninckx, J.-F. Gleyze, and Y. Jaouën. Non-linear phase modulations for control of high power lasers perfomances. In *CLEO 2009*, number papier JThE52, Baltimore (USA), June 2009.
[538] Y. Jaouën, C. Palavicini, A.-F. Obaton, C. Moreau, and P. Sillard. Direct chromatic dispersion determination of higher-order mode fibers using OLCR technique. In *CLEO'05*, number paper Cth4, Baltimore, May 2005.
[539] S. Jiang and P. Gallion. PMD assisted pump to signal noise transfer in distributed raman Amplifier. In *Optical Fiber Communication Conference, OFC 2008, Paper OTuN6,*, pages Paper OTuN6,, San Diego, California, Feb. 2008.
[540] F. Kefelian, R. Gabet, and P. Gallion. Phase noise characterization of a RF signal generation and transmission optical system based on injection locked DFB lasers. In *Conference on Lasers and Electro-Optics Europe 2005*, volume 29B, page 142, MUNICH (RFA), June 2005.
[541] V. Lanticq, R. Gabet, J.-L. Auguste, S. Lesoille, S. Fortier, and Y. Jaouën. Spontaneous brillouin scattering

modelling and measurement in various axisymetric optical fibres. In *ECOC 2007*, volume paper P004, Berlin, Sept. 2007.

[542] V. Lanticq, S. Jiang, R. Gabet, Y. Jaouën, S. Delepine-Lesoille, and J.-M. Henault. Self-referenced method to measure the gain coefficient in optical fibers. In *ECOC 2008*, number paper Tu.3.B.2, Bruxelles, Oct. 2008.

[543] C. Lesvignes, V. Couderc, P. Leproux, Barthelemy, J.-L. Auguste, D. Pagnoux, X. Daxhelet, S. Lacroix, and Y. Jaouën. Second harmonic generation in a highly birefringent nonlinear microstructured fibre. In *ECOC 2006*, number paper Th3P188, Cannes, Sept. 2006.

[544] S. Mumtaz, G. Rekaya-Ben Othman, Y. Jaouën, and G. Charlet. Efficient interleaving of fec for optical psk systems. In *ECOC 2009*, number paper P3.02, Vienne, Autriche, Sept. 2009. To appear.

[545] L. K. Oxenløwe, F. Gómez Agis, C. Ware, S. Kurimura, H. C. H. Mulvad, M. Galili, K. Kitamura, H. Nakajima, J. Ichikawa, D. Erasme, A. T. Clausen, and P. Jeppesen. 640 Gbit/s data transmission and clock recovery using an ultra-fast periodically poled lithium niobate device. In *Optical Fiber Conference*, number PDP22, San Diego, CA, USA, Feb. 2008. Postdeadline paper.

[546] M. Patterson, S. Hughes, S. Combrié, N. V. Q. Tran, A. De Rossi, R. Gabet, and Y. Jaouën. Disorder-induced coherent scattering in slow-light photonic crystal waveguides. In *CLEO 2009*, page paper JTuF3, Baltimore (USA), June 2009.

[547] J. Petit, D. Erasme, C. Kazmierski, C. Jany, J. Decobert, F. Alexandre, N. Dupuis, and R. Gabet. Enhanced 10-Gb/s NRZ Transmission Distance using Dual Modulation of an Integrated Electro-absorption Modulated Laser Transmitter. In *Optical Fiber Communication Conference*, number OThG2, San Diego, California, USA, Mar. 2009.

[548] J. Renaudier, B. Lavigne, M. Jourdran, P. Gallion, F. Lelarge, B. Dagens, A. Accard, O. Le Gouezigou, and G. H. Duan. First demonstration of all-optical clock recovery at 40 GHz with standard-compliant jitter characteristics based on a quantum-dots self-pulsating semiconductor laser. In *European Conference on Optical Communication ECOC05*, page Post DeadLine Paper Th4.3.4, Glasgow (Scotland), Sept. 2005.

[549] J. Renaudier, B. Martin, F. Poingt, F. Pommereau, L. Legouezigou, F. Lelarge, F. Martin, O. Le Gouezigou, J.-G. Provost, P. Gallion, B. Thedrez, and G. H. Duan. "polarization insensitive 40ghz self-pulsating dbr lasers with enhanced nonlinearities and wide self-pulsation frequency tunability". In *Conference on Lasers and Electro-optics CLEO 2005*, Baltimore (MD), May 2005.

[550] M. Sabban, Q. Xu, P. Gallion, and F. J. Mendieta. Security evaluation of dual-threshold homodyne quantum cryptographic systems. In *2008 Quantum Entanglement and Decoherence: 3rd International Conference on Quantum Information (ICQI) Topical Meeting. ICQI*, Boston (MS), July 2008.

[551] M. Selmi, Y. Jaouën, and P. Ciblat. Accurate digital frequency offset estimator for coherent polmux qam transmission systems. In *European Conference on Optical Communications (ECOC)*, number paper P3.08, Vienne, Autriche, Sept. 2009. To appear.

[552] A. Tan, A. Bezard, E. Pincemin, Y. Jaouën, A. Tonello, S. Wabnitz, J.-D. Anai-Castanon, and S. Turitsyn. Performance comparison of duobinary modulation formats for 40 Gb/s long-haul WDM transmissions. In *ECOC 2006*, number paper We3P94, Cannes, Sept. 2006.

[553] A. Tan, E. Pincemin, Y. Jaouën, A. Tonello, S. Wabnitz, J. D. Castanon, S. K. Turitsyn, and L. Gruner-Nielsen. Can SSMF handle ULH 40-Gb/s WDM transmission? In *ECOC 2007*, volume paper P098, Berlin, Sept. 2007.

[554] C. Ware and D. Erasme. 30 GHz sub-clock recovery using an opto-electronic phase-locked loop based on four-wave mixing in a semiconductor optical amplifier. In *CLEO/Europe*, number CI3-5-MON, Munich, Germany, June 2005.

[555] Q. Xu, M. B. Costa E Silva, P. Gallion, and F. J. Mendieta. One way differential qpsk quantum key with channel impairment compensation. In *Conference on Lasers and Electro-optics CLEO Europe, JOINT CLEO/Europe-IQEC 2007 SYMPOSIA*, München (Germany), June 2007.

[556] Q. Xu, M. B. Costa E Silva, A. Arvizu, P. Gallion, and F. J. Mendieta. Weak coherent state homodyne detection with sequential i-q measurements. In *IEEE/OSA/APS Conference on Lasers and Electro-optics and Quantum Electronics and Laser Science Conference CLEO/QELS 2008*, San Jose, California, May 2008.

[557] Q. Xu, M. B. Costa E Silva, P. Gallion, and F. J. Mendieta. Auto-compensating quantum Cryptosystem using homodyne detection. In *Optical Fiber Communication Conference, OFC 2008,*, pages San Diego, California, Feb. 2008.

[558] L. Yi, Y. Jaouën, R. Gabet, W. Hu, Y. Su, and S. Bigo. 10-Gb/s slow-light performance based on SBS effect in optical fiber using NRZ and PSBT modulations formats. In *ECOC 2007*, volume paper We6.6.2, Berlin, Sept. 2007.

[559] L. Yi, Y. Jaouën, W. Hu, J. Zhou, Y. Su, and E. Pincemin. Simultaneous demodulation and slow-light delay of DPSK signals at flexible bit-rates using bandwidth-tunable SBS in optical fibre. In *ECOC 2007*, volume paper We6.6.1, Berlin, Sept. 2007.

[560] Z. Zhang, A. Locquet, P. L. Voss, and P. Gallion. A Simple, Extremely Large Bandwidth, Modulator-Free QKD System. In *Conference on Lasers and Electro-optics CLEO Europe, JOINT CLEO/Europe-IQEC 2007 SYMPOSIA*, pages aper JSI 2–5 Thu, München (Germany), June 2007, June 2007.

[561] J. H. Zhou, L. L. Yi, Y. Jaouën, J. P. Chen, and P. Gallion. Pump-to-stoke relative intensity noise transfer in brillouin fiber amplifiers. In *33rd European Conference on Optical Communication, ECOC 2007*, page Paper 2.4.3, Berlin (Germany), Sept. 2007.

5.3.3 ACTI–B: Articles in Proceedings of Other International Conferences

[562] W. Aktar, P. Gallion, and M. Gharei. Hybridization readiness for multiservice broadband networks. In *IEEE 16th International Conference on Telecommunications (ICT)*, Marrakech, Marocco, May 2009.

[563] D. Armand, Y. Todorov, F. Garet, J. L. Coutaz, and C. Minot. Evidence of THz Surface Plasmon-like Wave Propagation along a 1D Metallic Grid. In *Joint 32nd International Conference on Infrared and Millimetre Waves and 15th International Conference on Terahertz Electronics*, Cardiff, Royaume Uni, Sept. 2007.

[564] O. Audouin, D. Erasme, M. Jouvin, O. Leclerc, C. Mouton, P. Primet, D. Rodrigues, and L. Thual. CARRIOCAS project: An experimental high bit rate optical network for for computing intensive distributed applications. In *BroadBand Europe'07*, page Tu3A4, Anwerpen Belgique, Dec. 2007.

[565] B. Bennai, V. Jolivet, P. Bourdon, E. Pourtal, G. Canat, Y. Jaouën, and O. Vasseur. Coherent combining amplifiers: from single-mode fiber demonstration to large-mode-area modelling. In *Europhoton 2008*, Paris, Sept. 2008.

[566] P. Bourdon, B. Bennai, V. Jolivet, B. G. Moreau, O. Vasseur, and Y. Jaouën. Coherent beam combining of fiber amplifier arrays ans application to laser beam propagation through turbulent atmosphere. In *Photonics West 2008*, pages paper 6873–41, Jan. 2008.

[567] M. B. Costa E Silva, Q. Xu, S. Agnolini, P. Gallion, and F. J. Mendieta. Homodyne detection for quantum key distribution : an alternative to photon counting. In *International Conference On Applications of Photonic Technology, Photonics North 2006,*, Quebec City, (Canada),, June 2006.

[568] M. B. Costa E Silva, Q. Xu, S. Agnolini, P. Gallion, and F. J. Mendieta. Homodyne QPSK Detection for Quantum Key Distribution. In *Coherent Optical Technologies and Applications (COTA) Topical Meeting. of the OAA*, Whistler B.C. (Canada), June 2006.

[569] A. De Rossi, S. Combrié, Q. V. Tran, C. Huscko, G. Vadala, P. Hamel, R. Gabet, Y. Jaouën, A. Parini, Y. Gottesman, and F. Raineri. Impact on nonlinearity and disorder on slow modes in membrane photonic crystal. In *Slow and Fast light 2008*, volume paper SWC2, Boston (USA), July 2008.

[570] A. Farhat, M. Mnif, C. Lepers, H. Rezig, and P. Gallion. Importance Sampling Applied to an Optical DS-CDMA System. In *IEEE International Conference on Electronics, Circuits and Systems ICECS, 2007,*, number paper 2284, Marrakech, Morocco,, Dec. 2007.

[571] P. Gallion, R. Vallet, M. Lourdiane, I. Fsaifes, C. Lepers, and V. Beugin. Accès multiple par code : des réseaux sans fils aux réseaux optiques. In *Colloque International Optique Hertzienne et Diélectriques*, Hammamet (Tunisie), Sept. 2005.

[572] P. Gallion, J. Renaudier, G. H. Duan, and B. Lavigne. Semiconductor lasers for optical clock recovery. In *Optics East, SPIE conference: "Active and Passive Optical Components for Communications VI*, Boston, Massachusetts, Oct. 2006.

[573] P. Gallion, J. H. Zhou, S. F. Jiang, J. P. Chen, and Y. Jaouën. Noise in Distributed Raman Amplification, Invited Paper. In *Asia-Pacific Optical Communications (APOC),*, Oct. 2007.

[574] M. Gharei, C. Lepers, I. Fsaifes, and P. Gallion. A novel reconfigurable ring architecture of multiple secure private networks over EPON using OCDMA code-drop units. In *Photonics North*, 2008.

[575] F. Gómez Agis, C. Ware, and D. Erasme. Clock synchronization and sub-clock extraction of optical signals at high rates using an opto-electronic PLL based on three-wave mixing in PPLN. In *International Conference on Transparent Optical Networks (ICTON)*, Rome, Italy, July 2007. Invited conference.

[576] S. Grot, L. Goldberg, P. Besnard, and Y. Jaouën. High-performance pulsed coherent fiber laser emitting $>$ 1.7k w at 1060-nm in ns regime. In *Photonics West'05*, number paper CthB4, Anheim, Jan. 2005.

[577] A. Guernache, V. Voiriot, D. Locatelli, F. Legrand, N. Bouche, F. Lelarge, R. M. Capella, P. Gallion, and J. Jaquet. Over 0.7-W 14xx-nm FBG-stabilised output power InP based pump laser. In *European Conference on Integrated Optics ECIO'05*, Grenoble, Apr. 2005.

[578] J.-F. Huang, P. Gallion, Y.-T. Chang, and L.-W. Chou. Confidential enhancement with active reconfigurable awg-based codecs over fiber-to-the-home network. In *IASTED International Conference, Wireless and Optical Communications (WOC 2008)*, Quebec City Canada, May 2008.

[579] Y. Jaouën, R. Gabet, and P. Hamel. Optical low-coherence reflectometry for characterization of specialty fibers and photonics crystal waveguides. In *Photonics North 2008*, volume paper FLD-3-4-1, Montreal (Canada), June 2008.

[580] F. Kefelian and P. Gallion. Theoretical analysis of forward and backward optical injection locking configuration in semiconductor Fabry-Perot and DFB lasers. In *Photonics Europe 2006*, number 6184-18, page 85, Strasbourg, Apr. 2006.

[581] S. Khemiri, C. Ware, R. Gabet, and D. Erasme. 10 GHz Short Pulse Clocked Optical Source Based on Four-Wave Mixing in an Optical fibre. In *12th IEEE International Conference on Electronics, Circuits and Systems*, number Optical network and system III, Gammarth (Tunisie), Dec. 2005.

[582] P. Lazaridis, G. Debarge, P. Gallion, Z. Zaharis, D. Kampitaki, A. Hatzigaidas, A. Papastergiou, and G. Grammatikopoulos. Signal compression method for biomedical image using the discrete orthogonal gauss-hermite transform. In *6th WSEAS International Conference on Signal Processing, Computational Geometry & Artificial Vision (ISCGAV'06)*, Elounda, Agios Nikolaos, Crete Island, Greece, Aug. 2006.

[583] M. Menif, P. Gallion, C. Karaborni, and H. Rezig. Performance evolution for a new implementation of multirate optical fast frequency hopping cdma system for multimedia transmission. In *12th IEEE International Conference on Electronics, Circuits and Systems, ICECS 2005*, page 186, Gammarth, (Tunisia), Dec. 2005.

[584] A.-F. Obaton, P. Hamel, R. Gabet, Y. Jaouën, E. Burov, G. Melin, M. Lievre, and J. Dubard. Comparative measurement of group velocity dispersion on micro-structured fibre using optical low coherence reflectometry. In *OFMC 2007*, Teddington, UK, Oct. 2007.

[585] H. Teimoori, J. D. Topomondzo, C. Ware, R. Gabet, and D. Erasme. All-Optical 3*8 SOA-based Decoder Design

and Demonstration at 10 Gbit/s for Packet-Switching Applications. In *Broadband Europe'06*, Geneva, Dec. 2006.
[586] C. Ware, S. Cordette, C. Lepers, I. Fsaifes, B. Kibler, C. Finot, and G. Millot. Spectral slicing of a supercontinuum source for WDM/DS-OCDMA application. In *International Conference on Transparent Optical Networks (ICTON)*, Athens, Greece, June 2008. Invited conference.
[587] Q. Xu, M. B. Costa E Silva, J.-L. Danger, S. Guilley, P. Bellot, P. Gallion, and F. J. Mendieta. Towards quantum key distribution system using homodyne detection with differential time-multiplexed reference. In *5th IEEE International Conference on Information and Communication Technologies RIVF 2007*, pages 158–165, Hanoi (Vietnam), Mar. 2007.
[588] Q. Xu, M. Sabban, P. Gallion, and F. J. Mendieta. Quantum key distribution system using dual-threshold homodyne detection. In *6th IEEE International Conference on Information and Communication Technologies RIVF 2007, Ho Chi Mim Ville (Vietnam)*,, Ho Chi Mim Ville (Vietnam), July 2008.
[589] L. Yi, Y. Jaouën, W. Hu, Y. Su, and P. Gallion. SBS Based Slow-Light Performance Comparison of 10-Gb/s NRZ, PSBT and DPSK Signals. In *"Asia-Pacific Optical Communications (APOC)*, Wuhan PRC, Feb. 2007.
[590] L. Yi, Y. Jaouën, W. Hu, Y. Su, and P. Gallion. SBS based slow-light performances comparison of 10-Gb/s NRZ, PSBT and DPSK signals. In *APOC 2007*, pages paper 6783–19, Wuhan (Chine), Oct. 2007.

5.3.4 ACLN: Articles in Other Refereed Journals

[591] P. Hamel, R. Gabet, A.-F. Obaton, E. Burov, G. Melin, and Y. Jaouën. Mesure de la dispersion chromatique de fibres micro-structurées par réflectométrie à faible cohérence. *Revue française de métrologie*, 2006-4(8):3–11, Jan. 2007.
[592] C. Palavicini, Y. Jaouën, P. Gallion, and G. Campuzano. Caracterizacion de componentes fotonicos utilizando reflectometra optica de baja coherencia. *Revista Mexicana de física*, 52(4):379–386, Aug. 2006.

5.3.5 ACTN: Articles in Proceedings of French Conferences

[593] B. Bennai, V. Jolivet, P. Bourdon, C. Coudrain, Y. Jaouën, and O. Vasseur. Etude des fluctuations de phase et combinaison cohérente de lasers a fibre en vue de la réalisation d'une source de forte énergie. In *JNOG 2007*, volume papier ME1, Grenoble, July 2007.
[594] A. Bezard, A. Tan, E. Pincemin, Y. Jaouën, A. Tonello, and S. Wabnitz. Performances des formats duobinaires pour la transmission longue distance à 40 Gb/s. In *JNOG 2006*, number papier A-TH1-9, Metz, Nov. 2006.
[595] L. Bigot, V. Pureur, Y. Jaouën, Y. Quiquempois, and G. Bouwmans. Laser à 980nm basé sur une fibre toute solide à bandes photoniques interdites dopée ytterbium. In *JNOG 2007*, volume papier MA8, Grenoble, July 2007.
[596] G. Canat, Y. Jaouën, J.-C. Mollier, S. Bordais, J. P. Bouzinac, and Y. Aubry. Conception d'amplificateurs à fibre dopée er3+/yb3+ de puissance : application à la génération d'impulsions 100 µj. In *JNOG 2005*, number papier 5_8, Chambéry, Nov. 2005.
[597] S. Cordette, B. Kibler, I. Fsaifes, C. Lepers, C. Ware, C. Finot, and G. Millot. étude expérimentale d'un système hybride WDM/DS-OCDMA pour réseau d'accès optique haut débit. In *Journées Nationales d'Optique Guidée JNOG'08*, Lannion, France, Oct. 2008. Poster.
[598] I. Fsaifes, C. Lepers, M. Lourdiane, and P. Gallion. Encodage spectral à réseaux de Bragg pour les systèmes CDMA tout optiques. In *JNOG 2005*, Chambéry, Nov. 2005.
[599] I. Fsaifes, C. Lepers, R. Gabet, M. Douay, and P. Gallion. étude expérimentale d'un système DS-OCDMA cohérent à réseaux de Bragg superstructurés. In *26èmes Journées Nationales d'Optique Guidée JNOG*, Grenoble France, July 2007.
[600] I. Fsaifes, C. Lepers, R. Gabet, M. Douay, and P. Gallion. étude expérimentale d'un système ds-ocdma cohérent à réseaux de bragg superstructurés. In *26es Journées Nationales d'Optique Guidée JNOG*, Apr. 2009.
[601] R. Gabet, K. Clément, G. Melin, A.-F. Obaton, E. Burov, and Y. Jaouën. Caractérisation modale de fibres microstructurées par réflectométrie à faible cohérence. In *JNOG 2005*, number papier 2_5, Chambéry, Nov. 2005.
[602] F. Gómez Agis, C. Ware, D. Erasme, R. Ricken, V. Quiring, and W. Sohler. Récupération d'horloge par une boucle à verrouillage de phase opto-électronique utilisant le mélange à trois ondes dans le niobate de lithium périodiquement inversé. In *Journées nationales d'optique guidée*, Chambéry, France, Nov. 2005.
[603] F. Gómez Agis, C. Ware, and D. Erasme. Extraction d'horloge des signaux optiques par une boucle à verrouillage de phase opto-electronique utilisant un dispositif en niobate de lithium à inversion de domaines. In *Journées Nationales d'Optique Guidée*, Grenoble, France, July 2007.
[604] F. Gómez Agis, C. Ware, L. Oxenløwe, S. Kurimura, H. Mulvad, M. Galili, and D. Erasme. Récuperation d'horloge d'un signal OTDM à 640 Gbit/s transmis sur 50 km par boucle à verrouillage de phase opto-électronique utilisant un dispositif en niobate de lithium à inversion de domaines. In *Journées Nationales d'Optique Guidée JNOG'08*, Lannion, France, Oct. 2008.
[605] V. Lanticq, S. Jiang, R. Gabet, Y. Jaouën, S. Delepine-Lesoille, and J.-M. Henault. Mesure auto référencée du coefficient de gain brillouin dans les fibres optiques monomodes. In *JNOG 2008*, page papier A8.11, Lannion, Oct. 2008.
[606] V. Lanticq, S. Jiang, R. Gabet, Y. Jaouën, S. Delepine-Lesoille, and G. Moreau. Mesure auto référencée du coefficient de gain brillouin dans les fibres optiques monomodes. In *CMOI 2008*, page Session8, Nantes, Nov. 2008.

[607] A. Maalouf, P. Hamel, D. Bosc, Y. Jaouën, S. Haesaert, F. Henrio, P. Grosso, M. Gadonna, Y. Gottesman, and R. Gabet. Caractérisation de micro-résonateurs polymère par réflectométrie à faible cohérence. In *JNOG 2007*, volume papier ME9, Grenoble, July 2007.
[608] S. Sahuguede, D. Fafchamps, A. Julien-Vergonjanne, G. Rodriguez, J.-P. Cances, P. Gallion, and J.-M. Dumas. Performances du decodage ldpc sur un anneau optique fonctionnant en mode paquet. In *27èmes Journées Nationales d'Optique Guidée JNOG,*, Lannion (France), Oct. 2008.
[609] H. Teimoori, C. Ware, and D. Erasme. Application du mélange à quatre ondes à la conversion série / parallèle. In *Journées Nationales d'Optique Guidée JNOG'05*, Chambery (France), Nov. 2005.
[610] H. Teimoori, C. Ware, J. D. Topomondzo, and D. Erasme. Traitement du label de paquets optiques pour les réseaux optiques de communications. In *Journées Nationales d'Optique Guidée JNOG'07*, Grenoble (France), June 2007.
[611] L. Yi, Y. Jaouën, W. Hu, Y. Su, and R. Gabet. Ralentissement de signaux à 10Gb/s par effet Brillouin dans une fibre optique. In *JNOG 2007*, volume paper JE3, Grenoble, July 2007.

5.3.6 ASCL: Articles in Journals without review committee

[612] P. Gallion. Le ftth : La révolution de l'optique. *La revue TELECOM, ISSN 1769-338*, (153):59–64, Apr. 2009.

5.3.7 COM: Talks in Conferences Which Do Not Publish Proceedings

[613] S. Agnolini and P. Gallion. Quantum key distribution implementations by QPSK modulation using a single dual-electrode mach-zehnder modulator. In *Symposium on Technology Fusion of Optoelectronics and Communications, SFTOC'05,*, number 19T07, Taipei (ROC), Oct. 2005.
[614] G. Campuzano and P. Gallion. Static/dynamic locking range dependence on grating characteristics of index-coupled DFB lasers. In *Sixth Symposium Optics in Industry*, Monterrey (Mexico), 2007.
[615] G. Canat, J.-C. Mollier, and Y. Jaouën. Performances and limitations of high brightness erbium-ytterbium fiber sources. In *Journées scientifiques ONERA*, Chatillon, June 2005.
[616] D. Erasme and T. B. Consortium. Broadband-for-all in europe and in the world: the analysis of the eu-bread project. In *2005 Optics Valley of China International Symposium on Optoelectronics*, Wuhan (Chine), Nov. 2005.
[617] R. Gabet, K. Clément, C. Lepers, and Y. Jaouën. Caractérisation de fibres microstructurées par réflectométrie à faible cohérence. In *Colloque du GDR Ondes*, Marseille, June 2005.
[618] P. Gallion. Récents travaux sur le cdma optique". In *Technologies dAccès et Evolutions Futures, Etat de lArt et Perspectives*, Oct. 2005.
[619] P. Gallion. Advanced concepts and devices for optical communications and networking. In *GET-NTP Broadband & Wireless Communications WORKSHOP*, Hsinchu Taiwan, Nov. 2006.
[620] V. I. Gavrilenko, K. V. Maremyanin, M. I. Orlov, D. V. Ushakov, N. Dyakonova, W. Knap, Y. Todorov, I. Sagnes, and C. Minot. Generation of terahertz radiation in quantum cascade structures. In *Annual symposium on Nanophysics and Nanoelectronics*, pages 543–544, Nizhny Novgorod, Russie, Mar. 2007.
[621] F. Gómez Agis, C. Ware, D. Erasme, R. Ricken, V. Quiring, and W. Sohler. 10 GHz clock recovery using three-wave mixing in PPLN. In *COST 288*, Saint-Andrews, Royaume-Uni, Aug. 2005.
[622] F. Gómez Agis, C. Ware, D. Erasme, R. Ricken, V. Quiring, and W. Sohler. 30 GHz sub-clock recovery using three-wave mixing in PPLN. In *COST 291*, Cannes, France, Sept. 2006.
[623] A. Guermache, V. Voiriot, N. Bouche, D. Locatelli, F. Legrand, B. Ligat, R. M. Capella, and J. Jacquet. Experimental demonstration of output power improvement of 1.48 µm pump lasers by spatial hole burning reduction. In *International Workshop on PHysics and Applications of SEmiconductor LASERs*, Metz (France), Mar. 2005.
[624] Y. Jaouën, G. Canat, S. Grot, and S. Bordais. Power limitation induced by nonlinear effects in pulsed high-power fiber amplifier. In *Journées scientifiques ONERA*, Chatillon, June 2005.
[625] Y. Jaouën, G. Canat, J.-C. Mollier, and J. P. Bouzinac. Performances and limitations of high brightness erbium-ytterbium fiber sources. In *RFLS 2005*, Nice, Sept. 2005.
[626] F. Kefelian, R. Gabet, and P. Gallion. Phase noise characterization of a RF signal generation and transmission optical system based on injection locked DFB lasers. In *International Workshop on PHysics and Applications of SEmiconductor LASERs,*, page 30, Metz (France), Mar. 2005.
[627] C. Minot, Y. Todorov, I. Abram, U. Gennser, and I. Sagnes. Contrôle de l'émission térahertz dans les super-réseaux en microcavité. In *3èmes Journées Térahertz*, pages 5–8, Aussois (France), Mar. 2005.
[628] J. Renaudier, L. Legouezigou, F. Poingt, F. Pommereau, F. Lelarge, F. Martin, O. Le Gouezigou, J.-G. Provost, P. Gallion, B. Thedrez, and G. H. Duan. Polarization insensitive 40 GHz self-pulsating DBR lasers with wide self-pulsation frequency tunability. In *International Workshop on PHysics and Applications of SEmiconductor LASERs,*, Apr. 2005.
[629] H. Teimoori, D. Apostolopoulos, K. Vlachos, C. Ware, D. Petrantonakis, L. Stampoulidis, H. Avramopoulos, and D. Erasme. Physical architectures for packet-switching network nodes based on non-linear logic gates. In *6th Symposium on Communication Systems, Networks and Digital Signal Processing, CSNDSP08*, Graz, Austria, Aug. 2008.
[630] J. D. Topomondzo, D. Erasme, E. Alvarez, H. Soto, and G. Debarge. Experimental determination of coupling coefficient in semiconductor optical amplifier subjected to the cross polarization modulation. In *PHOTONICS*

PRAGUE 2005, 5th International Conference on Photonics, Devices and Systems, volume 6180, Prague, June 2005.

[631] Q. Xu, M. B. Costa E Silva, S. Agnolini, P. Gallion, and F. J. Mendieta. Photon Counting and Super Homodyne Detection of Weak QPSK Signals for Quantum Key Distribution Applications. In *EOS Annual Meeting 2006, Topical Meeting on Extreme Optics (QEOD/EPS and EOS)*, Paris, Oct. 2006.

[632] Q. Xu, M. B. Costa E Silva, P. Gallion, and F. J. Mendieta. Experimental super homodyne quantum key distribution system. In *École d'été e-Photon/One+ 2007*, Brest France, July 2007.

[633] Q. Xu, M. Sabban, P. Gallion, and F. J. Mendieta. Dual threshold receiver for 1550nm homodyne qpsk quantum key distribution system. In *2008 Coherent Optical Technologies and Applications (COTA) Topical Meeting.*, Boston (MS), July 2008.

5.3.8 OS: Books and Book Chapters

[634] J. C. Bouley. Lasers à semi-conducteurs. In *Sciences et Techniques: Electronique*, chapter E 2660, page 16 p. Editions Techniques de l'Ingénieur, Paris, 2007.

[635] G. Campuzano and P. Gallion. Theory of Injection Locking and Quantum Static/dynamic locking range dependence on grating characteristics of index-coupled DFB lasers. In J. C. G.-V. J. D.-R. C. L.-M. Editors, editor, *Proceedings of SPIE-Volume 6422*. SPIE, Bellingham, WA, 2008, 2007.

[636] A. Farhat, M. Mnif, C. Lepers, H. Rezig, and P. Gallion. Impact of the unipolar family codes on the performances of the dsocdma system. *Proceedings of SPIE, Optical Transmission, Switching, and Subsystems VI, Editor(s): Kenichi Kitayama; Pierpaolo C. Ghiggino; Kim Roberts; Yikai Su, ISBN: 9780819473769Editors , SPIE Bellingham, WA, December 2008*, 7136, Dec. 2008.

[637] I. Fsaifes, M. Lourdiane, C. Lepers, R. Gabet, V. Beugin, and P. Gallion. Performance of a 1gbps optical direct sequence cdma based on sampled fiber bragg grating. In P. Mascher, A. P. Knights, J. C. Cartledge, and D. V. Plant, editors, *Proceedings of SPIE, Vol 5970, Photonic Applications in Devices and Communication Systems*, pages 713–718. SPIE, Bellingham, WA, (USA), 2005.

[638] P. Gallion, J. Renaudier, G. H. Duan, and B. Lavigne. Self-pulsating semiconductor lasers for high bit-rate all-optical clock recovery. In A. K. Dutta, Y. Ohishi, N. K. Dutta, and J. Moerk, editors, *Proceedings of SPIE-Volume 6389 : Active and Passive Optical Components for Communications VI*. SPIE, Bellingham, WA, USA, 2007.

[639] P. Gallion, J. H. Zhou, S. F. Jiang, J. P. Chen, and Y. Jaouën. Noise in distributed Raman amplification. In M.-J. Li, J. Chen, S. Kawanishi, and I. H. White, editors, *Active and Passive Optical Components for Communications VI*, volume 6781. SPIE, Bellingham, WA, Nov. 2007.

[640] P. Gallion, F. J. Mendieta, and S. Jiang. *Signal and quantum noise in optical communcation and in cryptography*, pages 149–259. Elsevier, Amsterdam, 2009.

[641] Y. Jaouën, R. Gabet, and P. Hamel. Optical low-coherence reflectometry for characterization of specialty fibers and photonics crystal waveguides. *Photonics North 2008 Proceedings of SPIE*, pages paper 7099–19, Aug. 2008.

[642] F. Kefelian and P. Gallion. Theoretical analysis of optical injection locking in semiconductor DFB lasers, influence of the injection direction. In I. H. W. D. Lenstra, M. Pessa, editor, *Proc. of SPIE vol. 6184 Semiconductor Lasers and Laser Dynamics II* , pages 147–157. SPIE, Bellingham, USA, 2006.

[643] L. Yi, Y. Jaouën, W. Hu, Y. Su, and P. Gallion. SBS Based Slow-Light Performance Comparison of 10-Gb/s NRZ, PSBT and DPSK Signals. In *Proceedings of SPIE-Volume 6XXX: Active and Passive Optical Components for Communications VI ,*. SPIE, Bellingham, WA, 2008, 2008.

5.3.9 AP: Other Productions: Database, Registred Software, Registred Patent, . . .

[644] J. M. Moison and C. Minot. Réseaux de guides d'ondes permettant de dévier un faisceau lumineux. (07/54872), Sept. 2007.

[645] S. Mumtaz, G. Rekaya-Ben Othman, and Y. Jaouën. Procédé et dispositif de modulation mettant en œuvre une modulation différentielle, procédé et dispositif de démodulation, signal et produits programme d'ordinateur correspondants. (FR 09/52207), Apr. 2009.

[646] S. Sahuguede, D. Fafchamps, A. Julien-Vergonjanne, G. Rodriguez, J.-P. Cances, P. Gallion, and J.-M. Dumas. Ldpc soft decision fec performance in an optical packet ring network, Sept. 2009.

Part II

Network and Computer Science

Network and Computer Science (INFRES)

During the period of this evaluation, the Networks and Computer Sciences Department was averaging about 50 permanents including faculty and engineers. Its growth stayed modest with an increase of one or two faculty or engineer each year. However in the same period of time its revenue growth was at a remarkable rate of over 30%. As for this year ending, despite the economic crisis, we are forecasting a 5% growth in revenue. As a consequence, counting in term of FTFE (Full Time Faculty Equivalent, who are clearly responsible for getting most of our research contracts and grants), the ratio revenue per FTFE has been growing similarly to reaching nearly 150k€ this year from about 80k€ at the beginning of this evaluation.

The Networks and Computer Sciences Department has a long tradition of studying complex network or software system architectures. Both complex network systems and complex software systems are constrained by a series of classical common high level requirements including: scalability, quality of service, availability, maintainability, safety, security, dependability, usability, and of course performance and cost saving. Today, energy saving and durability would certainly have to be added to the list, even if they are not really as new as it would seem. Fortunately, this list changes very slowly. However, system elements change fundamentally and at a fast pace: links between nodes became optical or wireless. This allowed nodes to become mobile, to appear, disappear, and reappear at another end of the network. Networks are becoming networks of 'things' as they include all kind of cell phones, sensors, RFIDs or even robots (like drones). These things can be more or less ubiquitous, more or less autonomous. Let's stop here for a moment and describe later our vision for the research in the Department; this rapid landscape should be sufficient to explain how research is led in the Department. For instance, one specific category of system could have been chosen and thoroughly studied under the entire variety of high level requirements. Instead, it has been chosen to focus on the various 'Gordian' knots found in complex software systems and networks that have high scientific value and make these systems or networks difficult to develop, maintain, and control.

For instance, how to process and analyze a large amount of data 'on the fly' as they arrive from multiple nodes? How to efficiently search through a vast heterogeneous set of data more or less reliable over the web? How to rapidly develop and verify a real time system re-using existing components? What kind of middleware can support collaborative applications over a wireless self-configuring network? How to broaden the interaction with a computing device using solely the movement of a thumb? All these various questions are illustrating part of the research led in the **Information Systems and complex systems (IC2&S3) Group**.

Sometimes good common sense and solid methodologies are just not enough. When it is about pushing the constraints over the requirements described above to the limits of what physics can offer, for instance using quantum theory to establish the highest level of security possible. When it is about providing with the best tools possible allowing designing the best network architecture to fight in the fierce economy of the telecommunication industry, for instance making some advance in probability theory using the Malliavin calculus. When it is about optimizing an optical network using graph theory or linear programming elevating drastically technology barriers. Discrete or not, mathematics are impassable and are a key component in the research

led in the Department. Members of the **Mathematics of Information, Communication, and Computation (MIC2) Group** are dedicated to this critical effort.

Last but not least, the members of the **Networks, Mobility, and Security Group** are studying a broad variety of network architectures (P2P, mobile, mesh, or hybrid,...) going from the core layers of the communication network to the service layers: establishing how congestions can be avoided, looking at various architectures and making contributions to new protocols able to transport data, voices, images, or video; analyzing QoS or performance; managing mobility or radio resource; revisiting scheduling or failover algorithms. At last, in order to conduct its research in the domain of security, the group is mastering a large array of technologies spanning from novel usages of the smart card to game theory.

To succeed, the Department is demanding more than *just* publishing even important books like the J. Sakarovitch's one. To reach critical mass, it is participating to common labs like UBI-Media with Alcatel-Lucent, BiLab with EdF today extended to France Telecom and Inria, or more recently with the LInC with UPMC, Inria, and Thomson. It has constant and noticeable contributions to many industry standards (AADL just to pick one in the domain of embedded systems), an increased number of patents and public domain software. It also has a strong contribution to the Telecom ParisTech curriculum as well as the program of continuing education. At last, the Department has been able to create two start-ups SeQureNet and Ether Trust both in the domain of security.

Faculty [IT, CNRS]	[37.8, 3.2]
PhD students	56.5
Post-docs, engineers and sabbaticals	14.3
Defended PhD theses	44
Defended HDR	5
Journal papers	155
Papers in conference proceedings	608
Chapters and books	66
Patents and software	14
Grants [public, private, european] (k€)	[2870, 2464, 2734]

Chapter 6

Information Systems and Complex Systems (IC2/S3)

Team leaders I. Demeure (P), G. Hebrail (P).

Faculty T. Abdessalem (MC), B. Burtschy (P), B. Cautis (MC, 10/07–), A. Danzart (MC), J.L. Dessalles (MC), A. Grumbach (P, –10/08), Y. Guiard (DR CNRS, 10/07–), G. Hebrail (P, 12/06–), J. Hugues (MC), E. Lecolinet (MC), A. Mari (CR CNRS, –09/05), E. Najm (P), G. Origgi (CR CNRS, –09/05), L. Pautet (P), J.M. Saglio (DE, –01/07), C. Potier (MC), F. Rossi (MC, 09/08–), P. Senellart (06/08–), S. Tardieu (MC), S. Vignes (MC), F. Yvon (MC, –08/07).

PhD students M. Baglioni (11/09–), G. Bailly (11/06–05/09), K. Barbaria (10/05–12/08), E. Borde (12/06–), R. Chiky (10/05–01/09), B. Csernel (CIFRE 11/04–02/08), J. Delange (10/07–), N. Derouiche (10/08–), A. Dimulescu (10/08–), N. Gabsi (CIFRE 11/07–), O. Gilles (03/07–), X. Grehant (10/06–), B.Gueni (10/05–), H. Ha Duong (10/06–), I. Hamid (02/05–05/08), J. Hugues (10/02 – 09/05), Z. Kazi-Aoul(10/03–2/08), G. Lasnier (10/08–), S.Malacria (11/08–), S. Naqvi (10/02–12/05), G. Paroux (CIFRE 10/04–06/09), I. Perseil (10/05–), X. Renault (1/2007–), A. Roudaut (11/07–), M. Tahir (12/06–07/09), T. Vergnaud (10/03–11/06), Y. Yu (01/07–12/07), B. Zalila (10/05–11/08).

Post-docs, engineers and sabbaticals G. Bailly (06/09-05/10), N. Benguigui (délégation CNRS, 10/08-09/09), R. Blanch (12/05-09/06), P. Busch (Technician), P. Dax (DE, acting as research engineer), B. Dupouy (MC, acting as research engineer), P. Feiler (CMU-SEI 04/08–06/08), S. Ferrandiz (02/07–11/07), S. Gadret (CE), S. Gardoll (CNRS engineer, 01/09–), S. Huot (02/06-01/07), K. Jouini (08/08-07/09), K.P. Maalej (11/07-01/09), G. Mouret (Research engineer), H. Olafsdottir (10/08–), A. Tabard (04/09–), S. Tardieu (MC, acting as research engineer).

External collaborators A. Cotton (Thales Communications), A. Fantechi (Univ. Florence), P. Feiler (CMU/SEI), A. Galland (PhD student, INRIA Saclay), S. Jarp (CERN), E. Kharlamov (PhD student, Free University of Bozen-Bolzano & INRIA Saclay), F. Kordon (LIP6/MoVe),F. Singhoff (UBO), P. Toft (HP Labs, Bristol).

Faculty [IT, CNRS]	[14.3 [1], 0.7]
PhD students	12.6
Post-docs, engineers and sabbaticals	7
Defended PhD theses	11
Defended HDR	1
Journal papers [published, in press]	[30, 3]
Papers in conference proceedings	273
Chapters and books	32
Patents and sofware	4
Grants [public, private, european] (k€)	[852, 793, 449]

[1] This number figures the yearly average number of IT faculties. It should be divided by 2 to take into account that IT faculties dedicate half of their time to teaching.

6.1 Objectives

This section reports on the research work accomplished both within the IC2 and the S3 groups. The decision to federate both groups in one report was taken because although S3 is about the same size as the other groups nevertheless only a small half of the members of S3 are active in research while the other half consists in engineers and technicians providing operational network and system support to the INFRES department. It therefore seemed appropriate to present altogether the research accomplished in the computer science field within the INFRES department.

The research activity of the team focuses on Information Systems and their architecture, in their various forms: Distributed, Ubiquitous, Data Intensive, Complex, Web based, Real Time and Embedded; the team has important contributions to the main tiers that constitute these Systems: Human Computer Interfaces, Middleware, Data Bases and Services. Hence, the main challenges addressed by the team are related to:

- the mobile and highly distributed nature of today systems which stresses problems of reliability, connectivity, data sharing and coherence
- the monotonic growth of data that needs to be combined with more flexible structures (both on the web and within large companies)
- new levels of software complexity for which there is a strong need for new software engineering techniques (complexity and scalability on the number of components in enterprise IS and web services, reliability in embedded systems)
- the human computer interfaces which is a critical factor of acceptance and usage of computerized systems.

These challenges are cross-disciplinary: from a practical point of view, the activity of the team has been developped along the following dimensions:

- (1) Business Intelligence for Enterprise Information Systems;
- (2) Databases: management of web data, distributed management of trust and data access;
- (3) Middleware: that needs to be adaptive in many different ways;

- (4) Software Engineering for distributed real-time embedded systems: which is model based, taking advantage of formal semantics and supporting transformation tools;
- (5) Human Computer Interaction : mobile interaction, manipulation of a large amount of data.

Dimension (1) and partially dimension (2) are mainly related with the application level of Information Systems. Dimensions (2) and (3) cover the technical architecture of IS. Dimensions (4) and (5) are related to the design of IS. The objectives within each dimension, together with corresponding basic research are developed and described below.

Business Intelligence (BILAB Project)

The activity of the BILab Project covers several aspects of the Business Intelligence field in relation to both theoretical approaches and industrial applications. The two main challenges we address are (1) facing the increasing volume of available data to feed BI systems and (2) the need for almost real time reporting on the enterprise activity. Consequently, a major activity during the period has been related to data stream processing. Data stream processing has been studied intensively recently is to process data *on the fly* as they arrive instead of storing them beforehand in a data warehouse. This approach is referred as Data Stream Querying (if the goal is to query data) or Data Stream Mining (if the goal is to mine data).

Within this context, the BILab Project developed a research activity in this domain which is very active in the USA but not yet in Europe, and focussed on summarizing the history of data streams. Indeed, all existing data stream processing approaches can only provide results from the part of the stream posterior to the definition of queries or mining tasks.

Industrial applications mainly cover the telecommunication and energy fields.

Databases and the World Wide Web (DBWeb Project)

In this project, we study the fundamental issues raised in modern data and knowledge management systems, especially on the World Wide Web and in collaborative contexts oriented towards peer-to-peer networks. Research interests cover theoretical foundations as well as practical solutions and applications of data and knowledge management systems. The main challenges we address are:

- Query optimization over structured or semi-structured data,
- Web data management, with heterogeneous data, with restricted access patterns (deep Web), uncertain and contradictory data,
- Mining of very large graphs, and in particular of the Web graph,
- Relevance in communication and its applications in modern knowledge management systems,
- Distributed management of trust and data access in large information-sharing networks,
- Data management for mobile sensors.

Adaptable middleware

Existing middleware technologies for Mobile Ad hoc Networks applications (MANet) or Distributed Real time Embedded Systems (DRE) (such as TAO) provide general purpose execution platforms targeting a large spectrum of application domains. Their complex design patterns induce large memory footprints and execution overheads but also produce systems that are difficult to analyse and verify.

Our research is precisely aimed at addressing this pitfall. Our goal is to produce a verifiable and highly configurable middleware factory. The sought and delivered factory should be based

on a flexible, modular and versatile architecture that allows for the automated generation of middleware instances matching specific application requirements. This endeavour involves also the design and delivery of predefined or automatically generated components that support specific distribution and communication functions. The factory should allow for the verification of these individual components as well as their sound integration in the delivered middleware.
General purpose middleware also fail to resolve MANet specific needs. A MANet is a self-configuring network of mobile nodes connected by wireless links. MANets are highly dynamic. Changes may impact network topology in many ways - nodes may become out of reach of each other, or may have energy failures. Hence servers must be redundantly distributed over the nodes. The supporting middleware must manage dynamic service location and routing. Thus they must monitor the topology and adapt with appropriate actions. They must also preventively manage power consumption by monitoring and balancing node activities. These are the goals we pursued in designing middleware for MANets.

Model driven development
Our main endeavour is to define and build a development process, endowed with a supporting transformational tool chain, that aims at producing systems that faithfully implement high-level requirements. Mode Driven Engineering (MDE) is a key enabling technology: models are versatile as they can describe various software and system engineering artefacts: from requirements down to resources, platforms, application components, infrastructure components, etc. The applicability of MDE to Distributed Real time Embedded sytems(DREs) has not been properly addressed yet by the research community.

Our aim is precisely to bring the potential benefits of MDE to reality in the realm of DREs and safety critical systems. Thus, the sought and delivered tool chain has distinctive features that are hard to obtain in DREs.

Cost reduction and higher quality are to be achieved by extending the automatic code generation capabilities to distributed code and to the automatic deployment of the system. It is to be achieved also by allowing for the integration of predefined components (COTS) in the transformational process. Such an automatic code generation allows to produce the optimized and analyzable components of PolyORB-HI, our DRE AADL middleware (previously described). System quality and correctness is to be enhanced by the use of formal verification of both the functional (deadlock/starvation non-appearance) and non-functional (schedulability, response time) properties of systems.

The delivered process should address and integrate the different domains of expertise that are involved in building complex space and avionics systems, from requirmements capture, through formal modeling and property assessment, down to to the final impementations.

Advanced Interaction and Visualization (VIA Project)
This project is devoted to fundamental and applied research on Human Computer Interaction (HCI). It focuses on the double challenge of representing and manipulating more and more data, and to allow this not only on standard computers but also on small, mobile and non traditional devices. Our main contributions take place in the following domains:

- Novel interaction techniques and principles, with an emphasis on leveraging input dimensions that had been overlooked so far,
- Mobile interaction, with a special effort toward increasing the ”interaction bandwidth” between users and their devices (tablets, iphone, ...),
- Information visualization, and more specifically interactive visualization, which aims at allowing users to explore and manipulate the data actively,

- Fundamental HCI research on simple reaching movements, overwhelmingly frequent in HCI, with a project aimed at providing a more general understanding of the Fitts' law.

6.2 Main Results

6.2.1 Business Intelligence (BILab)

Faculty B. Burtschy, A. Danzart, G. Hebrail, C.Potier, F. Rossi, S. Vignes.

Main events Organization of several workshops: *Temporal data mining* at EGC2008 and EGC2009; *28th International Symposium on Forecasting (ISF)*, Nice, France, June 2008; *International Workshop on data stream management and mining*, University of Beihang, Beijing, October 2008; *European Workshop on Data Stream Analysis*, University of Naples, Caserta, March 2007; 14th Annual Conference of the Société Francophone de Classification (with the MIC2 team of INFRES), September 2007.

Projects ANR MDCO MIDAS (2008-2010).

Industrial collaborations Orange Labs (2 CIFRE PhD students, EDF R&D (BILab: a joint research laboratory on BI created in 2007).

Since 2007, most of the activity related to BI is inscribed into a new joint research laboratory with the research centre of EDF (Electricité de France). This laboratory is called the BILab (see `http://bilab.enst.fr`). This collaboration enables closer relationship with a large industrial company. During year 2009, the BILab is extending to another large industrial company (Orange Labs) and another research organization (INRIA, Axis Project). This extension is a great opportunity for our project because both EDF and Orange are very large companies having real practical problems related to managing a huge amount of data in a BI perspective. EDF data is mainly related to electrical power consumption of all customers which will be available massively with the development of smart meters. Orange data is also related to the usage of services by customers, both on telecommunication calls and internet access.

Data stream management

Data stream management systems (sometimes called complex event processing systems) are systems which extend the standard database technology to query data available in the form of streams of structured records. We developed a prototype with one of the first commercial DSMS (STREAMBASE) which processes electrical power consumption data available from electrical power smart meters [862]. Still in the context of electrical power smart meters, a new data model was defined to transmit data from households to the utility information system. This data model describes appliances of the household and their usage in terms of *On/Off* events. A simulator of such events was also designed and developed to generate a data stream from each household. Generated streams are captured by a Data Stream Management System in order to show that few basic queries are sufficient to supervise the household electrical power consumption [742] .

Our main activity related to data stream processing focuses on summarizing structured data streams: this requires the summaries to be built incrementally with little computation for each record and bounded or slowly growing disk space for storage. We developed several new approaches to summarize one or several structured data streams:

- *Streamsamp*: a random sampling approach which summarizes a unique stream but is combined with a technique which decreases the precision (and thus the storage space) for older data [725]. Several experiments have shown the efficiency of this algorithm however its accuracy decreases with very old data. In order to solve this issue, an hybrid approach has been developed and assessed: it combines the streamsamp algorithm with another existing algorithm (clustream) based on micro-clustering [836].

- *Crosstream*: an approach which summarizes three related streams. Two streams contain information about two different entity types and the third stream contains information about the relationships between entities [868].
- A temporal sampling approach applicable to a large number of distributed streams all producing the same type of information. The temporal sampling is adaptive and optimized to provide good precision on aggregation of any subset of the streams. The optimization is performed in relation to: (1) a maximum available bandwidth for stream transmission, (2) individual values of each stream. This approach has been applied and assessed on time series issued by electric power meters [724].

Beyond the definition of these algorithms, much work has been done on designing new ways of evaluation of the accuracy/precision of the summaries, and running comprehensive experiments both on artificial and real data. Indeed, standard assessment methodologies had to be revisited to take into account the temporal evolution of data inherent to streams.

Finally, a first study was carried out on the management of OLAP data cubes fed by one or several streams. A load shedding method was designed to sample randomly incoming data, in order to be able to continue to feed the cube when the input rate is too high. Confidence intervals on queries on such a data cube were theoretically defined [835].

Time series and functional data mining

BI deals frequently with time varying objects. Such objects are better understood as functional data: each object is described by some functions that map time to appropriate values describing the object on a given dimension at the specified date. Rather than analysing snapshots of the objects, one handles their complete evolution through time by targeting directly the functions.

We provide exploratory analysis of functional datasets via a combined clustering and segmentation approach. Functions are clustered into homogeneous clusters with the specific property that each cluster is represented by a simple functional prototype, for instance a piecewise constant function. The complexity of the prototype set (e.g., the total number of constant parts) is globally optimized by an efficient dynamic programming scheme [755]. Related work include [774] in which a piecewise constant approximation of functional data is built in a supervised manner: one finds a simplified representation optimized according to an external criterion (such as the ability to separate efficiently two classes of functions).

In [884], we handle time varying data in a quite different manner: in this case, the evolution through time of an unique system (a web server) is studied. A time aware clustering algorithm is used to track the evolution of the web server usage patterns.

Several approaches related to time series modelling, analysis and forecasting have also been developed, with applications in the domain of software reliability (see [781], [783], [782], [811], [676], [690]).

Web and social network mining

We have recently started to work on exploratory analysis of social networks and proposed in [801] a new clustering method for graphs. It produces communities that optimize a trade-off between a graph clustering quality measure (Girvan and Newman's Modularity measure) and a visualization quality measure inspired by the self organizing map algorithm. The method results in a coarse grained graph that is both a faithful simplification of the original graph and easy to represent and draw.

6.2.2 Databases and the World Wide Web (DBWeb)

Faculty T. Abdessalem, B. Cautis, J.-L. Dessalles, P. Senellart.

Main events and external collaborations Ongoing collaborations on XML data management with the Database group of University of California San Diego (Alin Deutsch) and Athens University of Economics and Business (Vasilis Vassalos).

Ongoing collaborations on data exchange, probabilistic databases, and the deep Web with the University of Oxford and INRIA-Saclay GEMO project (Serge Abiteboul).

Extended research stay of P. Senellart at Max-Planck-Institut für Informatik (Saarbrücken, Germany).

Projects ANR DataRing (2009–2011), ANR ISICIL (2009–2011), ANR LPOD (2009–2010), ANR PANIC (2010–2012), Advanced ERC Project Webdam (2009–2013), Webograph (Institut TELECOM, 2007), Confidence (Institut TELECOM, 2008), Ranking of RSS streams (LIP6/Télécom ParisTech, 2009).

We study the problem of querying data sources that accept a limited set of queries, such as sources accessible by Web services which can implement very large (potentially infinite) families of queries. For the relational data model, we revisited in [659] a classical setting in which the application queries are conjunctive queries and the source accepts families of (possibly parameterized) conjunctive queries specified as the expansions of a (potentially recursive) Datalog program with parameters, under the assumption that sources satisfy integrity constraints. For semi-structured databases, we study in [660] the problem of querying XML data sources that accept only a limited set of queries, such as sources accessible by Web services which can implement very large (potentially infinite) families of XPath queries.

As part of the work on XML query optimization, we proposed a rewriting algorithm that exploits minimization opportunities raised in composition-style nesting of queries [664, 875]. More precisely, we consider the simplification of XQuery queries in which the intermediate result constructed by a subexpression is queried by another subexpression, focusing on algorithms that can recursively prune query expressions, eliminating useless intermediate results. Still in the field of view-based query optimization, we study in [722] view-based rewriting for XPath in the presence of node identifiers or keys. We consider restrictions under which an XPath can be rewritten in polynomial time using an intersection of views and effective algorithms that can work for any documents or type of identifiers. Moreover, we consider the complexity of the related problem of deciding if an XPath with intersection can be equivalently rewritten as one without intersection or union.

We deal with the general problem of knowledge discovery and information extraction in the deep Web [813], and propose unsupervised and fully automatic techniques to perform an intensional (and not extensional) indexing thereof [673, 808]. For that purpose, we have the need to develop a probabilistic semi-structured data model that consists in annotating a tree-like document with conjunctions of literals representing independent probabilistic events. We study in depth the expressiveness of this model [672, 648], and propose efficient algorithms for querying and updating probabilistic data [708].

We develop techniques for the mining of large graphs: discovery of synonyms in the graph of a dictionary [911], of similar articles in that of an encyclopedia [670], of key actors in a collaboration network, prediction of the evolution of the World Wide Web graph, etc.

The extraction of complex data from semi-structured (HTML) sources is another recent direction of research of the group. We study techniques for template generation that exploit domain knowledge and semantics over the data.

In this project, we also carry on a basic research activity on relevance in communication in order to understand the foundations of modern knowledge systems. In our modelling work on relevance, we try to understand and predict what makes the content of a communicative act relevant. The ambition is to offer a predictive theory of what people talk about. This work has led to the *Complexity drop theory* [888]: interesting events are those which are less complex to describe than to generate (see: www.unexpectedness.eu). We could also formulate a *Generative theory of relevant argument* [736]. Lastly, we designed a model in which relevant communication is possible between non-cooperative (selfish) agents [887]. In this model, relevant communication is profitable to the emitter because it advertises definite qualities (relevance) that are appraised by listeners.

Still related to human aspects of modern knowledge systems, we work on the management of trust and access control in open contexts such as collaborative environments and social tagging platforms (Flickr, Del.icio.us, CiteUlike, etc). In particular, we are interested in the mechanisms by which trust (or distrust) relations between users can be built based on user activities, thematic proximity, reputation and peer evaluation, social links, and so on.

Finally, we work on spatio-temporal data streams and location service applications [706, 861]. We analyzed the necessity of a spatial windowing over spatio-temporal data streams and, based on the query language CQL (Continuous Query Language), we propose a appropriate syntax and formal semantics for spatial windowing operations.

Additional and up to date information on DbWeb main results and publications can be found on the project web page http://dbweb.enst.fr

6.2.3 Adaptable Middleware

Faculty I. Demeure, J. Hugues, L. Pautet.

Main events and external collaborations Summer school on Real Time Systems (ETR 09) by L. Pautet, France Telecom R&D, TAI/Thales, SC2/Thales, Agence Spatiale Europeenne (TOS-EME/ESA), Peter Feiler (SEI/CMU), Fabrice Kordon (LIP6/UPMC). Member of the SAE (Society of Automotive Engineers) ADL (Architecture Analysis Design Language) standard committee.

Projects ANR Flex-eWare, IST ASSERT, contracts with ESA and AdaCore RNRT-Transhumance, IST-POPEYE STREP, Contract with Orange R&D.

Adaptable middleware for distributed real time embedded systems

We study the problem of middleware engineering in the context of distributed real-time embedded (DRE) systems [901].

To tackle the middleware development complexity, we defined the schizophrenic middleware architecture. It makes it possible, for the first time, to instantiate simultaneously several distribution models with an excellent code reuse ratio compared to other approaches [757]. PolyORB, an implementation of this highly configurable architecture [758], is now industrially supported by AdaCore[1].

PolyORB is one of the very few middleware platforms to have been modelled and verified on some non-trival configurations using Petri nets (collaboration with LIP6/UPMC) in order to assess properties like deadlock free, livelock free or buffer dimensioning [900]. To improve the analysability of both the DRE system and its middleware, we decided to comply with the Ravenscar profile, a concurrency model for use in High-Integrity systems [758]. We also decided to use the Architecture Analysis and Description Language (AADL) (collaboration with SEI/CMU) to support our new design process for DRE systems [687].

We revisited PolyORB and the schizophrenic architecture [763] to define PolyORB-HI. It takes advantage of AADL to precisely deduce deployment and configuration information to automatically generate optimized and analyzable middleware components [817]. This AADL executive platform was one of the main results of the IST project ASSERT leaded by the European Space Agency, but also of the ANR Flex-eWare project. For instance, THALES reduced by a factor of 500 the memory footprint of executables produced with a concurrent approach. PolyORB-HI associated with our code generators is currently the first AADL execution platform for producing both Ada, C or RTSJ DRE systems.

We are studying the impact of new trends towards more complex DRE systems, like hierarchical partitioning as well as the duality of the safety and security features on middleware architecture. POK has enriched PolyORB-HI with safety (ARINC) and security (MILS) features coming from partitioned systems [729]. To our knowledge, POK is the first open-source kernel providing

[1] `http://www.adacore.com/home/products/gnatpro/add-on_technologies/distributed_systems`

both ARINC and MILS services. In the context of ANR Flex-eWare, we also made architectural improvements to enforce mode-based reconfiguration [718].

Adaptable middleware for collaborative applications over MANets
We designed and prototyped adaptable middleware solutions for Mobile Ad hoc Networks (MANets) providing support for collaborative applications. This led us to the following contributions.
Publish-subscribe system for MANets. Chapar is an event system designed for MANets [772]. It supports event persistency to resist transient disconnections and network partitioning. Following a cross-layer approach, Chapar relies on the Multipoint Relays (MPRs) defined in the OLSR MANet routing protocol as distributed brokers, and uses the OLSR routing table to disseminate the events. The support of persistency coupled with the cross-layer approach taking benefit from the OLSR MANet routing protocol, make Chapar quite unique.
Data-sharing system for MANets. Our system uses a predictive algorithm based on semantic information about the user and the data and previous access patterns to decide how to proactively replicate data. It creates enough replica to prevent data loss in case a peer unexpectedly disappears or a partition occurs. To this end, we proposed a stable group creation algorithm based on long lasting connectivity. While data sharing systems for MANET already exist, both the use of semantic information and of temporal stability are new in this domain. We illustrated the interest of the proposed algorithms by studying how a wiki service on MANETs would benefit from them [751], [750].
Energy-aware middleware for MANets. We proposed architectural guidelines, mechanisms and algorithms to design an energy aware middleware for MANets [857]. Each middleware module is designed with various level of functioning. When the energy level is high, the middleware provides all functionalities. When the energy level decreases, the functionalities are degraded in order to preserve the battery. The experiments performed showed a reduced energy consumption of about 20 % for the experiments conducted with ciphering and non acknowledged transport.
Open source software. Our contributions were prototyped and integrated to either one of the two platforms developed within the framework of POPEYE an IST STREP Project, and Transhumance an ANR RNRT project. Both platforms are available as open source software on Sourceforge. These developments were consucted jointly with our Transhumance and POPEYE partners and in particular with THALES present in both projects.
Innovative demonstrators. Finally, another contribution of this work lies in the cooperation with digital media designers (SES department) in order to propose innovative services, such as the above mentioned treasure hunting game, as demonstrators [1594], [731].

A flexible architecture for the adaptation of composed multimedia
We proposed and prototyped PAAM (Provision of AdAptable Multimedia composed documents) a service oriented architecture for the adaptation of multimedia documents to user preference and context. A novelty in PAAM, with respect to related work, is that adaptors are offered as shared resources by the participants; hence PAAM is an example of peer-to-peer collaboration overlay that provides all the functionalities to declare, look for, select and compose adaptors located at participating peers. For the project purpose, we extended WSDL (Web Services Description Language) to describe adaptors in order to make them easily declared, looked-up and composed. We proposed a complete adaptation chain that was implemented using the web services technology [2126].

6.2.4 Proof Based and Model Driven Developments

Faculty J. Hugues, E. Najm, L. Pautet, S Vignes.

Main events Organisation of AFADL'06 by S. Vignes; Neptune'08 et '09 by J. Hugues, S Vignes; FORTE'06, SDL'07 and ICSSEA'08 by E. Najm; IEEE/IFIP RSP'09 by J. Hugues

Projects and ACI FIACRE, ANR Flex-eWare, IST ASSERT, contracts with ESA and AdaCore,

ANR EDEMOI

Model based development for distributed real time embedded systems

We have built a combined expertise in modular middleware, formal modelling and software engineering. This wide range of expertise helps in delivering a full toolchain targeting the development of DREs.

We chose the AADL (Architecture Analysis and Design Language) as our pivot modelling language. AADL is an Architecture Description Language (ADL) well suited for DRE's. We have taken a leading position in the standardisation of this language, proposing several contributions to the core AADLv2 standard, and taking the lead on the definition of some annexes on data modeling, integration of programming languages, and on the integration of ARINC653 for the modeling of avionics system.

Based on AADL, We have designed a "Verification Driven Engineering" [773] process, where one iterates in order to enable verification at model level. We have shown that we need multiple formal methods to support the full engineering process. Therefore, we explored different tracks:

We adopted the Ada Ravenscar profile as one of our target patterns towards code generation, for its robustness and suitability for high-integrity systems as well as for its deterministic behaviour and its schedulability analysis capabilities.

We have defined the Ravenscar Meta Model (RMM) that we endowed with a formal semantics in order to make the generated code amenable for verification [753]. We have also defined a novel "deterministic" intertask commmunication pattern that we proved to be sound (cooperation with INRIA) [752]. We developed a prototype: ARC, to validate our transformations [686, 754].

We studied in collaboration with LIP6, the possibility to use Colored or Timed Petri Nets as another tool to support verification [799, 798] , and with UBO the possibility to perform high-level schedulability analysis of DREs.

We studied in collaboration with CMU/SEI the possibility to express safety and security properties on AADL model. We defined an AADL annex (REAL) [837] to express design patterns mandated by ARINC or MILS.

Ocarina [778] is the Open Source platform software that gathers our AADL tools and contributions. Ocarina has been tested and validated by academic and industrial partners as part of our funded R& D projects IST-ASSERT and ANR Flex-eWare in collaboration with ESA and Thales. Ocarina provides also a method for the integration of other modeling frameworks like SCADE or Simulink.

Proof based orchestration of web services

We defined a novel approach for the sound orchestration of services, based on expressing jointly behaviours and their types [743]. We proposed (1) Orcharts (orchestration charts) to define session based services and (2) Typecharts to support session types with complex interaction patterns that generalise the request/response interaction paradigm defined in BPEL. We defined an algorithm for deciding behavioural well typedeness and showed that it guarantees an important safety property: in all states of any configuration of well typed orcharts, all exchanged messages are expected and understood by their target partner.

Model based approach for formalising security properties

Our main contribution is a method to formalize security properties derived from the Goal-Oriented Requirements meta-method [780]. In this method, we match goals with security properties (for instance preventive security measures). We have adopted multiple notations to capture these properties: Natural language, a UML security profile, and formal methods (B and Z). Graphical UML descriptions are readable by domain experts and are used to support validation activities whereas formal methods are needed to support verification. Formal models are used to check the consistency of the documents and to generate test scenarios. The UML and formal models are tighly linked so as to make sure that "what you validate is that you verify".

We have applied our RE process and method to the domain of airport security (cf. EDEMOI Project). However, various domains including safety critical embedded system or ambient and pervasive adaptation, are concerned by confidence in the security properties and will be

confronted with certification activities.

6.2.5 Advanced Interaction and Visualization (VIA)

Faculty E. Lecolinet, Y. Guiard

Main events Official launching of the UBIMEDIA laboratory (2008); Conference organization (IHM 2006 and UBIMOB 2006: program co-chair), Special journal issue (Document Numérique, Hermès 2006)

Projects MOBA, MOBA2 then NIU projects with Alcatel-Lucent (12/05–; 2 theses), ANR XWiki Concerto (2006-2009), ANR TennisServer (2006-2009), iSphere (Institut Télécom; 2008), ENEIDE (Cap Digital; 2007-2010; 1 thesis), Quaero (OSEO; 2009-2013), Post-doc fundings by Region Ile-de-France (2007) and Carnot (2008-09).

Collaborations UBIMEDIA joint research lab with Alcatel-Lucent Bell Labs (created in 2008), co-direction of a PhD Student with L. Nigay (LIG), various research collaborations with INRIA/Aviz & INRIA/InSitu (Orsay), ESPCI/LOA, Paris8 PPCS & MISTIC, LIP6 (Paris), Université de Guanajuato (Mexique), other teams at TELECOM ParisTech (INFRES/S3, TSI/MM, SES/SHS, IP) and with the members of the projects we are involved in.

Our work on novel *interaction techniques* led us to develop new kinds of Marking menus, such as WaveMenus [711], FlowerMenus [712] and LeafMenus [804]. These techniques, based on gestural interaction, allow users to easily learn in novice (i.e., closed-loop) mode and later quickly execute in expert (i.e., open-loop) mode fairly large sets of commands. Gestural interaction is related to pattern recognition, especially handwriting recognition, a research field where we have collaborated with other researchers [657]. We have also worked on digital pen [854], tangible interfaces [787], tactile feedback [697] and developed hybrid devices that intermingle tangible interfaces and tactile feedback [789]. We also designed iSphere, a spherical input device currently under evaluation, aimed at facilitating interaction in 3D virtual worlds. Finally we recently introduced Motion-Pointing [663], a technique for selecting targets using elliptical motion instead of pointing. On these subjects, we have collaborated with various laboratories: LIG (a PhD thesis as been co-directed with L. Nigay), COSTECH (Compiègne), ESPCI LOA (Paris), INRIA AVIZ (Orsay)... and with colleagues from other teams at Telecom ParisTech (INFRES/S3, IP, TSI/MM).

We have developed several techniques specifically designed to facilitate *mobile interaction*, such as SpiraList [765] and SnailList [766], that use multi-scale spiral representations to minimize small-screen real estate. As an attempt to increase interaction bandwidth on common mobile devices, we proposed Tap-Tap, MagStick [805] and MicroRolls [671], which make it possible to interact very efficiently with the thumb. TapTap and MagStick outperform previous work on target acquisition on small devices while MicroRolls introduces a new set of gestures that enriches the input vocabulary of passive tactile surfaces. More recently, we also developed techniques based on 3D gestural interaction [803]. All these studies have been performed in collaboration with Alcatel-Lucent Bell Labs. They are also related to other partners of the UBIMEDIA laboratory, especially the SHS team (Telecom ParisTech SES).

In the Information visualization field, we introduced the concept of Zoomable Treemaps [649], a technique that makes it possible to navigate huge trees like the web base of the Open Directory project, with its 700,000 nodes. Another result in this category is the development of Perspective Drag [666] (in collaboration with INRIA InSitu) which leverages the familiar nonlinear variations of scale inherent in the perspective projection, and which we showed to help for navigating any sorts of large documents.

Finally, we have started casting some new light on Fitts' law, a famous empirical regularity of experimental psychology. In particular, we have clarified in what sense Fitts' law constitutes an instance of a speed-accuracy tradeoff [841]. We have also shown that the traditional definition

of the independent variables involved in the law suffers a high degree of indeterminacy, and suggested a novel way of defining the basic dimensions of the problem [665].

It is important to note that people involved in the HCI activity have developed long-term collaborations with several industrial and academic partners: Alcatel Lucent Bell Labs (and the just launched UBIMEDIA joint research laboratory), LIG (Grenoble), INRIA InSitu and Aviz projects (Orsay), ESPCI LOA, Paris8 and LIP6 (Paris), COSTECH (Compiègne)... Moreover, VIA is an institutional project of Institut TELECOM that regroups researchers from other teams at Telecom ParisTech (INFRES/S3, TSI/MM, IP, SES/SHS) and Telecom SudParis (EPH). Many of them are also members of UBIMEDIA or other common projects.

6.3 References

6.3.1 ACL: Articles in ISI-Indexed Journals

[647] S. Abiteboul, B. Cautis, and T. Milo. Reasoning about xml update constraints. *Journal of Computer and System Sciences (JCSS)*, 2009.

[648] S. Abiteboul, B. Kimelfeld, Y. Sagiv, and P. Senellart. On the expressiveness of probabilistic XML models. *VLDB Journal*, 2009.

[649] R. Blanch and E. Lecolinet. Browsing zoomable treemaps: Structure-aware multi-scale navigation techniques. *IEEE Transactions on Visualization and Computer Graphics*, 13(6):1248–1253, November 2007.

[650] C. Carrez, A. Fantechi, and E. Najm. Assembling components with behavioural contracts / assemblage de composants selon des contrats comportementaux. *Annals of Telecommunications*, 60(7-8):989 – 1022, July 2005.

[651] J.-L. Dessalles. Storing events to retell them (commentary on Suddendorf & Corballis: 'The evolution of foresight'). *Behavioral and Brain Sciences*, 30(3):321–322, October 2007.

[652] J.-L. Dessalles. From metonymy to syntax in the communication of events. *Interaction Studies*, 9(1):51–65, 2008.

[653] J.-L. Dessalles. Why is language well-designed for communication? (short paper). *Behavioral and Brain Sciences*, 31(5):518–519, November 2008.

[654] A. Gentes, A. Guyot-Mbodji, and I. Demeure. Gaming on the move: Urban experience as a new paradigm for mobile pervasive game design. *Springer Multimedia Systems Journal*, May 2009.

[655] J. Hansson, B. Lewis, J. Hugues, L. Wrage, P. H. Feiler, and J. Morley. Model-Based Verification of Security and Non-Functional Behavior using AADL. *IEEE Security & Privacy*, November 2009.

[656] I. Manolescu, L. Afanasiev, A. Arion, J.-P. Dittrich, S. Manegold, N. Polyzotis, K. Schnaitter, P. Senellart, S. Zoupanos, and D. Shasha. The repeatibility experiment of SIGMOD 2008. *SIGMOD Record*, 37(1):39–45, March 2008.

[657] J. Ruiz-Pinales, R. Jaime-Rivas, E. Lecolinet, and M. J. Castro-Bleda. Cursive word recognition based on interactive activation and early visual processing models. *International Journal of Neural Systems*, 18(5):419–31, October 2008.

6.3.2 ACTI-A: Articles in Proceedings of Major International Conferences

[658] S. Abiteboul, B. Cautis, and T. Milo. Reasoning about xml update constraints. In *ACM SIGACT-SIGMOD-SIGART Symposium on Principles of Database Systems (PODS)*, Pekin (Chine), June 2007.

[659] B. Cautis, A. Deutsch, and N. Onose. Querying data sources that export infinite sets of views. In *12th International Conference on Database Theory (ICDT)*, Saint-Pétersbourg (Russie), March 2009.

[660] B. Cautis, A. Deutsch, N. Onose, and V. Vassalos. Efficient rewriting of xpath queries using query set specifications. In *35th International Conference on Very Large Data Bases (VLDB) 2009*, Lyon (France), August 2009.

[661] J.-L. Dessalles. Coincidences and the encounter problem: A formal account. In *30th Annual Conference of the Cognitive Science Society*, pages 2134–2139, Washington D.C., USA, July 2008.

[662] A. Dimulescu and J.-L. Dessalles. Understanding narrative interest: Some evidence on the role of unexpectedness. In *31st Annual Conference of the Cognitive Science Society*, pages 1734–1739, Amsterdam, NL, July 2009.

[663] J.-D. Fekete, N. Elmqvist, and Y. Guiard. Motion-pointing: Target selection using elliptical motions. In *ACM CHI (Conference on Human Factors in Computing Systems)*, pages 289–298, Boston, USA, April 2009.

[664] B. Gueni, T. Abdessalem, B. Cautis, and E. Waller. Pruning nested xquery queries. In *ACM 17th Conference on Information and Knowledge Management (CIKM)*, Napa Valley (USA), October 2008.

[665] Y. Guiard. The problem of consistency in the design of fitt's law experiments: Consider either target distance and width or movement form and scale. In *ACM CHI (Conference on Human Factors in Computing Systems)*, pages 1809–1818, Boston, USA, April 2009.

[666] Y. Guiard, Y. Du, and O. Chapuis. Quantifying degree of goal directedness in document navigation: Application to the evaluation of the perspective-drag technique. In *CHI, ACM Conference on Human Factors in Computing Systems*, pages 327–336, San Jose (California, USA), May 2007.

[667] A. Krul, G. Damnati, T. Moudenc, and F. Yvon. Corpus design based on the Kullback-Leibler divergence for text-to-speech synthesis applications. In *ICSLP/Interspeech 2006*, Carnegie-Mellon, PA, September 2006.
[668] A. Krul, G. Damnati, F. Yvon, C. Boidin, and T. Moudenc. Approaches for adaptive database reduction for text-to-speech synthesis. In *Interspeech*, Antwerpen, Belgique, September 2007.
[669] S.-S. Lin and F. Yvon. Optimization of decoding graphs by discriminative training. In *Interspeech*, Antwerpen, Belgique, August 2007.
[670] Y. Ollivier and P. Senellart. Finding related pages using Green measures: An illustration with Wikipedia. In *AAAI (Association for the Advancement of Artificial Intelligence)*, pages 1427–1433, Vancouver, Canada, July 2007.
[671] A. Roudaut, E. Lecolinet, and Y. Guiard. Microrolls: Expanding touch-screen input vocabulary by distinguishing rolls vs. slides of the thumb. In *ACM CHI (Conference on Human Factors in Computing Systems)*, pages 927–936, Boston, USA, April 2009.
[672] P. Senellart and S. Abiteboul. On the complexity of managing probabilistic XML data. In *PODS (Principles Of Database Technology)*, pages 283–292, Beijing, China, June 2007.
[673] P. Senellart and G. Gottlob. On the complexity of deriving schema mappings from database instances. In *PODS (Principles of Database Systems)*, pages 23–32, Vancouver, Canada, June 2008.
[674] N. Stroppa and F. Yvon. An analogical learner for morphological analysis. In *Proceedings of the Ninth Conference on Computational Natural Language Learning (CoNLL'2005)*, pages 120–127, Ann Arbor, MI, June 2005.
[675] M. Vazirgiannis, D. Drosos, P. Senellart, and A. Vlachou. Web page rank prediction with Markov models. In *WWW (World Wide Web)*, pages 1075–1076, Beijing, China, April 2008.

6.3.3 ACLN: Articles in Other Refereed Journals

[676] G. . Albeanu, H. Madsen, B. Burtschy, F. Popentiu, and M. Ghica. Bootstrapping time series with application to risk management. *R & RATA, Electronic Journal of International Group on Reliability*, 1(3):84–93, September 2008.
[677] J. A. Botia Blaya, I. Demeure, P. Gianrossi, P. Garcia Lopez, J.-A. Martinez Navarro, E. M. Meyer, P. Pelliccione, and F. Tastet-Cherel. Popeye: providing collaborative services for ad hoc and spontaneous communities. *Springer journal Service Oriented Computing and Applications.*, January 2009.
[678] J.-L. Dessalles. Du protolangage au langage : modèle d'une transition. *Marges linguistiques*, 11:142–152, June 2006.
[679] J.-L. Dessalles. Intérêt conversationnel et complexité : le rôle de l'inattendu dans la communication spontanée. *Psychologie de l'interaction*, 21, November 2006.
[680] J.-L. Dessalles. Complexité cognitive appliquée à la modélisation de l'intérêt narratif. *Intellectica*, 45(1):145–165, June 2007.
[681] J.-L. Dessalles and L. Ghadakpour. Semantic abilities evolved as well - commentary on michael arbib: 'from monkey-like action recognition to human language, an evolutionary framework'. *Behavioral and Brain Sciences*, 28(2):(electronic suppl.), 2005.
[682] J.-L. Dessalles, E. Machery, J. McKenzie Alexander, and F. Cowie. Symposium on j.-l. dessalles's why we talk. *Biology and philosophy*, August 2009.
[683] J.-D. Fekete and E. Lecolinet. Coordination et introduction du numéro spécial "visualisation pour les bibliothèques numériques". *Document Numérique*, 9(2), December 2006.
[684] S. Gerard, P. Feiler, J. Rolland, M. Filali, M. Reiser, D. Delanote, Y. Berbers, L. Pautet, and I. Perseil. Uml&aadl '2007 grand challenges. *ACM SIGBED Newsletter : The 15th issue*, 15, September 2007.
[685] A. Grumbach and E. Klinger. Virtuel et cognition. *Intellectica*, (45):7–22, December 2007.
[686] I. Hamid, B. Zalila, E. Najm, and J. Hugues. Automatic framework generation for hard real-time applications. *Innovations in Systems and Software Engineering: A NASA Journal*, 4(1):107–122, April 2008.
[687] J. Hugues, B. Zalila, L. Pautet, and F. Kordon. From the Prototype to the Final Embedded System Using the Ocarina AADL Tool Suite. *ACM Transactions in Embedded Computing Systems (TECS)*, 7(4):1–25, July 2008.
[688] R. Laleau, S. Vignes, Y. Ledru, M. Lemoine, D. Bert, V. Donzeau-Gouge, C. Dubois, and F. Peureux. Adopting a situational requirements engineering approach for the analysis of civil aviation security standards. *Software Process : Improvement and Practice*, 11(5):487–503, September 2006.
[689] T. Lucia and A. Mari. Getting 'even' with an additive particle. *The (In-)Determinacy of Meaning: Issues in Formal Pragmatics.*, February 2005.
[690] H. Madsen, P. Thyregod, B. Burtschy, G. . Albeanu, and F. Popentiu. On using soft computing techniques in software reliability engineering. *International Journal of Reliability, Quality and Safety Engineering.*, 13:1–12, January 2006.
[691] A. Mari. Intensional and epistemic wholes. *Linguistics and Philosophy, Ontos*, 2, 2005.
[692] M. S. O'Droma, I. Ganchev, M. Siebert, F. Bader, H. Chaouchi, I. Armuelles, I. Demeure, and F. Mcevoy. A 4g generic anwire system and service integration architecture. *Mobile Computing and Communication Review, MC2R, ACM SIGMOBILE*, 10(1):13–30, January 2006.
[693] I. Perseil and L. Pautet. Foundations of a new software engineering method for real-time systems. *Innovations in Systems and Software Engineering: A NASA journal*, 4(3):195–202, September 2008.
[694] J. Pulido, J. De La Puente, M. Bordin, T. Vardanega, and J. Hugues. Ada 2005 Code Patterns for Metamodel-Based Code Generation . *Ada Letters*, 27(2):53–58, August 2007.
[695] N. Stroppa and F. Yvon. Du quatrième de proportion comme principe inductif: une proposition et son application à l'apprentissage de la morphologie. *Traitement Automatique des Langues*, 46(1), January 2007.

[696] B. Zalila, J. Hugues, and L. Pautet. An Improved IDL Compiler for Optimizing CORBA Applications. *ACM SIGAda Ada Letters*, XXVI(3):21 – 27, December 2006.
[697] M. Ziat, O. Gapenne, C. Lenay, E. Lecolinet, G. Mouret, and J. Stewart. Espace de perception et seuils de confort pour un zoom haptique en 2D. *Revue d'Interaction Homme-Machine (RIHM)*, 7(1), 2007.

6.3.4 INV: Invited Talks

[698] T. Abdessalem and P. Senellart. Concepts et modèles des webs communautaires. In *BDA*, Guilherand-Granges, France, October 2008.
[699] T. Abdessalem and P. Senellart. Concepts et modèles des webs communautaires. In *AFIA 2009*, Hammamet, Tunisie, May 2009.
[700] F. Clérot, B. Csernel, and G. Hébrail. Tutoriel gestion et fouille de flux de données. In *EGC (Extraction et Gestion des Connaissances)*, Namur, Belgique, January 2007.
[701] J.-L. Dessalles. Le langage humain à la lumière de l'évolution. In *Journées d'étude sur la parole*, pages 17–23, Dinard, France, June 2006.
[702] G. Hébrail. Data stream management and mining. In *NATO Advanced Study Institute on Mining Massive Data Sets for Security*, Gazzada, Italie, September 2007.
[703] G. Hébrail. Statistical challenges in data stream applications. In *56th Session of the ISI International Statistical Institute*, Lisbonne, Portugal, August 2007.
[704] E. Lecolinet. Nouvelles techniques de visualisation et d'interaction. In C. Faure E. Castelli, Le Hai Khoi, editor, *Ecole Franco-Vietnaminenne de Recherche Do Son, Multimédia 2005*. CNRS/MICA, Do Son, Vietnam, November 2005.
[705] E. Lecolinet. Techniques de visualisation. In *Ecole Jeune Chercheur Interaction et Visualisation de l'Information*, Bordeaux:Cap-Ferret, September 2005.

6.3.5 ACTI-B: Articles in Proceedings of Other International Conferences

[706] T. Abdessalem, L. Decreusefond, and J. Moreira. Evaluation of probabilistic queries in moving objects databases. In *Fifth International ACM Workshop on Data Engineering for Wireless and Mobile Access (MobiDE),*, Chicago, IL, USA, June 2006.
[707] S. Abiteboul, B. Cautis, A. Fiat, and T. Milo. Digital signatures for modifiable collections. In *The First International Conference on Availability, Reliability and Security (ARES)*, Vienne, May 2006.
[708] S. Abiteboul and P. Senellart. Querying and updating probabilistic information in XML. In *EDBT (Extending DataBase Technology)*, pages 1059–1068, Munich, Germany, March 2006.
[709] M. Attnäs, P. Senellart, and J. Senellart. Integration of systran mt systems in an open workflow. In *MT Summit X*, Phuket, Thailand, September 2005.
[710] J.-C. Baillie, A. Demaille, Q. Hocquet, M. Nottalle, and S. Tardieu. The urbi universal platform for robotics. In *International Workshop on Standards and Common Platforms for Robotics*, Venise, Italie, November 2008.
[711] G. Bailly, E. Lecolinet, and L. Nigay. Wave menus: Improving the novice mode of hierarchical marking menus. In *INTERACT'07 - Springer Verlag, LNCS series*, volume I, pages 475–488, Rio, Brésil, September 2007.
[712] G. Bailly, E. Lecolinet, and L. Nigay. A new type of marking menus with large menu breadth, within groups and efficient expert mode memorization. In *Advanced Visual Interfaces (AVI / ACM Press)*, pages 15–22, Napoli, May 2008.
[713] K. Barbaria, J. Hugues, and L. Pautet. Design and Performance of a Generic Consensus Component for Critical Distributed Applications. In *12th International Conference on Reliable Software Technologies - Ada-Europe 2007*, volume LNCS, pages 208–220, Geneva, Switzerland, June 2007.
[714] K. Barbaria, L. Pautet, and I. Perseil. Schizophrenic middleware support for fault tolerance. In *SIGAda' 06*, Albuquerque, New Mexico, USA., November 2006.
[715] D. Bert, F. Bouquet, Y. Ledru, and S. Vignes. Validation of regulation documents by automated analysis of formal models. In *Workshop on Regulations Modelling and their Validation and Verification (REMO2V'06)*, Luxembourg, June 2006.
[716] A. Boly, S. Goutier, and G. Hébrail. Forgetting data intelligently in data warehouses. In *(RIVF) International Conference on Research, Innovation and Vision for the Future*, Hanoi, Vietnam, March 2007.
[717] E. Borde, G. Haik, V. Watine, and L. Pautet. Really hard time developing hard real time. In *Workshop on Control Architecture of Robots 2007 Workshop on Control Architecture of Robots 2007 (CAR'07)*, page 9, Paris, May 2007.
[718] E. Borde, L. Pautet, and G. Haïk. Mode-based reconfiguration of critical software component. In *12th IEEE International Conference on Design Automation and*, Nice, France, April 2009.
[719] J. Botia, H. Ha Duong, I. Demeure, and A. Gómez-Skarmeta. A context-aware data sharing service over manet to enable spontaneous collaboration. In *The 6th International Workshop on Distributed and Mobile Collaboration (DMC 2008). WETICE*, Rome, Italy, June 2008.
[720] M. Caillet, J. Carrive, C. Roisin, and F. Yvon. Engineering multimedia applications on the basis of multi-structured descriptions of audiovisual contents. In *International Workshop On Semantically Aware Document Processing And Indexing (SADPI)*, Montpellier, France, May 2007.

[721] B. Cautis. Distributed access control: A privacy conscious approach. In *12th ACM Symposium on Access Control and Technologies (SACMAT)*, Sophia Antipolis (France), June 2007.
[722] B. Cautis, A. Deutsch, and N. Onose. Xpath rewriting using multiple views: Achieving completeness and efficiency. In *Tenth International Workshop on the Web and Databases (WebBD, with ACM SIGMOD)*, Vancouver (Canada), June 2008.
[723] R. Chahine and C. Rigault. The generic context sharing protocol gcsp. application to signaling in a cross-network and multi-provider environment. In *WCC 2006*, Santiago du Chili, October 2006.
[724] R. Chiky and G. Hébrail. Summarizing distributed data streams for storage in data warehouses. In *Data Warehousing and Knowledge Discovery (DaWak 2008)*, pages 65–74, Turin, Italie, September 2008.
[725] B. Csernel, F. Clérot, and G. Hébrail. Streamsamp: data stream classification over tilted windows through sampling. In *International Workshop on Knowledge Discovery from Data Streams (in conjunction with ECML-PKDD)*, Berlin, Allemagne, September 2006.
[726] M.-D. Dang. Improving unconditional oblivious transfer from noisy channels. In *6th WSEAS International Conference on Information Security and Privacy - ISP'07*, pages 1–9, Tenerife, Espagne, December 2007.
[727] J. Delange, J. Hugues, L. Pautet, and B. Zalila. Code Generation Strategies from AADL Architectural Descriptions Targeting the High Integrity Domain. In *4th European Congress ERTS*, Toulouse, France, January 2008.
[728] J. Delange, L. Pautet, and P. H. Feiler. Validating safety and security requirements for partitioned architectures. In *Reliable Software Technologies 2009*, Brest, France, June 2009.
[729] J. Delange, L. Pautet, and F. Kordon. Code Generation Strategies for Partitioned Systems. In *29th IEEE Real-Time Systems Symposium (RTSS'08)*, page 53_56, Barcelona, Spain, December 2008.
[2087] I. Demeure, C. Faure, E. Lecolinet, J. C. Moissinac, and S. Pook. Mobile computing to facilitate interaction in lectures and meetings. In *DFMA*, Besançon, France, February 2005.
[731] I. Demeure, A. Gentès, J. Stuyck, A. Guyot-Mbodji, and L. Martin. Transhumance: a platform on a mobile ad hoc network challenging collaborative gaming. In *The 1st International Workshop on Collaborative Games (CoGames 2008)*, Irvine, California, USA, May 2008.
[732] I. Demeure, G. Paroux, J. Hernando-Ureta, A. R. Khakpour, and J. Nowalczyk. An energy-aware middleware for collaboration on small scale manets. In *Autonomous and Spontaneous Networks Symposium Telecom ParisTech, Paris*, Paris, November 2008.
[733] J.-L. Dessalles. Communication among selfish agents: From cooperation to display. In *3rd Lake Arrowhead Conference on Human Complex Systems*, Los Angeles, U.S.A., May 2005.
[734] J.-L. Dessalles. Generalised signalling: a possible solution to the paradox of language. In *International Conference on the Evolution of Language*, pages 75–82., Rome, Italy, April 2006.
[735] J.-L. Dessalles. A structural model of intuitive probability. In *International Conference on Cognitive Modeling*, pages 86–91, Trieste, Italy, April 2006.
[736] J.-L. Dessalles. A computational model of argumentation in everyday conversation: a problem-centred approach. In *International Conference on Computational Models of Argument*, pages 128–133, Toulouse, May 2008.
[737] J.-L. Dessalles. Spontaneous narrative behaviour in homo sapiens: how does it benefit to speakers? In *7th Evolution of Language Conference*, pages 91–98, Barcelone, March 2008.
[738] J.-L. Dessalles and D. Phan. Emergence in multi-agent systems: Cognitive hierarchy, detection, and complexity reduction. In *Artificial Economics*, volume Springer LNEMS, pages 147–159, Lille (France), September 2005.
[739] Y. Du, Y. Guiard, O. Chapuis, and M. Beaudouin-Lafon. Assisting target acquisition in perspective view. In *HCI, British Computer Society Conference on Human Computer Interaction*, pages 135–150, London (UK), September 2006.
[740] F.-X. Dudouet, I. Manolescu, B. Nguyen, and P. Senellart. Xml warehousing meets sociology. In *IADIS ICWI (International Conference on the Web and Internet)*, pages 170–174, Lisbon, Portugal, October 2005.
[741] G. Ebrard, M. A. Fernández, J.-F. Gerbeau, F. Rossi, and N. Zemzemi. From intracardiac electrograms to electrocardiograms. models and metamodels. In *Functional Imaging and Modeling of the Heart*, Nice (France), June 2009.
[742] K. El Marshi, S. Vignes, G. Hébrail, and Ml. Picard. A data stream model for home device description. In *Conf. on Research Challenges in Information Science*, Féz Maroc, April 2009.
[743] A. Fantechi and E. Najm. Session types for orchestration charts. In *Coordination 2008*, Oslo, June 2008.
[1594] A. Gentès, A. Guyot, and I. Demeure. Gaming on the move : Urban experience as a new paradigm for mobile pervasive game design. In *11th ACM MindTrek Conference MindTrek 2008: Entertainment and Media in the Ubiquitous Era*, Tampere, Finland, October 2008.
[745] O. Gilles and J. Hugues. Applying WCET analysis at architectural level. In *Worst-Case Execution Time (WCET'08)*, pages 113–122, Prague, Czech Republic, July 2008.
[746] X. Gréhant and I. Demeure. Symmetric mapping: an architectural pattern for resource supply in grids and clouds. In *The Fifth International Workshop on System Management Techniques, Processes, and Services (SMTPS'09)*, Rome, Italie, May 2009.
[747] X. Gréhant, O. Pernet, S. Jarp, I. Demeure, and P. Toft. Xen management with smartfrog: On-demand supply of heterogeneous, synchronized execution environments. In *Workshop Europar on Virtualization/XEN in HPC Cluster and Grid Computing Environments (VHPC)*, Rennes, August 2007.
[748] Y. Guiard, O. Chapuis, Y. Du, and M. Beaudouin-Lafon. Allowing camera tilts for document navigation in the standard gui: A discussion and an experiment. In *AVI, ACM conference on Advanced Visual Interfaces*, pages 241–244, Venice (Italy), May 2006.
[749] Y. Guiard, Y. Du, J.-D. Fekete, M. Beaudouin-Lafon, C. Appert, and O. Chapuis. Shakespeare's complete works as a benchmark for evaluating multiscale document-navigation techniques. In *AVI, ACM conference on Advanced*

Visual Interfaces, pages 135–150, Florence (Italy), May 2006.

[750] H. Ha Duong and I. Demeure. A nomadic wiki for mobile ad hoc networks. In *2009 International Symposium on Collaborative Technologies and Systems (CTS 2009)*, Baltimore, USA, May 2009.

[751] H. Ha Duong and I. Demeure. Proactive data replication using semantic information within mobility groups in manet. In *Mobilware 2009*, Berlin, Allemagne, April 2009.

[752] I. Hamid and E. Najm. Real-time connectors for deterministic data-flow. In *13th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA 2007)*, pages 173–182, Seoul - Koera, August 2007.

[753] I. Hamid and E. Najm. Operational semantics of ada ravenscar. In *13th International Conference on Reliable Software Technologies - Ada-Europe 2008*, Venise - Italie, June 2008.

[754] I. Hamid, B. Zalila, E. Najm, and J. Hugues. A generative approach to building a framework for hard real-time applications. In *31st Annual NASA Goddard Software Engineering Workshop*, pages 269–278, Baltimore, USA, March 2007.

[755] B. Hugueney, G. Hébrail, Y. Lechevallier, and F. Rossi. Simultaneous clustering and segmentation for functional data. In *European Symposium on Artificial Neural Networks (ESANN)*, pages 281–286, Bruges, Belgium, April 2009.

[756] J. Hugues and O. Gilles. Towards Model-based optimisations of Real-Time systems, an application with the AADL. In *15th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA 2009)*, Pekin, Chine, August 2009.

[757] J. Hugues, F. Kordon, and L. Pautet. A framework for DRE middleware, an application to DDS. In *Proceedings of the 9th IEEE International Symposium on Object-oriented Real-time distributed Computing (ISORC'06)*, pages 224–231, Gyeongju, Korea, April 2006.

[758] J. Hugues, F. Kordon, L. Pautet, and T. Vergnaud. A Factory To Design and Build Tailorable and Verifiable Middleware. In *Monterey Workshop 2005 on Networked Systems: realization of reliable systems on top of unreliable networked platforms*, volume LNCS, pages 123–144, February 2007.

[759] J. Hugues, L. Pautet, and B. Zalila. From MDD to Full Industrial Process: Building Distributed Real-Time Embedded Systems for the High-Integrity Domain. In *Monterey Workshop 2006*, volume LNCS, pages 35–52, Paris, France, January 2006.

[760] J. Hugues, L. Pautet, B. Zalila, P. Dissaux, and M. Perrotin. Using AADL to build critical real-time systems:Experiments in the IST-ASSERT project. In *4th European Congress ERTS*, Toulouse, France, January 2008.

[761] J. Hugues, M. Perrotin, and T. Tsiodras. Using MDE for the Rapid Prototyping of Space Critical Systems. In *The 19th IEEE/IFIP International Symposium on Rapid System Prototyping, 2008*, pages 10–16, Monterey, CA, USA, June 2008.

[762] J. Hugues, B. Zalila, and L. Pautet. Middleware and Tool suite for High Integrity Systems. In *Work-in-Progress session of the Real-Time Systems Symposium (RTSS'-WiP06)*, pages 1–4, Rio de Janeiro, Brésil, December 2006.

[763] J. Hugues, B. Zalila, and L. Pautet. Combining Model processing and Middleware Configuration for Building Distributed High-Integrity Systems. In *10th IEEE International Symposium on Object-oriented Real-time distributed Computing (ISORC'07)*, pages 307–312, Santorini Island, Greece, May 2007.

[764] J. Hugues, B. Zalila, L. Pautet, and F. Kordon. Rapid Prototyping of Distributed Real-Time Embedded Systems Using the AADL and Ocarina. In *18th IEEE/IFIP International Workshop on Rapid System Prototyping (RSP'07)*, pages 106–112, Porto Allegre Brésil, May 2007.

[765] S. Huot and E. Lecolinet. Spiralist: A Compact Visualization Technique for One-Handed Interaction with Large Lists on Mobile Devices. In *NordiCHI 2006*, pages 445–448, Oslo, Norway, October 2006.

[766] S. Huot and E. Lecolinet. Focus+context visualization techniques for displaying large lists with multiple points of interest on small tactile screens. In *INTERACT'07 - Springer Verlag, LNCS series*, volume I, pages 219–234, Rio, Brésil, September 2007.

[2227] A. R. Kaced and J. C. Moissinac. Multimedia content authentication for proxy-side adaptation. In *IEEE International Conference on Digital Telecommunications ICDT*, Cap Esterel, Côte d'Azur, France, September 2006.

[2121] A. R. Kaced and J. C. Moissinac. Protecting adaptive multimedia delivery and adaptation using proxy based approach. In *International Conference on Security and Cryptography SECRYPT*, Setubal, Portugal, August 2006.

[2229] A. R. Kaced and J. C. Moissinac. Semafor: a framework for authentication of adaptive multimedia content and delivery for heterogeneous networks. In *IEEE International Conference on Internet Surveillance and Protection ICISP*, Cap Esterel, Côte d'Azur, France, August 2006.

[2125] Z. Kazi-Aoul, I. Demeure, and J. C. Moissinac. Towards a peer-to-peer architecture for the provision of adaptable multimedia composed documents. In *DFMA (Distributed Frame for Multimedia Applications), IEEE conference*, Penang, Malaysia, May 2006.

[2127] Z. Kazi-Aoul, I. Demeure, and J. C. Moissinac. Paam: A web services oriented architecture for the adaptation of composed multimedia documents. In *Parallel and Distributed Compuing and Networks (PDCN)*, Innsbruck, Austria, February 2008.

[772] A. R. Khakpour and I. Demeure. Chapar: A cross-layer overlay event system for manets. In *Mobilware 2009*, Berlin, Germany, April 2009.

[773] F. Kordon, J. Hugues, and X. Renault. From Model Driven Engineering to Verification Driven Engineering. In *6th IFIP Workshop on Software Technologies for Future Embedded & Uiquitous Systems (SEUS 2008)*, volume LNCS, pages 381–393, Capri, Italy, October 2008.

[774] C. Krier, M. Verleysen, F. Rossi, and D. François. Supervised variable clustering for classification of nir spectra.

In *European Symposium on Artificial Neural Networks (ESANN)*, pages 263–268, Bruges, Belgium, April 2009.

[775] A. Krul, G. Damnati, F. Yvon, C. Boidin, and T. Moudenc. Adaptative database reduction for domain specific speech synthesis. In *Speech Synthesis Workshop*, Berlin, September 2007.

[776] R. Laleau, S. Vignes, Y. Ledru, M. Lemoine, and D. Bert. Application of requirements engineering techniques to the analysis of civil aviation security standards. In *SREP'O5, RE'05*, PARIS - F, September 2005.

[777] R. Laleau, S. Vignes, Y. Ledru, M. Lemoine, D. Bert, V. Donzeau-Gouge, C. Dubois, and F. Bouquet. Using Computer Science Modeling Techniques for Airport Security Certification. In *1st Int. Conf. on Research Challenges in Information Science*, Ouarzazate, Maroc, April 2007.

[778] G. Lasnier, B. Zalila, L. Pautet, and J. Hugues. OCARINA: An Environment for AADL Models Analysis and Automatic Code Generation for High Integrity Applications. In *Reliable Software Technologies'09 - Ada Europe*, volume LNCS, pages 237–250, Brest, France, June 2009.

[779] Y. Ledru, R. Laleau, M. Lemoine, S. Vignes, D. Bert, V. Donzeau-Gouge, C. Dubois, and F. Peureux. An attempt to combine uml and formal methods to model airport security. In *CAISE'06-Forum*, Luxembourg, June 2006.

[780] M. Lemoine, E. Lopez Ruiz, Y. Ledru, D. Bert, R. Laleau, and S. Vignes. Edemoi: a methodology for security of air transport system. In *EUCASS 2007*, Bruxelles, July 2007.

[781] H. Madsen, G. . Albeanu, B. Burtschy, and F. Popentiu-Vladicescu. Addressing time series modelling, analysis and forecasting in -learning environments. In *1st International Conference on Virtual Learning (ICVL 2006)*, pages 37–44, Bucharest, Romania, June 2006.

[782] H. Madsen, G. . Albeanu, B. Burtschy, and F. Popentiu-Vladicescu. Bootstrapping time series with application to risk management for software projects, finance and environment. In *17th SRA-Europe Conference joint Esrel 2008*, Valencia, Spain, September 2008.

[783] H. Madsen, P. Thyregod, B. Burtschy, G. . Albeanu, and Fl. Popentiu-Vladicescu. On using chained neural networks for software reliability prediction. In *Esrel 2007*, volume 1, pages 411–418, Stavanger, Norway, June 2007.

[784] A. Mari and L. Tovena. An additive and a scalar particle: the case of the italian neppure and its french counterparts. In *LSRL 35*, Austin Texas, February 2005.

[785] L. Martin and I. Demeure. Structured segmented data for improving collaborative edition on manets. In *Personal, Indoor and Mobile Radio Communications, 2008. PIMRC 2008. IEEE 19th International Symposium on*, pages 1–5, Nice, September 2008.

[786] T. Muhammad, G. Bailly, Y. Guiard, and E. Lecolinet. Tactile assistance for selecting list favorites with a bifocal absolute and relative representation. In *ChiNL'09*, Leiden, Netherlands (Pays-Bas), June 2009.

[787] T. Muhammad, G. Bailly, and E. Lecolinet. Aremote: A tangible interface for selecting tv channels. In *IEEE-ICAT*, pages 298–299, Esjberg, Danmark, November 2007.

[788] T. Muhammad, G. Bailly, and E. Lecolinet. Exploring the impulsion and vibration effects of tactile patterns. In *British HCI*, pages 237–240, Liverpool UK, September 2008.

[789] T. Muhammad, G. Bailly, E. Lecolinet, and G. Mouret. Tactimote: Tactile remote control for navigating in long lists. In *ACM-ICMI*, pages 285–288, Chania Grece, October 2008.

[790] T. Muhammad, G. Bailly, E. Lecolinet, and G. Mouret. Categorization, analysis and properties of tactile patterns. In *ChiNL'09*, Leiden, Netherlands (Pays-Bas), June 2009.

[791] B. Nguyen, A. Vion, F.-X. Dudouet, I. Manolescu, D. Colazzo, and P. Senellart. The WebStand project. In *WebSci (Web Science)*, Athens, Greece, March 2009.

[792] V. Oria, T. T. Pham Quang, and J.-M. Saglio. Webograph: A selective publication model for bloggers. In *IADIS Web Based Communities 2008 (WBC 2008) Conference*, Amsterdam, Nederland, July 2008.

[793] G. Paroux, L. Martin, J. Nowalczyk, and I. Demeure. Transhumance: A power-sensitive middleware for data sharing on mobile ad hoc networks. In *ASWN 2007 - seventh international Workshop on Applications and Services in Wireless Networks*, Espagne, May 2007.

[794] I. Perseil and L. Pautet. A Co-Modelling Methodology Designed for RT Architecture Models Integration. In *12th IEEE International Conference on Engineering of Complex Computer Systems*, pages 371–377, Auckland, New Zealand, July 2007.

[795] I. Perseil and L. Pautet. A Concrete Syntax for UML 2.1 Action Semantics Using +CAL. In *ICECCS '08: Proceedings of the 13th IEEE International Conference on Engineering of Complex Computer Systems*, pages 217–221, February 2008.

[796] I. Perseil and L. Pautet. Continuum, a co-modeling methodology for the integration of real-time architecture models. In *ERTS 2008*, Toulouse, France, January 2008.

[797] X. Renault, J. Hugues, and F. Kordon. Formal Modeling of a Generic Middleware to Ensure Invariant Properties. In *10th Formal Methods for Open Object-based Distributed Systems (FMOODS'08),*, volume LNCS, pages 185–200, Oslo, Norvège, June 2008.

[798] X. Renault, F. Kordon, and J. Hugues. Adapting models to model checkers, a case study : Analysing AADL using Time or Colored Petri Nets. In *IEEE/IFIP 20th International Sypmosium on Rapid System Prototyping* , Paris, France, June 2009.

[799] X. Renault, F. Kordon, and J. Hugues. From AADL architectural models to Petri Nets : Checking model viability. In *12th IEEE International Symposium on Object-oriented Real-time distributed Computing (ISORC'09)*, pages 313–320, Tokyo, Japon, March 2009.

[800] N. Richard, S. Tardieu, and S. Yamada. Cascaded Generic XCS to Learn About Reminding Preferences. In *International Workshop on Learning Classifier Systems*, Londres, Angleterre, July 2007.

[801] F. Rossi and N. Villa. Topologically ordered graph clustering via deterministic annealing. In *European Symposium on Artificial Neural Networks (ESANN)*, pages 529–534, Bruges, Belgium, April 2009.

[802] A. Roudaut. Visualization and interaction techniques for mobile devices. In *CHI EA*, pages 3153–3156, Boston, US, April 2009.
[803] A. Roudaut, M. Baglioni, and E. Lecolinet. Timetilt: Using sensor-based gestures to travel through multiple applications on a mobile device. In *Interact (Conference in Human-Computer Interaction)*, Upsalla, August 2009.
[804] A. Roudaut, G. Bailly, E. Lecolinet, and L. Nigay. Leaf menus: Linear menus with stroke shortcuts for small handheld devices. In *Interact (Conference in Human-Computer Interaction)*, Upsalla, August 2009.
[805] A. Roudaut, S. Huot, and E. Lecolinet. Taptap and magstick: Improving one-handed target acquisition on small touch-screens. In *Advanced Visual Interfaces (AVI / ACM Press)*, pages 146–153, Napoli, Italy, May 2008.
[806] J.-M. Saglio, M. Scholl, and T. A. Ta. Efficient query processing in p2p networks of taxonomy based sources. In *CAiSE'05*, page 14, Porto (Portugal), June 2005.
[807] P. Senellart. Identifying websites with flow simulation. In *ICWE (International Conference on Web Engineering)*, pages 124–129, Sydney, Australia, July 2005.
[808] P. Senellart, A. Mittal, D. Muschick, R. Gilleron, and M. Tommasi. Automatic wrapper induction from hidden-web sources with domain knowledge. In *WIDM (Web Information and Data Management)*, pages 9–16, Napa, USA, October 2008.
[809] P. Senellart and J. Senellart. Systran translation stylesheets: Machine translation driven by xslt. In *XML Conference & Exposition*, Atlanta, USA, November 2005.
[810] M. Spaniol, D. Denev, A. Mazeika, P. Senellart, and G. Weikum. Data quality in Web archiving. In *WICOW (Workshop on Information Credibility on the Web)*, Madrid, Spain, April 2009.
[811] C. Toque and B. Burtschy. Identification of time-series models : Application to arma processes. In *Joint Statistical Meeting*, volume BESS, pages 792–796, Mineapolis, USA, August 2005.
[812] E. S. Varadaradjou, P. Dax, and A. Grumbach. Improved Communication in Virtual Worlds. In *Virtual Reality International Conference 2006*, pages 103–111, Laval, France, April 2006.
[813] A. Varde, F. M. Suchanek, R. Nayak, and P. Senellart. Knowledge discovery over the deep Web, semantic Web and XML. In *DASFAA (Database Systems for Advanced Applications)*, pages 784–788, Brisbane, Australia, April 2009.
[814] Th. Vergnaud, K. Barbaria, I. Hamid, L. Pautet, S. Vignes, and E. Najm. Modeling and generating tailored distribution middleware for embedded real-time systems. In *ERTS'06*, Toulouse, Paris, January 2006.
[815] B. Zalila, I. Hamid, J. Hugues, and L. Pautet. Generating Distributed High Integrity Applications from their Architectural Description. In *12th International Conference on Reliable Software Technologies - Ada-Europe 2007*, volume LNCS, pages 155–167, Geneva, Switzerland, June 2007.
[816] B. Zalila, J. Hugues, and L. Pautet. An Improved IDL Compiler for Optimizing CORBA Applications. In *Proceedings of the 2006 annual ACM SIGAda international conference on Ada (SIGAda'06)*, pages 21 – 27, Albuquerque, USA, November 2006.
[817] B. Zalila, L. Pautet, and J. Hugues. Towards Automatic Middleware Generation. In *11th IEEE International Symposium on Object-oriented Real-time distributed Computing (ISORC'08)*, pages 221–228, Orlando, Florida, USA, May 2008.
[818] J. Zamorano, J. A. De La Puente, J. Hugues, and T. Vardanega. Run-time mechanisms for property preservation in high-integrity real-time systems. In *OSPERT 2007 — Workshop on Operating Systems Platforms for Embedded Real-Time applications*, pages 35–39, Pise, Italie, July 2007.

6.3.6 ACTN: Articles in Proceedings of French Conferences

[819] T. Abdessalem, R. Chiky, G. Hébrail, and J. L. Vitti. Traitement de données de consommation électrique par un système de gestion de flux de données. In *EGC (Extraction et Gestion des Connaissances)*, Namur, Belgique, January 2007.
[820] G. Bailly, A. Demeure, E. Lecolinet, and L. Nigay. Multitouch menu (mtm). In *IHM'08*, September 2008.
[821] G. Bailly, E. Lecolinet, and L. Nigay. Quinze ans de recherche sur les menus : Critères et propriétés des techniques de menus. In *IHM'07 - ACM Press*, pages 119–126, Paris, France, November 2007.
[822] G. Bailly, A. Roudaut, E. Lecolinet, and L. Nigay. Menus leaf : Enrichir les menus linéaires par des gestes. In *IHM'08*, pages 169–172, Metz, September 2008.
[823] C. Bauzer-Medeiros, O. Carles, F. Devuyst, G. Hébrail, B. Hugueney, M. Joliveau, G. Jomier, M. Manouvrier, Y. Naïja, G. Scemama, and L. Steffan. Vers un entrepôt de données pour le trafic routier. In Revue des Nouvelles Technologies de l'Information RNTI, editor, *Entrepôts de données et analyse en ligne - EDA'06*. Cépadues, France, 2006.
[824] R. Blanch and E. Lecolinet. Treemaps zoomables: Techniques d'interaction multi-échelles pour les treemaps. In *IHM'07 - ACM Press*, pages 131–139, Paris, November 2007.
[825] A. Boly, S. Goutier, and G. Hébrail. Des fonctions d'oubli intelligentes dans les entrepôts de données. In *EGC (Extraction et Gestion des Connaissances)*, Namur, Belgique, January 2007.
[826] A. Boly, G. Hébrail, and M. L. Picard. Fonctions d'oubli et conservation de détail dans les entrepôts de données. In *EGC 2005*, volume 1, page 355, Paris - France, January 2005.
[827] E. Borde, F. Gilliers, G. Haïk, J. Hugues, and L. Pautet. Myccm-hi : un framework à composants mettant en œuvre une approche d'ingénierie dirigée par les modèles. In *NEPTUNE 2009*, volume 89, Paris, France, June 2009.
[828] R. Chiky, J. Cubillé, A. Dessertaine, G. Hébrail, and M. L. Picard. Echantillonnage spatio-temporel de flux de

données distribués. In *Extraction et Gestion des Connaissances (EGC 2008)*, volume I, pages 169–179, Sophia-Antipolis, France, January 2008.

[829] R. Chiky, B. Defude, and G. Hébrail. Définition et diffusion de signatures sémantiques dans les systèmes pair-à-pair. In *EGC (Extraction et Gestion des Connaissances)*, Lille (France), January 2006.

[830] R. Chiky and G. Hébrail. Echantillonnage optimisé de données temporelles distribuées pour l'alimentation des entrepôts de données. In Revue des Nouvelles Technologies de l'Information RNTI, editor, *Entrepôts de données et analyse en ligne - EDA'07*. Cépadues, 2007.

[831] J.-L. Dessalles. Vers une modélisation de l'intérêt. In *Modèles Formels de l'Interactions (MFI'05)*, pages 113–122, Caen, May 2005.

[832] J.-L. Dessalles. Le rôle de l'impact émotionnel dans la communication des événements. In *Modèles formels de l'interaction' (MFI-07)*, pages 113–125, Paris, France, May 2007.

[833] A. Dimulescu and J.-L. Dessalles. Prédire l'intérêt dans la communication événementielle. In *Modèles formels de l'interaction (MFI-09)*, pages 125–134, Lannion, F, June 2009.

[2224] C. Faure, P. Benci, A. Danzart, and E. Lecolinet. Conception de services mobiles pour étudiants. In *UbiMob'06*, Paris, September 2006.

[835] S. Ferrandiz and G. Hébrail. Délestage pour l'analyse multi-dimensionnelle de flux de données. In *Extraction et Gestion des Connaissances (EGC 2008)*, volume I, pages 193–198, Sophia-Antipolis, France, January 2008.

[836] N. Gabsi, F. Clérot, and G. Hébrail. Résumé hybride de flux de données par échantillonnage et classification automatique. In *Extraction et Gestion des Connaissances (EGC)*, number RNTI-E15, pages 229–240, Strasbourg, France, January 2009.

[837] O. Gilles and J. Hugues. Validating requirements at model-level. In *Ingénierie Dirigée par les modèles (IDM'08)*, pages 35–49, Mulhouse, France, June 2008.

[838] N. Grabar, G. Dal, B. Fradin, N. Hathout, S. Lignon, F. Nammer, C. Planq, D. Tribout, F. Yvon, and P. Zweigenbaum. Productivité quantitative des suffixations -ité et -able dans un corpus journalistique moderne. In *Conférence sur le Traitement Automatique des Langues (TALN)*, Louvain, Belgique, April 2006.

[839] N. Grabar, G. Dal, B. Fradin, N. Hathout, S. Lignon, F. Nammer, C. Planq, D. Tribout, F. Yvon, and P. Zweigenbaum. Productivité quantitative du procédé suffixable -able dans un corpus journalistique du francçais. In *Journées Internationales d'Analyse statistique des données textuelles*, Besançon, France, April 2006.

[840] Y. Guiard. De l'ambiguïté des écritures fractionnaires: interprétations polaire et cartésienne de l'expression d/w dans les lois de fitts et d'accot et zhai. In *IHM, conference francophone d'interaction homme-machine*, pages 19–22, IRCAM (Paris, France), 2007.

[841] Y. Guiard. Langage ordinaire et modélisation mathématique: quelle fonction d'échange dans la loi du mouvement canalisé d'accot et zhai ? In *IHM, conference francophone d'interaction homme-machine*, pages 11–18, IRCAM (Paris, France), 2007.

[842] H. Ha Duong and I. Demeure. Partage de données sur réseau mobile ad hoc. In *CDUR 2008 (colloque de la conférence NOTERE 2008)*, Lyon, France, June 2008.

[843] S. Huot, P. Dragicevic, and C. Dumas. Flexibilité et modularité pour la conception d'interactions: le modèle d'architecture logicielle des Graphes Combinés. In *18e Conférence Francophone sur l'Interaction Homme-Machine, IHM 2006*, pages 43–50, Montréal, Québec, Canada, April 2006.

[844] S. Huot and E. Lecolinet. Archmenu et thumbmenu : Contrôler son dispositif mobile " sur le pouce ". In *IHM'07 - ACM Press*, pages 107–110, Paris, November 2007.

[2226] A. R. Kaced and J. C. Moissinac. La sécurité, problème majeur pour les plates-formes de diffusion de flux multimédia adaptable. In *SSTIC 2006*, Rennes, May 2006.

[2228] A. R. Kaced and J. C. Moissinac. Sécurité dans les plates-formes de diffusion de flux multimédia adaptables. In *3rd French-speaking conference on Mobility and uibquity computing UbiMob*, Paris, France, September 2006.

[2230] Z. Kazi-Aoul, I. Demeure, and J. C. Moissinac. Vers un système d'adaptation de documents multimédia dans un environnement p2p. In *Conference sur les Nouvelles Technologies de la Répartition (NOTERE'06)*, Toulouse, France, June 2006.

[2126] Z. Kazi-Aoul, I. Demeure, and J. C. Moissinac. Paam: A web services oriented architecture for the adaptation of composed multimedia documents. In *Parallel and Distributed Computing and Networks (PDCN)*, Innsbruck, Austria, February 2008.

[849] A. Krul, G. Damnati, T. Moudenc, and F. Yvon. Constitution d'un corpus textuel basé sur la divergence de kullback leibler pour la synthèse par corpus. In *Journées d'études sur la Parole (JEP)*, Saint Malo, France, June 2006.

[2235] E. Lecolinet, C. Faure, I. Demeure, J. C. Moissinac, and S. Pook. Augmentation de cours et de réunion dans un campus. In *Ubimob*, Grenoble, France, May 2005.

[851] E. Lecolinet and G. Mouret. Tactiball,tactipen,tactitab, ou comment " toucher du doigt " les données de son ordinateur. In *17ème Conférence Francophone sur l'Interaction Homme-Machine*, Toulouse, September 2005.

[852] E. Lecolinet and D. Nguyen. Représentation focus+contexte de listes hierarchiques zoomables. In *18e conférence francophone sur l'Interaction Homme-Machine (IHM'06)*, Montréal, April 2006.

[853] Y. Ledru, R. Laleau, and S. Vignes. Une tentative d'utilisation conjointe d'UML et d'une méthode formelle pour la modélisation de la sécurité des aéroports. In *INFORSID*, Perros-Guirec France, May 2007.

[854] S. Malacria and E. Lecolinet. Espace de caractérisation du stylo numérique. In *IHM'08*, Metz, France, September 2008.

[855] L. Martin and I. Demeure. Améliorer l'édition collaborative sur manets avec des données structurées et segmentées. In *CDUR 2008 (colloque de la conférence NOTERE 2008)*, Lyon, France, June 2008.

[2150] J. C. Moissinac, Z. Kazi-Aoul, and I. Demeure. Sémantique pour la composition de web services d'adaptation multimédia. In *7th International Conference on New Technologies of Distributed Systems (NOTERE'07)*, Marrakech,

July 2007.
[857] G. Paroux, I. Demeure, and L. Reynaud. Un intergiciel adaptable à l'energie. In *8e Conférence Internationale sur les NOuvelles TEchnologies de la REpartition (NOTERE'08)*, Lyon, France, June 2008.
[858] A. Roudaut and E. Lecolinet. Un espace de classification pour l'interaction sur dispositifs mobiles. In *IHM'07 - ACM Press*, pages 99–106, Paris, November 2007.
[859] N. Stroppa and F. Yvon. Apprentissage par analogie et rapports de proportion: contributions méthodologiques et expérimentales. In *Conférence d'Apprentissage (CAp'2005)*, pages 61–62, Nice, France, June 2005.
[860] E. Varadaradjou, P. Dax, and A. Grumbach. Communication améliorée dans les mondes virtuels. In *Association Française de Réalité Virtuelle*, pages 83–89, INRIA Rocquencourt, November 2006.
[861] Y. Yu and T. Abdessalem. Semantics of spatial window over spatio-temporal data stream. In *8èmes journées francophones Extraction et Gestion des Connaissances (EGC'08)*, Sophia Antipolis, France, January 2008.

6.3.7 COM: Talks in Conferences Which Do Not Publish Proceedings

[862] T. Abdessalem, R. Chiky, G. Hébrail, and J. L. Vitti. Using data stream management systems to analyze electric power consumption data. In *International Workshop on Data Stream Analysis*, Caserta (Italie), March 2007.
[863] T. Abdessalem, L. Decreusefond, and J. Moreira. Probabilistic measurement of uncertainty in moving objects databases. In *BDA'2005, 21èmes Journées Bases de Données Avancées*, Saint-Malo, France, October 2005.
[864] D. Colazzo, I. Manolescu, F.-X. Dudouet, B. Nguyen, P. Senellart, and A. Vion. Traiter des corpus d'information sur le Web. vers de nouveaux usages informatiques de l'enquête. In *Congrès de l'Association française de sciences politiques*, Toulouse, France, September 2007.
[865] B. Csernel, F. Clérot, and G. Hébrail. Traitement des flux de données. In *37èmes Journées de Statistique (SFDS)*, Pau, France, June 2005.
[866] B. Csernel, F. Clérot, and G. Hébrail. Classification de flux de données par échantillonnages sur fenêtres inclinées. In *Rencontres Inter Associations (RIA)*, Lyon, France, March 2006.
[867] B. Csernel, F. Clérot, and G. Hébrail. Crossstream : résumé de flux relationnels. In *14èmes Rencontres de la Société Francophone de Classification*, pages 70–73, Paris, France, September 2007.
[868] B. Csernel, F. Clérot, and G. Hébrail. Summarizing a 3 way relational data stream. In *International Workshop on Data Stream Analysis*, Caserta (Italie), March 2007.
[869] J.-L. Dessalles. Criteria for coalition formation. In *European Conference on Complex Systems (ECCS)*, Paris, November 2005.
[870] J.-L. Dessalles. Trivialization behaviour in conversation. In *Language, Culture and Mind*, pages 44–46, Paris, France, July 2006.
[871] J.-L. Dessalles. Unexpectedness and probability judgments. In *37th European Mathematical Group Meeting*, page 25, Brest, June 2006.
[872] J.-L. Dessalles and D. Phan. Emergence in multi-agent systems: cognitive hierarchy, detection and complexity reduction. In *37th European Mathematical Group Meeting*, page 26, Brest, France, June 2006.
[873] A. Grumbach. Les facultés cognitives d'adaptation au virtuel. In *Technologie et Sciences de l'homme, Le virtuel et le tangible : ce qui résiste*, pages 67–75, Compiègne, France, January 2005.
[874] A. Grumbach and D. Mellet. A domain related model and a graphical notation formalism for the design of virtual environments. In *VSMM 2005, Workshop : methods and tools for designing VR applications*, Gand (Belgique), January 2005.
[875] B. Gueni, T. Abdessalem, B. Cautis, and E. Waller. Elagage de requêtes xquery imbriquées. In *24-èmes journées Bases de Données Avancées (BDA'08)*, Guilherand-Grange, France, October 2008.
[876] B. Hugueney, G. Hébrail, and Y. Lechevallier. Réduction de séries temporelles par classification et segmentation. In *38èmes Journées de Statistique*, Clamart, France, May 2006.
[877] J. Jayez and A. Mari. Togetherness. In *Proceedings Sinn und Bedeutung 9*, pages 155–169, April 2005.
[878] T. Muhammad, G. Bailly, and E. Lecolinet. Performance evaluation of list control based on 3d translational gestures of tui. In *CHITALY-07*, Padova-Italy, June 2007.
[879] D. Phan and J.-L. Dessalles. Strong emergence in a population of agents. In *European Conference on Complex Systems (ECCS)*, Paris, November 2005.
[880] M. L. Picard and G. Hébrail. Data stream approaches for electric load curve analysis. In *28th Annual International Symposium on Forecasting (ISF 2008)*, Nice, France, June 2008.

6.3.8 OS: Books and Book Chapters

[881] T. Abdessalem, C. Du Mouza, J. Moreira, and P. Rigaux. Management of large moving objects datasets: Indexing, benchmarking and uncertainty in movement representation. In A. Papadopoulos Y. Manolopoulos and M. Vassilakopoulos, editors, *Spatial Databases: Technologies, Techniques and Trends*, chapter Chapitre X. Idea Group Inc., Hershey, PA (USA), 2005.
[882] Ch. Béchet and S. Tardieu. *Créer son blog en 5 minutes*. Eyrolles, 2006.
[883] G. Cobena and T. Abdessalem. *A Comparative Study Of XML Change Detection Algorithms*, chapter II. IGI Global, Hershey, PA, USA, 2009.
[884] A. Da Silva, Y. Lechevallier, F. Rossi, and F. De Carvalho. *Clustering Dynamic Web Usage Data*, chapter 4, pages 71–82. Springer, Berlin, Allemagne, 2009.

[885] G. Dal, N. Grabar, S. Lignon, C. Planq, D. Tribout, and F. Yvon. Les adjectifs de forme in-x-able en français. In *La négation dans les langues romanes*, pages 205–224. John Benjamins publishing company - Lingvisticæ Investigationes Supplementa Series n. 26, 2007.
[886] B. Defude and E. Lecolinet. Actes des 3e journées francophones mobilité et ubiquité. In E. Lecolinet B. Defude, editor, *Ubimob'06*, Paris, France, September 2006. ACM Press.
[887] J.-L. Dessalles. *Why we talk - The evolutionary origins of language*. Oxford University Press, Oxford, 2007.
[888] J.-L. Dessalles. *La pertinence et ses origines cognitives - Nouvelles théories*. Hermès-Science, Paris, France, 2008.
[889] J.-L. Dessalles. *Une anomalie de l'évolution : le langage*, chapter 39, pages 863–882. Syllepse Editions, Paris, France, 2009.
[890] J.-L. Dessalles. Narrative relevance: A formal approach to conversational interest. In F. Aldama, editor, *Toward a Theory of Narrative Acts*, pages 167–178. University of Texas Press, Austin, TX, 2010.
[891] J.-L. Dessalles. *Pragmatics and evolution*. Cambridge University Press, Cambridge, UK, 2010.
[892] J.-L. Dessalles, J. Ferber, and D. Phan. Emergence in agent based computational social science: Conceptual, formal and diagrammatic analysis. In Y. Shyan and A. Yang, editors, *Intelligent complex adaptive systems*, chapter IX, pages 255–299. IGI Global, 2008.
[893] J.-L. Dessalles, J.-P. Müller, and D. Phan. Emergence in multi-agent systems:conceptual and methodological issues. In F. Amblard and D. Phan, editors, *Agent-based modelling and simulation in the social and human sciences*, chapter 14, pages 327–355. The Bardwell-Press, Oxford, UK, 2007.
[894] J.-L. Dessalles, P. Picq, and B. Victorri. *Les origines de la culture - La naissance du langage*. Editions Le Pommier, Paris, France, 2006.
[895] E. Gaudin, E. Najm, and R. Reed. Design for dependable systems. In *SDL Forum 2007*, Heidelberg Allemagne, September 2007. Springer Verlag.
[896] A. Grumbach. Apport de la réalité virtuelle à la création artistique. In P. Fuchs, editor, *Le Traité de la Réalité Virtuelle*, chapter 11, pages 237–248. Presses des Mines de Paris, Paris, 2006.
[897] B. Hammer, A. Hasenfuß, and F. Rossi. *Median Topographic Maps for Biomedical Data Sets*, pages 92–117. Springer, Berlin / Heidelberg, 2009.
[898] G. Hébrail. *Data stream management and mining*, chapter Data stream management and mining, pages 89–102. IOS Press, Amsterdam, The Netherlands, 2008.
[899] G. Hébrail and Y. Lechevallier. Building symbolic objects from data streams. In G.Cucumel P.Brito, P.Bertrand and R.de Carvalho, editors, *Selected Contributions in Data analysis and Classification*, chapter Part I, pages 83–94. Springer-Verlag, Berlin Heidelberg, 2007.
[900] J. Hugues, F. Kordon, and L. Pautet. *Construction d'un intergiciel vérifié*, chapter 9, pages 267–290. Number ISBN:2-7462-1447-4. Hermès, 2006.
[901] F. Kordon, L. Pautet, and L. Petrucci. *Systèmes répartis en action : de l'embarqué aux systèmes à large échelle*. Lavoisier, France, 2008.
[902] Y. Lechevallier, A. El Golli, and G. Hébrail. Improved generation of symbolic objects from relational databases. In E. Diday and M.Noirhomme-Fraiture, editors, *Symbolic Data Analysis and the SODAS Software*, chapter I.2, pages 45–59. John Wiley & Sons, England, 2008.
[903] H. Madsen, P. Thyregod, B. Burtschy, G. . Albeanu, and F. Popentiu. A fuzzy logic approach to software testing and debugging. In C. Guedes Soares & E. Zio, editor, *Safety and Reliability for Managing Risk*, chapter Vol II, pages 1435–1442. Taylor and Francisc Group, London, Great Britain, 2006.
[904] H. Madsen, P. Thyregod, B. Burtschy, Fl. Popentiu, and G. Albeanu. On using soft computing techniques in software reliability engineering. In K. Kolowrocki, editor, *Advances in Safety and Reliability*, pages 1317–1323. A. A. Balkema Publishers, London, Great Britain, 2005.
[905] A. Mari. Sous-spécification et interprétation contextuelle. In F. Corblin and C. Gardent, editors, *Interpréter en contexte*, chapter 2, pages 81–106. Hermès, Paris (France), 2005.
[906] A. Mari. What do instrumentality and manner have in common? In P. Saint-Dizier, editor, *The Syntax and the Semantics of Prepositions and Prepositional Phrases*. Kluwer Academic Publishers, Dordrecht, 2005.
[907] A. Mari and P. Saint-Dizier. A conceptual semantics for prepositions denoting instrumentality. In P. Saint-Dizier, editor, *The Syntax and the Semantics of Prepositions and Prepositional Phrases*. Kluwer Academic Publishers, Dordrecht, 2005.
[908] E. Najm, J.-F. Pradat-Peyre, and V. Viguié-Donzeau-Gouge. Formal techniques for networked and distributed systems. In LNCS 4229, editor, *FORTE 2006*, Heidelberg, Germany, September 2006. Springer.
[909] J.-M. Robert, M. Desmarais, E. Lecolinet, and B. David. Nouveaux espaces d'interaction. In *18ème Conférence Francophone sur l'Interaction Homme-Machine (IHM'06)*, Montréal, Canada, April 2006. ACM Press.
[910] J.-M. Saglio. *Indexation spatiale*, chapter 6, pages 151–173. Editions Hermès-Lavoisier, Paris (France), 2006.
[911] P. Senellart and V. D. Blondel. *Automatic discovery of similar words*, chapter 2, pages 25–44. Springer-Verlag, 2008.
[912] M. Verleysen, F. Rossi, and D. François. *Advances in Feature Selection with Mutual Information*, pages 52–69. Springer, Berlin / Heidelberg, 2009.

Chapter 7

Mathematics of Information, Communications and Computation (MIC^2)

Team leader L. Decreusefond (01/09–), O. Hudry (01/06–12/08)

Faculty R. Alléaume (Ass. P.), P. Bourgade (Ass. P.), I. Charon (P.), G. Cohen (P.), L. Decreusefond (P.), E. Diamanti (CR CNRS) (01/09–), M. Gagnaire (P.), O. Hudry (P.), A. Lobstein (CR CNRS), D. Madore (Ass. P.) (09/07–), D. Markham (CR CNRS) (09/08–), N. Puech (Ass. P.)(–06/08) H. Randriambololona (Ass. P.), J. Sakarovitch (DR CNRS), A.S. Üstünel (P.).

PhD students S. Al Zahr (11/04–11/07), P.Y. Angrand (09/08–), R. Aoun (01/07–), D. Auger (10/07–), L. Belgacem-Denœud (11/03–11/06), A. Bocquet (09/08–),P. Bourgade (–01/09), I. Camilier (07/07–), C. Cardenas (01/07–), R. de Souza (10/04–10/08), E. Doumith (05/04–05/07), D. Elkouss (01/08–12/08), E. Ferraz (01/09–), J.P. Flori (09/08–), B. Kindarji (09/07–), A. Leverrier (09/06–), R. Medeiros (09/05–09/08), A. Morea (10/03–10/06), A. Pichot (04/05–04/08), J. Valentin (04/09–), T. Vu (09/08–), M. Youssef (09/08–).

Post-docs, engineers and sabbaticals S. Al Zhar (06/08–), B. Barbe (01/09–06/09), L. Belgacem-Denœud (03/07–03/08) , M. Dianati (07/07–06/08), E. Doumith (02/09–), P. Jouguet (03/09–), N. Skorin-Kapov (09/06–06/07).

External collaborators H. Chabanne, N. Puech, G. Zémor.

Faculty [IT, CNRS]	[9.5, 2.5]
PhD students	13
Post-docs, engineers and sabbaticals	2
Defended PhD theses	7
Defended HDR	1
Journal papers [published, in press]	[63, 14]
Papers in conference proceedings	62
Chapters and books	15
Patents and software	1
Grants [public, private, European] (k€)	[318, 71, 585]

7.1 Objectives

Our research is devoted to concepts, methods and models coming from mathematics, computer sciences , quantum mechanics. Our works are twofold: On the one hand, we apply abstract and generic mathematical results to the computer real world (biometry, optical networks, quantum networks, mobile networks). On the other hand, we consider new mathematical problems raised by the applications (differential geometry, algebraic geometry, automata, infinite dimensional calculus, quantum information). For instance, classic tools of combinatorial optimization, such as graphs and linear programming, are revisited for their applications to design and control of optical networks. We also strongly believe in the necessity to develop abstract theories like algebraic geometry or infinite dimensional analysis, in order to forge the tools which will be used in a near future to model and analyze more and more complex phenomenons.

7.2 Main Results

The main research results obtained during the period 2005-2009 are presented below for the research areas of the MIC^2 team.

7.2.1 Probability, Stochastic Modeling

Faculty : **P. Bourgade**, I. Camilier, **L. Decreusefond**, E. Ferraz, **A.S. Üstünel**, T. Vu.

Projects : *Projet structurant :* MONGE

- TROMATIC, CNRS Grant (01/06–12/06)
- CADRA, CNRS Grant (01/08–12/08)

Historically, the team was interested in analysis in infinite dimension, mainly Malliavin calculus and nuclear spaces, and its applications to telecommunications networks. Since the arrival of P. Bourgade, our themes widened to random matrices and number theory.

The optimal transportation problem dates back to the eighteenth century. Its modern approach was introduced in the forties by Kantorovitch as an optimization problem in a space of probability. A full solution for the quadratic cost was found in the nineties by Y. Brenier. Because of its numerous applications, for instance to functional inequalities, it is sensible to look at a generalization of this problem to infinite dimension spaces. The optimal transportation problem for a singular quadratic cost on the Wiener space was solved in [953, 993]. The results are formally identical

to those known in finite dimension but the lines of proofs are radically different. Consequences of these works are to be found in [991, 994, 995, 990]. In particular, we found necessary and sufficient conditions for a perturbation of the identity to be invertible in the Wiener space. We also gave some applications to filtering theory.

The mathematical properties of point processes are well known only for a very few number of processes. Unfortunately, in real life, it is seldom true that the real phenomenon can be modeled precisely by one of the known processes. It is thus of the utmost importance to quantify how far we are from the reality when we replace the "natural" process by a mathematically tractable one. It turns out that the optimal transportation problem for point processes gives an approach to this sort of problem. We solved it in [944]. Strangely enough, the methods are similar to those used in the Wiener space. One can now estimate the distance between Poisson point processes and several kind of processes like Cox processes, Markov modulated processes, Gibbs processes. Two articles are submitted about this topic.

As said above, a natural consequence of optimal transportation problem is the existence of functional inequalities like isoperimetric inequalities. Applications of such inequalities led us [1151] to new and robust principles for the dimensioning of mobile networks operated under the OFDMA protocol.

We were also interested in the performance evaluation of some real times systems. In such systems, the evolution after each time depends on the whole past of the system. It is well known in Markov theory, that history can be taken into account by increasing the dimension (in the algebraic sense) of the state space. In the system we studied, this history was put in an infinite dimensional space, namely we worked on the space of tempered distributions. Using abstract results developed by A.S. Üstünel a few years ago, we were the first to find some limit theorems for high traffic regime [945, 946] for the so-called *Earliest Deadline First* discipline.

Another tool for stochastic modeling is made by random linear operators. Since the meeting between Montgomery and Dison in 1972, it is clear that there should exist deep connexions between number theory and random matrices. In this spirit, in [922], we gave a probabilistic proof of some formulas yielding $\zeta(2n)$. This is based on a representation of $\zeta(2n)$ as the Mellin transform of some Cauchy-related random variables. We also gave a generalization of this result to some L functions related to some Dirichlet characters. In [923], we showed that $\det(Id - u)$ can be decomposed as a product of independent random variables for u chosen according to the Haar measure on the unitary group. This implies an elementary proof of a central limit theorem conjectured in the eighties. These results were then extended to some Lie groups and some perturbations of the Haar measure, see [924]. It must be noted that these approaches can be applied to make explicit some computations for MIMO systems.

7.2.2 Discrete Mathematics, Communication, Information

Faculty : P.-Y. Angrand, D. Auger, **I. Charon, G. Cohen**, L. Denœud-Belkacem, J.-P. Flori, **O. Hudry**, B. Kindarji, **A. Lobstein, D. Madore, H. Randriambololona, J. Sakarovitch**, R. de Souza, G. Zémor.

Projects : *Projet structurant* : COOPT

- European grant VIPBOB

Algebraic Geometry, Number Theory and Cryptography

One research direction is the approach to problems of arithmetic nature (transcendence, Diophantine equations) by geometric methods (algebraic geometry, Arakelov geometry [983], Hermitian lattices). But of equal importance is also the application of these same geometric methods to concrete problems in combinatorics, coding theory, cryptography, analog and digital modulations, quantum information theory, etc.

With F. Castro, I. Rubio, O. Moreno, and H.F. Mattson Jr, we gave new proofs and then improvements, of some results about the number of solutions of systems of polynomial equations over finite fields [1007]. We then gave applications of these new results to problems in coding theory.

With J.J. Boutros and F. Kharrat ([1004]), we studied the quantification problem for the state space of a MIMO channel. In particular we compared results obtained from models based on various quantification methods, some of which naive, some others sophisticated, relying on the very differential geometric properties of the natural structure of Hermitian symmetric space carried by the space state of the channel.

Again with J.J. Boutros, we constructed a space-time code for 2×2 MIMO channels that is optimal both for maximum likelihood decoding and for iterative decoding ([1005]). This construction was made possible by the use of objects from various branches of mathematics: matrix groups, quadratic forms, algebraic number theory, generalized quaternions.

In public-key cryptography, we began to explore the possibilities of finding cryptosystem not relying on the hardness of the discrete logarithm or the factorization, and if possible, efficient. That is why we are studying the potentialities of objects stemming from algebraic geometry such as algebraic tori, semi-abelian varieties, cubic hypersurfaces, in existing cryptosystems (especially on elliptic or hyperelliptic curves, e.g., pairings). We also study links with coding theory (e.g. toric codes) and information theory (secret sharing) and the possibility of applying combinatorial game theory to cryptographic protocols (so as to formalize them).

Combinatorics and Optimization

The external co-authors are I. Honkala (University of Turku, Finland), Y. Ben-Haim (University of Tel-Aviv, Israel), S. Gravier, M. Mollard and J. Moncel (researchers in Grenoble), A. Guénoche (CNRS, Marseille).

Once we realize that any technological system will eventually suffer errors or failures, it is necessary to develop tools to handle such events. For instance, in a multiprocessor architecture, we may want locate the malfunctioning processors. The so-called identifying codes in graphs are one of the best possible way to achieve this goal. Hence, we studied the properties of these codes, as well as the ones of the graphs admitting identifying codes, called twin-free graphs. We also studied two other kinds of codes, whose definitions are close to the one of identifying code: the locating-dominating codes and the discriminating codes in bipartite graphs. This is, in particular, the subject of D. Auger's PhD thesis [917, 918, 919]. Different aspects were considered: structural properties, study of special graphs, complexity issues, or search of exact algorithms [927, 928, 929, 932, 933, 941, 942].

Another direction of research deals with problems of distance between partitions, as well as the application of partitioning methods to bioinformatics. These topics were partly the subject of the PhD thesis of L. Denœud-Belgacem [930, 931, 935, 936]. Note that the "Prix Simon Régnier" was awarded to L. Denœud-Belgacem by the "Société francophone de classification" for her work in this field in 2007. Last, we would like to mention the continuation of our study of combinatorial properties of tournaments and of combinatorial optimization [934, 937, 961, 962].

Information Theory

The main recent activity in the field is related to the extension of the European project VIPBOB (Virtual Pin Based on Biometrics). The new challenge, from the cryptographic point of view, is that digitalized biometric data cannot be reproduced exactly every time it is extracted from a physical person. This is a situation that can't be covered by classical authentication schemes that do not distinguish between "almost correct" and "completely wrong". Therefore, if biometric data is to replace more traditional passwords, existing protocols must be modified in a way that will tolerate slightly erroneous submissions. This is a situation where the theory of error-correcting codes proved to be relevant. A protocol of Juels and Wattenberg was the basis for the European project VIPBOB in which the Telecom ParisTech team MIC^2 took an essential part.

This application of coding theory to biometrical identification is potent. However, a number of questions needed to be addressed. In practice, the distribution of biometric traits is far from uniform and the scheme is liable to leak undesirable partial knowledge to an unauthorized third party. It was thus desirable to have a protocol for which zero information leakage to potential eavesdroppers is guaranteed. As was put forward in the VIPBOB project, the information leakage problem can be interpreted as a wire-tap channel problem. Through this modeling we obtained precise measures of information leakage and proposed more robust schemes in [1008].

Then, we explored the possible applications of this approach to devise a biometric identification technique based on the iris, in the framework of a contract with SAGEM; the idea was to use a product of two simple codes, equipped with a fast decoding algorithm [925].

Bruno Kindarji has begun a PhD CIFRE on biometric identification, co-supervised by H. Chabanne (SAGEM) and our team (Cohen and Zémor).

Automata Theory

The activity in this domain is conducted by J. Sakarovitch, his PhD students (R. de Souza, P.-Y. Angrand) and several external collaborators, mainly S. Lombardy. It may be described under four themes: synthesis, research, non-standard numeration systems, and construction of software for handling finite automata.

The concepts, methods et results of automata theory pervade the whole field of computer science. The English edition [1027], published by Cambridge University Press, of the monograph (in french) published in 2003 aims at showing both the unity of the subject and its wide scope in a pedagogical approach.

In research, the systematic use of coverings revealed a structural approach to automata that proved to be very fruitful. We showed, with M.-P. Béal and S. Lombardy in [1002], that the equivalence of automata with multiplicity can be expressed in terms of conjugacy; a deep result, which can be applied to the theory of automatic structures and to the axiomatisation of N-rational series. With R. de Souza, we rewrote a new theory for finite valued transducers, based on the notion of lexicographic covering. With S. Akiyama and Ch. Frougny, we showed how the introduction of numeration systems in rational base allows to make progress in the problem of the repartition of the powers of rationals modulo 1 ([913]). Some other works complete the applications of finite automata to non-standard numeration systems ([1003, 916]).

As for the software activity, Vaucanson, a C++ platform for computing with weighted automata and transducers, is written in collaboration with a team from EPITA and is under development. It also gaves rise to a cooperation with the National Taiwan University. Along with the platform, we developed an XML format for finite automata. Finally, Vaucanson-G, a LaTeX package for drawing automata and graphs, co-written with S. Lombardy, is now publicly available from the CTAN servers.

7.2.3 Quantum Information

Faculty: **R. Alléaume, E. Diamanti,** A. Leverrier, **D. Markham**, G. Cohen R. Medeiros, D. Elkouss, M. Dianati, S. De Crescenzo, M. Nicoletti, R. Guerra, P. Jouguet, A. Bocquet, G. Zémor.

Projects : *Projet structurant :* TRAQUE

- SECOQC, European Grant FP6, Trust & Security, (04/04 – 10/08).
- PROSPIQ, Projet ANR PNANO, (01/07–06/10).
- SEQURE, Projet ANR SeSUR, (01/08 – 12/10).
- COCQ, Projet ANR Domaines Emergents, (01/09 – 10/11).

Main Collaborators: Groupe de Philippe Grangier (Institut d'Optique), groupe de Nicolas Gisin (GAP Optique Genève), Austrian Research Center (Vienne, Autriche), groupe de Norbert Lütkenhaus (Institute for Quantum Computing,Waterloo, Canada), Institut Mathématique de Bordeaux (Gilles Zémor), Joseph Boutros (Texas AM Univ, Qatar), groupe de Nicolas Cerf (Université Libre de Bruxelles).

Quantum Networks

We developed an architecture and protocols specifically adapted for the distribution of secret keys over large scale networks. They were tested and validated within the European consortium SECOQC: The first live demonstration of a working quantum key distribution (QKD) network took place in Vienna in the framework of the SECOQC Demonstration and International Conference [981, 1011, 1015, 950]. Eight QKD-links were combined in a novel quantum-back-bone network physically deployed within a typical metropolitan area network to connect different company sites from SIEMENS Austria. Typical applications for QKD, to secure data traffic from telephony and video conferencing, were included in the demonstration.

We also studied quantum networks from a fundamental point of view, looking at security within the model of "Trusted Repeater Nodes" and its extension to the case of corrupted nodes [985], a crucial factor in any realistic "telecom" approach of quantum key distribution networks. We established a new methodology for the optimization of topologies for future quantum networks, and obtained novel results improving the design of experimental systems and facilitating economic planning of the deployment of large scale quantum networks [2457].

Quantum Key Distribution and Quantum Information Theory

Work on quantum key distribution has been carried out within the framework of European project SECOQC, and ANR projects SEQURE and PROSPIQ, and has been conducted along two principle axes: the establishment of demonstrations in optical fiber and/or in free space, and the theoretical study of new high performance protocols along with the formal proofs of their security. Leading an international effort in this direction, we studied the role of quantum key distribution in the broader landscape of current cryptography, as discussed in detail in the "SECOQC Crypto White Paper", edited by R. Alléaume. This White Paper is the outcome on a thorough consultation and discussion among the participants of the European project SECOQC. This paper is a review article that attempts to position Quantum Key Distribution (QKD) in terms of cryptographic applications. A detailed comparison of QKD with the solutions currently in use to solve the key distribution problem, based on classical cryptography, is provided. We also detail how the work on QKD networks lead within SECOQC will allow the deployment of long-distance secure communication infrastructures based on quantum cryptography. The purpose of the White Paper is finally to promote closer collaboration between classical and quantum cryptographers. We believe that very fruitful research, involving both communities, could emerge in the future years and try to sketch what may be the next challenges in this direction.

Experimental aspects of research are led by collaboration with the Institut d'Optique. The arrival of E. Diamanti, previously at the Institut d'Optique, to our team allows us to capitalize on a well respected and known expertise in the field, whether for continuous variables [954, 955, 969], or discrete variables [987, 949]. In particular, E. Diamanti was responsible for the implementation of an all-fiber continuous variables quantum key distribution system for the European project SECOQC [981].

On the theoretical side, our team proposed new techniques for error correction for both discrete [1012] and continuous [966] variables. A. Leverrier co-invented a new continuous variable key distribution protocol, which improves performance of real systems [968]. In addition, the proof of security for these protocols provided new results of fundamental interest to quantum information.

Finally, we progressively developed our theoretical activity in quantum information, most significantly in the direction of quantum codes within the project ANR COCQ. In collaboration with the

Universidade Federal de Campina Grande, Brazil, we extended the notion of zero-error capacity to the quantum framework [978, 1014], giving a necessary and sufficient for non-null capacity, and reformulating the determination of the capacity in graph theoretical terms. The arrival of D. Markham to our team allows us to engage in the study of fundamental problems linking entanglement and quantum computing [915, 1025, 980], for example by the conceptually useful unification of quantum error correction codes, secret sharing and one-way quantum computation notably via the "graph states" and the stabilizer formalism [975, 960, 976].

Industrial Development

The enterprise SeQureNet was created in February 2008. It is a "spin-off" from the research activities initiated within Telecom ParisTech/INFRES in the framework of the European FP6 project SECOQC and is aimed at the industrial development of networks for quantum key distribution. The enterprise was launched based on the success of winning two prizes in the national competition for "concours national de création d'entreprises de technologies innovantes" organized by OSEO and MNRT, first in 2007, and then in 2008 (in the categories "émergence" and "création-développement" respectively). Part of the generated intellectual property generated by our research in quantum information is already linked with industrial development via SeQureNet. A software "SeQure Phone" allowing for secure communication between a smartphone and a server over a quantum network has been registered and the protocol [968] has been filed with the patent office. In addition, the network protocols we specified, having been given the opportunity to develop in the European SECOQC project, are now en route to becoming the European standards which permit the integration of quantum key distribution into standard telecommunications networks. Our team actively participated in work on standardization, run under ETSI, within the "QKD Specification Group" which we co-founded in 2008.

7.2.4 Combinatorial Optimization for Optical Networks Design and Traffic Engineering

Within the Institut Telecom, our research in the domain of optical networks is organized around the ETTON (Ethernet Technologies and Transparent Optical Networks) collaborative project. In terms of tools, both exact techniques (Branch and Bound, ILP formulation) and approximate techniques (heuristics, metaheuristics) are requires to address a vast class of problems.

Research team : M. Gagnaire, N. Puech, E. Doumith, S Al Zahr, R. Aoun, M. Youssef, C. Cardenas, A. Morea, A. Pichot.

Projects: *Projet structurant :* ETTON

- DICONET: "*Dynamic Impairment Constraint Networking for Transparent Mesh Optical Networks*", STREP European research project, (01/08–06/10).
- BONE: "*Building the future Optical Network in Europe*", European Network of Excellence (NoE) on optical communications and networking; (01/08–12/10).
- e-Photon ONE: "*Optical Networks in Europe*", European Network of Excellence (NoE) on optical communications and networks; (03/06–02/08).
- Research contract with Orange-labs in Lannion "*Access networks: architecture and traffic modeling*"; (09/05–05/07).
- Sebastian 2: "*Resource virtualization and pricing strategies for collaborative remote digital image processing*", research project in collaboration several parisian animation studios, (01/08–12/09).
- Carriocas, sub-project within the National Systematic research project: (10/06–09/09).

Traffic Aggregation in Multilayer Networks

In 2002, we introduced the concept of *Scheduled Lightpath Demand* (SLD). Unlike a *Random Lightpath Demand* (RLD), an SLD is dynamic and deterministic. It is characterized by a 5-tuple made of the source and destination nodes, the bandwidth capacity expressed in number of optical channels, the date of activation, and life duration of the connection. We proposed the very first Routing and Wavelength Assignment (RWA) algorithms exploiting time-space correlation between SLDs (PhD of J. Kuri). These algorithms enable to reduce considerably the cost of optical cross-connects (OXC) in the network. Since 2002, numerous papers in international conferences and journals proposed extensions or variations of our original approach. We extended the SLD concept to traffic demands with fractional wavelength capacity (PhD of E. Doumith). Such traffic requests are designated by *Scheduled Electrical Demands* (SED). By extension, we have also introduced the terms of PED (*Permanent Electrical Demand*) and RED (*Random Electrical Demand*). We proposed the first RWA algorithms including shared-path protection under SLD/SED traffic (PhD of M. Koubaa). We proposed an original traffic characterization relying on a decomposition of real traffic traces into a set of PLDs/PEDs, SLDs/SEDs and RLDs/REDs (PhD of E. Doumith). More recently, we focused our activities on multi-layer traffic grooming. Two contexts were considered: the encapsulation of electrical connections (typically MPLS LSPs) into lightpaths (PhD of E. Doumith) and the logical aggregation of lightpaths into wavebands (PhD of J. Kuri) [951], [958]. Our expertise in the field of grooming has motivated the writing of a chapter in a collaborative book published by Springer-USA in 2008 [1021].

Impairment-Aware Routing and Wavelength Assignment (IA-RWA)

Within the National RYTHME project, we developed one of the very first RWA algorithms taking into account Quality of Transmission (QoT) also known as *Impairment-Aware RWA* (IA-RWA). The principal objective was to consider in the context of PLDs, the main factors degrading QoT, namely chromatic dispersion (CD), optical signal to noise ratio (OSNR), non-linear phase (Φ_{NL}) and modal dispersion (PMD). We proposed a new algorithm called LERP (*Lightpath Establishment with Regenerator Placement*) aiming to judiciously place electrical regenerators (ER) when bit error rate (BER) goes beyond a certain admissibility threshold [957] (PhD of S. Al Zahr). Minimizing the global amount of regenerators is a CAPEX-oriented objective. Carriers also should like in parallel to favor a concentration of ERs in the network for OPEX purposes [1013]. In the context of the European DICONET project, we developed a new algorithm called COLERP (*Cross-Optimization LERP*). COLERP aims at a triple objective: minimize rejection ratio, global number of ERs, and number of regeneration sites [999] (PhD of M. Youssef). Our coming studies deal with two topics: hard failures monitor's placement strategies and soft-failures monitor's placement strategies. If a few recent papers deal with hard failures, soft-failures related to aging of devices and systems remain a very open field of investigation.

Virtualization and Pricing Strategies in Cloud Computing

Grid Service Providers (GSP) are typically interfaced on one hand with clients generating job requests and on the other hand with resources (computing facilities, storage devices, networking facilities) providers. Considering a fluctuation in resources availability, our aim is to determine on which computers, storage devices and networking facilities a set of jobs can be satisfied at the lowest cost. In the context of the Carriocas national research project, we proposed a first economic model based on an Integer-Linear-Programming formulation aiming at maximizing the gain of the GSP [1000]. Our approach is advantageous compared to an on-the-fly approach both for the clients (lower rejection ratio) and for the GSP (increased gain). We extended this analysis to the concept of sliding window in which a client may wish the processing of his job. The wider this window, the lower the cost for the client, the more efficient resources' utilization, and the higher the number of accepted jobs. In order to consider realistic network scenarios, we also proposed a meta-heuristics to deal with this same problem [1001] (PhD of R. Aoun). Other

investigations were carried out in Grid Computing dealing with architecture and protocol aspects (PhD of A. Pichot) and on the application of Flow Aware Networking (FAN) developed in Orange Labs for Grid sessions admission control in IP networks [1006] (PhD of C. Cardenas). We shall soon collaborate with Essex University under BONE NoE in order to consider the delays required for network resources establishment.

Control Plane for Hybrid Optical-Wireless Access Systems

In collaboration with Prof. Mario Pickavet, we proposed an original analytical model of the IEEE 802.3.ah EPON MAC protocol. This model takes into account the MPCP signalling protocol and the IPACT dynamic bandwidth allocation mechanism [964], [965]. In the context of a collaboration with Orange-Labs, we proposed a passive WDM metro-access architecture including AWG routers and colorless Optical Network Units. We designed an original control plane applicable to this architecture in order to provide dynamic optical bandwidth capacity to multiple WDM-PONs [956]. Our coming studies are extending these studies to the federation of WDM-PONs and Next Generation wireless base-stations thanks to Radio-over-Fiber techniques.

7.3 References

Below is the full list of articles published, since January 2005, in international journals by current members of the team (thus, these also includes a few publications that where not counted in the summary table of page 116). As regard articles in proceedings, only the selected articles which are cited in the text appear below. The full list of publications of the team is available at the following URL

`http://www.infres.enst.fr/wpmufr/mic2/publications/`

7.3.1 ACL: Articles in ISI-Indexed Journals

[913] S. Akiyama, Ch. Frougny, and J. Sakarovitch. Powers of rationals modulo 1 and rational base number systems. *Israel Journal of Mathematics*, 168:53–91, 2008.

[2457] R. Alléaume, F. Roueff, E. Diamanti, and N. Lutkenhaus. Topological optimization of quantum key distribution networks. *New Journal of Physics*, 11, July 2009.

[915] J. Anders, M. Hajdusek, D. Markham, and V. Vedral. How much of one-way quantum computation is just thermodynamics? *Foundations of Modern Physics*, 38(6):506–522, June 2009.

[916] P.-Y. Angrand and J. Sakarovitch. Radix enumeration of rational languages. *RAIRO – Theoret. Informatics and Applications*, 2009.

[917] D. Auger. Induced paths in twin-free graphs. *Electronic Journal of Combinatorics*, 15(1):N17, June 2008.

[918] D. Auger, I. Charon, I. Honkala, O. Hudry, and A. Lobstein. Edge number, minimum degree, maximum independent set, radius and diameter in twin-free graphs. *Advances in Mathematics of Communications*, 3(1):97–114, 2009.

[919] D. Auger, I. Charon, O. Hudry, and A. Lobstein. Complexity results for identifying codes in planar graphs. *International Transactions in Operational Research*, 2009.

[920] Y. Ben-Haim, S. Gravier, A. Lobstein, and J. Moncel. Adaptive identification in graphs. *Journal of Combinatorial Theory, Ser. A*, 115:1114–1126, September 2008.

[921] P. Bourgade. Conditional Haar measures on classical compact groups. *Annals of Probability*, 2009.

[922] P. Bourgade, T. Fujita, and M. Yor. Euler's formulae for $\zeta(2n)$ and products of Cauchy variables. *Electronic Communications in Probability*, 12:73–80, April 2007.

[923] P. Bourgade, C. Hughes, A. Nikeghbali, and M. Yor. The characteristic polynomial of a random unitary matrix: A probabilistic approach. *Duke Mathematical Journal*, 145:45–69, November 2008.

[924] P. Bourgade, A. Nikeghbali, and A. Rouault. The characteristic polynomial on compact groups with Haar measure : some equalities in law. *Comptes rendus de l'Académie des sciences*, 345(4):229–232, June 2007.

[925] J. Bringer, H. Chabanne, G. Cohen, B. Kindarji, and G. Zémor. Theoretical and practical boundaries of binary secure sketches. *IEEE Transactions on Information Forensics and Security*, 3(4):673–683, December 2008.

[926] E. Charbit, I. Charon, G. Cohen, and O. Hudry. Discriminating codes in bipartite graphs. *Electronic Notes in Discrete Mathematics*, 26(1):29–35, September 2006.

[927] E. Charbit, I. Charon, G. Cohen, O. Hudry, and A. Lobstein. Discriminating codes in bipartite graphs: Bounds, extremal cardinalities, complexity. *Advances in Mathematics of Communications*, 2(4):403–420, 2008.

[928] I. Charon, G. Cohen, O. Hudry, and A. Lobstein. Discriminating codes in (bipartite) planar graphs. *European Journal of Combinatorics*, 29(5):1353–1364, 2008.
[929] I. Charon, G. Cohen, O. Hudry, and A. Lobstein. New identifying codes in the binary Hamming space. *European Journal of Combinatorics*, 2009.
[930] I. Charon, L. Denoeud, A. Guénoche, and O. Hudry. Maximum transfer distance between partitions. *Journal of classification*, 23(1):103–121, June 2006.
[931] I. Charon, L. Denoeud, and O. Hudry. Maximum de la distance de transfert à une partition donnée. *Mathématiques et Sciences humaines - Mathematics and Social Sciences*, 179:45–83, 2007.
[932] I. Charon, S. Gravier, O. Hudry, A. Lobstein, M. Mollard, and J. Moncel. A linear algorithm for minimum 1-identifying codes in oriented trees. *Discrete Applied Mathematics*, 154(8):1246–1253, May 2006.
[933] I. Charon, I. Honkala, O. Hudry, and A. Lobstein. Structural properties of twin-free graphs. *Electronic Journal of Combinatorics*, 14(1):R16, January 2007.
[934] I. Charon and O. Hudry. A branch and bound algorithm to solve the linear ordering problem for weighted tournaments. *Discrete Applied Mathematics*, 154(15):2097–2116, October 2006.
[935] I. Charon and O. Hudry. Noising methods for a clique partitioning problem. *Discrete Applied Mathematics*, 154(5):754–769, April 2006.
[936] I. Charon and O. Hudry. Optimal clustering of multipartite graphs. *Discrete Applied Mathematics*, 156(8):1330–1341, 2008.
[937] I. Charon and O. Hudry. Self-tuning of the noising methods. *Optimization*, 2009.
[938] I. Charon, O. Hudry, and A. Lobstein. On the structure of identifiable graphs. *Electronic Notes in Discrete Mathematics*, 22:491–495, October 2005.
[939] I. Charon, O. Hudry, and A. Lobstein. Possible cardinalities for identifying codes in graphs. *Australasian Journal of Combinatorics*, 32:177–195, 2005.
[940] I. Charon, O. Hudry, and A. Lobstein. Possible cardinalities for locating-dominating codes in graphs. *Australasian Journal of Combinatorics*, 34:23–32, 2006.
[941] I. Charon, O. Hudry, and A. Lobstein. Extremal cardinalities for identifying and locating-dominating codes in graphs. *Discrete Mathematics*, 307(3-5):356–366, January 2007.
[942] I. Charon, O. Hudry, and A. Lobstein. Extremal values for identification, domination and maximum cliques in twin-free graphs. *Ars Combinatoria*, 2009.
[943] I. Charon, O. Hudry, and A. Lobstein. Extremal values for the maximum degree in a twin-free graph. *Ars Combinatoria*, June 2009.
[944] L. Decreusefond. Wasserstein distance on configurations spaces. *Potential Analysis*, 28(3):283–300, 2008.
[945] L. Decreusefond and P. Moyal. Fluid limit of a heavily loaded EDF queue with impatient customers. *Markov Processes and Related Fields*, 14:131–158, 2008.
[946] L. Decreusefond and P. Moyal. A functional central limit theorem for the M/GI/∞ queue. *The Annals of Applied Probability*, 18(6):2156–2178, 2008.
[947] L. Decreusefond and D. Nualart. Hitting times for Gaussian processes. *Annals of Probability*, 36(1):319–330, 2008.
[948] E. Diamanti, C. Langrock, M.M. Fejer, Y. Yamamoto, and H. Takesue. 1.55 μm-photon-counting optical time-domain reflectometry with a single-photon detector based on upconversion in a periodically poled lithium niobate waveguide. *Optics Letters*, 31:727–729, 2006.
[949] E. Diamanti, H. Takesue, C. Langrock, M.M. Fejer, and Y. Yamamoto. 100 km differential phase shift quantum key distribution experiment with low-jitter up-conversion detectors. *Optics Express*, 14(26):13073–13082, 2006.
[950] M. Dianati, R. Alleaume, M. Gagnaire, and X. Shen. Architecture and protocols of the future european quantum key distribution network. *Security and Communication Networks*, 1(1):57–74, April 2008.
[951] E. Doumith and M. Gagnaire. Impact of traffic predictability on WDM EXC/OXC network performance. *IEEE Journal on Selected Areas in Communications*, 25(5):895–904, June 2007.
[952] M. Droste, J. Sakarovitch, and H. Vogler. Weighted automata with discounting. *Information Processing Letters*, 108:23–28, 2008.
[953] D. Feyel, A. S. Ustunel, and M. Zakai. The realization of positive random variables via absolutely continuous transformations of measure on Wiener space. *Probability Surveys*, 3:170–205, February 2006.
[954] S. Fossier, E. Diamanti, Th. Debuisschert, R. Tualle-Brouri, and Ph. Grangier. Improvement of continuous-variable quantum key distribution systems by using optical preamplifiers. *Journal of Physcis B*, 42(11):114014, June 2009.
[955] S. Fossier, E. Diamanti, Th. Debuisschert, A. Villing, R. Tualle-Brouri, and Ph. Grangier. Field test of a continuous variable quantum key distribution prototype. *New Journal of Physics*, 11(4):045023, April 2009.
[956] M. Gagnaire. T ransparent WDM Metro-Access networks. *International Journal of Communication Networks and Distributed Systems*, 1(2):x–(x+13), November 2008.
[957] M. Gagnaire and S. Al Zahr. Impairment-aware routing and wavelength assignment in translucent networks: state of the art. *IEEE Communications Magazine*, 47(5):55–61, May 2009.
[958] M. Gagnaire, M. Koubaa, and N. Puech. From Network Planning to Traffic Engineering in WDM All-Optical Networks. *IEEE Journal on Selected Areas in Communications*, September 2007.
[959] M. Hayashi, D. Markham, M. Murao, M. Owari, and S. Virmani. Bounds on multipartite entangled orthogonal state discrimination using local operations and classical communication. *Physical Review Letters*, 96(4):40501, 2006.
[960] M. Hayashi, D. Markham, M. Murao, M. Owari, and S. Virmani. Entanglement and group symmetries: stabilizer states, symmetric and antisymmetric states. *Physical Review A*, 77(1):012104, 2008.
[961] O. Hudry. NP-hardness results on the aggregation of linear orders into median orders. *Annals of Operations Research*, 163:63–88, October 2008.

[962] O. Hudry. A survey on the complexity of tournament solutions. *Mathematical Social Sciences.*, 57:292–303, 2009.
[963] J. Kuri, M. Gagnaire, and N. Puech. On the resource efficiency of virtual concatenation in SDH/SONET mesh transport networks bearing protected scheduled connections. *IEEE/OSA Journal of Lightwave Technology*, 23(10):3012–3023, October 2005.
[964] B. Lannoo, L. Verslegers, D. Colle, M. Pickavet, M. Gagnaire, and P. Demeester. Analytical model for the IPACT dynamic bandwidth allocation algorithm for EPONs. *Journal of Optical Networking*, 6(6):677–688, June 2007.
[965] B. Lanoo, L. Verslegers, D. Cole, M. Pickavet, M. Gagnaire, and P. Demester. Performance Analysis of the IPACT Dynamic Bandwitdth Allocation Algorithm for EPONs. *IEEE Jounal on Lightwave Technologies*, June 2007.
[966] A. Leverrier, R. Alleaume, J. Boutros, G. Zémor, and P. Grangier. Multidimensional reconciliation for continuous-variable quantum key distribution. *Physical Review A*, 77(4), April 2008.
[967] A. Leverrier and N. Cerf. Quantum de Finetti theorem in phase space representation. *Physical Review A*, 2009.
[968] A. Leverrier and P. Grangier. Unconditional security proof of long-distance continuous-variable quantum key distribution with discrete modulation. *Physical Review Letters*, 102(180504), May 2009.
[969] J. Lodewyck, M. Bloch, R. García Patrón, S. Fossier, E. Karpov, E. Diamanti, Th. Debuisschert, N. Cerf, R. Tualle-Brouri, S. McLaughlin, and Ph. Grangier. Quantum key distribution over 25 km with an all-fiber continuous variable system. *Physical Review A*, 76:042305, October 2007.
[970] S. Lombardy and J. Sakarovitch. Séquential ? *Theoretical Computer Science*, 356:224–244, 2006.
[971] D. Madore. Approximation faible aux places de bonne réduction sur les surfaces cubiques sur les corps de fonctions. *Bull. Soc. Math. France*, 134(4):465–475, May 2006.
[972] D. Madore. Équivalence rationnelle sur les hypersurfaces cubiques de mauvaise réduction. *J. Number Theory*, 128(4):926–944, 2008.
[973] D. Markham, J. Anders, V. Vedral, M. Murao, and A. Miyake. Survival of entanglement in thermal states. *Europhysics Letters*, 81(4):40006–42000, 2008.
[974] D. Markham, J.A. Miszczak, Z. Puchala, and K. Zyczkowski. Quantum state discrimination: a geometric approach. *Physical Review A*, 77(4):42111, 2008.
[975] D. Markham, A. Miyake, and S. Virmani. Entanglement and local information access for graph states. *New Journal of Physics*, 9(6):194, 2007.
[976] D. Markham and B.C. Sanders. Graph states for quantum secret sharing. *Physical Review A*, 78(4):042309, 2008.
[977] E. Mayer-Wolf, A. S. Ustunel, and M. Zakai. Some covariance inequalities in Wiener space. *Journal of Functional Analysis*, 255:2563–2578, February 2009.
[978] R. Medeiros and F. Assis. Quantum zero-error capacity. *International Journal of Quantum Information*, 3(1):135–139, April 2005.
[1871] Y. Menesguen, J. L. Smirr, G. Pillet, R. Alleaume, A. Maruani, I. Zaquine, R. Frey, and L. Jacubowiez. Source de photons intriqués en polarisation : travaux pratiques de physique quantique. *Bulletin de l'Union des Physiciens*, 102:61–80, November 2008.
[980] Y. Nakata, D. Markham, and M. Murao. Thermal robustness of multipartite entanglement of the 1-D spin 1/2 XY model. *Physical Review A*, 79:042313, April 2009.
[981] M. Peev, C. Pacher, R. Alléaume, C. Barreiro, W. Boxleitner, J. Bouda, R. Tualle-Brouri, E. Diamanti, M. Dianati, Th. Debuisschert, J.F. Dynes, S. Fasel, S. Fossier, M. Fürst, J.-D. Gautier, O. Gay, N. Gisin, Ph. Grangier, A. Happe, Y. Hasani, M. Hentschel, H. Hubel, G. Humer, Th. Länger, M. Legré, R. Lieger, J. Lodewyck, T. Lorsünser, N. Lutkenhaus, A. Marhold, T. Matyus, O. Maurhart, L. Monat, S. Nauerth, J.-B. Page, E. Querasser, G. Ribordy, A. Poppe, L. Salvail, S. Robyr, M. Suda, A.W. Sharpe, A. Shields, D. Stucki, C. Tamas, T. Themel, R.T. Thew, Y. Thoma, A. Treiber, P. Trinkler, F. Vannel, N. Walenta, H. Weier, H. Weinfurter, I. Wimberger, Z.L. Yuan, H. Zbinden, and A. Zeilinger. The SECOQC Quantum Key Distribution Network in Vienna. *New Journal of Physics*, 2009.
[982] N. Puech, J. Kuri, and M. Gagnaire. Assessing the Economic Benefit of Introducing Multi-Granularity Switching Cross-Connects in Optical Transport Networks. *IEEE Journal on Selected Areas in Communications*, 24(8 Part Supplement):82– 96, August 2006.
[983] H. Randriambololona. Métriques de sous-quotient et théorème de Hilbert-Samuel arithmétique pour les faisceaux cohérents. *Journal für die reine und angewandte Mathematik (Crelles Journal)*, 590:67–88, 2006.
[984] J. Sakarovitch and R. De Souza. Lexicographic decomposition of k-valued transducers. *Theory of Computing Systems*, 2009.
[985] L. Salvail, M. Peev, E. Diamanti, R. Alléaume, N. Lutkenhaus, and Th. Länger. Security of trusted repeater quantum key distribution networks. *Journal of Computer Security*, 2009.
[986] N. Skorin-Kapov, O. Tonguz, and N. Puech. Towards efficient failure management for reliable transparent optical networks. *IEEE Communications Magazine*, March 2009.
[987] H. Takesue, E. Diamanti, C. Langrock, M.M. Fejer, and Y. Yamamoto. 10-GHz clock differential phase shift quantum key distribution experiment. *Optics Express*, 14(20):9522–9530, 2006.
[988] H. Takesue, E. Diamanti, C. Langrock, M.M. Fejer, and Y. Yamamoto. 1.5-μm single-photon counting using polarization- independent up-conversion detector. *Optics Express*, 14(26):13067–13072, 2006.
[989] Y. Tanaka, D. Markham, and M. Murao. Local encoding of classical information on quantum states. *Journal of Modern Optics*, 54(13):2259, 2007.
[990] A. S. Ustunel. Estimation for the additive Gaussian channel and Monge-Kantorovitch measure transportation. *Stochastic Processes and Their Applications*, February 2007.
[991] A. S. Ustunel. A necessary and sufficient condition for invertibility of adapted perturbation of identity on Wiener space. *Comptes Rendus Mathématiques*, 346:897–900, October 2008.
[992] A. S. Ustunel. Probabilistic solution of American options. *Journal of Functional Analysis*, February 2009.

[993] A. S. Ustunel and D. Feyel. The strong solution of the Monge-Ampère equation on the Wiener space for log-concave measures: General case. *Journal of Functional Analysis*, 232:29–55, February 2006.
[994] A. S. Ustunel and M. Zakai. The invertibility of the adapted perturbations of identity on the wiener space. *Comptes Rendus de l'Academie des Sciences, Serie I*, 342(9):689–692, February 2006.
[995] A. S. Ustunel and M. Zakai. Sufficient conditions for the invertibility of the adapted perturbations of identity on the Wiener space. *Probability Theory and Related Fields*, February 2007.
[996] E. Waks, E. Diamanti, and Y. Yamamoto. Generation of photon number states. *New Journal of Physics*, 8(1):4, January 2006.
[997] E. Waks, B.C. Sanders, E. Diamanti, and Y. Yamamoto. Highly nonclassical photon statistics in parametric down conversion. *Physical Review A*, 73:033814, March 2006.
[998] Q. D. Xuân, R. Alleaume, L. Xiao, F. Treussart, B. Journet, and J.-F. Roch. Intensity noise measurement of strongly attenuated laser diode pulses in the time domain. *The European Physical Journal - Applied Physics*, 35(2):117–121, August 2006.

7.3.2 ACTI: Selected Articles in Proceedings of International Conferences

[999] S. Al Zahr, M. Gagnaire, and N. Puech. Impact of wavelegnth assignment strategies on hybrid wdm network planning. In *IEEE-DRCN*, La Rochelle, France, October 2007.
[1000] R. Aoun and M. Gagnaire. An Exact Approach for Resource V irtualization and Job Scheduling in Grid Networks. In *IEEEE/IFIP 1rst International Workshop on End-to-End Virtualization and Grid Management*, San-Jose, California-USA, July 2007.
[1001] R. Aoun and M. Gagnaire. An exact optimization tool for market-oriented grid middleware. In *2009 Annual IEEE CQR International Workshop*, Naples-Florida USA, May 2009.
[1002] M.-P. Beal, S. Lombardy, and J. Sakarovitch. Conjugacy and equivalence of weighted automata and functional transducers. In *Computer Science in Russia'06*, pages 58–69, Lect. Notes in Comp. Sci. 3967, 2006.
[1003] V. Berthé, Ch. Frougny, M. Rigo, and J. Sakarovitch. On the cost and complexity of the successor function. In *WORDS 2007*, 2007.
[1004] J. Boutros, F. Kharrat, and H. Randriambololona. A classification of multiple antenna channels. In *International Zurich Seminar on Communications*, pages 14–17, Zurich, Suisse, February 2006.
[1005] J. Boutros and H. Randriambololona. Optimal linear precoding for both maximum likelihood and iterative probabilistic decoding: The Aladdin space-time code. In *ISIT*, Séoul, Corée du Sud, June 2009.
[1006] C. Cardenas and M. Gagnaire. Performance comparison of flow aware networking (FAN) architectures under GridFTP traffic. In *ACM-SIGAPP SAC*, Fortaleza, Brazil, March 2008.
[1007] F. Castro, I. Rubio, H. Randriambololona, O. Moreno, and H. Mattson Jr. An elementary approach to Ax-Katz, McEliece's divisibility and applications to quasi-perfect binary 2-error correcting codes. In *IEEE International Symposium on Information Theory*, Seattle, États-Unis, July 2006.
[1008] G. Cohen and G. Zémor. Syndrome-coding for the wire-tap channel revisited. *IEEE Catalog Number: 06EX1268*, pages 33–36, January 2006.
[1150] L. Decreusefond, E. Ferraz, and P. Martins. Simple estimate of signal to interference ratio with randomly located antennas. In *RIVF'07*, Hanoï, Vietnam, January 2007.
[1151] L. Decreusefond, E. Ferraz, and P. Martins. Upper bound of loss probability for the dimensioning of ofdma systems with multi class randomly located users. In *SPASWIN 2009*, Seoul, South Korea, June 2009.
[1011] M. Dianati and R. Alleaume. A transport layer protocol for the secoqc qkd quantum key distribution networks. In *The Third IEEE LCN Workshop on Network Security Security (WNS)*, Dublin, Irlande, October 2007.
[1012] D. Elkouss, A. Leverrier, R. Alleaume, and J. Boutros. Efficient reconciliation protocol for discrete-variable quantum key distribution. In *ISIT 2009.*, Séoul, Corée du Sud, June 2009.
[1013] M. Gagnaire. Physical layer impairments in all-optical networks. In *IEEE-OSA Optical Fiber Communications*, San Diego-USA, February 2008.
[1014] R. Medeiros, R. Alleaume, F. Assis, H. Randriam, and G. Cohen. Quantum states characterization for the zero-error capacity. In *Information Theory Winter School*, volume 1, pages 1–11, La Colle sur Loup, France, July 2007.
[1015] M. Peev, R. Alleaume, T. Länger, N. Lutkenhaus, O. Maurhart, and L. Salvail. The secoqc quantum key distribution network prototype : principles, design and implementation. In *Globecomm*, Washington, November 2007.

7.3.3 OS: Books and Book Chapters

[1016] M. Aigner, G. M. Ziegler, and N. Puech. *Raisonnements divins, 2ème édition française*. Springer Verlag, Paris (France), 2006.
[1017] P. Bourgade. *Olympiades Internationales de Mathématiques 1976-2005*. Cassini, Paris, France, 2005.
[1018] I. Charon, L. Denoeud, and O. Hudry. *Overlapping clustering in a graph using k-means and application to protein interactions networks*, pages 173–182. Springer, collection Studies in Classification, Data Analysis, and Knowledge Organization, Heidelberg, Allemagne, 2007.
[1019] L. Decreusefond and D. Nualart. *Flow properties of differential equations driven by fractional Brownian motion*. World Scientific, June 2007.

[1020] M. Gagnaire. *Réseaux d'accès filaires*, chapter Réseaux et télécommunications, pages 40–51. Vuibert, Paris - France, 2006.
[1021] M. Gagnaire, J. Kuri, and E. Doumith. *Grooming of Scheduled demands in multi-layer optical networks*, pages x–(x+25). Springer, Norwell-MA, USA, 2008.
[1022] M. Gagnaire, J. Kuri, and M. Koubaa. *From Network Planning to Traffic Engineering in Translucent Optical WDM Networks*. Springer, Norwell -MA , USA, 2008.
[1023] O. Hudry, B. Leclerc, B. Monjardet, and J.-P. Barthélemy. *Médianes métriques et laticielles*, pages 271–316. Hernès, Paris, France, 2006.
[1024] S. Lombardy and J. Sakarovitch. *The universal automaton*, pages 457–504. Amsterdam Univ. Press, 2008.
[1025] D. Markham. *Introduction to Entanglement Theory.* World Scientific, Singapore, 2007.
[1026] N. Puech. *Maple — Règles et fonctions essentielles*. Springer-Verlag, Paris, FRANCE, 2009.
[1027] J. Sakarovitch. *Elements of Automata Theory*. Cambridge University Press, 2009.

Chapter 8

Networks, Mobility, Security (RMS)

Team leader Daniel Kofman.

Faculty Nadia Boukhatem (MC), Claude Chaudet (MC), Marceau Coupechoux (MC), Philippe Godlewski (P), Daniel Kofman (P), Artur Hecker (MC), Houda Labiod (MC), Jean Leneutre (MC), Philippe Martins (MC), Michel Riguidel (P), Dario Rossi (MC), Jean-Louis Rougier (MC), Ahmed Serhrouchni (MC), Noëmie Simoni (P), Pascal Urien (P).

PhD students ACHKAR DIAB Talal (21 months), ADIB Mustapha (3 months), ADRA Nadine (12 months), AFIF Meriem (20 months), AI Chi (11 months), AL MAMOU Abd Al Basset (42 months), ALAOUI SOULIMANI Houda (5 months), ALJNIDI Mohamad (43 months), ARANDA Liliana (20 months), ARYA Azin (16 months), AUGE Jordan (33 months), BEN CHEIKH BATTIK Dorra (6 months), BENAHMED DAHO Zakaria (2 months), BERMOLEN Paola (34 months), BIANZINO Aruna (5 months), BREHON Yannick (9 months), CARDENAS PEREZ César (43 months), CHAMOUN Maroun (6 months), CHEN Lin (37 months), CHI Jing (14 months), DAILLY Nicolas (10 months), DANDJINOU Toundé Mesmin (11 months), DELAMARE Simon (34 months), DIALLO Alpha Amadou (34 months), EL FEGHALY Antoine (9 months), FADLALLAH Ahmad (25 months),FAYCAL Marguerite (43 months), FEKI Ines (33 months), FERRAGUT VARELA Ruben André (9 months), GARCIA DE LA FUENTE Miguel(9 months), GUILLET Thomas (32 months), HADDAD Yoram (33 months), HAN Bing (39 months), HE Ruan (21 months), HORRICH Sana (25 months), HUYNH Hanane (11 months),KACED Ahmed Reda (33 months), KAMAL MAHMOUD Hany (20 months), KELIF Jean-Marc (35 months), KHAWAM Kinda (10 months), KOMAROVA Maryna (29 months), KTARI Salma (33 months), LANGAR Rami (8 months), LARROCA Frederico (34 months), LENGOUMBI MAKOGHA Carle Tricana (26 months), LI Chuan (14 months), LIN Hai (37 months), LIU Bin (37 months), LUU Thanh Tra (6 months),MAQBOOL Masood (33 months), MIRANI Farhan Hyder (9 months), NGUEGUIA NYAMY Dorice (20 months), NGUYEN Huu Quynh (26 months), ORNELAS Netzahualcoyotl (17 months), OUANOUCHE KESSAL Soumia (16 months), PIETRE-CAMBACEDES Ludovic (23 months), RIBEIRO CARDOSO André (21 months), RODIER Bernard (6 months), SAAD Radwane (33 months), SALAZAR GAITAN Oscar (21 months), SANCHEZ SANCHEZ Erwing Ricardo (12 months), SECCI Stefano (38 months), SOKHN Maria (21 months), SONG Meng (34 months), SOULE DE CASTRO Rodrigo (18 months), TCHEPNDA Christian (36 months), THIBAUD Cédric (6 months), TOUBIANA Vincent (37 months), TRAN Phuoc Nguyen (31 months), VALENTI Silvio (12 months), VEGLIA Paolo (12 months), WANG Lu Sheng (41 months), WU Yijun (30 months), YIN Chun Yang (38 months).

Post-docs, engineers and sabbaticals ABABNEH Nedal (5 months), CHEN Lin (7 mois), DIALLO Madiagne (2 months), FADLALLAH Ahmad (12 months), HADDAD Sammy (7 months), LIU Bin (3 months), MABIALA MOUNDELE Muriel (5 months), SONG Meng (5 months), TRAN Minh Anh (7 months), YIN Chun Yang (4 months), ALBERTIN Pierre (20 months),

ALESSANDRIA Eugénio (1 months), BACHELIER Stéphane (18 months), BENCHAIB Yacine (25 months), BIANZINO Aruna (2 months),DJARALLAH Nabil (2 months), ELRHARBI Simon (21 months), KIENNERT Christophe (12 months), LAURIER Philippe (27 months),LAVINAL Emmanuel (14 months), MARIE Estelle (5 months), MENDOUGA Laure (10 months), ODIC Xavier Steve (18 months), RAJU Pusapati (1 months), SOTTILE Elisa (7 months), TESTA Claudio (4 months), VALENTI Silvio (6 months), VEGLIA Paolo (6 months), ALCOBER Jesus (12 months), RÄTY Tomi (7 months), SUNGHYUN Kim (13 months).

Faculty [IT, CNRS]	[14, 0]
PhD students	30.9
Post-docs, engineers and sabbaticals	5.3
Defended PhD theses	26
Defended HDR	3
Journal papers	45
Papers in conference proceedings	273
Chapters and books	19
Patents and sofware	9
Grants [public, private, european] (k€)	[1700, 1600, 1700]

8.1 Scientific Environment, Positioning and Objectives

The NMS team covers a broad, consistent thematic field, as shown in the first part of this introduction. As networks are at the heart of the Télécom ParisTech scientific and technological field, we have chosen to cover a large number of topics that we consider to be strategic for enabling the expected development of networks and services. The second part of the introduction provides a reminder of the high level of involvement of our team in national and international research initiatives and organizations as well as its numerous collaborations with the industrial sector.

Services are becoming personalised, ubiquitous and agnostic in relation to the technologies and networks used to gain access to them. These personalised services adapt themselves dynamically to the context and the location. We hold that major flexibility will be introduced through the concept of having a composition of services where various actors propose components used to dynamically create new services that fulfil specific needs. These developments require major changes in services' architectures. Our research strategy is focused in architectural modelling, enabling the problem to be understood as a whole, and on innovative fundamental principles of future architectures. In particular, the team validated these principles in collaboration with various network and services operators. Moreover, service overlays, particularly in peer-to-peer (P2P) mode, are continually being deployed in order to support the development of services and particularly the distribution of content. Our contributions in this field relate to the design and analysis of P2P applications, work based on an innovative methodology that we pioneered. The relevant scientific contributions are presented in section 8.2.1.

Services are becoming mobile (a concept which largely goes beyond the mobility of users and terminals that we currently have); we will be able to cross technological frontiers and boundaries between administrative domains (different operators and service providers), and change terminals without the communication we have in progress being affected. All services are becoming mobile, and therefore the capacity needs are exploding. Within this context, the team has focused on two groups of topics: firstly the planning of new-generation wireless networks, cognitive

radio and scheduling at the radio interface (topics considered to be critical for optimal use of the spectrum) and secondly the mechanisms enabling seamless mobility, particularly across technological frontiers and administrative boundaries (an obstacle that limits service offers like the ones described above). Our contributions in this field are presented in section 8.2.2.

Peripheral to infrastructure networks and particularly to the access networks referred to above, we find devices (residential gateways, terminals, etc.) which increasingly have radio interfaces and functionality enabling opportunistic creation of self-organized networks. These networks can fulfil specific needs that change greatly over time. The generic concept of self-organised networks is not new, but its implementation in specific contexts (e.g. vehicle networks) has opened the door to a large number of applications and raised new scientific and technological problems. At the same time, new concepts such as wireless sensor and actuators networks (WSANs), new-generation RFID and the Internet of things, will enable the real and the digital worlds to be brought closer together, thus facilitating new services which will change our lifestyles. This is a wide-ranging topic; on the one hand we have focused on certain algorithms and protocols enabling fundamental issues to be resolved (efficient and fair sharing of resources, time synchronisation) and on the other hand we proposed innovative architectures for wireless sensor networks (including one pioneering contribution usually cited), for vehicle networks and for mesh networks. Our contributions to self-organised networks are presented in section 8.2.3.

The architecture of IP networks (including the Internet) will have to change in order to integrate the concepts outlined above, and in order to integrate new network paradigms facilitating the offering of services like the ones described. In particular, the team focused on inter-domain routing, an issue recognised as being one of the main obstacles to networks development. Indeed, present Internet inter-domain routing neither allows for guaranteeing QoS or deploying efficient traffic engineering approaches. Moreover, advanced services, such as IP Virtual Private Networks, are seldom interconnected due to the complexity of existing solutions. We present our contribution to these topics in section 8.2.4. Moreover, the team is also involved in initiatives dealing with more radical changes in Internet architecture.

Security is an ever-present, fundamental topic involved in all of the themes presented above, and future networks and systems will have to include security right from their design stage onwards. Within a dynamic context like the one described above, the development of numerous usages requires the establishment of solutions enabling users' trust to be developed whilst at the same time devoting attention to respecting privacy. The central socio-economic role of networks makes studies concerning infrastructure safety a necessity. Our results regarding these topics are outlined in section 8.2.5.

The team is greatly involved in national and international collaborative research projects (financed by the FP7, the ANR and competitiveness clusters). It was the initiator of the PF6's European Network of Excellence (NoE), Euro-NGI and of its successor in the FP7: Euro-NF. It has chaired this NoE's Steering Committee since it was created. The Steering Committee is, in particular responsible for co-ordinating all research activities of the NoE. Moreover, by way of an example, during this period the team participated in several European projects (NapaWine, SEINIT, CI2RCO, IRRIIS, Seserec, TIGER and Bugyo) and in the RNRT and ANR Actrice, Diaforus, Georacing, R2M, TRAFFIC, IROISE, Resodo, T2TIT, ESTER, and OSCAR projects, among others. The team is involved in the System@tic (trust platform) and CapDigital (wireless high-speed Internet) competitiveness clusters.

The team is also involved in numerous bilateral research contracts with industrials, and particularly with Orange, SFR, Alcatel-Lucent and Thales. It maintains close links with various international laboratories, including Turin Polytechnic, Milan Polytechnic, the University of Waterloo, Imperial College, Hubert Curien Partnerships, and STIC Asia Partnerships. The group participates in numerous projects.

In 2009, one of its members chaired the Experts Committee of the ANR's VERSO programme. Within the Telecom Institute, it is greatly involved in the Networks of the Future lab, and several of its members are part of its Experts Committee. Moreover, the team regularly responds to

requests for expertise from various French and European institutions. As far as innovation is concerned, members of the team were either the founders of, or are greatly involved in, innovative enterprises dealing with technologies that have resulted directly from research work within the team.

8.2 Main Results

8.2.1 Services Architecture and Applications Services

Faculty Dario Rossi, Noëmie Simoni.

The development of new services and usages makes it necessary to rethink how services and content are made available. The major changes required for a dynamic composition of heterogeneous services, provided by multiple actors, in a way that is transparent to the user, may be summarised as follows:

- Shifting from a vertical architecture (in silos) to a horizontal architecture (that is integrated).
- Shifting from a client-server architecture (strong coupling) to a service-oriented architecture (loose coupling).
- Shifting from a centralised architecture to a distributed architecture (P2P).
- Shifting from a static architecture to a dynamic, flexible architecture.

The joint design of networks and applications services is required to ensure the end-to-end continuity of QoS, guaranteeing full integration. Personalisation of the user's workflow, which is now central to the solution, brings about a trans-organisational context where session mobility needs to be managed.

There are several approaches for achieving the simplification, reuse and loose coupling of the various services, above and beyond Web 2.0/3.0, which was the first to emphasise the sharing of knowledge and social networks. The next stage, represented by Service Oriented Architecture (SOA), and Software as a Service (SaaS), is defining a paradigm for the organisation and use of the distributed capacities of services platforms: our initial research orientation is aiming to go beyond the limits of these approaches.

An important aspect of the Darwinian evolution of the Internet has undoubtedly been the introduction of the "peer to peer" (P2P) paradigm. In light of the impact of P2P applications, we were interested in two major issues: analysis of the traffic structure that they generate (in order to facilitate handling them), and their mechanisms for interaction with the network (enabling a global optimisation of resources). We have come up with innovative methods for traffic classification (the usefulness of which extends well beyond the framework of this study) which have enabled us to understand certain operating principles of the main P2P applications as well as their mechanisms for interaction with the network. These results are now recognised by the scientific community in light of their usefulness in joint services/networks design, especially through integrating self-adaptation mechanisms (work in progress within the team).

Main contributions

Development of applications services

Here, our work relates both to the design and analysis of P2P applications. Of the major results, we can cite the analysis of Skype congestion control mechanisms [1054] or its signalling [1246, 1029], as well as the characterisation of its users [1031], or of the black-out which caused an outage of the Skype network lasting three days in a row and which created a firestorm of messages on the Internet [1076]. Other aspects taken into account concern the study devoted to

VoIP service quality [1053], and the impact of P2P-TV applications on the network [1041, 1184, 1078, 1077], which depends on their level of knowledge of the underlying.

Analysis of these applications was made possible by the development of reliable, sophisticated techniques for the classification of Internet traffic, based on the recognition of the applications that generated the flows of information. To do this, we proposed an analysis method based on the similarities that exist between the dynamics of human communications and exchanges of digital data carried out by Internet applications [1055, 1079, 1096, 1084, 1058, 1085]. Two orientations were considered: the first was the similarities of the verbal aspect of communication with a new class of classification technique: "Stochastic Packet Inspection" (SPI) [1084], a statistical extension of DPI. It should be noted that the germ of this idea is described in [1055, 1079, 1096], which is currently considered to be the state of the art for Skype classification. The second orientation relates to the behavioural exchanges of applications, whilst completely ignoring the packet content and only considering the behaviour of the traffic [1058, 1085]: here, the similarity is more with the dynamics involved in human interactions.

Development of service architectures

The NMS team has fully contributed to the integration and joint design of networks and services. It is thanks to a unified approach and an architectural modelling of NGNs (Next Generation Networks) and of this new generation of services that converging, dynamic and flexible solutions for networks and services have been proposed. The main objective is for the whole system to be at the user's service, unlike other approaches, where the user must bend to the various connections constraints (Network Centric) or processing constraints (Application Centric). One of the main results is the proposing of an information model for managing a user-centric session (a time-based connection with the system). In other words, this is a session by a user wanting to establish his workflow dynamically depending on the services that his environment may offer during all his travels. To achieve this, in [1100, 1239, 1040, 1270, 1185, 1269, 1265] we propose a structuring of this new personalised service landscape, which is trans-organisational and based on the dynamic service composition, subject to QoS constraints within a generalised mobility environment. But a service is neither an application nor a transaction, and still less a system. As we noted above, the SOA and SaaS approaches have enabled development, but they are not sufficient for ensuring the dynamic nature and the integration of the service and networks. This is why we introduced self-management through the management of communities of interest and management of the QoS in terms of each of the service components. The global organisation is based on the ubiquitous nature and sharing of the service components. What is original about this is that it steps outside of the client-server model by proposing the implementation of the user's service logic (workflow) in the same mobile session, based on the sharing of service components.

8.2.2 Wireless Networks and Mobility

Faculty Nadia Boukhatem, Marceau Coupechoux, Philippe Godlewski, Daniel Kofman, Houda Labiod, Philippe Martins.

Support for the development of the services previously described in this document in particular requires two major developments: firstly, a major increase in the capacity of access networks and, secondly, advanced management of mobility.

Over recent years, cellular radio interfaces have experienced rapid development. Beyond increases in speeds, in particular this has been characterised by new packet mode optimisation mechanisms, the coexistence of several technologies, greater equipment agility in terms of frequencies, and the use of OFDMA for the physical layer. Dimensioning and capacity calculation methods have been greatly modified because of the characteristics of the physical layer, and services and users, are changing. Radio access scheduling and protocols must be adapted to the constraints of new services. Making access transparent to the user requires the development of advanced inter-technologies handover algorithms. Lastly, the promises of radio software are

forcing us to rethink spectrum management methods.

Main contributions

Capacity and dimensioning of wireless networks

The group is interested in the dimensioning and planning of wireless networks. This requires evaluation, firstly, of coverage and, secondly, of the capacities of these networks. These two aspects are linked by the spatial distribution of the Signal-to-Interference+Noise Ratio (SINR). The coverage ratio is in fact defined by the probability of exceeding the SINR. The cellular capacity, on the other hand, is an increasing function of the SINR. Within the context of CDMA networks, and working in collaboration with Orange, we expressed (the results are presented in [1059]) the spatial distribution of the SINR and the probability of exceeding it, taking masking and attenuation effects into account. Within the context of OFDMA networks and in collaboration with Alcatel-Lucent, we compared different frequency reuse schemas (the results are presented in [1175]). In [1150], we propose an approximation of the SINR when the cells are distributed according to a spatial Poisson process.

The group proposed an innovative approach, based on stochastic geometry, for planning metropolitan wireless networks. This approach enables simple engineering rules to be obtained in spite of the complexity of the problem [1072]. The work was carried out in collaboration with the ENS within the context of the Iroise RNRT project.

In collaboration with Alcatel-Lucent and UPMC/LIP6, we developed dimensioning algorithms for WiMAX networks based on the Markov chains theory and taking into account the various types of traffic (best effort, voice, etc.) and different types of radio channels [1052].

Scheduling and radio access protocols

The group is interested in scheduling algorithms and in radio access protocols.

Opportunistic scheduling dynamically considers the variable capacity of the radio channels of the various users sharing the radio resources of a given cell in order to obtain a good compromise between the optimisation of these resources and the fairness between users. We proposed and evaluated a new opportunistic scheduling mechanism which improves the performance of the very popular WFQ scheduler (used in wired links) whilst maintaining fundamental properties like fairness. Some of the scheduler's properties are demonstrated analytically [1072]. The work was financed by the Iroise RNRT project.

OFDMA scheduling consists on allocating groups of sub-carriers of the band to the cell's users. We propose an algorithm [1220] that maximises the cell's capacity whilst at the same time ensuring the users' individual througput. To guarantee real-time traffic maximum delays and to maximise non real-time traffic throughput whilst at the same time ensuring proportional fairness between both of them, two algorithms, extensions of WFS (Wireless Fair Service) for OFDMA, are proposed by the team in [1225]. In the field of random access, together with the BUPT (Beijing, China), we proposed a new algorithm for WiMAX in [1057]. The group provided a consulting service to the European Space Agency for standardisation - CCSDS.

Cognitive radio and dynamic access to the spectrum

The frequency spectrum is considered to be poorly used: certain bands are locally and temporarily congested while others are under-used. Current software radio techniques will soon enable radio interfaces to be quickly and dynamically reconfigured across broad bands of the spectrum. These technologies greatly modify the management algorithms for the radio resource. The group is giving consideration to these questions and is proposing solutions in the TEROPP (inter-Carnot) and URC (SYSTEMATIC competitiveness cluster) projects, e.g. in [1144].

Mobility management and handover algorithms

The group has developed expertise in the field of multi-technology handovers. Cross-layer optimisation strategies have been proposed for the data handover in multi-technology EGPRS and WLAN networks (in the ANAIS RNRT project) [1148] on the one hand, and WiMAX and

3G LTE (with Orange) [1229] on the other hand. We have also proposed solutions based on extensions to the SIP protocol, enabling roaming to be managed at the application level [1097].

A new anchoring points selection approach within the IPv6 Mobile architecture, which offers good performances within a broader context compared to existing solutions adapted solely to specific mobility cases, was proposed and evaluated [1086]. This work was carried out in collaboration with Orange Labs under the framework of a bilateral project.

Studies on the dynamic selection of interfaces, considering various attributes such as the characteristics of the interfaces, applications' needs, and user preferences, were carried out. In particular, MADM (Multiple Attribute Decision Making) methods applied to interface selection were evaluated [1286], and a new method which eliminates classification anomalies was proposed. The group is also interested in the issues raised by the multi-home nature of mobile terminals and the possibility of having these terminals communicate simultaneously with two different radio access systems. Within this context, we are working on the impact of multi-homing on mobility management protocols (MIPv6 and MIPv4), and a mechanism which extends the mCoA (multiple Care of Address) solution was proposed. SCTP's multi-homing functionality was exploited to develop inter-system handover mechanisms [1109]. Lastly, we use games theory as a tool for modelling multi-interface terminals.

Analysis of the protocols on the radio interface

The VIGIE software (GSM/GPRS) enabling protocols on the radio interface to be analysed, which was designed and developed in collaboration with Telecom Bretagne, formed the subject of an application to the APP in 2007. The group is now working in collaboration with SFR on new software (called "Metradip") for 3G/HSDPA systems. In addition to its interest for operators, such software constitutes a very valuable tool for teaching purposes.

8.2.3 Spontaneous Networks and Self-Organisation

Faculty Claude Chaudet, Marceau Coupechoux, Daniel Kofman, Houda Labiod, Jean Leneutre, Jean-Louis Rougier.

Peripheral to infrastructure networks, we are witnessing the generalised use of new network paradigms, often with self-organisation properties. Work in this field was originated by the research on packet radio networks carried out by DARPA from the 1970s onwards. In particular, reference may be made to multi-hop radio networks, for which several application classes have emerged over the last decade.

Recently, several specific applications, such as environmental monitoring and road safety and road traffic management applications have enabled the behaviour of these networks to be evaluated under real or realistic conditions. The experiments conducted have enabled several scientific challenges to be identified and have given impetus to themes such as wireless sensor networks, mesh networks, and vehicular networks.

Numerous scientific and technical issues remain and must be solved so that the deployment of spontaneous networks capable of arousing the interest of a critical mass of users can be deployed. Within this context, we have focused on the one hand on fundamental and generic issues (distributed location, clocks synchronisation, sharing of resources) and, on the other hand, on specific architectures (wireless sensor networks, vehicular networks, and radio mesh networks).

Main contributions

Distributed location and clocks synchronisation

In the context of self-organized networks, the NMS team has proposed several algorithms and protocols enabling the solving of fundamental issues required for ensuring good local functioning on which end-to-end protocols can rely on. In particular, contributions have been made (and are currently being published) on distributed location based on a low number of fixed points in the network.. Moreover, a scalable method for clocks synchronisation for ad-hoc nodes has been

proposed in [1137, 1033].

Sharing of resources

The performance and overall behaviour of these networks is the result of a set of local behaviours and consequently they are difficult to characterise and influence from a global perspective. Ensuring a fair sharing of resources, for example, requires collaboration between transmitters in order to avoid having one group of terminals monopolising all of the available resources. Such a situation may be the outcome of unintentional behaviour, egotistical or intentional behaviour, or may be the result of an explicit attack on the network. The team is examining these three scenarios. While a purely algorithmic and protocol-based approach based on local measures enables unintentional unfair situations to be responded to [1047], using games theory, particularly for defining the power control and resources allocation policy, enables egotistical behaviour to be discouraged [1139, 1034]. Furthermore, this work led to contributions relating to detection of, and protection against, the attacks referred to in the chapter within this report relating to safety.

The contributions outlined in the preceding paragraphs are generic. They do not presuppose either a particular network architecture, or a particular mobility for the nodes, nor do they presuppose a limit to their energy reserves. At the same time, NMS team has taken an interest in several types of particular distributed multi-hop networks, as follows.

Wireless Sensors Networks

Wireless Sensor Networks are generally low-capacity networks for which saving the energy of the various nodes is a key issue.

Often, their objective is to capture information and transmit it in multi-hop mode to a sink. Due to this architecture, the sensors close to the sink consume more energy; indeed they have to relay more packets. We proposed a heterogeneous sensors architecture (based on sets of sensors with different capacities and batteries), and we optimised it using modelling based on stochastic geometry, which enabled us to find structural properties ([1042] quotation).

The team also proposed and optimised processes for waking up sensors and putting them into sleep mode based on cross-layer collaboration in order to optimise the disribution of energy expenditure within a network [1250, 1081].

Mesh and hybrid networks

Mesh networks and hybrid networks are based on the existence of a fixed infrastructure around which a multi-hop network is created. Under this framework, the team proposed improvements to the ad hoc OLSR routing protocol within the context [1165], thus enabling the advent of routing circuits to be avoided when the Fisheye extension is used. In addition to routing, mesh networks formed the subject of several studies within the team, aimed at characterising their performance. Various combinatory problems were studied and led to the proposal of optimisation models [1143].

Vehicle networks

Vehicular networks are characterised by their special mobility model and a distinction between inter-vehicle communication and communication between vehicles and an infrastructure. The speed of movements, as well as trajectory constraints, requires major changes in the addressing and routing policy. In particular, the NMS team proposed a routing protocol based on the trajectory, in which the next hop is chosen autonomously without control packets exchange with the neighbours [1173, 1174].

8.2.4 Core Networks

Faculty Nadia Boukhatem, Daniel Kofman, Jean-Louis Rougier.

Our work in this field is positioned in terms of the Internet architecture and the current development of operator networks towards an ”all-IP” approach. The objective is to enable an increase in

the network's capacity and control of it, whilst at the same time minimising costs. Consequently, our contributions relate to the following three aspects: architectural concepts for the optimisation of new-generation metropolitan and core networks, inter-domain routing, and traffic engineering.

Main contributions

Network architecture

In order to reduce deployment and management costs, we are witnessing, on the one hand, a reduction in technology layers (for example with solutions like IP over WDM or IP over Ethernet Carrier Class) and, on the other hand, the seeking out of integrated management and control methods, or multi-layer methods, for the various technology layers. Within this context, we worked on the Bus-LSP concept [1064], and we showed how it enables the deployment of cheaper transport architectures that are easier to manage. Solutions for the dimensioning of these networks were proposed [1039]. This work was carried out in collaboration with Alcatel-Lucent.

We have also taken an interest in problems related to the diversity of IP signalling protocols deployed nowadays. Development costs, complexity, and management costs constitute the main issues in this regard. We defined unified signalling capable of supporting different signalling needs. In particular, we developed a generic transport protocol for signalling [1126].

Traffic engineering

IP traffic engineering has experienced considerable development over the last few years. Nevertheless, existing techniques remain difficult to implement because they often require prior knowledge of the traffic, for example the traffic matrix, the characteristics of the flows to be transported, etc. And yet this information is sometimes difficult to measure and is often unpredictable. Consequently our research focused on defining efficient traffic engineering techniques, robust, with respect to unforeseen traffic changes, and which do not require any hypotheses regarding the traffic transported. In particular, we studied dynamic load sharing as a natural tool that fulfils these objectives. We proposed new load balancing methods, based on routing games (Wardrop Equilibrium) enabling to maximize the global utility of all of the transported elastic flows [1068]. We also proposed load-sharing techniques based on cost functions measured through non-parametric regression [1067, 1249]. For example, these techniques enable the average timeframe required for all of the flows transported to be minimised without making any hypothesis about the traffic. In collaboration with Orange Labs, we have also taken an interest in using load sharing jointly with the cross-protect mechanism, enabling a QoS to be offered that is satisfactory for streaming and elastic flows, without any need for explicit identification of traffic classes [1167].

Inter-domain routing

The services offered currently by operators are limited geographically (except for the Internet, which only offers a Best Effort Service), because they are only available within their networks. This situation is due firstly to the difficulties involved in defining a regulatory and economic framework where the operators will have real incentives to co-operate. Following on from that, the main reason is due to the absence of effcient inter-domain engineering mechanism. Under the framework of an ANR project, for connection oriented networks (e.g. MPLS/GMPLS), we proposed a network architecture based on the concept of an operators alliance, [1038]. We defined inter-domain path selection mechanisms subject to multiple constraints; both economic and QoS-related ones [1083, 1257]. For the connectionless case , we used games theory in order to highlight the most effective inter-domain routing strategies. In particular, we demonstrated that it is possible to reduce congestion and reduce deflections on peering links, whilst at the same time protecting operators' independence (non-collaborative strategies) [1259]. We also developed an SLA/SLS (Service Level Agreement/Specification) dynamic negotiation protocol for the provision of inter-domain QoS services. This protocol was designed to be flexible and configurable in order to overcome, on the one hand, the heterogeneity of solutions and deployed architectures for the

provision of of QoS, and, on the other hand, the diversity of offered services [1092].

8.2.5 Networks Security, Critical Infrastructure, Trust Objects

Faculty Artur Hecker, Houda Labiod, Jean Leneutre, Ahmed Serhrouchni, Pascal Urien.

The NMS group conducts research on the topic of security according to three orientations; networks security, critical infrastructures, and trust objects; these three themes do however address a single objective, which is the definition of secure networks, architectures and services. The security of the pervasive infrastructures which encompass wireless technologies, and ad hoc or mesh self-organised networks, is a major research orientation for removing technological obstacles for ambient radio networks. Likewise, the critical infrastructures study addressing issues such as auditing, data back-ups and automatic reconfiguration, is a key issue for the deployment of reliable information systems, which the emerging economy based on digital information transfers relies upon. Lastly, trust objects (or in other words IT platforms that can withstand attacks) integrated into the digital ecosystem and, more specifically, the Web, are the cornerstone of digital identity (or in other words strong authentication enabling access to diffuse radio services), guaranteeing the traceability of exchanges and limiting the risks of data being pirated. vspace0.5cm
Main contributions

Network security

The solutions studied for the Internet are aimed at traceability needs and requirements for optimising different resources (bandwidth, storage, processing). For telephony [1088, 1157, 1335, 1264, 1080, 1166, 1162, 1117, 1130], we proposed a security solution based on the data channel, and independent of operators' infrastructures. This contribution enables users to check their consumption. Within the context of ad hoc mobile infrastructures and, more broadly speaking, autonomous networks [1036, 1111, 1137, 1139, 1140], our work relates to defining trust models, as well as designing secure mechanisms and protocols adapted to these new stakes. We have defined a new global security architecture dedicated to MANETs networks and to hybrid mesh WLAN networks. In this latter case, we studied security-related problems within the most vulnerable part of such a system, namely the ad hoc subset within the operator context. The outcome of our work was the design of a comprehensive solution, while current solutions are generally only partial. In relation to heterogeneous mobile networks [1203, 1201], we designed a fast authentication protocol for the inter-domain transition, which combines 802.1x and PANA operations. We introduced access control based on trust, which enables access rights to be defined according to your past behaviour, recommendations and the reputations of those supplying recommendations, which offers the possibility of adapting access policies to the dynamic environment and of processing the interactions log on a long-term basis.

Critical infrastructures

[1182, 1180, 1119, 1204, 1244, 1181], started under the framework of the CELTIC BUGYO project, is being extended under the Deserec IST project and the Oscar RNRT project: modelling the vulnerabilities of services within a large system, defining indicators for ensuring security, the architecture of the device capable of repatriating monitoring data in the event of crashes or attacks, and automatic service reconfiguration. Under the frameworks of Bugyo and Deserec, the work is aimed at implementing a system for measuring and maintaining a services safety assurance level (static and dynamic aspects). A tool measuring the department's network safety assurance level was implemented that is capable of estimating not only the safety assurance levels of network components (stations, servers, routers) but also high-level entities like sub-networks and the entire network. Under the framework of Deserec, we designed a robust recovery network (ROSA) dedicated to monitoring and reconfiguring an IS, which measures the robustness of its topology locally and modifies it in order to maximise it. Based on this information, each node selects its neighbours in such a way as to maximise this local robustness. We implemented an application responsible for monitoring and reconfiguring a network. Work was also carried out

under the framework of the European CI2RCO and IRRIIS projects on modelling and simulating the protection of critical infrastructures.

Trust objects

Our work [1104, 1087, 1298, 1296, 1316, 1051, 1292, 1307] is aimed at defining safety points based on chip cards within a complex hardware, software and protocol context involving multiple actors. We proposed the first open application for EAP chip cards, compatible with the Javacard and dotnet market standards, and we integrated these modules into the Windows operating system. We introduced an innovative RADIUS authentication server concept based on EAP cards, and defined new security properties that make use of the benefits provided by dialogue between two high-security elements. In particular, we designed an ID protection mechanism in which critical data are only analysed in an unnumbered form by security modules. We have designed dual SSL batteries (partly onboard) for trust elements, which are compatible with current Web applications, and which effectively combat risks of identity theft and phishing. Recently, we proposed a new concept for RFIDs for the objects Internet; HIP tags. These activities resulted in approximately 30 publications in periodicals and at international conferences, three patents, 2 registered types of software, an industrial prize, a prizewinning project in the OSEO Innovation competitions in 2007 and 2009, and a spin-off.

8.3 References

8.3.1 ACL: Articles in ISI-Indexed Journals

[1028] S. Beker, R. Casellas, and D. Kofman. Optimization techniques for the dimensioning and reconfiguration of mpls networks. *IEEE Journal of Selected Areas in Telecommunications*, August 2005.

[1029] P. Bermolen and D. Rossi. Support vector regression for link load prediction. *Elsevier Computer Networks*, 53(2):191–202, February 2009.

[1030] R. Birke, M. Mellia, M. Petracca, and D. Rossi. Inspecting voip by measurements from a large isp. *Computer Networks*, 2009.

[1031] D. Bonfiglio, M. Mellia, M. Meo, and D. Rossi. Detailed analysis of skype traffic. *IEEE Transaction on Multimedia*, 11(1):117–127, January 2009.

[1032] C. Chaudet, D. Dhoutaut, and I. Guérin Lassous. Performance issues with IEEE 802.11 in ad hoc networking. *IEEE Communications Magazine*, 43(7):110–116, July 2005.

[1033] L. Chen and J. Leneutre. Toward secure and scalable time synchronization in ad hoc networks. *Computer Communications*, 30(11-12):2453–2467, September 2007.

[1034] L. Chen and J. Leneutre. A game theoretical framework of distributed power and rate control in ieee 802.11 wlans (extended paper version). *IEEE Journal on Selected Areas in Communications (J-SAC)*, 26(7):1128–1137, September 2008.

[1035] L. Chen and J. Leneutre. A game theoretical framework on intrusion detection in heterogenous networks. *IEEE Transactions on Information Forensics & Security*, January 2009.

[1036] L. Chen and J. Leneutre. On multipath routing in multihop wireless networks: Security, performance and their tradeoff. *EURASIP Journal on Wireless Communications and Networking*, 2009.

[1037] M. Coupechoux, B. Baynat, Ch. Bonnet, and V. Kumar. Croma: An enhanced slotted mac protocol for manets. *ACM/Kluwer Mobile Networks and Applications*, 10:183–197, June 2005.

[1038] R. Douville, J.-L. Le Roux, J.-L. Rougier, and S. Secci. A Service Plane over the PCE Architecture for Automatic Multi-Domain Connection-Oriented Services. *IEEE Communications Magazine*, 46(6), June 2008.

[1039] D. Kofman, Y. Bréhon, M. Pioro, A. Diallo, and et al. Optimal virtual topology design using bus-label switched paths. *IEEE JSAC*, 25(5):1001–1010, June 2007.

[1040] E. Lavinal, N. Simoni, and M. Song. A next-generation service overlay architecture. *Annals of telecommunications*, December 2008.

[1041] E. Leonardi, M. Mellia, A. Horvath, L. Muscariello, S. Niccolini, and D. Rossi. Building a cooperative p2p-tv application over a wise network: The approach of the european fp-7 strep napa-wine. *IEEE Communication Magazine*, 64(6), April 2008.

[1042] V. Mahtre, C. Rosenberg, D. Kofman, R. Mazumdar, and N. Shroff. A minimum cost heterogeneous sensor network with a lifetime constraint. *IEEE Transactions of Mobile Computing*, 4(1):4–15, January 2005.

[1043] M. Mellia, M. Meo, L. Muscariello, and D. Rossi. Passive analysis of tcp anomalies. *Elsevier Computer Networks*, 52(14), 2008.

[1044] J. Oyedapo, X. Lagrange, and P. Martins. Vigie: A learning tool for cellular air interfaces (gsm, gprs, umts, wifi). *Transactions on Internet Research*, 1(2):59–65, July 2005.

[1045] A. Reinert, B. Sanso, and S. Secci. Design Optimization of the Petaweb Architecture. *IEEE/ACM Transactions on Networking*, 17(1):332–345, February 2009.

[1046] D. Rossi, M. Mellia, and M. Meo. Understanding skype signaling. *Elsevier Computer Networks*, 53(2):130–140, February 2009.
[1047] C. Sarr, C. Chaudet, G. Chelius, and I. Guérin Lassous. Bandwidth estimation for IEEE 802.11-based ad hoc networks. *IEEE Transactions on Mobile Computing*, 7(10):1228–1241, 2008.
[1048] S. Secci, M. Tornatore, and A. Pattavina. Optimal Design for Survivable Backbones with End-to-End and Subpath Wavebanding. *OSA Journal of Optical Networking*, 6(1):1–12, December 2006.
[1049] C. Tchepnda, H. Moustafa, H. Labiod, and G. Bourdon. On analyzing the potential of a layer-2 multi-hop authentication and credential delivery scheme for vehicular communications. *Wireless Personal Communications (WIRE) - Springer Journal*, 2008.

8.3.2 ACTI-A: Articles in Proceedings of Major International Conferences

[1050] H. Aouad and S. Tohme. Using network tomography for dynamic path adaptation. In *WCNC*, New orleans, March 2005.
[1051] M. Badra and P. Urien. Adding identity protection to eap-tls smartcards. In *Wireless Communications and Networking Conference 2007 [WCNC 2007]*, Hong Kong, China, March 2007.
[1052] B. Baynat, G. Nogueira, M. Maqbool, and M. Coupechoux. An efficient analytical model for the dimensioning of wimax networks. In *IFIP/TC6 Networking*, Aachen, Germany, May 2009.
[1053] R. Birke, M. Mellia, M. Petracca, and D. Rossi. Understanding VoIP from Backbone Measurements. In *IEEE INFOCOM*, Anchorage, Alaska, USA, May 2007.
[1054] D. Bonfiglio, M. Mellia, M. Meo, N. Ritacca, and D. Rossi. Tracking Down Skype Traffic. In *IEEE INFOCOM*, Phoenix, AZ, USA, April 2008.
[1055] D. Bonfiglio, M. Mellia, M. Meo, D. Rossi, and P. Tofanelli. Revealing Skype Traffic: When Randomness Plays with You. In *ACM SIGCOMM*, Kyoto, Japan, August 2007.
[1056] L. Chen and J. Leneutre. A game theoretical framework of distributed power and rate control in ieee 802.11 wlans (short paper version). In *IEEE 15th International Conference on Network Protocols (ICNP 2007)*, October 2007.
[1057] J. Chi, P. Martins, and M. Coupechoux. A novel mechanism for contention-based initial ranging in ieee 802.16e networks. In *IEEE Wireless Communications and Networking Conference, WCNC*, Budapest, Hungary, April 2009.
[1058] A. Finamore, M. Mellia, M. Meo, and D. Rossi. Kiss: Stochastic packet inspection. In *TMA Workshop at IFIP Networking 2009*, Aachen, Germany, May 2009.
[1059] J. M. Kélif and M. Coupechoux. Impact of topology and shadowing on the outage probability of cellular networks. In *IEEE International Conference on Communications, ICC*, Dresden, Germany, June 2009.
[1060] J. M. Kélif and M. Coupechoux. On the impact of mobility on outage probability in cellular networks. In *IEEE Wireless Communications and Networking Conference, WCNC*, Budapest, Hungary, April 2009.
[1061] J. M. Kélif, M. Coupechoux, and Ph. Godlewski. Fluid model of the outage probability in sectored wireless networks. In *IEEE Wireless Communications and Networking Conference, WCNC*, Las Vegas, USA, March 2008.
[1062] K. Khawam and D. Kofman. Flow size-based proportional fair scheduler. In *infocom 2007*, Anchorage, AL, USA, May 2007.
[1063] K. Khawam, D. Kofman, and E. Altman. A modified proportional fair scheduler. In *Networking'06*, July 2005.
[1064] D. Kofman, Y. Bréhon, and et al. Bus-label switched paths, an approach to reduce the cost of multilayer networks. In *ICC 2006*, Istambul, June 2006.
[1065] R. Langar, N. Bouabdallah, and S. Tohme. Handoff support for mobility in future wireless mpls networks: a proposal and analysis. In *IEEE WCNC 2006, IEEE Wireless Communications and Networking Conference*, Las Vegas, Nevada, USA, April 2006.
[1066] R. Langar, N. Bouabdallah, and S. Tohme. A mobility tracking model and handoff performance analysis for wireless mpls networks. In *IEEE ICC 2006, IEEE International Conference on Communications*, Istambul, Turkey, June 2006.
[1067] F. Larroca and J.-L. Rougier. Minimum-delay load-balancing through non-parametric regression. In *IFIP/TC6 NETWORKING 2009*, Aachen, Germany, May 2009.
[1068] F. Larroca and J.-L. Rougier. Routing games for traffic engineering. In *ICC 2009 QoS and Modelling Symposium*, Dresden, Germany, June 2009.
[1069] E. Lavinal and N. Simoni. Dynamic and adaptative composition of SIP - based services. In *ICC 2008*, Beijing, Chine, May 2008.
[1070] L. Muscariello, M. Meo, M. Mellia, and D. Rossi. Passive measurement of tcp anomalies,. In *In Procs. of IEEE International Conference of Communication (ICC'06)*, Istanbul, Turkey, June 2006.
[1071] L. Muscariello, D. Perino, and D. Rossi. Do next generation networks need path diversity. In *IEEE International Conference on Communication (ICC'09)*, Dresde, Germany, June 2009.
[1072] H. Q. Nguyen, F. Baccelli, and D. Kofman. A stochastic geometry analysis of dense ieee 802.11 networks. proceedongs of ieee infocom 2007: pp 1199-1207, may 2007, anchorage, alaska, usa. In *IEEE INFOCOM 2007*, volume IEEE 802.11, pages 1199–1207, Anchorage, Alaska, USA., May 2007.
[1073] L. Piètre-Cambacédès and M. Bouissou. The promising potential of the bdmp formalism for security modeling. In *DSN 2009, the 39th Annual IEEE/IFIP International Conference on Dependable Systems and Networks*, Estoril, Portugal, June 2009.
[1074] D. Rossi, R. Fracchia, and M. Meo. VANETs: Why beaconing at all. In *IEEE International Conference on Communications (ICC'08)*, Beijing,China, May 2008.

[1075] D. Rossi and M. Mellia. Real-time tcp/ip analysis with common hardware. In *In Procs. of IEEE International Conference of Communication (ICC'06)*, Istanbul, Turkey, June 2006.
[1076] D. Rossi, M. Mellia, and M. Meo. Evidences behind skype outage. In *IEEE International Conference on Communication (ICC'09)*, Dresde, Germany, June 2009.
[1077] D. Rossi and E. Sottile. Sherlock: A framework for p2p traffic analysis. In *IEEE P2P*, Seattle, USA, September 2009.
[1078] D. Rossi, E. Sottile, S. Valenti, and P. Veglia. Gauging the network friendliness of p2p applications. In *ACM SIGCOMM*, Barcelona, Spain, August 2009.
[1079] D. Rossi, S. Valenti, P. Veglia, D. Bonfiglio, M. Mellia, and M. Meo. Pictures from the skype. In *ACM SIGMETRICS Demo Competition*, Annapolis, MD, USA, June 2008.
[1080] R. SAAD, A. Serhrouchni, and F. Nait-Abdesselam. A collaborative peer-to-peer architecture to defend against ddos attacks. In *IEEE Conference on Local Computer Networks, LCN'2008*, Montreal, Canada, October 2008.
[1081] E. Sanchez Sanchez, C. Chaudet, and M. Rebaudengo. Power reduction by adapting strobed preambles in wireless sensor networks. In *6th European Conference on Wireless Sensor Networks - Demos/Posters*, Cork, Irlande, February 2009.
[1082] C. Sarr, C. Chaudet, G. Chelius, and I. Guérin Lassous. Improving Accuracy in Available Bandwidth Estimation for 802.11-based Ad Hoc Networks. In *3rd IEEE International Conference on Mobile Ad-Hoc and Sensor Systems (IEEE MASS)*, Vancouver, Canada, October 2006.
[1083] S. Secci, J.-L. Rougier, and A. Pattavina. AS Tree Selection for Inter-Domain Multipoint MPLS Tunnels. In *2008 IEEE International Conference on Communications (ICC 2008)*, Pekin, Chine, May 2008.
[1084] S. Valenti, D. Rossi, M. Meo, M. Mellia, and P. Bermolen. Abacus: Accurate behavioral classification of p2p traffic. In *TMA Workshop at IFIP Networking 2009*, Aachen, Germany, May 2009.
[1085] S. Valenti, D. Rossi, M. Meo, M. Mellia, and P. Bermolen. An abacus for p2p-tv traffic classification. In *IEEE INFOCOM Demo Session*, Rio de Janeiro, Brazil, April 2009.
[1086] L. Wang, B. Gaabab, D. Binet, and D. Kofman. Novel map selection scheme using location history in hierarchical mipv6 networks. In *IEEE WIRELESS COMMUNICATION AND NETWORKING CONFERENCE*, Las Vegas, NV USA, April 2008.

8.3.3 ACLN: Articles in Other Refereed Journals

[1087] M. Badra, P. Urien, and I. Hajjehb. Flexible and fast security solution for wireless lan. *Pervasive and Mobile Computing*, 3(1):1–14, January 2007.
[1088] S. Delamare, A. Diallo, and C. Chaudet. High-level modelling of critical infrastructure's interdependencies. *International Journal on Critical Infrastructures*, 5(1/2):100–119, January 2009.
[1089] V. Guyot and N. Boukhatem. Design and implementation of a service provisioning platform using smart cards. *Lecture Notes in Computer Science, Springer Berlin*, 4195/2006(978-3-540-45891-3):109–118, September 2006.
[1090] R. Langar, S. Tohme, and N. Bouabdallah. Mobility management support and performance analysis for wireless mpls networks. *International Journal of Network Management (Wiley Interscience)*, 16(4):279–294, July 2006.
[1091] G. Le Grand. Ciip complexity: the need for a coordinated research effort. *European CIIP Newsletter (ECN),*, 2(1), January 2006.
[1092] T. M. Nguyen and N. Boukhatem. A cops-based qos negotiation for heterogeneous ip networks. *ACM IJNM (International Journal on Network Management)*, 2009.
[1093] L. Pièrre-Cambacédès and P. Sitbon. Cryptographic key management for scada systems - issues and perspectives. *IJSIA - International Journal of Security and Its Applications*, 2(3):31–40, July 2008.
[1094] N. Puech. Niels Henrik Abel (1802-1829). *Quadrature*, (56):7–10, April 2005.
[1095] D. Rossi, R. Fracchia, and M. Meo. Vanets: Why beaconing at all. *Wiley Security and Communication Networks Journal*, 2009.
[1096] D. Rossi, S. Valenti, P. Veglia, D. Bonfiglio, M. Mellia, and M. Meo. Pictures from the skype. *Performance Evaluation Review (PER)*, 36(2), September 2008.
[1097] O. Salazar, P. Martins, and S. Tohme. Enabling Roaming in Heterogeneous Multi-Operator Wireless Networks. In *Journal of Communications*. Academy Publisher, OULU, FINLAND, 2007.
[1098] C. Sarr, C. Chaudet, G. Chelius, and I. Guérin Lassous. A node-based available bandwidth evaluation in IEEE 802.11 ad hoc networks. *International Journal of Parallel, Emergent and Distributed Systems (IJPEDS)*, 21(6):423–440, December 2006.
[1099] S. Secci and B. Sanso. Survivability and reliability of a composite-star transport network with disconnected core switches. *Telecommunication Systems*, 2009.
[1100] N. Simoni, N. Ornelas, C. Yin, A. Boutignon, and et al. Vpin: An event based knowledge inference for a user centric information system, international journal on advances in internet technology. *International Journal on Advances in Internet Technology*, 2(1), 2009.
[1101] N. Simoni, C. Yin, and K. Chen. E2E Service Delivery through user mobile session management. *NOVATICA*, December 2008.
[1102] C. Tchepnda, H. Moustafa, H. Labiod, and G. Bourdon. Vehicular communications security: Attacks, requirements, challenges and current contributions. *International Journal of Ambient Computing and Intelligence- IJACI Journal (IGI Global)*, 1(Issue 1):39–52, 2008.
[1103] P. Urien. Wimax offers some opportunities for the smartcard industry. *SmartCards Trends*, 4(2):14–15, March 2007.

[1104] P. Urien and G. Pujolle. Security and privacy for the next wireless generation. *International Journal of Network Management - IJNM*, January 2008.
[1105] B. Wolfinger, J. Wolf, and G. Le Grand. Improving node behavior in a qos control environment by means of load dependent resource redistributions in lans. *IJCS (International Journal of Communications Systems)*, 18(4):373–394, May 2005.
[1106] X. Xue, J. Leneutre, L. Chen, and J. Ben-Othman. Swan: A secured watchdog for ad hoc networks. *International Journal of Computer Science and Network Security*, 6(6):209–219, June 2006.

8.3.4 ACTI-B: Articles in Proceedings of Other International Conferences

[1107] M. Abdennebi, R. Langar, and S. Tohme. Cipman: Combining cellular ip and mobile ad hoc networks in a hop by hop all radio access network. In *IEEE ICON 2005, IEEE International Conference on Networks*, Kuala Lumpur, Malaysia, November 2005.
[1108] M. Afif, P. Martins, S. Tabbane, and P. Godlewski. Performance evaluation of sctp over e-gprs air interface for http traffic. In *ICECS 2005*, Gammarth Tunisia, December 2005.
[1109] M. Afif, P. Martins, S. Tabbane, and P. Godlewski. Radio aware sctp extension for handover data in egprs. In *PIMRC 2006*, Helsinki Finland, September 2006.
[1110] A. Al Mamou and H. Labiod. Scatterpastry: An overlay routing using a dht over wireless sensor networks. In *IEEE IPC-07*, Jeju Island, Korea, October 2007.
[1111] M. Aljnidi and J. Leneutre. Autonomic security for home networks. In *First International Workshop on Self-Organizing Systems*, volume 4124/2006, pages 239–242, Passau - Allemagne, September 2006.
[1112] M. Aljnidi and J. Leneutre. A security policy system for mobile autonomic networks. In *First ACM/ICST International Conference on Autonomic Computing and Communication Systems (Autonomics 2007)*, Rome, Italy, October 2007.
[1113] M. Aljnidi and J. Leneutre. Towards an autonomic security system for mobile ad hoc networks. In *IEEE Third International Symposium on Information Assurance and Security (IAS'07)*, Manchester, United Kingdom, August 2007.
[1114] M. Aljnidi and J. Leneutre. Security solutions in mobile autonomic networks. In *3rd International Conference on Information & Communication Technologies: from Theory to Applications (ICTTA'08)*, Damas Syrie, April 2008.
[1115] M. Badra, A. Serhrouchni, and Th. Guillet. Random values, nonce and challenges: Semantic meaning versus opaque and strings of data. In *IEEE 70th Vehicular Technology Conference: VTC2009-Fall*, Anchorage, Alaska, USA, September 2009.
[1116] M. Badra and P. Urien. Tls tandem. In *International Conference on New Technologies, Mobility and Security - NTMS2008*, Tangier Morocco, November 2008.
[1117] C. Bassil, A. Serhrouchni, and N. Rouhana. Simple voice security protocol. In *ACM, International Wireless Communications and Mobile Computing Conference*, Vancouver Canada., July 2006.
[1118] B. Baynat, S. Doirieux, G. Nogueira, M. Maqbool, and M. Coupechoux. An efficient analytical model for wimax networks with multiple traffic profiles. In *International Workshop on Performance and Analysis of Wireless Networks, ACM/IET/ICST PAWN*, Ilan, Taiwan, September 2008.
[1119] Y. Benchaïb and A. Hecker. VIRCONEL: A New Emulation Environment for Experiments with Networked IT Systems. In *HPCS*, Nicosia, Cyprus, June 2008.
[1120] F. Bennani, Z. Daho, N. Simoni, and C. Yin. An Informational Framework For Automomic Networking. In *GRES'06*, volume 1, pages p223–p234, Bordeaux, France, May 2006.
[1121] P. Bermolen and D. Rossi. Network forecast with support vector machines. In *International Workshop on Traffic Management and Traffic Engineering for the Future Internet (FITraMEn 08)*, Porto, Portugal, December 2008.
[1122] P. Bermolen and D. Rossi. Support Vector Regression for Link Load Prediction. In *IEEE QoS-IP*, Venezia, Italy, February 2008.
[1123] A. P. Bianzino, J.-L. Rougier, S. Secci, R. Casellas, R. Martinez, R. Munoz, N. Djarallah, R. Douville, and H. Pouyllau. Testbed Implementation of Control Plane Extensions for Inter-Carrier GMPLS LSP provisioning. In *2009 5th Int. Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities (TRIDENTCOM 2009)*, Washington, USA, April 2009.
[1124] A. Biri, P. Urien, E. Onfroy, and H. Afifi. A novel architecture for securing data delivery. In *International Conference on Internet Information Networking (ICOIN) 2008*, Busan, Korea, January 2008.
[1125] N. Boukhatem and P. N. Tran. Ip-based rfid architecture and location management. In *The International Conference on Software, Telecommunications and Computer Networks (SOFTCOM 2008)*, September 2008.
[1126] N. Boukhatem, P. N. Tran, and T. T. Luu. On performance evaluation of a generic ip signaling protocol. In *The 6th Annual IEEE Consumer Communications & Networking Conference (CCNC 2009)*, January 2009.
[1127] A. Boutignon, T. Nadour, and N. Simoni. where are we going with i m s ? In *i nternational information and telecommunication technologies symposium*, December 2005.
[1128] Y. Bréhon and D. Kofman. Bus label switched paths, an approach to reduce the cost of multilayer networks. In *Poster - ITC, 19 - International Teletraffic Conference*, Pékin, Chine, August 2005.
[1129] R. Bruno, C. Chaudet, M. Conti, and E. Gregori. A Novel Fair Medium Access Control for 802.11-based Multi-Hop Ad hoc Networks. In *14th IEEE Workshop on Local and Metropolitan Area Networks (LanMan)*, Chania, Crete, Greece, September 2005.
[1130] A. Cardoso, A. Serhrouchni, M. Salaun, and J. J. Celistino. New peer-to-peer system approach for service

deployment. In *IEEE International Conference on Computing & Informatics (ICOCI)*, Kuala Lumpur, Malyasia, June 2006.

[1131] A. Cardoso, A. Serhrouchni, M. Salaun, and J. J. Celistino. P2p overlay network for service deployment in active networks. In *2nd IEEE international conference on information and communication technologies : from theory to applications*, Damascus, Syria, April 2006.

[1132] A. Cardoso, A. Serhrouchni, M. Salaun, and J. J. Celistino. Convergence among peer-to-peer and programmable networks. In *4th European Conference on Universal Services Networks ECUMN*, Toulouse, France, February 2007.

[1133] R. Casellas and D. Kofman. Adaptive mpls load sharing: Modelling, dimensioning and test-bed platform. In *2nd International IEEE/CreateNet Conference on testbeds and Research Infrastructures for the Development of Networks and Communities*, Barcelone, Espagne, March 2006.

[1134] C. Chaudet, G. Chelius, H. Meunier, and D. Simplot-Ryl. Adaptive Probabilistic NAV to Increase Fairness in Ad Hoc 802.11 MAC Layer. In *Fourth annual Mediterranean workshop on Ad Hoc Networks (Med-Hoc-Net 2005)*, Island of Porquerolles, France, June 2005.

[1135] C. Chaudet, E. Fleury, I. Guérin Lassous, H. Rivano, and M.-E. Voge. Optimal positioning of active and passive monitoring devices. In *Co-Next Conference*, Toulouse, France, October 2005.

[1136] L. Chen, K. Almoubayed, and J. Leneutre. Detection and prevention of greedy behavior in ad hoc networks. In *International Conference on Risks and Security of Internet and Systems (CRiSIS'2007)*, Marrakech Morocco, July 2007.

[1137] L. Chen and J. Leneutre. A secure and scalable time synchronization protocol in ieee 802.11 ad hoc networks. In *International Conference on Parallel Processing Workshops (ICPP Workshops 2006)*, Columbus, USA, September 2006.

[1138] L. Chen and J. Leneutre. On the power and rate control in ieee 802.11 wlans – a game theoretical approach. In *IEEE 16th International Conference on Computer Communications and Networks (ICCCN'07)*, Honolulu, Hawaii, USA, August 2007.

[1139] L. Chen and J. Leneutre. Selfishness, not always a nightmare: modeling selfish mac behaviors in wireless mobile ad hoc networks. In *IEEE 27th International Conference on Distributed Computing Systems (ICDCS 2007)*, Toronto, Canada, June 2007.

[1140] L. Chen, J. Leneutre, and J.-J. Puig. A secure and efficient link state routing protocol for ad hoc networks. In *International Conference on Wireless and Mobile Communications (ICWMC'06)*, Bucharest, Romania, July 2006.

[1141] J. Chi, P. Martins, and M. Coupechoux. A novel waiting-time dependent mechanism for contention-based initial ranging in ieee 802.16e networks. In *IFIP EUNICE Open European Summer School*, Brest, France, September 2008.

[1142] J. Clarke, W. Donnelly, Z. Dooly, and M. Riguidel. Ict trust, security and dependability research strategy beyond 2010. In *IST Africa 2007*, page 9, Maputo, Mozambique., May 2007.

[1143] M. Coupechoux, P. Fouilhoux, and S. Martin. Combinatorial problems and integer formulations in wireless mesh network design. In *International Conference on Non-Convex Programming*, Rouen, France, December 2007.

[1144] M. Coupechoux, H. Kamal, Ph. Godlewski, and J. M. Kélif. Optimal and heuristic dsa policies for cellular networks with coordinated access band. In *IEEE European Wireless, EW*, Aalborg, Denmark, May 2009.

[1145] M. Coupechoux, J. M. Kélif, and Ph. Godlewski. Network controlled joint radio resource management for heterogeneous networks. In *IEEE Vehicular Technology Conference, VTC Spring*, Singapore, May 2008.

[1146] M. Coupechoux, J. M. Kélif, and Ph. Godlewski. Smdp approach for jrrm analysis in heterogeneous networks. In *IEEE European Wireless, EW*, Prague, Czech Republic, June 2008.

[1147] N. Dailly, P. Martins, and P. Godlewski. Evaluation des performances de l'abis dynamique pour e-gprs. In *Colloque Francophone sur l'Ingénierie des Protocoles (CFIP'05)*, Bordeaux, March 2005.

[1148] N. Dailly, P. Martins, and P. Godlewski. Performance evaluation of l2 handover mechanisms for inter-radio access networks. In *VTC Spring 2006*, Melbourne, May 2006.

[1149] N. Dailly, Ph. Martins, and Ph. Godlewski. Modeling and performance evaluation of dynamic abis for e-gprs. In *VTC Spring 2005*, Stockholm Suéde, May 2005.

[1150] L. Decreusefond, E. Ferraz, and P. Martins. Simple estimate of signal to interference ratio with randomly located antennas. In *RIVF'07*, Hanoï, Vietnam, January 2007.

[1151] L. Decreusefond, E. Ferraz, and P. Martins. Upper bound of loss probability for the dimensioning of ofdma systems with multi class randomly located users. In *SPASWIN 2009*, Seoul, South Korea, June 2009.

[1152] T. Diab, P. Martins, and L. Decreusefond. Performance of admission control strategies for dual transfer mode in egprs networks. In *PIMRC 2006*, Helsinki, September 2006.

[1153] T. Diab, P. Martins, and P. Godlewski. Wireless fair service for egprs. In *VTC Fall 2005*, pages 230–234, Dallas, March 2005.

[1154] A. Diallo, S. Delamarrre, and C. Chaudet. High-level modelling of critical infrastructures interdependencies. In *Satellite Workshop of European Conference on Complex Systems*, October 2007.

[1155] F. Didi, H. Labiod, and G. Pujolle. A comparative study of 802.11 and 802.11e wireless lan standards. In *2nd International Conference On Web Information Systems and Technologies,Webist*, Setubal, Portugal., 2006.

[1156] S. Doirieux, B. Baynat, M. Maqbool, and M. Coupechoux. An analytical model for wimax networks with multiple traffic profiles and throttling policy. In *Intl. Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks, WiOpt*, Seoul, Korea, June 2009.

[1157] S. Duflos, A. Diallo, and G. Le Grand. An overlay simulator for interdependent critical information infrastructures. In *Second International Conference on Dependability of Computer Systems DepCoS - RELCOMEX 2007*, Szklarska Poreba, Poland, June 2007.

[1158] S. Duflos, V. Gay, and B. Kervella. Considering security and quality of service in SLS to improve policy-based management of secure multimedia services. In *Sixth International Conference on Networking ICN 2007*, Sainte-Luce, Martinique, April 2007.

[1159] S. El-Sawda, P. Urien, I. Hajjeh, and R. El-Sawda. Non repudiation for sip protocol. In *The International Conference on Information & Communication Technologies: from Theory to Applications ICTTA08*, Damascus, Syria, April 2008.

[1160] A. Fadlallah and A. Serhrouchni. 3sp: A simple security signaling protocol for attack traceback. In *2nd International Conference on E-Business and Telecommunication Networks (ICETE)*, Reading, United Kingdom, October 2005.

[1161] A. Fadlallah and A. Serhrouchni. Denial of service attacks and defense: analysis and taxonomy. In *IEEE SETIT 2005, International Conference Sciences of Electronic, Technology of Information and Telecommunications*, Sousse, Tunisie, March 2005.

[1162] A. Fadlallah and A. Serhrouchni. Psat : Proactive signaling architecture for ip traceback. In *4th ACM/IEEE Annual Conference on Communication Networks and Services Research*, Moncton, New Brunswick, Canada, May 2006.

[1163] A. Fadlallah and A. Serhrouchni. A reactive architecture for ip traceback. In *2nd IEEE international conference on information and communication technologies : from theory to applications*, Damascus, Syria, April 2006.

[1164] A. Fadlallah and A. Serhrouchni. Ip traceback using packet marking and logging. In *International Conference on Risks and Security of Internet and Systems*, Marrakech, Maroc, July 2007.

[1165] Y. Faheem and J.-L. Rougier. Loop avoidance for fish-eye olsr in sparse wireless mesh networks. In *WONS*, Snowbird, USA, February 2009.

[1166] M. Fayçal and A. Serhrouchni. An efficient management technique for peer-to-peer networks. In *IEEE, International Conference on Software, Telecommunications and Computer Networks, SoftCom2008*, Split-Dubrovnik, Croatia, September 2008.

[1167] A. Ferragut, D. Kofman, F. Larroca, and S. Oueslati. Design and Analysis of Flow Aware Load Balancing Mechanisms for Multi-Service Networks. In *4th EURO-NGI Conference on Next Generation Internet Networks (NGI 2008)*, Cracovie, Pologne, April 2008.

[1168] R. Fracchia, M. Meo, and D. Rossi. Avoiding broadcast storms in inter-vehicular warning delivery services. In *In Procs. of the 6th International Workshop on Applications and Services in Wireless Networks (ASWN'06)*, Berli, Germany, April 2006.

[1169] R. Fracchia, M. Meo, and D. Rossi. Knowing vehicle location helps avoiding broadcast packets storm. In *In Procs. of the 3rd IEEE International Workshop on Mobile Peer-to-Peer Computing (MP2P'06) at IEEE PerComm'06*, Pisa, Italy, March 2006.

[1170] R. Fracchia, M. Meo, and D. Rossi. On the impact of traffic models on inter-vehicular broadcast communication. In *In Procs; of IEEE MedHocNet 2006*, Lipari, Italy, June 2006.

[1171] R. Fracchia, M. Meo, and D. Rossi. Vanets: To beacon or not to beacon. In *Autonet'06 Workshop of IEEE Globecom'06*, San Francisco, CA, November 2006.

[1172] M. Gagnaire. Flexible WDM PONs with Reflexive Modulators. In *IEEE International Conference on Transparent Optical Networks (ICTON)*, Barcelone (Espagne), July 2005.

[1173] M. Garcia De La Fuente and H. Labiod. Performance analysis of position-based routing approaches in vanets. In *IFIP-IEEE MWCN 2007*, September 2007.

[1174] M. Garcia De La Fuente and H. Labiod. A performance comparison of position-based routing approaches for mobile ad hoc networks. In *VTC-Fall 2007*, September 2007.

[1175] Ph. Godlewski, M. Maqbool, M. Coupechoux, and J. M. Kélif. Analytical evaluation of various frequency reuse schemes in cellular ofdma networks. In *ACM International Conference on Performance Evaluation Methodologies and Tools, Valuetools*, Athens, Greece, October 2008.

[1176] W. Guo, N. Simoni, and C. Yin. Automated Management of User Centric Session in NGN. In *DANMS 08*, New Orleans USA, November 2008.

[1177] V. Guyot, N. Boukhatem, and G. Pujolle. On smart card based service personnalisation. In *IEEE/IFIP SoftCom 2005*, Split Croatia, September 2005.

[1178] V. Guyot, N. Boukhatem, and G. Pujolle. Smart card, the mobility enabler. In *IEEE/IFIP ASWN 2005*, Paris France, June 2005.

[1179] F. Harivelo, P. Anelli, and G. Le Grand. An architecture to increase performance of self-organizing networks. In *IEEE ICN 2006*, Mauritius, April 2006.

[1180] A. Hecker. On System Security Metrics and the Definition Approaches. In *SECUREWARE 2008 - DEPEND 2008*, pages 412 – 419, Cap Esterel, France, August 2008.

[1181] A. Hecker, E.-O. Blass, and H. Labiod. A decentralized management and access control for 802.1x wlans. In *10th IFIP PWC 2005*, Colmar, France, August 2005.

[1182] A. Hecker and M. Riguidel. Survivability as a Complementary Operational Security Model for IT Services (position paper). In *PERADA Workshop, IEEE SASO 2008*, Venice, Italy, October 2008.

[1183] A. Hecker and M. Riguidel. On the operational security assurance evaluation of networked it systems. In *NEW2AN 2009*, St Petersburg (Russia), July 2009.

[1184] A. Horvath, M. Telek, D. Rossi, P. Veglia, D. Ciullo, M. A. Garcia, E. Leonardi, and M. Mellia. Network awareness of p2p live streaming applications. In *HOTP2P Workshop at IPDPS'09*, Rome, Italy, May 2009.

[1185] H. Huynh, E. Lavinal, and N. Simoni. A Dynamic QoS Management for Next Generation of Services. In *International Conference on Autonomic and Autonomous Systems*, Athènes - Grèce, June 2007.

[1186] H. Kamal, M. Coupechoux, and Ph. Godlewski. Inter-operator spectrum sharing for celullar networks using game theory. In *Personal, Indoor and Mobile Radio Communications Symposium (PIMRC)*, Tokyo, Japan, September 2009.

[1187] H. Kamal, M. Coupechoux, and Ph. Godlewski. Traffic studies for dsa policies in a simple cellular context with packet services. In *IEEE/ICST Int. Conf. on Cognitive Radio Oriented Wireless Networks and Communications, CrownCom*, Hannover, Germany, June 2009.
[1188] J. M. Kélif and M. Coupechoux. Cell breathing, sectorization and densification in cellular networks. In *Intl. Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks, WiOpt*, Seoul, Korea, June 2009.
[1189] J. M. Kélif, M. Coupechoux, and Ph. Godlewski. Spatial outage probability for cellular networks. In *IEEE GLOBECOM*, Washington, DC, USA, November 2007.
[1190] J. M. Kélif, M. Coupechoux, and Ph. Godlewski. Spatial outage probability formula for cdma networks. In *66th IEEE Vehicular Technology Conference, VTC falls*, Baltimore, MD USA, September 2007.
[1191] J. M. Kélif, M. Coupechoux, and Ph. Godlewski. Effect of shadowing on outage probability in fluid cellular radio networks. In *Intl. Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks, WiOpt*, Berlin, Germany, March 2008.
[1192] R. Khatoun, D. Gaïti, L. M. Boulahia, and A. Serhrouchni. Snort-oo: Improving intrusion detection performance by snort cooperation. In *MUCS 4th International Workshop on Managing Ubiquitous Communications and Services part of IM IEEE/IFIP*, Munich, Germany, May 2007.
[1193] R. Khatoun, D. Giati, L. M. Boulahia, and A. Serhrouchni. Optimizing intrusion detection using global spade preprocessor. In *International Conference on Risks and Security of Internet and Systems*, Marrakech, Maroc, July 2007.
[1194] K. Khawam. Modified proportional fair scheduler. In *PIMRC 2006*, September 2006.
[1195] K. Khawam and J. M. Kélif. A hierarchical proportional fair scheduler. In *NGI 2006*, Valence, Espagne, April 2006.
[1196] K. Khawam and D. Kofman. Flow size-aware proportional fair scheduler. In *NGI 2006*, Valence, Espagne, April 2006.
[1197] K. Khawam and D. Kofman. Opportunistic weighted fair queueing. In *VTC fall 2006*, September 2006.
[1198] K. Khawam, D. Kofman, and E. Altman. Weighted proportional fair scheduler. In *QShine 2006*, Ontario, Canada, August 2006.
[1199] M. Komarova and M. Riguidel. Optimized ticket distribution scheme for fast re-authentication protocol (FAP). In *ACM Q2SWiNet 2007*, Chania, Crete Island, Greece, October 2007.
[1200] M. Komarova and M. Riguidel. Adjustable trust model for access control. In *Autonomic and Trusted Computing (ATC-08)*, Oslo, Norway, June 2008.
[1201] M. Komarova, M. Riguidel, and A. Hecker. Fast re-authentication protocol for inter-domain roaming. In *PIMRC2007*, Athens, Greece, September 2007.
[1202] S. Ktari, H. Labiod, and M. Frikha. Load balanced multipath routing in mobile ad hoc network. In *10th IEEE ICCS 2006*, Singapore, 2006.
[1203] S. Ktari, M. Zoubert, A. Hecker, and H. Labiod. Performance Evaluation of Replication Strategies in DHTs under Churn. In *6th International Conference on Mobile and Ubiquitous Multimedia, MUM 2007*, Oulu, Finland, December 2007.
[1204] S. Ktari, M. Zoubert, A. Hecker, and H. Labiod. Symmetric Replication for Efficient Flooding in DHTs. In *ACM MobiHoc 2008*, pages 441–442, Hong Kong, China, May 2008.
[1205] J. Kuri, M. Gagnaire, N. Puech, R. Douville, and O. Audouin. Routing and slot assignment for protected scheduled connections in SDH/SONET mesh networks with contiguous or virtual concatenation. In *IEEE Broadnets*, Boston - USA, October 2005.
[1206] J. Kuri, N. Puech, and M. Gagnaire. Routing and Grooming of Scheduled Lightpath Demands in a Multi-Granularity Switching Network: A Mathematical Model. In *9th Conference on Optical Network Design and Modelling (ONDM)*, Milano (Italy), February 2005.
[1207] H. Labiod and M. Tlais. A centralized approach for multi-homed networks. In *International IPSI Conference*, Carcassonne, France, 2005.
[1208] H. Labiod and M. Tlais. Quality of service support in nemo networks. In *IEEE ASWN*, Berlin, Germany, 2006.
[1209] R. Langar, N. Bouabdallah, and S. Tohme. Handoff management schemes and performance analysis for ip/mpls-based cellular networks. In *IEEE PIMRC, 17th International Symposium on Personal Indoor and Mobile Radio Communications*, Helsinki, Finland, September 2006.
[1210] R. Langar, N. Bouabdallah, S. Tohme, and R. Boutaba. Mobility modeling and handoff analysis for ip/mpls-based cellular networks. In *IEEE Globecom 2006*, San Francisco, California, USA, November 2006.
[1211] R. Langar, G. Le Grand, and S. Tohme. Fast handoff process in micro mobile mpls protocol for micro-mobility management in next generation networks. In *WONS 2005*, Saint Moritz, Suisse, January 2005.
[1212] R. Langar and S. Tohme. Architecture for mobility in future wireless systems using micro mobile mpls. In *ICT, 12th IEEE International Conference on Telecommunications*, Cape Town, South Africa, May 2005.
[1213] R. Langar, S. Tohme, and N. Bouabdallah. An approach for mobility modeling - towards an efficient mobility management support in future wireless networks. In *IEEE/IFIP NOMS 2006, IEEE/IFIP Network Operations and Management Symposium*, Vancouver, Canada, April 2006.
[1214] R. Langar, S. Tohme, and N. Bouabdallah. On the analysis of micro mobile mpls access networks: The fast handoff and the forwarding chain mechanisms. In *IEEE CCNC 2006, IEEE Consumer Communications and Networking Conference*, Las Vegas, Nevada, USA, January 2006.
[1215] R. Langar, S. Tohme, N. Bouabdallah, and G. Pujolle. Performance analysis of micro mobile mpls for future wireless networks. In *IEEE PIMRC, 16th IEEE International Symposium on Personal Indoor and Mobile Radio Communications*, Berlin, Germany, September 2005.
[1216] R. Langar, S. Tohme, and G. Le Grand. Micro mobile mpls: A new scheme for micro-mobility management in

3g all-ip networks. In *ISCC, 10th IEEE Symposium on Computers and Communications*, Cartagena, Spain, June 2005.

[1217] F. Larroca and J.-L. Rougier. A fair and dynamic Load-Balancing mechanism. In *International Workshop on Traffic Management and Traffic Engineering for the Future Internet 2008*, Porto, Portugal, December 2008.

[1218] G. Le Grand and E. Adar. White cyber night – a risk assessment tool for network resilience evaluation. In *International Workshop on Complex Network and Infrastructure Protection (CNIP'06),*, Rome, Italie, March 2006.

[1219] G. Le Grand and A. Hecker. A framework for critical information infrastructure protection simulation. In *NATO Advanced Research Workshop, Computational Models of Risks to Infrastructure*, Primosten, Croatia, May 2006.

[1220] C. Lengoumbi, P. Godlewski, and P. Martins. An Efficient Subcarrier Assignment Algorithm for downlink OFDMA. In *Vehicular Technology Conference*, Montréal Canada, September 2006.

[1221] C. Lengoumbi, P. Godlewski, and P. Martins. Dynamic Subcarrier Reuse with Rate Guaranty in a Downlink Multicell OFDMA System. In *Personal, Indoor and Mobile Radio Communication*, Helsinki, Finlande, September 2006.

[1222] C. Lengoumbi, P. Godlewski, and P. Martins. Characterization of wireless fair service extensions for packet scheduling in ofdma. In *International OFDM-Workshop*, Hamburg, Allemagne, August 2007.

[1223] C. Lengoumbi, P. Godlewski, and P. Martins. Comparison of Different Subchannelization Modes for Ofdma. In *Personal, Indoor and Mobile Radio Communication*, Athènes, Grèce, September 2007.

[1224] C. Lengoumbi, P. Godlewski, and P. Martins. Subchannelization Performance for the Downlink of a Multi-Cell Ofdma System. In *INTERNATIONAL CONFERENCE ON WIRELESS AND MOBILE COMPUTING, NETWORKING AND COMMUNICATIONS*, New-York, Etats-Unis, October 2007.

[1225] C. Lengoumbi, P. Martins, and P. Godlewski. An Opportunist extension of Wireless Fair Service for Packet Scheduling in OFDMA. In *Vehicular Technology Conference*, Dublin Irlande, April 2007.

[1226] H. Lin and H. Labiod. Handover optimization for vehicle nemo networks. In *Ist IFI International Conference on New Technologies Mobility and Security*, Paris, France, May 2007.

[1227] H. Lin and H. Labiod. Release of unnecessary resource reservation in mobility case. In *IEEE ISCC'08*, Marrakech, July 2008.

[1228] H. Lin and H. Labiod. Rvp: A new policy for aggregate reservation. In *IEEE Globecom'08*, New Orleans, December 2008.

[1229] B. Liu, P. Martins, A. E. Samhat, and P. Bertin. A cross-layer scheme for inter-rat handover from wimax to umts. In *GLOBECOM 2008*, New Orleans, USA, November 2008.

[1230] T. T. Luu and N. Boukhatem. Generic signaling service framework. In *IEEE CCNC05*, Las Vegas, Nevada, USA, January 2005.

[1231] M. Maqbool, M. Coupechoux, and P. Godlewski. A semi-analytical method to model effective sinr spatial distribution in wimax networks. In *IEEE Sarnoff Symposium*, Princeton, USA, March 2009.

[1232] M. Maqbool, M. Coupechoux, and Ph. Godlewski. Comparison of various frequency reuse patterns for wimax networks with adaptive beamforming. In *IEEE Vehicular Technology Conference, VTC Spring*, Singapore, May 2008.

[1233] M. Maqbool, M. Coupechoux, and Ph. Godlewski. Effect of distributed subcarrier permutation on adaptive beamforming in wimax networks. In *IEEE Vehicular Technology Conference, VTC Fall*, Calgary, Canada, September 2008.

[1234] M. Maqbool, M. Coupechoux, and Ph. Godlewski. Reuse 1 in wimax networks with beamforming. In *Wireless World Research Forum, WWRF22*, Paris, France, May 2009.

[1235] M. Maqbool, M. Coupechoux, Ph. Godlewski, S. Doirieux, B. Baynat, and V. Capdevielle. Dimensioning methodology for ofdma networks. In *Wireless World Research Forum, WWRF22*, Paris, France, May 2009.

[1236] M. Mycek, S. Secci, M. Pioro, J.-L. Rougier, and A. Pattavina. Cooperative multi-provider routing optimization and income distribution. In *2009 7th Int. Workshop on the Design of Reliable Communication Networks (DRCN 2009)*, Washington, USA, October 2009.

[1237] M. Mycek, S. Secci, M. Pioro, J.-L. Rougier, and A. Pattavina. A shapley value-based incentive scheme for cooperative multi-provider traffic management. In *PTS 2009*, Lodz, Poland, September 2009.

[1238] N. Ornelas, N. Simoni, and A. Boutignon. HSS et DNS pour un IMS efficace. In *GRES'07*, November 2007.

[1239] N. Ornelas, N. Simoni, K. Chen, and A. Boutignon. VPIN: User-Session Knowledge Base for Self-Management of Ambient Networks. In *UBICOMM.08*, Valencia, Spain, September 2008.

[1240] L. Piètre-Cambacédès and P. Sitbon. Cryptographic key management for scada systems - issues and perspectives. In *ISA 2008 - International Conference on Information Security and Assurance*, pages 156–161, Pusan, Corée, April 2008.

[1241] L. Piètre-Cambacédès and P. Sitbon. An analysis of two new directions in control system perimeter security. In *SCADA Security Scientific Symposium (S4)*, Miamia, USA, January 2009.

[1242] S. A. Rajan and P. Urien. Session mobility - the ultimate goal of seamless networks. In *Wireless 2005 - 17th Annual International Conference on Wireless Communications*, Calgary Canada, June 2005.

[1243] C. Rigault and R. Chahine. Cooperative computing in the control plane. application to ngn services and control. In *IFIP MAN'05*, Ho Chi Min City, Vietnam, April 2005.

[1244] M. Riguidel, A. Hecker, and V. Simon. Armature for Critical Infrastructures. In *SMC 2006*, Taipei, Taiwan, October 2006.

[1245] P. Rogério Pereira, A. Grilo, F. Rocha, M. S. Nunes, A. Casaca, C. Chaudet, P. Almström, and M. Johansson. End-to-end reliability in wireless sensor networks: Survey and research challenges. In *Euro NGI Workshop on IP QoS and Traffic Control*, December 2007.

[1246] D. Rossi, M. Mellia, and M. Meo. A detailed measurement of skype network traffic. In *7th International Worshop*

on P2P Systems (IPTPS), Tampa Bay (FL), February 2008.
[1247] D. Rossi, M. Mellia, and M. Meo. Following Skype Signaling Footsteps. In *IEEE QoS-IP*, Venezia, Italy, February 2008.
[1248] D. Rossi and P. Veglia. On the peer selection policy of pplive. In *ACM NOSSDAV*, Williamsburg, Virginia, June 2009.
[1249] J.-L. Rougier, F. Larroca, and et al. Robust regression for minimum-delay load-balancing. In *ITC21*, PARIS, September 2009.
[1250] E. Sanchez Sanchez, C. Chaudet, and M. Rebaudengo. Improving preamble sampling performance in wireless sensor networks with state information. In *Sixth International Conference on Wireless On-demand Network Systems and Services (WONS 2009)*, Snowbird, Utah, USA, February 2009.
[1251] C. Sarr, C. Chaudet, G. Chelius, and I. Guérin Lassous. A node-based available bandwidth evaluation in IEEE 802.11 ad hoc networks. In *First International Workshop on System and Networking for Smart Objects (SANSO 2005)*, Fukuoka, Japan, July 2005.
[1252] S. E. Sawda and P. Urien. Sip security attacks and solutions: A state-of-the-art review. In *ICCTA'06 2nd IEEE International Conference Information & Communication Technologies from Theory to Applications*, Damascus Syrie, April 2006.
[1253] S. E. Sawda and P. Urien. Security in sip networks. In *Sciences of Electronics Technologies of Information and Telecommunication [SETIT2007]*, Hammamet, Tunisia, March 2007.
[1254] S. Secci, A. Ceselli, F. Malucelli, A. Pattavina, and B. Sanso. Direct Optimal Design of a Quasi-Regular Composite-Star Core Network. In *Sixth International Workshop on the Design of Reliable Communication Networks (DRCN 2007)*, La Rochelle, France, October 2007.
[1255] S. Secci, J.-L. Rougier, and A. Pattavina. Constrained Steiner Problem with Directional Metrics. In *EuroFGI Workshop on IP QoS and Traffic Control 2007*, Lisbone, Portugal, December 2007.
[1256] S. Secci, J.-L. Rougier, and A. Pattavina. Comparison of Quasi-Regular Composite-Star and Multi-Hop Structures for Core Networks. In *2008 IEEE International Conference on High Performance Switching and Routing (HPSR 2008)*, Shanghai, Chine, May 2008.
[1257] S. Secci, J.-L. Rougier, and A. Pattavina. On the Selection of Optimal Diverse AS-Paths for Inter-Domain IP/(G)MPLS Tunnel Provisioning. In *IEEE 4th International Telecommunication Networking WorkShop on QoS in Multiservice IP Networks (QoS-IP 2008)*, Venezia, Italie, February 2008.
[1258] S. Secci, J.-L. Rougier, and A. Pattavina. Routage inter-domaine en mode connecté. In *RESCOM*, Saint-Jean-Cap-Ferrat, June 2008.
[1259] S. Secci, J.-L. Rougier, A. Pattavina, F. Patrone, and G. Maier. ClubMED: Coordinated Multi-Exit Discriminator Strategies for Peering Carriers. In *2009 5th Euro-NGI Conference on Next Generation Internet Networks (NGI 2009)*, Aveiro, Portugal, July 2009.
[1260] S. Secci, J.-L. Rougier, A. Pattavina, F. Patrone, and G. Maier. PEMP: Peering Equilibrium MultiPath routing. In *2009 IEEE Global Communications Conference (GLOBECOM 2009)*, Honolulu, USA, December 2009.
[1261] S. Secci and B. Sanso. Design and Dimensioning of a Novel Composite-star WDM Network with TDM Channel Partitioning. In *IEEE Third International Conference on Broadband Communications, Networks and Systems (BROADNETS) 2006*, San José, CA, USA, October 2006.
[1262] S. Secci and B. Sanso. Optimization of a Dedicated Path Protected PetaWeb Architecture. In *Networking and Electronic Commerce Research Conference 2006 (NAEC 2006)*, Riva del Garda, Italie, October 2006.
[1263] S. Secci and B. Sanso. Upgrade of a Composite-Star Optical Network. In *NTMS 2007*, Paris, France, May 2007.
[1264] A. Serhrouchni, M. Chamoun, R. Kilany, and et al. A service oriented p2p architecture with semantic support. In *16th IEEE International Conference on Networks, ICON 2008*, New Delhi, India, December 2008.
[1265] N. Simoni and Z. Daho. Towards Dynamic Virtual Private Service Networks design and self-management. In *NOMS'06*, Vancouver, Canada, February 2006.
[1266] N. Simoni, B. Mathieu, C. Yin, and M. Song. Autogestion de service par la QoS dans un réseau overlay. In *GRES'07*, Hammamet, Tunisie, November 2007.
[1267] N. Simoni, Y. Wu, and A. Boutignon. vers la convergence des protocoles pour les besoins en QoS du NGN. In *GRES'07*, Hammamet, Tunisie, November 2007.
[1268] N. Simoni, C. Yin, R. Berberi, and G. Du-Chene. An NGN middleware based on an enhanced IMS. In *MNCNA'07*, Newport, California, USA, November 2007.
[1269] N. Simoni, C. Yin, and G. Du-Chene. n Intelligent user centric middleware in NGN: Infosphere and AmbientGrid. In *COMSWARE'08*, Bangalore, Inde, January 2008.
[1270] N. Simoni, C. Yin, and G. Du-Chene. Service continuity management through an E2E dynamic session in NGN. In *NOMS'08*, Salvador, Bresil, April 2008.
[1271] C. Tchepnda, H. Moustafa, and H. Labiod. Hybrid wireless networks: Applications, architectures and new perspectives. In *The IEEE International Workshop on Wireless Ad-hoc and Sensor Networks (IEEE IWWAN 2006)*, New York, NY, USA, June 2006.
[1272] C. Tchepnda, H. Moustafa, H. Labiod, and G. Bourdon. Securing vehicular communications: An architectural solution providing a trust infrastructure, authentication, access control and secure data transfer. In *IEEE Globecom-IEEE AutoNet 2006*, San Francisco, CA, USA, November 2006.
[1273] C. Tchepnda, H. Moustafa, H. Labiod, and G. Bourdon. A layer-2 multi-hop authentication and credential delivery scheme for vehicular networks. In *IEEE GLOBECOM 2008*, New Orleans, USA, 2008.
[1274] C. Tchepnda, H. Moustafa, H. Labiod, and G. Bourdon. A panorama on vehicular networks security. In *International workshop on interoperable vehicles (IOV) - Internet of things (IOT)*, 2008.
[1275] C. Tchepnda, H. Moustafa, H. Labiod, and G. Bourdon. Performance analysis of a layer-2 multihop authentication

and credential delivery scheme for vehicular networks. In *IEEE VTC Spring 2008*, Marina bay, Singapore, 2008.
[1276] C. Tchepnda, H. Moustafa, H. Labiod, and G. Bourdon. Prioritizing and enhancing vehicular networks authentication process using dsrc channels diversity. In *IEEE WiMob 2008*, Avignon, France, 2008.
[1277] C. Tchepnda and M. Riguidel. Distributed trust infrastructure and trust-security articulation: Application to heterogeneous networks. In *The IEEE 20th International Conference on Advanced Information Networking and Applications (IEEE AINA 2006)*, Vienna, Austria, April 2006.
[1278] M. Tlais and H. Labiod. Resource reservation for nemo networks. In *IEEE WirelessCom*, Hawaii, USA, 2005.
[1279] V. Toubiana and H. Labiod. An analysis of asma performances against packet dropping attacks in dense networks. In *IEEE ISCC 2008*, Marrakech, Morroco, 2008., 2008.
[1280] V. Toubiana and H. Labiod. Towards a flexible security management solution for dynamic manets. In *IEEE NOMS 2008*, Brazil, 2008.
[1281] V. Toubiana, H. Labiod, and B. Fischer. An analysis of asma trust evolution in a dense subway environment. In *1st IEEE Global Information Infrastructure Symposium*, Marrakech, Maroc, July 2007.
[1282] V. Toubiana, H. Labiod, and B. Fischer. Event based mobility model for subway scenarios. In *3rd IEEE international Conference Wireless and Mobile Computing, Networking and Communications*, New York, USA, October 2007.
[1283] V. Toubiana, H. Labiod, L. Raynaud, and Y. Gourhant. An adaptive security framework for ad hoc networks. In *1st IFIP Conference on New Technologies, Mobility and Security*, Paris, France, May 2007.
[1284] T. Tra Luu and N. Boukhatem. Implementation and evaluation of a generic ip signaling protocol. In *The International Conference on Information Networking 2008 (ICOIN 2008)*, Busan, Korea,, January 2008.
[1285] P. N. Tran and N. Boukhatem. Comparison of madm decision algorithms for interface selection in heterogeneous wireless networks. In *The International Conference on Software, Telecommunications and Computer Networks (SOFTCOM 2008)*, September 2008.
[1286] P. N. Tran and N. Boukhatem. The distance to the ideal alternative (dia) algorithm for interface selection in heterogeneous wireless networks. In *The 6-th ACM International Workshop on Mobility Management and Wireless Access (MOBIWAC 2008)*, October 2008.
[1287] P. N. Tran and N. Boukhatem. Extension of multiple care-of-address registration to support host multihoming. In *The International Conference on Information Networking (ICOIN)*, January 2008.
[1288] P. N. Tran and N. Boukhatem. Sipia: The shortest distance to positive ideal attribute for interface selecti. In *Australasian Telecommunications Networking and Application Conference (ATNAC 2008)*, November 2008.
[1289] P. Urien. Security in wimax networks. In *Internetworking 2005*, Paris France, July 2005.
[1290] P. Urien. Smartcards and digital identities in emerging wireless environments. In *SEINIT*, Paris France, April 2005.
[1291] P. Urien. Designing smartcards for collaboration with the wimax security sublayer. In *2007 International Symposium on Collaborative Technologies and Systems [CTS 2007],*, Orlando, Florida, May 2007.
[1292] P. Urien. Introducing smart cards for wimax-based networking. In *ArchitectureWorkshop on Security and Privacy in 4G Networks, IEEE Globecom 2007*, Washington DC USA, November 2007.
[1293] P. Urien. Is there a future for smart cards in wimax networks ? In *e-Smart2007*, Sophia Antipolis, France, September 2007.
[1294] P. Urien. Security api for the ieee 802.16 security sublayer [draft-urien-16ng-security-api-00.txt]. In *69th IETF*, Chicago, USA, July 2007.
[1295] P. Urien. Hip-tags: Tags for the internet of things. In *The Internet of Things and Services 1st International Research Workshop*, Sophia Antipolis France, September 2008.
[1296] P. Urien. Open two-factor authentication tokens, for emerging wireless lans. In *Fifth Annual IEEE Consumer Communications & Networking Conference 2008, CCNC'08*, Las Vegas, NV, USA, January 2008.
[1297] P. Urien. Tls-tandem, a convergent application of smart cards for mobile and web services. In *Smart Mobility 2008*, Sophia Antipolis France, September 2008.
[1298] P. Urien. Tls-tandem: A smart card for web applications. In *6th Annual IEEE Consumer Communications & Networking Conference CCNC 2009*, Las Vegas Nevada USA, January 2009.
[1299] P. Urien and M. Badra. Identity protection within eap-tls [draft-urien-badra-eap-tls-identity-protection-01.txt]. In *IETF 66th*, Montreal, Canada, July 2006.
[1300] P. Urien and M. Badra. Secure access modules for identity protection over eap-tls. In *SECRYPT 2006 International Conference on Security and Cryptography*, Setubal Portugal, August 2006.
[1301] P. Urien and M. Badra. Introducing pocket pki for wlan security. In *WWW/Internet 2007*, Vila Real Portugal, October 2007.
[1302] P. Urien, H. Chabanne, C. Pepin, M. Bouet, D. O. Cunha, V. Guyot, G. Pujolle, P. Paradinas, E. Gressier, and J. F. Susini. Hip-based rfid networking architecture. In *The Fourth IEEE and IFIP International Conference on wireless and Optical Communications Networks [WOCN 2007]*, Singapour, July 2007.
[1303] P. Urien, H. Chabanne, C. Pepin, M. Bouet, D. O. Cunha, V. Guyot, G. Pujolle, P. Paradinas, E. Gressier, and J. F. Susini. The t2tit research project: Introducing hip rfids for the iot. In *1st International Workshop on System Support for the Internet of Things [WoSSIoT'07]*, Lisbonne Portugal, March 2007.
[1304] P. Urien and M. Dandjinou. The openeapsmartcard platform. In *NetCon'05*, Lannion France, November 2005.
[1305] P. Urien and M. Dandjinou. The openeapsmartcard project. In *ANCS 2005 Applied Cryptography and Network Security 2005*, New York USA, June 2005.
[1306] P. Urien and M. Dandjinou. Designing smartcards for emerging wireless networks. In *CARDIS2006 Seventh Smart Card Research and Advanced Application IFIP Conference*, Tarragona Espagne, April 2006.
[1307] P. Urien and M. Dandjinou. Introducing smartcard enabled radius server. In *CTS 2006 The 2006 International*

Symposium on Collaborative Technologies and Systems, Las Vegas USA, May 2006.
[1308] P. Urien, M. Dandjinou, and M. Badra. Introducing micro-authentication servers in emerging pervasive environments. In *IADIS International Conference WWW/Internet 2005*, Lisbon Portugal, October 2005.
[1309] P. Urien, M. Dandjinou, and M. Badra. Introducing trusted eap module for security enhancement in wlans and vpns. In *CNIS 2006 IASTED International Conference on Communication, Network, and Information Security*, Cambridge USA, October 2006.
[1310] P. Urien and S. Elrharbi. Tandem smart cards: enforcing trust for tls-based network services. In *8th International Workshop on Applications and Services in Wireless Networks - ASWN 2008*, Kassel Germany, October 2008.
[1311] P. Urien and et al. Hip-tags, a new paradigm for the internet of things. In *IFIP Wireless Days Conference 2008*, Dubai United Arab Emirates, November 2008.
[1312] P. Urien and et al. Hip tags, a privacy architecture for networking in the internet of things. In *The Third International Conference on Systems and Networks Communications - ICSNC 2008*, Sliema Malta, October 2008.
[1313] P. Urien and et al. Hip tags, a privacy architecture for networking in the internet of things. In *Networking and Electronic Commerce Research Conference 2008 - NAEC 2008*, Lake Garda Italy, September 2008.
[1314] P. Urien and G. Pujolle. Openeapsmartcard, an open initiative for emerging open wlans. In *eSmart'2005*, Sophia-Antipolis France, September 2005.
[1315] P. Urien and G. Pujolle. Teapm, trusted eap module. In *eSmart'2006*, Sophia-Antipolis France, September 2006.
[1316] P. Urien and G. Pujolle. Javacard for emerging wlan environments. In *JavaOne 2007*, San Francisco, California, May 2007.
[1317] X. Xue, L. Chen, and J. Leneutre. A lightweight mechanism to secure olsr. In *International MultiConference of Engineers and Computer Scientists 2006 (IMECS '06)*, Hong Kong, China, June 2006.
[1318] H. Yehia and H. Kamal. Inter-System Interference Effect on WiMAX Network Performance. In *Information and Communication Technologies: From Theory to Applications (ICTTA)*, Damascus, Syria, April 2008.
[1319] C. Yin, N. Simoni, and G. Du-Chene. A personalization and mobility aware service enabler for a service continuity in heterogeneous networks. In *Mobile Services and Personalized Environments'06*, Aachen, Allemagne, November 2006.

8.3.5 ASCL: Articles in Non Refereed Journals

[1320] M. Riguidel. Les technologies numériques du futur : Nouvelles menaces, nouvelles vulnérabilités. *Les Cahiers de la sécurité*, (6):66–77, October 2008.
[1321] D. Rossi, M. Mellia, and M. Meo. Quando il pc diventa un telefono. *Il Sole 24 ore / Media 2000,*, 2008.
[1322] P. Urien. Pour le wimax de nouvelles cartes à puce sont à inventer. *Electronique International*, (178):3, March 2007.
[1323] P. Urien. La carte sim ou la sécurité du gsm par la pratique. *MISC Hors-Série Dossier Cartes à Puce*, November 2008.

8.3.6 ACTN: Articles in Proceedings of National Conferences

[1324] M. Aljnidi. Sécurité des réseaux mobiles autonomes. In *Premier workshop GET sur les réseaux spontanés*, pages 17–18, Rennes - France, November 2006.
[1325] F. Bennani, T. Nadour, and N. Simoni. QoS de bout en bout : vue Usager vs vue Fournisseur. In *Gestion de Reseaux Et de Services (GRES'05)*, page 211, Luchon - France, March 2005.
[1326] C. Chaudet, E. Fleury, I. Guérin Lassous, H. Rivano, and M.-E. Voge. Surveillance passive dans l'Internet. In *Septièmes Rencontres Francophones sur les aspects Algorithmiques des Télécommunications (Algotel 2005)*, Presqu'île de Giens, France, May 2005.
[1327] C. Chaudet and I. Guérin Lassous. état des lieux sur la qualité de service dans les réseaux ad hoc. In *Colloque Français sur l'Igénierie des Protocoles (CFIP 2006)*, Tozeur, Tunisie, October 2006.
[1328] L. Chen and J. Leneutre. A game theoretic analysis of jamming attack in wireless networks and defense strategy. In *4ème conférence sur la Sécurité des Architectures réseaux et des Systèmes d'information (SARSSI'09)*, Luchon, France, May 2009.
[1329] M. Coupechoux, P. Godlewski, P. Martins, and P. Ciblat. Projet urc : vers une gestion flexible et régulée du spectre radio en ile-de-france. *La Lettre Techniques de l'Ingénieur*, (11):5–6, January 2008.
[1330] Z. B. Daho and N. Simoni. Des Plateformes de service specifique vers un Reseau Overlay de Services : Le Serviceware. In *Gestion de Réseaux Et de Services (GRES'05)*, number ISBN:2-9520326-5-3, pages 225–236, Luchon - France, March 2005.
[1331] G. Du-Chene, T. Nadour, and N. Simoni. Pilotage QoS-Dependant de l'Organisation des architectures: Prototype. In *Gestion de Réseaux Et de Services (GRES'05)*, number ISBN:2-9520326-5-3, pages 19–30, Luchon - France, March 2005.
[1332] S. Ktari, F. Springinsfeld, and A. Hecker. Effet de la mobilité manet sur système p2p. In *CFIP 2008*, Les Arcs, France, March 2008.
[1333] R. Meraihi and G. Le Grand. Contrôle de topologie orienté stratégie basé sur des routeurs mobiles dédiés. *Annales des Télécommunications*, 61(5-6):602–626, June 2006.
[1334] C. Sarr, C. Chaudet, G. Chelius, and I. Guérin Lassous. Amélioration de la précision pour l'estimation de la

bande passante résiduelle dans les réseaux ad hoc basés sur IEEE 802.11. In *8emes Journées Doctorales en Informatique et Réseaux (JDIR 2007)*, Marne la Vallée, France, January 2007.
[1335] A. Serhrouchni and I. Hajjeh. Intégration de la signature numérique au protocole ssl/tls. *Annales des Télécommunications*, 61(5-6), May 2006.
[1336] N. Simoni. *Gestion de Réseaux et de Services*, chapter I/1, pages p132–p140. Vuibert, Paris France, 2006.
[1337] N. Simoni, C. Rigault, Z. Daho, S. Rostambeik, T. Aubonnet, T. Chamfrault, G. Charpin, and B. Mathieu. *Des Réseaux Intelligents à la NouvelleGénération de Service : Pourquoi et Comment repenser les services*. Hermes, Paris France, 2006.
[1338] M. Song, B. Mathieu, and N. Simoni. Gestion de vie de Réseaux Overlay pour les Réseaux Ambiants. In *GRES'06*, volume 1, pages p137–p150, Bordeaux, France, May 2006.
[1339] P. Urien. The openeapsmartcard platform. In *Cartes'2005 conferences*, Villepinte Fance, November 2005.
[1340] P. Urien. Le teapm, un îlot de confiance dans un cyber espace hostile. In *20ième congrès des nouvelles architectures pour les communications [DNAC 2006]*, Paris, France, November 2006.
[1341] P. Urien. Présentation des nouvelles architectures de cartes pour les réseaux ip. In *CRYPTO'PUCES 2007*, Porquerolles, France, April 2007.
[1342] P. Urien. Tls-tandem, une sécurité forte et collaborative, pour l'internet de nouvelle génération. In *DNAC 2007*, Paris France, November 2007.
[1343] P. Urien. Une architecture ouverte de module de sécurité pour une nouvelle génération de réseaux ip sans fil. In *2nd Conference On Security in Network Architectures and Information Systems [SAR-SSI 2007]*, Annecy, France, June 2007.
[1344] P. Urien. Y a-t-il un avenir pour les cartes java sim dans les réseaux wimax ? In *Conférences cartes'2007*, Villepinte France, November 2007.
[1345] P. Urien. La carte à puce comme vecteur de la convergence de la sécurité. In *22ème Congrès DNAC : De Nouvelles Architectures pour les Communication*, Paris France, December 2008.

8.3.7 OS: Books and Book Chapters

[1346] M. Badra and A. Hecker. *Security in WLAN*, pages 695–709. IGI Global, Hershey, PA, USA, 2008.
[1347] R. Bruno, C. Chaudet, M. Conti, and E. Gregori. *Fair MAC Protocols for 802: 11 -based Multi-Hop Ad hoc Networks: Challenges and Solutions*, chapter 3. Nova Publishers, Hauppauge NY, USA, 2006.
[1348] C. Chaudet and A. Hecker. *QoS dans Wi-Fi-IEEE 802.11 e/k/h*, chapter 7. HERMES Science Publishing Ltd, London, United Kingdom, 2008.
[1349] A. Hecker. *Vulnérabilités des réseaux filaires et sans fil*, chapter 2. Hermès Science, Éditions Lavoisier, Paris, France, 2007.
[1350] A. Hecker and M. Badra. *Security in 4G*, pages 272–296. IGI Global, Hershey, PA, USA, 2008.
[1351] H. Labiod. *Réseaux mobiles ad hoc et réseaux de capteurs sans fil*. Hermes Science Publications, 2006.
[1352] H. Labiod. *Routage ad hoc multicast*. Hermes Science Publications, 2006.
[1353] H. Labiod. *Multicast ad hoc routing*. ISTE Publishing Knowledge / John Wiley and Sons Inc,, 2008.
[1354] H. Labiod. *Wireless Ad Hoc and Sensor Networks*. ISTE Publishing Knowledge / John Wiley and Sons Inc, 2008.
[1355] H. Labiod, H. Afifi, and C. De Santis. *Wi-Fi, Bluetooth, ZigBee and WiMax*. Springer, 2007.
[1356] H. Labiod and et al. *New Technologies, Mobility and Security, Proceeding of NTMS2007 Conference*. Springer Verlag, 2007.
[1357] F. Larroca and J.-L. Rougier. *A Fair and Dynamic Load-Balancing Mechanism*. LNCS, Springer, 2009.
[1358] G. Nogueira, B. Baynat, M. Maqbool, and M. Coupechoux. *Performance Evaluation and Dimensioning of WiMAX*. CRC Press, 2008.
[1359] M. Riguidel. *La sécurité des réseaux et des systèmes*, chapter La sécurité des réseaux et des systèmes, pages 521–548. Vuibert, Paris, 2006.
[1360] M. Riguidel. *The Twilight of the Despotic Digital Civilization*, chapter The Twilight of the Despotic Digital Civilization, pages 83–98. Springer, Berlin / Heidelberg, 2006.
[1361] M. Riguidel. *Digital Security in the Future*, chapter 12, pages 159 – 189. Wiley, Chichester (United Kingdom), 2009.
[1362] D. Rossi, C. Casetti, and C. F. Chiasserini. *Some Study on Communication Performances*. N.P. Mahalik Editor, Springer-Verlag, Berlin, Germany, 2007.
[1363] C. Tchepnda, H. Moustafa, H. Labiod, and G. Bourdon. *Security in Vehicular Networks*. Auerbach Publkications - CRC Press (Taylor and Francis Group), 2008.
[1364] P. Urien. *La sécurité du WiMAX*, chapter Trois, pages 87–130. Lavoisier, 11, rue Lavoisier 75008 Paris, 2007.

8.3.8 AP: Other Productions: Reports, Registred Software, Registred Patent, ...

[1365] M. Afif. *Interaction des mécanismes RLC/MAC et de SCTP dans les réseaux mobiles B3G*. PhD thesis, November 2007.
[1366] Erik-Oliver Blass Artur Hecker and Houda Labiod. Device and a method for communicating in a network. Patent, March 2008. FR2883437, W006/097615.

[1367] M. Badra, A. Serhrouchni, and T. Guillet. Procédé d'authentification, système d'authentification. Patent, September 2009. FR2928798 (A1), WO2009115755(A2).
[1368] N. Boukhatem. Signalisation et mobilité pour l'internet de future généraion. Technical report, Telecom Paris-Tech, December 2008.
[1369] R. Casellas. Formation continue alcatel : Implementing a network protocol in linux, a case study bdp. 2005.
[1370] L. Chen and J. Leneutre. Playing with ennemies - a game theoretical analysis on intrusion detection in heterogenous networks. Technical report, École Nationale Supérieure des Télécommunications, ENST2007D014, October 2007.
[1371] M. Coupechoux, P. Godlewski, P. Martins, C. Riou, V. Capdevielle, V. Kumar, M. Alberi-Morel, N. Broqua, and J. Marzoni. Méthodes d'allocation du spectre radio dans les systèmes de communications mobiles terrestres. Technical Report URC-CPV 602, Ecole Nationale Supérieure des Télécommunications, January 2008.
[1372] F. Cuppens, A. R. Cavalli, N. Cuppens-Boulahia, J. Leneutre, and Y. Roudier, editors. *First Workshop on Security of Spontaneous Networks*, Paris, France, October 2008. Publibook.
[1373] N. Dailly. *Optimisation des réseaux d'accès mobiles pour les systèmes EGPRS et B3G*. PhD thesis, ENST, June 2007.
[1374] T. Diab, N. Dailly, P. Godlewski, C. Lengoumbi, and P. Martins. L5.0 : Anaïs : Synthèse sur la norme apco projet 25 phase 2 (tdma à 2 slots). Technical report, ENST, January 2005.
[1375] T. Diab, N. Dailly, P. Godlewski, C. Lengoumbi, and P. Martins. L5.1 : Anaïs : Méthodes de validation du simulateur rnrt anais - apco phase 2. Technical report, ENST, October 2005.
[1376] T. Diab, N. Dailly, P. Godlewski, C. Lengoumbi, and P. Martins. L5.2 : Anaïs : Rapport de validation du simulateur rnrt anais - apco phase 2. Technical report, ENST, May 2006.
[1377] S. Duflos, G. Le Grand, C. Chaudet, A. Diallo, A. Hecker, J. Leneutre, and R. Onori. Complete list of scenarios with corresponding user profiles. Technical report, École Nationale Supérieure des Télécommunications, March 2007.
[1378] V. Dupuis, M. Chaland, P. Radja, S. Allouche, A. Serhrouchni, and M. Adib. Procédé et système de distribution des clés cryptographiques dans un réseau hiérarchisé. Patent, May 2007. FR2923668 (A1), WO2009068815(A2).
[1379] V. Guyot. *la carte à puce vecteur de mobilité*. PhD thesis, Telecom Paris-Tech, October 2005.
[1380] A. Hecker. *On Logical System Access Control and the Associated User and Network Management in Future Heterogeneous 4G Wireless Systems*. PhD thesis, École Nationale Supérieure des Télécommunications, March 2005.
[1381] A. Hecker, E.-O. Blass, and H. Labiod. Dispositif et procédé de communication dans un réseau. Patent, September 2006.
[1382] R. Khanafer. *QoS, Classification et Contrôle d'admission des flux TCP*. PhD thesis, ENSTMars2005, March 2005.
[1383] K. Khawam. *Ordonnancement opportuniste dans les réseaux mobiles de nouvelle génération*. PhD thesis, ENST, November 2006.
[1384] D. D. Kouvatsos and D. Kofman. Guests editors of performance evaluation, vol 59, issues 2+3, february 2005, 2005.
[1385] H. Labiod. Les réseaux sans fil et ad hoc : routage et sécurité,. Technical report, université de Paris-Sud, Paris XI, May 2005.
[1386] C. Lengoumbi. *Accès multiple OFDMA pour les systèmes cellulaires post 3G: allocation de ressources et ordonnancement*. PhD thesis, TelecomParisTech, March 2008.
[1387] M. Mabiala and M. Coupechoux. Etude de trois mécanismes de qualité de service dans les réseaux ad hoc multi-bonds. Technical report, Ecole Nationale Supérieure des Télécommunications, June 2008.
[1388] R. Meraihi. *Gestion de la qualité de service et contrôle de topologie dans les réseaux ad hoc*. PhD thesis, Ecole Nationale Supérieure des Télécommunications, January 2005.
[1389] H. Q. Nguyen. *Réseaux sans fil hybrides Wi-Fi – WiMax*. PhD thesis, ENST, March 2008.
[1390] M. Riguidel, Ph. Laurier, and L. Ladouari. Procédé de traçabilité et de résurgence de flux pseudonymisés sur des réseaux de communication, et procédé d'émission de flux informatif apte à sécuriser le trafic de données et ses destinataires. Patent, June 2008.
[1391] S. Secci. Game Theory for Internetworking. Technical report, Politecnico di Milano, October 2008.
[1392] S. Secci, J.-L. Rougier, A. Pattavina, M. Marinoni, and G. Maier. Detection of bgp route deflections across top-tier interconnections. Technical report, Télécom ParisTech, 2009.
[1393] S. Secci, J.-L. Rougier, A. Pattavina, F. Patrone, and G. Maier. Internet extended peering: a non-cooperative game theoretic framework. Technical report, Télécom ParisTech, 2009.
[1394] A. Serhrouchni and M. Adib. Procédé de sécurisation des données. Patent, November 2007. FR2900776 (A1), WO2007125263(A2).
[1395] N. Simoni, A. Boutignon, P. Coude, and A. De Moissac. Procédé de traitement d'une demande d'un utilisateur d'un terminal numérique. Patent, December 2005. FR0554098.
[1396] N. Simoni, A. Boutignon, P. Coude, and A. De Moissac. Ingénierie d'architecture/ pilote organisationnel. Patent, May 2006. FR0651594.
[1397] C. Tchepnda. *Authentification dans les réseaux véhiculaires opérés*. PhD thesis, Telecom Paristech, December 2008.
[1398] L. Th. Tra. *Etude et mise en oeuvre d'une signalisation IP universelle*. PhD thesis, Telecom Paris-Tech, June 2006.
[1399] P. Urien and M. Badra. Identity protection method and corresponding computer programme product. Patent, October 2007. WO2007/115982(A2).

Part III

Economics and Social Sciences

Chapter 9

Economics and Social Sciences (SES)

Responsable Christian LICOPPE

Permanents AURAY Nicolas (MdC, 09.01-), BACACHE Maya (MdC, 12.07-), BAKER Michael (Dr CNRS, 03.09-), BEAUDOUIN Valérie (Dir. Et., sept. 09.08-), BEAUVALLET Godefroy (Dir. Et., -07), BOUNIE David (MdC, 11.02-), BOURREAU Marc (P, 10.00-), CAHOUR Béatrice (CR CNRS, 03.08-), CORTESI-GROU Nicole (Ing. Et., 03.00-), DAVIDOVICI-NORA Myriam (MdC, 09.99-), DENIS Jerôme (MdC, 09.05-), DETIENNE Françoise (DR, INRIA, 03.08-), DIMINESCU Dana (Ing. Etude, 09-), DRAETTA Laura (MdC, 02.05-), FERNANDEZ Valérie (MdC, 09.1998-), FOURNOUT Olivier (Ing. Et., 12.02-), GARRON Isabelle (MdC, 12.06-), GENTES Annie (MdC, 03.00-), GILLE Laurent (P, 04.02-), HOUY Thomas (MdC, 01.09-), LANTZ Jean-Sébastien (MdC, -08), LEBART Ludovic (Dr CNRS, -sep. 07, then emeritus at IT), LELOUP Benoît (MdC, 07-), LICOPPE Christian (P, 11.03-), MUNIER-TEMIME Brigitte (MdC, 01.98-), PASQUIER Dominique (DR CNRS, 07.08-), POGOREL Gérard (P, 09.98-), RELIEU Marc (MdC, 05.05-), SOUCHIER Emmanuel (P, -07), VISSER Willemien (CR INRIA, 03.08-), WAELBROECK Patrick (MdC, 12.05-)

Doctorants CHENAVAZ Régis (09.05-), CHEVALLIER Benjamin (09.06-), COUTURE Stéphane (03.08-), DIALLO Demba (03.01-), DOUINE Rémi (09.04-), DROUARD Joeffrey (09.06-), ERETEO Guillaume (01.08), FAUTRERO Valérie (12.04-03.08), GRECE Christian (07.06-), GUERN (09.08-), HEBERT Anne-Marie (01.09-), HOLZBERGER-BRAUN Carol-Ann (09.08-), HORQUIN Tania (04.07-), HOUY Thomas (10.04-08.08), IANEVA Maria (09.08-), JIANG Yun (09.03-01.09), JOOMA Hanene (09.03-), JULLIEN Caroline (01.09-), KARAMTI Chiraz (09.01-03.06), KAROUBI Bruno (10.06-), KHALIL Carine (10.08-), LAN HING TING Karine (10.06-), MANANT Matthieu (09.03-06.07), PAJAK Serge (09.07-), PROST Magali (01.09-), RASYID Asmiati (09.01-06.09), REBAI Lilia (11.04-), ROKOTONIAINA Lalao Harimanga (01.09-), TEITELBAUM Louis-Jean (10.08-), VERDIER Marianne(09.05-12.08), VIAN Dominique (11.06-), VOILMY Dimitri (05.07-), ZHANG Min (10.08).

Post-docs BOURDONNAUD David (09.05-11.06), CENTEMERI Laura (03.08-04.08), DELANOE Alexandre(09.08-), FIJEAC Julien (01.09-), FAUTRERO Valérie (08.08-),FRANCOIS Sébastien10.08-), FRIBOURG Bertrand (07.07-), HOUY Thomas (09.08-12.08), KARAMTI Chiraz (04.06-08.07), LABARTHE Fabien (12.08-), LEFEBVRE Liv (03.09-), LEVALLOIS-BARTH Claire (05.08-), NEGRI Anne-Laure (02.09-), RECUERO VIRTO Laura (11.07-10.08), RIMBERT Gérard (03.07-10.07), VERDIER Marianne (12.08-08.09)

Chercheurs contractuels MUSSO Pierre (12.07-)

Ingénieurs contractuels CORRE Pierre-Yves, DATCHARY Caroline, EANG Bora, GAUDIN Germain, HAMEL Sylvie, HORQUIN Tania, INADA Yoriko, JUTANT Camille, LABELLE Sarah,

LEGOUT Marie-Christine, LEITZELMAN Mylène, LEJEALLE Catherine, MACRA Maria, MELOT Vania, MERCIER Jeanne, MOREL Julien, PEROCHEAU Guillaume, PICARD Marie-Amélie, POUDAT Céline, TELLIEZ Elodie, VICENTE Michaël, VOILMY Dimitri,

Sabbatiques DAVID, Paul (06.08-12.08), DOGAN Pinar (01.05-30.05 et 01.06-30.06), PROULX Serge (01.06-06.08), SIRBU Marvin (09.06-06.07), WANG Ling Yu (01.06-02.06), WATSON Rodney (06.09)

Associés BALLE Michael, BARBET Philippe, DAVID Paul, FRANCOIS Abel, GENSOLLEN Michel, KARAMTI Chiraz, LEBART Ludovic, RECUERO Laura, ROWE Frantz, VALLEE Alain, BALLE Michael, MARCHANDISE Jacques-François, MUSSO Pierre, PROULX Serge

Permanents [IT, CNRS, INRIA]	[19.7, 1.4, 0.4]
Doctorants	17
Postdocs, ingénieurs contractuels, sabbatiques	19
Thèses soutenues	7
HDR soutenues	3
Articles de revues	145
Articles de conférences	72
Livres et chapitres de livres	[20, 40]
C.A. contrats (k€)	4 659
C.A. contrats publics (k€)	1 715
C.A. contrats privés (k€)	2 748
C.A. contrats européens (k€)	196

9.1 Goals

The department of economics and social sciences (which composes one single “team” for the purposes of this evaluation document) is an interdisciplinary department for teaching and research, At the 1st of July, 2009, it is composed of 30 permanent members in teaching and/or research positions (among which 3 researchers from CNRS and 2 from INRIA), 8 associate researchers, 33 ongoing Ph.D projects, 16 non permanent members and post-doc (among which four visiting professors from abroad for various durations), and 3 persons employed in administrative capacities.

It is original in the French landscape by being highly multi-disciplinary: it involves researchers in economics, management sciences, sociology, information and communication sciences, cognitive psychology and ergonomics, liable to several sections of the CNRS, 29, 34, 36, 37, 40 and 44, as well as CNU section 71 (not represented in CNRS). Its focus is therefore not disciplinary but thematic. It aims to cover the Information and Communication Technology (ICT) “human”-oriented perspectives, with two sets of equally stringent, and sometime cross-cutting exigencies: operating at the cutting edge of each disciplinary field, while also participating to collaborative and innovative research projects (involving cooperation either between social sciences or between social science and more “technology-oriented” departments and industries) which directly benefit from the involvement of multiple disciplines. But in this particular domain, trying to satisfy

both exigencies as much as possible is a key to original, innovative research which may shed new light on the uses of ICTs, for these are usually oriented with respect to multiple normative orders, economic, social, technological, etc.

For management purposes, the department is organized in three research groups, two in Paris and one in Sophia Antipolis. Its research activities are structured around three axes which are deliberately not congruent with the boundaries of the three groups (because they aim towards stimulating various forms of interdisciplinary collaboration). These three research axes each explore significant issues regarding mediated interactions and transactions, but at several scales. At the "macro level" Axis 1 one looks at regulation and innovation-related phenomena in the telecommunication sector. At the "meso level", Axis 2 studies the production, circulation and reception of media and cultural contents with an eye towards the blurring of the boundaries between producers and consumers, professional and amateurs, etc. At the "micro level" Axis 3 focuses on mediated interactions and the local management of situations and activities relying on communication technologies and services.

9.2 Main Results

Social sciences are essential to the development of the IT sector for IT-based technologies and services mediate the way we collectively inhabit in "Information Ecologies". Putting such technologies to work in actual settings cannot be separated from social issues related to various forms of "living together". The scientific recognition level of the laboratory can be seen in several ways :

- in the number and quality of its publications;
- in its growing attractivity (several well known researchers from CNRS and INRIA have joined us in the last three years; the number of foreign researchers asking for visitor's status is also increasing);
- in the growing network of its teaching and research partners (EHESS and MSH Paris, Paris I, X and XI universities, University of Nice Sophia Antipolis, the ENSCI school of Industrial design). In each case this implies co-habilitated master formations, and significant teaching commitments.
- in the striking progression in the participation of the laboratory to collaborative research project (with a good success rate on ANR-deposed projects) and its growing ability to get funding from various sources (state agencies, "collectivités locales" and particularly the Ile de France and PACA regions, ministries – culture, justice- research programs) and stimulate additional teaching and research activity (post-doctoral and doctoral positions) complementary to the one of its permanent members.
- in its efforts to sustain cooperation with the industry. The laboratory is committed to maintain and develop relationships with the industrial research sector, either through direct contractual research, or indirectly through the participation of its researchers to several competivity poles (Cap Digital in Ile de France, SCS and IRI in PACA, NFC in Normandy). It also aims at developing "chaires" funded by key firms in the sector. Two were launched in the evaluation period ("Regulation and Innovation", with Ecole Polytechnique and Orange; on "ICTs and Sustainable Development", with Orange and Caisse des Dépôts et Consignations),and one more is in its final stages of elaboration (on the "Imaginary of Technology" with Dassault Systems, Ubisoft and L'Oreal). The laboratory is also involved in several joint research initiative with the industry (it participates significantly to the joint research laboratory between Institut telecom with Alcatel, and to the joint Paristech initiative with Renault around the "Institut de la mobilité Durable" project).
- In its international orientations on top of a specific training for African regulators and operators, members of the Department are greatly involved in cooperative research with Asian

and African regulators and operators about regulatory issues in emerging markets (in more than ten countries). An important level of international cooperation has also developed around the issue of electronic money, and in the frame of the research "chaires" managed by the Department (Particularly on "innovation and regulation").

More detailed and specific scientific results will now be provided in the sections devoted to the three research axes of the department.

9.3 Research Axes

9.3.1 Regulation and Innovation (RINNO), Maya Bacache and Marc Bourreau (animators)

Project participants *Faculty members:* Maya Bacache, David Bounie, Marc Bourreau, Myriam Davidovici-Nora, Laura Draetta, Dana Diminescu, Valérie Fernandez, Laurent Gille, Benoit Leloup, Gérard Pogorel, Thomas Houy.
Research associates: Philippe Barbet, Abel François, Laura Recuero
Post-doctoral students: Valérie Fautrero (2008-2009), Marianne Verdier (2008-2009)
Visiting researchers: Paul David (2008-2009), Pinar Dogan (June 05, June 06), Marvin Sirbu (Sept. 06 - June 07)

Research contracts SportViews European project, COST Action IS0605 Econ@Tel (2008-), Research contracts with the Department of Regulatory Affairs of France Telecom (2007-2009 and 2009-2011), Research contracts with the Groupement Cartes Bancaires "CB" (2005-2011), Research contract with FT R&D on regulatory forecasting (2007-2008), Contracts with regulatory authorities in developing countries, Chaire "Regulation and Innovation in Digital Services" Orange-Ecole Polytechnique-Telecom ParisTech,

PhD projects Chiraz Karamti (Started 2001, ended 2007): Empirical evaluation of the contribution of ICTs on economic performance.
Mathieu Manant (started, 2003, ended 2006): innovation, inter-firm cooperation and intellectual property. Valerie Fautrero (Started 2004, ended 2008): Broadband access technologies: actor strategies and emergent use patterns.
Yun Jiang (started 2004): The structuration of the value chain for mobile technology in the context of the growth of multimedia technologies : which economic models ?
Lilia Rebai (started 2004): Identifying relevant telecom markets in Tunisia.
Marianne Verdier: Interchange Fees and Pricing in Payment Card Systems (Started 2005-ended 2008).
Asmyati Rasyid (started 2005, ended 2008): Preparing new directions for long term telecommunications development in Indonesia.
Régis Chenavaz: Dynamic pricing models (started 2005).
Joeffrey Drouard: Competition and Investment in Telecommunications (started 2006).
Bruno Karoubi: Economics of Payments (started 2006).
Benjamin Chevallier (started fall 2006): The structuration of new market services and the management of regulation costs by mediated communities.
Christian Grece (started 2006): Management and pricing of the hertzian spectrum.
Dominique Vian (Started 2006): From the assessment of invention to its transformation in innovation: cognitive processes.
Serge Pajak (started 2007): Intellectual property and innovation strategies.
Tania Horquin (started 2007): The forms of emergence of the markets for teleservices.

Context and objectives

The dynamics of ICT industries are influenced by a tension between innovation and regulation (see: Gille et al. (2009) [1738]. Indeed, these industries are characterized both by a high pace of innovation (affecting the supply side and the demand side), and strong regulation (through intellectual property, the scrutiny of competition authorities, and sector-specific regulation in telecoms and media markets). On the one hand, due to the endogenous relationship between technological progress and industry structure, regulatory policies clearly affect the speed of technological change, via two different channels (Bourreau and Doğan, 2001[1]). First, price regulations (e.g., the regulation of interconnection charges and retail prices in telecoms, or the regulation of the interchange fee in the payment industry) alter industry profits, hence the incentives to innovate. Secondly, both price and entry regulations (e.g., spectrum licenses, patents, banking licenses. . .) change the terms of entry, and hence innovation decisions regarding new entry. But on the other hand, to the extent that technological changes alter the organization of the industry, the speed of innovation - particularly in the new markets - should also be reflected in any regulatory intervention. If regulatory authorities cannot respond fast enough to follow the rapid change of the market, many regulatory measures then become either inefficient or obsolete.[2]).

Consequently, new flexible forms of regulation are called for. Indeed, though a regulation which would not adapt fast enough to changes in technologies or market structures would be inefficient, an unregulated environment would probably also lead to inefficient outcomes, as the current economic crisis illustrates. We therefore need to rethink public policy, by taking into account innovation dynamics and the institutional constraints (Bacache and Maynéris, 2006)[3].

This research project tackles the two dimensions of the relation between innovation and public policy through two different areas of research:

Sub-theme 1: Regulation in Innovative Industries. In this first area of research, we study the design of public policy in innovative industries. In particular, we examine how sector-specific regulation in telecoms should be designed to take into account its effects on innovation strategies.

Sub-theme 2: Innovation in Regulated Industries. In this second area of research, we study innovation strategies in industries where regulatory constraints are binding (intellectual property, constraints on R&D collaboration in Europe and US. . .). A strong emphasis is given to the payment industry.

Sub-theme 1: Regulation in Innovative Industries

The telecommunications industry is the most dynamic industry among those subject to sector specific regulation.[4] Dynamic industries are characterized by a high speed of innovation. Two types of innovation, namely innovation for new services and innovation for alternative network infrastructures, underlie competition in the telecommunications industry. While innovation for new services is provided mainly by telecommunications operators,[5] equipment suppliers provide most of the innovation for new network technologies. A network innovation in the equipment sector is followed by an adoption process in the telecommunications sector. Operators have to decide whether and when to adopt the new technology. Indeed, an immediate adoption may be costly and risky.

[1] Bourreau, M. and P. Doğan, 2001, "Regulation and Innovation in the Telecommunications Industry," *Telecommunications Policy*, 25, 167-184.

[2] This calls for an ever evolving regulation. This is somehow done in practice. In particular, in Europe, the so-called "Review" aims at adjusting regulation every four years (see: Pogorel and Gassot, (2006) [1458]

[3] Bacache et Mayneris, 2006, "Le rôle de l'Etat : fondements et réformes", Bréal, Paris.

[4] Other asymmetrically regulated industries include electricity, railway, etc.

[5] The fast convergence of telecommunications and media has been another source of innovation in services. This evolution question the separation of media and telecom regulators, as Gérard Pogorel argues in [1772] and [1499].

One key regulatory issue in the last decade has been how to encourage new entrants to invest in their own infrastructures.[6] This is why, in the broadband market, as Baranès and Bourreau (2005) [1407] have shown, it has been highly debated whether service-based competition (where new entrants lease access to the incumbents' infrastructure to provide services to end consumers – e.g. through unbundling of the local loop) could delay or even deter the development of facility-based competition (where new entrants build their own access infrastructure, using cable, WLL, or more recently, fiber access technologies).

Bourreau and Doğan (2005 [1424], 2006 [1425]) showed that service-based and facility-based entry are indeed substitute strategies for the entrants, and hence, that policies that are designed to support each one of them may exhibit conflicts. They developed their arguments on the basis of two formal dynamic models, where an incumbent and an entrant compete to provide high-bandwidth services. They showed that an incumbent who faces an effective threat of facility-based competition can strategically delay facility-based entry by providing attractive terms of access to its facilities. The delay that is introduced by attractive terms of access is by virtue of a replacement effect, which may also affect the choice of technology to be eventually built by the entrant. A regulatory intervention is therefore called for, but Bourreau and Doğan have proved that the so-called "sunset clauses" which set ex ante a date after which access will no longer be regulated are ineffective.

Wireless access technologies have long been cited as candidate technologies for new access infrastructures. In the last ten years they also experienced a high pace of innovation (with such technologies as Wifi, Wimax, etc.). One strong limitation of these technologies as entry enablers is that they usually require access to spectrum. For this reason, it has become more and more crucial to fine tune the regulation for access to spectrum resources (see [1791]). The department conducted a research project on this issue and was also involved in a European research project, SPORT VIEWS. One important output of this research is a new framework with simple decision rules to help public authorities designing their spectrum management public policy.

Pogorel (2007 [1500], 2008 [1770]) began by showing that management regimes for the radio spectrum were defined by a 4-dimensional problem: (1) Are frequencies assigned according to a harmonized plan? (2) Should technologies be normalized? (3) Should the spectrum rights be exclusive, unbundled or collective? (4) Should the fees be set by market mechanisms, administrative procedures or a hybrid form of the two? He then proposed a set of decision criteria for each of these four questions. Nine schemes resulted from the different possible combinations. The taxonomy he obtained illustrates the possible rationale for a variety of schemes larger than the standard trilogy (Command and Control, Market and Commons) proposed by the FCC and Cave's 2002 reports. It allows decision makers to make choices using all the technical information available on the basis of defined criteria and a rigorous methodology.

The evolution of the telecom sector in the last years has also been marked by the development of wholesale markets where facility-based entrants compete with incumbents to provide wholesale services to service-based entrants. One example is the development of mobile virtual network operators (MVNOs) in the mobile market. In the fixed market, the development of the unbundling of the local and the development of fiber networks in some countries ([1699]) has also given birth to broadband wholesale markets. Bourreau et al. (2007) [1550] proposed a formal framework where two vertically-integrated operators compete to serve a pure downstream firm on a wholesale market, while the three firms compete on the retail market. They showed that, without any regulatory intervention, the wholesale market is unlikely to become competitive. Therefore, they proposed some regulatory intervention like a price cap on the wholesale price. This research received attention from regulatory authorities (see Bourreau and Pouyet, 2007 [1552]).

Most of our research concerns regulatory issues in developed countries. However, as telecom markets in industrialized become more mature, more and more attention is paid to developing countries. Besides training programs and expertise to regulators in these countries (on compu-

[6] This is true in particular for rural areas, where the development of alternative access infrastructures is crucial due to low investment from the main players (see Fernandez, V. Fautrero et G. Puel (2009) [1448]).

tation of interconnection rates, in particular), we also studied how the regulation of the telecom sector should be adapted for developing countries. A particular focus has been made on African countries (see Gille (2008) [1736]).

Our research shows that public policy should take into account the innovation dynamics in the ICT sector. In particular, regulatory authorities should build indexes taking into technological progress. Karamti (2007) [1470] proposed a hedonic index for mobile services for the period 1996-2002, taking into account quality improvements. Bacache (2009) [1779] showed, however, that indicators should be used carefully when taking decisions in terms of public policy, and gave examples where the introduction of an indicator led to unexpected (and inefficient) outcomes.

Though ICT represent a risk for public policy, as they can make existing rules rapidly obsolete, they can also provide opportunities. In particular, in many countries, on-line administration has been developing fast. Bacache, Bounie and François (2008) [1804] studied the use of on-line administrative services in France in 2005. They found that the relative access cost to online administrative services, the cost to find administrative information and the cost of processing administrative information as well as the availability of Internet services played a major role in the trade-off between online and offline administrative channels.

Sub-theme 2: Innovation in Regulated Industries

In the first area of research, we study how public policy should adapt to take into account innovation dynamics. However, public policy also affects the incentives to innovate. This second area of research therefore focuses on innovation strategies, in particular in digital markets, and on the effects of innovation on the industrial organization of specific markets.

The first and immediate effect of digitization has been the transformation of rival goods into non-rival goods (for instance, of CDs into MP3 files). As it is well known, this transformation has destabilized the existing business models in content industries, such as the music industry, because it allows end users to copy and share content goods at almost zero cost. Davidovici-Nora (2005) [1433] and Peitz and Waelbroeck (2006) [1497] propose an overview of the theoretical literature on the economic consequences of end-user copying. They analyze different options to model piracy behaviors, and discuss the applicability of the different modeling strategies to a number of industries such as software, video and computer games, music, and movies.

Though the digitization of content goods and the possibility to copy and share these goods easily and at low cost is a clear benefit for consumers, it also represents a clear threat for companies. However, as Duchêne and Waelbroeck (2007) [1441] and Duchêne, Peitz and Waelbroeck (2006) [1440] argue, a maximum protection with Digital Rights Management technologies is not necessarily the optimum for the firms. Duchêne and Waelbroeck (2007) [1441] propose a model in which they view traditional distribution as an information-push technology in which the firm pays to provide information to consumers and P2P as an information-pull technology where consumers spend resources to acquire information on products they have a potential interest in. They determine copyright owners' protection strategies according to the level of legal protection, and they study their effects on profits and consumers' surplus with the two different information transmission technologies.

A second effect of digitization is that it facilitates a modular design of products. The concept of modularity has been defined in a wide range of fields: construction, art, software design, etc. Modularity in products implies that products consist of distinct, relatively independent building blocks, among which the interactions are ruled by standardized interfaces. Modular design in products allows the pairing of common units with different modules to create product variants. Bourreau and Doğan (2007 [1427]) studied modular design strategies in digital markets and showed that the possibility of having common modules embedded in a range of products is likely to affect firms' product innovation strategies and post-innovation competition, both in traditional and digital markets.

Bourreau and Doğan (2005 [1580]) consider an innovator who holds the exclusive rights to its innovation and faces a single potential entrant. The innovation has a modular nature and the

innovator decides to license an arbitrary partition of it. They show that the factors that alter the sensitivity of the industry profits to the degree of differentiation (for example, the type of competition, cost asymmetries) affect the size of the license. A higher sensitivity implies a smaller license, hence a smaller common component in competing firms' products. Bourreau and Doğan (2009 [1426]) provide a simple formal framework to analyze cooperation in product development between competitors. Taking into account a direct link between cooperation decisions on product development and process R&D, they show that the degree of cooperation in product development may adversely affect the intensity of cooperation in process R&D. Finally, Bourreau and Doğan (2009 [1582]) extends this setting to an oligopoly and analyze formally the relation between the degree of cooperation in product development and the size of RJVs. They show that the size of the RJV and the degree of cooperation in product development follow a non-monotonic relationship. That is, a high degree of cooperation in product development can either lead to a small or a large RJV.

In this area of research, we are also interested in how intellectual property affects innovation strategies. One reason is that intellectual property rules affect the protection strategies of innovators. Pajak (2009) [1605] showed that, indeed, firms trade-off between different protection methods, in particular patenting and secrecy. Using data from the 2004 Community Innovation Survey, he showed that the use of patents, relative to secrecy, is increasing with the firm's size. However, this result do not support the hypothesis of a higher relative use of secrecy for all class sizes; in practice, only small firms use secrecy relatively more than patent. Furthermore, he investigated whether secrecy was used to protect small innovations or large ones, and found that the relative use of patent was decreasing with the magnitude of the innovation in a third of the innovative industries (7 industries out of 21).

Finally, in this area of research, a strong emphasis is given to the payment industry. In this industry, technological progress has given birth to new payment instruments, such as the debit or the credit card in the 80s or, more recently, virtual currencies (on the Internet) and mobile payments. The development of new payment instruments does not only affect how consumer use payment instruments to purchase goods and services or to transfer funds (see: Bounie and Bourreau (2007) [1416] and Bounie et François (2007) [1720]), it also transforms the industrial organization of the industry.

Before analyzing the impact of the introduction of a new payment instrument, a preliminary step has been to analyze the determinants of the choice of a payment instrument for consumers. Using an original data set, Bounie and François (2006) [1419], Bounie, François and Kiser (2007) [1578] and Bounie, Bourreau, François and Verdier (2008) [1417] studied the determinants of the adoption and usage of payment instruments and showed that the choice of a payment instrument is influenced more by the characteristics of the payment transaction and by the characteristics of the payment instrument than by individual characteristics (like age or income). Bounie and François (2009) [1421] also showed that the determinants of the choice of a bank branch are mainly related to indirect costs of cash withdrawals, whereas the direct of cash withdrawals have no significant effect.

Using this empirical research as a starting point, Bounie, François and Houy (2008) [1579] proposed a new decision rule to account for the choice of a payment instrument. They showed that their decision rule (the so-called "Cash holding model") predicts the choice of a payment instrument better than existing rules, like Whitesell's decision rule (Whitesell, 1989, 1992[7]). Bounie and Houy (2007) (see: [1808] and [1809]) provide axiomatic foundations for the Cash holding rule.

As Bounie and Gaze (2009) [1695] show, innovation in payment systems can take different forms: new billing systems, person-to-person lending, etc. The authors show that interbank systems induce high costs for clearing and settlement of payments that are not adapted to the specificities of internet payments. In a similar vein, Bounie and Gaze (2007) [1694] propose a synthesis of the main developments of internet payments and show that the use of such solutions

[7] Whitesell, W.C., 1989, "The Demand for Currency versus Debitable Accounts," *Journal of Money, Credit, and Banking*, 21(2), 246-251; Whitesell, W.C., 1992, "Deposit Banks and the Market for Payment Media," *Journal of Money, Credit, and Banking*, 24(4), 483-498.

are questioning the status of the payment function in the standard theories of banking. The introduction of a new currency can also have the same effect as an innovation in payment systems. Bounie and Soriano (2006) [1423] studied whether electronic money could substitute for Euro in the euro zone. Using a formal framework and numerical simulations, the authors estimated the maximum reduction of the mass of money. Bounie and Houy (2009) [1422] introduced a formal framework to evaluate the efficiency of the current division of euro coins.

One striking effect of innovation in payment systems is to favor person-to-person transfers. One interesting application concerns money transfers of migrants. Bounie, Diminescu and Licoppe (2008) [1693] and Bounie, François and Diminescu [1805] studied the effect of new transfer technologies on money transfers of migrants.

In equilibrium, the choice of a payment instrument results from the interaction between different players of the payment industry. The recent theory of two-sided markets proposes a framework to study interactions in payment markets ([1509]). Using this theoretical framework, Marianne Verdier (2009) [1609] shows that competition in the market for deposits in a context where banks share their ATM networks, leads to an inefficient substitution between cash and debit card. Verdier (2007) [1608] proposes a formal framework in which banks invest in the quality of the payment system. The author shows that, if consumers are sensitive to the quality of card payments, then the optimal interchange fee can be lower than the margin of the merchant bank, in contrast with the standard literature. Bourreau and Verdier (2008) [1583] study the incentives of a large retailer to bypass the payment system by building its own payment infrastructure. They show that the payment system can deter the merchant from introducing private cards by lowering the interchange fee.

9.3.2 Industry Evolution and Cultural Creation in the Digital Era (MICEN), Nicolas Auray and Patrick Waelbroeck (animators)

Project participants 14 full-time researchers

Multi disciplinary team (sociology, economics, statistics, econometrics, information systems, philosophy and ethics) with 3 economists (Myriam Davidovici-Nora, Michel Gensollen, Patrick Waelbroeck), 1 statistician (Ludovic Lebart), 3 sociologists (Nicolas Auray, Brigitte Munier-Temime, Dominique Pasquier) ; 4 communication and information researchers (Valérie Beaudouin, Olivier Fournout, Isabelle Garron, Pierre Musso).

Ph.D. Projects Rémi Douine (started fall 2004) : non-merchant competition on service markets

Sébastien François (started fall 2008): The involvements of media audiences and the mutations of cultural industries

Research contracts ANR PANIC (2009-2012)

French ministry of culture, DEPS

THD (2008-2010)

ANR Plug

ANR Autograph

Project description

The research project studies the transformation of media content and cultural activities in the digital era. Although some cultural activities have already experienced disruptive technological change, today's fast and easy access to digital content over the internet has revolutionized all cultural industries. Moreover, productivity gains associated with digital copies and internet communications go beyond the productive system. We can already witness three major changes. First, the structure of cultural industries traditionally modeled as an oligopoly with a competitive fringe is challenged by the digital transformation of the value chain. Second, the diffusion and promotion of cultural products now includes internet retailers, online platforms where consumers can interactively post comments and product recommendations, and the self promotion of niche

artists. Third, information reception about cultural products has become more active, and led by expert consumers. This process is interactive and self-reinforcing as the frontier between consumers and artists, between amateurs and professionals has become blurred.

Beyond the empirical studies detailed below, the project proposes a multidisciplinary approach to the understanding of new forms of coordination and cooperation between authors, editors, producers, retailers and broadcasters, culture experts and consumers. Three approaches interact in this project; each of them has met international standards of visibility and publications.

- Cultural economics to understand how cultural industries supply, and consumer demand, react to new forms of digital communication;
- A pragmatic approach that analyzes culture as performance, and that seeks to understand how material conditions affect cultural activities and how consumer tastes and amateur work are reflected by different forms of attachment between an individual and an artistic object.
- A sociological approach to cultural audiences that analyzes the collective dimensions of the process by which cultural products and performances are perceived in a community.

The interaction between these three approaches proposes complementary and original analysis of taste formation, invention of forms, cultural variety and attention.

The strength of MICEN lies in a detailed study of the transformation of formats linked to new forms of interaction between production, distribution and reception in the four main cultural industries and its relation to the public good nature of culture, which is relevant for public policies. With this respect, the project also analyzes how public policies, such as subvention, regulation of content and advertising have transformed our perception of culture.

The project builds on PANIC, an ANR project (2009-2012). The axis is led by researchers who have already studied the four main cultural industries (music, movies, book, video games) and therefore offers a perspective on how different supports have adapted to the media convergence.

Sub-theme 1: Cultural Creation and the Digitalization of Production

This part of the project deals with the challenges raised by digital transition of media industries. First, Bourreau, Bounie, Gensollen & Waelbroeck have undertaken an econometric study to assess the extent of economics of scale in cultural in the pre-recorded music industry. Bourreau and Bounie have analyzed the cultural industries as two-sided markets and stressed the specific challenges related to digital culture [1697]. Bourreau has isolated the effect of peer-to-peer networks on the music industry crisis in France [1697]. Musso questions the traditional concept of innovation in the context of the digital revolution. He reflects on technological “imaginaire” associated with new forms of cultural innovations where informal and collective creativity coexist [1786]. Munier offers a historical analysis of the digital revolution. She investigates early substitution between music-hall and theatre attendance on the one hand and prerecorded shows on videotapes, with a special focus on myths and symbols associated with technology [1785].

Several research works deal with intellectual property protection and how the separation of content and media has challenged our undestanding of copyright. Bourreau, Gensollen, & Waelbroeck have undertaken a study commissioned by the French Ministère de la culture on the impact of digitalization on the music industry [1428, 1698]. They observed different adoption rates of digital productivity tools such as digital retailing, internet recruitment, online websites and forums [1810, 1570]. Bacache, Bourreau and Gensollen offer a complementary study that seeks to understand how artists perceive opportunities and threats related to digital music [1551]. The vast survey is done in collaboration with the Adami.

In the audiovisual domain, Pasquier explores the transformation of the notion of originality using data on royalty rates [1496]. She also studies the tension between labor specialization and the inequality of audiences on television [1495]. For the videogame industry, Davidovici-Nora studies the dynamics of innovation in massive mutliplayers online role-playing games [1434]. Innovations are driven by cooperation among consumers to bring original content to the environment and by the desire of platform owners to control their rights.

Sub-theme 2: Collective Promotion and the Transformation of Retailing

New forms of distribution have appeared with the digital transformation of the cultural industries: online retailers, changes in the bargaining power between industry players, consumers communities.

Digital culture has multiplied the way consumers can access and experience content. This transformation together with online interactions has changed cultural practices. Pasquier has led a series of studies on the impact of sociability on taste formation and cultural preferences [1494]. She also analyzes the evolution of cultural transmission with respect to parental authority and peer influence [1767]. Auray and Gensollen describe taste formation in the context of online communities [1687], where consumers tend to experiment more with novelty [1406]. In this context, Auray studies which forms of regulation and governance are best suited to online collaborative filters [1402].

Cultural variety and the study of the long tail of electronic commerce is also an important theme. Bourreau and Gensollen construct several measures to track the evolution of cultural variety in the French music industry using data from GFK (2002 – 2007). Douine reports several measures of online audience and studies the impact of social networks on the promotion of new content on internet platforms. Bounie, Bourreau and Waelbroeck analyze the impact of music downloads on internet peer-to-peer networks on consumption and show that there are two types of internet users: pirates and explorers [1522, 1418, 1498].

Sub-theme 3: New Forms of Digital Consumption and the Emergence of Active Audiences

The research in this section deals with new forms of collective consumption of cultural content and the regulation required for collective or composite works. Using various surveys of media consumption and theatre attendance, Pasquier develops the notion of “performativity” of audience [1766]. Fournout and Garron have studied the issues of appropriation of literary works on the internet [1724]. Garron studies how online travel guides affect the business of the travel agencies [1639]. The team in collaboration with the IRI (Centre Pompidou) studies movies annotation systems associated with the development of fiber optic lines in 500 households.

Auray studies new forms of cultural consumption in online massive multiplayers worlds [1683]. He analyzes different forms of cultural production associated with different strategies of self projection and self promotion [1516]. François studies the way writers re-use the popular media culture to produce online content [1457]. Gentes studies online artist networks and shows how they question our understanding of modernity [1628]. Gentes and Garron study mobile solutions combining cell phones and audioguides on new forms of communication with the public in museums [1621]. Licoppe and Inada analyze games on mobile phones equipped with GPS devices and study issues related to the violation and the protection of personal territories [1489] et [1490]. Lejealle studies player sociability on online mobile phones and the relationship between media consumption and the decision to participate to collective actions [1782].

Sub-theme 4: The Evolution of Creation Formats and the Emergence of Interactive Constructs

The intertwining between production, distribution and reception of cultural goods gets tighter as users are involved in creation (“produsers”), consumers are involved in distribution (recommendation and conversation around cultural works) and producers highly focus on their audience and reputation. This interconnection also transforms the shape of digital and cultural goods.

This theme analyzes the evolution of cultural works in this moving context of active audience, open creation, mixing and rearranging parts. Around these transformations, this research analyzes the future of culture and examines the evolution of the notion of “cultural work”.

Fournout examines how the screen writing in electronic spaces of reception insert into a complex tradition of written dialogue (which he calls “diatext”), of which he studied the past and current forms [1452]. Gentes studies, starting from the example of networked art, how an “intermediality”

is set up [1623, 1531]. Beaudouin studies the transformation of digital writing and the emergence of transient writing formats; she analyzes the transformation of communication practices using new hybrid technical devices mixing oral communication with written speech [1411]. She investigates the transformations of sociability forms in the context of "being always on" and attention scarcity [1690]. Gensollen studies the emergence of new interactional constructs in the area of interactive platforms [1415].

9.3.3 Interaction, Technology, Activity (INTERACT), Françoise Detienne and Christian Licoppe (animators)

Permanent Researchers Michael Baker, Béatrice Cahour, Françoise Détienne, Jérôme Denis, Dana Diminescu, Annie Gentès, Christian Licoppe, Marc Relieu, Willemien Visser

Projects

As principalsPorteurs

- Projet "Urban uses of mobile multimedia services", with OrangeLabs, funding by Région Ile de France (2006-2008)
- Projet ANR (Blanc) SHS EPE, "Ecologies end politics of writing" (2006-2009)
- Projet "Graphic ecologies of public spaces", funded by Institut des Sciences et de l'Information et de la Communication du CNRS (2009)

As active funded participants

- Joint research laboratory Alcatel-Lucent Bell Labs- Institut Télécom "Ubimedia" (2009-2012)
- ANR SHS (Communication) COMUT "Communication and Multi-activity" (2009-2011)
- ANR STIC (Content and Interaction) CCCP-prosodie "Characterization and classification of communities of practice: participation and roles at individual level, internal organization, digital rights and external institutions" (2009-2011)
- ANR STIC (RIAM) PLUG on pervasive computing in museums(2009-2009)
- ANR STIC (RNTL) Myblog3D on intelligent virtual agents in 3D environments 3D (2007-2010)
- Contract MOTISTAR (Mobility and ICT in chinese metropolises): funded by Institut des Sciences et de l'Information et de la Communication du CNRS 2008-2009
- ANR SHS (Corpus) MOBITIC, construction of a corpus on mobilities and the uses of mobile communication devices(2007-2009)
- Projet GIP Justice (2007-2008) on Videoconference and distributed courtroom hearings
- Project Turbulences (Started 2009) on social networking, migration and mobilities

Ongoing Ph.D. projects Hanene Jomaa (CIFRE with CIGREF, started 2003, ended 2009)) : ICT and performance analysis. From interactionnism to the institution of performance-oriented routines. (to be held in November 2009)
Karine Lan Hing Ting : Phone interactions with consumers in outsourced call centers in Mauritius (started 2006).
Dimitri Voilmy : Interactional uses of interactive blackboards in the classroom (started 2007).
Maria Ianeva (Co-direction with university of Lyon II): Customer relationship in call centers from an activity theory perspective (started 2007).
Stephane Couture (co-direction with the Université du Quebec à Montréal, started 2007) : sociology of code

Guillaume Ereteo (started 2007): Semantic annotation-based methods for detecting the emergence of communities of practice and supporting their development along their life-cycle
Anne-Marie Hebert (started 2008): Ethnographic study of the design of a mobile game.
Jean-Louis Teitelbaum (started 2008) : Social history of computer desktop "affordances".
Caroline Jullien (CIFRE with OrangeLabs, started 2008) : The new forms of mediated presence.
Carine Khalil (Started 2008): User-centered lean design for ICTs and the dynamics of organizing
Min Zhang (started 2008): Socio-technical assemblages, public space and urban fragmentation : the Chinese case.
Magali Prost (started 2009) : Affective dimensions of mediated communications in professional online forums
Lalao rakotiainia (CIFRE Alcatel, started 2009): Using existing media cultures to design innovative learning practices for the use of advanced ICT services.

This project deals with the fine-grained observation and analysis of the interplay between social interaction, information and communication technologies and activity system in concrete settings. It is an interdisciplinary research program which involves psychology, cognitive ergonomics, sociology, information and communication sciences aimed at understanding emergent cultures in digital "forms-of-life" [1798], inhabiting "informational ecologies". Beyond the various empirical themes detailed below it is also a locus for a more theory-oriented investigation of the convergence and divergence of different activity-oriented theories and methodologies. The questions discussed here are also part of a more general "practice turn" which is an active concern of current work at the international level in several very active communities (human-computer interaction, computer supported cooperative work, ubiquitous computing, interaction design, mobility studies, conversation analysis, organization sciences, etc.), whose theories we try to adapt and discuss with a sharper focus on the situated use of information and communication technologies [1484] [1504], and the use of video analysis to study multimodal and multiple engagements in complex settings [1508].

Sub-theme 1: Mediated communication and new interactional modalities

A first thread of research in this theme deals with the organization of mediated interactions, and the ways participants accomplish relevant interactional moves and in mediated communication in different settings and the emergence of communicative genres : the construction of emotion in collaborative interactions [1585], instant messaging in professional settings (the emergence of the "quick question" genre), accomplishing informal encounters between colleagues in video-mediated tele-presence environments [1506] [1505], managing commercial "rebounds" and accomplishing "commercial gestures" on the phone in commercial call centers for a telco [1479], caring for suicidal callers on the phone [1481] [1483], discussing a purchase at a distance in advanced collaborative video environments, interactions between phone callers and conversational machines in call center (the issue of "conversational repairs"), interactions between avatars in Second Life (the management of social interaction and "embodied" proximities in the virtual space).

Another (related) set of research deals with how participants coordinate, collaborate and manage multiple involvements in complex activities unfolding in co-present and/or distributed settings in which information and communication technologies figure as prominent resources: finding friends and keeping together in multimedia events, taking turns at the ordinary or interactive blackboard in the classroom, managing ongoing interactions between co-present and distant sites and showing documents onscreen in video-conference and tele-presence environments, managing customers and collaborating with colleagues and managers on large call center platforms in the service industry [1471] [1472] and e-commerce [1701] [1749]. One running project in this thread has followed the development of distributed judicial hearings in France from initial experiments in

Saint-Pierre and Miquelon to its generalization today in every courtroom and prison in France. It has explored the interplay of the technology with the dual accountability regime (with respect to the organization of mundane social interactions and with respect to the law) which characterizes such settings [1488] [1480].

Sub-theme 2: Emerging roles, regulation and governance in online communities

This direction of research aims to understand the dynamics of online communities. A first thread of research aims to understand the various forms of participation in online communities. Based on interactionist psychology and cognitive ergonomics, participation is approached by the notion of role, viewed as a phenomena emerging from interaction. It is analysed along several combined dimensions (social, cognitive, interactive). Analyses along these three primary dimensions allows a second-level analysis, where their combination allows participation profiles of participants to be revealed [1688]. According to this framework, participation in a community based on open source software production has been analysed. A set of participation profiles [1410] [1408] [1409] have been identified as they evolve throughout the interaction, which provides a global vision of the whole collective process and its dynamics.

A complementary research direction concerns the emergence of a new participatory model of democratic process [1682], in particular through the forms of implication of people in collective production of informational public goods [1439, 1404]. The major issues in governance and regulation of online communities have been identified, so as to underline the rules of the new "economy of contribution" which is being established [1403]. This research has focused on the treatment of underhand vandalism, on the institutional mechanisms – like relative veto – invented to struggle against chronophagy of online concertation, in particular the moderation processes which are experienced to avoid the slippage of cooperation in conflict. An investigation of the co-writing graphs and of the effective norms of collaboration in the French Wikipedia has been fulfilled [1405, 1406]. More generically, the changing context of information production and the increasing influence of the strategies implemented by communication agencies or structures have been studied [1686].

Another research concerns the implication of the information technologies for some professionally active people, through the new solidarities emerging from the online communities. It emphasizes the relief function of blogs for some suffering workers. The effusion in blogs is used to compensate the decaying of the places and of the moments of shared listening in the work organization, and the demand of recognition is a substitute for the decline of the collective instances of representation of the staff [1685].

Sub-theme 3: Interaction, space and mobility

This research theme develops an ethnographic perspective on space, communication and mobility. It is highly connected to the development of ubiquitous computing and pervasive communication technologies. How do users manage spatial and communicational, local and distant, multimodal resources to produce various experiences of communication reflexively anchored in definite spatial settings or "on the move"? Most of the work in this theme relies on the gathering of naturally occurring sequences, and it relies on corpora of mobile phone conversations and mobile video calls (the latter being the only one of its kind). It deals with space-related interactional topics such as "talking while walking", providing directions or guiding a mobile recipient in a mobile phone conversation using mobile communication devices while being mobile [1773], connecting to and using mobile multimedia services on the move [1539] [1514]. A similar approach has been developed in mobile video calls, the focus of which is on the work users do to produce relevant images, and to switch from a "talking heads" interaction format to a "video as data" format in which they frame some feature in their settings. Another line of research deals with the social management of mediated proximity, that is how mutual positional knowledge, and particularly proximity awareness as achieved from a distance in different settings (mobile conversation, location aware communities) projects strong expectations regarding face to face encounters [1486].

The development of locative media offers new opportunities and resources for this kind of research. Researchers in this thread have performed the first ethnography of a location aware community, i.e. the Japanese players of the geo-located game MOGI between 2003 and 2008 [1489] and tried to elucidate some of the more significant concerns and behavioral patterns in the social management of location awareness : the construction of territories in hybrid ecologies [1490], "augmented" social encounters [1751] and transgressive behavior such as "stalking" [1703]. They have also explored the potential of location data for large scale behavioral studies of mobility and communication, with the constitution and analysis of a corpus of locations (through mobile cell positioning) and communication acts (in collaboration with Orange for a test sample of 25 urban dwellers over a year). Findings show how the probabilities to use the phone were highly dependent on places, and various form of interplay between communication and mobility patterns [1487, 1713]. The research program MOBISTAR (ISCC 2008) has explored how chinese cities and their inhabitants interact with ICT-focused socio-technical systems (here "cybercafés"), and how new socio-technical practices produce fleeting or unstable urban forms and reinforce social fragmentation [1655].

The recent evolution of migratory systems combines the issues of space and community, communication and mobility, with the new and complex entanglements between place and online participation which characterize current diasporic phenomena. Their study calls for a new epistemological and methodological approach [1646]. Diaspora-related uses of the web are both a cause and a consequence of emerging Web geographies that questions traditional social science dichotomies such as "center" and "periphery".

Sub-theme 4: Understanding the construction, maintenance and use of complex information ecologies

Distributed cognition has shown how coordination and communication practices rely on environmental resource. Our environments are more and more constructed, governed, and regulated as ecologies embedding cues designed to invite some form of behavior. One research program has looked closely at the construction and maintenance of urban public transport sign systems. Such an ethnographic approach to "graphic ecologies", accomplished in the frame of the ANR project "Ecologies et Politiques de l'Écrit" led by one of us, highlight the competition of various sign infrastructures and the scripts they materialize in public spaces [1707], raising the issue of their integration in a coherent whole [1589]. As much as this informational infrastructure strives for perceptual salience, it makes invisible the work of its production and maintenance, and the people who do that work [1590]. All these issues have lead to a new research program about: Graphical Ecologies of Public Spaces (ISCC 2009).

This connects to more general issues about the performativity of artefacts [1435], [1480] whether they be "static signs", electronic displays, or communication related micro-events. This research program has also looked at the issue of how mediated communicative events start, through "notifications" (which may be linguistic or not) and at the pragmatics of such occurrences: such notifications proliferate and become more "indirect" while users actively shape their notification landscape to adjust what they actually do when they occur, all this raising new theoretical issues about performativity [1482, 1748, 1532].

In the same thread, an ethnography of prescriptions at work has been made. It shows that rules are grounded in mundane activities through heterogeneous ecologies within which artifacts play a important role, but also specific people who stand has intermediaries and strive for a day-do-day balance between the automation of rules and their translation for everyday tasks [1436].

Approaching the use of ICTs through the way information ecologies are designed, maintained and inhabited also rises the question of their increasing complexity and force of agencies. Do they support (and if they actually do, how ?) multiple involvements, and multi-activity [1432, 1478, 1485]. This has led to a significant participation of several researchers in this thread in the 2008 ANR project COMUT exploring joint issues about communication and multi-activity.

Sub-theme 5: Designing technologies, engineering interactions

A first thread of research aims to understand and construct models of the design activity, in particular design of interactive or cooperative systems. One theoretical issue is to characterise design with respect to other cognitive activities. According to an augmented cognitively oriented generic-design hypothesis [1511, 1512], there are both significant similarities between the design activities implemented in different situations and crucial differences between these and other cognitive activities; yet, characteristics of a design situation (related to the design process, the designers, and the artefact) introduce specificities in the corresponding cognitive activities and structures that are used, and in the resulting designs. One methodological issue concerns the analysis of the design activity. A special effort has been made to elaborate methodological principles for analysing collaborative design [1793]. A pluri-disciplinary approach, based on science of language, psychology of interaction, and cognitive ergonomics (see [1708] for cognitive and interactive approaches) has been developed. Different analysis principles have been developed and compared on the basis of a same corpus of collaborative design (on the CLAPI basis, `http://clapi.univ-lyon2.fr/`, corpus Mosaic). The cognitive ergonomics' analysis has been extended taking into consideration interaction's multi-modality [1584, 1777].

A second, and complementary, thread of research concerns the design and evaluation of interactive technologies with respect to their future use. Several engineering research projects (ANR + FP6) on adhoc wifi, RFID, and 3D applications have been conducted which combines a media studies approach to an engineering design approach so as to better understand the rationale of conception of communicating object [1594, 1587, 1461]. A focus is put on the role of intermediary artefacts as creative mediation in collective design [1460]. This is complemented by case studies in science and technology studies documenting ethnographically the design of mobile location-based services, such as the design and social construction of a location aware game [1750], or the design and implementation of Bluetooth-enhanced ads in underground stations from a sociological and juridical perspective.

Furthermore, a special effort is made to elaborate methods to assess usability and acceptability of technologies: methodologies of "re-situating" interviews for analysing user experience [1702] and understanding potential sources of emotional discomfort [1586]; methodologies to support the construction of trust in systems by projecting users into use [1431]; methodologies to assess groupware technologies on the basis of user-studies [1591], video-based methodology to analyze connexion to mobile multimedia services in context.

9.4 References

9.4.1 ACL: Articles in Indexed Journals

[1400] M.-L. Allain and P. Waelbroeck. La concurrence entre distributeurs favorise-t-elle la variété des produits ? *Economie et Prévision*, February 2007.

[1401] S. Assar, G. Beauvallet, and I. Boughzala. L'Administration électronique, un point de rencontre entre la pratique des projets et la recherche en management des systèmes d'information. *Systèmes d'information et management*, 10(5), May 2005.

[1402] N. Auray. Folksonomy : a new way to serendipity. *Communications & Strategies*, (n^{o}65):pp. 67–91., June 2007.

[1403] N. Auray. Le modèle souverainiste des communautés en ligne : impératif participatif et désacralisation du vote. *Hermès*, (48):pp. 137–145, January 2008.

[1404] N. Auray and D. Kaminsky. The professionalisation paths of hackers in it security: The sociology of a divided identity. *Annals of Telecommunications*, 11-12(62):1313–1327, December 2007.

[1405] N. Auray, P. Pons, and C. Poudat. Democratizing scientific vulgarization : the balance between conflict and cooperation in french wikipedia,. *Observatorio*, vol 1(3):20–55, March 2008.

[1406] N. Auray, C. Poudat, and M. Hurault-Plantet. La négociation des points de vue : une cartographie sociale des controverses dans wikipedia francophone. *Réseaux*, 27(154):15–50, May 2009.

[1407] E. Baranès and M. Bourreau. An economist's guide to local loop unbundling. *Communications & Strategies*, 57:13–31, April 2005.

[1408] F. Barcellini, F. Détienne, and J.-M. Burkhardt. User and developer mediation in an open source software community: boundary spanning through cross participation in online discussions. *International Journal of Human Computer Studies*, 66(7):558–570, May 2008.

[1409] F. Barcellini, F. Détienne, and J.-M. Burkhardt. Participation in online interaction spaces: design-use mediation in an open source software community. *International Journal of Industrial Ergonomics*, June 2009.
[1410] F. Barcellini, F. Détienne, J.-M. Burkhardt, and W. Sack. A socio-cognitive analysis of online design discussions in an open source software community. *Interacting With Computers*, 20(1):141–165, May 2008.
[1411] V. Beaudouin. Powerpoint : le lit de procuste revisité. *Social Sciences Information*, 47(3):371–390, May 2008.
[1412] G. Beauvallet. Quand l'écran fait écran : la numérisation du travail coopératif. *Communication et Langages*, (148):15–28, 2006.
[1413] G. Beauvallet. Partie de campagne : militer en ligne au sein de "Désirs d'avenir". *Hermès*, (47):155–166, June 2007.
[1414] G. Beauvallet and M. Ronai. Vivre à Temps Réels. Le Renouvellement des pratiques militantes autour des TIC est-il possible au sein des partis de gouvernement ? *Réseaux*, 23(129-130):275–306, July 2005.
[1415] C. Bonneau and M. Gensollen. Web 2.0: The internet as a digital common. *Communications & Strategies*, 65(1):9–14, February 2007.
[1416] D. Bounie and M. Bourreau. The payment industry facing new challenges. *Communications & Strategies*, (66):11–15, 2007.
[1417] D. Bounie, M. Bourreau, A. François, and M. Verdier. La détention et l'usage des instruments de paiement en france. *Revue d'Economie Financière*, 91:53–76, March 2008.
[1418] D. Bounie, M. Bourreau, and P. Waelbroeck. Pirates or explorers? analysis of music consumption in french graduate schools. *Brussels Economic Review*, 50(2), 2007.
[1419] D. Bounie and A. François. Les déterminants de la détention et de l'usage des instruments de paiement : éléments théoriques et empiriques. *Revue d'Economie Financière*, (83):159–173, March 2006.
[1420] D. Bounie and A. François. Is baumol's 'square root law' still relevant? evidence from micro-level data. *Applied Financial Economics*, 18(13):1091–1098, July 2008.
[1421] D. Bounie and A. François. Pourquoi les détenteurs de carte de retrait retirent-ils encore des espèces aux guichets bancaires ? *Revue d'Economie Industrielle*, 2009.
[1422] D. Bounie and N. Houy. La structure du système des divisions monétaires européen est-elle efficace ? *Revue Francaise d'Economie*, 2009.
[1423] D. Bounie and S. Soriano. La substitution de la monnaie électronique à la monnaie fiduciaire: modèle et simulations. *Revue Francaise d'Economie*, XX, January 2006.
[1424] M. Bourreau and P. Dogan. Unbundling the local loop. *European Economic Review*, 49(1):173–199, January 2005.
[1425] M. Bourreau and P. Dogan. Build or buy strategies in the local loop. *American Economic Review*, 96(2):72–76, May 2006.
[1426] M. Bourreau and P. Dogan. Cooperation in product development and process r&d between competitors. *International Journal of Industrial Organization*, 2009.
[1427] M. Bourreau, P. Dogan, and M. Manant. Modularity and innovation in digital markets. *Review of Network Economics*, 6(2):175–193, 2007.
[1428] M. Bourreau and M. Gensollen. L'impact d'internet et des technologies de l'information et de la communication sur l'industrie de la musique enregistrée. *Revue d'Economie Industrielle*, (116):31–70, December 2006.
[1429] M. Bourreau and B. Labarthe-Piol. Crise des ventes de disques et téléchargements sur les réseaux peer-to-peer : le cas de la france. *Réseaux*, (139):106–144, December 2006.
[1430] M. Bourreau and N. Sonnac. Competition in two-sided markets. *Communications & Strategies*, (61):11–15, 2006.
[1431] B. Cahour and J. F. Forzy. Does projection into use improve trust and exploration? an example with a cruise control system. *Safety Science*, December 2009.
[1432] C. Datchary and C. Licoppe. La multi-activité et ses appuis. l'exemple de la présence obstinée des messages dans l'environnement. *Activités*, 4(1):4–29, 2007.
[1433] M. Davidovici-Nora. Les analyses économiques du piratage des biens numériques. *Revue Francaise d'Economie*, XX(2):107–149, October 2005.
[1434] M. Davidovici-Nora. The dynamics of co-creation in the video game industry: The case of world of warcraft. *Communications & Strategies*, 1st quarter(73):53–66, March 2009.
[1435] J. Denis. Les nouveaux visages de la performativité. *Études de communication*, (29), 2006.
[1436] J. Denis. La prescription ordinaire. circulation et énonciation des règles au travail. *Sociologie du travail*, 49(4):496–513, December 2007.
[1437] J. Denis. Projeter le marché dans l'activité. les saisies du public dans un service de production télévisuelle. *Revue Française de Socio-économie*, 1(2):161–180, January 2008.
[1438] D. Diminescu. The connected migrant. an epistemological manifesto. *Social Sciences Information*, 47(4):565–579, 2008.
[1439] R. Dorat, M. Latapy, B. Conein, and N. Auray. Multilevel analysis of an interaction network between individuals in a mailing-list. *Annals of Telecommunication*, (3-4):62–88, April 2007.
[1440] A. Duchêne, M. Peitz, and P. Waelbroeck. Can drm create new markets? *Communications & Strategies*, 62:197–207, September 2006.
[1441] A. Duchêne and P. Waelbroeck. Legal and technological battle in music industry: Information-push vs. information-pull technologies. *International Review of Law and Economics*, 2007.
[1442] V. Fautrero, V. Fernandez, and G. Puel. Alternative technologies : What about "alternative" dimension? *Geojournal*, 2005.
[1443] Ch. Fauvelle-Aymar and A. François. The impact of closeness on turnout : An empirical relation based on a study of a two round ballot. *Public Choice*, 127(3-4):461–483, June 2006.

[1444] V. Fernandez, L. Draetta, and et al. Nouvelle politique industrielle et constitution de systèmes territoriaux d'innovation : le cas du secteur tic. *Revue d'Économie Régionale et Urbaine*, September 2009.
[1445] V. Fernandez, V. Fautrero, and G. Puel. Les technologies alternatives d'accès au haut débit : l'expérimentation comme lieu de jeux d'acteurs. *Réseaux*, 24(137):149–172, 2006.
[1446] V. Fernandez, V. Fautrero, and G. Puel. Alternative technologies for rural areas - what about the "alternative" dimension of wi-fi. *Geojournal*, 68(1):41–53, 2007.
[1447] V. Fernandez, V. Fautrero, and G. Puel. Les technologies alternatives à l'usage : à propos d'une expérimentation "satellite-wifi". *Espaces et Sociétés*, 131(4):137–153, 2007.
[1448] V. Fernandez, V. Fautrero, and G. Puel. The business ecosystem of alternative high-speed internet technologies: between stimulating and foreclosing the french market. *Communication and Strategies*, September 2009.
[1449] V. Fernandez and H. Isaac. Assessment of and prospects for research on knowledge management. *Revue des Annales des Télécommunications*, 62(7/8):938–945, July 2007.
[1450] V. Fernandez and S. Rivard. Km : les réseaux de connaissances. *Revue des Annales des Télécommunications*, 62(7/8):723–733, July 2007.
[1451] O. Fournout. La forme érotique des dialoques par médias informatisés. *Communication & Langages*, (145):17–36, September 2005.
[1452] O. Fournout. Diatextes. *Communication & Langages*, (156):3–20, June 2008.
[1453] A. François and M. Foucault. Le rendement des dépenses électorales en france : le cas des élections législatives de 1997. *Revue Economique*, 55(5):1125–1144, September 2005.
[1454] A. François, M. Foucault, and F. Baumgartner. Punctuated equilibrium in french budgeting processes. *Journal of European Public Policy*, September 2006.
[1455] A. François, M. Foucault, E. Dubois, and F. Facchini. Un modèle explicatif du vote fnsea aux élections des représentants des chefs d'exploitation aux chambres d'agriculture départementales (1995-2001). *Economie rurale*, 2009.
[1456] A. François and N. Sauger. Groupes d'intérêt et financement de la vie politique en france : une évaluation des effets de l'interdiction des dons des personnes morales. *Revue française de Science Politique*, April 2006.
[1457] S. François. Fanf(r)ictions. tensions identitaires et relationnelles chez les auteurs de récits de fans. *Réseaux*, 27(153):157–189, January 2009.
[1458] Y. Gassot and G. Pogorel. Reviewing the review-communication & strategies-special issue-. *Communications & Strategies*, (64), November 2006.
[1459] A. Gentès. L'intime à l'épreuve du réseau. *Communication et langages*, (152), June 2007.
[1460] A. Gentès. Design et médiation créative dans les technologies de l'information. *Hermès*, (50), March 2008.
[1461] A. Gentés. Pervasive gaming: testing future context aware applications. *Communications & Strategies*, (73), March 2009.
[1462] A. Gentès and C.-A. Braun. Between representation and social interaction : Fluxus intermedia and dialogic form on the internet. *Post Indentity*, 4(2), June 2005.
[1463] C. Guéneau. L'intéractivité : une définition introuvable. *Communication & Langages*, (145):117–130, September 2005.
[1464] T. Houy. Ict and lean management : Will they ever get along ? *Communications & Strategies*, (59):53–75, September 2005.
[1465] T. Houy and G. Beauvallet. L'adoption des pratiques de gestion lean dans les entreprises industrielles françaises. *Revue Française de Gestion*, pages 256–265, February 2009.
[1466] T. Houy and G. Beauvallet. Research on hrm and lean management: A literature survey. *International Journal of Human Resources Development and Management*, February 2009.
[1467] T. Houy and N. Houy. Outils de reporting structuré (ors) et pratiques d'amélioration continue (ac). *Revue Française de Gestion*, February 2009.
[1468] Y. Jeanneret and E. Souchier. L'énonciation éditoriale dans les écrits d'écran. *Communication & Langages*, (145):3–16, September 2005.
[1469] Y. Jeanneret and E. Souchier. "productions médiatiques et logiques publicitaires", coordination du numéro. *Communication & Langages*, (143), March 2005.
[1470] C. Karamti. Indices de prix des services de la téléphonie mobile en france. *Economie et Statistiques*, 2007.
[1471] K. Lan Hing Ting. Ethnographier le bruit en centre d'appels : une analyse située de l'activité des téléopérateurs. *Activités.org*, November 2008.
[1472] K. Lan Hing Ting and B. Pentimalli. Le "bruit" comme ressource pour la coopération et la coordination entre téléopérateurs dans les centres d'appels. *Ethnographiques.org*, November 2008.
[1473] K. Lan Hing Ting and D. Voilmy. L'evitement du blanc radiophonique comme accomplissement multimodal. *Communications*, 27(1), February 2009.
[1474] J. S. Lantz and J.-M. Sahut. R&d investments and the financial performances of technological firms. *International Journal of Business*, 10(3), 2005.
[1475] L. Lebart. Assessing self organizing maps via contiguity analysis. *Neural Networks*, 19:847–854., February 2006.
[1476] L. Lebart. Correspondence analysis and self organizing maps. *Tetradia Analysis Dedomenon. (Data Analysis Quarterly),*, September 2007.
[1477] C. Levallois-Barth. Géolocalisation : du service au traçage. *Hermès*, April 2009.
[1478] C. Licoppe. De la communication interpersonnelle aux communautés épistémiques : le développement des tic et l'enracinement du paradigme de la distribution. *Hermes*, 47:59–68, 2007.
[1479] C. Licoppe. La construction conversationnelle de l'activité commerciale : "rebondir" au téléphone pour placer des services. *Réseaux*, 24(135-136):123–148, 2007.

[1480] C. Licoppe. Ouvrir, suspendre et lever une audience à distance tenue par visioconférence : effets performatifs des actes de langage et situations équipées. *Etudes de communication*, 29:95–117, 2007.
[1481] C. Licoppe. Pushing the distribution model to its limits : "listening" in a helpline. *Computer Supported Cooperative Work*, 15(2-3):123–148, 2007.
[1482] C. Licoppe. Qu'est-ce que répondre au téléphone ? une sociologie des sonneries téléphoniques (musicales). *Reseaux*, 25(141-142):327–360, February 2007.
[1483] C. Licoppe. Aux limites du paradigme de la distribution: l'écoute des appels de détresse et le traitement de la souffrance des suicidaires, du téléphone à l'e-mail. *Sociologie du Travail*, 50(3):417–433, 2008.
[1484] C. Licoppe. Dans le carré de l'activité : perspectives internationales sur le travail et l'activité. *Sociologie du Travail*, 50(3):287–302, 2008.
[1485] C. Licoppe. Logiques d'innovation, zapping et multiactivité au travail. *Hermes*, 50:171–178, 2008.
[1486] C. Licoppe. Recognizing mutual 'proximity' at a distance. weaving together mobility, sociality and technology. *Journal of Pragmatics*, 41, 2009.
[1487] C. Licoppe, D. Diminescu, Z. Smoreda, and C. Ziemlicki. Using mobile phone geolocalisation for 'socio-geographical' analysis of coordination, urban mobilities and social integration patterns. *Tijdschrift voor Economische en Sociale Geografie*, 99(5):584–601, 2008.
[1488] C. Licoppe and L. Dumoulin. L'ouverture des procès à distance par visioconférence : activité, performativité, technologie. *Réseaux*, 25(144):103–140, 2007.
[1489] C. Licoppe and Y. Inada. Les usages émergents d'un jeu multijoueurs sur terminaux mobiles géolocalisés. mobilités équipées dans un japon. *Réseaux*, (133):135–164, 2006.
[1490] C. Licoppe and Y. Inada. Geolocalized technologies, location aware communities and personal territories : The mogi case. *Journal of Urban Technology*, 15(3):pp. 5–24, 2008.
[1491] C. Licoppe and M.-A. Picard. Ventes et enchères en ligne sur un même site internet : enjeux et conséquences du voisinage d'écran de deux modalités de mise en marché. *Economie Rurale*, April 2005.
[1492] C. Licoppe and Z. Smoreda. Are social networks technologically embedded ? how networks are changing today with changes in communication technology. *Social Networks*, 27(4):317–335, October 2005.
[1493] B. Munier. Comment l'esprit vient aux machines. l'imaginaire de l'objet et de la machine aux débuts de la modernité. *Communication et Langages*, (50), December 2006.
[1494] D. Pasquier. Culture et sociabilité : les pratiques de loisir des français. *Réseaux*, (145-146):158–215, May 2007.
[1495] D. Pasquier. Conflits professionnels et luttes pour la visibilité à la télévision française. *Ethnologie Française*, 38(1):23–31, May 2008.
[1496] D. Pasquier. Les barèmes de l'originalité. *Réseaux*, (148-149):175–201, May 2008.
[1497] M. Peitz and P. Waelbroeck. Piracy of digital products: A critical review of the theoretical literature. *Information Economics and Policy*, 18(4):449–476, 2006.
[1498] M. Peitz and P. Waelbroeck. Why the music industry may gain from free downloading - the role of sampling. *International Journal of Industrial Organization*, 24(5), 2006.
[1499] G. Pogorel. Competitive compliance: streamlining the regulation process in telecom & media. *Communications & Strategies*, (61):159–162, March 2006.
[1500] G. Pogorel. Nine regimes of radio spectrum management: a 4-step decision guide. *Communications & Strategies*, (65):169–184, April 2007.
[1501] R. Préget and P. Waelbroeck. Treasury auction procedures: Empirical perspectives from market bid functions. *Journal of International Money and Finance*, 24(7):1054–72, November 2005.
[1502] R. Préget and P. Waelbroeck. Un modèle d'estimation de la valeur des lots de bois à partir des résultats d'enchère avec invendus. *Revue Economique*, 57(3):593–604, May 2006.
[1503] M. Relieu. Les usages des tic en situation naturelle : une approche éthnométhodologique de l'hybridation des espaces d'activité. *Intellectica*, (41-42), 2006.
[1504] M. Relieu. Remarques sur l'analyse conversationnelle et les activités médiatisées. *Revue Française de Linguistique Appliquée*, XI(2):17–32, December 2006.
[1505] M. Relieu. La téléprésence, ou l'autre visiophonie. *Réseaux*, 23(144):183–225, February 2007.
[1506] M. Relieu and C. Licoppe. Présentation "de la rue au tribunal. etudes sur la vidéocommunication". *Réseaux*, 23(144):9–23, November 2007.
[1507] M. Relieu, P. Salambier, and J. Theureau. Activités et action/cognition situées : introduction. *Activités*, 1(2), 2005.
[1508] M. Relieu, M. Zouinar, and N. La Valle. At home with video cameras. *Home Culture*, 4(1), April 2007.
[1509] M. Verdier. Retail payment systems: what do we learn from two-sided markets? *Communications & Strategies*, 61:37–51, March 2006.
[1510] M. Verdier. Payment card systems in europe: Convergence or disappearance? *Communications & Strategies*, 69:127–147, March 2008.
[1511] W. Visser. Design: one, but in different forms. *Design Studies*, 30(3):187–223, January 2009.
[1512] W. Visser. La conception : de la résolution de problèmes à la construction de représentations. *Le Travail Humain*, 72(1):61–78, 2009.
[1513] D. Voilmy and K. Lan Hing Ting. A first-time wireless internet connection: more than just clicking on a link. *PsychNology Journal*, 15(2):165–195, 2007.
[1514] D. Voilmy, Z. Smoreda, and C. Ziemlicki. Geolocation and video ethnography: capturing mobile internet used by a commuter. *Mobilities*, 3(2):201–222, July 2008.
[1515] P. Waelbroeck. Computational issues in the sequential probit model: A monte-carlo study. *Computational Economics*, 26(2):141–161, 2005.

9.4.2 ACLN: Articles in Other Refereed Journals

[1516] N. Auray. " entre individualisme et singularité : le star sims theme des amateurs de sims ". *Médiamorphoses*, (n°21):53–68, November 2007.
[1517] N. Auray and M.-C. Legout. Entre individualisme et singularité : le star sims thème des amateurs de sims. *Médiamorphoses*, (16):67–80, 2006.
[1518] M. Bacache and F. Audier. Le métier de procureur de la république. *Economies et Sociétés*, December 2008.
[1519] F. Ballé and M. Ballé. Lean development. *Business Strategy Review*, 16(3):17, October 2005.
[1548] G. Beauvallet, M.-C. Le Garff, F. Cara, and A.-L. Negri. L'usage d'Internet par les demandeurs d'emploi. *La Revue de l'IRES*, (3):41–69, December 2006.
[1521] M. Berne and G. Pogorel. Privatisation experiences in france. *Journal for Institutional Comparisons*, 3(1):33–40, May 2005.
[1522] D. Bounie, M. Bourreau, and P. Waelbroeck. Piracy and the demand for films: Analysis of piracy behavior in french universities. *Review of Economic Research on Copyright Issues*, 3(2):15–27, December 2006.
[1523] M. Bourreau. A comment on: Martin peitz and patrick waelbroeck: An economist's guide to digital music. *CESifo Economic Studies*, 51(2-3):429–433, February 2005.
[1524] N. Cortési-Grou. Suivre un stage long à distance : la dimension symbolique. *Education-Formation*, e-289, December 2008.
[1525] V. Fernandez, V. Fautrero, and G. Puel. Réseaux wifi, jeux d'acteurs et territoires : diffusion, adoption et appropriation. *Revue du Management Technologique*, 15(1):47–67, 2006.
[1526] A. François. Testing the "baobab strategy" of the french politicians. the " cumul des mandats " as a way of obtaining more political resources and limiting electoral competition. *French Politics*, December 2006.
[1527] A. François and C. Fauvelle-Aymar. Campaign, political preference and turnout. an empirical study of the 1997 french legislative election. *French Politics*, 3(1):49–72, March 2005.
[1528] A. François and M. Foucault. La politique influence-t-elle les décisions publiques locales ? analyse empirique des budgets communaux de 1977 à 2001. *Politique et Managment Public*, 2005.
[1529] A. François, M. Foucault, and F. Baumgartner. Public budgeting in the french fifth republic: The end of. *West European Politics*, March 2009.
[1530] M. Gensollen. Les communautés en ligne : échanges de fichiers, partage d'expériences et participation virtuelle. *ESPRIT*, (324), May 2006.
[1531] A. Gentès. Art sur le web : citation, échantillon et jeu. *Terminal*, (101), November 2007.
[1532] C. Licoppe. Pragmatique de la notification. *Tracés*, 16(1):77–98, 2009.
[1533] P. Musso. Le rapport jouyet-lévy. *QUADERNI*, (64):81–88, November 2007.
[1534] P. Musso. L'éternel non-retour à l'ortf. *QUADERNI*, (65):81–92, February 2008.
[1535] P. Musso. Perroux lecteur du saint-simonisme. *Economies et sociétés*, November 2009.
[1536] P. Musso and et al. Critique de la notion de territoire numérique. *QUADERNI*, (66):15–30, April 2008.
[1537] M. Peitz and P. Waelbroeck. An economist's guide to digital music. *CESifo Economic Studies*, 51(2-3):359–428, 2005.
[1538] M. Relieu. Quels contextes pour quelles interactions ? remarques sur l'étude située des activités de communication médiée. *Migrance*, 23, March 2005.
[1539] M. Relieu and J. Morel. Le caméraphone...pour être ensemble. *MediaMorphoses*, (21):107–112, September 2007.

9.4.3 ACLN: Articles in Non Refereed Journals

[1540] M. Bacache. Economie politique des déficits publics. *Idées*, pages 18–26, March 2008.
[1541] M. Bacache. Les cycles politiques. *Idées*, pages 10–18, March 2008.
[1542] M. Bacache. Marché et droit: la logique économique du droit de l'enironnement. *Pouvoirs*, (127):35–47, November 2008.
[1543] M. Bacache. Que nous apprend l'économie politique sur l'économie publique ? *Idées*, pages 4–8, March 2008.
[1544] M. Ballé. Lean attitude - lean applications often fail to deliver the expected benefites but could the missing link for successful implementations be attitude? *IEEE Manufacturing Engineer*, 84(2):14–19, April 2005.
[1545] M. Ballé, G. Beauvallet, A. Smalley, and D. Sobek. The Thinking Production System. *Reflections: the SoL. Journal*, 7(2):1–12, May 2006.
[1546] M. Ballé and A. Regnier. Lean as a Learning System in a Hospital Ward. *Leadership in Health Services*, 20(1):33–41, January 2007.
[1547] G. Beauvallet. Si einstein avait eu un mail, il n'aurait jamais reçu le prix Nobel. *01 Informatique*, (1806), March 2005.
[1548] G. Beauvallet, M.-C. Le Garff, F. Cara, and A.-L. Negri. L'usage d'Internet par les demandeurs d'emploi. *La Revue de l'IRES*, (3):41–69, December 2006.
[1549] D. Bounie. Le rôle des instruments de paiement dans l'économie. *Horizons Bancaires*, 2009.
[1550] M. Bourreau, J. Hombert, J. Pouyet, and N. Schutz. Wholesale markets in telecommunications. *CEPR Discussion Paper*, (6224), March 2007.
[1551] M. Bourreau, F. Moreau, and M. Gensollen. Musique enregistrée et numérique : quels scénarios d'évolution de la filière ? *Culture Prospective*, 1(1):1–16, April 2007.
[1552] M. Bourreau and J. Pouyet. Marché de gros et de détail dans les télécommunications : un fonctionnement intimement lié. *La Lettre de l'Autorité*, (56):30, June 2007.

[1553] M. Gensollen. L'économie politique du code ouvert. *AGIR*, (20-21), January 2005.
[1554] A. Gentès and C.-A. Braun. La question de l'intermédialité dans les œuvres sur internet : un héritage fluxien ? *Cahier Louis Lumière*, (3), October 2005.
[1555] L. Gille. La fracture numérique: qu'avons-nous à mettre en commun? *Telecom*, (137):32–35, April 2005.
[1556] L. Gille. Le service de transport dans une société d'information. *Transports*, (429):32–47, February 2005.
[1557] J. S. Lantz and S. Montandrau. Activisme des investisseurs institutionnels et richesse de l'actionnaire : L'influence de la performance antérieure lors des alertes de l'afg sur la gouvernance. *Revue du Financier*, (154), July 2005.
[1558] B. Munier. La fonction de l'imaginaire dans la publicité. *A.P.M.*, May 2005.
[1559] P. Musso. Existe-t-il un sarkoberlusconisme? *Le Temps des Médias*, (10):129–141, April 2008.
[1560] P. Musso. La "revolution numerique" : Techniques et mythologies. *La Pensée*, (355):103–120, June 2008.
[1561] P. Musso. Saint-simon, penseur du changement social. *Medium*, (14):155–163, January 2008.
[1562] P. Musso. Territoires numériques. *Medium*, (15):25–38, April 2008.
[1563] P. Musso. La barbarie managériale. *Les Cahiers européens de l'imaginaire*, (1):126–134, June 2009.
[1564] G. Pogorel. Radio spectrum: Changing institutional arrangements in europe? *PolicyTracker*, September 2006.
[1565] G. Pogorel. Spectre radio : vers une cohérence des choix en europe ? *01 Informatique*, (1861):28, May 2006.
[1566] G. Pogorel. Spectrum wars: Will the empires strike back? *Epsilon E-zine*, September 2006.
[1567] G. Pogorel. What spectrum policy for what wireless services? *Release Magazine*, (1):198–215, March 2007.
[1568] M. Relieu. Loin des yeux près du net. *Les cahiers de l'Iforep*, (128), January 2009.
[1569] P. Waelbroeck. Evolution de la musique préenregistré à l'ère numérique. *Reflets et perspectives*, 45:83–92, October 2006.
[1570] P. Waelbroeck, C. Mille, and E. Touboul. How does the music industry view its digital future? *The Merdian*, 7, November 2008.

9.4.4 ACTI: Articles in Proceedings of International Conferences

[1571] F. Barcellini, F. Détienne, and J.-M. Burkhardt. Requirements for design participation in open source communities. In *Workshop on Distributed Participatory Design, CHI 2008*, Milano, Italy, April 2008.
[1572] G. Beauvallet and T. Houy. Continuous improvement of research on lean management. In *International Conference on Emerging Paradigms in Managing Business*, Cochin, India, January 2007.
[1573] D. Bounie. Cash, check or bank card: the effects of transaction characteristics on the use of payment instruments. In *Workshop on Financial Regulation and Payments Systems, CASS Business School and London School of Economics*, September 2006.
[1574] D. Bounie. The economics of payment. In *Federal Reserve Bank of New York, The Economics of Payment II*, New York, March 2006.
[1575] D. Bounie. Economics of cash management. In *European Financial Management & Marketing Association, Cash in the Third Millenium*, Barcelona, April 2008.
[1576] D. Bounie, M. Bourreau, and P. Waelbroeck. Pirates and explorers: Analysis of music consumption in french graduate schools. In *European Association for Research in Industrial Economics (E.A.R.I.E.)*, Porto, August 2005.
[1577] D. Bounie and A. François. Cash, check or debit card: the effects of transaction characteristics on the use of payment instruments. In *Federal Reserve Bank of Boston, Consumer Behavior and Payment Choice Conference*, Boston, July 2006.
[1578] D. Bounie, A. François, and E. K. Kiser. Debit card float and consumption patterns. In *Conference on The Economics of Payment Systems: from Theoretical to Empirical Issues*, page Paris, October 2007.
[1579] D. Bounie and N. Houy. The demand for currency versus debitable accounts: A reconsideration. In *Federal Reserve Bank of Atlanta, Economics of Payments III*, Atlanta, April 2008.
[1580] M. Bourreau and P. Dogan. Partial licensing of product innovations. In *Third bi-annual conference on the economics of the software and Internet industries*, Toulouse, France, January 2005.
[1581] M. Bourreau and P. Dogan. Cooperation in product and process r&d. In *EARIE Conference*, Valence, Espagne, September 2007.
[1582] M. Bourreau, P. Dogan, and M. Manant. Size of rjvs and degree of cooperation in product development. In *Industrial Organization Conference*, Boston, USA, April 2009.
[1583] M. Bourreau and M. Verdier. Private cards and the bypass of payment systems by merchants. In *Norges Bank Payment System conference*, Oslo, Norvège, November 2008.
[1584] J.-M. Burkhardt, F. Détienne, L. Moutsingua-Mpaga, L. Perron, P. Leclercq, and S. Safin. Multimodal collaborative activity among architectural designers using an augmented desktop at distance or in collocation. In *European conference of Cognitive Ergonomics, ECCE 2008*, Madeira, Portugal, September 2008.
[1585] B. Cahour. Affects management and protection of the relation in cooperative interactions. In *COOP 08 Conference (Design of cooperative systems), Workshop 'Affective aspects of cooperative interactions'*, Carry-le-Rouet, May 2008.
[1586] B. Cahour. Discomfort, affects and coping strategies in driving activity. In *ECCE 2008 European Conference on Cognitive Ergonomics*, pages 91–99, Madeira, September 2008.
[1587] I. Demeure, A. Gentès, J. Stuyck, A. Guyot, and M. L. Transhumance. Transhumance: a platform on a mobile ad hoc network challenging collaborative gaming. In *CoGames 2008- IEEE*, Irvine, California, May 2008.
[1588] J. Denis and D. Pontille. Organizing a public space. subway signs and the shaping of riders dispositions. In *ISA Forum of Sociology*, Barcelona, Spain, May 2008.

[1589] J. Denis and D. Pontille. Organizing a public space. subway signs and the shaping of rides. In *What is an organization ? Materiality, Agency, Discourse*, Montreal, Canada, May 2008.
[1590] J. Denis and D. Pontille. Placing subway signs: Pragmatical properties of signs at work. In *Conference of the International Communication Association*, Montreal, Canada, May 2008.
[1591] F. Détienne, J.-M. Burkhardt, A.-M. Hébert, and L. Perron. Assessing the quality of collaboration in design : bridging cognitive ergonomics and cscl approaches. In *Workshop "CSCW and Human Factors", CSCW 2008*, San Diego, USA, November 2008.
[1592] D. Diminescu and C. Licoppe. Mobile-based money transfert: weaving together financial and migration fluxes. In *International Communication Association 2008*, Montreal, Canada, May 2008.
[1593] A. Gentes and I. Garron. Intermediality : Vertigo in the machine. In *IMAGINE MEDIA*, volume 1, pages pp 5–10, VÄXJÖ, Suède, October 2007.
[1594] A. Gentès, A. Guyot, and I. Demeure. Gaming on the move : Urban experience as a new paradigm for mobile pervasive game design. In *11th ACM MindTrek Conference MindTrek 2008: Entertainment and Media in the Ubiquitous Era*, Tampere, Finland, October 2008.
[1595] T. Houy and N. Houy. Demand forecasting tools and stocks : Complements or substitutes ? In *Conférence de l'European Association for Research in Industrial Economics*, Valence Espagne, September 2007.
[1596] Y. Jiang and L. Gille. Exploring the interactive business model of mobile multimedia services: Case study on supergirl contest show in china. In *MoMM' 2006 - The Fourth International Conference on Advances in Mobile Computing and Multimedia*, volume 215, pages 199–210, Yogyakarta, Indonesia, December 2006.
[1597] C. Karamti. Hedonic study on mobile telephony firms' pricing-quality strategies in france. In *6th Conference on Telecommunication Techno-Economics*, Helsinki, 2007.
[1598] L. Lebart. Analyse statistique de textes avec dtm. In *Analyse de textes par Ordinateurs*, UQAM, Montréal, Québec, Canada, September 2005.
[1599] L. Lebart. Assessing self-organizing maps via contiguity analysis. In *WSOM-2005. 5th Workshop on Self Organizing Maps*, volume 1, pages 703–711, Paris, September 2005.
[1600] L. Lebart. Assessment of multiple correspondence analysis. In *International Meeting of Psychometric Societies*, Tilburg (Pays-Bas), July 2005.
[1601] L. Lebart. L'analyse statistique des textes. In *Giornate Non-Standard : Analisi dei testi tra statistica e Ermneutica*, Brescia (Italie), May 2005.
[1602] L. Lebart. Validation techniques in simple and multiple correspondence analysis. In *Third Pan-Hellenic Conference on Data Analysis Methods*, Sinthonia (Greece), September 2005.
[1603] L. Lebart. Visualization of textual data. In *Applied Stochastic Models and Data Analysis, Brest, May 2005*, volume 1, Brest, France, May 2005.
[1604] L. Lebart. Explorer l'espace des mots : du linéaire au non-linéaire. In *8èmes Journées Internationales d'Analyse des Données Textuelles*, volume 1, pages 593–600, Presse Universitaire de Franche-Comté., March 2006.
[1605] S. Pajak. Intellectual Property Protection Strategies: analysis from the CIS4 survey. In *Economics and Managment of Innovation, Technology and Organizational Change*, Aalborg, Danemark, February 2009.
[1606] M. Relieu. Good organizational reasons for interruptions. when a hearing exercise for the visually-impaired bumps into the visual order. In *PlaceMe. Space, interaction, Discourse 2008*, Aalborg, Danemark, November 2008.
[1607] M. Relieu and J. Morel. Embodied references and guidance in mobile phone conversations. In *10ème International Pragmatics Conference*, pages 8–13, Göteborg, Suède, July 2007.
[1608] M. Verdier. Interchange fees and incentives to invest in quality of a payment card system. In *DNB Research Seminar (Banque Centrale des Pays-Bas)*, Amsterdam Banque Centrale, December 2007.
[1609] M. Verdier. Optimal interchange fees for card payments and cash withdrawals. In *Industrial Organization Conference*, Boston, USA, April 2009.
[1610] W. Visser. Characterising gestures according to their function in collaborative design. In *GW 2009, the 8th International Gesture Workshop*, Bielefeld (Germany), February 2009.
[1611] D. Voilmy, Z. Smoreda, and C. Ziemlicki. Geolocation and video ethnography: seizing a mobile internet user in context. In *COST 298 The good, the bad and the unexpected*, Moscou Russie, May 2007.

9.4.5 ACTN: Articles in Proceedings of French Conferences

[1612] M. Bourreau, D. Lescop, and G. Pogorel. Les enjeux de la régulation des infrastructures : faut-il dégrouper la fibre optique ? In *La société de la connaissance à l'ère du numérique*, pages 73–87, Paris, 2007.
[1613] J.-M. Burkhardt, F. Détienne, L. Moutsingua-Mpaga, L. Perron, P. Leclercq, and S. Safin. Conception architecturale collaborative avec un bureau augmenté : une étude exploratoire de leffet de la distance et de la colocalisation. In *43ème Congrès de la Société dErgonomie de Langue Français, SELF 2008*, September 2008.
[1614] J. Denis. La prescription de la sécurité informatique en entreprises. figures de la solidarité sociotechnique. In *De l'insécurité numérique à la vulnérabilité de la société*, June 2007.
[1615] J. Denis. Signalétique, cognition et espace public. In *Les dispositifs de médiation organisationnelle, technologique et symbolique dans la communication des organisations*, Nice, September 2008.
[1616] J. Denis. Les règles et leur disponibilité. In *Écritures normatives, écritures normées*, Lille, France, April 2009.
[1617] D. Diminescu. Le passage par l'écran : ou l'émergence de nouvelles frontières. In *Les frontières de l'Europe*, pages 120–132, Bucarest, Roumanie, 2007.
[1618] E. Souchier et al., editor. *L'image Sosie. L'original et son double.* Obsidiane - Les Belles lettres, 2005.
[1619] O. Fournout, I. Garron, and E. Souchier. L'accés direct au monde, l'écran dénié. In *La sociètè de la connaissance*

à l'ère de la vie numérique, Colloque du dixième anniversaire du GET, volume 1, pages pp192–200, Paris, France, April 2007.
[1620] I. Garron. Ecrire le livre. In *Le livre et ses desseins*, volume 1, page pp00, Caen, France, November 2007.
[1621] I. Garron and A. Gentès. Les dispositifs de mobilité. In *Muséologie, Muséographie et nouvelles formes d'adresses au public*, volume 1, page 1, Paris, France, June 2007.
[1622] I. Garron, J. L. Minel, and E. Souchier. Citer, indexer ou cartographier. In *Indice, Index, Indexation*, volume 1, pages pp163–174, Lille (France), June 2006.
[1623] A. Gentès. Les enjeux de l'art du vide en réseau. de l'intime mécanique à l'intermédia politique : la double vie des " secrets " de nicolas frespech. In *Esthétiques intermédias: approches historiques*, Paris, June 2006.
[1624] L. Lebart. Validation des visualisations de données numériques et textuelles. *Revue des nouvelles technologies de l'information, Cepadues, Toulouse*, pages 169–174., February 2007.
[1625] C. Levallois-Barth. L'encadrement juridique du traitement des données biométriques dans le secteur privé. In *Colloque " La biométrie : champs et enjeux " - FMSH*, Paris, January 2008.
[1626] M. Relieu, C. Licoppe, and K. Lan Hing Ting. Filmer le travail dans les centres d'appel : le cadrage vidéo et sonore comme mise à l'échelle de l'activité. In *Filmer le Travail*, Aix en provence, November 2007.
[1627] E. Souchier. L'image sosie. l'original et son double (introduction du colloque). In *L'image Sosie. L'originale et son double.*, pages 7–14, SENS (Yonne), 2005.

9.4.6 COM: Talks in Conferences Which Do Not Publish Proceedings

[1628] *Esthétiques intermédia*, Saint Denis -France, September 2006. Synesthésie.
[1629] N. Auray. La construction d'espaces publics délibératifs dans les jeux en ligne. In *L'espace public à petits pas : adolescences en Méditerranée*, Paris, December 2006.
[1630] N. Auray and M. Hurault-Plantet. Managing conflicts between users in wikipedia. In *SAW 2008 (SocialAspects of Web)*,, Innsbrück Austria., May 2008.
[1631] N. Auray, M. Hurault-Plantet, B. Jacquemin, and C. Poudat. La fiabilité des informations sur le web : le cas wikipedia. In *CORIA 2008*, Bretagne, April 2008.
[1632] N. Auray and M. Vicente. Free software and the double life of computing professionals : Some biographical insights in the life courses of some elfder developers. In *Le logiciel libre en tant que modèle d'innovation socio-technique ACFAS*, Montréal Canada, 2006.
[1633] M. Bacache and L. Janin. Valeur de licence et régulation du marché des taxis. In *AFSE*, September 2008.
[1634] G. Beauvallet. Un Point de vue "processus" sur la compétitivité et les tic. In *Workshop TIC et Compétitivité*, Paris, January 2005.
[1635] D. Bounie. Cash, chèque ou carte bancaire, : les effets des caractéristiques des transactions. In *Développements récents en Economie Financière, aspects microéconomiques et macroéconomiques, Journées de l'AFSE*, May 2006.
[1636] D. Bounie, M. Bourreau, and P. Waelbroeck. Pirates and explorers: Analysis of music consumption in french graduate schools. In *Journées de Microéconomie Appliquée*, Tunis, June 2005.
[1637] D. Bounie and A. François. Pourquoi les détenteurs de carte de retrait retirent-ils encore des espèces aux guichets bancaires ? In *Colloque de l'Association Francaise de Sciences Economiques*, Paris, September 2007.
[1638] M. Bourreau and P. Dogan. Cooperation in product and process r&d. In *Journées de Microéconomie Appliquée*, Lausanne, Suisse, June 2007.
[1639] D. Cotte and I. Garron. Les carnets de voyage, rénovation d'un genre et nouveaux usages des tic. In *EUTIC 2008*, Lisbonne, Portugal, October 2008.
[1640] J. Denis. La prescription ordinaire. énonciation et circulation des règles au travail. In *IIème Congrés de l'Association Française de Sociologie*, Bordeaux, September 2006.
[1641] J. Denis. L'écrit au travail et le travail de l'écrit. le cas de l'ouverture de comptes bancaires. In *Anthropologie de l'écriture. De la théorie au terrain*, Varsovie, Pologne, December 2006.
[1642] J. Denis and S. Barrey. Opérations de qualification et mise en forme de l'offre. produits, actes de présence et figure de l'offreur. In *IIème Congrés de l'Association Française de Sociologie*, Bordeaux, September 2006.
[1643] F. Détienne, J.-M. Burkhardt, and A.-M. Hébert. Vers une méthode d'analyse de la qualité de la collaboration en conception. In *Journées dAutomne du GDR de Psychologie ergonomique*, Telecom-ParisTech, November 2008.
[1644] D. Diminescu. Bulles, corridors et ni l'un ni l'autre. l'appropriation des réseaux sociaux par les migrants. In *Les entretiens du nouveau monde industriel*, Paris, France, October 2008.
[1645] D. Diminescu. The connected migrant. In *eInclusion, immigrant and ethnic minority groups*, Bruxelles, Belgique, November 2008.
[1646] D. Diminescu. e-diasporas atlas : réseaux et cartographies de la blogoshère marocain. In *International Sociological Association*, Aix-en-Provence, France, June 2008.
[1647] D. Diminescu. The emergence of a new migrant figure: the connected migrant. In *Fifth Annual IMISCOE*, Bilbao, Espagne, September 2008.
[1648] D. Diminescu. Le migrant connecté. In *Cycle 2008-2009 des Conférences de prospective du Grand Lyon*, Lyon, France, December 2008.
[1649] D. Diminescu and M. Renault. Ict and sponsoships in activist movements in support of france's sans-papiers. In *Annual conference of the ASA Political Economy of the World-System section of the American sociological*, 2008.
[1650] L. Draetta and V. Fernandez. Les tic comme artefacts de médiation de la connaissance à l'échelle des territoires. In *Colloque du Dizième Anniversaire du GET*, June 2007.

[1651] L. Draetta, V. Fernandez, and B. Fribourd. Coopérer dans le territoire : les tic dans une approche de la proximité organisée. In *AISLF*, Istanbul, Turquie, July 2008.
[1652] V. Fautrero, V. Fernandez, and G. Puel. Les technologies alternatives à l'usage : à propos d'une expérimentation satellite-wifi. In *colloque GDR TIC et territoires, TIC et aménagement du territoire : technologie, usages et gouvernance locale*, Cordes sur Ciel - France, April 2005.
[1653] V. Fernandez. Clusters d'entreprises et plateformes de gestion des connaissances. In *FING - DATAR TIC et Aménagement du Territoire*, Paris - France, March 2005.
[1654] V. Fernandez. Contribution de l'usage des si à la performance. In *L'Usage des Systèmes d'Information - La Recherche au CIGREF*, Paris, December 2007.
[1655] V. Fernandez. Clusters et artefacts tic de médiation de la connaissance : de l'analyse de mécanismes de structuration. In *EUTIC*, Lisbon, Portugal, October 2008.
[1656] V. Fernandez and V. Fautrero. The business ecosystem of alternative high-speed internet technologies: between stimulating and foreclosing the french market. In *IBIMA 11th*, Le Caire, Egype, January 2009.
[1657] V. Fernandez, T. Horquin, and G. Puel. Les modalités d'émergence des marchés de la télémédecine, valeurs marchandes et d'usages : une approche en termes d'écosystème d'affaires. In *AISLF*, Istanbul, Turquie, July 2008.
[1658] V. Fernandez and H. Jomaa. Les théories de la structuration pour la question de la valeur d'usage. In *Colloque TIC et Usages*, Bordeaux France, September 2005.
[1659] V. Fernandez and H. Jomaa. Erp et performance des grandes entreprises : repositionnement à la lumière du paradigme de giddens. In *Association Information et Management*, Luxembourg, June 2006.
[1660] V. Fernandez and H. Jomaa. Usage des tic et performance des organisations. In *IBIMA*, Bonn, June 2006.
[1661] V. Fernandez and G. Puel. Réseaux wifi, jeux d'acteurs et territoires : diffusion, adoption et appropriation. In *RESER*, Lisbonne, June 2006.
[1662] V. Fernandez and G. Puel. Innovation and communities of practice. In *Second Global Conference on Economic Geography*, Beijing - China, June 2007.
[1663] V. Fernandez and G. Puel. Dispositifs socio-techniques, espace public et fragmentation urbaine: Le cas des cybercafés en chine. In *EUTIC*, Lisbon, Portugal, October 2008.
[1664] T. Houy and N. Houy. Erp : A theoretical study. In *Congrès de l'Association Française de Science Economique*, September 2007.
[1665] K. Lan Hing Ting. Managing customer relationships during telephone sales in the context of the global distribution of work between an offshored and a french call center. In *CITASA pre-conference 2008 Worlds of Work: Communication and Information Technologies*, Cambridge, MA, United States, July 2008.
[1666] K. Lan Hing Ting, C. Licoppe, and M. Relieu. Comprendre le métier de téléopérateur en observant l'activité de plateau, January 2008.
[1667] K. Lan Hing Ting and D. Voilmy. L'évitement du blanc radiophonique comme accomplissement multimodal. In *Les mises en scène du discours médiatique*, Québec Canada, June 2007.
[1668] J. S. Lantz. Stratégie d'intermédiation financière. In *CERGAM*, Aix en Provence, November 2007.
[1669] J. S. Lantz and G. Trè-Hardi. Evaluation financière des brevets et des licences : modélisation par la théorie des jeux et des options réelles. In *Conférence AFFI*, Poitiers, June 2006.
[1670] C. Levallois-Barth. La mobilité : les risques pour les libertés fondamentales. In *Congrès Net Lille Métropole*, Lille - France, November 2008.
[1671] C. Levallois-Barth. Un exemple d'interaction entre le droit et l'innovation : l'affichage interactif via bluetooth. In *Atelier TIC, usages et organisation - Télécom Paristech*, Paris, January 2008.
[1672] C. Licoppe. Economies de la disponibilité et transformation des partaiques de communication , présence connectée et usages des sonneries musicales. In *ACFAS*, 2006.
[1673] C. Licoppe, M. Relieu, and K. Lan Hing Ting. Studies of calls and studies of work in telecom call centres. In *Call centres and emergency calls: professional talk and multiactivity in action*, Lyon, April 2007.
[1674] B. Munier. L'héroïsation romanesque de paris au xixè siècle. In *Colloque du GEPECS*, July 2005.
[1675] G. Pogorel. Le bien informationnel entre autorégulation et réglementation. In *Colloque Centre de Recherche en Droit des Affaires-CCIP-SECRET ET TRANSPARENCE Le vice ou la vertu ? L'information sur les entreprises à la croisée des chemins*, Paris, July 2005.
[1676] G. Pogorel. Conference report. In *3rd European Spectrum Management Conference*, Brussels, June 2008.

9.4.7 OS: Books and Book Chapters

[1677] *Proceedings of the 2006 Telecom Paris conference on the economics of ICT*, December 2006.
[1678] *Proceedings of the 2006 Telecom Paris conference on the economics of ICT*, December 2007.
[1679] *Proceedings of the 2008 TELECOM ParisTech conference on the economics of ICT*, 2008.
[1680] H. Assadi and J. Denis. Les usages de l'e-mail en entreprise : efficacité dans le travail ou surcharge informationnelle ? In E. Kessous and J.-L. Metzger, editors, *Le travail avec les technologies de l'information*, pages 135–155. Hermès, Paris, 2005.
[1681] N. Auray. Les avatars dans les jeux en ligne : entre écritures et images. In *L'image sosie. L'original et son double*, pages pp.93–107. Obsidiane, 2005.
[1682] N. Auray. Les configurations de marché du logiciel et le renouvellement du capitalisme. In O. Favereau and L. Thévenot, editors, *Conventions et Institutions*, pages 80–110. La Découverte, 2005.
[1683] N. Auray. *Les agrandissements politiques de la jeunesse. Internet, jeu et politique*. L'Harmattan, 2006.

[1684] N. Auray. Decision making and liability in collective distributed projects: a comparison between debian and open bsd. In Stefan Kauffmann, editor, *in Vernetzte Steuerung. Soziale Prozesse im Zeitalter technischer Netzwerke, Interferenzen - Studien zur Kulturgeschichte der Technik Band*. Chronos, Zurich Suisse, 2008.
[1685] N. Auray. *Communautés en ligne et nouvelles formes de solidarité*. FYP, 2009.
[1686] N. Auray. Communities and open governance: boundaries, statuses and conflicts. In E. Brousseau, M. Marzouki, and C. Méadel, editors, *Governance, Regulations and Powers on the Internet,*, chapter 5, pages 100–140. Cambridge University Press, 2009.
[1687] N. Auray and M. Gensollen. Internet et la synthèse collective des goûts. In O. Assouly, editor, *Goûts à vendre: Essais sur la captation esthétique*, chapter Mise en marché des goûts, pages 223–260. Edition du Regard, Paris, 2007.
[1688] M. Baker, F. Détienne, K. Lund, and A. Séjourné. *Etude des profils interactifs dans la conception collective en architecture*, chapter 6, pages 183–220. PUN, Collection " Langage, Cognition, Interaction ", 42-44 avenue de la libération, Nancy, France, 2009.
[1689] M. Ballé and G. Beauvallet. *Le Lean en France. Préface à l'édition française*, chapter V-XIX. Village Mondial, Paris, France, 2005.
[1690] V. Beaudouin. Les dynamiques des sociabilités. In Christian Licoppe, editor, *L'évolution des cultures numériques*, pages 21–28. FYP, Paris, France, 2009.
[1691] G. Beauvallet and Y. Boughzala. La Dématérialisation des marchés publics, entre volontarisme politique affiché et transformation des pratiques réelles. In S. Assar and I. Boughzala, editors, *Administration électronique, constats et perspectives*, chapter 13. Lavoisier, Cachan, France, 2007.
[1692] D. Bounie and M. Bourreau. Les marchés à deux versants dans les médias. In X. Greffe and N. Sonnac, editors, *Le management des produits de contenu*, chapter 26, pages 477–491. Dalloz, 2008.
[1693] D. Bounie, D. Diminescu, and C. Licoppe. Send money abroad with a simple phone call. a socio-economic perspective. In V. Lazea, editor, *Economic Growth and Convergence*. Mustang, 2008.
[1694] D. Bounie and P. Gazé. *Payment and the Internet: Issues and research perspectives in economics of banking*. Cambridge University Press, 2007.
[1695] D. Bounie and P. Gazé. How do internet payments challenge the retail payment industry? In R. Schmidt L. Anderloni, D.T. Llewellyn, editor, *Financial Innovation in Retail and Corporate Banking*. Edward Elgar Publishing Ltd., 2009.
[1696] M. Bourreau. Mimicking vs counter-programming strategies for television. In G. Doyle, editor, *The Economics of the Mass Media*. Edward Elgar Publishing, 2006.
[1697] M. Bourreau. Economies of scale in media markets. In Wolfgang Donsbach, editor, *International Encyclopedia of Communication*, pages 1426–1430. Wiley-Blackwell Publishing, 2008.
[1698] M. Bourreau and M. Gensollen. *L'impact du numérique sur la filière de la musique enregistrée*, chapter 5. Hermès, Paris, 2007.
[1699] M. Bourreau, D. Lescop, and G. Pogorel. *Les enjeux de la régulation des infrastructures*, pages 147–164. éditions fyp, Limoges (France), 2009.
[1700] M. Bourreau and V. Lethiais. Pricing information goods: Free vs pay content. In E. Brousseau and N. Curien, editors, *Internet and Digital Economics*, pages 345–367. Cambridge University Press, 2007.
[1701] M. Bourreau and C. Licoppe. On-line bidding and buying on the same site. In E. Brousseau and N. Curien, editors, *Internet and Digital Economics*, pages 510–535. Cambridge University Press, 2007.
[1702] B. Cahour. émotions, affects et confort comme nouveaux déterminants de l'activité et de l'usage. In M-C.LePort G.Valléry, M.Zouinar, editor, *Ergonomie des produits et des services médiatisés : nouveaux territoires, nouveaux enjeux*. PUF, Paris, 2009.
[1703] A. Da Sousa Silva and D. Sutko. *Mediated co-proximity and its dangers: a case of stalking*, pages 100–126. Peter Lang, 2009.
[1704] J. Denis. *Le travail invisible de l'information*. FYP, Paris, 2009.
[1705] J. Denis. *Les ressorts de la sécurité informatique. Des hommes, des machines, des données*. FYP, Paris, 2009.
[1706] J. Denis and C. Licoppe. *La coprésence équipée : usages de la messagerie instantanée en entreprise*. Octares, Toulouse, 2006.
[1707] J. Denis and D. Pontille. *L'écologie informationnelle des lieux publics. Le cas de la signalétique du métro*. FYP, Paris, 2009.
[1708] F. Détienne, M. Baker, and W. Visser. *La co-conception du point de vue cognitif et interactif*, chapter 1, pages 19–38. PUN, Collection " Langage, Cognition, Interaction ", 42-44 avenue de la libération, Nancy, France, 2009.
[1709] F. Détienne, L. Greco, L. Mondada, V. Traverso, and W. Visser. *Principes de Transcription*, chapter 4, pages 69–86. PUN, Collection " Langage, Cognition, Interaction ", 42-44 avenue de la libération, Nancy, France, 2009.
[1710] F. Détienne and V. Traverso. *Introduction*, pages 7–15. PUN, Collection " Langage, Cognition, Interaction ", 42-44 avenue de la libération, Nancy, France, 2009.
[1711] F. Détienne and V. Traverso. *Présentation du corpus et de la situation*, chapter 3, pages 61–68. PUN, Collection " Langage, Cognition, Interaction ", 42-44 avenue de la libération, Nancy, France, 2009.
[1712] D. Diminescu. *L'usage du téléphone portable par les migrants en situations précaires*, chapter L'usage du téléphone portable par les migrants en situations précaire, pages pp.90–98. Presse Universitaire François Rabelais, Tours, France, 2007.
[1713] D. Diminescu, C. Licoppe, Z. Smoreda, and C. Ziemlicki. Tailing untethered mobile users. studying urban mobilities and communication practices. In R. Ling and S. Campbell, editors, *The reconstruction of space and time. Mobile communication practices*, pages 17–37. Transaction Publishers, New Bruswick (USA), 2008.
[1714] L. Draetta. *"On n'est pas des repris de justice!" Pour une sociologie de l'environnementalisme industriel*, chap-

ter 18, pages 335–361. De Boeck, Paris, 2006.
[1715] L. Draetta. L'ambigüité de la relation entreprise-environnement : de la technique au management, entre préoccupation écologique et prudence économique. In F. Lafaye, editor, *Risques et Industrie*, page 16. Édisud, Aix-en-Provence, 2009.
[1716] L. Draetta and V. Fernandez. *Les TIC comme artefact de médiation de la connaissance à l'échelle des territoires*, pages 176–182. FYP, France, 2009.
[1717] A. Duchêne and P. Waelbroeck. *Peer-to-Peer, Piracy and the Copyright Law : Implications for Consumers and Artists*, pages 121–157. Eward Elgar, 2005.
[1718] V. Fernandez and C. Longhi. *Dynamique de structuration d'un cluster TIC : le cas de Sophia Antipolis*, pages 219–233. Hermès, Paris, 2006.
[1719] F. Flipo, L. Draetta, and et al. *Ecologie des infrastructures numériques*. Hermès Sciences, Paris, France, 2007.
[1720] A. François and D. Bounie. Des systèmes de paiement dématérialisés. In Gille Laurent, editor, *Les dilemmes de l'économie numérique*, chapter 2(4), pages 101–108. FYP, 2009.
[1721] A. François, C. Fauvelle-Aymar, and P. Vornetti. *The 2007 Presidential Election and the 2005 Urban Violence in French Deprived Urban Areas*. Willan editions, 2009.
[1722] A. François and M. Foucault. *General Policy Speech of Prime Ministers and Fiscal Choices in France: "Preach water and drink wine!"*. Springer, 2009.
[1723] A. François, M. Foucault, and F. Baumgartner. *Patterns of Public Budgeting in the French Fifth Republic. From Hierarchical Control to Multi-Level Governance*. Palgrave, 2008.
[1724] I. Garron, J. Bonacorsi, J. L. Minel, S. Labelle, and E. Souchier. *Ecriture appareillées : appropriation de l'oeuvre de Raymond Queneau sur Internet*, chapter 5, pages pp174–203. Hermes, Lavoisier, Paris, France, 2007.
[1725] I. Garron and A. Gentès. Musée et mobilité, réflexion prospective. In *Les entretiens du nouveau monde industriel*, volume 1, Paris, France, November 2007.
[1726] M. Gensollen. Des réseaux aux communautés: la transformation des marchés et des hiérarchies. In M. Sénécal S. Proulx, L. Poissant, editor, *Communautés virtuelles : penser et agir en réseau*. Presses de l'Université Laval, Montréal, 2006.
[1727] M. Gensollen. *La culture entre économie et écologie : l'exemple des communautés en ligne. Création et diversité au miroir des industries culturelles.*, pages 285–312. Xavier Greffe, ed. La Documentation Française, Paris, 2006.
[1728] M. Gensollen. Information goods and online communities. In E. Brousseau and N. Curien, editors, *Internet and Digital Economics*, pages 173–200. Cambridge University Press, 2007.
[1729] M. Gensollen. Vers une propriété virtuelle ? l'économie réelle des univers persistants. In Frank Beau, editor, *Culture d'univers*, pages 229–244. fyp, Paris, 2007.
[1730] A. Gentès. *Art et internet : art en action*. Larousse, 2005.
[1731] A. Gentès. Second life, une mise en jeu des médias. In *Second Life*. Les petits matins, Paris France, 2007.
[1732] A. Gentès. *Musées et technologies mobiles : une nouvelle cours du visiteur*, pages 287–291. Mille et une nuits, Fayard, 2008.
[1733] A. Gentès. *L'art de l'émotion ou comment l'informatique nous attendrit (Le design des émotions)*. Hermès, 2009.
[1734] L. Gille. *La protezione della proprieta intelletuale, fattore della divisione internazionale della conoscenza*. Le edizioni del Mulino, Bologna, Italia, 2005.
[1735] L. Gille. *Aux sources de la valeur, des biens et des liens*. L'Harmattan, Paris, France, 2006.
[1736] L. Gille. *La régulation des télécommunications en Afrique*, pages 91–108. LGDJ, Paris, France, 2008.
[1737] L. Gille and F. Beau. *La mutation industrielle des jeux*, pages 164–172. FYP, Limoges, France, 2007.
[1738] L. Gille, P.-J. Benghozi, and A. Vallée. *Innovation and Regulation in the Digital Age: a Call for New Perspectives*, pages 503–525. Physica-Verlag, Heildeberg (FRG), 2009.
[1739] L. Gille and I. Garron. *La téléphonie mobile et le lien social en Afrique subsaharienne*, pages 33–44. FYP éditions, Limoges (France), 2009.
[1740] T. Houy. Quelle contribution des tic à la compétitivité de l'economie ? In *Livre Vert du GET*, chapter Les dilemmes de l'économie numérique, pages 27–36. 2007.
[1741] L. Lebart. *Validation Techniques in Multiple Correspondence Analysis*, chapter 10. Springer, Berlin, 2005.
[1742] L. Lebart. *Validation techniques in Multiple Correspondence Analysis*, chapter 7, pages 179–196. Chapman and Hall/CRC, London, 2007.
[1743] L. Lebart. *Which bootstrap for principal axes methods ?*, pages 581–588. Springer, New York, 2007.
[1744] L. Lebart, M. Piron, and A. Morineau. *Statistique Exploratoire Multidimensionnelle, 4ème Edition, Refondue.* Dunod, Paris, 2005.
[1745] C. Levallois-Barth. *Navigo : simplification ou traçabilité absolue*. Fyp, 2009.
[1746] C. Licoppe. Le commerce électronique, entre interactivité et interaction. In P. Moatti, editor, *Nouvelles technologies et modes de vie. Aliénation ou hypermodernité ?*, pages 171–191. Editions de l'aube, Paris, France, 2005.
[1747] C. Licoppe. Entre local et global : le tournant interactionnel des progiciels intégrés. In de Terssac G., Bazet I., and Rapp L., editors, *La rationalisation dans les entreprises par les technologies coopératives*. Octares, Toulouse, France, 2007.
[1748] C. Licoppe. The mobile phone's ring. In J. Katz, editor, *The Handbook of Mobile Communication*, pages 139–152. MIT Press, Cambridge (USA), 2008.
[1749] C. Licoppe. Understanding and reframing the electronic consumption experience : the ambiguities of mediated coordination. In T. Pinch & R. Swedberg, editor, *Living in a Material World*, pages 317–340. MIT Press, Cambridge (USA), 2008.
[1750] C. Licoppe and R. Guillot. *ICT and the engineering of encounters. A case study in the development of a mobile*

game based on the geolocation of terminals. Taylor and Francis, London, UK, 2006.
[1751] C. Licoppe and Y. Inada. *Shared encounters in a location aware and proximity aware mobile community. The Mogi case.* Springer, Berlin, 2009.
[1752] C. Licoppe and M. Relieu. Une compétence située : la gestion de la multiactivité par les opérateurs d'assistance technique. In E. Kessous and J.M. Metzger, editors, *TIC et activité professionnelle*. Hermès, Paris, 2005.
[1753] C. Licoppe and Z. Smoreda. Rhythms and ties : towards a pragmatics of technology-mediated sociability. In R. Kraut, M. Brynin, and S. Kiesler, editors, *Domesticating Information Technologies*, pages 296–313. Oxford University Press, Oxford, UK, 2006.
[1754] B. Munier. *Paris des romanciers au XIXè siècle. La question des media et de l'objet technique aux débuts de la modernité. Essai*. Éditions du Rocher-Serpent à plumes, Paris. France, 2005.
[1755] B. Munier. *Au Bonheur des dames*. Action artistique de la ville de Paris, Paris. France, 2006.
[1756] B. Munier. *Les alternatives du parfum*. Simili-type N^{o}5, Montrany, 24750 Cornille, 2006.
[1757] B. Munier. Patrimoine et culture populaire en france. In Bruno Péquignot, editor, *Délits de curiosité*. L'Harmattan, Paris. France, 2007.
[1758] B. Munier. *Roman et culture populaires en France au XIXe siècle*, pages 85 – 109. L'Harmattan, 2008.
[1759] B. Munier. *Sur les voies du patrimoine. Le patrimoine en culture et politique*, pages 7–18. L'Harmattan, 2008.
[1760] P. Musso. *L'individu et l'Etat de Spencer*. MANUCIUS, Houilles, 2008.
[1761] P. Musso. Critique de la notion de territoire numérique. In *Les dilemmes de l'économie numérique*, chapter III, pages 168–175. FYP éditions, Limoges, 2009.
[1762] P. Musso. *La notion de territoires numériques*. PUR, Rennes, 2009.
[1763] P. Musso. *Les médias en Italie*. FAYARD, Paris, 2009.
[1764] P. Musso. *Les reconfigurations territoriales dans " l'économie de la connaissance " : démythification et prospective*. PUR, Rennes, 2009.
[1765] P. Musso. Usages et imaginaires des tic. In *L'évolution des cultures numériques*, chapter Conclusion, pages 201–210. FYP éditions, Limogaes, 2009.
[1766] D. Pasquier. *Publicos e communidades sociais : o papel dos media nas sociabilidades juvenis*, pages 39–51. Livros Horizonte, Lisboa, 2006.
[1767] D. Pasquier. *From parental control to peer pressure : cultural transmission and conformism*, pages pp 448–460. Sage, London, 2008.
[1768] M. Peitz and P. Waelbroeck. *Digital Music*. MIT PRess, 2005.
[1769] G. Pogorel. La disciplina dei nuovi mercati ad alta tecnologia-discussion paper. In M.-P. Caruso, editor, *La costruzione del mercato delle telecomunicazioni fisse e mobili.*, pages 127–131. Rubbettino, Napoli, 2005.
[1770] G. Pogorel. How to regulate spectrum? a 4-step assessment guide. In Ramakistaiah. Jilla, editor, *Spectrum Law and Governance*, pages 52–67. Amicus Books (ICFAI University), Hyderabad, A.P, India, Hyderabad, A.P, India, 2008.
[1771] G. Pogorel and M. Berne. Privatization experiences in france. In M. Köthebürger et al., editor, *Privatization Experiences in the European Union*, chapter II-6, pages 163–198. The MIT Press, Cambridge, Massachussetts-London, England, 2006.
[1772] G. Pogorel and G. Fontaine. *DTT and Digital Convergence: A European Policy Perspective*. Routledge, London, 2006.
[1773] M. Relieu. Mobile phone "work": Disengaging and engaging mobile phone activities with concurrent activities. In Scott Campbel Rich Ling, editor, *The Reconstruction of Space and Time: Mobile Communication Practices*. Transaction Publishers, 2008.
[1774] C. Rivière and C. Licoppe. From voice to text. continuity and change in the uses of mobile phones in france and japan. In L. Palen R. Harper and A. Taylor, editors, *The Inside Text : Social, Cultural, and Design Perspectives on SMS*. Springer, Berlin, 2005.
[1775] V. Traverso and W. Visser. *Co-élaboration de solutions et rôle du graphico-gestuel : confrontation de méthodologies*, chapter 5, pages 87–182. Presses Universitaires de Nancy, Nancy (France), 2009.
[1776] W. Visser. *Co-élaboration de solutions en conception architecturale et rôle du graphico-gestuel : Point de vue de la psychologie ergonomique*, chapter 5.3, pages 129–167. Presses Universitaires de Nancy, Nancy (France), 2009.
[1777] W. Visser. *The function of gesture in an architectural design meeting*, chapter 15. Taylor & Francis, London, 2009.
[1778] P. Waelbroeck. *Le commerce électronique de produits culturels : enjeux informationnels*, chapter 12. Dalloz, 2008.

9.4.8 OV: Popularizing works

[1779] M. Bacache. *Les Stratégies absurdes, comment faire pire en croyant faire mieux*. Seuil, Paris, 2009.
[1780] F. Ballé and M. Ballé. *The Gold Mine*. Lean Enterprise Institute, Brookline, MA (USA), 2005.
[1781] L. Gille. *Imaginer un nouveau réseau pour la logistique urbaine*, pages 145–158. La Documentation Française, Paris, 2009.
[1782] C. Lejealle. *Les usages du jeu sur le téléphone portable : une mobilisation dynamique des formes de sociabilité*. L'Harmattan, Paris, 2008.
[1783] B. Munier. Le roman populaire au xixè siècle. In *Encyclopaedia Universalis*. 2005.
[1784] B. Munier. *Quand Paris était un roman. Du mythe de Babylone au culte de la vitesse.* Éditions de la Différence, Paris France, 2007.

[1785] B. Munier. *Sur les voies du patrimoine. Entre culture et politique*. L'Harmattan, Paris. France, 2008.
[1786] P. Musso. *Fabriquer le futur 2, L'imaginaire au service de l'innovation*. Village Mondial, Paris, 2008.
[1787] P. Musso. *Le saint-simonisme, l'Europe et la Méditerrannée*. MANUCIUS, Houilles, France, 2008.
[1788] P. Musso. *Les télécommunications*. La Découverte, Paris, 2008.
[1789] P. Musso. Silvio berlusconi. In *Encylcopedia Universalis*. 2009.

9.4.9 DO: Journal or Proceedings Edition

[1790] M. Cave and G. Pogorel. *Spectrum Policy: What next?* IDATE, Montpellier, 2007, 2007.
[1791] J.-M. Chaduc and G. Pogorel. *The Radio Spectrum: Managing a strategic resource*. ISTE-WILEY, London, UK, 2008.
[1792] J. Denis. Performativité : relectures et usages d'une notion frontière (coordination du numéro), 2006.
[1793] F. Détienne and V. Traverso. *Méthodologies d'analyse de situations coopératives de conception: Corpus MOSAIC*. PUN, Collection " Langage, Cognition, Interaction ", 42-44 avenue de la libération, Nancy, France, 2009.
[1794] V. Fernandez and C. Longhi. Dynamique de structuration d'un cluster tic : le cas de sophia antipolis. In *Communication et Territoires*, pages 219–233. Hermes, 2006.
[1795] L. Gille. *Les dilemmes de l'économie numérique*. FYP éditions, Limoges (France), 2009.
[1796] B. Lanvin and G. Pogorel. Icts & development, communications & strategies, n^{o}58/2nd quarter 2005, 2005.
[1797] C. Levallois-Barth and A. Camilleri. *Sensitive Data Protection in the European Union*. Bruylant, Bruxelles - Belgique, 2007.
[1798] C. Licoppe. *L'évolution des cultures numériques. De la mutation du lien social à l'organisation du travail*. FYP Editions, Limoges, 2009.
[1799] P. Musso and Ch. Alvergne. *L'aménagement du territoire en images*. La Documentation Française, Paris, 2009.
[1800] P. Musso and et al. *Territoires et cyberespace 2030*. La Documentation Française, Paris, 2008.
[1801] G. Pogorel. Radio spectrum management and ubiquitous network societies, 2005.

9.4.10 AP: Technical Reports

[1802] G. Beauvallet and C. Chabiron. Le Muda sous la moquette. Comment démarrer une démarche de Lean Office ? Technical Report 3, Lean Working Papers, Paris, France, February 2005.
[1803] B. Bonu and M. Relieu. La téléprésence à ftrd. les usages du mur de téléprésence et des salles realmeet. Technical report, Ecole Nationale Supérieure des Télécommunications, May 2006.
[1804] D. Bounie, M. Bacache, and A. François. Explaining the use of on-line administrative services: Economic approach and empirical evidences. *08/05/ESS - Telecom Paris Working Paper in Economics and Social Sciences*, 2008.
[1805] D. Bounie, D. Diminescu, and A. François. Gender, type of relationship and migrant remittances: A cross-country analysis based on transfer data. Technical report, Telecom ParisTech, March 2009.
[1806] D. Bounie and A. François. Les comportements de paiement des français: description statistique et analyses économétriques. Technical report, Groupement des Cartes Bancaires, August 2005.
[1807] D. Bounie and A. François. Les comportements de paiement des marchands: analyses statistiques. Technical report, Telecom ParisTech, May 2008.
[1808] D. Bounie and N. Houy. A model of demand for cash and deposits. Technical Report 1, Telecom ParisTech, June 2007.
[1809] D. Bounie and N. Houy. Modelling the aggregate payment decisions in the economy. Technical report, Telecom ParisTech, May 2007.
[1810] M. Bourreau, M. Gensollen, and F. Moreau. The digitization of the recorded music industry: Impact on business models and scenarios of evolution. 2008.
[1811] M. Bourreau and J. Pouyet. Tarification de l'accès : théorie et pratique. Technical report, CREST, January 2005.
[1812] J.-M. Burkhardt, F. Détienne, and A.-M. Hébert. Vers l'évaluation de la qualité de la collaboration en conception assistée par des technologies d'information et de communication. Technical report, Contrat Orangelabs, December 2008.
[1813] V. Fernandez. Evaluation du service web sur la dynamique communautaire du cluster. Technical Report RNRT - KMP, ENST, February 2005.
[1814] V. Fernandez. Knowledge management platform. Technical report, Contrat RNRT, April 2005.
[1815] V. Fernandez, L. Draetta, M. Gadille, G. Puel, and T. Horquin. Analyse des dynamiques de structuration de la filière numérique. Technical report, Conseil Régional, December 2007.
[1816] V. Fernandez and V. Lethiais. Tic et aménagement du territoire : technologies, usages et gouvernance locale. Technical report, GET- ENST Bretagne et Télécom Paris, March 2005.
[1817] L. Gille. Modèle de détermination des coûts (cmilt) de la terminaison d'appel, 2009.
[1818] Y. Jeanneret, V. Patrin-Leclère, D. Cotte, E. Souchier, C. Tardy, and J. Davallon. Métamorphoses médiatiques. pratiques d'écriture et médiation des savoirs. Technical report, EGSH - ENST, February 2005.
[1819] G. Pogorel, F. Pujol, and et al. Spectrum policies and radio technologies: Sport views final report. Technical report, ENST, May 2007.
[1820] J. Scott Marcus, L. Nett, M. Scanlan, U. Stumpf, M. Cave, and G. Pogorel. Towards more flexible spectrum regulation. Technical report, WIK-BundesNetzAgentur, Bonn, December 2005.

Part IV

Signal and Image Processing

Signal and Image Processing (TSI)

The research topics covered by the Signal and Image Processing department at TELECOM ParisTech are: the study of image processing in its various formats, digital, optical... for different applications like medical imaging, remote sensing, fine arts..., the study of speech, music and sound.

After its reorganization at the beginning of 2007, the department is now organized into four groups:

- "Statistics and applications" - STA - is a group that is devoted to the applications of statistics and probability to the field of information processing. The research area covers a wide spectrum from the development of new techniques and new algorithms to various applications. The activities of the group comprises the following topics: statistical learning, independent data and complex random systems, methods and algorithms for cosmological data analysis, Markov Chain Monte-Carlo techniques, sequential Monte-Carlo techniques (particle filters), array processing, geolocalization, models estimation.

- "Image Processing and Interpretation" - TII - has, as its main purpose, the development of methodologies and theoretical tools for image processing, scene analysis and 3D objects. This implies global treatment of complex image processing problems, integrating multiple techniques that cover the path from raw data to high-level interpretation. The concerned applications are art items (sculptures, paintings), biomedical images, satellite images, natural scenes.

- "Audio, Acoustics and Waves" - AAO - conducts activities in signal processing having strong connections with the physical phenomenon that is at the source of the signals, whether acoustical or optical. In digital audio signal processing, the activities span the entire acquisition chain, from capture to analysis or transformation, transmission up to its restitution, with the goal of proposing solutions to the main problems centered around the sound, speech or music, in multimedia applications. In optical information processing, the group contribute to new detection schemes and to the characterization of new materials.

- "Multimedia" - MM- is a group that covers the life cycle of multimedia documents in the framework of a complete chain going from authoring tools for on-line and offline production of multimedia contents to multimodal interaction for the final user; this also includes automated processing like enhancement of degraded pictures, verification of the identity of the user, modification of auditive and visual appearance, image segmentation and pattern recognition. The group also works on techniques that allow the analysis, compression and robust transmission of these media in heterogeneous networks. It also works on the dynamic and distributed adaptation of the transmitted data flow (including meta-data and in particular those concerning the digital rights management) with respect to context, transport conditions and terminal type.

One research topic is common to all groups, this is indexation and data mining. Summarizing and extracting informations from multimodal databases requires statistical tool for learning and mining, which are among the activities of the STA group with a particular focus on text indexation

and retrieval. Indexing satellite images, extricating informations from primitives to semantic annotations is the main goal of the “Center of Competence”, a joint lab between CNES, DLR and the TII group. This group also develops the same kind of tools for biomedical images and for 3D objects. The AAO group is concerned by many aspects of music information retrieval: identification of rhythms, main melodies, instruments, styles, moods, tonalities either from plain audio or from mixed audio and video. Video signals are also a core activity in the MM group together with complex documents analysis (mixing printed texts, handwritten texts, pictures, graphics) and with multimodal analysis for biometry (voice, faces, fingerprints).

Our most recent recruitments were aimed towards the reinforcement of two topics: the first one is distributed sensor processing; the second one is 3D images and virtual worlds.

Permanent staff [*Institut ; CNRS*] ; post-docs	[32 ; 11.6] ; 8.4
PhDs	55.6
Defended PhDs	90
Defended HDR	8
Journal papers	291
Chapters and books	52
Conference papers	713
Patents and software	8
Contractual income 2005–2009 (june) [Private ; Public ; European] (k€)	[5865; 2747 ; 1782]

Chapter 10

Audio, Acoustical and Optical waves (AAO)

Head G. Richard (P)

Permanent staff R. Badeau (MC), B. David (MC), C. Févotte (CR2-CNRS, from 11/07), R. Frey (P, 40%), Y. Grenier (P), S. Maeda (DR CNRS), A. Maruani (P), D. Matignon (MC, -09/07), N. Moreau (P), S. Essid (IE, from 10/06), J. Prado (MC, on leave 06/07-09/08), I. Vasilescu (CR2-CNRS, -09/05), I. Zaquine (MC, 80 %).

PhD students S. Essid (10/02-12/05), R. Badeau (10/01-04/05), D. Bitault (10/02-10/05), A. Aissa El Bey (10/04-06/07), S. Fontana (10/04-07/08), M. Guillaume (10/03-11/06), N. Bertin (10/05-), M. Betser (10/04-06/08), C. Clavel (11/03-03/07), V. Emiya (10/04-10/08), J-L. Durrieu (01/07-), O. Gillet (12/03-06/07), P. Leveau (11/04-11/07), M. Ramona (10/06-), M. Alonso (10/02-11/06), C. Baras (10/02-06/06), A. Moreau (10/03-09/06), Q. He (11/05-10/08), J-L. Smirr (01/07-), E. Ravelli (10/05-10/08), C. Joder (11/07-), L. Oudre (10/07-), F. Vallet (11/07-), S. Gulluni (02/08-), R. Hennequin (10/08-), M. Maazaoui (01/09-).

PostDocs, engineers and sabbaticals S. Essid (Postdoc 9 months), C. Hory (Postdoc 16 months), C. Févotte (Postdoc 8 months), M. Christensen (Aalborg Univ. (DK) Sabb. 1 month), A. Ozerov (Postdoc 18 months), M. Lagrange (Postdoc,10/2008-), T. Fillon (Postdoc,10/2008-), B. Mathieu (Engineer,10/2008-), Y. Menesguen (PostDoc 6 months).

External collaborators L. Daudet (Univ. Paris VI), O. Derrien (Univ. of Toulon), E. Vincent (IRISA), L. Devillers (LIMSI-CNRS), T. Sikora (Technical Univ. of Berlin) ...

Permanent staff [*IT ; CNRS*] ; post-docs	[7.5 ; 1.5] ; 1.5
PhDs	10
Defended PhDs	18
Defended HDR	2
Journal papers [published, in press]	[53 ; 5]
Chapters and books [published, in press]	[3 ; 7]
Conference papers	136
Patents and software	2
Contractual income 2005–2009 (june) [Private ; Public ; European] (k€)	[560; 755 ; 356]

The AAO (**A**udio, **A**coustical and **O**ptical waves) research group gathers digital and optical signal processing activities with a strong reference to the physical properties of the acoustical and optical phenomena. The group is structured in two research projects:

- Audio Signal Processing (*AudioSig* project),
- Optical Signal Processing (*TOS* project)

10.1 Audio Signal Processing (*AudioSig* Project)

10.1.1 Objectives

The aim of this project is to develop digital audio signal processing methods in order to propose innovative solutions to the main problems linked to audio (speech, music,...) in multimedia applications. Our interests encompass the complete processing chain from sound capture and transmission to sound restitution. Work is both conducted on a methodological level to develop new sound representations and models especially for musical signals (Adaptive methods for high resolution sinusoidal components tracking, sparse representations, Non-Negative Matrix factorization, hierarchical models,...) and on their application to practical problems (watermarking, compression, EEG signal processing, automatic indexing). Audio indexing and retrieval currently is the central research theme of this project and includes topics such as broadcast streams segmentation into broad classes of audio events (speech/music/silence/singing,...), musical signals automatic analysis, decomposition and understanding (polyphonic audio source separation, rhythm extraction, multiple fundamental frequencies estimation, main melody extraction,...). A new transverse orientation has also gained more interest with the arrival in november 2007 of a new CNRS permanent researcher on the specific theme of statistical methods for audio signal processing.

On a different level, the group has initiated the development of a multimedia indexing and mining platform (called PLATO) which now involves several other groups. This internal platform, targeted to researchers, aims at being an intelligent media library, at centralizing research software, processing tools and computation resources and at providing demonstrative and communication tools.

The project is also maintaining tight links and collaborations with both academics (Queen Mary university of London, Dublin City University, Technical University of Berlin, University Paris 6 (LAM), IRCAM, INRIA-IRISA, LABRI-CNRS,...) and industry (Thalès, FT R&D, RTL, INA, Audionamix,...).

10.1.2 Results

Audio and multimedia scenes analysis and indexing

Researchers R. Badeau, B. David, S. Essid, C. Févotte, Y. Grenier, J. Prado, G. Richard;

Highlights :

Collaborations: With industry (FT R&D, Thales, RTL, INA) and academics (TU Berlin, Queen Mary University, LAM-Paris 6, IRISA, IRCAM, LABRI,...)

Projects: Network of Excellence IST-Kspace (*Knowledge Space of Semantic Inference for Automatic Annotation and Retrieval of Multimedia Content*), ACI Musicdiscover (*Indexing and search in audio databases*), ANR-Desam (*Decompositions in sound elements and musical applications*), IVMN-infom@gic, ANR Sarah (*StAndardisation of High-Definition Remastering*, OSEO-QUAERO (*towards multimedia and multilingual search engines for professional and general public applications*);

Prize: PhD prize "ParisTech 2006" (R. Badeau)

This activity is following several research axes. The first direction, which is on a rather methodological level, aims at developing generic signal models and representations with a specific focus on audio signals. Several very interesting results were obtained for the estimation and tracking of sinusoidal components of an audio signal (new estimators for amplitude and frequency modulated components in noise [1836], efficient algorithms for the adaptive estimation and tracking of the signal subspace components [1828][1831]). An increased effort was also dedicated to sparse signal representations, such as based on Matching Pursuit or Non-negative Matrix factorisation (NMF)[1846], that allow to decompose a signal using a limited number of atoms or basis functions. The applicability of these methods to generic problems such as scalable audio signal compression [1863], audio source separation or music signal indexing was demonstrated by introducing specific constraints deduced from the audio signal properties (use of instrument specific atoms for music instrument recognition [1859], use of harmonicity or temporal constraints for music transcription[1983], use of source production or timbre models for source separation [1922],...). This methodological effort explores both deterministic and statistical approaches.

The second direction concerns the different facets of audio indexing and audio source separation which are two intricate problems. Indeed, efficient source separation eases the transcription of the resulting sources and efficient audio indexing facilitates the source separation. In music signal transcription, the group is directly interested in the four main problems which are *multiple fundamental frequencies estimation* (e.g. detection of simultaneous notes in a polyphonic musical recording [1925],[1983]), *rhythmical information tracking* (tempo and beat estimation [1825, 1824], *harmonic information estimation* (recognition of the chords sequence) and *timbre recognition* (musical instrument recognition in polyphonic audio [1844]). Source separation approaches were developed for specific music transcription tasks such as drum track transcription and resynthesis [1850]) and main melody estimation (by use of a NMF-based source-filter model for separating the singing voice from the musical accompaniment [1923]) but also for specific audio rendering tasks such as stereo signal remastering [1862].

The third research direction is dedicated to the audio streams segmentation into broad classes of audio events with application to *broadcast multimedia streams* (speech/music segmentation [1976], speech emotion recognition [1866],[1840] or TV show structuring) and *musical streams* (musical instrument recognition [1845],[1857], multimodal audio/video semantic alignment [1848]). Our efforts in this field is now evolving towards the automatic classification- both supervised and unsupervised- of multi-modal (or multi-stream) data sequences, typically audiovisual streams. Our emphasis is targeted to the incorporation of prior knowledge on the nature and structure of the streams processed, typically temporal dependencies and/or inter-stream correlations/dependencies, both at the signal level and the semantic level, possibly using ancillary information attached to the content (available meta-data, tags, notices, etc.) and/or user interaction (relevance feedback). At the methodological level, a special interest has been directed to kernel-based methods (Support Vector Machines, sequence kernels, probabilistic distances, kernel change detection, kernel LDA,. . .) and more recently to hybrid kernel and Bayesian network based methods.

Whenever possible, the results obtained are submitted to national or international evaluation campaigns. In particular in 2008, the group has participated to the national *ESTER 2 campaign* (Audio stream segmentation : best algorithm for music/non music detection and 2nd best for speech/non speech detection), the *Sissec campaign* (best results in two audio source separation subtasks) and *MIREX* (best algorithm for main melody estimation in 2008).

Sound capture and rendering

Researchers B. David, Y. Grenier, J. Prado, G. Richard;

Highlights Joint PhD with University of Parme, Italy; contract with France Télécom on audio source separation in the automotive domain, CapDigital-ROMEO (*a project within "pôle de compétitivité CapDigital, lead by Aldebaran Robotics and aiming at creating a humanoid robot*)

The objective of this theme is to improve sound field analysis and synthesis capabilities by developing specific digital signal processing methods. In binaural reproduction, a new approach was introduced to rapidly acquire new Head Related Transfer Functions (HRTF) and to personalize the rendering system to a new listener [1933]. Such a binaural reproduction system, where the acoustics of a room are simulated as perceived by the listener through his HRTF, was developed. Formal perception tests were also conducted in collaboration with the university of Parme to validate the different sound rendering methods proposed [1907].

In sound capture, recent work permitted to propose a novel technic for automatic sound field analysis from a network of sensors (microphones) [1944]. This approach refers to the classical multi-microphones beamforming and parametric spectral estimation principles. The sound field component in each direction is obtained from the maximization of the spatial resolution around the targeted direction. This filtering is directly expressed under the form of spheroidal functions. Current work tackles the difficult problem of humanoid robot audition which needs, using a limited number of sensors, to be robust to movements of the robot and to highly variable environments.

Concurrently, a novel approach for blind audio source separation from a network of sensors was introduced for the underdetermined case (e.g. less sources than sensors). This method combines a wavelet-based time frequency analysis with an automatic classification of the data vectors that represent the positions of each source [1823]. We produced several variants of this approach, one of them being based on an empirical modal decomposition [1865]. We have shown that our blind separation techniques could be embedded in a general framework characterized by the use of second order statistical properties of the signals [1822]. Since our goal was to apply these techniques in the car environment, we had to take into account the properties of the acoustic channels between the position of each source and the microphones (each channel acts as a filter or a convolution between the source signal and the impulse response of the channel); for this reason, another variant of the separation technique, which takes into account the convolutions, was elaborated in the time-frequency domain[1821].

Sound sources watermarking and compression

Researchers N. Moreau, G. Richard

Highlights : Media Puppet project, academic collaborations (Univ. of Toulon, INPG Grenoble, Univ. of Paris 6/LAM)

Originally, the focus in audio watermarking was on the technology performances improvement (in terms of bit rates/ratio of binary errors) by introducing new methods exploiting the fact that a watermarking system can be viewed as a communication channel with adjacent information [1833]. Recently, the objective was refocused on robustness issues to take into account typical use cases (such as those provided by Mediametrie). In particular, specific effort was dedicated to allow the detection of a hidden signal for degraded recordings (low quality microphones) or degraded communications (due to reverberation in a set-up where the loudspeakers and microphone are separated by at least 1m50). This appears to be a difficult problem that can only be partially solved by adaptive equalisation technics.

In audio compression, the work was mostly dedicated to low bit rate audio coding in the transform domain. On the one hand, specific effort was put to develop optimized quantization schemes for the MPEG Advanced Audio Coder (AAC) using a statistical subband model [2405]. This approach was later extended to stereo signals for the MS-stereo mode of the AAC coder. In particular, the quantization error model introduced permits a global approach for coding both Middle and Side channels in the same process leading to improved efficiency without increase of complexity [1842]. On the other hand, investigations were conducted to develop highly scalable transform coders which can seamlessly operate from very low bit rate up to transparency. To that aim, sparse overcomplete representations are used to decompose the audio signals over a redundant union of bases (such as Modified Discrete Cosine Transform bases at different scales) [1863]. It was also shown that the high flexibility of the signal representations used in this coder

allows to tackle various audio indexing tasks (such as beat tracking or musical genre recognition) directly in the transform domain [1864].

Active noise control and biomedical signals analysis

Researchers J. Prado, Y. Grenier;

Highlights : External collaboration, ACI Abrupt (*Active Noise control of perceived background noise in call centers*)

In the framework of the ACI ABRUPT project, the activity focused on the development of appropriate methods for active noise control of background noise in call centers. For this purpose, a slightly modified GMDFα(Generalised Multi-Delay Filter) algorithm was used where the signal reconstruction by overlap and add was suppressed. Although this modification leads to slightly lower performances, it permits to obtain a lower complexity algorithm with still better noise suppression capabilities than time-domain approaches (such as FXLMS for example) especially in terms of signal processed bandwidth.

The other research direction is dedicated to the analysis of biomedical signals and especially electroencephalogram (EEG) signals recorded on asleep subjects using a single pair of sensors. Our approach to this problem has two technological breakthroughs since it aimed at an automated analysis (and not only visual) and uses a single channel EEG. The efficiency and robustness of the method developed have been measured and experimentally validated [1994],[1835]. The first goal of this method is to reduce the overall complexity (both in processing time and operation) of the standard approaches in order to obtain a hypnogram according to the rules of Rechtschaffen and Kales (R&K 1968) and that are adapted to the new rules of the American Academy of Sleep Medicine (AASM 2007). A hypnogram is a graphical representation of the sleep stages, from light sleep to deep sleep. Hence the method is able to control the drowsiness in real-time which has numerous industrial applications such as risky site monitoring or transport security (preliminary results are reported in [1897]). Another direction of research targets the so call ”smart waking up” concept whose principle is to awaken a subject when the phase of sleep is the most favorable (light sleep or dream (REM stage)) to reduce the inertia of sleep. The sleep inertia is a transitional state of disorientation and confusion on awakening and may causes the degradation of mental performance. It was, in particular, shown that it is possible to optimize sleep to get the benefits (the recovery) without the disadvantages (torpor, sleep inertia).

Speech production

Researchers S. Maeda;

Highlights :

Collaborations: Collaboration With Department of Human Information Processing in ATR, Kyoto Japan and Phonetics and Phonology Laboratory (PPL), CNRS-University Paris 3.
Projects:IST-ASPI (Audiovisual to Articulatory Inversion), ANR-ARTIS (Articulatory inversion from audio-visual speech for augmented speech presentation), Experimental and Clinical phonetics with multi-instrumentations

In the context of the European project ASPI, we have investigated the acoustics characteristics of fricative sounds in various languages, which can be exploited in the acoustics-to-articulatory inversion. The combination of the high resolution MRI data recorded at ATR for the 3D vocal-tract shapes during the production of the fricatives and acoustic simulation have revealed that 1) distinctively different two classes of vocal tract configurations are used by French speakers to produce the same fricative consonant [1979]; 2) a smooth change in the vocal-tract shape does not always produce a smooth spectral shape variation of the fricatives. Rather, in some regions the change produces a little spectral change whereas in other regions it causes an important spectral shape change. Interestingly the MRI observed vocal-tract shapes during fricatives tend

to disperse in the stable regions, providing the evidence that the acoustic property of the vocal tract contributes to the specificity of the fricative sounds used in languages [1961]; 3) we have developed relatively simple models of fricatives that can produce highly intelligible and naturally sounding fricatives in speech synthesis experiment [2019].

In the follow up project, ARTIS, we are improving the acoustic modeling of fricatives and other consonants in order to fully exploit the advance in the MR imaging technique to measure detailed vocal-tract shapes. We expect that such modeling will allow us to gain the comprehensive understanding on the mapping between the vocal-tract shapes and the acoustic patterns of speech. The collaboration with Kiyoshi Honda (ATR) resulted in the invention of two non-invasive instruments: an external lighting and sensing PhotoGlottoGraph (ePGG) and a pneumotachograph with a disposal mask. The former is used to observe the activities of the larynx, abduction/adduction of the vocal folds during consonants and their oscillation during voicing. The latter one is used to measure the airflow passing through the vocal tract. These instruments will be used to evaluate the speech ability of patients in medical environments as well as in phonetic experiments [1986]. Patent application for each of these two inventions is in progress with help from the CNRS.

10.2 Optical Signal Processing

Researchers R. Frey , A. Maruani , I. Zaquine ;

Highlights Institut TELECOM funding on the subject *Netwok functions for quantum information*
Ile de France Région funding on the subject *Quantum Interface for storage of long distance propagating photons* (collaboration with "Institut d'Optique Graduate School").

Objectives

In the domain of classical optical signal processing, diffraction gratings are a basic resource that can be used for a number of devices, ranging from filters to holographic memories. Significant advances can be made, as far as diffractive properties are concerned, if a clever combination of material choice, nonlinear effects and configuration can be found, which has been our main concern for many years.

A new research subject on quantum signal processing for quantum communications applications has started for two years, as in this field also, the need is great for new devices based on nonlinear optics.

Results

The investigation of new intracavity gratings configurations using Gaussian beams [1839], gain media [1860], thin gratings [1872] has given rise to very efficient devices for optical signal processing applications :

The experimental results obtained with a YAG micro-laser confirmed the theoretical predictions and the advantage of the intracavity gain medium [1860]. The diffraction efficiency of the grating is increased by a factor 5000 and the angular selectivity by a factor 20. The developed models enable predictions on various devices from the infinitely thin grating [1872] to the thick grating filling the whole cavity that was experimentally tested.

The 2D refractive index gratings, using the band edge resonance of the Bragg mirror to enhance the diffraction properties of the transverse diffraction grating have also been very successful. With the dual independently tunable optical parametric generator developed in our laboratory, a Bragg diffraction regime was observed together with a huge enhancement of the diffraction efficiency in these crystals, in spite of their micrometric size[1852]. The simple analytical modeling developed for this kind of gratings can be most useful for the design of new devices [1853].

The first achievement concerning quantum signal processing is the implementation of a continuous polarisation entangled photon pairs source at 810 nm, based on spontaneous parametric down-conversion [1871]. It was setup for teaching purposes but its performances are comparable to the published results for comparable systems.

The next extraordinary challenge for quantum communication networks is the quantum repeater, including a quantum memory, a full Bell-state analysis and also an entanglement purification facility. The first issue is the compatibility between the long distance carrier photons at 1550 nm, with a bandwidth of 1 nm and the storage systems that operate below 900 nm, with a linewidth of only few hundreds of fm.

In this context, two key elements are a narrowband polarisation entangled photon pairs source and the corresponding wavelength changing interface that will preserve the bandwidth and polarisation of the photons. Nonlinear optics is at the heart of all these functions as spontaneous parametric down conversion will be used for the source, together with very complex filtering, and sum-frequency generation for the interface. An optical parametric oscillator will be setup as a specific narrow-band pumping source for the sum-frequency generation.

With the grants of Region Ile de France and Institut Telecom, the experiments on the quantum interface that will enable the storage of a telecom photon in a solid state quantum memory while preserving its polarization have been started.[2000]. The investigation of the compatibility of a propagating qubit with the quantum memory has also led us to the project of designing a new narrow-band polarisation entangled photon pairs source. Future work will be conducted in collaboration with the IQ team of Romain Alléaume (INFRES department of Telecom ParisTech), the Laboratoire Aimé Cotton in Orsay and the LPMC of Nice University within the framework of the three years “eQUANET” ANR project (accepted in 2009). Preliminary experiments show that 20000 photon pairs should be available in the 40 MHz expected bandwidth.

10.3 References

10.3.1 ACL: Articles in ISI-Indexed Journals

[1821] A. Aissa El Bey, K. Abed-Meraim, and Y. Grenier. Blind separation of underdetermined convolutive mixtures using their time-frequency representation. *IEEE Transactions on Audio, Speech & Language Processing*, 15(5):1540–1550, July 2007.

[1822] A. Aissa El Bey, K. Abed-Meraim, Y. Grenier, and Y. Hua. A general framework for second order blind separation of stationary colored sources. *Signal Processing*, 88(9):2123–2137, September 2008.

[1823] A. Aissa El Bey, N. Linh-Trung, K. Abed-Meraim, A. Belouchrani, and Y. Grenier. Underdetermined blind separation of nondisjoint sources in the time-frequency domain. *IEEE Transactions on Signal Processing*, 55(3):897–907, March 2007.

[1824] M. Alonso, G. Richard, and B. David. Accurate tempo estimation based on harmonic+noise decomposition. *Eurasip Journal on Advances in Signal Processing*, January 2007.

[1825] M. Alonso, G. Richard, and B. David. Tempo estimation for audio recordings. *Journal of New Music Research*, 36(1):17–26, March 2007.

[1826] R. Badeau and R. Boyer. Fast multilinear singular value decomposition for structured tensors. *SIAM Journal on Matrix Analysis and Applications*, 30(3):1008–1021, September 2008.

[1827] R. Badeau, B. David, and G. Richard. Fast approximated power iteration subspace tracking. *IEEE Transactions on Signal Processing*, 53(8 part 1):2931–2941, August 2005.

[1828] R. Badeau, B. David, and G. Richard. High resolution spectral analysis of mixtures of complex exponentials modulated by polynomials. *IEEE Transactions on Signal Processing*, 54(4):1341–1350, April 2006.

[1829] R. Badeau, B. David, and G. Richard. A new perturbation analysis for signal enumeration in rotational invariance techniques. *IEEE Transactions on Signal Processing*, 54(2):450–458, February 2006.

[1830] R. Badeau, B. David, and G. Richard. Cramér-Rao bounds for multiple poles and coefficients of quasipolynomials in colored noise. *IEEE Transactions on Signal Processing*, 56(8):3458–3467, August 2008.

[1831] R. Badeau, G. Richard, and B. David. Fast and stable yast algorithm for principal and minor subspace tracking. *IEEE Transactions on Signal Processing*, 56(8):3437–3446, August 2008.

[1832] R. Badeau, G. Richard, and B. David. Performance of ESPRIT for estimating mixtures of complex exponentials modulated by polynomials. *IEEE Transactions on Signal Processing*, 56(2):492–504, February 2008.

[1833] C. Baras, N. Moreau, and P. Dymarki. Controlling the inaudibility and maximizing the robustness in an audio annotation watermarking system. *IEEE Transactions on Audio, Speech and Language Processing*, 14(5):1772–1782, September 2006.

[1834] C. Berthomier, X. Drouot, M. Herman-Stoïca, P. Berthomier, J. Prado, O. Benoît, J. Mattout, and M. P. D'Ortho.

Wake-rem-nrem automatic classification based on a single eeg channel: Epoch by epoch comparison with human sleep scoring in patients. *Journal of Sleep Research*, September 2006.

[1835] C. Berthomier, X. Drouot, M. Herman-Stoïca, J. Prado, J. Mattout, and M. P. D'Ortho. Automatic analysis of single-channel sleep eeg: Validation in healthy individuals. *Journal of Sleep research*, 30(11):1587–1595, 2007.

[1836] M. Betser, P. Collen, G. Richard, and B. David. Estimation of frequency for am/fm models using the phase vocoder framework. *IEEE Transactions on Signal Processing*, 56(2):505 – 517, February 2008.

[1837] D. Bitauld, L. Menez, I. Zaquine, A. Maruani, and R. Frey. Diffraction of Gaussian beams on intracavity bragg gratings. *Journal of the Optical Society of America B*, 22(6):1153–1160, June 2005.

[1838] D. Bitauld, I. Zaquine, A. Maruani, and R. Frey. Uniform response high resolution tunable optical filtering using a grating-assisted acousto-optic device. *Optics Express*, 13(17):6438–6444, August 2005.

[1839] D. Bitauld, I. Zaquine, A. Maruani, and R. Frey. Numerical analysis of a high resolution fast tunable filter based on an intracavity bragg grating. *Applied Optics*, 46(21):4728–4735, July 2007.

[1840] C. Clavel, I. Vasilescu, L. Devillers, G. Richard, and T. Ehrette. Fear-type emotion recognition for future audio-based. *Speech Communication*, 50(6):487–503, June 2008.

[2405] O. Derrien, P. Duhamel, M. Charbit, and G. Richard. A new quantization optimization algorithm for the mpeg advanced audio coder using a statistical sub-band model of the quantization noise. *IEEE Transactions on Audio, Speech and Language Processing*, 14(4):1328–1339, July 2006.

[1842] O. Derrien and G. Richard. A new model-based algorithm for optimizing the mpeg-aac in ms-stereo. *IEEE Transactions on Audio, Speech and Language Processing*, 16(8):1373–1382, November 2008.

[1843] K. Ege, X. Boutillon, and B. David. High-resolution modal analysis. *Journal of Sound and Vibration*, May 2009.

[1844] S. Essid, G. Richard, and B. David. Instrument recognition in polyphonic music based on automatic taxonomies. *IEEE Transactions on Audio, Speech, and Language Processing*, 14(1):68–80, January 2006.

[1845] S. Essid, G. Richard, and B. David. Musical instrument recognition by pairwise classification strategies. *IEEE Transactions on Audio, Speech, and Language Processing*, 14(4):1401– 1412, July 2006.

[1846] C. Févotte, N. Bertin, and J.-L. Durrieu. Nonnegative matrix factorization with the Itakura-Saito divergence. With application to music analysis. *Neural Computation*, 21(3), March 2009.

[1847] C. Févotte, B. Torrésani, L. Daudet, and S. J. Godsill. Sparse linear regression with structured priors and application to denoising of musical audio. *IEEE Trans. Audio, Speech and Language Processing*, 16(1):174–185, January 2008.

[1848] O. Gillet, S. Essid, and G. Richard. On the correlation of automatic audio and visual segmentations of music videos. *IEEE Trans. on Circuit and Systems for Video Technology*, March 2007.

[1849] O. Gillet and G. Richard. Drum loops retrieval from spoken queries. *Journal of Intelligent Information Systems - Special issue on Intelligent Multimedia Applications*, 24(2/3):159–177, March 2005.

[1850] O. Gillet and G. Richard. Transcription and separation of drum signals from polyphonic music. *IEEE Transactions on Audio, Speech and Language Processing*, 16(3):529 – 540, March 2008.

[1851] M. Guillaume and Y. Grenier. Sound field analysis based on analytical beamforming. *EURASIP Journal on Advances in Signal Processing*, 2007, August 2007.

[1852] Q. He, I. Zaquine, R. Frey, R. Andre, and G. Roosen. Efficient bragg diffraction in thin semiconductor 2d gratings. *Optics Letters*, 33(23):2868–2870, December 2008.

[1853] Q. He, I. Zaquine, R. Frey, and G. Roosen. Bragg diffraction in thin 2d refractive index modulated semiconductor samples. *Journal of the Optical Society of America B*, 26(3):390–396, March 2009.

[1854] Q. He, I. Zaquine, A. Maruani, and R. Frey. Band edge induced bragg diffraction in 2d photonic crystals. *Optics Letters*, 31(9):1184–1186, May 2006.

[1855] Th. Hélie and D. Matignon. Diffusive reprentations for the analysis and simulation of flared acoustic pipes with visco-thermal losses. *Mathematical Models and Methods in Applied Sciences (M3AS)*, 16(4):503–536, April 2006.

[1856] Th. Hélie and D. Matignon. Representations with poles and cuts for the time-domain simulation of fractional systems and irrational transfer functions. *Signal Processing (SP)*, 86(10):2516–2528, October 2006.

[1857] C. Joder, S. Essid, and G. Richard. Temporal integration for audio classification with application to musical instrument classification. *IEEE Transaction on Audio, Speech and Language Processing*, 17(1):174–186, January 2009.

[1858] J. Kergomard, V. Debut, and D. Matignon. Resonance modes in a 1d medium with two purely absorbing boundaries: calculation methods, orthogonality and completeness. *Journal of the Acoustical Society of America (JASA)*, 119(3):1356–1367, March 2006.

[1859] P. Leveau, E. Vincent, G. Richard, and L. Daudet. Instrument-specific harmonic atoms for mid-level music representation. *IEEE Transactions on Audio, Speech and Language Processing*, January 2008.

[1860] A. Moreau, Q. He, I. Zaquine, A. Maruani, and R. Frey. Intracavity gain gratings. *Optics Letters*, 32(3):208–210, February 2007.

[1861] A. Moreau, I. Zaquine, A. Maruani, and R. Frey. Efficient Bragg-like operation of intracavity low efficiency plane gratings. *Journal of the Optical Society of America B*, 22(11):2289–2294, November 2005.

[1862] A. Ozerov and C. Févotte. Multichannel nonnegative matrix factorization in convolutive mixtures for audio source separation. *IEEE Trans. Audio, Speech and Language Processing*, 2010.

[1863] E. Ravelli, G. Richard, and L. Daudet. Union of mdct bases for audio coding. *IEEE Transactions on Audio, Speech and Language Processing*, 16(8):1361–1372, November 2008.

[1864] E. Ravelli, G. Richard, and L. Daudet. Audio signal representations for indexing in the transform domain. *IEEE Transactions on Audio, Speech and Language Processing*, December 2009.

10.3.2 ACLN: Articles in Other Refereed Journals

[1865] A. Aissa El Bey, K. Abed-Meraim, and Y. Grenier. Underdetermined blind audio source separation using modal decomposition. *EURASIP Journal on Audio, Speech & Music Processing*, 2007:1–15, March 2007.
[1866] C. Clavel, I. Vasilescu, G. Richard, and L. Devillers. Du corpus émotionnel au système de détection : le point de vue applicatif de la surveillance dans les lieux publics. *Revue en Intelligence Artificielle (RIA)*, 20(4-5):529–551, September 2006.
[1867] Y. Grenier. Interfaces audio aes/ebu. In *Editions Techniques de l'Ingénieur*. Editions Techniques de l'Ingénieur, 2005.
[1868] Th. Hélie, D. Matignon, and R. Mignot. Criterion design for optimizing low-cost approximations of infinite-dimensional systems: towards efficient real-time simulation. *International Journal of Tomography and Statistics*, 7(7):13–18, September 2007.
[1869] H. Kim, K. Honda, and S. Maeda. Stroboscopic cine-mri study on the phasing between the tongue and the larynx in korean three-way phonation contrast. *Journal of Phonetics*, 33(1):1–26, January 2005.
[1870] D. Matignon and Ch. Prieur. Asymptotic stability of linear conservative systems when coupled with diffusive systems. *European Series in Applied and Industrial Mathematics: Control, Optimization and Calculus of Variations (ESAIM:COCV)*, 11(3):487–507, July 2005.
[1871] Y. Menesguen, J. L. Smirr, G. Pillet, R. Alleaume, A. Maruani, I. Zaquine, R. Frey, and L. Jacubowiez. Source de photons intriqués en polarisation : travaux pratiques de physique quantique. *Bulletin de l'Union des Physiciens*, 102:61–80, November 2008.
[1872] A. Moreau, I. Zaquine, A. Maruani, and R. Frey. Réseaux minces de diffraction en régime de bragg. *Journal de Physique IV*, 135:239, October 2006.
[1873] J. Prado. Introduction à matlab. In *Techniques de l'Ingénieur*, chapter dossier AF1450, Vol papier n^{o}AFM3. 2005.

10.3.3 ACTI: Articles in Proceedings of International Conferences

[1874] A. Aissa El Bey, K. Abed-Meraim, and Y. Grenier. Blind separation of audio sources convolutive mixtures using parametric decomposition. In *IWAENC'05*, volume 1, pages 161–164, Eindhoven (Pays-bas), September 2005.
[1875] A. Aissa El Bey, K. Abed-Meraim, and Y. Grenier. Blind separation of audio sources using modal decomposition. In *ISSPA'05*, volume 2, pages 451–454, Sydney (Australie), August 2005.
[1876] A. Aissa El Bey, K. Abed-Meraim, and Y. Grenier. Underdetermined blind source separation of audio sources in time-frequency domain. In *SPARS'05*, volume 1, pages 115–118, Rennes, France, November 2005.
[1877] A. Aissa El Bey, K. Abed-Meraim, and Y. Grenier. Iterative blind source separation by decorrelation: algorithm and performance analysis. In *14th European signal processing conference (EUSIPCO)*, Florence, Italie, September 2006.
[1878] A. Aissa El Bey, K. Abed-Meraim, and Y. Grenier. On the identifiability testing in blind source separation using resampling technique. In *6th International Conference on Independent Component Analysis and Blind Source Separation*, number LCNS 3889, pages 755–764, Charleston, SC, USA, March 2006.
[1879] A. Aissa El Bey, K. Abed-Meraim, and Y. Grenier. Blind audio source separation using sparsity based criterion for convolutive mixture case. In *7th International Conference on Independent Component Analysis and Blind Source Separation*, London, UK, September 2007.
[1880] A. Aissa El Bey, K. Abed-Meraim, and Y. Grenier. Underdetermined audio source separation using fast parametric decomposition. In *ISSPA'07*, Sharjah (United Arab Emirates), February 2007.
[1881] A. Aissa El Bey, K. Abed-Meraim, and Y. Grenier. Underdetermined blind separation of audio sources from the time-frequency representation of their convolutive mixtures. In *ICASSP'07*, volume 1, pages 153–156, Hawaii (USA), April 2007.
[1882] A. Aissa El Bey, H. Bousbia-Salah, K. Abed-Meraim, and Y. Grenier. Audio source separation using sparsity. In *IWAENC'06*, Paris, France, September 2006.
[1883] M. Alonso, G. Richard, and B. David. Extracting note onsets from musical recordings. In *IEEE-ICME*, Amsterdam, NL, July 2005.
[1884] J. Altuna, B. Mulgrew, R. Badeau, and V. Atxa. A fast adaptive method for subspace based blind channel estimation. In *ICASSP'06*, volume IV, pages 1121–1124, Toulouse, France, May 2006.
[1885] R. Badeau and B. David. Weighted Maximum Likelihood Autoregressive and Moving Average Spectrum Modeling. In *ICASSP'08*, pages 3761–3764, Las Vegas, Nevada, USA, April 2008.
[1886] R. Badeau, B. David, and G. Richard. Yet another subspace tracker. In *ICASSP'05*, volume 4, pages 329–332, Philadelphie, Pennsylvanie, USA, March 2005.
[1887] R. Badeau, B. David, and G. Richard. YAST algorithm for minor subspace tracking. In *ICASSP'06*, volume III, pages 552–555, Toulouse, France, May 2006.
[1888] R. Badeau, B. David, and G. Richard. Conjugate gradient algorithms for minor subspace analysis. In *ICASSP'07*, volume 3, pages 1013–1016, Honolulu, Hawaii, USA, April 2007.
[1889] R. Badeau, V. Emiya, and B. David. Expectation-maximization algorithm for multi-pitch estimation and separation of overlapping harmonic spectra. In *ICASSP'09*, pages 3073–3076, Taipei, Taiwan, April 2009.
[1890] R. Badeau, G. Richard, and B. David. Fast adaptive esprit algorithm. In *SSP'05*, Bordeaux, France, July 2005.
[1891] W. Bailer, E. Dumont, S. Essid, and B. Mérialdo. A collaborative approach to automatic rushes video summarization. In *IEEE ICIP Workshop on Multimedia Information Retrieval: New Trends and Challenges*, October 2008.

[1892] C. Baras and N. Moreau. An audio spread-spectrum data hiding system with an informed embedding strategy adapted to a Wiener filtering based receiver. In *IEEE International Conference on Multimedia and Exposition (ICME)*, Amsterdam, NL, July 2005.

[1893] C. Baras, N. Moreau, and P. Dymarki. Comparative study of two informed embedding strategies for audio spread-spectrum data hiding systems. In *EUSIPCO*, Antalya, Turquie, September 2005.

[1894] C. Berthomier, X. Drouot, M. Herman-Stoïca, J. Prado, J. Mattout, and M. P. D'Ortho. A wake-rem-nrem automatic analysis using a single eeg channel: Epoch by epoch comparison with human sleep scoring in healthy subjects. In *First Congress of the World Association of Sleep Medicine (WASM)*, Berlin, Allemagne, October 2005.

[1895] C. Berthomier, X. Drouot, M. Herman-Stoïca, J. Prado, J. Mattout, and M. P. D'Ortho. Single channel based brain monitoring: Sleep/wakefulness classification. In *International conference on Monitoring sleep and sleepiness - from physiology to new sensors*, Bâle, Suisse, May 2006.

[1896] C. Berthomier, X. Drouot, M. Herman-Stoïca, J. Prado, J. Mattout, and M. P. D'Ortho. Real-time automatic measurement of recorded sleep time. In *American College of Chest Physicians (ACCP) congress : CHEST*, number 694S, Chicago, US, October 2007.

[1897] C. Berthomier, A. Muzet, P. Berthomier, J. Prado, and J. Mattout. Real-time automatic measurement of drowsiness based on a single eeg channel. In *European Sleep Research Society*, Glasgow Scotland, September 2008.

[1898] N. Bertin, R. Badeau, and G. Richard. Blind signal decompositions for automatic transcription of polyphonic music: NMF and K-SVD on the benchmark. In *ICASSP'07*, volume 1, pages 65–68, Honolulu, Hawaii, USA, April 2007.

[1899] N. Bertin, C. Févotte, and R. Badeau. A tempering approach for Itakura-Saito non-negative matrix factorization. With application to music transcription. In *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'09)*, pages 1545–1548, Taipei, Taiwan, April 2009.

[1900] M. Betser, P. Collen, and G. Richard. Frequency estimation based on adjacent dft bins. In *EUSIPCO-2006*, Florence, Italie, September 2006.

[1901] M. Betser, P. Collen, G. Richard, and B. David. Review and discussion on classical stft-based frequency estimators. In *International Convention of the Audio Engineering Society (AES)*, Paris, France, May 2006.

[1902] D. Bitauld, I. Zaquine, A. Maruani, and R. Frey. A fast tunable high resolution filter. In *Conference on lasers and electro-optics*, number CI-4-TUE, Munich (Allemagne), June 2005.

[1903] D. Bitauld, I. Zaquine, A. Maruani, and R. Frey. Grating-assisted acousto-optic filtering. In *Photonics*, page 7, Prague, République Tchèque, June 2005.

[1904] R. Blouet, G. Rapaport, I. Cohen, and C. Févotte. Evaluation of several strategies for single sensor speech/music separation. In *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'08)*, Las Vegas, USA, April 2008.

[1905] R. Boyer, K. Abed-Meraim, and L. De Lathawer. Delayed exponential fitting by best tensor rank-(r1,r2,r3) approximation. In *Proc. IEEE Int. Conf. on Acoustics, Speech and Signal Processing (ICASSP)*, May 2005.

[1906] R. Boyer and R. Badeau. Adaptive multilinear SVD for structured tensors. In *ICASSP'06*, volume III, pages 880–883, Toulouse, France, May 2006.

[1907] A. Capra, S. Fontana, F. Adriaensen, A. Farina, and Y. Grenier. Listening tests of the localization performance of stereodipole and ambisonic systems. In *123rd Convention of the Audio Engineering Society*, New York, USA, October 2007.

[1908] C. Clavel, L. Devillers, G. Richard, I. Vasilescu, and T. Ehrette. Abnormal situation detection and analysis through fear-type acoustic manifestations. In *ICASSP'07*, Honolulu, Hawai, April 2007.

[1909] C. Clavel, T. Ehrette, and G. Richard. Events detection for an audio-based surveillance system. In *IEEE-ICME*, Amsterdam, July 2005.

[1910] C. Clavel, I. Vasilescu, L. Devillers, G. Richard, T. Ehrette, and C. Sedogbo. The safe corpus: illustrating extreme emotions in dynamic situations. In *LREC Workshop Corpora and Emotion*, Gênes, Italie, May 2006.

[1911] C. Clavel, I. Vasilescu, G. Richard, and L. Devillers. Fear-type emotions in the safe corpus : annotation issues. In *LREC*, Gênes, Italie, May 2006.

[1912] C. Clavel, I. Vasilescu, G. Richard, and L. Devillers. Voiced and unvoiced content of fear-type emotions in the safe corpus. In *Speech Prosody 2006*, Dresden, Germany, May 2006.

[1913] G. Cornuz, E. Ravelli, P. Leveau, and L. Daudet. Object Coding of Harmonic Sounds using Sparse and Structured Representations. In *10th Int. Conference on Digital Audio Effects (DAFx-07)*, Bordeaux, France, September 2007.

[1914] B. David and R. Badeau. Fast sequential LS estimation for sinusoidal modeling and decomposition of audio signals. In *WASPAA 2007*, pages 211–214, New Paltz, New York, USA, October 2007.

[1915] B. David, R. Badeau, and G. Richard. HRHATRAC algorithm for spectral line tracking of musical signals. In *ICASSP'06*, volume III, pages 45–48, Toulouse, France, May 2006.

[1916] B. David, V. Emiya, R. Badeau, and Y. Grenier. Harmonic plus noise decomposition: Time-frequency reassignment versus a subspace-based method. In *120th Convention of the Audio Engineering Society*, Paris, France, May 2006.

[2821] J. Dellière, A. Maruani, H. Maître, and P. Benjamin. A full electromagnetic SAR image simulator for urban structures. In *4th IEEE-GRSS - ISPRS workshop - URBAN 2007*, Paris (France), April 2007.

[2822] J. Dellière, A. Maruani, H. Maître, P. Benjamin, and J. P. Piau. A full electromagnetic SAR simulator for urban structures. In *Physics in Signal and Image Processing, PSIP'07*, Mulhouse, January 2007.

[1919] J.-F. Deü and D. Matignon. A coupled Nemark-diffusive scheme for fractionally damped oscillators. In *8th International Conference on Mathematical and Numerical Aspects of Waves*, pages 526–528, Reading, United Kingdom, July 2007.

[1920] E. Dumont, B. Merialdo, S. Essid, W. Bailer, D. Byrne, H. Bredin, N. E. O'Connor, G. J. F. Jones, M. Haller,

A. Krutz, Th. Sikora, and T. Piatrik. A collaborative approach to video summarization. In *SAMT 2008, 3rd International Conference on Semantic and Digital Media Technologies*, Koblenz, Germany, December 2008.

[1921] E. Dumont, B. Merialdo, S. Essid, W. Bailer, H. Rehatschek, D. Byrne, H. Bredin, N. E. O'Connor, G. J. F. Jones, A. F. Smeatonand, M. Haller, A. Krutz, Th. Sikora, and T. Piatrik. Rushes video summarization using a collaborative approach. In *TRECVID 2008, ACM International Conference on Multimedia Information Retrieval 2008*, Vancouver, BC, Canada, November 2008.

[1922] J.-L. Durrieu, A. Ozerov, C. Févotte, G. Richard, and B. David. Main instrument separation from stereophonic audio signals using a source/filter model. In *European Signal Processing Conference (EUSIPCO)*, Glasgow,Scotland, August 2009.

[1923] J.-L. Durrieu, G. Richard, and B. David. Singer melody extraction in polyphonic signals using source separation methods. In *ICASSP'08*, Las Vegas, Nevada, USA, April 2008.

[1924] J.-L. Durrieu, G. Richard, and B. David. An iterative approach to monaural musical mixture de-soloing. In *IEEE International Conference on Acoustics, Speech and Signal Processing*, Taipei, Taiwan, April 2009.

[1925] V. Emiya, R. Badeau, and B. David. Multipitch estimation of inharmonic sounds in colored noise. In *10th Int. Conf. on Digital Audio Effects (DAFx-07)*, pages 93–98, Bordeaux, France, September 2007.

[1926] V. Emiya, R. Badeau, and B. David. Automatic transcription of piano music based on HMM tracking of jointly-estimated pitches. In *EUSIPCO 2008*, Lausanne, Switzerland, August 2008.

[1927] V. Emiya, B. David, and R. Badeau. A parametric method for pitch estimation of piano tones. In *ICASSP'07*, volume 1, pages 249–252, Honolulu, Hawaii, USA, April 2007.

[1928] V. Emiya, B. David, and V. Gibiat. Two representation tools to analyse non-stationary sounds in a perceptual context. In *Forum Acusticum 2005*, Budapest, Hongrie, August 2005.

[1929] S. Essid, G. Richard, and B. David. Instrument recognition in polyphonic music. In *ICASSP'05*, Philadelphie, US, March 2005.

[1930] S. Essid, G. Richard, and B. David. Hierarchical classification of musical instruments on solo recordings. In *ICASSP'06*, Toulouse, France, May 2006.

[1931] C. Févotte and F. Theis. Pivot selection strategies in jacobi joint block-diagonalization. In *7th International Conference on Independent Component Analysis and Signal Separation (ICA'07)*, Londres (United-Kingdom), September 2007.

[1932] S. Fontana, A. Farina, and Y. Grenier. Binaural for popular music: a case of study. In *13th International Conference on Auditory Display*, Montréal, Canada, June 2007.

[1933] S. Fontana, Y. Grenier, and A. Farina. A system for head related impulse responses rapid measurement and direct customization. In *120th Convention AES*, Paris, France, October 2006.

[1934] O. Gillet and G. Richard. Automatic transcription of drum sequences using audiovisual features. In *ICASSP'05*, Philadelphie, US, March 2005.

[1935] O. Gillet and G. Richard. Drum track transcription of polyphonic music signals using noise subspace projection. In *6th International Conference on Music Information Retrieval, ISMIR 2005*, London, UK, September 2005.

[1936] O. Gillet and G. Richard. Extraction and remixing of drum tracks from polyphonic music signals. In *IEEE Workshop on Applications of Signal Processing to Audio and Acoustics, WASPAA'05*, New Paltz, USA, October 2005.

[1937] O. Gillet and G. Richard. Indexing and querying drum loops databases. In *CBMI*, Riga, Lettonie, June 2005.

[1938] O. Gillet and G. Richard. Comparing audio and video segmentations for music videos indexing. In *IEEE International Conference on Acoustics, Speech, and Signal Processing, ICASSP'06*, Toulouse, France, May 2006.

[1939] O. Gillet and G. Richard. Enst-drums: an extensive audio-visual database for drum signals processing. In *7th International Conference on Music Information Retrieval, ISMIR 2006*, Victoria, Canada, October 2006.

[1940] O. Gillet and G. Richard. Supervised and unsupervised sequence modelling for drum transcription. In *International Congress on Music Information Retrieval (ISMIR)*, Vienne, Autriche, September 2007.

[1941] S. J. Godsill, A. T. Cemgil, C. Févotte, and P. J. Wolfe. Bayesian computational methods for sparse audio and music processing. In *Proc. 15th European Signal Processing Conference (EUSIPCO'07)*, Poznan (Poland), September 2007.

[1942] M. Guillaume and Y. Grenier. Experimental 3d sound field analysis with a microphone array. In *28th International Conference of the AES*, Pitea, Sweden, July 2006.

[1943] M. Guillaume and Y. Grenier. Sound field analysis based on generalized prolate spheroidal wave sequences. In *120th Convention of the Audio Engineering Socitety*, Paris, FRANCE, May 2006.

[1944] M. Guillaume and Y. Grenier. Sound field analysis with a two-dimensional microphone array. In *ICASSP*, volume V, pages 321–324, Toulouse, France, May 2006.

[1945] M. Guillaume, Y. Grenier, and G. Richard. Iterative algorithms for multichannel equalization in sound reproduction systems. In *ICASSP'05*, Philadelphie, US, March 2005.

[1946] H. Haddar, J.-R. Li, and D. Matignon. Efficient solution of a wave equation with fractional order dissipative terms. In *8th International Conference on Mathematical and Numerical Aspects of Waves*, pages 529–531, Reading, United Kingdom, July 2007.

[2563] Z. Harchaoui, F. Vallet, A. Lung-Yut-Fong, and O. Cappé. A regularized kernel-based approach to unsupervised audio segmentation. In *ICASSP 2009*, pages 1665–1668, Taiwan, April 2009.

[1948] Q. He, I. Zaquine, R. Andre, G. Roosen, and R. Frey. Bragg diffraction regime in thin semiconductor 2d refractive index gratings. In *PR 09*, Bad Honnef, Allemagne, June 2009.

[1949] Q. He, I. Zaquine, A. Maruani, S. Massenot, R. Chevallier, and R. Frey. Diffraction enhancement in 2d photonic crystals. In *European Optical Society Annual Meeting*, volume TOM3, page 193, Paris France, October 2006.

[1950] Th. Hélie, D. Matignon, and R. Mignot. Criterion design for optimizing low-cost approximations of infinite-dimensional systems: towards efficient real-time simulation. In *IFAC workshop on Control Applications of Op-*

timisation (CAO'06), pages 368–373, Cachan, France, April 2006.
[1951] C. Hory and W. J. Christmas. Cepstral features for classification of an impulse response with varying sample size dataset. In *EUSIPCO 2007*, pages 1546–1550, Poznan, Pologne, September 2007.
[1952] C. Joder, S. Essid, and G. Richard. Alignment kernels for audio classification with application to music instrument recognition. In *EUSIPCO 2008*, Lausanne, Suisse, August 2008.
[1953] J. Kergomard, D. Matignon, and V. Debut. Waves in a 1d-medium with two resistive terminations: completeness of the modes. In *WAVES'05: 7th Int. Conf. on Mathematical and Numerical Aspects of Wave Propagation*, pages 273–275, Providence (Rhode Island, USA), June 2005.
[1954] S. Krstulovic, R. Gribonval, P. Leveau, and L. Daudet. A comparison of two extensions of the matching pursuit algorithm for the harmonic decomposition of sounds. In *IEEE Workshop on Applications of Signal Processing to Audio and Acoustics, (WASPAA05)*, Mohonk (NY) - USA, October 2005.
[1955] M. Lardeur, S. Essid, G. Richard, M. Haller, and T. Sikora. Incorporating prior knowledge on the digital media creation process into audio classifiers. In *IEEE International Conference on Acoustics, Speech and Signal Processing*, Taipei, Taiwan, April 2009.
[1956] J.-L. Le Carrou, F. Gautier, and R. Badeau. Theoretical and experimental investigations of harp's sympathetic modes. In *ICA 2007*, Madrid, Spain, September 2007.
[1957] P. Leveau and L. Daudet. Multi-resolution partial tracking with modified matching pursuit. In *14th European Signal Processing Conference (EUSIPCO)*, Florence (Italy), September 2006.
[1958] P. Leveau, S. Essid, G. Richard, L. Daudet, and B. David. On the usefulness of differentiated transient/steady-state processing in machine recognition of musical instruments. In *AES convention*, Barcelone, May 2005.
[1959] P. Leveau, D. Sodoyer, and L. Daudet. Automatic Instrument Recognition in a Polyphonic Mixture using Sparse Representations. In *8th Int. Conf. on Music Information Retrieval (ISMIR 2007)*, Vienne, Autriche, September 2007.
[1960] P. Leveau, E. Vincent, G. Richard, and L. Daudet. Mid-level sparse representations for timbre identification: design of an instrument-specific harmonic dictionary. In *1st Workshop on Learning the Semantics of Audio Signals*, Athènes, Grèce, December 2006.
[1961] S. Maeda and M. Toda. Quantal aspects of non anterior sibilant fricatives: A simulation study. In *7th International Seminar on Speech Production (ISSP)*, pages 573–580, July 2006.
[1962] D. Matignon. Asymptotic stability of the Webster-Lokshin model. In *Mathematical Theory of Networks and Systems*, page CDROM 11p, Kyoto, Japan, July 2006.
[1963] D. Matignon. Diffusive representation for fractional Laplacian and other non-causal pseudo-differential operato rs. In *IFAC workshop on Control of Distributed Parameter Systems (CDPS'07)*, pages 19–20, Namur, Belgique, July 2007.
[1964] K. Mcguinness, O. Gillet, N. O'Connor, and G. Richard. Visual analysis for drum sequence transcription. In *European Signal Processing Conference (Eusipco)*, Poznan, Pologne, September 2007.
[1965] R. Mignot, Th. Hélie, and D. Matignon. Waveguide modeling of lossy flared acoustic pipes: derivation of a Kelly-Lochbaum structure for real-time simulations. In *IEEE Workshop on Applications of Signal Processing to Audio and Acoustics*, page 4, New Paltz, USA, October 2007.
[1966] A. Moreau, Q. He, I. Zaquine, A. Maruani, and R. Frey. Intracavity bragg diffraction in microlasers. In *European Optical Society Annual Meeting*, volume TOM6, page 45, Paris France, October 2006.
[1967] A. Moreau, Q. He, I. Zaquine, A. Maruani, and R. Frey. Gain grating in a nd:yvo4 microlaser. In *Conference on Lasers and Electrooptics*, Baltimore, May 2007.
[1968] A. Moreau, I. Zaquine, A. Maruani, and R. Frey. Diffraction regime of an intracavity thin grating. In *Conference on Lasers and Electro-Otpics*, number CK-4-WED, Munich (Allemagne), June 2005.
[1969] A. Moreau, I. Zaquine, A. Maruani, and R. Frey. Intracavity thin diffraction gratings. In *Photonics*, page 83, Prague, République Tchèque, June 2005.
[1970] I. Potamitis and A. Ozerov. Single channel source separation using static and dynamic features in the power domain. In *EUSIPCO, 16th European Signal Processing Conference*, Laussane, Switzerland, August 2008.
[1971] M. Ramona, G. Richard, and B. David. Vocal detection in music with support vector machines. In *ICASSP'08*, Las Vegas, USA, April 2008.
[1972] E. Ravelli, G. Richard, and L. Daudet. Extending transform coding to very lowbirates using overcomplete dictionaries. In *IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, New Paltz, US, October 2007.
[1973] E. Ravelli, G. Richard, and L. Daudet. Fast mir in a sparse transform domain. In *ISMIR*, Philadelphie, USA, September 2008.
[1974] E. Ravelli, G. Richard, and L. Daudet. Matching pursuit in adaptive dictionaries for scalable audio coding. In *EUSCIPCO*, Lausanne, Suisse, September 2008.
[1975] G. Richard, P. Leveau, L. Daudet, S. Essid, and B. David. Towards polyphonic musical instrument recognition. In *International Congress on Acoustics (ICA)*, Madrid, September 2007.
[1976] G. Richard, M. Ramona, and S. Essid. Combined supervised and unsupervised approaches for automatic segmentation of radiophonic audio streams. In *ICASSP'07*, Honolulu, Hawai, April 2007.
[2590] W. Souidene, A. Aissa El Bey, K. Abed-Meraim, and A. Beghdadi. Blind image separation using sparse representation. In *14th International Conference on Image Processing ICIP*, San Antonio, Texas, USA, September 2007.
[1978] V. Y. F. Tan and C. Févotte. Automatic relevance determination in nonnegative matrix factorization. In *Workshop on Signal Processing with Adaptative Sparse Structured Representations (SPARS'09)*, St-Malo, France, April 2009.
[1979] M. Toda, S. Maeda, M.Aron, and M.0. Berger. Modeling subject-specific formant transition patterns in /asha/

sequences. In *8th International Seminar on Speech Production (ISSP)*, pages 357–360, July 2008.
[1980] K. Trabelsi, T. Hélie, and D. Matignon. Time-domain simulation of functions and dynamical systems of Bessel type. In *8th International Conference on Mathematical and Numerical Aspects of Waves*, pages 547–549, Reading, United Kingdom, July 2007.
[1981] I. Venturini. Oracle attacks and covert channels. In *International Workshop on Digital Watermarking, IWDW 2005*, Siena, Italy, September 2005.
[1982] I. Venturini. Reality Preserving Fractional Discrete Cosine Transforms. In *Electronic imaging and the Visual Arts 2006*, Florence, Italy, April 2006.
[1983] E. Vincent, N. Bertin, and R. Badeau. Harmonic and inharmonic nonnegative matrix factorization for polyphonic pitch transcription. In *ICASSP'08*, pages 109–112, Las Vegas, Nevada, USA, April 2008.
[1984] S. Wegener, M. Haller, J.-J. Burred, T. Sikora, S. Essid, and G. Richard. On the robustness of audio features for musical instrument classification. In *EUSCIPCO*, Lausanne, Suisse, September 2008.
[1985] P. Wilkins, T. Adamek, D. Byrne, G. Jones, H. Lee, G. Keenan, K. Mcguinness, N. E. O'Connor, A. F. Smeaton, A. Amin, Z. Obrenovic, R. Benmokhtar, E. Galmar, B. Huet, S. Essid, R. Landais, F. Vallet, G. Th. Papadopoulos, S. Vrochidis, V. Mezaris, I. Kompatsiaris, E. Spyrou, Y. Avrithis, R. Morzinger, P. Schallauer, W. Bailer, T. Piatrik, K. Chandramouli, E. Izquierdo, M. Haller, L. Goldmann, A. Samour, A. Cobet, T. Sikora, and P. Praks. K-space at TRECVid 2007. In *TRECVID 2007*, November 2007.
[1986] M. Yeou and S. Maedaand K.S.Honda. Laryngeal activity in the production of consonants clusters and geminates in moroccan arabic. In *8th International Seminar on Speech Production (ISSP)*, pages 249–252, July 2008.

10.3.4 ACTN: Articles in Proceedings of French Conferences

[1987] A. Aissa El Bey, K. Abed-Meraim, and Y. Grenier. Séparation aveugle sous-déterminée de sources audio par la méthode EMD (Empirical Mode Decomposition). In *20e Colloque GRETSI sur le traitement du signal et des images*, volume 2, pages 1233–1236, Louvain-La-Neuve, Belgique, September 2005.
[1988] A. Aissa El Bey, K. Abed-Meraim, and Y. Grenier. Séparation aveugle sous-déterminée de sources en utilisant la décomposition en paquet d'ondelettes. In *21e Colloque GRETSI sur le traitement du signal et des images*, Troyes, France, September 2007.
[1989] G. Bailly, C. Baras, P. Bas, S. Baudry, R. Brun, D. Beautemps, F. Davoine, F. Elisei, G. Gibert, D. Grison, J.-P. Léoni, J. Liénard, N. Moreau, and P. Nguyen. Artus : Calcul et tatouage audiovisuel des mouvements d'un personnage animé virtuel pour l'accessibilité d'émissions télévisuelles aux spectateurs sourds comprenant la langue française parlée complétée. In *Handicap*, pages 265–270, Paris, June 2006.
[1990] C. Baras and N. Moreau. Modulation cdma informée dans un système de tatouage audio. In *CORESA*, Rennes, France, November 2005.
[1991] C. Baras, N. Moreau, and B. Zayen. Mécanisme de synchronisation en tatouage audio pour des perturbations désynchronisantes à forte dérive. In *GRETSI*, pages 1205–1208, Louvain-La-Neuve, Belgique, September 2005.
[1992] C. Berthomier, X. Drouot, M. Herman-Stoïca, J. Prado, J. Mattout, and M. P. D'Ortho. Analyse automatique du sommeil à partir d'une dérivation eeg : Comparaison entre hypnogrammes automatique et visuel chez le sujet sain. In *XXème Congrès de la Société Française de Recherche sur le Sommeil (SFRS)*, Lyon, November 2005.
[1993] C. Berthomier, X. Drouot, M. Herman-Stoïca, J. Prado, J. Mattout, and M. P. D'Ortho. Analyse automatique du sommeil à partir dune unique dérivation eeg : Comparaison des analyses automatique et visuelle chez le patient. In *XXIème Congrès de la Société Française de Recherche et Médecine sur le Sommeil (SFRMS)*, Albi, France, November 2006.
[1994] C. Berthomier, X. Drouot, M. Herman-Stoïca, J. Prado, J. Mattout, and M. P. D'Ortho. Sleep automatic analysis using a single electroencephalogram channel in healthy subjects. In *Congrès de Physiologie, de Pharmacologie et Thérapeutique (P2T)*, Lyon, April 2006.
[1995] D. Bitauld, I. Zaquine, A. Maruani, and R. Frey. Filtrage frequentiel optique par un dispositif acousto-optique associe a un reseau de diffraction. In *COLOQ 9*, page 43, Dijon, France, September 2005.
[1996] K. Ege, X. Boutillon, B. David, and J. Lozada. Analyse modale sans transformée de fourier. In *Congrès Français de Mécanique*, Grenoble, August 2007.
[1997] Q. He, I. Zaquine, A. Maruani, and R. Frey. Diffraction de bragg dans des cristaux photoniques 2d. In *Coloq*, Grenoble, July 2007.
[1998] J.-L. Le Carrou, F. Gautier, and R. Badeau. Analyse des modes de cordes couplées d'une harpe par une méthode à haute résolution. In *8ème Congrès Français d'Acoustique CFA'06*, Tours, France, April 2006.
[1999] J. Lozada, X. Boutillon, and B. David. Modes propres de vibration : comment oublier fourier. In *Congrès Français de Mécanique*, Tours, France, April 2006.
[2000] Y. Menesguen, J. L. Smirr, G. Pillet, C. Bourdarias, R. Alleaume, A. Maruani, I. Zaquine, and R. Frey. Interface de changement de longueur donde conservant lintrication en polarisation. In *COLOQ*, Grenoble, July 2007.
[2001] A. Moreau, I. Zaquine, A. Maruani, and R. Frey. Réseaux minces de diffraction en régime de bragg. In *COLOQ 9*, page 189, Dijon France, September 2005.
[2002] M. Ramona and G. Richard. Segmentation parole/musique par machines à vecteurs de support. In *Journées d'Etudes sur la Parole (JEP'08)*, Avignon, France, June 2008.

10.3.5 COM: Talks in Conferences Which Do Not Publish Proceedings

[2003] R. Badeau and B. David. Adaptive subspace methods for high resolution analysis of music signals. In *Acoustics'08*, Paris, France, July 2008.
[2004] N. Bertin and R. Badeau. Initialization, distances and local minima in audio applications of the non-negative matrix factorization. In *Acoustics'08*, Paris, France, July 2008.
[2005] B. David and R. Badeau. Towards an adaptive subspace-based representation of musical spectral content. In *Acoustics'08*, Paris, France, July 2008.
[2006] O. Derrien, G. Richard, and R. Badeau. Damped sinusoids and subspace based approach for lossy audio coding. In *Acoustics'08*, Paris, France, July 2008.
[2007] J.-L. Durrieu, G. Richard, and B. David. Single sensor singer/music separation using a source/filter model of the singer voice. In *Acoustics*, Paris, France, July 2008.
[2008] J.-L. Durrieu and J. Weil. Automatic beat-synchronous generation of music lead sheets. In *Kspace PhD Jamboree*, Paris, France, July 2008.
[2009] F. Vallet, G. Richard, S. Essid, and J. Carrive. Detecting artist performances in a tv show. In *Kspace PhD Jamboree*, Paris, France, July 2008.

10.3.6 OS: Books and Book Chapters

[2010] C. Baras, N. Moreau, and T. Dutoit. *How could music contain hidden information*, chapter 7, pages 223 – 264. 2009.
[2011] R. Benmokhtar, B. Huet, G. Richard, T. Declerck, and S. Essid. *Feature Extraction for Multimedia Analysis*, chapter 4. Wiley, 2009.
[2012] C. Clavel and G. Richard. *Reconnaissance acoustique des émotions,*, chapter 5. Hermès, 2009.
[2013] T. Dutoit and N. Moreau. *How is sound processed in an MP3 player*, chapter 3, pages 65–101. 2009.
[2014] T. Dutoit, N. Moreau, and P. Kroon. *How is speech processed in a cell phone conversation*, chapter 1, pages 1–31. 2009.
[3045] S. Essid, M. Campedel, G. Richard, T. Piatrik, R. Benmokhtar, and B. Huet. *Machine Learning Techniques for Multimedia Analysis*, chapter 5. Wiley, 2009.
[2016] C. Févotte. *Bayesian audio source separation*, chapter 11, pages 305–335. Springer, 2007.
[2017] N. Moreau. *Codage audio et normes*. Vuibert, 2006.
[2018] G. Richard. *Audio Indexing*. Information Science Reference - IGI Global, 2008.
[2019] M. Toda, S. Maeda, and K. Honda. *Formant-cavity affiliation in sibilant fricatives*. Fuchs, S., Zygis, M., Toda, M., and Shadle Ch. (Eds.). Mouton de Gruyter., 2009.

Chapter 11

Multimedia (MM)

Team leader B. Pesquet-Popescu (P).

Faculty M. Cagnazzo (MC, 02/08–), G. Chollet (DR CNRS), C. Concolato (MC, 10/07 –), C. Faure (CR CNRS), J. LeFeuvre (IE), L. Likforman-Sulem (MC), J.-C. Moissinac (MC), C. Pelachaud (DR CNRS, 01/09 –), M. Sigelle (MC), C. Tillier (06/05–09/07)

PhD students H. Bredin (09/04–10/07), S. S. Lin (09/02–06/07), L. Zouari (01/04–04/07), R. El-Hajj (11/05–07/07), T. Hueber (10/06–), B. Pellan (10/06–), B. Elloumi (12/06 –), M. Bendris (10/08–), R. Bayeh (12/03–), C. Angeli (), P. Perrot (01/05–), C. Concolato (10/02–07/07), G. Pau (01/03–06/06), M. Trocan (10/04–10/07), C. Tillier (10/02–06/05), G. Feideropoulou (10/01-04/05), A. Robert (11/04–01/08), C. Bergeron (01/04–01/07), G. Laroche (11/05–05/09), N. Tizon (11/05–), O. Crave (10/05–12/08), I. Daribo (10/06–), T. Maugey (10/07–), S. Chebbo (12/06–), C. Yaacoub (04/06–07/09), M. Kaaniche (10/06–), S. Hyniewska (10/08–), Q. Anh Le (07/09 –), J. Huang (10/09 –), C. Greco (09/08 –), R. de Oliveira (01/09 –), A-L Bianne (09/08–), M. Kimiaei-Asadi (02/02 – 06/05), B. Rodriguez (02/09–), A. R. Kaced (10/05–10/08), Z. K. Aoul (10/05–10/08)

Post-docs, engineers and sabbaticals R. Landais (05/06–12/07), G. Aversano (01/06–09/06), L. Zouari (04/07–11/08), J. Wei (10/07–09/08), Y-Z. Zhang (03/07–03/08), A. Fraysse (10/06–08/08), S. Brangoulo (01/06–09/06), B. Pellan (–09/06), T. André (10/07–05/08), J. Gauthier (06/08–09/09), W. Miled (10/07–09/09), A.M. de Bellaing (10/06–04/07), B. Zalesky (sabbatical 1 month), R. Niewiadomski (01/09 – 12/09), A.-M. Pez(10/08-01/10), K. Prepin (01/09-12/09), E. de Sevin (01/09 – 06/10), M. Ochs (09/09 – 08/10), H. Sarria (sabbatical, 01/08–01/09), E. Barney Smith (sabbatical, 2 weeks), E. Sanchez-Soto (05/09–), J. Razik (02/08–08/09), C. Riedinger (11/08–12/09), P. de Cuetos (–06/05), A. Amehraye (11/08–)

External collaborators A. Bennazza (SupCom Tunis), R. de Quieroz (Univ. Brasilia), C. Mokbel (UOB, Liban), C. Kermorvant (A2IA), A. Vinciarelli (IDIAP), I. Jermyn (INRIA Sophia), S. Perreau (ITR, Adelaide), E. Bratsolis (Univ. Athens), J. Farah (USEK, Liban), M. van der Schaar (UCLA, USA), G. Piella (Univ. Pompeu Fabra, Barcelona), C. Guillemot (INRIA Rennes)

Faculty [IT, CNRS]	[7, 2.3]
PhD students	11
Post-docs, engineers and sabbaticals	2
Defended PhD theses	16
Defended HDR	2
Journal papers	42
Papers in conference proceedings	135
Chapters and books	15
Patents and sofware	3
Standardization contributions	95
Grants [public, private, european] (k€)	[1778, 833, 1322]

11.1 Objectives

The research in the "Multimedia" (MM) group covers the life cycle of multimedia documents in the framework of a complete chain, going from authoring tools for on-line and off-line production of multimedia contents to multimodal interaction for the final user; this also includes automated processing like enhancement of degraded pictures, verification of the identity of the user, modification of auditive and visual appearance, image segmentation and pattern recognition. The group also works on techniques that allow the analysis, compression and robust transmission of these media in heterogeneous networks. It also works on the dynamic and distributed adaptation of the transmitted data flow (including meta-data and in particular those concerning the digital rights management) with respect to context, transport conditions and terminal type.

11.2 Main Results

The main research results obtained during the period 2005-2009 are presented below for the research areas of the Multimedia team.

11.2.1 Robust Compression and Transmission of Visual Data

Faculty B. Pesquet-Popescu, C. Tillier, M. Cagnazzo

Main events Best Paper Award IEEE Trans. Circuits and Systems for Video Technology 2006 received by B. Pesquet-Popescu. B. Pesquet-Popescu is a member of the IEEE SPS Multimedia Signal Processing (MMSP) Technical Committee, of the IEEE SPS Image, Video and Multidimensional Signal Processing (IVMSP) TC, Associate Editor for IEEE Trans.on Multimedia, Associate Editor for Elsevier Signal Processing, and was a Co-Chair of the MPEG AHG on Exploration in Wavelet Video Coding (04/05–07/06). She is also a member and Treasurer of the EURASIP AdCom and member of the GdR ISIS administrative committee. In 2006 and 2007 she was also a "rapporteur" for the RIAM program and is, since 2005, an expert for ANR.

Projects ANR DIVINE (2006-2009), ANR DITEMOI (2006-2009), pôle CapDigital Sebastian2 (2008-2010), pôle CapDigital PINGO (2008-2010), IST STREP DANAE (2004-2006), IST

NoE MUSCLE (2004-2008), ANR blanc ESSOR (2006-2009), CEDRE (2009-2010), bilateral SFR project (2005-2008), ACI Masses de Données CoDage (2004-2007)

Scalable and Adaptive Coding

One of our main topics of interest is *scalable video coding* [2267], allowing a video system to provide a flexible and robust bitstream, able to be adapted to different transport and visualization conditions. We have studied video coding based on spatio-temporal wavelet decompositions, enabling a natural spatial and temporal scalability. These schemes also have the advantage of easily allowing the implementation of unequal error protection [2056].

In this context, we have been among the first to introduce motion-compensated temporal lifting schemes ([2050, 2029]). New temporal decomposition tools have been proposed like, for example, 3-band temporal schemes [2051], optimized update operators, iterative bidirectional prediction structures, low delay temporal schemes etc. In the spatial domain, we have worked on M-band filter banks permitting a fractional scalability [2039], and that can also be adapted to the quantization step and to the content itself. This technique leads to important gains in quality and computational time, and allowed Telecom ParisTech to get a patent and to be in the process of obtaining a second one on the extension of this idea to H.264/AVC and SVC video adaptation. Different other adaptations and optimizations of the AVC/SVC codecs have been implemented in the collaborative project PINGO.

Another application of lifting structures is the construction of content-adaptive filter banks, where the choice between two or several structures is related to a criterion uniquely based on the analysed data. We have proposed [2048, 2057], in collaboration with G. Piella (Univ. Pompeu Fabra), and H. Heijmans (CWI, Amsterdam) an original framework based on semi-norms allowing to provide flexible decision criteria. Recently, we have incorporated rate-distortion criteria in these decompositions. Another approach for designing sparse representations adapted to the video content is based on block-oriented transforms, where we proposed solutions in a standardized framework during the PhD thesis of A. Robert (CIFRE FTRD).

An extension of the previous techniques to *multi-view coding and 3DTV compression* was performed, in several directions: first, the compression of stereo image pairs and stereo video sequences by joint multiresolution analyses without leakage [2031], and second, the multi-view coding for free-point of view and 3DTV applications [2046]. In this context, we have proposed optimal bitrate allocation in such schemes, as well as pre-, post-processing and compression of depth maps. The disparity estimation in a variational approach with convex constraints is a key point of this theme, which is developed by W. Miled [2038]. It was also extended to dense motion estimation and joint disparity-motion estimation for multi-view coding. Lifting structures for multi-view coding and the application of joint wavelet packets in this framework was done in collaboration with Nuremberg University.

Finally, an important theoretical work, in collaboration with A. Fraysse (now at Univ. Paris-Sud) and J.-C. Pesquet (Univ. Paris-Est), was the study of asymptotic operational rate-distortion curve of Bernouilli-Generalized Gaussian sources, which provide an accurate model for the subbands of different spatio-temporal transforms [2045].

Robust and Joint Source-Channel Coding

In a standardization context of MPEG-4/AVC, we have studied schemes based on “competition” [2034], based on different optimization criteria (PhD thesis of G. Laroche, CIFRE FTRD). Some of the proposed tools have been integrated in the KTA, which is the reference software for a possible future standard (H.265 ?). We have also proposed original solutions for temporal scalability using frame shuffling [2021] (PhD thesis of C. Bergeron, CIFRE with Thalès). In the same collaboration with Thalès, several *joint source-channel coding* optimizations for H.264/AVC streams have been performed. Video streaming over wireless networks, stream commutation, detection and prevention of congestion, ressource allocation, are the main topics of the work performed by N. Tizon in his CIFRE PhD thesis with SFR [2052].

In the same time, video transmission over error-prone networks may be highly affected by congestion or bottlenecks. A tool allowing to cope with such errors is the *multiple description coding* (MDC), exploiting the existence of different paths from the sender to the receiver. We developed MDC schemes issued from wavelet frames with reduced redundancy in the spatial and/or temporal domain and proposed several solutions exploiting advanced convex optimization techniques. One of them, called "synthesis frame approach", allowed us to establish interesting connections with the *compressed sensing* framework. The MDC paradigm is also considered in collaborative projects like DIVINE (DIffusion de Vidéo et Image vers des termiNaux hEtérogènes, à travers des liens hétérogènes), where we performed unequal error protection for multicast links, or DITEMOI (DIffusion et TElechargement sur lien MObile Ip), where we work on joint source-channel coding for wireless multi-point to multi-point (Wi-Fi or WiMAX) channels [2041]. In the Sebastian2 project, dedicated to real-time tools for post-production between Paris and San Francisco creation areas, we develop the idea of using MDC for P2P communications and propose new protocoles for wired and wireless P2P networks.

Distributed Video Coding

The current development of applications like mobile visiophony raises an increasing interest from the industry for compression techniques with low complexity, and low battery charge, in order to increase the autonomy of mobile terminals. In this context, the *distributed source coding* paradigm provides original solutions for moving the complexity of video compression from the encoder to the decoder or base station [2024]. Moreover, there is a strong increase of sensor network solutions for videosurveillance, facing similar constraints. In our team, we develop distributed video coding (DVC) schemes, some of them in collaborative projects like ANR ESSOR (codagE de SourceS vidéO distRibué), and consider both theoretical and applicative aspects in mono- and multi-view distributed codig, and related multi-terminal concepts. For example, in collaboration with INRIA Rennes, we proposed iterative (turbo-like) decoding of MDC streams with adjacent information [2042]. We have also performed a rate-distortion analysis and error propagation study of mono- and multi-view DVC schemes [2042].

11.2.2 Rich Media, Adaptation and Open Source Software

Faculty C. Concolato, J. LeFeuvre, J.-C. Moissinac

Main events Organization of Distributed Framework for Multimedia Applications 2007, 2nd Best Open Source Software Award in ACM MM 07, Edition of several ISO and W3C standards

Projects ANR MP4MC (01/06–06/07), ANR Radio+(11/08–11/10), Cap Digital PINGO(04/08–04/10), IST FP6 STREP ISIS (09/02–03/05), IST FP6 STREP TIRAMISU (11/03–12/05), IST FP6 STREP DANAE (01/04–06/06), IST FP6 NoE INTERMEDIA (10/06–10/10), ANR Georacing (01/07–03/09), IT JEMTU (01/06–12/08).

Rich Media Representation

The term "Rich Media" [2027] designates the methods, algorithms, tools or technlogies required for the processing of the new generation of multimedia content, i.e. content that encompasses natural or synthetic audio-visual material but adds animation and interactive capabilities. Rich Media technologies target a wide range of application domains: from digital TV or radio, to mobile multimedia and the Web 2.0.

The research topic that the team pursued in this area are numerous. Some work has been done towards finding the best representation for such content, as well as designing compression approaches for multimedia scene description languages, with features such as error protection and scalability. Other works focused on improving the visualization of such content [2023], in

particular on mobile phones. Finally, the problems related to the delivery of such content on diverse networks such as broadcast networks have been also investigated. As part of this work, the team is an active participant to standardization bodies such as W3C and ISO. The team has contributed (more than 80 contributiions) and participated to the editing of the following international standards: MPEG-4 Systems, MPEG-4 BIFS, MPEG-4 LASeR, and W3C SVG.

Multimedia Adaptation

The adaptation of multimedia content to its context of use (terminal capabilities, network characteristics, user preference) is a very active research topic, with tight link with standardization activities such as MPEG-21 or W3C. The team explores specific problems in the adaptation of multimedia content: adaptation of protected content, adaptation of human-computer interface, and the authoring of adaptable services [2040]. These problems are addressed along different axis either by defining software architectures for such adaptations (in relationship with the ASTRE Team) or by defining methods and languages facilitating the adapation of multimedia documents.

GPAC Open Source Software

The team maintains an Open Source platform called GPAC [2134], GPAC Project on Advanced Content (http://gpac.sourceforge.net), distributed under an LGPL license. This platform offers various tools for the encoding, the delivery and the playback of multimedia content, ranging from simple audio/video to full-fledge Rich Media. These tools implement state-of-the-art algorithms, methods and protocols from many standards organizations (MPEG, W3C, IETF, ETSI) and are kept in close sync with new industrial deployments. GPAC is used by the academic world (42 citations in journals or international conferences), the industrial world (integrated in several R&D projects) and the internet community (e.g. used for iPod file management). GPAC constitues the back-bone for the implementation of the team's work (Rich Media representations and adaptation) and is often demonstrated in conferences or standardization meetings.

11.2.3 Document Imaging and Interaction

Faculty L. Likforman, M. Sigelle, C. Faure

Main events L. Likforman is the General Chair of the Document Recognition and Retrieval (DRR) 2009 and DRR 2010 conferences.

Projects DGA REI (2008-2010), GET projects : Campus Mobile (2002- 2005), GEOService (2007), i-Shpere (2008), RNRT INFRADIO (2003- 2006), TechnoVision RIMES (2006-2008)

We first showed that the use Dynamic Bayesian Networks for the recognition of either naturally of artificially degraded characters performs significantly better than other current state-of-the-art methods such as Support Vector Machines [2035](L. Likforman, M. Sigelle). Also, we designed a recognition system for cursive arabic handwriting combining several Hidden Markov Model classifiers using different oriented windows [2028], which proved to be one of the most performant at this moment (L. Likforman, in collaboration with C. Mokbel and R. Al-Hajj, Univ. of Balamand, Lebanon won the ICDAR 2005 competition for Arabic handwritten word recognition). A grant has been provided in 2008 by the A2IA company to the PhD student Anne-Laure Bianne for improving this system. L. Likforman took part in the specification of the TechnoVision RIMES (Written documents recognition and indexing) project goals, as well as in the RIMES evaluation in character and logo recognition (in collaboration with S. Ladjal). Télécom ParisTech was ranked on the first position for logo recognition and second, ex-aequo, for character recognition.

For image restoration with Total Variation based on graph-cuts methods, the PhD of J. Darbon and subsequent work [2025, 2026] have lead to a new methodology for joint restoration of Synthetic Aperture Radar amplitude and phase images for 3D reconstruction of buildings (joint work

with F. Tupin et L. Denis ENSML). A new grant on this subject (funded by DGA/REI) has been accepted and should start soon (in collaboration with J-F, Aujol (CMLA) and J-M. Nicolas). M. Sigelle has also been working in collaboration with W. Pieczinsky (Télécom SudParis), F. Tupin and D. Benboudjema on triplet Markov Random Fields AIMED TO texture analysis and indexing in the framework of the Info@Magic project.

M. Sigelle started a collaboration with I. Jermyn (INRIA ARIANA) and S. Perreau (UNISA Adelaide Australia) on the topics of (discrete) diffusion processes, which can be applied both to modelling of traffic routing in ad hoc networks and to image restoration [2194, 2360].

The studies of C. Faure on documents and images emphasized the role of communication and the visual modality. Digital and digitised documents are processed to facilitate information access. Layout and logical structures are automaticaly detected in document images or in semi-structured digital documents. Applications were developped for the RNTL project InfRadio for which web documents were adapted to be read and activated on the small screens of mobile devices [2224]. More recently, document image analysis was performed for the digital library medic@ to assist the archivists in indexing and storing historical medical documents. New methods were proposed to structure the images of the pages and to extract relevant components such as the figure and caption pairs [2096, 2094, 2095]. To cope with ancient fonts difficult to recognise by OCR, word spotting methods were proposed to search for word-images similar to query words [2231, 2128, 2129]. These works for medic@ are made in collaboration with the LIPADE (Univ. Paris V). In GEOservice, a joint project between several research teams of the Institut Télécom (C. Faure was prime), the visual modality was involved in a web service. Images were combined with text to provide multimodal egocentric instructions for guiding a mobile user in a building. As a natural complement of the visual modality, the gestural modality was studied in the context of human-computer interaction where the users drew or wrote to communicate [2093, 2223, 2260, 2234, 2086].

11.2.4 Audio-visual Identity/Imposture and Virtual Worlds

Faculty G. Chollet, C. Pelachaud, M. Sigelle, M. Charbit

Main events G. Chollet and C. Pelachaud, general co-chairs of IVA'07; C. Pelachaud and T. Boubekeur, co-editor special issue on Facial Modeling, IEEE Computer Graphics and Applications, to appear in 2010; C. Pelachaud co-organizer of a Workshop held in conjunction with AAMAS 2009; she is since 2007 secretary of the Humaine association on emotion; she is part of the selection committee of ANR CONTINT (since 2008), ANR Blanc CSD9 Sciences Humaines et sociales (in 2009).

Projects IST NoE BIOSECURE (2004-2007), IV2 TechnoVision (2006-2007), IST SECURE-PHONE (2005-2007), IST NoE KSpace (2005-2008), INFOM@GIC (Cap Digital) (2006-2009), ANR KIVAOU (2008-2010), ANR MYBlog3D (2006-2010), CompanionAble: IP de IST (2008-2012), ANR blanc OUISPER (2006-2009), IST IP-CALLAS (2006-2010), IST STREP-SEMAINE (2008-2011), IST NoE-SSPNet (2009-2013), COST Action 2102 (2006-2010), ANR CECIL (2009-2011), ANR GV-Lex (2009-2011), ANR IMMEMO (2009-2011)

Two main directions of investigation are present in this theme:

Biometry and Speech/Face Synthesis/Recognition/Verification

The speech group was created in 1983 when Gérard Chollet joigned Télécom-ParisTech (called ENST at the time). The focus was centered on coding, synthesis and recognition. In the 1990, speaker verification was added, followed by language identification five years ago. At that time, audio-visual speech and speaker recognition became a topic of interest. The Biosecure network of excellence was an opportunity to promote open-source software for major biometric modalities (face, voice, audio-visual speaker, signature, iris, hand shape...) This led to the publication of

the book ([2269]) and to the development of databases, reference systems and benchmarking protocols ([2849, 2259]). The FP6-Securephone project was an opportunity to integrate audio-visual identity verification on a mobile phone. Audio-visual identification also finds applications in video indexing (InfoM@gic project, PhD theses supported by OrangeLabs,...) Face tracking and super-resolution of faces are issues under study in the ANR-KIVAOU project and are evaluated in the context of the NIST-MBGC campaigns. Speech recognition is still a major problem for our team. It is being experimented in projects such as the ANR-MyBlog3D and the FP7-IP-Companionable in the context of Spoken Dialogue Systems. Initial results on Very Low Bit Rate Speech Coding led to a participation of G. Chollet in start-up companies such as Peer2Phone and Shankaa. Our coder still needs to be improved in terms of speaker and language independence. A similar approach is developped in the context of the ANR OUISPER project aiming at the development of a Silent Speech Interface (driven from tongue and lip movements).

Interaction and Embodied Conversational Agent

We have been developing an interactive platform of an Embodied Conversational Agent GRETA (virtual entity endowed with human-like communication capabilities) (work done within the projects ANR RNTL MyBlog-3D and IP-CALLAS) [2062]. Greta is open source platform under GPL licence (http://www.tsi.enst.fr/p̃elachau/Greta/; more than 100 downloads in 1 year; it is used in several international projects as well as material for academic purposes). Two major axes are actually undertaken: the first one relates to nonverbal communicative and emotional behaviour model and the second one focuses on model of the interaction between user(s) and virtual agent(s). Models of communicative and emotional behaviours of ECAs are elaborated within the EU project IP-CALLAS and the national projects ANR CECIL, ANR GV-Lex and ANR IMMEMO. Different aspects of expressive behaviours are being modelled. Our aim is to go beyond the expression model of the six prototypical expressions of emotions that have been mainly considered so far. We are extending our model of expressive behaviours to other modalities than faces such as gesture and gaze [2185, 2135]. Expressions of emotions can correspond to blend of emotions (eg superposition of two emotions) (IP-CALLAS) [2262]. The expression of emotion does not correspond solely to a static facial expression but it corresponds to sequential multimodal behaviours (IP-CALLAS) [2152]; facial behaviours for complex emotions are going to be further defined (ANR CECIL; PhD thesis Jing Huang) from our previous work [2261]; Expressive communicative behaviour for virtual agent and the humanoid robot NAO is being developed within the project ANR GV-Lex (PhD thesis Quoc Anh Le); and finally emotionally-coloured communicative behaviours is being worked out in the project ANR IMMEMO. While in most of our work we based our model on literature and on careful observation of data (IP-CALLAS; PhD thesis Sylwia Hyniewska) [2151], in the project ANR IMMEMO we aim to use learning techniques to motion capture data so as to extract information on the relation between behaviour parameters. Our work on interaction is geared toward elaborating a listener model as well as the emergence of synchronous behaviours between interactants [2256]. Within the STREP SEMAINE we are developing a backchannel model to simulate listener's behaviour in an interaction [2143]. While the project SEMAINE deals with a dyad situation, a user dialoguing with a virtual agent, and is geared toward emotional dialogs, the project NoE SSPNet focuses on social signals. We are elaborating a model of synchrony between interactants of a conversation, synchrony being a sign of engagement. Within SSPNet we are extended our rule-based model to deal with dynamic model. Behaviours of agents are not only specified at a high-level (eg communicative intention and emotion) but they are also dynamically adapted to the user's behaviour [2256].

11.3 References

11.3.1 ACL: Articles in ISI-Indexed Journals

[2020] E. Argones Rua, H. Bredin, C. Garcia Mateo, G. Chollet, and D. Gonzalez Jimenez. Audio-visual speech asynchrony detection using co-inertia analysis and coupled hidden markov models. *Pattern Analysis and Applications Journal*, page 23, May 2008.

[2021] C. Bergeron, C. Lamy-Bergot, G. Pau, and B. Pesquet-Popescu. Temporal scalability through adaptive m-band filterbanks for robust h264/mpeg-4 avc video coding. *special issue on "Video Analysis and Coding for Robust Transmission", EURASIP Journal on Applied Signal Processing (JASP)*, 2006(1):259 – 259, January 2006.

[2022] H. Bredin and G. Chollet. Audio-Visual Speech Synchrony Measure: Application to Biometrics. *EURASIP Journal on Advances in Signal Processing – Special Issue on Knowledge-Assisted Media Analysis for Interactive Multimedia Applications*, 2007(1):179–190, January 2007.

[2023] C. Concolato, J. Le Feuvre, and J. C. Moissinac. Design of an Efficient Scalable Vector Graphics Player for Constrained Devices. *IEEE Transactions on Consumer Electronics*, 54(2):895–903, May 2008.

[2024] O. Crave, B. Pesquet-Popescu, C. Guillemot, and C. Tillier. Distributed temporal multiple description coding for robust video transmission. *EURASIP Journal on Wireless Communications and Networking*, February 2008.

[2025] J. Darbon and M. Sigelle. Image restoration with discrete constrained total variation part i: Fast and exact optimization. *Journal of Mathematical Imaging and Vision*, 26(3):261–276, December 2006.

[2026] J. Darbon and M. Sigelle. Image restoration with discrete constrained total variation part ii: Levelable functions, convex priors and non-convex cases. *Journal of Mathematical Imaging and Vision*, 26(3):277–291, December 2006.

[2027] J. C. Dufourd, O. Avaro, and C. Concolato. An MPEG standard for rich media services. *IEEE Multimedia*, 12(4):60–68, December 2005.

[2028] R. El-Hajj, L. Likforman-Sulem, and C. Mokbel. Combining slanted-frame classifiers for improved hmm-based arabic handwriting recognition. *IEEE PAMI*, 31(7):1165–1177, July 2009.

[2029] G. Feideropoulou, M. Trocan, G. Fowler, B. Pesquet-Popescu, and J.-C. Belfiore. Joint source-channel coding with partially coded index assignment for robust scalable video. *IEEE Signal Processing Letters*, 13(4):201– 204, April 2006.

[2674] L. Gueguen and M. Datcu. Image time-series data mining based on the information-bottleneck principle. *IEEE Transactions on Geoscience and Remote Sensing*, 45(4), April 2007.

[2031] M. Kaaniche, A. Benazza-Benyahia, B. Pesquet-Popescu, and J.-C. Pesquet. Vector lifting schemes for stereo image coding. *IEEE Transactions on Image Processing*, July 2009.

[2032] W. Karam, H. Bredin, H. Greige, G. Chollet, and C. Mokbel. Talking-face identity verification, audiovisual forgery and robustness issues. *EURASIP Journal on Advances in Signal Processing*, page 15, April 2009.

[2033] R. Landais, L. Vinet, and J.-M. Jolion. Une Méthode Autonome de Ciblage de l'Optimisation d'un Système de Détection d'Objets par Analyse de la Responsabilité. *Traitement du Signal*, 24(5):353–369, 2007.

[2034] G. Laroche, J. Jung, and B. Pesquet-Popescu. Rd optimized coding for motion vector predictor selection. *IEEE Trans.on CSVT*, 18(9):1247–1257, September 2008.

[2035] L. Likforman-Sulem and M. Sigelle. Recognition of degraded characters using dynamic bayesian networks. *Pattern Recognition*, 41(10):3092–3103, October 2008.

[2036] B. Marusic, S. Dobraveca, P. De Cuetos, and C. Concolato. Tiramisu: A novel approachto content representation and key management for seamless super-distribution of protected media. *Signal Processing: Image Communication*, 20(9-10):947–971, April 2005.

[2037] T. Maugey and B. Pesquet-Popescu. Side information estimation and new symmetric schemes for multi-view distributed video coding. *Journal of Visual Communication and Image Representation*, 19(8):589–599, December 2008.

[2038] W. Miled, J.-C. Pesquet, and M. Parent. A convex optimization approach for depth estimation under illumination variation. *IEEE Transactions on Image Processing*, 18(4):813–830, April 2009.

[2039] G. Pau, B. Pesquet-Popescu, and G. Piella. Modified M-band synthesis filter bank for fractional scalability of images. *IEEE Signal Processing Letters*, 13(6):345 – 348, June 2006.

[2040] B. Pellan and C. Concolato. Authoring of Scalable Multimedia Documents. *Multimedia Tools and Applications*, 43(3):225–252, July 2009.

[2041] B. Pesquet-Popescu, T. André, C. Lamy-Bergot, and A. Mokraoui-Zergainoh. Panorama des techniques de codage/décodage conjoint et techniques de diversité adaptées à la transmission de flux vidéo et html sur lien ip sans fil point/multipoint. *Traitement du Signal*, 25(5), October 2008.

[2042] B. Pesquet-Popescu, O. Crave, and C. Guillemot. Multiple description coding with side information: Practical scheme and iterative decoding. *EURASIP Journal on Advances in Signal Processing (JASP)*, July 2009.

[2043] B. Pesquet-Popescu, J. Farah, and C. Yaacoub. Feedback channel suppression in distributed video coding with adaptive rate allocation and quantization for multi-user applications. *EURASIP Journal on Wireless Communications and Networking*, July 2008.

[2044] B. Pesquet-Popescu, H. H. Heijmans, and G. Piella. Building nonredundant adaptive wavelets by update lifting. *Applied Computational Harmonic Analysis (ACHA)*, (18):252–281, May 2005.

[2045] B. Pesquet-Popescu, J.-C. Pesquet, and A. Fraysse. On the uniform quantization of a class of sparse sources. *IEEE Transactions on Information Theory*, July 2009.

[2046] B. Pesquet-Popescu, Ch. Tillier, and I. Daribo. Motion vector sharing and bit-rate allocation for 3d video-plus-depth coding. *EURASIP Journal on Advances in Signal Processing (JASP)*, July 2009.

[2047] G. Piella, B. Pesquet-Popescu, and H. Heijmans. Gradient-driven update lifting for adaptive wavelets. *Signal Processing : Image Communication*, 20(9-10):813–831, October 2005.
[2048] G. Piella, B. Pesquet-Popescu, H. Heijmans, and G. Pau. Combining seminorms in adaptive lifting schemes and applications to image analysis and compression. *Journal of Mathematical Imaging and Vision*, 25(2):203–226, September 2006.
[2049] B. Reiterer, C. Concolato, J. Lachner, J. Le Feuvre, J. C. Moissinac, S. Lenzi, S. Chessa, E. Fernández Ferrá, J. González Menaya, and H. Hellwagner. User-centric Universal Multimedia Access in Home Networks. *The Visual Computer*, 24(7-9):837–845, July 2008.
[2050] C. Tillier, B. Pesquet-Popescu, and M. Van Der Schaar. Improved update operators for lifting-based motion-compensated temporal filtering. *IEEE Signal Processing Letters*, 12(2):146–149, February 2005.
[2051] C. Tillier, B. Pesquet-Popescu, and M. Van Der Schaar. 3-band motion-compensated temporal structures for scalable video coding. *IEEE Transactions on Image Processing*, 15(9):2545–2557, September 2006.
[2052] N. Tizon and B. Pesquet-Popescu. Scalable and media aware adaptive video streaming over wireless networks. *EURASIP Journal of Advances in Signal Processing (JASP)*, February 2008.
[2053] D. S. Turaga, M. Van Der Schaar, and B. Pesquet-Popescu. Complexity scalable motion compensated wavelet video encoding. *IEEE Transactions on Circuits and Systems for Video Technology*, 15(8):982–993, August 2005.
[2054] A. Zahour, B. Taconet, L. Likforman-Sulem, and W. Boussella. Overlapping and multi-touching text-line segmentation by block covering analysis. *Pattern Analysis & Applications*, 2008.
[2055] L. Zouari and G. Chollet. Efficient codebook for fast and accurate low resource asr systems. *Speech Communication*, page 23, March 2009.

11.3.2 ACLN: Articles in Other Refereed Journals

[2056] J. Fowler and B. Pesquet-Popescu. Wavelets in source coding, communications, and networks: An overview. *special issue of the International Journal on Image and Video Processing (IJIVP) on "Wavelets in Source Coding, Communications, and Networks"*, January 2007.
[2057] H. H. Heijmans, G. Piella, and B. Pesquet-Popescu. Adaptive wavelets for image compression using update lifting: Quantisation and error analysis. *International Journal of Wavelets, Multiresolution and Information Processing*, 4(1):41–63, January 2006.
[2058] M. Kimiaei-Asadi and J. C. Dufourd. Support de transmodage de contenus multimédia dans mpeg-21. etude et validation d'un outil de description. *Revue des sciences et technologies de l'information*, 24(7):815–835, July 2005.
[2059] B. Pesquet-Popescu, J. Farah, and C. Yaacoub. New adaptive algorithms for gop size control with return channel suppression in wyner-ziv video coding. *International Journal of Digital Multimedia Broadcasting*, July 2009.
[2060] C. Tillier, T. Petrisor, and B. Pesquet-Popescu. A motion-compensated overcomplete temporal decomposition for multiple description scalable video coding. *EURASIP IJIVP*, page 12, January 2007.

11.3.3 ASCL: Articles in Journals Without Review Committee

[2061] S. Simske, B. Pellan, and M. Shilman. Acm doceng 2008 recap. *ACM SIGWEB Newsletter*, January 2009.

11.3.4 INV: Invited Talks

[2062] C. Pelachaud. Modelling multimodal expression of emotion in a virtual agent. *Philosophical Transactions B*, 2009.

11.3.5 ACTI: Articles in Proceedings of International Conferences

[2063] M. Antonini, M. Cagnazzo, and M. Oger. The "secure media sim" bitstream structure for video encryption and fingerprinting. In *The Smart Event*, Sophia Antipolis, France, September 2009.
[2064] E. Argonés, C. García, H. Bredin, and G. Chollet. Aliveness Detection using Coupled Hidden Markov Models. In *1st Spanish Workshop on Biometrics*, Girona, Espagne, June 2007.
[2505] A. Ben Hadj Alaya-Feki, B. Sayrac, P. Houze, and E. Moulines. Opportunistic spectrum access with ieee 802.11 in ieee p1900.4 framework. In *Networking and Communications, 2008. WIMOB '08. IEEE International Conference on Wireless and Mobile Computing,*, pages 82–83, October 2008.
[2754] D. Benboudjema, F. Tupin, W. Pieczynski, M. Sigelle, and J. M. Nicolas. Unsupervised sar images segmentation using triplet markov fields and fisher noise distributions. In *IGARSS 2007*, Barcelone, Spain, July 2007.
[2067] C. Bergeron, C. Lamy-Bergot, and B. Pesquet-Popescu. Adaptive m-band hierachical filterbanks for compliant temporal scalability in h.264 standard. In *Proc. IEEE ICASSP*, Philadelphia, USA, March 2005.
[2068] S. Brangoulo, N. Tizon, B. Pesquet-Popescu, and B. Lehembre. Video transmission over umts networks using udp/ip. In *EUSIPCO*, Florence, Italy, September 2006.
[2069] H. Bredin and G. Chollet. Audio-Visual Speech Synchrony Measure for Talking-Face Identity Verification. In *The 32nd International Conference on Acoustics, Speech, and Signal Processing - ICASSP2007*, Honolulu, Hawaii, USA, April 2007.

[2070] H. Bredin and G. Chollet. Making Talking-Face Authentication Robust to Deliberate Imposture. In *ICASSP 2008*, Las Vegas, USA, April 2008.
[2071] M. Cagnazzo, M. Agostini, M. Antonini, G. Laroche, and J. Jung. Motion vector quantization for efficient low bit-rate video coding. In *SPIE Visual Communications and Image Processing Conference*, San Diego, USA, January 2009.
[2072] M. Cagnazzo, T. Maugey, and B. Pesquet-Popescu. A differential motion estimation method for image interpolation in distributed video coding. In *International Conference on Audio, Speech and Signal Processing ICASSP*, pages 1861–1864, Taipei, Taiwan, April 2009.
[2073] M. Cagnazzo, W. Miled, Th. Maugey, and B. Pesquet-Popescu. Image interpolation with edge-preserving differential motion refinement. In *IEEE International Conference on Image Processing*, Cairo, Egypt, November 2009.
[2074] C. Concolato. Generation, Streaming and Presentation of Declarative EPG. In *EuroiTV*, Leuven, Belgium, June 2009.
[2075] C. Concolato and J. Le Feuvre. Playback of Mixed Multimedia Document. In *ACM Symposium on Document Engineering*, pages 219–220, São Paulo, Brazil, September 2008.
[2076] C. Concolato, J. Le Feuvre, and J. C. Moissinac. Timed-fragmentation of svg documents to control the playback memory usage. In *ACM Symposium on Document Engineering*, pages 121–124, Winnipeg, Canada, August 2007.
[2077] C. Concolato, J. Le Feuvre, and K. Park. An MPEG-based Widget System for CE and mobile devices. In *ICCE*, pages 1–2, Las Vegas, Etats-Unis, January 2009.
[2078] S. Corrado, M. Agostini, M. Cagnazzo, M. Antonini, G. Laroche, and J. Jung. Improving H.264 performances by quantization of motion vectors. In *Picture coding symposium*, Chicago, IL (USA), May 2009.
[2079] O. Crave, G. Piella, and B. Pesquet-Popescu. Image interpolation using an adaptive invertible approach. In *EUSIPCO*, Florence, Italy, September 2006.
[2819] J. Darbon, M. Sigelle, and F. Tupin. The use of levelable regularization functions for MRF restoration of SAR images while preserving reflectivity. In *S&T/SPIE 19th Annual Symposium Electronic Imaging Conf. E112*, San Jose (USA), January 2007.
[2081] I. Daribo, M. Kaaniche, W. Miled, M. Cagnazzo, and B. Pesquet-Popescu. Dense disparity estimation in multiview video coding. In *IEEE Workshop on Multimedia Signal Processing*, Rio de Janeiro, Bresil, October 2009.
[2082] I. Daribo, C. Tillier, and B. Pesquet-Popescu. Distance dependent depth filtering in 3D warping for 3DTV. In *IEEE Multimedia Signal Processing (MMSP)*, Greece, October 2007.
[2083] S. De Bruyne, J. De Cock, R. Van de Walle, P. Hosten, M. Asbach, M. Wien, and C. Concolato. Personalized adaptation and presentation of annotated videos for mobile applications. In *3rd European Symposium on Mobile Media Delivery (EUMOB)*, Londres, United Kingdom, September 2009.
[2084] N. Dehak and G. Chollet. Support vector gmms for speaker verification. In *Speaker and Language Recognition Workshop, IEEE-Odyssey*, page 4, Puerto Rico, June 2006.
[2085] I. Demeure, C. Faure, E. Lecolinet, J. C. Moissinac, and S. Pook. Mobile Computing to Facilitate Interaction in Lectures and Meetings. In *Int. IEEE Conf. on Distributed Frameworks for Multimedia Applications (DFMA)*, pages 359–366, Besançon, France, February 2005.
[2086] I. Demeure, C. Faure, E. Lecolinet, J. C. Moissinac, and S. Pook. Mobile computing to facilitate interaction in lectures and meetings. In *First Int. Conf. on Distributed Frameworks for Multimedia Applications (DFMA)*, Besançon, France, February 2005.
[2087] I. Demeure, C. Faure, E. Lecolinet, J. C. Moissinac, and S. Pook. Mobile computing to facilitate interaction in lectures and meetings. In *DFMA*, Besançon, France, February 2005.
[2825] L. Denis, F. Tupin, M. Sigelle, and J. Darbon. Sar amplitude filtering using tv prior and its application to building delineation. In *EUSAR 08*, Friedrichhaffen, Allemagne, June 2008.
[2089] J. C. Dufourd and M. Kimiaei-Asadi. Context-aware semantic adaptation of multimedia presentations. In *IEEE International Conference on Multimedia and Expo*, pages 362–365, Amsterdam, The Netherlands, July 2005.
[2090] R. El-Hajj, C. Mokbel, and L. Likforman-Sulem. Combination of HMM-based classifiers for the recognition of arabic handwritten words,. In *International Conference on Document Analysis and Recognition, ICDAR'07*, Curitiba (Bresil), September 2007.
[2091] R. El-Hajj, C. Mokbel, and L. Likforman-Sulem. Recognition of arabic handwritten words using contextual character models. In *IS&T/SPIE Electronic Imaging Conf.*, San Jose (USA), January 2008.
[2092] B. Elloumi, J. C. Moissinac, O. Martinot, and E. Baynaud. Towards an authoring tool for personalizable multimedia content. In *SMAP 2008*, Prague, December 2008.
[2093] C. Faure. Preferences in the drawing of simple shapes. In *13th Conference of the International Graphonomics Society (IGS)*, pages 167–170, Melbourne - Australie, November 2007.
[2094] C. Faure, K. Khurshid, and N. Vincent. Détection des composantes implicitement associées dans les images de document. In *EGC - Atelier Extraction de COnnaissance et Images*, Strasbourg, January 2009.
[2095] C. Faure and N. Vincent. Document Image analysis for active reading. In *Semantically aware document processing and indexing (SADPI)*, pages 1–14, Montpellier - France, May 2007.
[2096] C. Faure and N. Vincent. Simultaneous detection of vertical and horizontal text lines based on perceptual organisation. In *IS&T/SPIE-DRR (Document Recognition and Retrieval)*, volume 7247, pages 0M1–OM8, San Jose (USA), January 2009.
[2097] B. Fauve, H. Bredin, W. Karam, F. Verdet, A. Mayoue, G. Chollet, J. Hennebert, R. Lewis, J. Mason, C. Mokbel, and D. Petrovska. Some Results from the BioSecure Talking-Face Evaluation Campaign. In *ICASSP 2008*, Las Vegas, USA, April 2008.

[2098] G. Feideropoulou, J. Fowler, B. Pesquet-Popescu, and J.-C. Belfiore. Joint source-channel coding of scalable video with partially coded index assignment using reed-muller codes. In *ICIP2005*, Genova, Italie, September 2005.

[2099] G. Feideropoulou, B. Pesquet-Popescu, and J.-C. Belfiore. Bit-allocation algorithm for joint source-channel coding of t+2d video sequences. In *Proc. IEEE ICASSP*, Philadelphia, USA, March 2005.

[2849] G. Fouquier, L. Likforman, J. Darbon, and B. Sankur. The Biosecure Geometry-based System for Hand Modality. In *IEEE ICASSP 32nd International Conference on Acoustics, Speech, and Signal Processing*, number I, pages 801–804, Honolulu, Hawaii, USA, April 2007.

[2101] J. Fowler, M. Tagliasacchi, and B. Pesquet-Popescu. Video coding with wavelet domain conditional replenishement and unequal error protection. In *IEEE ICIP2006*, Atlanta, GA, USA, October 2006.

[2102] J. E. Fowler, M. Tagliasacchi, and B. Pesquet-Popescu. Wavelet-based distributed source coding of video. In *EUSIPCO*, Antalya, Turkey, September 2005.

[2103] A. Fraysse, B. Pesquet-Popescu, and J.-C. Pesquet. Rate-distortion results for generalized gaussian distributions. In *IEEE ICASSP*, Las Vegas, USA, April 2008.

[2104] A. Gentes, J.-Ph. Bernard, P. Horain, C. Pelachaud, D. Zhou, L. Zouari, and G. Chollet. Multimodal human machine interaction in virtual reality. In *Face2Face*, Grenoble, October 2008.

[2105] C. Gomes Gascon and B. Pesquet-Popescu. A simple and efficient eigenface method. In *ACIVS*, Delft, The Netherlands, August 2007.

[2862] L. Gueguen and M. Datcu. The Model Based Similarity Metric. In *DCC*, page 382, Snowbird, Utah, USA, March 2007.

[2864] L. Gueguen, M. Trocan, B. Pesquet-Popescu, A. Giros, and M. Datcu. Comparison of Multispectral Satellite Sequence Compression Appoaches. In *International Symposium on Signal, Circuits and Systems*, volume 1, pages 87–90, Iasi - Romania, July 2005.

[2108] Y. Han, G. Liu, and G. Chollet. Goal event detection in broadcast soccer videos by combining heuristic rules with unsupervised fuzzy c-means algorithm. In *International Conference on Control, Automation, Robotics & Vision*, Hanoi, Vietnam, December 2008.

[2109] Y. Han, G. Liu, G. Chollet, and J. Razik. Person identity clustering in tv show videos. In *IET Visual Information Engineering Conference*, Xi'an, China, July 2008.

[2110] T. Hueber, G. Aversano, G. Chollet, B. Denby, G. Dreyfus, Y. Oussar, P. Roussel, and M. Stone. Eigentongue feature extraction for an ultrasound-based silent speech interface. In *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, pages 1245–1248, Honolulu, Hawaii - USA, April 2007.

[2111] T. Hueber, L. Benaroya, G. Chollet, B. Denby, G. Dreyfus, and M. Stone. Visuo-phonetic decoding using multi-stream and context-dependent models. In *InterSpeech*, Brighton, September 2009.

[2112] T. Hueber, G. Chollet, B. Denby, G. Dreyfus, and M. Stone. Continuous-speech phone recognition from ultrasound and optical images of the tongue and lips. In *Interspeech*, pages 658–661, Antwerp, Belgium, August 2007.

[2113] T. Hueber, G. Chollet, B. Denby, G. Dreyfus, and M. Stone. Phone recognition from ultrasound and optical video sequences for a silent speech interface. In *Interspeech*, pages 2032–2035, Brisbane, Australia, September 2008.

[2114] T. Hueber, G. Chollet, B. Denby, G. Dreyfus, and M. Stone. Towards a segmental vocoder driven by ultrasound and optical images of the tongue and lips. In *Interspeech*, pages 2028–2031, Brisbane, Australia, September 2008.

[2115] T. Hueber, G. Chollet, B. Denby, and M. Stone. Acquisition of ultrasound, video and acoustic speech data for a silent-speech interface application. In *International Speech Production Seminar (ISPS)*, Strasbourg, December 2008.

[2116] T. Hueber, G. Chollet, B. Denby, and M. Stone. An ultrasound-based silent speech interface. In *Acoustics'08*, Paris, France, July 2008.

[2117] T. Hueber, G. Chollet, B. Denby, M. Stone, and L. Zouari. Ouisper: Corpus based synthesis driven by articulatory data. In *International Congress of Phonetic Sciences (ICPHS)*, pages 2193–2196, Saarbrücken - Germany, August 2007.

[2118] J. Jung, G. Laroche, and B. Pesquet-Popescu. Rd optimized competition scheme for efficient motion prediction. In *VCIP 2007, SPIE Electronic Imaging*, San Jose, CA, USA, January 2007.

[2119] M. Kaaniche, A. Benazza-Benyahia, J.-C. Pesquet, and B. Pesquet-Popescu. Lifting schemes for joint coding of stereoscopic pairs of satellite images. In *EUSIPCO*, Poznan, Poland, September 2007.

[2120] M. Kaaniche, W. Miled, B. Pesquet-Popescu, J.-Ch. Pesquet, and A. Benazza-Benyahia. Dense disparity map representations for stereo image coding. In *IEEE International Conference on Image Processing*, Le Caire, Égypte, November 2009.

[2121] A. R. Kaced and J. C. Moissinac. Protecting adaptive multimedia delivery and adaptation using proxy based approach. In *International Conference on Security and Cryptography SECRYPT*, Setubal, Portugal, August 2006.

[2122] A. R. Kaced and J.-C. Moissinac. Secure intermediary caching in mobile wireless networks using asymmetric cipher sequences based encryption. In *International Conference on Mobile Ad-hoc and Sensor Networks*, Beijing, China, December 2007.

[2123] A. R. Kaced and J.-C. Moissinac. Svg based secure universal multimedia access. In *International Conference on Signal Processing and Multimedia Applications*, Barcelone, Espagne, July 2007.

[2124] W. Karam, C. Mokbel, H. Greige, and G. Chollet. Audio-visual identity verification and robustness to imposture. In *ICB*, Alghero, June 2009.

[2125] Z. Kazi-Aoul, I. Demeure, and J. C. Moissinac. Towards a peer-to-peer architecture for the provision of adaptable multimedia composed documents. In *DFMA (Distributed Frame for Multimedia Applications), IEEE conference*, Penang, Malaysia, May 2006.

[2126] Z. Kazi-Aoul, I. Demeure, and J. C. Moissinac. Paam: A web services oriented architecture for the adaptation of composed multimedia documents. In *Parallel and Distributed Computing and Networks (PDCN)*, Innsbruck, Austria, February 2008.
[2127] Z. Kazi-Aoul, I. Demeure, and J. C. Moissinac. Paam: A web services oriented architecture for the adaptation of composed multimedia documents. In *Parallel and Distributed Compuing and Networks (PDCN)*, Innsbruck, Austria, February 2008.
[2128] K. Khurshid, C. Faure, and N. Vincent. Feature-based word spotting in ancient printed documents. In *8th International Workshop on Pattern Recognition in Information Systems, PRIS 2008*, pages 193–198, Barcelone - Espagne, June 2008.
[2129] K. Khurshid, C. Faure, and N. Vincent. Fusion of word spotting and spatial information for figure caption retrieval in historical document image. In *Inter. Conference on Document Analysis and Recognition (ICDAR)*, Barcelone Espagne, July 2009.
[2130] K. Khurshid, I. Siddiqi, C. Faure, and N. Vincent. Comparison of niblack inspired binarization methods for ancient documents. In *IS&T/SPIE-DRR (Document Recognition and Retrieval)*, volume 7247, pages 0U1–0U9, San Jose (USA), January 2009.
[2131] R. Landais, H. Bredin, L. Zouari, and G. Chollet. Vérification audiovisuelle de la parole. In *TAIMA*, pages 27–32, Hammamet, Tunisie, May 2007.
[2132] G. Laroche, J. Jung, and B. Pesquet-Popescu. A spatio-temporal competing scheme for the rate-distortion optimized selection and coding of motion vectors. In *EUSIPCO*, Florence, Italy, September 2006.
[2133] G. Laroche, J. Jung, and B. Pesquet-Popescu. Competition based prediction for skip mode motion vector using macroblock classification for the h.264 jm kta software. In *ACIVS*, Delft, The Netherlands, August 2007.
[2134] J. Le Feuvre, C. Concolato, and J. C. Moissinac. Gpac, open source multimedia framework. In *ACM Multimedia*, pages 1009 – 1012, Augsburg, Allemagne, September 2007. ACM New York, NY, USA.
[2135] Z. Li, P. Horain, A.-M. Pez, and C. Pelachaud. Statistical gesture models for 3d motion capture. In *Gesture Workshop 2009*, Bielefeld, D, February 2009.
[2136] L. Likforman-Sulem and M. Sigelle. Recognition of broken characters from historical printed books using dynamic bayesian networks. In *ICDAR 2007*, Univ. Parana, Curitiba (Bresil), September 2007.
[2137] L. Likforman-Sulem and M. Sigelle. Recognition of degraded handwritten digits using dynamic bayesian networks. In *IS&T/SPIE 19th Annual Symposium Electronic Imaging Conf. E114*, San Jose (USA), January 2007.
[2138] L. Likforman-Sulem and M. Sigelle. Combination of dynamic bayesian network classifiers for the recognition of degraded characters. In *IS&T/SPIE-DRR (Document Recognition and Retrieval)*, volume 7247, pages OH1–OH10, San Jose (USA), January 2009.
[2139] L. Likforman-Sulem and A. Vinciarelli. Hmm-based recognition of handwritten words crossed-out with different kinds of strokes. In *ICFHR 08*, Montreal, Canada, August 2008.
[2140] T. Maugey, T. André, B. Pesquet-Popescu, and J. Farah. Analysis of error propagation due to frame losses in a distributed video coding system. In *European Conference of Signal Processing*, Lausanne, Switzerland, August 2008.
[2141] T. Maugey, W. Miled, and B. Pesquet-Popescu. Dense disparity estimation in a multi-view distributed video coding system. In *International Conference on Acoustics, Speech, and Signal Processing*, Taipei, Taiwan, April 2009.
[2142] Th. Maugey, W. Miled, M. Cagnazzo, and B. Pesquet-Popescu. Fusion schemes for multiview distributed video coding. In *EUSIPCO*, Glasgow, Royaume Uni, August 2009.
[2143] M. McRorie, I. Sneddon, E. Bevacqua, E. de Sevin, and C. Pelachaud. A model of personality and emotional traits. In *International Working Conference on Intelligent Virtual Agents*, Amsterdam, NL, September 2009.
[2144] W. Miled, Th. Maugey, M. Cagnazzo, and B. Pesquet-Popescu. Image interpolation with dense disparity estimation in multiview distributed video coding. In *International Conference on Distributed Smart Cameras*, Como, Italie, September 2009.
[2145] W. Miled, J.-C. Pesquet, and M. Parent. Wavelet-constrained stereo matching under photometric variations. In *SPIE International Symposium on Optical and Digital Image Processing*, Strasbourg, France, April 2008.
[2146] W. Miled and B. Pesquet-Popescu. A convex programming approach for color stereo matching. In *IEEE International Workshop on Multimedia Signal Processing*, Queensland, Australie, October 2008.
[2147] W. Miled, B. Pesquet-Popescu, and W. Chérif. A variational framework for simultaneous motion and disparity estimation in a sequence of stereo images. In *IEEE International Conference on Acoustics, Speech, and Signal Processing*, Taipei, Taiwan, April 2009.
[2148] J.-C. Moissinac. Re-doing papyrus. In *SVG Open 2009*, Mountain View, USA, October 2009.
[2149] J. C. Moissinac and E. Guichard. One thousand billion of... maps (with svg and cocoon). In *SVG Open 2005*, Enschede - The Netherlands, August 2005.
[2150] J. C. Moissinac, Z. Kazi-Aoul, and I. Demeure. Sémantique pour la composition de web services d'adaptation multimédia. In *7th International Conference on New Technologies of Distributed Systems (NOTERE'07)*, Marrakech, July 2007.
[2151] R. Niewiadomski, S. Hyniewska, and C. Pelachaud. Evaluation of multimodal sequential expressions of emotions in eca. In *International Conference on Affective Computing and Intelligent Interaction*, Amsterdam, NL, September 2009.
[2152] R. Niewiadomski, S. Hyniewska, and C. Pelachaud. Modeling emotional expressions as sequences of behaviors. In *International Working Conference on Intelligent Virtual Agents*, Amsterdam, NL, September 2009.
[2153] S. Parrilli, M. Cagnazzo, and B. Pesquet-Popescu. Distortion evaluation in transform domain for adaptive lifting schemes. In *Multimedia Signal Processing*, Cairns, Australie, October 2008.
[2154] S. Parrilli, M. Cagnazzo, and B. Pesquet-Popescu. Estimation of quantization noise for adaptive-prediction lifting

schemes. In *IEEE Workshop on Multimedia Signal Processing*, Rio de Janeiro, Bresil, October 2009.
[2155] G. Pau and B. Pesquet-Popescu. Comparison of spatial m-band filter banks for t+2d video coding. In *VCIP 2005*, Pékin, Chine, July 2005.
[2156] G. Pau and B. Pesquet-Popescu. Four-band linear-phase orthogonal spatial filter bank for subband video coding. In *IEEE ICASSP*, Philadelphia, USA, March 2005.
[2157] G. Pau and B. Pesquet-Popescu. Image coding with rational spatial scalability. In *EUSIPCO*, Florence, Italy, September 2006.
[2158] G. Pau, J. Vieron, and B. Pesquet-Popescu. Video coding with flexible mctf structures for low end-to-end delay. In *IEEE ICIP*, Gênes, Italie, August 2005.
[2159] B. Pellan and C. Concolato. Media-driven dynamic scene adaptation. In *8th International Workshop on Image Analysis for Multimedia Interactive Services*, pages 67–70, Thira, Santorini, Greece, June 2007.
[2160] B. Pellan and C. Concolato. Adaptation of Scalable Multimedia Documents. In *ACM Symposium on Document Engineering*, pages 32–41, São Paulo, Brazil, September 2008.
[2161] B. Pellan and C. Concolato. Scalable multimedia documents for digital radio. In *ACM Symposium on Document Engineering*, pages 221–222, São Paulo, Brazil, September 2008.
[2162] B. Pellan and C. Concolato. Spatial Scene Adaptation in Broadcast Environment. In *IEEE International Conference on Multimedia and Expo*, pages 389–392, Hannovre, Allemagne, June 2008.
[2163] B. Pellan and C. Concolato. Summarization of Scalable Multimedia Documents. In *Workshop on Image Analysis for Multimedia Interactive Services*, pages 304–307, Londres, Angleterre, May 2009.
[2164] P. Perrot, H. Bredin, and G. Chollet. Biometrics and forensic sciences: the same quest for identification? In *2007 International Crime Science Conference*, London, UK, July 2007.
[2165] P. Perrot and G. Chollet. La voix: un atout utile à l'identification ? In *WISG (Worshop Interdisciplinaire sur la Sécurité Globale)*, Troyes, January 2008.
[2166] P. Perrot and G. Chollet. Les mondes virtuels : un nouvel espace ouvert à la criminalité. In *WISG (Worshop Interdisciplinaire sur la Sécurité Globale)*, Troyes, January 2009.
[2167] P. Perrot, M. Morel, J. Razik, and G. Chollet. Vocal forgery in forensic sciences. In *e-Forensics 2009*, Adelaide, Australie, January 2009.
[2168] P. Perrot, C. Preteux, S. Vasseur, and G. Chollet. Detection and recognition of voice disguise. In *2007 International Association for Forensic Phonetics and Acoustics Conference*, page 3, Plymouth, UK, July 2007.
[2169] P. Perrot, J. Razik, M. Morel, H. Khemiri, and G. Chollet. Techniques de conversion de voix appliquées à l'imposture. In *TAIMA*, Hammamet, May 2009.
[2170] B. Pesquet-Popescu, O. Crave, and C. Guillemot. Multiple description video coding and iterative decoding of ldpca codes with side information. In *ICASSP'09*, Taipei, Taiwan, April 2009.
[2171] B. Pesquet-Popescu, J. Farah, and C. Yaacoub. Content adaptive gop size control with feedback channel suppression in distributed video coding. In *IEEE ICIP'09*, Cairo, Egypt, November 2009.
[2172] B. Pesquet-Popescu, J. Farah, and C. Yaacoub. A genetic algorithm for side information enhancement in distributed video coding. In *IEEE ICIP'09*, Cairo, Egypt, November 2009.
[2173] B. Pesquet-Popescu, J. Farah, and C. Yaacoub. A genetic frame fusion algorithm for side information enhancement in wyner-ziv video coding. In *EUSIPCO'09*, Glasgow, UK, August 2009.
[2174] B. Pesquet-Popescu, J. Farah, and C. Yaacoub. Improving hash-based wyner-ziv video coding using genetic algorithms. In *MobiMedia'09*, London, UK, September 2009.
[2175] B. Pesquet-Popescu, J. Garbas, and A. Kaup. Optimized anisotropic spatial transforms for wavelet-based scalable multi-view video coding. In *VCIP, SPIE conf no EI124-83*, San Diego, USA, January 2009.
[2176] B. Pesquet-Popescu, J. Jung, and G. Laroche. Intra prediction with 1d macroblock partitioning for image and video coding. In *VCIP, SPIE conf no EI124-83*, San Diego, USA, January 2009.
[2177] B. Pesquet-Popescu, C. Lamy-Bergot, B. Gadat, and B. Candillon. A simple multiple description coding scheme for improved peer-to-peer video distribution over mobile links. In *PCS'09*, Chicago, USA, May 2009.
[2178] B. Pesquet-Popescu, G. Piella, and G. Pau. Représentations multirésolution 2d par lifting adaptatif. In *8-ème Colloque Franco-Roumain de Mathématiques Appliquées*, Chambéry, France, August 2006.
[2179] B. Pesquet-Popescu and N. Tizon. Adaptive video streaming with long term feedbacks. In *IEEE ICIP'09*, Cairo, Egypt, November 2009.
[2180] B. Pesquet-Popescu, M. Trocan, and J. E. Fowler. Block-based graph-cut rate allocation for subband image compression and transmission over wireless networks. In *MobiMedia'09*, London, UK, September 2009.
[2181] T. Petrisor, B. Pesquet-Popescu, and J.-C. Pesquet. Perfect Reconstruction in Reduced Redundancy Wavelet-based Multiple Description Coding of Images. In *EUSIPCO '05*, Antalya, Turquie, September 2005.
[2182] T. Petrisor, B. Pesquet-Popescu, and J.-C. Pesquet. Wavelet-based multiple description coding of images with iterative convex optimization techniques. In *International Conference on Image Processing (ICIP) '05*, Genes, Italie, September 2005.
[2183] T. Petrisor, B. Pesquet-Popescu, and J.-C. Pesquet. Redundant wavelet schemes for multiple description coding. In *WaVE2006*, Lausanne, Switzerland, July 2006.
[2184] T. Petrisor, C. Tillier, B. Pesquet-Popescu, and J.-C. Pesquet. Comparison of redundant wavelet schemes for multiple description coding of video sequences. In *Proc. of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Philadelphia, U.S.A., March 2005.
[2185] A.-M. Pez, C. Pelachaud, Z. Li, and P. Horain. Creating a library of gestures with variants. In *Gesture Workshop 2009*, Bielefeld, D, February 2009.
[2934] G. Piella, M. Campedel, and B. Pesquet-Popescu. Adaptive wavelets for image representation and classification. In *EUSIPCO'05*, September 2005.

[2187] G. Piella, G. Pau, and B. Pesquet-Popescu. Adaptive lifting schemes combining seminorms for lossless image compression. In *IEEE ICIP*, Gênes, Italie, August 2005.
[2188] M. Ransburg, H. Hellwagner, B. Pellan, C. Concolato, R. Cazoulat, S. De Zutter, C. Poppe, R. Van De Walle, and A. Hutter. Dynamic and distributed adaptation of scalable multimedia content in a context-aware environment. In *European Symposium on Mobile Media Delivery*, Alghero, Sardinia, Italy, September 2006.
[2189] B. Reiterer, C. Concolato, J. Lachner, J. Le Feuvre, J. C. Moissinac, S. Lenzi, S. Chessa, E. Fernández Ferrá, J. González Menaya, and H. Hellwagner. User-centric Universal Multimedia Access in Home Networks. In *Computer Graphics International*, Istanbul, Turquie, June 2008.
[2190] M. Repetto, S. Mangialardi, R. Rapuzzi, C. Concolato, J. Le Feuvre, and R. Bolla. A Transparent Session Migration Scheme for Real-Time Multimedia Streaming. In *International Conference on MOBILe Wireless MiddleWARE, Operating Systems, and Applications*, Berlin, Germany, April 2009.
[2191] R. Ricci, G. Chollet, J. Koreman, S. Jassim, M. Olivar-Dimas, S. Garcia-Salicetti, and P. Soria-Rodriguez. Securephone: a mobile phone with biometric authentication and e-signature support for dealing secure transactions on the fly. In *SPIE Symposium on Mobile Multimedia / Image Processing for Military and Security Applications.*, Orlando, Florida, April 2006.
[2192] A. Robert, I. Amonou, and B. Pesquet-Popescu. Improving dct-based coders through block oriented transforms. In *8th International Conference on Advanced Concepts for Intelligent Vision Systems*, September 2006.
[2193] A. Robert, I. Amonou, and B. Pesquet-Popescu. Improving intra mode coding in h.264/avc through block oriented transforms. In *IEEE MMSP*, October 2006.
[2194] M. Sigelle, I. Jermyn, S. Perreau, and A. Jayasuriya. Lattice green functions and diffusion for modelling traffic routing in ad hoc networks. In *PHYSCOMNET 2009*, Seoul (Sud-Coree), June 2009.
[2195] C. Tillier, O. Crave, B. Pesquet-Popescu, and C. Guillemot. A comparison of four video multiple description coding schemes. In *EUSIPCO*, Poznan, Poland, September 2007.
[2196] N. Tizon and B. Pesquet-Popescu. An adaptive synthesis filter bank for image decoding with fractional scalability. In *IEEE Multimedia ignal Processing (MMSP)*, Greece, October 2007.
[2197] B. U. Toreyin, M. Trocan, E. Cetin, and B. Pesquet-Popescu. Linear and nonlinear temporal prediction employing lifting structures for scalable video coding. In *EUSIPCO*, Florence, Italy, September 2006.
[2198] B. U. Toreyin, M. Trocan, B. Pesquet-Popescu, and E. Cetin. LMS-based adaptive prediction for scalable video coding. In *ICAASP*, May 2006.
[2199] M. Trocan and B. Pesquet-Popescu. Scene-cut processing in motion compensated temporal filtering. In *ACIVS*, Anvers, Belgium, September 2005.
[2200] M. Trocan and B. Pesquet-Popescu. Graph-cut rate-distortion optimization for subband image compression. In *EUSIPCO*, Poznan, Poland, September 2007.
[2201] M. Trocan and B. Pesquet-Popescu. Video coding with fully separable wavelet and wavelet packet transforms. In *VCIP 2007, SPIE Electronic Imaging*, San Jose, CA, USA, January 2007.
[2202] M. Trocan, B. Pesquet-Popescu, and C. Tillier. A sliding window implementation of the 5-band motion compensated temporal lifting scheme. In *IEEE Non-Linear Signal and Image Processing Conference (NSIP)*, Bucharest, Romania, September 2007.
[2203] M. Trocan, C. Tillier, and B. Pesquet-Popescu. Joint wavelet packets for groups of frames in mctf. In *SPIE Optics & Photonics 2005*, San Diego, USA, August 2005.
[2204] M. Trocan, C. Tillier, B. Pesquet-Popescu, and M. Van Der Schaar. A 5-band temporal lifting scheme for video surveillance. In *Proc. of IEEE International Workshop on MultiMedia Signal Processing (MMSP)*, Victoria B.C., Canada, October 2006.
[2205] N. Vasylieva, M. Sazhok, T. Vintsiuk, and G. Chollet. Acoustic-phonetic model for syllable speech recognition output processing. In *XII th International Conference on Speech and Computer (SPECOM)*, Moscow, Russia, October 2007.
[2206] J. Wei, J. Dang, and P. Perrier. Observation and Modeling of Lingual Coarticulation in the Planning Stage. In *AFCP Workshop Coarticulation: cues,direction, and representation*, Montpellier, France, December 2007.
[2207] C. Yaacoub, J. Farah, F. Marx, and B. Pesquet-Popescu. A cross-layer approach for dynamic rate allocation in h.264 multi-user video streaming. In *14th IEEE International Conference on Electronics, Circuits and Systems (ICECS)*, Marrakech, Morocco, December 2007.
[2208] C. Yaacoub, J. Farah, F. Marx, and B. Pesquet-Popescu. Performance analysis of a distributed video coding system - application to broadcasting over an error-prone channel. In *EUSIPCO*, Poznan, Poland, September 2007.
[2209] C. Yaacoub, J. Farah, and B. Pesquet-Popescu. Joint source-channel wyner-ziv coding in wireless video sensor networks. In *IEEE ISSPIT*, Cairo, December 2007.
[2210] C. Yaacoub, J. Farah, and B. Pesquet-Popescu. Dynamic rate allocation with variable quantization in multi-sensor wyner-ziv video coding systems. In *3rd Int. Symposium on Communications, Control and Signal Processing (ISCCSP)*, Malta, March 2008.
[2211] G. Yazbek, C. Mokbel, and G. Chollet. Video segmentation and compression using hierarchies of gaussian mixture models. In *ICASSP*, Honolulu, April 2007.
[2212] L. Yu, F. Ma, A. Jayasuriya, M. Sigelle, and S. Perreau. A New Contour Detection Approach in Mammogram Using Rational Wavelet Filtering and MRF Smoothing. In *Digital Image Computing: Techniques and Applications (DICTA)*, Adelaide Australie, December 2007.
[2213] A. Zahour, L. Likforman-Sulem, W. Boussellaa, and B. Taconet. Text line segmentation of historical arabic documents. In *ICDAR'07*, Curitiba (Bresil), September 2007.
[2214] L. Zouari and G. Chollet. Multi-level gaussian selection for accurate low-resource asr systems. In *3rd Baltic*

Conference on Human Language Technologies, Kaunas en Lituanie, October 2007.
[2215] L. Zouari and G. Chollet. Sélection de paramètres pour la discrimination parole/non parole d'émissions radio diffusées. In *Traitement et Analyse de l'Information : Méthodes et Applications (TAIMA)*, Hammamet (Tunisie), May 2007.
[2216] L. Zouari and G. Chollet. Sélection multi-niveaux des gaussiennes pour des systèmes embarqués. In *Reconnaissance des Formes et Intelligence Artificielle (RFIA)*, Amiens, January 2008.
[2217] L. Zouari and G. Chollet. Speech transcription for eca animation. In *Acoustics'08*, Paris, July 2008.
[2218] L. Zouari, H. Khemiri, J. Razik, A. Amehraye, and G. Chollet. Reconnaissance de la parole en temps réel pour le dialogue oral. In *TAIMA*, Hammamet, May 2009.

11.3.6 ACTN: Articles in Proceedings of French Conferences

[2990] D. Benboudjema, F. Tupin, W. Pieczynski, M. Sigelle, and J. M. Nicolas. Modélisation et segmentation non supervisée d'images RSO par champs de markov triplets et lois de fisher. In *GRETSI*, Troyes, September 2007.
[2220] C. Concolato, J. Le Feuvre, and J. C. Moissinac. Comparaison des méthodes de transport de séquences de graphiques animés. In *COmpression et REprésentation des Signaux Audiovisuels*, Montpellier, France, November 2007.
[2221] I. Daribo, C. Tillier, and B. Pesquet-Popescu. Filtrage de la profondeur pour le plaquage de la texture dans la télévision 3D. In *CORESA*, Montpellier, France, November 2007.
[2222] J. Farah, C. Yaacoub, F. Marx, and B. Pesquet-Popescu. Analyse des performances d'un système de compression distribuée de séquences vidéo transmises sur un lien non fiable. In *Colloque GRETSI*, Troyes, September 2007.
[2223] C. Faure. Préférences et variabilité dans les tracés de formes simples. In *CIFED'06 (Colloque Internatinal Francophone sur l'Ecrit et le Document)*, pages 163–168, Fribourg, Suisse, September 2006.
[2224] C. Faure, P. Benci, A. Danzart, and E. Lecolinet. Conception de services mobiles pour étudiants. In *UbiMob'06*, Paris, September 2006.
[2225] A. Kaced and J. C. Moissinac. Sécurisation des flux multimédia adaptables-proposition d'un schéma de signature sur des proxies. In *Ubimob*, Grenoble, June 2005.
[2226] A. R. Kaced and J. C. Moissinac. La sécurité, problème majeur pour les plates-formes de diffusion de flux multimédia adaptable. In *SSTIC 2006*, Rennes, May 2006.
[2227] A. R. Kaced and J. C. Moissinac. Multimedia content authentication for proxy-side adaptation. In *IEEE International Conference on Digital Telecommunications ICDT*, Cap Esterel, Côte d'Azur, France, September 2006.
[2228] A. R. Kaced and J. C. Moissinac. Sécurité dans les plates-formes de diffusion de flux multimédia adaptables. In *3rd French-speaking conference on Mobility and uibquity computing UbiMob*, Paris, France, September 2006.
[2229] A. R. Kaced and J. C. Moissinac. Semafor: a framework for authentication of adaptive multimedia content and delivery for heterogeneous networks. In *IEEE International Conference on Internet Surveillance and Protection ICISP*, Cap Esterel, Côte d'Azur, France, August 2006.
[2230] Z. Kazi-Aoul, I. Demeure, and J. C. Moissinac. Vers un système d'adaptation de documents multimédia dans un environnement p2p. In *Conference sur les Nouvelles Technologies de la Répartition (NOTERE'06)*, Toulouse, France, June 2006.
[2231] K. Khurshid, C. Faure, and N. Vincent. Recherche de mots dans des images de documents par appariement de caractères. In *CIFED'08 (Colloque Internatinal Francophone sur l'Ecrit et le Document)*, page 91:96, Rouen - France, October 2008.
[2232] G. Laroche, J. Jung, and B. Pesquet-Popescu. Codage de vecteurs mouvement par compétition de prédicteurs spatio-temporels dans le standard h.264. In *CORESA*, Caen, France, November 2006.
[2233] G. Laroche, J. Jung, and B. Pesquet-Popescu. Adaptation orientée contenu pour le codage par compétition des prédicteurs de mouvement. In *CORESA*, Montpellier, France, November 2007.
[2234] E. Lecolinet, C. Faure, I. Demeure, J. C. Moissinac, and S. Pook. Augmentation de cours et de réunion dans un campus. In *Conf. Mobilité et Ubiquité*, pages 161–168, May 2005.
[2235] E. Lecolinet, C. Faure, I. Demeure, J. C. Moissinac, and S. Pook. Augmentation de cours et de réunion dans un campus. In *Ubimob*, Grenoble, France, May 2005.
[2236] Th. Maugey, M. Wided, M. Cagnazzo, and B. Pesquet-Popescu. Méthodes denses d'interpolation de mouvement pour le codage vidéo distribué monovue et multivue. In *Colloque GRETSI - Traitement du Signal et des Images*, Dijon, France, September 2009.
[2237] W. Miled, I. Daribo, and B. Pesquet-Popescu. Estimation conjointe disparité mouvement pour le codage de séquences vidéo multi-vues. In *22ème Colloque Traitement du Signal et des Images GRETSI*, Dijon, France, September 2009.
[2238] J.-C. Moissinac, A. Demeure, and Z.-I. Kazi-Aoul. Services d'adaptation de contenus multimédia, composition de services et pair-à-pair. In *CRIMES 09*, Saint-Denis de La Réunion, France, November 2009.
[2239] B. Pesquet-Popescu, J. Farah, and C. Yaacoub. Nouvelle technique d'adaptation dynamique de la taille du gop dans le codage wyner-ziv des séquences vidéo. In *GRETSI'09*, Dijon, France, September 2009.
[2240] B. Pesquet-Popescu, J. Farah, and C. Yaacoub. Nouvelle technique de génération de l'information adjacente en codage vidéo distribué basée sur les algorithmes génétiques. In *GRETSI'09*, Dijon, France, September 2009.
[2241] B. Pesquet-Popescu, C. Guillemot, Th. Maugey, and J.-P. Gauthier. Amélioration du modèle statistique de bruit pour le codage vidéo distribué. In *GRETSI'09*, Dijon, France, September 2009.
[2242] B. Pesquet-Popescu, J.-C. Pesquet, and A. Fraysse. Une méthode d'allocation de débit basse-résolution pour des données parcimonieuses. In *GRETSI'09*, Dijon, France, September 2009.

[2243] T. Petrisor, A. Fraysse, B. Pesquet-Popescu, and J.-C. Pesquet. Une autre approche au codage par descriptions multiples, utilisant des représentations creuses. In *GRETSI*, Troyes, September 2007.
[2244] T. Petrisor, A. Fraysse, B. Pesquet-Popescu, and J.-C. Pesquet. Une nouvelle approche du codage par descriptions multiples, utilisant des représentations linéaires creuses. In *Gretsi*, Troyes, France, September 2007.
[2245] A. Robert, I. Amonou, and B. Pesquet-Popescu. Amélioration de codeurs dct par orientation des blocs de la transformée. In *CORESA*, Caen,France, November 2006.
[2246] A. Robert, I. Amonou, and B. Pesquet-Popescu. Amélioration du codage h.264 par orientation des blocs de la transformée. In *CORESA*, Montpellier, France, November 2007.
[2247] C. Tillier, T. Petrisor, B. Pesquet-Popescu, and J.-C. Pesquet. Codage par descriptions multiples pour la transmission video. In *GRETSI '05*, Louvain-la-Neuve, Belgique, September 2005.
[2248] N. Tizon, B. Pesquet-Popescu, and B. Lehembre. Streaming vidéo avec prise en compte du contenu de l'image pour l'allocation de ressources dans un réseau de type 3gpp. In *CORESA*, November 2007.

11.3.7 COM: Talks in Conferences Which Do Not Publish Proceedings

[2249] J. Bernard, G. Chollet, A. Gentès, P. Horain, C. Pelachaud, D. Zhou, and L. Zouari. Multimodal human machine interaction in virtual reality. In *face2face*, Grenoble, October 2008.
[2250] H. Bredin and G. Chollet. Synchronisation Voix/Lèvres pour la Vérification d'Identité. In *Journée Jeunes Chercheurs - GDR-ISIS - Visage/Geste/Mouvement*, Paris, France, October 2006.
[2251] G. Chollet, A. Amehraye, H. Khemiri, C. Mokbel, J. Razik, and L. Zouari. Spoken dialogue in virtual worlds. In *COST-2102 School*, Dublin, March 2009.
[2252] G. Chollet, A. Esposito, A. Gentes, P. Horain, W. Karam, Z. Li, C. Pelachaud, P. Perrot, D. Petrovska, D. Zhou, and L. Zouari. Multimodal human machine interactions in virtual and augmented reality. In *COST-2102 School*, page 23, Vietri, June 2008.
[2253] Y. Han, J. Razik, G. Chollet, and G. Liu. Speaker retrieval for tv show videos by associating audio speaker recognition result to visual faces. In *K-Space PhD Jamboree Workshop*, Paris France, July 2008.
[2254] J. Razik, P. Perrot, and G. Chollet. voice conversion: a toy, a threat or a forensic tool. In *YESS Identity Management*, Washington - USA, July 2009.

11.3.8 OS: Books and Book Chapters

[2255] B. Abboud, H. Bredin, G. Aversano, and G. Chollet. *Audio-Visual Identity Verification: an Introductory Overview*, pages 118–134. Y. Stylianou (ed.) Springer Verlag, LNCS-4391, 2007.
[2256] E. Bevacqua, K. Prépin, R. Niewiadomski, E. de Sevin, and C. Pelachaud. *Towards an Interactive Conversational Virtual Companion*. J. Benjamins publ. Y. Wilks (Ed), 2009.
[2257] G. Chollet, A. Esposito, A. Gentès, P. Horain, W. Karam, Z. Li, C. Pelachaud, P. Perrot, D. Petrovska-Delacretaz, D. Zhou, and L. Zouari. Multimodal human machine interactions in virtual and augmented reality. In A. Esposito, editor, *Multimodal Signals: Cognitive and Algorithmic Issues Interaction*, chapter Multimodal Human Machine Interactions in Virtual and Augmented Reality., page 24. Springer, 2009.
[2258] G. Chollet, R. Landais, H. Bredin, T. Hueber, C. Mokbel, P. Perrot, and L. Zouari. Some experiments in audio-visual speech processing. In M. Chetouani, editor, *Advances in Non-Linear Speech Processing*, chapter Some experiments in Audio-visual Speech Processing, page 32. Springer Verlag, Paris, 2007.
[2259] H. Dutagaci, G. Fouquier, E. Yoruk, B. Sankur, L. Likforman-Sulem, and J. Darbon. *A Reference Biometric System based on Hand Modality,*. Springer, 2008.
[2260] C. Faure. *Le geste graphique*, pages 217–247. Hermès-Lavoisier, Paris, 2006.
[2261] R. Niewiadomski, S. Hyniewska, M. Mancini, and C. Pelachaud. Emotional behaviours in embodied conversational agents. In E. Roesch K. Scherer, T. Banziger, editor, *A blueprint for Affective Computing: a sourcebook and manual*. Oxford, 2009.
[2262] R. Niewiadomski, S. Hyniewska, and C. Pelachaud. Modélisation des expressions faciales des émotions. In C. Pelachaud, editor, *Systèmes d'Interaction Emotionnelle*. Hermes, 2009.
[2263] C. Pelachaud. Les émotions dans l'interaction homme-machine. In *Informatique et Sciences Cognitives : influences ou confluences ?* C. Garbay and D. Kaiser (Eds); collection "Cogniprisme" (co-édition Ophrys/MSH), 2009.
[2264] C. Pelachaud. *Systèmes d'Interaction Emotionnelle*. Hermes, 2009.
[2265] P. Perrot, G. Aversano, and G. Chollet. Voice disguise and automatic detection, review and program. In Y. Stylianou, editor, *Progress in Non-Linear Speech Processing*. Springer-Verlag, LNCS-4391, 2007.
[2266] B. Pesquet-Popescu, S. Li, and M. Van Der Schaar. *Scalable Video Coding for Adaptive Streaming Applications*. Elsevier, 2007.
[2267] B. Pesquet-Popescu, M. van der Schaar, and S. Z. Li. Scalable video coding for adaptive streaming applications. In *Multimedia over IP and Wireless Networks*. Elsevier, 2007.
[2268] D. Petrovska, A. El Hannani, and G. Chollet. Automatic speaker verification, state of the art and current issues. In Y.Stylianou, editor, *Progress in Non-Linear Speech Processing*. Springer-Verlag, LNCS-4391, 2007.
[2269] D. Petrovska-Delacrétaz, G. Chollet, and B. Dorizzi, editors. *Guide to Biometric Reference Systems and Performance Evaluation.* Computer Imaging, Vision, PR and Graphics. Springer, 2009.

11.3.9 DO: Journal or Proceedings Edition

[2270] C. Pelachaud, J.-C. Martin, E. Andre, G. Chollet, K. Karpouzis, and D. Pelé, editors. *Intelligent Virtual Agents*, Paris, September 2007. Springer Verlag.

11.3.10 AP: Patents, Registered Softwares

[2271] S. Brangoulo, R. Leonardo, B. Pesquet-Popescu, M. Mrak, and J. Xu. Draft status report on wavelet video coding exploration. Technical Report N7571, Nice, France, October 2005.
[2272] S. Brangoulo, G. Pau, and B. Pesquet-Popescu. Integration of bidirectional joint motion estimation for vidwav software. Technical Report m13011, Bangkok, Thailand, January 2006.
[2273] C. Concolato. Mpeg-4 laser white paper. Technical Report N7507, Poznan, Poland, July 2005.
[2274] C. Concolato. Usage of laser content in mpeg-4 systems environments. Technical Report M12069, Busan, Korea, April 2005.
[2275] C. Concolato. Text of 14496-20:dcor (editor's input). Technical Report M13729, Klagenfurt, Austria, July 2006.
[2276] C. Concolato. Call for proposal on additional bifs technologies for interactive services for digital radio. Technical Report N10568, Maui, USA, April 2009.
[2277] C. Concolato. Clarification on usages of iso/iec 14496-20 by other standardization bodies. Technical Report N10449, Lausanne, Suisse, February 2009.
[2278] C. Concolato. Mpeg-4 part 1 fourth edition. Technical Report N10574, Maui, USA, April 2009.
[2279] C. Concolato. Requirements v3 for a new bifs profile to support interactive digital radio. Technical Report N10567, Maui, USA, April 2009.
[2280] C. Concolato and P. De Cuetos. An implementation of the mpeg-21 file format. Technical Report M12067, Busan, Korea, April 2005.
[2281] C. Concolato, P. De Cuetos, B. Pellan, and M. Kimiaei-Asadi. Conversionlink. Technical Report M11670, Hong-Kong, China, January 2005.
[2282] C. Concolato, J. C. Dufourd, O. Avaro, and Ch. Timmerer. Workplan for core experiment on open issues regarding the laser specification. Technical Report N6967, Hong-Kong, China, January 2005.
[2283] C. Concolato and J. Le Feuvre. Editorial and technical inputs for laser sofcd. Technical Report M12340, Poznan, Poland, July 2005.
[2284] C. Concolato and J. Le Feuvre. Mpeg-4 terminal architecture white paper. Technical Report M12651, Nice, France, October 2005.
[2285] C. Concolato and J. Le Feuvre. Statistical analysis of laser conformance test and encoding comparisons. Technical Report M12408, Poznan, Poland, July 2005.
[2286] C. Concolato and J. Le Feuvre. Iso file format conformance sequences. Technical Report M13678, Klagenfurt, Austria, July 2006.
[2287] C. Concolato and J. Le Feuvre. Items for part 20 corrigendum. Technical Report M13243, Montreux, Switzerland, April 2006.
[2288] C. Concolato and J. Le Feuvre. Laser fdis editorial issues. Technical Report M13018, Bangkok, Thailand, January 2006.
[2289] C. Concolato and J. Le Feuvre. On laser waiting tree. Technical Report m13790, Hangzhou, September 2006.
[2290] C. Concolato and J. Le Feuvre. On saf global streams. Technical Report m13789, Hangzhou, June 2006.
[2291] C. Concolato and J. Le Feuvre. Proposal for saf and laser conformance. Technical Report M13235, Montreux, Switzerland, April 2006.
[2292] C. Concolato and J. Le Feuvre. Proposed items for laser v2. Technical Report M13244, Montreux, Switzerland, June 2006.
[2293] C. Concolato and J. Le Feuvre. Request for clarifications on font data streams. Technical Report M13242, Montreux, Switzerland, April 2006.
[2294] C. Concolato and J. Le Feuvre. Technical analysis of the w3c svg wg liaison on laser. Technical Report M13232, Montreux, Switzerland, April 2006.
[2295] C. Concolato and J. Le Feuvre. Comments and proposal for laser amendment 2 on scene adaptation. Technical Report M15791, Turin, Italie, September 2008.
[2296] C. Concolato and J. Le Feuvre. Comments on laser amendment 3 on presentation of structured information. Technical Report M15792, Turin, Italie, September 2008.
[2297] C. Concolato and J. Le Feuvre. Conformance streams for mpeg-4 atg. Technical Report M13241, Montreux, Switzerland, April 2009.
[2298] C. Concolato and J. Le Feuvre. Wd 1.0 of mpeg-u. Technical Report N10626, Maui, USA, April 2009.
[2299] C. Concolato, J. Le Feuvre, and K. Park. Additional thoughts about the mpeg user interface framework. Technical Report m15604, Hannovre, Allemagne, July 2008.
[2300] C. Concolato, J. Le Feuvre, and K. Park. Analysis of mpeg-21 ued for scene personalization. Technical Report m15602, Hannovre, Allemagne, July 2008.
[2301] C. Concolato, J. Le Feuvre, and K. Park. Architecture for the mpeg ui framework. Technical Report M15521, Paris, June 2008.
[2302] C. Concolato, J. Le Feuvre, and K. Park. Comments on the architecture of the mpeg rich media ui framework. Technical Report M15793, Turin, Italie, September 2008.
[2303] C. Concolato, J. Le Feuvre, K. Park, Y. Ryu, S. Cho, and H. Park. Use cases and requirement for an mpeg user interface framework. Technical Report M15345, Archamps, France, April 2008.

[2304] C. Concolato, J. Le Feuvre, and B. Pellan. Comments on requirements for a new bifs profile. Technical Report M16179, Lausanne, Suisse, February 2009.
[2305] C. Concolato, J. Le Feuvre, and B. Pellan. Requirements v2 for a new bifs profile to support interactive digital radio. Technical Report N10503, Lausanne, Suisse, February 2009.
[2306] C. Concolato, J. Le Feuvre, and B. Pellan. Wd 1.0 of amd7 of bifs for interactive digital radio services. Technical Report N10439, Lausanne, Suisse, February 2009.
[2307] C. Concolato, K. Park, and G. Cordara. Call for Proposal on Rich Media UI Framework. Technical Report N10232, Busan, Korea, October 2008.
[2308] C. Concolato, K. Park, and G. Cordara. Context and Objectives of Rich Media UI Framework v1.0. Technical Report N10085, Hannovre, Allemagne, July 2008.
[2309] C. Concolato, K. Park, and G. Cordara. Context and Objectives of Rich Media UI Framework v2.0. Technical Report N10296, Busan, Korea, October 2008.
[2310] C. Concolato, K. Park, and G. Cordara. Rich Media UI Framework Requirements. Technical Report N10231, Busan, Korea, October 2008.
[2311] C. Concolato, B. Pellan, and M. Brelot. Requirements for a new BIFS profile to support Interactive Digital Radio. Technical Report N10228, Busan, Korea, October 2008.
[2312] C. Concolato, B. Pellan, and M. Brelot. Requirements on technologies to support Interactive Digital Radio. Technical Report N10086, Hannovre, Allemagne, July 2008.
[2313] P. De Cuetos, C. Concolato, and J. C. Dufourd. Using bifs updates for melisa sport broadcasting system. Technical Report M11671, Hong-Kong, January 2005.
[2314] J. C. Dufourd, N. Pierre, E. Le Coq, C. Concolato, and J. Le Feuvre. Final word on the encoding of times in laser. Technical Report m13969, Hangzhou, September 2006.
[2315] P. Gioia, R. Cavagna, A. Le Bris, and J. Le Feuvre. Report on ce2: Space partitioning. Technical Report m14185, Marrakech, January 2007.
[2316] S. Hwang, J. Song, C. Concolato, J. Le Feuvre, and Y. Lim. Architecture for the mpeg ui framework. Technical Report M15892, Busan, Korea, October 2008.
[2317] S. Hwang, J. Song, C. Concolato, J. Le Feuvre, and Y. Lim. Study text for adaptivesceneindicator of cd on 14496-20 amd2. Technical Report M15890, Busan, Korea, October 2008.
[2318] S. Hwang, J. Song, C. Concolato, J. Le Feuvre, and Y. Lim. Study text for cd of 14496-20 amd2. Technical Report M15889, Busan, Korea, October 2008.
[2319] B. Jovanova, C. Concolato, J. Le Feuvre, and M. Preda. Storage of xml documents and associated media resources in the iso file format. Technical Report m14905, Shenzhen, October 2007.
[2320] H. Y. Kim, H. Lee, H. Kim, D. Kwon, B. Pellan, and A. David. Conformance files contribution for iso/iec 23000-9 (dmb-af). Technical Report M15896, Busan, Korea, October 2008.
[2321] J. Le Feuvre. Comments on laser and saf dcor. Technical Report m13787, Hangzhou, September 2006.
[2322] J. Le Feuvre. Gpac project on advanced content. (IDDN.FR.001.310013.000.S.C.2006.000.40000), July 2006.
[2323] J. Le Feuvre. On aac sbr storage in iso media file. Technical Report m13877, Hangzhou, September 2006.
[2324] J. Le Feuvre. On laser animatescroll. Technical Report m13788, Hangzhou, September 2006.
[2325] J. Le Feuvre. On laser conditional execution. Technical Report m13785, Hangzhou, September 2006.
[2326] J. Le Feuvre. On laser events. Technical Report m13920, Hangzhou, September 2006.
[2327] J. Le Feuvre. On saf configuration. Technical Report m13786, Hangzhou, September 2006.
[2328] J. Le Feuvre. On saf streams redefinition. Technical Report m13895, Hangzhou, September 2006.
[2329] J. Le Feuvre. Update of enst iso file format conformance. Technical Report m14026, Hangzhou, September 2006.
[2330] J. Le Feuvre. Comments on space partitioning ce. Technical Report m14953, Shenzhen, October 2007.
[2331] J. Le Feuvre. On audio storage in iso media file. Technical Report m14264, Marrakech, January 2007.
[2332] J. Le Feuvre. Comment on iso ff technology removal. Technical Report m15351, Archamps, May 2008.
[2333] J. Le Feuvre and C. Concolato. On laser fraction events. Technical Report m13879, Hangzhou, September 2006.
[2334] J. Le Feuvre and C. Concolato. Bifs and laser harmonisation. Technical Report M14662, Lausanne, Suisse, June 2007.
[2335] J. Le Feuvre and C. Concolato. Comments on laser pdam2. Technical Report M16085, Lausanne, Suisse, February 2009.
[2336] J. Le Feuvre, C. Concolato, and K. Park. First comments on the use of dcci for mpeg ui personalization. Technical Report m15603, Hannovre, Allemagne, July 2008.
[2337] J. Le Feuvre and J. C. Dufourd. Discussion on saf global streams. Technical Report m13878, Hangzhou, September 2006.
[2338] J. Le Feuvre and J. C. Dufourd. On laser bitstream exchange. Technical Report m14660, Lausanne, July 2007.
[2339] J. Le Feuvre and J. C. Dufourd. Proposed text for updatesource. Technical Report m14266, Marrakech, January 2007.
[2340] R. Leonardo, S. Tubaro, J. Xu, and B. Pesquet-Popescu. Ahg on exploration in wavelet video coding. Technical Report N7344, Poznan, Poland, July 2005.
[2341] R. Leonardo, S. Tubaro, J. Xu, and B. Pesquet-Popescu. Ahg on exploration in wavelet video coding. Technical Report m12729, Nice, France, October 2006.
[2342] R. Leonardo, J. Xu, S. Tubaro, and B. Pesquet-Popescu. Ahg on exploration in wavelet video coding. Technical Report m13037, Montreux, Switzerland, April 2006.
[2343] V. Levantovsky and C. Concolato. Clarifications on font subsets in font data streams. Technical Report M13495, Klagenfurt, Austria, July 2006.
[2344] K. Park, C. Concolato, and J. Le Feuvre. Additional use cases for the mpeg ui framework. Technical Report

m15601, Hannovre, Allemagne, July 2008.
[2345] K. Park, C. Concolato, J. Le Feuvre, and G. Cordara. Items under considerations in rich ui framework. Technical Report M16038, Lausanne, Suisse, February 2009.
[2346] K. Park, Y. Ryu, S. Cho, H. Park, C. Concolato, and J. Le Feuvre. Requirements and use cases for bifs/laser in the home environment. Technical Report M15373, Archamps, France, April 2008.
[2347] K. Park, Y. Ryu, S. Cho, H. Park, C. Concolato, and J. Le Feuvre. Use cases and requirements for personalized user interfaces in laser and bifs. Technical Report M15372, Archamps, France, April 2008.
[2348] G. Pau and B. Pesquet-Popescu. Comparison of spatial m-band filter banks for t+2d video coding. Technical Report m12058, Busan, Korea, April 2005.
[2349] G. Pau and B. Pesquet-Popescu. Four-band linear-phase orthogonal spatial filter bank in wavelet video coding. Technical Report m11739, Hong Kong, January 2005.
[2350] G. Pau and B. Pesquet-Popescu. Optimized prediction of uncovered areas in wavelet video coding. Technical Report m11738, Hong Kong, January 2005.
[2351] G. Pau and B. Pesquet-Popescu. Proposal of vidwav obmc bug fixing. Technical Report m12616, Nice, France, October 2005.
[2352] G. Pau, J. Viéron, G. Boisson, E. François, and B. Pesquet-Popescu. Proposal for svc ce1 : Time and level adaptive mctf architectures for low delay video coding. Technical Report m11673, Hong Kong, January 2009.
[2353] G. Pau, J. Viéron, and B. Pesquet-Popescu. Wavelet video coding with flexible 5/3 mctf structures for low end-to-end delay. Technical Report m11741, Hong Kong, January 2005.
[2354] B. Pellan, C. Concolato, T. Cong Thang, E. Delfosse, P. De Cuetos, and M. Kimiaei-Asadi. Report of ce on the use of adaptation qos for conversions. Technical Report M11884, Busan, Korea, April 2005.
[2355] B. Pellan, C. Concolato, T. Demartini, C. Timmerer, T. Cong Thang, P. De Cuetos, M. Kimiaei-Asadi, and E. Delfosse. Report of ce on harmonisation of conversion tools. Technical Report M12191, Poznan, Poland, July 2005.
[2356] B. Pellan, Y.-K. Lim, and C. Concolato. Bifs profiles and extensions for interactive digital radio and tv services. Technical Report M15436, Archamps, France, April 2008.
[2357] B. Pellan, Y.-K. Lim, and C. Concolato. New bifs profile for interactive digital radio. Technical Report m15550, Hannovre, Allemagne, July 2008.
[2358] B. Pesquet-Popescu, M. Trocan, and G. Pau. Bidirectional joint motion estimation for vidwav software. Technical Report m12303, Poznan, Poland, July 2005.
[2359] B. Pesquet-Popescu and J. Xu. Ahg on exploration in wavelet video coding. Technical Report m12121, Poznan, Poland, July 2005.
[2360] M. Sigelle, I. Jermyn, and S. Perreau. Markov chains, diffusion and green functions - applications to traffic routing in ad hoc networks and to image restoration. Technical report, TELECOM PARISTECH CNRS UMR 5141, January 2009.
[2361] C. Tillier, G. Pau, and B. Pesquet-Popescu. Coding performance comparison of entropy coders in wavelet video coding, April 2005.
[2362] C. Tillier and B. Pesquet-Popescu. CBR 3-band MCTF, January 2005.
[2363] Ch. Tillier, G. Pau, and B. Pesquet-Popescu. Coding performance comparison of entropy coders in wavelet video coding. Technical Report m12056, Busan, Korea, April 2009.
[2364] Ch. Tillier and B. Pesquet-Popescu. Constant bit rate 3-band mctf. Technical Report m11732, January 2005.
[2365] C. Timmerer, B. Pellan, and T. Cong Thang. Mpeg-21 dia amd/1 reference software status. Technical Report M12583, Nice, France, October 2005.
[2366] C. Timmerer, B. Pellan, and T. Cong Thang. Conformance bitstreams for dia conversions and permissions. Technical Report M12909, Bangkok, Thailand, January 2006.
[2367] J. Xu, R. Leonardo, S. Tubaro, and B. Pesquet-Popescu. Ahg on exploration in wavelet video coding. Technical Report N 7831, Bangkok, Thailand, January 2006.
[2368] L. Zvi and C. Concolato. Proposal for a free-distribution maf. Technical Report M12335, Poznan, Poland, July 2005.

Chapter 12

Statistics and Applications (STA)

Team leader F. Roueff (P).

Faculty K. Abed Meraim (MC, on sabbatical leave at University of Sharjah, 06/07–06/09), G. Blanchet (DE), P. Bianchi (MC, 01/09–), O. Cappé (DR CNRS), J-F. Cardoso (DR CNRS), M. Charbit (P, on sabbatical leave at University of Adelaide, 06/07–12/07), S. Clémençon (MC, 10/07–), G. Fort (CR CNRS), A. Garivier (CR CNRS, 10/07–), J. Jakubowicz (MC, 11/08–), E. Moulines (P), C. Lévy-Leduc (CR CNRS), J. Najim (CR CNRS), F. Roueff (P).

PhD students A. Ben Hadj Alaya (10/05–10/08), S. Barembruch (10/07–), T. Ben Jabeur (10/05–), H. Benoudnine (09/06–07/08, phd started at USTO, Algeria), L. Berriche (09/02–04/06), M. Boulé (09/03–09/07), H. Bousbia-Salah (01/05–05/06, phd started at Ecole Polytechnique d'Alger, Algeria), N. Castaneda, (09/04–07/08), J. Cornebise (09/05–06/09, also at Univ. Paris 6), M. Depecker (10/07–), J.F. Germain (09/05–10/08), F. Guilloux (10/05–12/08, also at Univ. Paris 7), Z. Harchaoui (11/05–11/08), M. Karray (09/03–09/07), I. Kacha (01/05–04/07, phd started at Ecole Polytechnique d'Alger, Algeria), M. Kharouf (01/07–), O. Kouamo (09/07–, also at Univ. Yaoundé 1, Cameroon), D. Lahat (09/07–, also at Univ. Tel Aviv, Israel), A. Lung-Yut-Fong (10/08–), N. Mahler (02/08–, also at ENS Cachan), B. Mouhouche (09/02–12/05), N. Sokolovska (11/06–), S. Philippi (10/07–), G. Picard (10/03–12/06), T. Rebafka (10/06–), L. Rigouste (10/03–11/06), W. Souidene (06/03–10/07), T. Trigano (10/02-12/05).

Post-docs, sabbaticals B. Benmammar (postdoc 12 months), P. Etoré (postdoc 8 months, also at CERMICS, Ponts), J. Olsson (Postdoc 10 months), M.S. Taqqu (Prof. at Boston Univ., 3 months), L. White (Prof. at Univ. of Adelaide, Australie, 6 months), M. Zetlaoui (postdoc, 1 year), V. Reisen (MC, Vitória Univ., Brazil, 8 months), Samir Attallah (Prof. at NUS, Singapore, 2 months).

Faculty [IT, CNRS]	[5.5, 5.3]
PhD students	7.2
Post-docs, sabbaticals	1.4
Defended theses	19
Defended HDR	3
Journal papers [published, to appear]	[92, 13]
Papers in conference proceedings	140
Registered [patents, software]	[1,1]
Grants [public, private, European] (k€)	[822, 497, 7]

12.1 Objectives

The STA team's main research interest is in the development and analysis of statistical methods for information processing, with applications in signal processing, applied statistics, complex systems and digital communications. The team's main expertise lies in statistical signal processing and mathematical statistics but also in probability, operation research and, more generally in applied mathematics. The team is also involved in research projects targeting more specific applications, usually in the context of broader collaborations, often supported by funds from the Agence Nationale de la Recherche (ANR). In this context, topics that are relevant to the team expertise include digital communications, astronomical data analysis, security and defense applications (localization, intrusion or anomaly detection), and data mining. In the recent period, the team started to extend its expertise towards statistical machine learning, in particular for ranking and sequential learning applications.

The members of the STA team are actively participating to teaching, typically at the master level and in the fields of probability, statistics, signal processing, machine learning and applied mathematics, at Télécom ParisTech but also in several other Grandes Ecoles of the ParisTech institute (Ecole des Ponts, Ecole Polytechnique, ENSAE) and universities (M2 *Modélisation aléatoire* at Paris 7 Denis Diderot, M2 *Modélisation Vision Apprentissage* at ENS Cachan, M2 *Ingénierie Mathématique* at Paris 11 Orsay, University Paris-Dauphine).

The STA team has developed long term research collaborations with several academic Parisian partners such as Univ. Paris 7 Denis Diderot (LPMA and ADAMIS), Univ. Paris 10 Nanterre (MODAL'X), Univ. Paris-Est (IGM), Institut d'Astrophysique de Paris, Univ. Paris-Dauphine (Cérémade), research groups in other ParisTech schools (CMBIO, Mines and CERMICS and CERTIS, Ponts) and with the Ecoles Normales Supérieures Ulm (INRIA projects TREC and WILLOW) and Cachan (CMLA). Such collaborations are essential to the team for achieving long term research programs, and, more generally, for exchanging ideas and views within a stimulating academic environment.

These academic relationships parallel industrial partnerships. The latter have been developed in the framework of national research projects (ANR), bilateral contracts, or the funding of PhdDtheses (through CIFRE conventons). Beside favoring our financial autonomy, such partnerships bring practical applications which are helpful for our opening and to remaining active on new research prospects. In the last years, regular industrial partners include the Commissariat à l'Energie Atomique (CEA), Renault, France Télécom R&D and Direction Générale de l'Armement (DGA).

The team enjoys a high national and international recognition with editorial board members in high quality journals such as Bernoulli, ESAIM P&S (E. Moulines) and the Journal of the Royal Statistical Society, Series B (O. Cappé) as well as regular participation as program comity mem-

bers in the major international conferences (IEEE ICASSP, IEEE statistical Signal Processing workshop, International Conference on Machine Learning, Neural Information Processing Systems). The team regularly organizes or co-organizes scientific events such as the international workshop *New directions in Monte Carlo Methods* in Fleurance (2007) as well as recurrent scientific seminars in the Parisian region (*séminaire parisien de statistiques*, ParisTech Machine Learning reading group).

Finally, members of the team are regularly invited to give talks in national seminars such as the *séminaire parisien de statistiques*, universities abroad (Hong Kong University of Science and Technology and National University of Singapore, S. Clémençon; probability seminars in University of Bochum and Stanford Univ., J. Najim; seminar of statistics in Cornell Univ. and Université Catholique de Louvain, F. Roueff; seminar of applied probability in Warwick, G. Fort) as well as in workshops or conferences (Isaac Newton Institute, O. Cappé, E. Moulines; 2006 New Developments in MCMC workshop, 2008 Adap'Ski workshop, 2008 SSC-SFDS conference, 2009 workshop on Scaling methods in Warwick, G. Fort; 2009 Physcomnet, J. Najim; 2006 ValueTools workshop, 2006 New Developments in MCMC workshop, 2007 Eurandom Algorithms in Complex Systems workshop, 2008 European Geosciences Union General Assembly, 2008 Sequential Monte Carlo Methods SAMSI workshop, E. Moulines).

12.2 Main Results

12.2.1 Statistical Learning

Contributors O. Cappé, A. Garivier, S. Clémençon, C. Lévy-Leduc, E. Moulines, F. Roueff.

Main events ANR projects KERNSIG (Learning and kernels for representation and decision in signal processing, 2007–), MGA (Graphical Models and Applications, 2008–), TAMIS (Adaptation, multiple tests, ranking and applications, 2006–2009), BEMOL (Prediction of internet users' behavior, simulation and collaborative filtering, 2008–); Contracts with France Telecom R&D (two theses) and Renault (two theses).

In the context of the STA team, statistical learning is a new research theme that has been largely developed during the last four years. Our efforts on this aspect have benefited from two recruitments (A. Garivier, S. Clémençon) and from the support of several academic (ANR projects KERNSIG, TAMIS and MGA) and industrial grants. Although recent, the team's contribution in statistical learning is now recognized, with several team members regularly participating as program comity members to the main conferences of the field (ICML, EMCL, COLT and NIPS). The team also developed strong collaborations on this theme with other teams within the ParisTech alliance (CMBIO, Mines and CERTIS, Ponts) and the INRIA/ENS project WILLOW (F. Bach), with whom we are organizing the popular monthly Paris Tech-Machine Learning reading group, as well as with the CMLA, ENS Cachan group (N. Vayatis).

Since 2006, the team has been active first on **kernel methods** and more specifically their use for purposes other than supervised classification and, in particular, for signal processing applications (which is the main focus of the KERNSIG project). Our main contributions include a mathematical analysis of kernel-based changepoint detection tests [2559] as well as several extensions to the multiple changepoints and changepoint localization problems.

Graphical models is another topic on which the team is active with works on parameter inference for latent variable models used in natural language processing [2472] (in collaboration with F. Yvon, Univ. Paris-Sud 11) as well as online learning algorithms for mixture and hidden Markov models [2393]. The team also worked on several applications of **sparse regression and classification** using LASSO type procedures [2562, 2468].

Ranking has become a very important research theme in the team with a series of works initiated by S. Clemençon in [2399]. The distinctive feature of this approach is to view methods based on the AUC (Area Under Curve) criterion as solving a functional optimization task which

requires adaptive approximation of the optimal ROC (Receiver Operating Characteristic) curve. The computation of confidence bands through resampling for the ROC curve and associated performance criteria has been investigated in [2519, 2539]. Reference [2401] presents the main ranking algorithm, termed tree-rank, and provides a thorough theoretical analysis of its performance. In the context of the ANR project BEMOL, the team also started some preliminary works on related tasks such as collaborative filtering.

More recently, with the arrival of A. Garivier, the team started working on themes related to resource allocation and **reinforcement learning**, in particular in the context of the PhD thesis of S. Filippi (funded by France Telecom R&D).

12.2.2 Statistical Methods for Astronomy

Contributors O. Cappé, J-F. Cardoso, G. Fort.

Projects ANR projects COSMOSTAT (Statistical methods for reconstruction and analysis of the cosmic microwave background) and ECOSTAT (Exploration of the cosmic model by statistical methods).

There is a growing interest in statistically and numerically efficient methods for the processing of the complex massive data sets delivered by modern astronomical observatories and surveys. Our team contribute to this domain along several axis, with a strong focus on the Planck space mission of the European Spatial Agency. This mission, which will deliver measurements of the Cosmic Microwave Background (CMB) of unprecedented resolution and sensitivity, requires data processing of outstanding quality. The team has been contributing several challenges in this area.

In the context of the Planck mission, which will deliver multi-frequency sky maps, the first task is to develop **component separation** methods for extracting the best possible CMB map from these measurements. We contribute a powerful blind separation method which performed very well in the Planck separation challenge [2432] and a fast and robust non-blind method [2404] based on spherical needlets.

CMB maps are *spherical maps*. Usual space-frequency methods such as wavelet analysis cannot be applied in this context. The ANR project COSMOSTAT has been dedicated to develop **multi-scale methods on the sphere**. We proposed and studied a promising new tool for this purpose, the *needlets*, a spherical frame for optimal filtering [2404] and spectral estimation on the sphere [2426, 2415].

Ultimately, CMB data are exploited in a Bayesian framework for the inference of the cosmological parameters (age of the Universe, Hubble constant, etc). The complexity of the models requires a specific approach based on **Monte Carlo methods** (ANR project ECOSTAT) on which the team enjoys a high level of expertise. In [2456], we have developed an adaptive importance sampling scheme targeted to the specificities of cosmological data.

CMB data enter in cosmological inference via the likelihood of their angular spectrum, which raises several issues in terms of the dependence structure. Again this specificity calls for new methods in **statistical analysis on the sphere**. We developed exact and approximate likelihoods function for the observation of the CMB sky with missing data [2379] via interpolations methods on the sphere.

The formation of the large scale structures of the Universe by gravitational collapse can be analyzed via the *skeleton* of the matter density field. Analytical skeleton models require knowing the joint distribution of the field and of all its derivative tensors. This problem is related to the theoretical description of **spherical invariants of isotropic fields**. We obtained closed form expressions of it via a theory of spherical invariants for isotropic fields [2446].

12.2.3 Statistical Methods for Signal Processing

Contributors K. Abed-Meraim, P. Bianchi, M. Charbit, J. Jakubowicz, E. Moulines, J. Najim.

Projects Euopean REX network NewCom; ANR project MalCom (Random matrices for communications); ANR project SESAME (inference for random matrices and communicaton) ; Contracts DEMORO (with CS), Blind demodulation (with I2E), Aintercom (with DGA), WAVECOM (one thesis) and France Telecom R&D (one thesis).

Our interest lies in applications of mathematical and statistical tools to performance evaluation and optimization of the physical layer of wireless communications systems. Such approaches have been particularly fruitful in many areas of interest in the last decade.

The first topic of interest is the performance analysis of **Multiple Input Multiple Output (MIMO) communications**. MIMO systems are widely acknowledged as a mean for increasing the spectral efficiency of wireless communication systems. In order to design efficient MIMO communications, a crucial issue is to evaluate the performance of MIMO transmissions in terms of capacity or outage probability. **Random matrix theory** is a powerful tool which allows to evaluate such performance indicators [2427, 2428]. Whereas the pioneer works in this field usually assume simplistic communication models, our activity consists in developing new tools for random matrices in order to encompass a wider class of communication models, including realistic propagation channel models and involved transmit/receive architectures.

On the other hand, **geo-localization and tracking** of base stations and mobile stations of GSM network have been considered (in the context of the DEMORO project, and N. Castaneda's thesis). This study used both GSM signals with a multiple sensor array and traffic informations and took into account multipath propagation and presence of outliers. Different approaches have been considered: Expectation-Maximization (EM) algorithm and recursive EM for DOA estimation applications but also Monte Carlo methods (or particle filtering) in the context of Bearing Only Tracking [2532, 2531].

A final field of interest for non-cooperative communications is **blind signal processing**. In this context, it is assumed that the signal coming from an unknown transmitter has been intercepted. The received signal is corrupted by an unknown propagation channel. The aim is to demodulate the received signal in order to recover the transmitted data and to estimate the value of the technical parameters used by the transmitter. In order to achieve attractive performance in terms of Bit Error Rate, our aim is to develop blind demodulation approaches using approximate Maximum Likelihood methods. One of the main stake is to propose methods which are suitable to modulations with high spectral efficiency, that is, in the case where the size of the alphabet used by the transmitter is large (Aintercom project, I2E contract).

12.2.4 Monte Carlo Methods

Contributors O. Cappé, S. Clémençon, G. Fort, E. Moulines.

Projects/Main events ANR project ADAP'MC (Adaptive Monte Carlo Methods); ANR project BigMC (Issues in large scale Monte Carlo)); Organization of the international workshop *New directions in Monte Carlo Methods* in Fleurance, 2007.

The team has acquired a high reputation in the domain of Monte Carlo methods by working on sequential Monte Carlo methods or particles filtering, Markov chain Monte Carlo methods as well as so-called Population Monte Carlo. Its activity has a strong emphasis on methodological and theoretical developments in Monte Carlo methods.

When applying **Sequential Monte Carlo** methods (SMC), a well-known problem is the degeneracy of the approximations introduced by the resampling steps. We obtained results on optimal sampling allocation [2465]. We also developed methods for statistical inference in Hidden Markov Models, which exploits the forgetting properties of the conditional hidden chains [2445, 2408, 2412] [coll. with Univ. of Lund, Sweden; and Univ. of Jerusalem, Israël].

The efficiency of the **Markov chain Monte Carlo** (MCMC) methods relies on the tuning of design parameters. New algorithms are based on self-tuning of the parameters on the fly without relying on a priori expert parameter tuning, thus yielding to adaptive MCMC algorithms. We

developed techniques to identify the optimal values of these design parameters [2420]. We obtained results on the asymptotic behavior of these adaptive procedures [2370] [coll. with Univ. of Illinois, US; and Univ. of Bristol, UK].

Population Monte Carlo methods are designed as generic self-adaptive importance sampling algorithms. The goal is thus to calibrate the best fitting proposal. We developed an adaptive method for an automatic computation of the optimal proposal among a class of parameterized importance functions [2391].

Developing proper theoretical tools is an important issue for Monte Carlo methods: studying the simulation problems by using theoretical tools used in the **theory of Markov chains** and particle approximations allows to identify the key convergence bottlenecks and to propose the appropriate methodological approaches to solve them. We obtained results in the Markov chain theory [2409, 2407, 2630, 2413], in limit theorems for weighted samples [2411] and in output analysis for Markov models [2397] using bootstrap methods.

12.2.5 Time Series

Contributors M. Charbit, S. Clémençon, C. Lévy-Leduc, E. Moulines, F. Roueff.

Projects ANR projects OSCAR (Overlay network security : characterization, analysis and recovery) and SARAH (Standardization of high-definition audio remastering); Contracts with CEA (one thesis) and CSA; Participation to the European IP project SECOQC.

Statistical inference for time series and, more generally, for stochastic processes is a wide area. The research activities of the team in this domain covers long standing problems in statistical signal processing and new directions in spatial statistics. These topics are often motivated by applications that are also of interest to the team.

A first topic is concerned with **time frequency analysis** of time series based on a study of the asymptotic statistics in a semi-parametric or non-parametric framework. Our expertise in **long range dependence** has been increased, in particular by a thorough analysis of semi-parametric Wavelet methods ([2442, 2443, 2450, 2449], coll. Boston Univ.). Specific domains of application have been considered, such as financial time-series [2414, 2416] and teletraffic data ([2417, 2470]). Other subjects in time frequency analysis have been considered such as frequency estimation for irregularly sampled series [2434] in a non-parametric framework and missing-value estimation for an AR process applied to DNA microarray data ([2396], coll. Univ. of Sydney).

A second topic of interest for the team is **change detection** by statistical methods and their applications. We have been working on anomaly detection in Internet teletraffic data (ANR-RNRT project OSCAR, [2435]) based on non-parametric statistical methods. An online algorithm [2632] has been proposed and implemented in a platform dedicated to anomaly detection in the Internet. On the methodological side, we proposed new change detection methods based on LASSO for automatically selecting the number of changes and kernel methods for change detection using unspecified features ([2562, 2559]).

Our activities include theoretical studies of specific stochastic processes arising in applied probability and/or having a strong impact on specific applications. We have been interested in **spatial point processes** for modelling natural images using geometrical models (coll. with TII team [2673, 2651]) and quantum key distribution networks ([2457], SECOQC project, coll. with MIC2 team). With a particular emphasis on the time evolution of spatial point processes, we also considered stochastic epidemic models [2462, 2381]. The **pileup models** appear naturally in several measurements context such as spectrometry and fluorescence. We proposed statistical methods which take into account the pileup phenomenon rather than avoiding it leading to new algorithms for processing such measurements ([2454, 2633]). A coll. with Univ. of Lille and Michigan State Univ. yielded new results on the path properties of α–stable fields [2374, 2458]. We also studied the **extremes** (tail properties) of Markov chains [2380, 2382], which are of interest in risk management.

12.3 References

12.3.1 ACL: Articles in ISI-Indexed Journals

[2369] T. Adali, H. Li, M. Novey, and J.-F. Cardoso. Complex ICA using nonlinear functions. *IEEE Trans. Signal Processing*, 56(9):4536–4544, September 2008.

[2370] C. Andrieu and E. Moulines. On the ergodicity properties of some adaptive mcmc algorithms. *Annals of Applied Probability*, 16(3):1462–1505, December 2006.

[2371] C. Andrieu, E. Moulines, and P. Priouret. Stability of stochastic approximation under verifiable conditions. *SIAM Journal on Control and Optimization*, 44(1):283–312, 2005.

[2372] S. Attallah and K. Abed-Meraim. A fast adaptive algorithm for the generalized symmetric eigenvalue problem. *Signal Processing Letters, IEEE*, 15:797–800, 2008.

[2373] S. Attallah, J. Manton, and K. Abed-Meraim. Convergence analysis of the noja algorithm using the ode approach. *Signal Processing*, November 2006.

[2374] A. Ayache, F. Roueff, and Y. Xiao. Linear fractional stable sheets : wavelet expansion and sample path properties. *Stochastic processes and their applications*, 119(4):1168–1197, 2009.

[2375] S. Barembruch, A. Garivier, and E. Moulines. On approximate maximum likelihood methods for blind identification: How to cope with the curse of dimensionality. *IEEE Transactions on Signal Processing*, July 2009.

[2376] S. Bartelmaos and K. Abed-Meraim. Fast minor component extraction using givens rotations. *Electronics Letters*, 43(18), August 2007.

[2377] S. Bartelmaos and K. Abed-Meraim. Fast principal component extraction using givens rotations. *IEEE Signal Processing Letters*, 2008.

[2378] S. Bartelmaos, K. Abed-Meraim, and E. Grosicki. Selection criteria for mobile location in nlos situations. *Wireless Communications, IEEE Transactions*, 7(1):4393–4403, November 2008.

[2379] K. Benabed, J.-F. Cardoso, S. Prunet, and E. Hivon. Teasing: a fast and accurate approximation for the low multipole likelihood of the cosmic microwave background temperature. *Monthly Notices of the Royal Astronomical Society*, January 2009.

[2380] P. Bertail and S. Clémençon. Sharp bounds for the tails of functionals of harris markov chains. *Theory of Probability and Its Applications*, July 2007.

[2381] P. Bertail, S. Clémençon, and J. Tressou. A storage model with random release rate for modeling exposure to food contaminants. *Mathematical Biosciences and Engineering*, 5(1):35–60, January 2008.

[2382] P. Bertail, S. Clémençon, and J. Tressou. Extreme values statistics for harris markov chains via the (pseudo-) regenerative method. *Extremes*, February 2009.

[2383] M. Betoule, E. Pierpaoli, J. Delabrouile, M. Lejeune, and J.-F. Cardoso. Measuring the tensor to scalar ratio from CMB B-modes in presence of foregrounds. *Astronomy and Astrophysics*, January 2009.

[2651] C. Bordenave, Y. Gousseau, and F. Roueff. The dead leaves model : an example of a general tessellation. *Advances in Applied Probability*, 38(1):31–46, March 2006.

[2385] S. Boucheron, A. Garivier, and E. Gassiat. Coding on countably infinite alphabets. *IEEE Transactions on Information Theory*, 55(1):358–374, January 2009.

[2386] A.-O. Boudraa, J.-Ch. Cexus, and K. Abed-Meraim. Cross psib-energy operator-based signal detection. *Journal of the Acoustical Society of America*, 2008.

[2387] R. Boyer and K. Abed-Meraim. Damped and delayed sinusoidal model for transient signals. *IEEE Transactions on Signal Processing*, 53(5):1720– 1730, May 2005.

[2388] R. Boyer and K. Abed-Meraim. Asymptotic performance for delayed exponential process. *IEEE Transactions on Signal Processing*, June 2007.

[2389] R. Boyer and K. Abed-Meraim. Asymptotic performance for delayed exponential process. *IEEE Transactions on Signal Processing*, June 2007.

[2390] R. Boyer, S. De Lathauwer, and K. Abed-Meraim. Higher-order tensor-based method for delayed exponential fitting. *IEEE Transactions on Signal Processing*, June 2007.

[2391] O. Cappé, R. Douc, A. Guillin, J.-M. Marin, and C. P. Robert. Adaptive importance sampling in general mixture classes. *Statistics and Computing*, 18(4):447–459, 2008.

[2392] O. Cappé, S. Godsill, and E. Moulines. An overview of existing methods and recent advances in sequential monte carlo. *Proceedings of the IEEE*, 95(5):899–924, May 2007.

[2393] O. Cappé and E. Moulines. Online expectation-maximization algorithm for latent data models. *J. Royal Statist. Soc. B*, 71(3):593–613, 2009.

[2394] J.-F. Cardoso, M. Martin, J. Delabrouille, M. Betoule, and G. Patanchon. Component separation with flexible models. application to the separation of astrophysical emissions. *IEEE Journal of Selected Topics in Signal Processing*, October 2008.

[2395] A. Chambaz, A. Garivier, and E. Gassiat. A mdl approach a mdl approach to hmm with poisson and gaussian emissions. *Journal of Statistical Planning and Inference*, 139(3):962–977, March 2009.

[2396] M. K. Choong, M. Charbit, and H. Yan. Autoregressive model-based missing value, estimation for dna microarray time series data. *IEEE Transactions on Information Technology in BioMedicine*, 13-1:131–137, January 2009.

[2397] S. Clémençon and P. Bertail. Approximate regenerative-block bootstrap for markov chains. *Computational Statistics & Data Analysis*, 52(5):2739–2756, January 2008.

[2398] S. Clémençon, G. Lugosi, and N. Vayatis. Ranking and empirical minimization of u-statistics. *Annals of Statistics*, 36(2):844–874, March 2008.

[2399] S. Clémençon and N. Vayatis. Ranking the best instances. *Journal of Machine Learning Research*, 8:2671–2699, December 2007.
[2400] S. Clémençon and N. Vayatis. The rankover algorithm: overlaid classification rules for optimal scoring. *Constructive approximation*, October 2008.
[2401] S. Clémençon and N. Vayatis. Tree-based ranking methods. *IEEE IT*, July 2008.
[2402] J. Cornebise, E. Moulines, and J. Olsson. Adaptive methods for sequential importance sampling with application to state space models. *Statistics and Computing*, 18(4):461–480, August 2008.
[2403] L. De Lathauwer, J. Castaing, and J.-F. Cardoso. Fourth-order cumulant based blind identification of underdetermined mixtures. *IEEE Transactions on Signal Processing*, 55(6):2965–2973, December 2007.
[2404] J. Delabrouille, J.-F. Cardoso, M. Le Jeune, M. Betoule, G. Fay, and F. Guilloux. A full sky, low foreground, high resolution CMB map from WMAP. *Astronomy and Astrophysics*, 2008.
[2405] O. Derrien, P. Duhamel, M. Charbit, and G. Richard. A new quantization optimization algorithm for the mpeg advanced audio coder using a statistical sub-band model of the quantization noise. *IEEE Transactions on Audio, Speech and Language Processing*, 14(4):1328–1339, July 2006.
[2406] A. Djebbar, K. Abed-Meraim, and A. Djebbari. Blind and semi-blind equalization of downlink mc-cdma system exploiting guard interval redundancy and excess codes. *Communications, IEEE Transactions*, 57(1):156–163, January 2009.
[2407] R. Douc, G. Fort, and A. Guillin. Subgeometric rates of convergence of f-ergodic strong markov processes. *Stochastic processes and their applications*, May 2006.
[2408] R. Douc, G. Fort, E. Moulines, and P. Priouret. Forgetting of the initial distribution for hidden markov models. *Stochastic processes and their applications*, April 2007.
[2409] R. Douc, A. Guillin, and E. Moulines. Bounds on regeneration times and limit theorems for subgeometric markov chains. *Annales de l'Institut Henri Poincaré*, 44(2):239–257, October 2008.
[2410] R. Douc, A. Guillin, and J. Najim. Moderate deviations for particle filtering. *Annals of Applied Probability*, 15(1B):587–614, February 2005.
[2411] R. Douc and E. Moulines. Limit theorems for weighted samples with applications to sequential monte carlo methods. *Annals of Statistics*, 36(5):2344–2376, May 2008.
[2412] R. Douc, E. Moulines, and Y. Ritov. Forgetting of the initial condition for the filter in general state-space hidden markov chain: a coupling approach. *Electronic Journal of Probability*, 14:27–49, February 2009.
[2413] R. Douc, E. Moulines, and P. Soulier. Computable convergence rates for sub-geometric ergodic markov chains. *Bernoulli*, 13(3):831–848, October 2007.
[2414] R. Douc, F. Roueff, and P. Soulier. On the existence of some arch(∞) processes. *Stochastic processes and their applications*, 118(5):755–761, 2007.
[2415] G. Fay, F. Guilloux, M. Betoule, J.-F. Cardoso, J. Delabrouille, and M. Le Jeune. CMB power spectrum estimation using wavelets. *Physical Review D*, 78(8):083013, 2008.
[2416] G. Fay, E. Moulines, F. Roueff, and M. S. Taqqu. Estimators of long-memory : Fourier versus wavelets. *Journal of Econometrics*, 2009.
[2417] G. Fay, F. Roueff, and P. Soulier. Estimation of the memory parameter of the infinite source poisson process. *Bernoulli*, 13(2):473–491, 2007.
[2418] F. Forbes and G. Fort. A convergence theorem for variational em-like algorithms : application to image segmentation. *IEEE Transactions on Image Processing*, 16(3):824–837, June 2007.
[2419] G. Fort and S. Lambert-Lacroix. Classification using partial least squares with penalized logistic regression. *Bioinformatics*, 21(7):1104–1111, July 2005.
[2420] G. Fort, S. Meyn, E. Moulines, and P. Priouret. The ode method for stability of skip-free markov chains with applications to mcmc. *Ann. Appl. Probab*, 18(2):664–707, 2008.
[2421] G. Fort and G. Roberts. Subgeometric ergodicity of strong markov processes. *Ann. Appl. Probab.*, 15(2):1565–1589, July 2005.
[2422] E. Gassiat and C. Lévy-Leduc. Efficient semiparametric estimation of the periods in a superposition of periodic functions with unknown shape. *Journal of Time Series Analysis*, 27(6):877–910, November 2006.
[2423] H. Gazzah and K. Abed-Meraim. Optimum ambiguity-free directional and omni-directional planar antenna arrays for doa estimation. *IEEE Transactions on Signal Processing*, 2009.
[2673] Y. Gousseau and F. Roueff. Modeling occlusion and scaling in natural images. *SIAM Multiscale Modeling and Simulation*, 6(1):105–134, 2007.
[2425] E. Grosicki, K. Abed-Meraim, and Y. Hua. A weighted linear prediction method for near-field source localization. *IEEE Transactions on Signal Processing*, 53(10 part 1):3651 – 3660, October 2005.
[2426] F. Guilloux, G. Fay, and J.-F. Cardoso. Practical wavelet design on the sphere. *Applied and computational harmonic analysis*, December 2008.
[2427] W. Hachem, P. Loubaton, and J. Najim. The empirical distribution of the eigenvalues of a gram matrix with a given variance profile. *Annales de l'Institut Henri Poincare (B) Probability and Statistics*, 42, November 2006.
[2428] W. Hachem, P. Loubaton, and J. Najim. Deterministic equivalents for certain functionals of large random matrices. *Annals of Applied Probability*, 17(3):875–930, July 2007.
[2429] C. Hurvich, E. Moulines, and Ph. Soulier. Estimating long memory in volatility. *Econometrica*, 73(4):1283–1328, July 2005.
[2430] I. Kacha, K. Abed-Meraim, and A. Belouchrani. Fast adaptive blind mmse equalizer for multichannel fir systems. *EURASIP Journal on Applied Signal Processing*, 2006, 2006.
[2431] M. Lavielle and C. Lévy-Leduc. Semiparametric estimation of the frequency of unknown periodic functions and its application to laser vibrometry signals. *IEEE Transactions on Signal Processing*, 53(7):2306–2315, July 2005.

[2432] S. M. Leach, J.-F. Cardoso, and et al. Component separation methods for the Planck mission. *Astronomy and Astrophysics*, 491:597–615, November 2008.

[2433] C. Lévy-Leduc. Efficient frequency estimation from a particular almost periodic function. *Journal of Time Series Analysis*, 27(5):637–670, September 2006.

[2434] C. Lévy-Leduc, E. Moulines, and F. Roueff. Frequency estimation based on the cumulated Lomb-Scargle periodogram. *Journal Of Time Series Analysis*, 29(6):1104–1131, 2008.

[2435] C. Lévy-Leduc and F. Roueff. Detection and localization of change-points in high-dimensional network traffic data. *Annals Of Applied Statistics*, 3(2):637–662, June 2009.

[2436] Y. Lu, S. Attallah, G. Mathew, and K. Abed-Meraim. Analysis of orthogonality error propagation for frans and hfrans algorithms. *IEEE Transactions on Signal Processing*, 56(9):4515–4521, September 2008.

[2437] J. F. Macias-Perez, G. Lagache, B. Maffei, P. Ade, A. Amblard, R. Ansari, E. Aubourg, J. Aumont, S. Bargot, J. Bartlett, A. Benoit, J. Ph Bernard, R. Bhatia, A. Blanchard, J. J. Bock, A. Boscaleri, F. R. Bouchet, A. Bourrachot, P. Camus, J.-F. Cardoso, F. Couchot, P. De Bernardis, J. Delabrouille, F.-X. Desert, O. Dore, M. Douspis, L. Dumoulin, X. Dupac, Ph. Filliatre, P. Fosalba, K. Ganga, F. Gannaway, B. Gautier, M. Giard, Y. Giraud-Heraud, R. Gispert, L. Guglielmi, J. Ch Hamilton, S. Hanany, S. Henrot-Versille, V. Hristov, J. Kaplan, J.-M. Lamarre, A. E. Lange, K. Madet, Ch. Magneville, D. P. Marrone, S. Masi, F. Mayet, J. A. Murphy, F. Naraghi, F. Nati, G. Patanchon, O. Perdereau, G. Perrin, S. Plaszczynski, M. Piat, N. Ponthieu, S. Prunet, J.-L. Puget, C. Renault, C. Rosset, D. Santos, A. Starobinsky, I. Strukov, R. V. Sudiwala, R. Teyssier, M. Tristram, C. Tucker, J. Ch Vanel, D. Vibert, E. Wakui, and D. Yvon. Archeops in-flight performance, data processing and map making. *Astronomy & Astrophysics*, 467(3):1313–1344, June 2007.

[2438] M. Maida, J. Najim, and S. Peche. Large deviations for weighted empirical mean with outliers. *Stochastic Processes and their Applications*, 117:1373 – 1403, May 2007.

[2439] Y. Moudden, J.-F. Cardoso, J.-L. Starck, and J. Delabrouille. Blind component separation in wavelet space. application to CMB analysis. *EURASIP Journal on Applied Signal Processing*, 2005(15):2437–2454, 2005.

[2440] E. Moulines, P. Priouret, and F. Roueff. On recursive estimation for locally stationary time varying autoregressive processes. *The Annals of statistics*, 33(6):2610–2654, December 2005.

[2441] E. Moulines, F. Roueff, A. Souloumiac, and T. Trigano. Nonparametric inference of photon energy distribution from indirect measurements. *Bernoulli*, 13(2):365–388, 2007.

[2442] E. Moulines, F. Roueff, and M. Taqqu. On the spectral density of the wavelet coefficients of long memory time series with application to the log-regression estimation of the memory parameter. *Journal of Time Series Analysis*, 28(2):155–187, March 2007.

[2443] E. Moulines, F. Roueff, and M. Taqqu. A wavelet whittle estimator of the memory parameter of a non-stationary gaussian time series. *Annals of Statistics*, 36(4):1925–1956, 2008.

[2444] L. T. Nguyen, A. Belouchrani, K. Abed-Meraim, and B. Boashash. Separating More Sources Than Sensors Using Time-Frequency Distribution. *EURASIP Journal on Applied Signal Processing*, 2005(17):2828–2847, September 2005.

[2445] J. Olsson, O. Cappé, R. Douc, and E. Moulines. Sequential monte carlo smoothing with application to parameter estimation in non-linear state space models. *Bernouilli*, 14(1):155–179, 2008.

[2446] D. Pogosyan, C. Pichon, C. Gay, S. Prunet, J.-F. Cardoso, T. Sousbie, and S. Colombi. The local theory of the cosmic skeleton. *Monthly Notices of the Royal Astronomical Society*, 2009.

[2447] J. F. Ponthieu, J. F. Macias-Perez, M. Tristram, P. Ade, A. Amblard, R. Ansari, J. Aumont, E. Aubourg, A. Benoit, J.-Ph. Bernard, A. Blanchard, J. J. Bock, F. R. Bouchet, A. Bourrachot, P. Camus, J.-F. Cardoso, F. Couchot, P. De Bernardis, J. Delabrouille, F.-X. Desert, M. Douspis, L. Dumoulin, Ph. Filliatre, P. Fosalba, M. Giard, Y. Giraud-Heraud, R. Gispert, J. Grain, L. Guglielmi, J.-Ch. Hamilton, S. Hanany, S. Henrot-Versille, J. Kaplan, G. Lagache, A. E. Lange, K. Madet, B. Maffei, S. Masi, F. Mayet, F. Nati, G. Patanchon, O. Perdereau, S. Plaszczynski, M. Piat, S. Prunet, J.-L. Puget, C. Renault, C. Rosset, D. Santos, D. Vibert, and D. Yvon. Temperature and polarization angular power spectra of Galactic dust radiation at 353 GHz as measured by Archeops. *Astronomy & Astrophysics*, 444(1):327–336, December 2005.

[2448] F. Roueff and T. Rydén. Non-parametric estimation of mixing densities for discrete distributions. *The Annals of Statistics*, 33(5):2066–2108, October 2005.

[2449] F. Roueff and M. S. Taqqu. Asymptotic normality of wavelet estimators of the memory parameter for linear processes. *J. Time Ser. Anal.*, 2009.

[2450] F. Roueff and M. S. Taqqu. Central limit theorems for arrays of decimated linear processes. *Stochastic processes and their applications*, 2009.

[2451] M. Sahmoudi, K. Abed-Meraim, and M. Benidir. Blind separation of impulsive alpha-stable sources using minimum dispersion criterion. *IEEE Signal Processing Letters*, 12(4):281–284, April 2005.

[2452] W. Souidene, K. Abed-Meraim, and A. Beghdadi. A new look to multichannel blind image deconvolution. *IEEE Transactions on Image Processing*, 2009.

[2453] L.B. Thiagarajan, S. Attallah, K. Abed-Meraim, L. Ying-Chang, and F. Hongyi. Non-data-aided joint carrier frequency offset and channel estimator for uplink mc-cdma systems. *IEEE Transactions on Signal Processing*, 56(9):4398–4408, September 2008.

[2454] T. Trigano, E. Moulines, F. Roueff, T. Montagu, and A. Souloumiac. Statistical pileup correction method for hpge detectors. *IEEE Transactions on Signal Processing*, 55(10):4871 – 4881, October 2007.

[2455] M. Tristram, G. Patanchon, J. F. Macias-Perez, P. Ade, A. Amblard, R. Ansari, E. Aubourg, A. Benoit, J.-Ph. Bernard, A. Blanchard, J. J. Bock, F. R. Bouchet, A. Bourrachot, P. Camus, J.-F. Cardoso, F. Couchot, P. De Bernardis, J. Delabrouille, F.-X. Desert, M. Douspis, L. Dumoulin, Ph. Filliatre, P. Fosalba, M. Giard, Y. Giraud-Heraud, R. Gispert, L. Guglielmi, J.-Ch. Hamilton, S. Hanany, S. Henrot-Versille, J. Kaplan, G. Lagache, J.-M.

Lamarre, A. E. Lange, K. Madet, B. Maffei, Ch. Magneville, S. Masi, F. Mayet, F. Nati, O. Perdereau, S. Plaszczynski, M. Piat, N. Ponthieu, S. Prunet, C. Renault, C. Rosset, D. Santos, D. Vibert, and D. Yvon. The CMB temperature power spectrum from an improved analysis of the Archeops data. *Astronomy & Astrophysics*, 436(3):785–797, September 2005.

[2456] D. Wraith, M. Kilbinger, K. Benabed, O. Cappé, J.-F. Cardoso, G. Fort, S. Prunet, and Ch. P. Robert. Estimation of cosmological parameters using adaptive importance sampling. *Physical Review D*, 2009.

12.3.2 ACLN: Articles in Other Refereed Journals

[2457] R. Alléaume, F. Roueff, E. Diamanti, and N. Lutkenhaus. Topological optimization of quantum key distribution networks. *New Journal of Physics*, 11, July 2009.

[2458] A. Ayache, F. Roueff, and Y. Xiao. Joint continuity of the local times of linear fractional stable sheets. *C. R. Acad. Sci. Paris, Ser. I.*, 344(10):635–640, May 2007.

[2459] A. Ayache, F. Roueff, and Y. Xiao. Local and asymptotic properties of linear fractional stable sheets. *C. R. Acad. Sci. Paris, Ser. I.*, 344(6):389–394, March 2007.

[2711] M. Campedel and E. Moulines. Classification et sélection de caractéristiques de textures. *Revue d'Intelligence Artificielle / RSTI (Hermès)*, 19:633–659, September 2005.

[2461] I. Catillo, C. Lévy-Leduc, and C. Matias. Exact adaptive estimation of a periodic function with unknown period. *Mathematical Methods Of Statistics*, 15(2):146–175, 2006.

[2462] S. Clémençon, H. De Arazoza, and V. Tran. A stochastic epidemic model with contact-tracing: Large population approximation and statistical estimation. *Journal of Biological Dynamics*, 2(4):392–414, October 2008.

[2463] S. Clémençon and J. Tressou. Exposition aux risques alimentaires et processus stochastiques. *Journal de la Société Française de Statistique*, 150(1):3–29, August 2009.

[2464] A. Djebbar-Bouzidi, K. Abed-Meraim, and A. Djebbari. Blind channel equalization and carrier frequency offset estimation for mc-cdma systems using guard interval redundancy and excess codes. *International Journal of Electronics and Communications*, 2008.

[2465] R. Douc, E. Moulines, and J. Olsson. Optimality of the auxiliary particle filter. *Probability and Mathematical Statistics*, 29(I), February 2009.

[2466] G. Fort, S. Lambert-Lacroix, and J. Peyre. Réduction de dimension dans les modèles généralisés : Application à la classification de données issues des biopuces. *Journal de la Société Française de Statistique*, 146(1-2):117–152, July 2005.

[2467] M. Fromont and C. Lévy-Leduc. Adaptive tests for periodic signals detection with applications to laser vibrometry. *ESAIM Probability and Statistics*, 10:46–75, September 2005.

[2468] J.-F. Germain. Pampering the client: Calibrating vehicle parts to satisfy customers. *Case Studies in Business, Industry and Government Statistics*, 1(2):164–172, 2007.

[2469] R. Iferroudjene, K. Abed-Meraim, and A. Belouchrani. A new jacobi-like method for joint diagonalization of arbitrary non defective matrices. *Journal of Applied Mathematics and Computation*, 211(2):363–373, May 2009.

[2470] E. Moulines, F. Roueff, and M. Taqqu. Central Limit Theorem for the log-regression wavelet estimation of the memory parameter in the Gaussian semi-parametric context. *Fractals*, 15(4):301 – 313, December 2007.

[2471] J. Najim. Large deviations for independent random variables, application to Erdös-renyi's functionnal law of large numbers. *ESAIM : Probability and Statistics*, 9:116–142, April 2005.

[2472] L. Rigouste, O. Cappé, and F. Yvon. Inference and evaluation of the multinomial mixture model for text clustering. *Information Processing and Management*, 43(5):1260–1280, January 2007.

[2473] L. Rigouste, O. Cappé, F. Yvon, and F. Clérot. Modèles multi-thématiques markoviens pour la segmentation de textes. *RNTI E10 : revue des nouvelles technologies de l'information*, 2007.

12.3.3 INV: Invited Talks

[2474] K. Abed-Meraim. Plenary talk on space time processing for OTH Radar at CGE, Algiers, 2006.

[2475] K. Abed-Meraim. Tutorial talk on blind and semi blind system identification at ISSPA, Sharjah, February 2007.

[2476] K. Abed-Meraim. Tutorial talk on mobile localization at ICSPC, Dubai, November 2007.

[2477] O. Cappé. Adaptive population Monte Carlo. In *Recent Advances in Monte Carlo Based Inference Workshop*, Isaac Newton Institute, Cambridge, UK, November 2006.

[2478] O. Cappé. Monte carlo methods for cosmological models. XXIIIrd IAP Colloquium, July 2007.

[2479] O. Cappé. An introduction to sequential monte carlo for filtering and smoothing. In *Workshop on statistical modeling of extremes in data assimilation and filtering approaches*, Strasbourg, France, June 2008.

[2480] G. Fort. Criteria for subgeometric ergodicity of strong markov processes. In *New Developments in MCMC (Diffusions, Images and Other Challenges)*, Warwick, GB, July 2006.

[2481] G. Fort. Adaptive mcmc : theory and methods. In *Optimization in MCMC*, Warwick, GB, July 2009.

[2482] S. Haykin and E. Moulines. From kalman to particle filtering (tutorial). In *IEEE Int. Conf. on Acoustics, Speech, and Signal Processing*, Philadelphia, USA, March 2005.

[2483] E. Moulines. Mcmc, smc,... what next ? In *Algorithms in Complex Systems Workshop*, EURANDOM, Eindhoven, Netherlands, September 2007.

[2484] E. Moulines. Adaptive methods for sequential importance sampling with application to state space models. In

Inference and Estimation in Probabilistic Time-Series Models Workshop, Isaac Newton Institute, Cambridge, UK, June 2008.

12.3.4 ACTI: Articles in Proceedings of International Conferences

[2485] K. Abed-Meraim and S. Attallah. A new adaptive algorithm for the generalized symmetric eigenvalue problem. In *Proc. ISSPA*, February 2007.
[2486] A. Aissa El Bey and K. Abed-Meraim. Blind identification of sparse simo channels using maximum a posteriori approach. In *EUSIPCO*, August 2008.
[2487] A. Aissa El Bey and K. Abed-Meraim. Blind simo channel identification using a sparsity criterion. In *Proc. SPAWC*, Brazil, July 2008.
[2488] A. Alaya-Feki, B. Sayrac, E. Moulines, and A. Le Cornec. Opportunistic spectrum access: Online search of optimality. In *Global Telecommunications Conference, 2008. IEEE GLOBECOM 2008.*, pages 1–5, November 2008.
[2489] F. Alayyan, K. Abed-Meraim, and A. Zoubir. Blind equalization in ofdm systems exploiting guard interval redundancy. In *Proc. of the 39th Asilomar Conference on Signals, Systems and Computers*, November 2005.
[2490] F. Alayyan, K. Abed-Meraim, and A. E. H. Zoubir. Blind mmse channel identification and equalization algorithms for ofdm-based systems. In *Proc. ISSPA*, February 2007.
[2491] F. O. Alayyan, K. Abed-Meraim, and A. M. Zoubir. Blind equalization and frequency offset estimation in ofdm systems exploiting guard interval redundancy. In *Proc. of Int. Symposium on Signal Processing and its Applications (ISSPA), Sydney, Australia*, August 2005.
[2492] C. Andrieu, E. Moulines, and P. Priouret. Stability of stochastic approximation under verifiable conditions. In *IEEE Conference on Decision and Control*, pages 6656–6661, Grenade, December 2005.
[2493] F. Bach and Z. Harchaoui. Diffrac: a discriminative and flexible framework for clustering. In *NIPS*, Vancouver, December 2007.
[2494] S. Barembruch, A. Garivier, and E. Moulines. On approximate maximum likelihood methods for blind identification: How to cope with the curse of dimensionality. In *IEEE SPAWC 2008*, Recife, Brésil, July 2008.
[2495] S. Barembruch, A. Garivier, and E. Moulines. On optimal sampling for particle filtering in digital communication. In *IEEE SPAWC 2008*, Recife, Brésil, July 2008.
[2496] S. Bartelmaos and K. Abed-Meraim. Principal and minor subspace tracking: Algorithms & stability. In *ICASSP*, May 2006.
[2497] S. Bartelmaos and K. Abed-Meraim. An efficient & stable algorithm for minor subspace tracking and stability analysis. In *ICASSP*, 2007.
[2498] S. Bartelmaos and K. Abed-Meraim. General selection criteria to mitigate the impact of nlos errors in rtt measurements for mobile positioning. In *ICC*, 2007.
[2499] S. Bartelmaos, K. Abed-Meraim, and S. Attallah. Fast algorithms for minor component analysis. In *SSP 2005*, Bordeaux Paris, July 2005.
[2500] S. Bartelmaos, K. Abed-Meraim, and S. Attallah. Efficient and fast tracking algorithm for minor component. In *PIMRC*, October 2006.
[2501] S. Bartelmaos, K. Abed-Meraim, and F. Soltani. An efficient rake-cfar method for downlink mobile positioning in umts fdd mode. In *SPAWC*, 2007.
[2502] A. Belouchrani, A. Bourennane, and K. Abed-Meraim. A closed form solution for the blind separation of two sources from two sensors. In *14th European Signal Processing Conference (EUSIPCO06)*, Florence, Italie, September 2006.
[2503] A. Ben Hadj Alaya-Feki, E. Moulines, and E. Villebrun. Exploiting radio measurements in wireless mobile networks with advanced signal processing. In *Third International Conference on Wireless and Mobile Communications, 2007. ICWMC '07.*, page 28, March 2007.
[2504] A. Ben Hadj Alaya-Feki, B. Sayrac, S. Ben Jemaa, and E. Moulines. Interference cartography for hierarchical dynamic spectrum access. In *3rd IEEE Symposium on New Frontiers in Dynamic Spectrum Access Networks, 2008. DySPAN 2008.*, pages 1 – 5, October 2008.
[2505] A. Ben Hadj Alaya-Feki, B. Sayrac, P. Houze, and E. Moulines. Opportunistic spectrum access with ieee 802.11 in ieee p1900.4 framework. In *Networking and Communications, 2008. WIMOB '08. IEEE International Conference on Wireless and Mobile Computing,*, pages 82–83, October 2008.
[2506] A. Ben Hadj Alaya-Feki, B. Sayrac, A. Le Cornec, and E. Moulines. Semi dynamic parameter tuning for optimized opportunistic spectrum access. In *IEEE 68th Vehicular Technology Conference, 2008. VTC 2008-Fall.*, pages 1–5, October 2008.
[2507] T. Ben Jaber and K. Abed-Meraim. Blind channel shortening in ofdm system using nulltones and cyclic prefix. In *Proc. ICASSP*, April 2008.
[2508] T. Ben Jaber, K. Abed-Meraim, and M. Bonnet. Channel shortening in ofdm system with controlled tir quality. In *Proc. ISSPA*, February 2007.
[2509] T. Ben Jaber, K. Abed-Meraim, and H. Boujemaa. A new blind channel shortening for differential encoded ofdm system. In *Proc. SPAWC*, Brazil, July 2008.
[2510] T. Ben Jaber, K. Abed-Meraim, and H. Boujemaa. Blind channel shortening in mimo-ofdm systems using single block differential modulation. In *IWCMC*, June 2009.
[2511] T. Ben Jaber, K. Abed-Meraim, and H. Boujemaa. Blind channel shortening in zp-ofdm systems with controlled tir quality. In *EUSIPCO*, August 2009.

[2512] A. M. Bentahar, A. Belouchrani, E. Bourennane, and K. Abed-Meraim. An analytical solution for a second order blind identification algorithm. In *Proc. CNTSA: Colloque National sur le Traitement du Signal et ses Applications, Guelma, Algeria*, September 2005.

[2513] L. Berriche and K. Abed-Meraim. Semi-blind stochastic maximum likelihood for frequency selective MIMO channels. In *The 16th Annual IEEE International Symposium on Personal Indoor and Mobile Radio Communications*, Berlin, Germany, September 2005.

[2514] L. Berriche, K. Abed-Meraim, and J.-C. Belfiore. Investigation of the channel estimation error on MIMO system performance. In *EUSIPCO*, Antalya, Turquie, September 2005.

[2515] L. Berriche, K. Abed-Meraim, and J.-C. Belfiore. Effect of imperfect channel knowledge on the mimo channel outage capacity. In *SPAWC workshop*, Cannes, France, July 2006.

[2516] L. Berriche, K. Abed-Meraim, and J.-C. Belfiore. MIMO systems: Performance comparison of semi-blind techniques. In *9th International Symposium on Signal Processing and Its Applications, 2007. ISSPA 2007*, February 2007.

[2517] P. Bertail, S. Clémençon, and J. Tressou. A regeneration-based runs estimator for the extremal index in the markov setup. In *International Workshop in Applied Probability*, Compiègne France, July 2008.

[2518] P. Bertail, S. Clémençon, and J. Tressou. Regenerative block-bootstrap confidence intervals for the extremal index. In *International Workshop in Applied Probability*, Compiègne France, July 2008.

[2519] P. Bertail, S. Clémençon, and N. Vayatis. On bootstrapping the ROC curve. In *ADVANCES IN NEURAL INFORMATION 21, Proceedings of the NIPS 2008 Conference*, volume 21, pages 137–144, Vancouver CANADA, December 2008.

[2520] A. Boudraa, J. C. Cexus, Z. Zaidi, and K. Abed-Meraim. Interaction measure of am-fm signals by cross-ψ_b-energy operator. In *Proc. of Int. Symposium on Signal Processing and its Applications (ISSPA), Sydney, Australia*, August 2005.

[2521] R. Boyer and K. Abed-Meraim. Estimation of the complex amplitudes associated to the common poles in a multichannel signal. In *Proc. ICASSP*, 2007.

[2522] R. Boyer, G. Bouleux, and K. Abed-Meraim. Common pole estimation with an orthogonal vector method. In *14th European Signal Processing Conference (EUSIPCO06)*, Florence, Italie, September 2006.

[2786] M. Campedel, E. Moulines, and M. Datcu. Feature selection for satellite image indexing. In *IGARSS'05*, Séoul, Corée, July 2005.

[2524] O. Cappé. Online sequential monte carlo em algorithm. In *IEEE Workshop on Statistical Signal Processing*, Cardiff, Wales, UK, September 2009.

[2525] O. Cappé, M. Charbit, and E. Moulines. Recursive EM algorithm with applications to DOA estimation. In *Proc. IEEE Int. Conf. Acoust., Speech, Signal Processing (ICASSP)*, volume III, pages 664–667, Toulouse, France, May 2006.

[2526] O. Cappé and E. Moulines. On the use of particle filtering for maximum likelihood parameter estimation. In *European Signal Processing Conference (EUSIPCO)*, Antalya, Turkey, September 2005.

[2527] O. Cappé and E. Moulines. Recursive computation of the score and observed information matrix in hidden markov models. In *IEEE Workshop on Statistical Signal Processing (SSP'05)*, Bordeaux, France, July 2005.

[2528] J.-F. Cardoso and M. Martin. A flexible component model for precision ICA. In *7th International Conference on Independent component analysis and component separation*, pages 1–8, London, UK, December 2007.

[2529] N. Castaneda, M. Charbit, and E. Moulines. Source localization from quantized time of arrival measurements. In *ICASSP*, volume IV, pages 933–936, Toulouse, France, May 2006.

[2530] N. Castaneda, M. Charbit, and E. Moulines. Source localization from quantized time of arrival measurements. In *International Conference on Acoustics, Speech and Signal Processing*, volume 4, pages IV933–IV936, Toulouse, France, May 2006.

[2531] N. Castaneda, M. Charbit, and E. Moulines. A New Approach for Mobile Localization in Multipath Scenarios. In *IEEE International Conference on Communications*, pages 4680–4685, Glasgow, Scotland, June 2007.

[2532] N. Castaneda, M. Charbit, and E. Moulines. A New Bearings-Only Tracking Algorithm for Ground Moving Targets Constrained to Roads. In *IEEE Workshop on Signal Processing Advances in Wireless Communications*, Helsinki, Finland, June 2007.

[2533] M. Charbit and L. White. System design for temporally correlated mimo channels. In *Communications Theory Workshop, 2008. AusCTW 2008. Australian*, pages 156–160, University of Canterbury, Christchurch, New Zealand, January 2008.

[2534] S. Clémençon, A. Garivier, and J. Tressou. Pseudo regenerative block-bootstrap for hidden markov models. In *SSP 2009*, Cardiff, UK, July 2009.

[2535] S. Clémençon and N. Vayatis. Approximation of the optimal ROC curve and a tree-based ranking algorithm. In *Algorithmic Learning Theory*, Budapest Hongrie, October 2008.

[2536] S. Clémençon and N. Vayatis. Empirical performance maximization based on linear rank statistics. In *ADVANCES IN NEURAL INFORMATION 21, Proceedings of the NIPS 2008 Conference*, volume 21, pages 305–312, Vancouver CANADA, December 2008.

[2537] S. Clémençon and N. Vayatis. Overlaying classifiers: a practical approach to optimal ranking. In *ADVANCES IN NEURAL INFORMATION 21, Proceedings of the NIPS 2008 Conference*, volume 21, pages 313–320, Vancouver CANADA, December 2008.

[2538] S. Clémençon and N. Vayatis. Adaptive estimation of the optimal roc curve and a bipartite ranking algorithm. In *ALT 2009*, Porto, Portugal, June 2009.

[2539] S. Clémençon and N. Vayatis. Nonparametric estimation of the precision-recall curve. In *ICML 2009*, Montréal, Canada, June 2009.

[2540] S. Clémençon and N. Vayatis. On partitioning rules for bipartite ranking. In *AISTATS 2009, JMLR: W&CP*, number 5, pages 97–104, TAMPA, USA, April 2009.
[2541] J. Cornebise, E. Moulines, and J. Olsson. Adaptive methods for sequential importance sampling with application to state space models. In *16th European Signal Processing Conference (EUSIPCO)*, Lausanne, Suisse, August 2008.
[2542] J. Cornebise, E. Moulines, and J. Olsson. Adaptive methods for sequential importance sampling with application to state space models. In *International Workshop on Applied Probability (IWAP)*, Compiègne, France, July 2008.
[2543] A. Djebbar, K. Abed-Meraim, and A. Djebbari. Blind channel equalization in downlink mc-cdma systems exploiting guard interval redundancy excess codes. In *SPAWC workshop*, Cannes, France, July 2006.
[2544] A. Djebbar-Bouzidi, K. Abed-Meraim, and A. Djebbari. Blind cannel equalization and carrier frequency offset estimation for mc-cdma systems using guard interval redundancy and excess codes. In *Proc. ICSPC*, pages 456–459, Dubai, EAU, November 2007.
[2545] A. Djebbar-Bouzidi, K. Abed-Meraim, and A. Djebbari. Semi-blind equalization of downlink mc-cdma system. In *Proc. ICSPC*, pages 460–463, Dubai, EAU, November 2007.
[2546] F. Djebbari, D. Guerchi, K. Abed-Meraim, and H. Hamam. Text hiding in high frequency components of speech spectrum. In *IH*, Allemagne, June 2009.
[2547] R. Douc, O. Cappé, and E. Moulines. Comparison of resampling schemes for particle filtering. In *4th International Symposium on Image and Signal Processing and Analysis (ISPA)*, Zagreb, Croatia, September 2005.
[2548] R. Douc and E. Moulines. Limit theorems for weighted samples with applications to sequential monte carlo methods. In *Sequential Monte Carlo Methods: filtering and other applications*, volume 19, pages 101–107, Oxford, Angleterre, August 2007. EDP Sci., Les Ulis.
[2549] R. Douc, E. Moulines, and J. Olsson. Improving the performance of the two-stage sampling algorithm: a statistical perspective. In *IEEE Statistical Signal Processing Workshop 2007*, Madison, USA, August 2007.
[2550] J. Dumon, W. Hachem, S. Lasaulce, P. Loubaton, and J. Najim. On the asymptotic analysis of mutual information of mimo rician correlated channels. In *ISCCSP*, Marrakech, May 2006.
[2551] G. Fay, F. Roueff, and P. Soulier. Estimation of the memory parameter of transmission rate measurements using an infinite source poisson model. In *ASMDA2005*, Brest, France, June 2005.
[2552] C. Févotte and J.-F. Cardoso. Maximum likelihood approach for blind audio source separation using time-frequency Gaussian source models. In *IEEE Workshop on Applications of Signal Processing to Audio and Acoustics*, Mohonk, NY, USA, October 2005.
[2553] S. Filippi, O. Cappé, F. Clérot, and E. Moulines. A near optimal policy for channel allocation in cognitive radio. In *Recent Advances in Reinforcement Learning, Lectures Notes in Computer Science*, volume 5323, pages 69–81, Lille, France, June 2008.
[2554] G. Fort, S. Meyn, E. Moulines, and P. Priouret. Ode methods for markov chain stability with applications to mcmc. In *ValueTools'2006*, Pise (Italie), October 2006.
[2555] H. Gazzah and K. Abed-Meraim. Optimum ambiguity-free isotropic antenna arrays. In *ICASSP*, April 2009.
[2858] Y. Gousseau and F. Roueff. A geometrical a priori for capturing the regularity of images. In *EUSIPCO 2005*, August 2005.
[2557] E. Grosicki and K. Abed-Meraim. A new trilateration method to mitigate the impact of some non–line–of–sight errors in toa measurements for mobile localization. In *Proc. IEEE Int. Conf. on Acoustics, Speech and Signal Processing (ICASSP)*, May 2005.
[2558] Z. Harchaoui and F. Bach. Image classification with segmentation graph kernels. In *CVPR*, Minneapolis, June 2007.
[2559] Z. Harchaoui, F. Bach, and E. Moulines. Testing for homogeneity with kernel fisher discriminant analysis. In *NIPS*, Vancouver, December 2007.
[2560] Z. Harchaoui, F. Bach, and E. Moulines. Kernel change-point analysis. In *Neural Information Processing Systems (NIPS)*, December 2008.
[2561] Z. Harchaoui and O. Cappé. Retrospective change-point estimation with kernels. In *IEEE Workshop on Statistical Signal Processing (SSP'07)*, Madison, USA, August 2007.
[2562] Z. Harchaoui and C. Lévy-Leduc. Catching change-points with lasso. In *NIPS*, Vancouver Canada, December 2007.
[2563] Z. Harchaoui, F. Vallet, A. Lung-Yut-Fong, and O. Cappé. A regularized kernel-based approach to unsupervised audio segmentation. In *ICASSP 2009*, pages 1665–1668, Taiwan, April 2009.
[2564] S. Haykin, A. Hero, and E. Moulines. Modeling, identification, and control of large-scale dynamical systems. In *ICASSP*, volume V, pages 945–948, Philadelphie (USA), April 2005.
[2565] A. Ikhlef, K. Abed-Meraim, and D. le Guennec. A fast blind adaptive separation algorithm using multiuser kurtosis maximization criterion. In *Proc. SPAWC*, 2007.
[2566] I. Kacha, K. Abed-Meraim, and A. Belouchrani. A new blind blind adaptive MMSE equalizer for MIMO systems. In *The 16th Annual IEEE International Symposium on Personal Indoor and Mobile Radio Communications*, Berlin, Germany, September 2005.
[2567] I. Kacha, K. Abed-Meraim, and A. Belouchrani. Fast adaptive simo equalizer based on truncated covariance matrix method. In *Proc. WoSPA*, March 2008.
[2568] I. Kacha, K. Abed-Meraim, and A. Belouchrani. A low-cost adaptive algorithm for blind equalization without channel order estimation. In *Proc. ISCCSP*, Malta, March 2008.
[2569] A. Kammoun, K. Abed-Meraim, and S. Affes. Performance of linear receivers based on superimposed training. In *Proc. SPAWC*, 2007.
[2570] A. Kammoun, K. Abed-Meraim, and S. Affes. An efficient regularized semi-blind estimator. In *Conference ICC*,

Allemagne, June 2009.
[2571] A. Kammoun, K. Abed-Meraim, and S. Affes. Superimposed or time-multiplexed training: A performance comparison. In *EUSIPCO*, August 2009.
[2572] C. Lévy-Leduc. Frequency estimation from a particular almost periodic function. In *ICASSP*, Toulouse, France, May 2006.
[2573] N. Linh-Trung, A. Aissa El Bey, K. Abed-Meraim, and A. Belouchrani. Underdetermined blind source separation of non-disjoint nonstationary sources in time-frequency domain. In *ISSPA'05*, volume 1, pages 46–49, Sydney (Australie), August 2005.
[2574] Y. Lu, S. Attallah, and K. Abed-Meraim. Propagation of orthogonality error for frans algorithm. In *Proc. ISSPA*, February 2007.
[2575] A. Lung-Yut-Fong, C. Lévy-Leduc, and O. Cappé. Distributed detection/localization of network anomalies using rank tests. In *SSP 09*, Cardiff, UK, September 2009.
[2576] E. Misra, O. Cappé, and F. Yvon. Using lda to detect semantically incoherent documents. In *Conf. Computational Natural Language Learning (CoNLL)*, Manchester, UK, August 2008.
[2577] E. Moreau, F. Yvon, and O. Cappé. Robust similarity measures for named entities matching. In *International Conference on Computational Linguistics (COLING)*, Manchester, UK, 2008.
[2578] E. Moreau, F. Yvon, and O. Cappé. Semi-automatic labeling of (coreferent) named entities: an experimental study. In *LREC Workshop on "Resources and Evaluation for Identity Matching, Entity Resolution and Entity Management"*, Marakech, Marocco, 2008.
[2579] Y. Moudden, P. Abrial, P. Vielva, J.-B. Melin, J.-L. Starck, J.-F. Cardoso, J. Delabrouille, and M. K. Nguyen. Independent component separation from incomplete spherical data using wavelets. application to CMB data analysis. In *Physics in Signal and Image Processing*, Toulouse, France, January 2005.
[2580] B. Mouhouche, Ph. Loubaton, and K. Abed-Meraim. On the performance of space time transmit diversity in the downlink of w-cdma with and without equalization. In *Proc. IEEE Int. Conf. on Acoustics, Speech and Signal Processing (ICASSP)*, May 2005.
[2581] J. Olsson, O. Cappé, R. Douc, and E. Moulines. On the use of sequential monte carlo methods for approximating smoothing functionals, with application to fixed parameter estimation. In *Proceedings of the SMC'2006 workshop, European Series in Applied and Industrial Mathematics*, Oxford, UK, July 2006.
[2582] L. Rigouste, O. Cappé, and F. Yvon. Evaluation of a probabilistic method for unsupervised text clustering. In *International Symposium on Applied Stochastic Models and Data Analysis*, Brest, France, May 2005.
[2583] L. Rigouste, O. Cappé, and F. Yvon. Inference for Probabilistic Unsupervised Text Clustering. In *IEEE Workshop on Statistical Signal Processing (SSP'05)*, Bordeaux, France, July 2005.
[2584] L. Rigouste, O. Cappé, and F. Yvon. Quelques observations sur le modèle LDA. In *Journées Internationales d'Analyse statistique des données textuelles*, pages 819–830, Besançon, France, April 2006.
[2585] M. Sahmoudi and K. Abed-Meraim. Investigations on contrast functions for blind source separation based on non-gaussianity and sparsity measures. In *Proc. of Int. Symposium on Signal Processing and its Applications (ISSPA), Sydney, Australia*, August 2005.
[2586] M. Sahmoudi and K. Abed-Meraim. Robust quadratic time-frequency distributions for the analysis of multicomponent fm signals in heavy-tailed noise. In *in Proc. of the IEEE Stat. Sig. Proc. (SSP) Workshop, Bordeaux, France*, July 2005.
[2587] M. Sahmoudi, K. Abed-Meraim, M. Laviel, E. Kuhn, and Ph. Ciblat. Blind source separation of noisy mixtures using a semi-parametric approach with application to heavy-tailed signals. In *in Proc. of the European Sig. Proc. Conf. (EUSIPCO), Antalya, Turkey*, September 2005.
[2588] N. Sokolovska, O. Cappé, and F. Yvon. The asymptotics of semi-supervised learning in discriminative probabilistic models. In *International Conference on Machine Learning (ICML)*, Helsinki, Finland, July 2008.
[2589] W. Souidene, K. Abed-Meraim, and A. Beghdadi. Deterministic techniques for multichannel blind image deconvolution. In *Proc. of Int. Symposium on Signal Processing and its Applications (ISSPA), Sydney, Australia*, August 2005.
[2590] W. Souidene, A. Aissa El Bey, K. Abed-Meraim, and A. Beghdadi. Blind image separation using sparse representation. In *14th International Conference on Image Processing ICIP*, San Antonio, Texas, USA, September 2007.
[2591] L.B. Thiagarajan, S. Attallah, L. Ying-Chang, and K. Abed-Meraim. Channel identifiability for blind subspace-based channel estimator in uplink mc-cdma systems. In *Proc. ICC*, May 2008.
[2592] T. Trigano, E. Barat, T. Dautremer, and A. Souloumiac. Pile-Up Correction Algorithms for Nuclear Spectrometry. In *ICASSP 2005*, Philadelphie (USA), March 2005.
[2593] T. Trigano, F. Roueff, E. Moulines, A. Souloumiac, and T. Montagu. Energy spectrum reconstruction for HPGe detectors using analytical pile-up correction. In *ICASSP*, volume III, pages 592–595, Toulouse, France, May 2006.
[2594] T. Trigano, A. Souloumiac, F. Roueff, and E. Moulines. Nonparametric Inference for Pileup Correction in Nuclear Spectroscopy. In *IEEE Workshop on Statistical Signal Processing*, Bordeaux, France, July 2005.
[2595] J. Ybanez, F. Davoine, and M. Charbit. Face tracking using canonical correlation analysis. In *International Conference on Computer Vision Theory and Applications*, volume 1, pages 396–402, Barcelone, Espagne, March 2007.
[2596] J. Ybanez, F. Davoine, and M. Charbit. Linear tracking of pose and facial features. In *10th IAPR International Conference on Machine Vision Applications*, Tokyo, Japon, May 2007.

12.3.5 ACTN: Articles in Proceedings of French Conferences

[2597] S. Bartelmaos and K. Abed-Meraim. Critères de cohérence permettant d'atténuer l'impact des erreurs de nlos sur le positionnement du mobile. In *Proc. GRETSI*, 2007.

[2598] S. Bartelmaos, K. Abed-Meraim, J. M. Chaufray, and V. Guillet. Estimation des paramètres de propagation d'un canal mimo par l'algorithme esprit-unitaire multidimentionnel. In *GRETSI 2005*, Belgique, September 2005.

[2599] B. Benmammar, C. Lévy-Leduc, and F. Roueff. Algorithme de détection d'attaques de type syn flooding. In *Gretsi*, Troyes France, September 2007.

[2999] M. Campedel and E. Moulines. Méthodologie de sélection de caractéristiques pour la classification d'images satellitaires. In *CAP05*, pages 107–108, Nice - France, June 2005.

[2601] O. Cappé and E. Moulines. A propos de l'utilisation des méthodes de monte carlo séquentielles pour l'estimation de paramètres dans les modèles de markov cachés. In *Actes du colloque du GRETSI*, Louvain, Belgique, September 2005.

[2602] O. Cappé and C. P. Robert. Une approche monte carlo adaptative pour l'approximation de lois a posteriori avec application à l'inférence de paramètres cosmologiques. In *Colloque du GRETSI*, Troyes, France, September 2007.

[2603] J.-F. Cardoso, P. Abrial, Y. Moudden, J.-L. Starck, and J. Delabrouille. Statistiques direction-multipôle pour la séparation de composantes dans le fonds de rayonnement cosmologique. In *GRETSI*, Louvain-la-Neuve, September 2005.

[2604] N. Castaneda, M. Charbit, and E. Moulines. A Batch-Recursive Algorithm for Passive Ground Target Tracking. In *GRETSI*, Troyes, France, September 2007.

[2605] J. Dumon, W. Hachem, S. Lasaulce, P. Loubaton, and J. Najim. Quelques propriétés d'un approximant de l'information mutuelle des canaux mimo de rice bicorrélés. In *GRETSI*, Troyes, September 2007.

[2606] J.-F. Germain. Une procédure de sélection de modèle basée sur la régression logistique régularisée l1. application au passage de vitesse. In *39èmes Journées de Statistiques - SFdS*, Angers - France, June 2007.

[2607] W. Hachem, P. Loubaton, and J. Najim. "sur les fluctuations de l'information mutuelle des canaux mimo de grande dimension". In *GRETSI*, Troyes, September 2007.

[2608] Z. Harchaoui and F. Bach. Classification d'images à l'aide de noyaux sur graphes de segmentation. In *GRETSI*, Troyes, September 2007.

[2609] Z. Harchaoui and C. Lévy-Leduc. Segmentation temporelle de signaux à l'aide du lasso. In *Gretsi*, Troyes France, September 2007.

[2610] A. Ikhlef, K. Abed-Meraim, and D. le Guennec. S'eparation aveugle sous-déterminée de sources audio en utilisant la décomposition en paquet d'ondelettes. In *Proc. GRETSI*, 2007.

[2611] A. Lung-Yut-Fong, O. Cappé, C. Lévy-Leduc, and F. Roueff. Détection et localisation décentralisées d'anomalies dans le trafic internet. In *GRETSI*, Dijon, France, September 2009.

[2612] E. Moreau, F. Yvon, and O. Cappé. Appariement d'entités nommées coréférentes : combinaisons de mesures de similarité par apprentissage supervisé. In *Conférence sur le Traitement Automatique des Langues (TALN)*, Avignon, France, 2008.

[2613] T. Rebafka. An mcmc approach for estimating a fluorescence lifetime with pile-up distorsion. In *Gretsi*, Troyes, September 2007.

[2614] L. Rigouste, O. Cappé, and F. Yvon. Modèle de mélange multi-thématique pour la Fouille de Textes. In *Traitement Automatique des Langues Naturelles - Atelier DÉfi Fouille de Textes*, Dourdan, France, June 2005.

12.3.6 COM: Talks in Conferences Which Do Not Publish Proceedings

[2615] S. Bartelmaos, K. Abed-Meraim, and S. Attallah. Mobile localization using subspace tracking. In *APCC 2005*, Australie, October 2005.

[2616] J. Cornebise, E. Moulines, and J. Olsson. Adaptive refueling in particle filter algorithms. In *New directions in Monte Carlo Methods*, Fleurance, France, June 2007.

[2617] J. Cornebise, E. Moulines, and J. Olsson. Adaptive methods for sequential importance sampling. In *Opening workshop of SAMSI 2008-09 Program onSequential Monte Carlo methods*, Durham, Etats-Unis, September 2008.

[2618] J. Cornebise, E. Moulines, and J. Olsson. Adaptive methods for sequential importance sampling. In *Journées MAS de la SMAI*, Rennes, France, August 2008.

[2619] G. Fay, F. Roueff, and P. Soulier. Estimation of the long memory parameter using an infinite source poisson model applied to transmission rate measurements. In *4th Conference on Extreme Value Analysis*, Gothenburg, Sweden, August 2005.

[2620] G. Fort. Limites fluides de quelques échantillonneurs mcmc. In *Journées MAS*, Lille, France, July 2006.

[2621] G. Fort. Fluid limit for hybrid mcmc samplers. In *INFORMS Applied Probability Society*, July 2007.

[2622] G. Fort. Fluid limit-based tuning of some hybrid mcmc samplers. In *Adap'SKI*, Bormio, Italie, July 2008.

[2623] G. Fort. Stability of markov chains based on fluid limit techniques. applications to mcmc. In *Congrès SSC-SFDS*, Ottawa, Canada, July 2008.

[2624] G. Fort. Limit theorems for adaptive mcmcalgorithms. In *41eme journées de Statistiques de la SFDS*, Bordeaux, France, July 2009.

[2625] G. Fort. On adaptive stratification. In *2009 INFORMS Applied Probability Society*, July 2009.

[2626] J. Ybanez, F. Davoine, and M. Charbit. A linear estimation method for 3D pose and facial animation tracking. In *Workshop on Component Analysis Methods for Classification, Clustering, Modeling, and Estimation Problems in Computer Vision on the IEEE Conference on Computer Vision and Pattern Recognition*, Minneapolis, June 2007.

12.3.7 OS: Books and Book Chapters

[2627] O. Cappé, E. Moulines, and T. Rydén. *Inference in Hidden Markov Models*. Springer, 2005.
[2628] J.-F. Cardoso. *Vraisemblance*, pages 115–168. Hermes, Paris, France, 2007.
[2629] J. Delabrouille and J.-F. Cardoso. *Diffuse source separation in CMB observations*. Springer, Lecture Notes in Physics, 2008.
[2630] R. Douc, E. Moulines, and P. Soulier. Subgeometric ergodicity of Markov chains. In *Dependence in probability and statistics*, pages 55–64. Springer, 2006.
[2631] G. Fort, E. Moulines, and Ph. Soulier. *Elements of Markov chain theory*, pages 511–562. Springer, 2005.

12.3.8 AP: Patents, Registered Softwares

[2632] B. Benmammar, C. Lévy-Leduc, and F. Roueff. Logiciel TopRank, 2008.
[2633] T. Rebafka, F. Roueff, and A. Souloumiac. Procede d'estimation des parametres de la distribution des temps de reponse de particules d'un systeme, applique notamment aux mesures de fluorescence. (09 00524), February 2009.

Chapter 13

Image Processing and Interpretation (TII)

The Image Processing and Interpretation Group (TII) of the TSI department includes research projects dealing with images and 3D objects, and the Center of Competences in information extraction and image understanding for earth observation (CoC).

Team leader F. Schmitt (P) until October 2008[1], then I. Bloch (P).

Faculty A. Almansa (CR1 CNRS, since 10/07), E. Angelini (Assoc. P), I. Bloch (P), H. Brettel (CR1 CNRS), T. Boubekeur (Asso. P, since 11/08), M. Campedel (Assoc. P), M. Datcu (P), J. Delon (CR2 CNRS, since 10/05), Y. Gousseau (Assoc. P), S. Ladjal (Assoc. P), H. Maître (P, part time), J.-M. Nicolas (P), S. Rital (IR), M. Roux (Assoc. P), H. Sahbi (CR1 CNRS, since 10/07), F. Schmitt (P, until 10/08), T. Tanzi (P), F. Tupin (P).

Supporting permanent staff (shared with other groups): D. Asselineau, S.C. Barrière, B. Nabati.

PhD students Defended: D. Cherifi (03/05), S. Ladjal (03/05), T. Tung (06/05), F. Duguet (06/05), S. Homayouni (12/05), P. Soler (03/06), D. Girardeau-Montaut (05/06), F. Bretar (06/06), F. Rossant (10/06), C. Valade (12/06), F. Cellier (01/07), G. Peters (06/07), A. Moreno (09/07), J.-F. Goudou (10/07), L. Gueguen (10/07), J. Gerhardt (10/07), C. B. Akgul (11/07), B. Zhang (11/07), L. Bin (12/07), A. Bhattacharya (12/07), C. Millet (01/08), H. Khotanlou (02/08), T. Hurtut (03/08), I. Kyrgyzov (05/08), J. Delliere (06/08), N. Bonnier (09/08), M. Costache (09/08), A. Kermi (10/08), P. Lopez Quiroz (11/08), A. Baillard (12/08), R. El-Berbari (01/00), X. Perrotton (01/09), A. Ghaleb (02/09), M. Liénou (03/09), O. Nempont (03/09), J.-B. Bordes (04/09), H. Chaabouni (06/09).

Current: E. Aldea (10/06), C. Angeli (01/07), J. Anquez (02/06), S. Audière (10/08), J. Baussé (12/06), P. Birjandi (01/08), H. Bizot (10/08), P. Blanchart (10/08), E. Bughin (10/07), J. Caron (10/08), J. Chen (doctoral stay, 1 year), N. Chenouard (10/06), D. Craciun (10/06)), C. Deledalle (10/08), V. Duval (09/08), G. Fouquier (10/06), G. Ferraioli (doctoral stay, 1 year), B. Galerne (10/07), I. Ghorbel (11/08), D. Hadidi (11/08), G. Hochard (11/07), C. Lemen (10/05), G. Lehureau (10/06), D. Lesage (10/05), C. Mallet (09/07), M. Marim (12/07), D. Martinez (10/06), F. Mosca (10/07), T. Napoléon (10/06), G. Palma (02/07), B. Petitpas (10/08), J. Rabin (10/06), S. Redko (05/06), A. Shabou (10/07), A. Simac (10/06),

[1] Francis Schmitt received his engineering diploma from the Ecole Centrale in Lyon, France, in 1973 and in 1979 was awarded a PhD from the University of Paris VI (Pierre et Marie Curie). From 1973 up to his sudden death in October 2008 he was a member of the faculty at Télécom ParisTech (Ecole Nationale Supérieure des Télécommunications, last holding the rank of full professor in the Image and Signal Processing Department in which he headed the Image Processing Group. His main interests were in computer vision, 3D modeling, image and 3D object indexing, computational geometry, multispectral imagery and colorimetry. He authored or co-authored nearly 150 publications in these fields.

H. Soubaras (01/09), H. Sportouche (10/07), C. Vanegas (01/08), Y. Wang (doctoral stay, 1 year), N. Widynski (10/07), J. Wojak (11/07), G. Xia (09/07).

Post-docs, engineers and sabbaticals J. Atif (8 months), B. Batrancourt (6 months), D. Benboudjema (1 year), R. Berger (1 year), L. Bibin (1 year), R. Cesar (Univ. Sao Paulo, 3 months), S. Chambon (15 months), O. Colliot (4 months), E. Erdem (3 months), M. Ferecatu (1 year), G. Dardier (1 year), L. Denis (1 year), M. Gasteau (18 months), C. Hudelot (8 months), V. Israël-Jost (1 year), H. Kiyochi, R. Lepage (Univ. Montréal, 1 year), R. Pino (Univ. Merida, 4 months), N. Richard (1 year), H. Tang (6 months), A. Zureiki (1 year).

Faculty [EC, CNRS]	[12 ; 2,5]
PhD students	27,4
Post-docs, engineers and sabbaticals	3,5
Defended PhD theses	37
Defended HDR	1
Journal papers [published, in press]	[75, 11]
Papers in conference proceedings	302
Chapters and books	26
Patents and sofware	1
Grants [public, private, european] (k€)	[2705, 662, 97]

13.1 Objectives

The objective of the group is to develop methodologies and theoretical tools for image, scene and 3D object processing and interpretation. The main approach consists in solving globally complex problems, based on rigorous theoretical bases, and integrating multiple and complementary techniques, for deriving interpretations from data. Applications focus on medical imaging, aerial and satellite imaging, natural image analysis. Contributions of the group can therefore be found at theoretical level (knowledge and information representation and modeling, at various levels and in 2D as well as 3D, processing, interpretation and reasoning on spatial data), at algorithmical level (in particular to implement the developed models for large and complex data sets), and at applicative level. The group is now well recognized, in both academic, institutional and industrial domains. It has numerous collaborations with other universities, and is supported by grants and contracts. The different research activities are closely linked together, which is one of the strong features of the group.

Over the last four years, the team has benefited from the appointment of three CNRS researchers and one associate professor, strengthening research axes in indexing and mathematics for image processing and computer vision, and in computer graphics. The good reputation of the group and its visibility, in France as well as at international level, are confirmed by the number of publications, but also by the number of collaborations, mentioned below for each research axis, and by its attractiveness for CNRS candidates, post-docs and PhDs.

The scientific animation of the team includes a general seminar and several specific ones (medical imaging, compressed sensing, radar imaging, CoC seminar...). PhD candidates are invited to present their work at the end of the first year of their PhD, so as to gather comments from the whole team and initiate discussions among them, thus favoring cross-fertilization of ideas. We also pay attention to the accompanying process of the PhD theses, beside the direct scientific supervision, including a help to prepare their future.

The team is also strongly involved in teaching, both at undergraduate level and master level, at Télécom ParisTech and in partner universities. It is responsible for several master programs in image processing and its applications to medical imaging and satellite imaging, thus ensuring a strong link between teaching and research.

13.2 Main Results

The main research results obtained during the period 2006-2009 are presented below for the research areas of the TII team, both from a theoretical and methodological point of view and from an application perspective.

13.2.1 Knowledge Representation and Spatial Reasoning

Faculty I. Bloch, M. Campedel, H. Maître.

Main events RFIA 2008 (program chair) and edition of a special issue of the I3 journal, with selected papers.

Projects Collaborations: J. Atif (Univ. Antilles-Guyane), R. Cesar (Univ Sao Paulo, Brazil), C. Hudelot (ECP), J. Inglada (CNES), J. Lang (IRIT and LAMSADE), N. Milisavljecvic (RMA, Brussels), R. Pino-Perez and C. Uzcategui (Univ Los Andes, Merida, Venezuela), F. Rossant (ISEP), L. Laborelli (INA), S. Dubuisson (LIP6).

Spatial reasoning in images requires to develop tools for representing spatial information, both for objects and their spatial relations, and for reasoning on this type of information. Uncertainty and imprecision management, as well as fusion of heterogeneous information are central in our work. As the continuation of previous work, we proposed models for representing spatial relations based on fuzzy sets theory [2643, 2648, 2646]. Recently, we proposed new definitions of fuzzy connectivity, based on the notion of hyper-connectivity, and dealing properly with the fuzzy sets semantics and with continuity issues [2692]. The associated algorithms are based on tree representations, that make filtering and other processing tractable. We also addressed the modeling of complex relations such as “parallel” and “across”, again using fuzzy mathematical morphology. A new orientation of our work deals with the modeling of bipolar spatial information, in order to represent both positive and negative information. We proposed a novel approach, based on mathematical morphology on the complete lattice of bipolar fuzzy sets to represent and manipulate such information [3035].

Besides knowledge representation aspects, we addressed the reasoning component of spatial reasoning from different points of view. We developed an ontology of spatial relations, which was used to enrich a part of the FMA[2] (medical ontology) concerning brain structures. Fuzzy models of spatial relations define the semantics of ontology concepts and their representations in the spatial domain contribute to reduce the semantic gap. This provides a promising way for using the enriched ontology to guide the recognition of image structures [2677]. For each particular application, the semantics of the spatial relations (in particular the shape and parameters of the membership functions) are learned on a database of examples. Other work on ontologies, in the domain of satellite imaging, are carried out in DAFOE project (see Section 13.2.5).

These models have also been integrated in graphs representing image structures (objects and spatial relations between them). Reasoning schemes in these graphs have been designed, in order to find optimal paths providing an ordered sequence of objects to be recognized, each object being processed based on the previously processed objects in the sequence and on spatial relations with respect to them. The optimality is defined in terms of spatial relations and saliency computed from the actual data [2848]. As a novel contribution, we also integrated these models in constraint networks, and expressed the recognition process as a constraint satisfaction problem,

[2] http://sig.biostr.washington.edu/projects/fm/

for which we derived specific propagators for each spatial relation in order to reduce the domains of the solutions [2921]. Finally, fuzzy spatial relations are integrated in particle filters for tracking objects in video sequences (collaboration with the LIP6). This new contribution shows a better behavior than classical particle filters in case of abrupt changes in the trajectory.

Our work on fuzzy mathematical morphology has led to the development of new transformations, for defining fuzzy influence zones and skeleton by influence zones, with applications to interpolation between fuzzy sets [2645]. These transformations have also been developed in a logical framework (in collaboration with R. Pino-Perez, C. Uzcategui and J. Lang), with applications to mediation and negotiations [2771].

Finally, our work on information fusion deals with fusion of spatial relations, fusion of defect detectors for digital film restoration (with INA) [2700] and fusion of fuzzy musical rules, which led to higher recognition rates in various musical scores than commercial softwares (with ISEP) [2699]. We also have a long collaboration with the RMA in Brussels for fusion in the domain of anti-personnel mine detection for which we proposed original methods based on belief functions and possibility theory [2686].

13.2.2 Machine Learning and Image Retrieval

Faculty The whole group is involved in this research axis.

Projects Infom@gic in pôle CapDigital, ANR 2006 AVEIR and DAFOE projects, European project K-Space. Collaborationss with J.-Y. Audibert and R. Keriven (Ponts ParisTech).

In 2006-2007, a new research direction, spreading across various themes in the TSI department, has emerged. In the TII group, it concerns indexing of multimedia documents. By indexing, we mean the analysis of images or documents contents, in order to facilitate their massive exploration. Indexing is strongly linked to the mining operation an end-user may need. Research in this domain benefits from methodological advanced developments (modeling, adaptive learning depending on the type of images), in strong connection with STA team, and from a better knowledge management and exploitation (fuzzy reasoning, visual or domain ontologies). Indexing of 3D models was also studied, based on either 2D views or purely 3D information, using kernel approaches for estimating joint density distributions [2635, 2636], and using Reeb graphs [2703]. For 3D object recognition in biological vision, we found that view-specific *and* 3D-model based representations are used by human observers [3046, 2695]. Finally, mining strategies for large image databases are developed, based on relevance feedback.

Spatial relations have been exploited in this context for recognizing regions of an image and providing a linguistic description of its content (with CEA-LIST). Classification and image mining are also addressed using marginalized graph kernels, and have contributed to the Infom@gic project.

A software platform, PLATO, is being developed with the aim of organizing, centralizing and handling multimedia data (images, sounds, videos, but also processing tools and processing results), in collaboration with AAO team.

The goal of the UrbanView project (partners LIP6, EADS, THALES, etc.) is to design machine learning techniques for multi-camera object (car, person,...) tracking, retrieval and traffic surveillance. Two different scenarios were considered, synchronous and asynchronous, depending on the fact that objects and tracks are matched using overlapping or non overlapping cameras. In this work, we introduced a framework for multi-view object matching and tracking based on kernel canonical correlation analysis. Our method is purely statistical and encodes intrinsic object appearances while being view-point invariant.

Further collaborations, mainly with Ponts ParisTech, include kernel design for object-based image retrieval. The goal is to incorporate many properties (invariance, context, etc.) in order to achieve object matching and retrieval. Theoretical properties, about the positive definiteness of these kernels and their convergence to a fixed point, were proved together with experiment validation on widely used databases including Corel and Flickr [2947].

3D retrieval has recently emerged as an important boost for 2D search techniques, by its several complementary aspects, for instance, enriching views in 2D image datasets, overcoming occlusion and serving in many real world applications such as photography, art, archeology and geo-localization. In this work, we introduced a complete "2D photography to 3D object" retrieval framework which, given a (collection of) picture(s) or sketch(es) of the same scene or object, allows us to retrieve the underlying similar objects in a database of 3D models. The contributions of the method include (i) a generative approach for alignment which is able to find canonical views consistently through scenes/objects and (ii) the application of an efficient but effective matching method used for ranking. The results are reported through the SHREC benchmarking consortium and evaluated/compared by a third-party, showing clearly the good performance of the proposed framework with respect to the other participants [2917].

The AVEIR ANR project is about combined text and image retrieval joining LIP6, LSIS and LIG; its goal is to design machine learning techniques in order to learn the relationships between text and images and perform inference (i.e., image annotation). The members of the consortium are actively collaborating and participating in different evaluations and challenges including ImageClef 2008 and 2009; they submitted a common run ranked 2nd among 25 international experienced teams working on the same topic.

Another research topic is to use manifold learning techniques (graph Laplacian and diffusion maps) for relevance feedback based image retrieval. A new graph Laplacian technique was introduced which makes it possible to robustly learn the embedding of a manifold enclosing an image database, via diffusion map [2949, 2944]. The approach is three folds, it allows us (i) to integrate all the unlabeled images in the decision process (ii) to robustly capture the topology of the image set and (iii) to perform the search process inside the manifold. This technique shows a clear and a consistent gain with respect to state of the art relevance feedback approaches on standard databases. The graph Laplacian technique was also used for dimensionality reduction and applied to large scale image database "visualization".

Finally, we recently addressed the problem of image queries in large databases from user sketches (binary strokes). We proposed a new descriptor [2838] for fast large scale search and integrated the so-defined search engine within a variational image compositing tool [2839].

In this part of our activities, a core feature concerns kernel-based statistical methods which allow taking into account invariance and contextual properties for object matching and recognition in images and video sequences. The main goal is to integrate additional information about geometry, textual relations and invariance properties in the kernel definition. Theoretical properties of kernels have then to be proved in order to use them for machine learning and dimensionality reduction. Taking into account the transductive aspect is important, via the introduction of prior information in a weakly supervised manner and will lead to increased performances in recognition and interpretation tasks. Multiple applications can be anticipated, such as scene recognition, interactive search and navigation in multimedia generic and specific databases, within ongoing projects such as ANR AVEIR.

13.2.3 2D and 3D Mathematical Modeling

Faculty A. Almansa, T. Boubekeur, J. Delon, Y. Gousseau, S. Ladjal, H. Maître, F. Roueff, F. Schmitt.

Projects European project MUSCLE, ANR Otarie, ANR Freedom, ANR CeCil, ANR NatSim. Collaborations with L. Alvarez (U. Gran Canaria, Spain), J.-F. Aujol (ENS-Cachan), J.-M. Morel (ENS-Cachan), L. Vese (UCLA), V. Caselles (UPF, Barcelona), S. Durand (U. Paris Descartes), M. Lindenbaum (Technion, Israël), P. Musé (U. de la República, Uruguay), A. Sobolevskii (Poncelet Lab., Moscou), T. Buades and A. Desolneux (U. Paris Descartes), S. Masnou (Paris 6), Mila Nikolova (ENS-Cachan), I. Lyuboshenko (PhaseView), M. Alexa (CG Lab, TU Berlin).

Main events International Color Consortium (ICC), digital printing days (March 2009).

Tetxure and Natural Images Modeling This research theme deals with the stochastic modeling of natural images. First, generative models taking into account scaling phenomena in natural images have been developed. These models (dead leaves, shot-noise, transparent models) are grounded in the theory of marked point processes, whose marks are geometrical structures [2651]. In particular, we have shown that some models enable the simultaneous representation of geometry and scaling properties in natural images [2673]. More recently, we applied such models to image and texture synthesis. A second research direction is concerned with the mathematical analysis of variational methods for image restoration, and in particular the influence of such methods on the geometry and textures within images. In particular, we have shown that the popular TV-L1 model is equivalent to some morphological filtering [3061]. Another contribution is concerned with the variational decomposition of color images.

Mathematical Methods for Image Analysis and Computer Vision These last years, we have developed or applied various mathematical tools for the analysis indexing or matching of images. Among these tools, let us first mention optimal transportation equations. These equations enable the definition of metrics between weighted features and yield elegant ways to compare images. Another methodological aspect of our researches deals with *a contrario* methods, developed by Desolneux et al. to automatically fix detection thresholds for image analysis. In particular, we applied these methods to the problem of image matching. Among the other tools that we have investigated and applied, let us mention topographic maps, scale spaces, and deformable models.

We first proposed solutions to the decision problem for shape matching [2690]. We also have developed a complete chain for the matching of images from local descriptors (such as SIFTs). This procedure encompasses the descriptors themselves, a transportation metric adapted to circular histograms to compare them, an unsupervised matching criterion and a validation, RANSAC-like step [3070, 2936, 2937]. Another research direction concerns the indexing of satellite images, invariant to resolution changes [2685, 2684] or relying on morphological tools [2683]. More recently, we have proposed an original method for the indexing of texture, respecting a wide range of geometrical and radiometric changes [3073]. This method can be seen as an extension of the classical granulometry from mathematical morphology. We also took interest in the indexing and matching of museal artworks, first through the unsupervised comparison of the color composition of images [2678], and then through the automatic analysis of artistic hand drawings [2873]. In the domain of artwork, original contributions on multispectral imaging have been developed for high quality image acquision [2696]. A mathematical framework for spatial and color gamut mapping has also been proposed, leading to adpative algorithms with real applications for color printing [2898, 2775, 3058]. In the domain of aerial image matching, we have shown under which conditions a matching is licit, with a precision of a tenth of a pixel. This enables one to develop stereoscopic vision systems with very small b/h [3042, 2662, 2941].

Restoration of Old Movies As part of a research project (FREEDOM JCJC ANR project), we have proposed several contributions in the field of movie and videos restoration, in collaboration with researchers from the CMLA (ENS Cachan) and J-L Lions Lab (Paris 6 University). In these contributions, various tools have been used (statistical tests, variationnal approaches, copy-paste methods, patch-based methods, Fourier analysis) and both theoretical and applied points have been tackled, as for instance: the automatic combination of patch-based methods and geometrical interpolation for image inpainting [3060]; the variational interpretation of copy-paste methods [3065]; the automatic detection of occulting defects (dust, scratches) and the restoration of local radiometric problems [2659], for which it has been shown that a precise motion estimation was not necessary, etc. Some of the algorithms developed by the team should soon be made available as plugins for standard movie processing softwares.

At the same time, we also took interest in superresolution and irregular sampling problems. A first direction deals with subspace methods. We continue researches previously developed several years ago at the TSI department and include regularity constraints to circumvent the intricate

problem of source separation in the image superresolution context [2851]. A second direction uses total variation for restoration and superresolution in the case of irregular sampling [2667].

Finally, our work on phase reconstruction for optical waves was pursued, for incoherent cameras and several axial views (in collaboration with PhaseView and I. Lyuboshenko).

3D Computer Graphics The group has a long history in 3D image and object acquisition, modeling, processing and interpretation. A new focus of our research activities concerns computer graphics, with the arrival in fall 2008 of Tamy Boubekeur. We have mainly focused on efficient and scalable methods for geometric modeling and realtime rendering.

We have introduced *TopStoc* [2652], a fast mesh simplification algorithm. The two main components are stochastic vertex selection and re-indexing of triangles. The probability for vertex selection depends on a local feature estimator, which prefers areas of high curvatures but still ensures sufficient sampling in flat parts. Re-indexing the triangles is done by breadth-first traversal starting from the selected vertices and then identifying triangles incident upon three regions. Both steps are linear in the number of triangles, require minimal data, and are very fast, while still preserving geometrical and topological features. Additional optional processing steps improve sampling properties and/or guarantee homotopy equivalence with the input. These properties provide an alternative to vertex clustering especially for CAD/CAM models in the areas of previewing or network graphics.

Ambient occlusion captures a subset of global illumination effects, by computing for each point of the surface the amount of incoming light from all directions and considering potential occlusion by neighboring geometry. We have introduced an approach to ambient occlusion [2938] combining object and image space techniques in a deferred shading context. It is composed of three key steps: an on-the-fly voxelization of the scene, an occlusion sampling based on this voxelization and a bilateral filtering of this sampling in screen space. The result are smoothly varying ambient terms in occluded areas at interactive frame rates without any pre-computation. In particular, all computations are performed dynamically on the GPU while eliminating the problem of screen-space methods, namely ignoring geometry that is not rasterized into the Z-buffer.

As for perspectives, scalable geometric optimizations such as our simplification algorithm, offer a nice framework for large scale problems involved in *Cloud Visual Computing*. We will study deeper how such methods can be used in a realtime context, to allow high resolution dynamic geometries with all-frequencies content in interactive applications. On the other side of the computer graphics pipeline, we have built our ambient occlusion algorithm on an hybrid object-image space basis. This opens a way toward a more general hybrid rendering engine capable of achieving complex illumination effects such as color bleeding, subsurface scattering or even global indirect reflections, while using volumetric representations as a medium between object and image spaces. This also emphasizes the current convergence between computer graphics (object space) and computer vision (image space) methods.

13.2.4 Medical Imaging

Staff E. Angelini, I. Bloch, T. Boubekeur, J. Delon.

Main events IEEE ISBI 2008 (program chair, finance chair, organization).

Projects collaborations within ANR MARIO, INCA, Fondation Santé et Radiofréquences FEMONUM, GET, MINIARA (pôle de compétitivité MEDICEN) projects, J. Rolland and A. Santhanam (Univ. South Florida), A. Laine (Univ. Columbia, NY), J. Darbon (UCLA), Y. Petegnief, D. Hasboun and H. Duffau (CHU Pitié-Salpêtrière), IFR 49, E. Mandonnet (CHU Lariboisière), B. Devaux (Ste Anne hospital), C. Adamsbaum (Hôpital Saint Vincent de Paul), E. Mousseaux (HEGP), M. Paques and S. Tick (XV-XX Hospital), C. Prunier (CHU Tours), A. Herment and F. Frouin (INSERM, LIF), A. Osorio (LIMSI), M. Teichmann (INSERM), P. Moireau and D. Chapelle (INRIA/MACS), Jean-Christophe Olivo-Marin (Institut Pasteur), F. Rossant (ISEP), O. Gérard (Philips, GE), S. Muller (General Electric), J.F. Stevenet and S.

Hammer (Segami), J. Wiart (FT R&D), Gareth Funka-Lea (Siemens), H. Kafrouni, C. Diaz, and A. Guimond (Dosisoft), R. Ferrand (CPO), Volcano, Fovéa, V. Miette et L. Sandrin (Echosens).

In order to address difficult problems in medical imaging related to the huge size of the data, the complexity of knowledge and information to be processed, the inter-individual variability and the potential presence of pathology, we develop approaches in which knowledge representation plays a central role. Our research focuses mainly on segmentation, recognition and longitudinal analysis of pathological images, in particular for oncology and tumoral pathologies. While the analysis of normal images for several years has led to a very good understanding of the image content in several imaging modalities, the extension to pathological case is difficult and methods relying only on shape and appearance often reach their limits. Our proposal for modeling anatomical knowledge is to make an intensive use of spatial relations (see Section 13.2.1), formalized using fuzzy mathematical morphology, ontologies and graph-based representations. Their integration in deformable models and the analysis of their stability among individuals and in case of pathologies led to robust and accurate segmentation and recognition results [2657, 2689].

Detection of tumors in MRI data has been addressed using a combination of fuzzy methods and deformable models, and was evaluated on a large data base [2679]. Recognition of the normal structures could then be addressed using the same method as for normal cases, since most spatial relations remain stable in pathological cases. We introduced more flexibility in the spatial constraints, for the relations that are prone to strong changes due to the presence of the tumors [2748]. Another approach for the segmentation of multi-modal images has been proposed, based on an extension of the multi-phase level sets model to the multi-channel case. As for the longitudinal follow-up of tumors, a new method for normalizing MRI images and a statistical analysis of difference maps have been developed, which allow designing a framework for automatic quantification of tumoral growth.

All these results have been incorporated in a graph representing both generic knowledge and information extracted from images, with the aim of enriching digital patient records [2694]. The graph representation is also exploited in a web application dedicated to medical teaching, developed in collaboration with D. Hasboun.

Our work on pathologies does not only focus on brain imaging. In thoracic oncology, we have improved our previous non-linear registration methods with a new formalism for constraining the deformations of the pathologies during the registration, while preserving a continuous deformation field (project with Segami) [2653]. Moreover, a breathing model developed at the University of Central Florida was integrated in the registration, thus guaranteeing physiological consistent deformations [2688]. A new project was initiated with Dosisoft (within the "Pôle de compétitivité" MEDICEN) on the segmentation of CT and PET images for radiotherapy applications.

In mammography, our collaboration with General Electric has led to one of the first methods for micro-calcification and mass detection on data obtained with new 3D digital mammography techniques. Recently, new methods for denoising such images and for detecting convergence areas using an a contrario method have been proposed.

In the context of a collaboration with Columbia University (New York, USA), several projects were carried out focusing on the processing of 3D real-time ultrasound data for the characterization of cardiac function (one NIH project, collaborations with Philips Healthcare and Siemens). Dedicated speckle-tracking algorithms and real-time deformable models formulated with active graph functions [2833], in prolate spheroidal coordinates, have lead to novel methods for extraction of myocardial surfaces and tracking of myocardial points. Extensive clinical studies on dog experiments [2836] have been performed to precisely assess the accuracy of local myocardial deformation quantification on ultrasound data. In addition, we also have an on-going collaboration with INSERM LIF group, focusing on the segmentation and quantification of cine and delayed-enhancement MR images, leading to quantitative results on myocardial infarct transmurality and on the estimation of regional mean transition times and radial velocities [2666]. In vascular imaging, a collaboration with Siemens Corporate Research (Princeton, USA) led to the development of several novel methods for the tracking and segmentation of coronaries in high

resolution CT images, using morphological image filtering and tracking with minimal paths and particle filters. Very accurate results have been obtained on an publicly available data base. A collaborative project with Columbia University and Volcano had focused on the exploitation of multiscale texture-based brushlet analysis for the decomposition of intra-vascular ultrasound (IVUS) data and the extraction of coronary arteries lumen borders.

Regarding the modeling of the human body, which concerned mainly adult and children head until now [2707], a new direction was taken and focuses on fetus modeling, based on MRI and US data (in collaboration with Saint Vincent de Paul Hospital and France Telecom R&D). A variational segmentation method has been developed for 3D US data, taking into account the statistical distributions of maternal and fetal tissues. In MRI, the segmentation is based on anatomical knowledge, driving a graph-cut segmentation. Meshed models are then derived from the segmentation using recent geometry processing methods derived from mesh-based computer graphics techniques and embedded in a synthetic woman body. Preliminary results on dosimetry simulations show that the local and the whole body specific absorption rates are lower in the fetus than in the mother and that they depend on position and morphology but not on gestational age. A common lab with France Telecom R&D (Orange Labs) is currently being launched on this topic.

Recently, a collaboration with ISEP and the XV-XX Hospital was initiated on the analysis of OCT and adaptive optics images of the retina, which led to the development of an automated method for segmenting all layers of the retina. The proposed method was a basis for a preliminary quantitative study of variation of the morphology of foveal and perifoveal layers within a population of healthy subjects.

Finally, a new research axis has been initiated recently, in collaboration with Institut Pasteur, on biological imaging, for tracking and compressed sensing applications. Original multiple hypotheses tracking methods have been proposed, by joint estimation of kinetic and image models [2809, 2806], and CS-based denoising and acquisition protocols have been designed for improved image quality with reduced acquisition times, in the context of fluorescence imaging [2903].

13.2.5 CoC

Faculty M. Campedel, M. Datcu, H. Maître, S. Rital, M. Roux, T. Tanzi.

Main events Organization of the 2nd Scientific Meeting of the Health and Radiofrequencies Foundation. 20-21 October 2009, at Telecom ParisTech, Paris (T. Tanzi).

The joint CNES-DLR-Télécom ParisTech competence center (CoC) was created in June 2005. Its research activities focus on information extraction and image content understanding, for both satellite and optical images (Télécom ParisTech), and SAR images (DLR). It regularly involves about five permanent researchers and 10 PhD candidates. Both theoretical [2684, 2685, 2674] and applied researches are carried out and deal with image indexing and their usage. The images are characterized by their large size, with an important semantical variety of scenes, and their huge number (the Pleiade satellites will send 450 images per day with a 70cm/pixel resolution in 2010!). It becomes urgent to develop (semi)-automatic methods for rapidly accessing the contents of these images. Our current research directions allow us to describe the image content in terms of colorimetry, geometry, texture, and semantics, by using learning methods or pattern detection from which semantical objects are derived (river or road networks, buildings). The learning can be performed either interactively and adapted to the user (photo-interpreter) using relevance feedback, or using statistical inference methods. Finally, the CoC is involved in close collaborations with EADS and Thalès, within the Infom@gic project, and with INSERM and Mondeca within the ANR DAFOE project. The latter aims at developing better knowledge representations (ontologies) for satellite images and their applications to allow reasoning on these representations, using in particular the approaches described in Section 13.2.1. The objective is to benefit from both the “bottom-up” learning approach and the “top-down” expert reasoning one, with applications to interactive satellite image annotation.

A new research axis concerns risk assessment and management [3055, 3056], promoting the excellence of the research accomplished in the group by applying it to the management of disasters [3021]. These works concern the mapping of damages caused by disaster. The EXITER project was accomplished in collaboration with CNES as part of the international charter of risks [3064]. The EXITER project relies on the experience of the group in image analysis, knowledge extraction, classification and spatial reasoning.

13.2.6 Aerial and Satellite Imaging

Faculty A. Almansa, J.-M. Nicolas, M. Roux, F. Tupin.

Main events Organization of the 2007 Urban Remote Sensing Joint Event (F. Tupin and M. Roux).

Projects ANR MEGATOR (2004-2007), ANR EFIDIR (2008-2012), collaborations with CNES, DLR, ONERA, DGA, CEA, EADS, Thales, Magellium, M.-P. Doin and P. Briole (ENS), J. Darbon (UCLA), L. Denis (CPE Lyon), C. Tison (CNES), P. Gamba (University of Pavie), V. Pascazio and G. Ferraioli (University of Naples), D. Riccio (Naples, Galileo project), P. Refrégier and F. Galland (Institut Fresnel), E. Trouvé (University of Savoie), M. Gay (GIPSA-Lab), L. Moreau (EDYTEM), B. Fruneau and J.P. Rudant (UMLV), W. Pieczinsky (Telecom Sud Paris), C.Sintes (Telecom Bretagne).

In aerial imaging, we extended our previous work to the processing of 3D point sets, acquired using laser techniques. Our contributions concern the soft non-parametric registration between such data and a numerical surface model obtained from photogrammetric images, in order to compensate for attitude movements of the sensor. Another contribution deals with change detection between two point sets or a point set and a polygonal model. These works are now integrated within the TerraNumerica project (CapDigital), which aims at modeling complete urban scenes via the fusion of aerial images and data acquired at ground level. Moreover, detection of objects in aerial and satellite images is addressed using learning methods based on Adaboost. Missing learning data were successfully compensated by generating examples through image synthesis. This work is carried out in collaboration with EADS.

Concerning Synthetic Aperture Radar imagery (SAR imagery), three main axes are developed. The first one is concerned with differential interferometry and ground movement monitoring, the second one deals with high resolution SAR imagery and optical and radar data fusion, and the third one with SAR data regularization.

In SAR differential interferometry, our works focus on two applicative and methodological fields. The first axis deals with subsidence study in Mexico in collaboration with the geology laboratory of ENS [2682]. The second axis is the glacier monitoring in the framework of MEGATOR project (ANR 2004-2007), which has lead to the development of a new SAR processor (SYTER) which is well adapted to high mountains [2693]. These two axes are now fused in a new project which started in 2008 for 4 years: EFIDIR (ANR MDCO). This project groups together 7 teams with methodologists and thematicians. All space agencies will provide SAR data in the framework of this project, specially of Argentiere glacier.

High resolution SAR imagery and the fusion of SAR and optical data is an important research axis, with increased interest due to the recent launch of metric SAR sensors in 2007 and 2008. A methodology of automatic registration has been developed, as well as a joint classification with SVM. In the frame of a CIFRE PhD with Thales, a processing chain for the detection of building and estimation of their height has been proposed. Interferometric aspects and 3D reconstruction have been studied in collaboration with ONERA and in a CNES project, and polarimetric aspects during the doctoral stay of Y. Wang (2008). The developments on SAR statistics and specially the Fisher distributions have been integrated in the active grid developed by Fresnel Institut [2670]. SAR urban areas have also been studied through a simulator of wave propagation.

The last axis deals with SAR data regularization. It is a recent research axis based on the development of two families of approaches: Markovian methods coupled with graph-cut optimization and non-local means. General contributions have been brought: first a fast graph-cut based algorithm for optimization of vectorial data have been developed [2664]; secondly, a probabilitic patch-based method has been proposed, which is able to deal with any kind of noise. These works have been applied to the regularization of amplitude data and interferometric data [2663], specially in the frame of a CNES project and a collaboration of Naples University [2669].

Other specific themes of SAR imagery have been developed. On change detection a collaboration has started with CEA in 2008. In the frame of a collaboration with Télécom Sud Paris in 2007, a classification coupling Fisher distributions and triplet Markov fields has been proposed. Improvements of previous works on road detection have been done in the frame of a collaboration with University of Pavie [2691] [2681]. A PhD on SAR data compression in relation with DGA has been led. Micro-Doppler have also been studied in a collaboration with ONERA [2672].

In general, the team has developed an expertise on TerraSAR-X data through its participation to different projects, and specially on urban area processing [2671]. Moreover, its competence in coherent imagery (in particular on temporal approach [3069]) is used for sonar imagery (project with Telecom Bretagne) and in ultrasound imagery (PhD with SuperSonic Imagine).

13.3 References

13.3.1 ACL: Articles in ISI-Indexed Journals

[2634] R. Abdelfattah and J. M. Nicolas. Interferometric SAR coherence magnitude estimation using second kind statistics. *IEEE Transactions on Geoscience and Remote Sensing*, 44(7 part 2):1942– 1953, July 2006.

[2635] C. B. Akgul, B. Sankur, Y. Yemez, and F. Schmitt. Density-based 3d shape descriptors. *JASP - EURASIP Journal on Applied Signal Processing*, 2007(Article ID 32503):1–16, 2007.

[2636] C. B. Akgül, B. Sankur, Y. Yemez, and F. Schmitt. 3d model retrieval using probability density-based shape descriptors. *IEEE Pattern Analysis and Machine Intelligence*, 31(6):1117–1133, June 2009.

[2637] E. Angelini, T. Song, B. Mensh, and A. Laine. Brain MRI segmentation with multiphase minimal partitioning: A comparative study. *International Journal of Biomedical Imaging*, 2007.

[2638] E. D. Angelini, O. Clatz, E. Mandonnet, E. Konukoglu, L. Capelle, and H. Duffau. Glioma dynamics and computational models: A review of segmentation, registration and in silico growth algorithms and their clinical validations. *Current Medical Imaging Review*, 3(4):262–276, March 2007.

[2639] E. D. Angelini, S. Homma, G. Pearson, J. W. Holmes, and A. F. Laine. Segmentation of real-time three-dimensional ultrasound for quantification of ventricular function: a clinical study on right and left ventricles. *Ultrasound in Medicine and Biology*, 31(9):1143–1158, September 2005.

[2640] A. Bhattacharya, M. Roux, M. Maître, I. Jermyn, X. Descombes, and J. Zerubia. Computing Statistics from Man-Made Structures on the Earth's Surface for Indexing Satellite Images. *International Journal of Simulation Modelling*, 6(2):73–83, June 2007.

[2641] L. Bibin, J. Anquez, E. D. Angelini, and I. Bloch. Hybrid 3D modeling of mother and fetus from medical imaging for dosimetry studies. *International Journal of Computer Assisted Radiology and Surgery*, 2009.

[2642] I. Bloch. Fuzzy Spatial Relationships for Image Processing and Interpretation: A Review. *Image and Vision Computing*, 23(2):89–110, February 2005.

[2643] I. Bloch. Spatial Reasoning under Imprecision using Fuzzy Set Theory, Formal Logics and Mathematical Morphology. *International Journal of Approximate Reasoning*, 41(2):77–95, February 2006.

[2644] I. Bloch. Defining Belief Functions using Mathematical Morphology – Application to Image Fusion under Imprecision. *International Journal of Approximate Reasoning*, 48:437–465, 2008.

[2645] I. Bloch. Fuzzy Skeleton by Influence Zones - Application to Interpolation between Fuzzy Sets. *Fuzzy Sets and Systems*, 159:1973–1990, 2008.

[2646] I. Bloch. Duality vs. Adjunction for Fuzzy Mathematical Morphology and General Form of Fuzzy Erosions and Dilations. *Fuzzy Sets and Systems*, 160:1858–1867, 2009.

[2647] I. Bloch, O. Colliot, O. Camara, and T. Géraud. Fusion of Spatial Relationships for Guiding Recognition. Example of Brain Structure Recognition in 3D MRI. *Pattern Recognition Letters*, 26(4):449–457, March 2005.

[2648] I. Bloch, O. Colliot, and R. Cesar. On the Ternary Spatial Relation Between. *IEEE Transactions on Systems, Man, and Cybernetics SMC-B*, 36(2):312–327, April 2006.

[2649] I. Bloch, N. Milisavljevic, and M. Acheroy. Multisensor Data Fusion for Spaceborne and Airborne Reduction of Mine Suspected Areas. *International Journal of Advanced Robotics Systems*, 4(2):173–186, June 2007.

[2650] I. Bloch, J. Pescatore, and L. Garnero. A New Characterization of Simple Elements in a Tetrahedral Mesh. *Graphical Models*, 67(4):260–284, July 2005.

[2651] C. Bordenave, Y. Gousseau, and F. Roueff. The dead leaves model: an example of a general tessellation. *Advances in Applied Probability*, 38(1):31–46, March 2006.

[2652] T. Boubekeur and M. Alexa. Mesh simplification by stochastic sampling and topological clustering. *Computer and Graphics - Special Issue on IEEE Shape Modeling International 2009*, 33(3):241–249, 2009.
[2653] O. Camara, G. Delso, O. Colliot, A. Moreno, and I. Bloch. Explicit Incorporation of Prior Anatomical Information into a Non-Rigid Registration of Thoracic and Abdominal CT and 18-FDG Whole-Body Emission PET Images. *IEEE Transactions on Medical Imaging*, 26(2):164–178, February 2007.
[2654] F. Cao, J. Delon, A. Desolneux, P. Muse, and F. Sur. A unified framework for detecting groups and application to shape recognition. *Journal of Mathematical Imaging and Vision*, 27(2):91–200, February 2007.
[2655] R. Cesar, E. Bengoetxea, I. Bloch, and P. Larrañaga. Inexact graph matching for model-based recognition: Evaluation and comparison of optimization algorithms. *Pattern Recognition*, 38(11):2099–2113, November 2005.
[2656] F. Chaabane, A. Avallone, F. Tupin, P. Briole, and H. Maître. Multitemporal correction of tropospheric effects in differential sar interferometry. *IEEE Transactions on Geoscience and Remote Sensing*, 45(6):1605–1615, June 2007.
[2657] O. Colliot, O. Camara, and I. Bloch. Integration of Fuzzy Spatial Relations in Deformable Models - Application to Brain MRI Segmentation. *Pattern Recognition*, 39(8):1401–1414, August 2006.
[2658] R. Dehak, I. Bloch, and H. Maître. Spatial Reasoning with Incomplete Information about Relative Positioning. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 27(9):1473–1484, September 2005.
[2659] J. Delon. Movie and video scale-time equalization ; application to flicker reduction. *IEEE Transactions on Image Processing*, 15(1):241–248, January 2006.
[2660] J. Delon, A. Desolneux, J.-L. Lisani, and A.-B. Petro. Automatic color palette. *Inverse Problems and Imaging (IPI)*, 1(2):265–287, May 2007.
[2661] J. Delon, A. Desolneux, J.-L. Lisani, and A.-B. Petro. A non parametric approach for histogram segmentation. *IEEE Transactions on Image Processing*, 16(1):253–261, January 2007.
[2662] J. Delon and B. Rougé. Small baseline stereovision. *Journal of Mathematical Imaging and Vision*, 28(3):209–223, July 2007.
[2663] L. Denis, F. Tupin, J. Darbon, and M. Sigelle. Joint Regularization of Phase and Amplitude of InSAR Data: Application to 3D reconstruction. *IEEE Transactions on Geoscience and Remote Sensing*, 2009.
[2664] L. Denis, F. Tupin, J. Darbon, and M. Sigelle. SAR Image Regularization with Fast Approximate Discrete Minimization. *IEEE Transactions on Image Processing*, 18(7):1588–1600, 2009.
[2665] Q. Duan, E. D. Angelini, S. L. Herz, C. M. Ingrassia, K. D. Costa, J. W. Holmes, S. Homma, and A. F. Laine. Region-based endocardium tracking on real-time three-dimensional ultrasound. *Ultrasound in Medicine and Biology*, 35(2):256–265, February 2009.
[2666] R. El-Berbari, N. Kachenoura, A. Redheuil, A. Giron, E. Mousseaux, A. Herment, I. Bloch, and F. Frouin. An automated estimation of regional mean transition times and radial velocities from cine magnetic resonance images. evaluation in normal subjects. *Journal of Magnetic Resonance Imaging*, 30:236–242, 2009.
[2667] G. Facciolo, A. Almansa, J. F. Aujol, and V. Caselles. Irregular to regular sampling, denoising and deconvolution. *SIAM Multiscale Modelling and Simulation*, 2008.
[2668] M. Ferecatu and D. Geman. A statistical framework for image category search from a mental picture. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 31(6):1087–1101, June 2009.
[2669] G. Ferraioli, A. Shabou, F. Tupin, and V. Pascazio. Multichannel phase unwrapping with graph-cuts. *Geoscience and Remote Sensing Letters*, May 2009.
[2670] F. Galland, J. M. Nicolas, H. Sportouche, M. Roche, F. Tupin, and P. Réfrégier. Unsupervised Synthetic Aperture Radar image partitioning using Fisher distributions. *IEEE Transactions on Geoscience and Remote Sensing*, 2009.
[2671] P. Gamba, F. Tupin, and Q. Weng. Foreword to the special issue on Remote Sensing of Human Settlements: Status and Challenges. *IEEE JSTAR Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 1(2):82–86, August 2008.
[2672] A. Ghaleb, L. Vignaud, and J. M. Nicolas. Micro-doppler analysis of wheels and pedestrians in ISAR imaging. *IET Signal Processing*, 2(3):301–311, September 2008.
[2673] Y. Gousseau and F. Roueff. Modeling occlusion and scaling in natural images. *SIAM Multiscale Modeling and Simulation*, 6(1):105–134, 2007.
[2674] L. Gueguen and M. Datcu. Image time-series data mining based on the information-bottleneck principle. *IEEE Transactions on Geoscience and Remote Sensing*, 45(4), April 2007.
[2675] P. Heas and M. Datcu. Modelling trajectory of dynamic clusters in image time-series for spatio-temporal reasoning. *IEEE Transactions on Geoscience and Remote Sensing*, 43(7):1635– 1647, November 2005.
[2676] C. Hernandez, F. Schmitt, and R. Cippola. Silhouette coherence for camera calibration under circular motion. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 29(2):343–349, February 2007.
[2677] C. Hudelot, J. Atif, and I. Bloch. Fuzzy Spatial Relation Ontology for Image Interpretation. *Fuzzy Sets and Systems*, 159:1929–1951, 2008.
[2678] T. Hurtut, Y. Gousseau, and F. Schmitt. Adaptive image retrieval based on the spatial organization of colors. *Computer Vision and Image Understanding CVIU*, 112(2):101–113, 2008.
[2679] H. Khotanlou, O. Colliot, J. Atif, and I. Bloch. 3D Brain Tumor Segmentation in MRI Using Fuzzy Classification, Symmetry Analysis and Spatially Constrained Deformable Models. *Fuzzy Sets and Systems*, 160:1457–1473, 2009.
[2680] M. Lienou, M. Datcu, and H. Maître. Semantic annotation of satellite images using latent dirichlet allocation. *IEEE trans on Geosciences & Remote Sensing*, May 2009.
[2681] G. Lisini, C. Tison, F. Tupin, and P. Gamba. Feature fusion to improve road network extraction in high-resolution SAR images. *IEEE Geoscience and Remote Sensing Letters*, 3(2):217–221, April 2006.

[2682] P. Lopez Quiroz, M. P. Doin, F. Tupin, P. Briole, and J. M. Nicolas. Time series analysis of Mexico city subsidence constrained by radar interferometry. *Journal of Applied Geophysics*, 2009.
[2683] B. Luo, J. F. Aujol, and Y. Gousseau. Local scale measure from the topographic map and application to remote sensing images. *SIAM Multiscale Modeling and Simulation*, 2009.
[2684] B. Luo, J. F. Aujol, Y. Gousseau, and S. Ladjal. Indexing of Satellite Images with Different Resolutions by Wavelet Features. *IEEE Transactions on Image Processing*, 17(8):1465–1472, August 2008.
[2685] B. Luo, J. F. Aujol, Y. Gousseau, S. Ladjal, and H. Maître. Resolution- independent characteristic scale dedicated to satellite images. *IEEE Trans. on Image Processing*, 16(10):2503–2514, October 2007.
[2686] N. Milisavljevic and I. Bloch. Possibilistic vs. Belief Function Fusion for Anti-Personnel Mine Detection. *IEEE Transactions on Geoscience and Remote Sensing*, 46(5):1488–1498, May 2008.
[2687] Ch. Millet, I. Bloch, P. Hède, and P. A. Moellic. Automatic cleaning and segmentation of web images based on colors to build learning databases. *Image and Vision Computing*, 2009.
[2688] A. Moreno, S. Chambon, A. Santhanam, J. Rolland, E. Angelini, and I. Bloch. Combining a Breathing Model and Tumor-Specific Rigidity Constraints for Registration of CT-TEP Thoracic Data. *Computer Aided Surgery*, 13(5):281–298, September 2008.
[2689] A. Moreno, C. M. Takemura, O. Colliot, O. Camara, and I. Bloch. Using Anatomical Knowledge Expressed as Fuzzy Constraints to Segment the Heart in CT images. *Pattern Recognition*, 41:2525–2540, 2008.
[2690] P. Muse, F. Sur, F. Cao, Y. Gousseau, and J.-M. Morel. An a contrario decision method for shape element recognition. *International Journal of Computer Vision*, 69(3):295 – 315, September 2006.
[2691] M. Negri, P. Gamba, G. Lisini, and F. Tupin. Junction-aware extraction and regularization of road networks in SAR images. *IEEE Transactions on Geoscience and Remote Sensing*, 44(10, part 2):2962 – 2971, October 2006.
[2692] O. Nempont, J. Atif, E. Angelini, and I. Bloch. A New Fuzzy Connectivity Measure for Fuzzy Sets and Associated Fuzzy Attribute Openings. *Journal of Mathematical Imaging and Vision*, 34:107–136, 2009.
[2693] J. M. Nicolas, G. Vasile, M. Gay, F. Tupin, and E. Trouvé. SAR processing in the temporal domain : application to direct interferogram generation and mountain glacier monitoring. *Canadian Journal of Remote Sensing*, 33(1):52–29, February 2007.
[2694] J. Puentes, B. Batrancourt, J. Atif, E. Angelini, L. Lecornu, A. Zemirline, I. Bloch, G. Coatrieux, and C. Roux. Integrated Multimedia Electronic Patient Record and Graph-Based Image Information for Cerebral Tumors. *Computers in Biology and Medicine*, 38(4):425–437, 2008.
[2695] I. Rentschler, M. Gschwind, H. Brettel, E. Osman, and T. Caelli. Structural and view-specific representations for the categorization of three-dimensional objects. *Vision Research*, 48:2501–2508, November 2008.
[2696] A. Ribés, R. Pillay, F. Schmitt, and Ch. Lahanier. Studying That Smile: A tutorial on multispectral imaging of paintings using the Mona Lisa as a case study. *IEEE Signal Processing magazine*, 25(4):14–26, July 2008.
[2697] A. Ribés and F. Schmitt. Linear inverse problems in imaging: An introductory survey. *IEEE Signal Processing Magazine*, 25(4):84–99, July 2008.
[2698] A. Ribes, F. Schmitt, R. Pillay, and C. Lahanier. Calibration and spectral reconstruction for crisatel: an art painting multispectral acquisition system. *Journal of Imaging Science and Technology*, 49(6):563–573, November 2005.
[2699] F. Rossant and I. Bloch. Robust and Adaptive OMR System Including Fuzzy Modeling, Fusion of Musical Rules, and Possible Error Detection. *EURASIP Journal on Advances in Signal Processing*, 2007:1–25, 2007.
[2700] S. Tilie, I. Bloch, and L. Laborelli. Fusion of Complementary Detectors for Improving Blotch Detection in Digitized Films. *Pattern Recognition Letters*, 28:1735–1746, 2007.
[2701] C. Tison, F. Tupin, and H. Maître. A fusion scheme for joint retrieval of urban map and classification from high resolution interferometric SAR images. *IEEE Transactions on Geoscience and remote Sensing*, 45(2):495–505, February 2007.
[2702] E. Trouvé, G. Vasile, M. Gay, L. Bombrun, P. Grussenmeyer, T. Landes, J. M. Nicolas, P. Bolon, I. Petillot, A. Julea, L. Valet, J. Chanussot, and M. Koehl. Combining airborne photographs and spaceborne SAR data to monitor temperate glaciers: Potentials and limits. *IEEE Transactions on Geoscience and Remote Sensing*, 45(4):905–924, April 2007.
[2703] T. Tung. An augmented multiresolution reeb graph approach for content-based retrieval of 3d models. *International Journal of Shape Modeling*, 11(1):91–120, May 2005.
[2704] F. Tupin and M. Roux. Markov random field on region adjacency graphs for the fusion of sar and optical data in radargrammetric applications. *IEEE Transactions on Geoscience and Remote Sensing*, 43(8):1920–1928, August 2005.
[2705] G. Vasile, E. Trouvé, I. Petillot, Ph. Bolon, J. M. Nicolas, M. Gay, J. Chanussot, T. Landes, P. Grussenmeyer, V. Buzuloiu, I. Hajnsek, C. Andres, M. Keller, and R. Horn. High resolution SAR interferometry: estimation of local frequencies in the context of alpine glaciers. *IEEE Transactions on Geoscience and Remote Sensing*, 46(4):1079–1090, April 2008.
[2706] J. Wiart, A. Hadjem, N. Gadi, I. Bloch, M. F. Wong, A. Pradier, D. Lautru, V. F. Hanna, and C. Dale. Modeling of RF Exposure in Children. *Bioelectromagnetics*, 26(S7):S19–S30, 2005.
[2707] J. Wiart, A. Hadjem, M. F. Wong, and I. Bloch. Analysis of RF Exposure in the Head Tissues of Children and Adults. *Physics in Medicine and Biology*, 53(13):3681–3695, July 2008.
[2708] B. Zhang, J. Zerubia, and J.-C. Olivo-Marin. Gaussian approximation of fluorescence microscopic PSF. *Applied Optics*, 46(10):1819–1829, April 2007.

13.3.2 ACLN: Articles in Other Refereed Journals

[2709] I. Bloch. Knowledge-Driven 3D Medical Image Interpretation: A Few Examples. *Computer Society of India Technical Communications*, 31(10):24–26, January 2008.
[2710] M. Campedel. Traitement du signal et des images. *SIGNAUX*, (100):22–31, December 2005.
[2711] M. Campedel and E. Moulines. Classification et sélection de caractéristiques de textures. *Revue d'Intelligence Artificielle / RSTI (Hermès)*, 19:633–659, September 2005.
[2712] O. Colliot, O. Camara, and I. Bloch. Un modèle déformable intégrant des relations spatiales pour la segmentation de structures cérébrales. *Information, Interaction, Intelligence, I3*, 5(1):29–58, 2005.
[2713] L. Denis, F. Tupin, J. Darbon, and M. Sigelle. Filtrage conjoint de la phase interférométrique et de l'amplitude en imagerie radar par champs de Markov et coupes minimales. *Traitement du Signal*, 2009.
[2714] R. El-Berbari, F. Frouin, A. Redheuil, E. Angelini, E. Mousseaux, I. Bloch, and A. Herment. Développement et évaluation d'une méthode de segmentation automatique de l'endocarde sur des images acquises par résonance magnétique. *ITBM-RBM Innovation et Technologie en Biologie et Médecine*, 28:117–123, 2007.
[2715] C. Hudelot, J. Atif, and I. Bloch. FSRO : une ontologie de relations spatiales floues pour l'inteprétation d'images. *RNTI*, 14:55–86, 2008.
[2716] A. Kermi, I. Bloch, and M. T. Laskri. A Non-Linear Registration Method Guided by B-Splines Free-Form Deformations for Three-Dimensional Facial Reconstruction. *International Review on Computers and Software (IRECOS)*, 2(6):609–619, November 2007.
[2717] J.-F. Marcotorchino, C. Malis, P. Constant, and H. Maître. Analyse de l'information par fusion multimodale. *Revue de l'Electricité et de l'Electronique*, 72:1–17, February 2007.
[2718] J. Puentes, L. Lecornu, G. Coatrieux, C. Roux, E. Angelini, and I. Bloch. Aide au dossier patient multimédia en neurochirurgie. *Techniques hospitalières*, 703:41–48, May 2007.
[2719] T. Tung and F. Schmitt. Indexation de modèles 3D par graphe de Reeb multirésolution augmenté / Augmented multiresolution Reeb graph for 3D models indexing. *Annales des télécommunications*, 60(11-12), November 2005.

13.3.3 INV: Invited Talks

[2720] E. Angelini, T. Song, B. Mensh, and A. Laine. Segmentation and quantitative evaluation of brain mri data with multiphase three-dimensional implicit deformable model. In *SIAM conference on Imaging Science*, Minneapolis, USA, April 2006.
[2721] I. Bloch. Fusion d'informations numériques : panorama méthodologique. In *Journées Nationales de la Recherche en Robotique 2005*, pages 79–88, Guidel, France, October 2005.
[2722] I. Bloch. Quelques perspectives en imagerie médicale. In *GRETSI 2005*, pages 283–286, Louvain-la-Neuve, Belgique, September 2005.
[2723] I. Bloch. Morphologie mathématique floue, applications en raisonnement spatial et en logique. In *LFA 2008*, pages 2–9, Lens, France, 2008.
[2724] I. Bloch. Fuzzy and Bipolar Mathematical Morphology, Applications in Spatial Reasoning. In *Symbolic and Quantitative Approaches to Reasoning with Uncertainty ECSQARU*, volume LNAI 5590, pages 1–13, Verona, Italy, 2009.
[2725] I. Bloch, C. Hudelot, and J. Atif. On the Interest of Spatial Relations and Fuzzy Representations for Ontology-Based Image Interpretation. In *International Conference on Advances in Pattern Recognition, ICAPR'07*, pages 15–25, Kolkata, India, January 2007.
[2726] H. Maître. Et si la 3D nous venait d'ailleurs ? In *Des images au 3D, SEE*, Paris, June 2005.
[2727] H. Maître. Indexing and retrieval in large satellite image databases. In *5th MIPPR, MIPPR2007, Remote Sensing and GIS Data Processing and Applications.*, volume 6790, pages 1–15, Wuhan (China), November 2007.
[2728] H. Maître. L'indexation des très grandes bases de données satellitaires. In *Traitement et Analyse de l'Information: Méthodes et Applications -TAIMA'07*, Hammamet (Tunisie), July 2007.
[2729] F. Tupin. Markov Random Fields for SAR image analysis and 3D reconstruction. In *SPIE European Symposium on Remote Sensing*, Stockholm, Suède, September 2006.

13.3.4 ACTI: Articles in Proceedings of International Conferences

[2730] R. Abdelfattah and J. M. Nicolas. Coherence estimation from complex coherence map using second kind statistics. In *IGARRS 2005*, Séoul, Corée du sud, July 2005.
[2731] R. Abdelfattah and J. M. Nicolas. Mixture model for the segmentation of the InSAR coherence map. In *IGARSS 2007*, Barcelone, Espagne, July 2007.
[2732] C. B. Akgul, B. Sankur, F. Schmitt, and Y. Yemez. 3D object matching via multivariate shape distributions. In *IEEE 13th Signal Processing and Communications Applications*, Kayseri, Turkey, May 2005.
[2733] C. B. Akgul, B. Sankur, F. Schmitt, and Y. Yemez. Density-based shape descriptors for 3D object retrieval. In *Int. Workshop on Multimedia Content Representation, Classification and Security (MRCS)*, pages 322–329, Istanbul, Turkey, September 2006.
[2734] C. B. Akgul, B. Sankur, Y. Yemez, and F. Schmitt. A framework for histogram-induced 3D descriptors. In *14th European Signal Processing Conference - EUSIPCO'2006*, Florence, Italy, September 2006.

[2735] C. B. Akgul, B. Sankur, Y. Yemez, and F. Schmitt. Improving efficiency of density-based shape descriptors for 3D object retrieval. In *MIRAGE 2007 - Computer Vision / Computer Graphics Collaboration Techniques and Applications*, volume 4418, pages 330–340, Rocquencourt, France, March 2007.

[2736] C. B. Akgul, B. Sankur, Y. Yemez, and F. Schmitt. Multivariate density-based 3D shape descriptors. In *Shape Modeling International (SMI)*, pages 3–12, Lyon, France, June 2007.

[2737] C. B. Akgül, B. Sankur, Y. Yemez, and F. Schmitt. Similarity score fusion by ranking risk minimization for 3D object retrieval. In *Eurographics 2008 Workshop on 3D object retrieval*, Crete, Grece, April 2008.

[2738] E. Aldea, J. Atif, and I. Bloch. Image Classification using Marginalized Kernels for Graphs. In *6th IAPR-TC15 Workshop on Graph-based Representations in Pattern Recognition, GbR'07*, volume 1, pages 103–113, Alicante, Spain, June 2007.

[2739] E. Aldea, G. Fouquier, J. Atif, and I. Bloch. Kernel Fusion for Image Classification Using Fuzzy Structural Information. In *3rd International Symposium on Visual Computing ISVC07*, volume LNCS 4842, pages 307–317, Lake Tahoe, USA, November 2007.

[2740] E. Angelini, J. Atif, J. Delon, E. Mandonnet, H. Duffau, and L. Capelle. Detection of glioma evolution on longitudinal MRI studies. In *Internation Symposium on Biomedical Imaging*, volume 1, pages 49–52, Arlington USA, April 2007.

[2741] E. Angelini and O. Gerard. Review of myocardial motion estimation methods from optical flow tracking on ultrasound data. In *IEEE EMBS Annual International Conference*, volume 1, pages 1537–1540, New York USA, August 2006.

[2742] E. Angelini, T. Song, and A. Laine. Homogeneity measures for multiphase level set segmentation of brain MRI. In *IEEE International Symposium on Biomedical Imaging (ISBI)*, volume 1, pages 746–749, Arlington USA, April 2006.

[2743] J. Anquez, E. Angelini, and I. Bloch. Segmentation of Fetal 3D Ultrasound Images based on Statistical Prior and Deformable Model. In *IEEE International Symposium on Biomedical Imaging (ISBI)*, pages 17–20, Paris, France, May 2008.

[2744] J. Anquez, E. Angelini, and I. Bloch. Automatic Segmentation of Head Structures on Fetal MRI. In *IEEE International Symposium on Biomedical Imaging (ISBI)*, Boston, USA, 2009.

[2745] J. Anquez, E. Angelini, I. Bloch, V. Merzoug, A. E. Bellaiche-Millischer, and C. Adamsbaum. Interest of the Steady State Free Precession (SSFP) Sequence for 3D Modeling of the Whole Fetus. In *Engineering in Medicine and Biology Conference, EMBC 2007*, pages 771–774, Lyon, France, August 2007.

[2746] J. Anquez, E. Angelini, I. Bloch, V. Merzoug, A. E. Bellaiche-Millischer, and C. Adamsbaum. In Vivo 3D Modeling of the Fetus with MRI. In *ESPR 2008*, Edimburgh, UK, June 2008.

[2747] J. Anquez, T. Boubekeur, L. Bibin, E. D. Angelini, and I. Bloch. Utero-fetal unit and pregnant woman modeling using a computer graphics approach for dosimetry studies. In *MICCAI*, London, UK, September 2009.

[2748] J. Atif, C. Hudelot, G. Fouquier, I. Bloch, and E. Angelini. From Generic Knowledge to Specific Reasoning for Medical Image Interpretation using Graph-based Representations. In *International Joint Conference on Artificial Intelligence IJCAI'07*, pages 224–229, Hyderabad, India, January 2007.

[2749] J. Atif, C. Hudelot, O. Nempont, N. Richard, B. Batrancourt, E. Angelini, and I. Bloch. GRAFIP: A Framework for the Representation of Healthy and Pathological Cerebral Information. In *IEEE International Symposium on Biomedical Imaging (ISBI)*, pages 205–208, Washington DC, USA, April 2007.

[2750] J. Atif, H. Khotanlou, E. Angelini, H. Duffau, and I. Bloch. Segmentation of Internal Brain Structures in the Presence of a Tumor. In *MICCAI Workshop on Clinical Oncology*, pages 61–68, Copenhagen, October 2006.

[2751] J. Atif, O. Nempont, O. Colliot, E. Angelini, and I. Bloch. Level Set Deformable Models Constrained by Fuzzy Spatial Relation. In *Information Processing and Management of Uncertainty in Knowledge-Based Systems, IPMU*, pages 1534–1541, Paris, France, 2006.

[2752] B. Batrancourt, J. Atif, O. Nempont, E. Angelini, and I. Bloch. Integrating Information from Pathological Brain MRI into an Anatomo-Functional Model. In *24th IASTED International Multi-Conference on Biomedical Engineering*, pages 236–241, Innsbruck, Austria, February 2006.

[2753] B. Batrancourt, D. Hasboun, J. Atif, C. Hudelot, E. Angelini, and I. Bloch. A Clustering View of the Human Brain Mapping Literature and an Anatomo-Functional Cerebral Model. In *Human Brain Mapping*, Florence, Italy, June 2006.

[2754] D. Benboudjema, F. Tupin, W. Pieczynski, M. Sigelle, and J. M. Nicolas. Unsupervised sar images segmentation using triplet markov fields and fisher noise distributions. In *IGARSS 2007*, Barcelone, Spain, July 2007.

[2755] A. Bhattacharya, I. H. Jermyn, X. Descombes, and J. Zerubia. Computing Statistics from a Graph Representation of Road Networks in Satellite Images for Indexing and Retrieval. In *CompIMAGE - Computational Modelling of Objects Represented in Images: Fundamentals, Methods and Applications*, Coimbra, Portugal, October 2006.

[2756] A. Bhattacharya, M. Roux, H. Maître, I. Jermyn, X. Descombes, and J. Zerubia. Indexing satellite images with features computed from man-made structures on the earth's surface. In *Proc. 5th International Workshop on Content-Based Multimedia Indexing (CBMI 2007)*, pages 244 – 250, Bordeaux (France), July 2007.

[2757] A. Bhattacharya, M. Roux, H. Maître, I. Jermyn, X. Descombes, and J. Zerubia. Indexing of mid-resolution satellite images with structural attributes. In *IEEE - ISPRS 2008*, Beijing (Chine), July 2008.

[2758] L. Bibin, J. Anquez, E. Angelini, and I. Bloch. Hybrid 3D Modeling of Mother and Fetus from Medical Imaging for Dosimetry Studies. In *CARS 2009 Computer Assisted Radiology and Surgery*, pages 378–379, Berlin, Germany, June 2009.

[2759] L. Bibin, J. Anquez, A. Hadjem, E. D. Angelini, J. Wiart, and I. Bloch. Dosimetry studies on a fetus model combining medical image information and synthetic woman body. In *11th World Congress on Medical Physics and Biomedical Engineering*, Munich, Germany, September 2009.

[2760] L. Bin, J. F. Aujol, and Y. Gousseau. Local scale measure in remote sensing images. In *2nd International Conference on Scale Space and Variational Methods in Computer Vision*, pages 856–867, June 2009.
[2761] R. Bizamba and T. J. Tanzi. Real-time system for crisis management in reunion island. In *UDMS 2006, 25th Urban Data Management Symposium*, Aalborg (Dk), May 2006.
[2762] I. Bloch. Duality vs Adjunction and General Form for Fuzzy Mathematical Morphology. In *WILF*, volume LNAI 3849, pages 354–361, Crema, Italy, September 2005.
[2763] I. Bloch. Dilation and Erosion of Spatial Bipolar Fuzzy Sets. In *International Workshop on Fuzzy Logic and Applications WILF 2007*, volume LNAI 4578, pages 385–393, Genova, Italy, July 2007.
[2764] I. Bloch. An Extension of Skeleton by Influence Zones and Morphological Interpolation to Fuzzy Sets. In *International Symposium on Mathematical Morphology (ISMM 2007)*, pages 3–14, Rio de Janeiro, Brazil, October 2007.
[2765] I. Bloch. Mathematical Morphology on Bipolar Fuzzy Sets. In *International Symposium on Mathematical Morphology (ISMM 2007)*, volume 2, pages 3–4, Rio de Janeiro, Brazil, 2007.
[2766] I. Bloch. A Contribution to the Representation and Manipulation of Fuzzy Bipolar Spatial Information: Geometry and Morphology. In *Workshop on Soft Methods in Statistical and Fuzzy Spatial Information*, pages 7–25, Toulouse, France, September 2008.
[2767] I. Bloch. Bipolar Fuzzy Mathematical Morphology for Spatial Reasoning. In *International Symposium on Mathematical Morphology ISMM'09*, Groningen, The Netherlands, August 2009.
[2768] I. Bloch. Geometry of Spatial Bipolar Fuzzy Sets based on Bipolar Fuzzy Numbers and Mathematical Morphology. In *International Workshop on Fuzzy Logic and Applications WILF*, volume LNAI 5571, pages 237–245, Palermo, Italy, June 2009.
[2769] I. Bloch, O. Colliot, and R. M. Cesar. Mathematical Modeling of the Relationship "Between" Based on Morphological Operators. In *ISMM 2005*, pages 299–308, Paris, France, April 2005.
[2770] I. Bloch, G. Martino, and A. Petrosino. A Fuzzy Mathematical Morphology Approach for Multiseeded Image Segmentation. In *WILF*, number LNAI 3849, pages 362–368, Crema, Italy, September 2005.
[2771] I. Bloch, R. Pino-Pérez, and C. Uzcátegui. Mediation in the Framework of Morphologic. In *European Conference on Artificial Intelligence ECAI 2006*, pages 190–194, Riva del Garda, Italy, 2006.
[2772] N. Bonnier, A. Lindner, Ch. Leynadier, and F. Schmitt. Compensating printer's modulation transfer function in spatial and color adaptive rendering workflows. In *IS&T/SID's Sixteenth Color Imaging Conference CIC 16*, Portland, Oregon, USA, November 2008.
[2773] N. Bonnier, A. Lindner, F. Schmitt, and C. Leynadier. Compensation of printer MTFs. In *SPIE Color Imaging XIV: Displaying, Hardcopy, Processing, and Applications*, San Jose, California, USA, 2009.
[2774] N. Bonnier, F. Schmitt, H. Brettel, and S. Berche. Evaluation of spatial gamut mapping algorithms. In *IS&T/SID's Fourteenth Color Imaging Conference*, Scottsdale, Arizona, USA (CIC 14), November 2006.
[2775] N. Bonnier, F. Schmitt, M. Hull, and Ch. Leynadier. Spatial and color adaptive gamut mapping: A mathematical framework and two new algorithms. In *IS&T/SID's Fifteenth Color Imaging Conference CIC 15*, Albuquerque, New Mexico, USA, November 2007.
[2776] N. Bonnier, F. Schmitt, and C. Leynadier. Improvements in spatial and color adaptive gamut mapping algorithms. In *IS&T/SPIE 4th European Conference on Colour in Graphics, Imaging and Vision,*, pages 341–346, Terrassa, Spain, 2008.
[2777] B.-B. Bordes and H. Maître. Semantic annotation of satellite images. In *5th International Conference on Machine Learning and Data Mining MLDM 2007, (Perner Ed, LNAI, 4571)*, volume 2, pages 120–133, Leipzig (Germany), July 2007.
[2778] J. B. Bordes and V. Prinet. Mixture distributions for weakly supervised classification in Remote Sensing images. In *British Machine Vision Conference*, Leeds (GB), September 2008.
[2779] J. B. Bordes and M. Roux. Detection of roundabouts in satellite images. In *ISPRS Workshop on Topographic Mapping from Space*, volume XXXVI-1, Ankara (Turkey), February 2006.
[2780] M. Brédif, D. Boldo, M. Pierrot-Deseilligny, and H. Maître. 3D building reconstruction with parametric roof superstructures. In *IEEE ICIP*, volume 2, pages 537–540, San Antonio (Texas), September 2007.
[2781] F. Bretar, M. Pierrot-Deseilligny, and M. Roux. Recognition of building roof facets by merging aerial images and 3D lidar data in a hierarchical segmentation framework. In *The 18th Int. Conf. on Pattern Recognition, ICPR 2006*, Hong Kong, Chine, August 2006.
[2782] F. Bretar and M. Roux. Extraction of 3D planar primitives from raw airborne laser data: a normal driven RANSAC approach. In *IAPR Machine Vision and Applications 2005*, Tsukuba, Japan, May 2005.
[2783] F. Bretar and M. Roux. Hybrid segmentation using LIDAR 3D planar primitives. In *ISPRS Workshop Laser Scanning 2005*, Enschede, the Netherlands, September 2005.
[2784] H. Brettel and F. Schmitt. Interactive multispectral image acquisition and analysis. In *International Workshop on Recording, Modeling and Visualization of Cultural Heritage*, Ascona, Suisse, May 2005.
[2785] M. Campedel, I. Kyrgyzov, and H. Maître. Unsupervised feature selection applied to spot5 satellite images indexing. In *FSDM*, Anvers (Belgique), September 2008.
[2786] M. Campedel, E. Moulines, and M. Datcu. Feature selection for satellite image indexing. In *IGARSS'05*, Séoul, Corée, July 2005.
[2787] M. Campedel, E. Moulines, H. Maître, and M. Datcu. Feature selection for satellite image indexing. In *ESA-EUSC: Image Information Mining*, Frascati (Italy), October 2005.
[2788] B. Cannelle, D. Craciun, N. Paparoditis, and D. Boldo. Bundle adjustement and pose estimation of images of a multiframe panoramic camera. In *9th Conference on Optical 3-D*, Vienna, Austria, July 2009.
[2789] F. Cellier and E. Colin. Building height estimation using fine analysis of altimetric mixtures in layover areas on

polarimetric interferometric X-band SAR images. In *IGARSS'06*, Denver, USA, August 2006.
[2790] F. Cellier, H. Oriot, and J. M. Nicolas. Introduction of the Mean Shift algorithm in SAR imagery : application to shadow extraction. In *EARSeL*, Porto, Portugal, June 2005.
[2791] F. Cellier, H. Oriot, and J. M. Nicolas. Hypothesis management for building reconstruction from high resolution InSAR imagery. In *IGARSS'06*, Denver, USA, August 2006.
[2792] F. Cellier, H. Oriot, and J. M. Nicolas. Study of altimetric mixtures in layover areas on high resolution InSAR images. In *EUSAR06*, Dresde, Allemagne, May 2006.
[2793] D. Cerra, A. Mallet, L. Gueguen, and M. Datcu. Complexity based analysis of earth observation imagery: an assessment. In *ESA EUSC*, Frascati (Italie), March 2008.
[2794] F. Chaabane, M. Sellami, J. M. Nicolas, and F. Tupin. INSAR permanent scatterers selection using SAR SVA filtering. In *IGARSS 2009*, Cape Town, Afrique du Sud, July 2009.
[2795] F. Chaabane, F. Tupin, and H. Maître. An empirical model for interferometric coherence. In *SPIE Remote Sensing 2005*, page 9, Bruges (Belgium), September 2005.
[2796] H. Chaabouni-Chouayakh and M. Datcu. Covariance based analysis of relevant scatterers in high resolution SAR images. In *ESA-EUSC 2006*, 2006.
[2797] H. Chaabouni-Chouayakh and M. Datcu. Relevant scatterers characterization in SAR images. In *MaxEnt 2006*, Paris (France), 2006.
[2798] H. Chaabouni-Chouayakh and M. Datcu. Azimuth sub-band and eigenspace decomposition for high resolution SAR image analysis. In *SSD'07*, Tunisia (Hammamet), 2007.
[2799] H. Chaabouni-Chouayakh and M. Datcu. Linear versus non-linear analysis of relevant scatterers in high resolution SAR images. In *IGARSS'07*, Barcelona (Spain), 2007.
[2800] H. Chaabouni-Chouayakh and M. Datcu. PCA vs. ICA decomposition of HR SAR images: Application to urban structures recognition. In *SPIE Europe Remote Sensing 2007*, Florence (Italy), 2007.
[2801] H. Chaabouni-Chouayakh and M. Datcu. Optimized PCA based feature extraction from multi-look / multi-resolution TerraSAR-X data. In *ESA EUSC*, Frascati (Italie), March 2008.
[2802] S. Chambon, A. Moreno, A. Santhanam, J. Rolland, E. Angelini, and I. Bloch. CT-PET Landmark-based Registration using a Dynamic Lung Model. In *International Conference on Image Analysis and Processing ICIAP 2007*, pages 691–696, Modena, Italy, September 2007.
[2803] Q. Chen and H. Maître. Reliable image/video watermark retrieval in the presence of lossy compression. In *EUSIPCO 05*, Istambul (Turkey), September 2005.
[2804] N. Chenouard, I. Bloch, and J.-C. Olivo-Marin. Feature-Aided Particle Tracking. In *IEEE International Conference on Image Processing ICIP*, pages 1796 – 1799, San Diego, CA, USA, October 2008.
[2805] N. Chenouard, I. Bloch, and J.-C. Olivo-Marin. Multiple hypothesis tracking in cluttered condition. In *IEEE International Conference on Image Processing ICIP*, Cairo, Egypt, 2009.
[2806] N. Chenouard, I. Bloch, and J.-C. Olivo-Marin. Multiple Hypothesis Tracking in Microscopy Images. In *IEEE International Symposium on Biomedical Imaging (ISBI)*, Boston, USA, 2009.
[2807] N. Chenouard, I. Bloch, and J.-C. Olivo-Marin. Particle tracking in fluorescent microscopy images improved by morphological source. In *IEEE International Conference on Image Processing ICIP*, Cairo, Egypt, 2009.
[2808] N. Chenouard, F. De Chaumont, I. Bloch, and J.-C. Olivo-Marin. Improving 3D Tracking in Microscopy by Joint Estimation of Kinetic and Image Models. In *MIIAB 2008 (MICCAI Workshop)*, New York, USA, September 2008.
[2809] N. Chenouard, S. Vernhettes, I. Bloch, and J.-C. Olivo-Marin. Morphological Source Separation for Particle Tracking in Complex Biological Environments. In *ICPR 2008*, Tampa, FL, USA, December 2008.
[2810] M. Ciucu and M. Datcu. Incremental grid based adaptive vector quantization for indexing very large eo image archives. In *ESA EUSC Conference on Information Mining*, Frascati (Italie), October 2005.
[2811] M. Ciucu and M. Datcu. Information theoretical approach for searching very large image archives. In *ESA EUSC Conference on Information Mining*, Frascati (Italie), October 2005.
[2812] L. A. Consularo, R. M. Cesar, and I. Bloch. Structural Image Segmentation with Interactive Model Generation. In *IEEE International Conference on Image Processing (ICIP 2007)*, volume 6, pages 45–48, San Antonio, Texas, USA, September 2007.
[2813] L. A. Consularo, R. M. Cesar, L. H. De Figueiredo, and I. Bloch. Oversegmentation Control for Inexact Graph Matching: First Results. In *International Symposium on Mathematical Morphology (ISMM 2007)*, pages 375–386, Rio de Janeiro, Brazil, October 2007.
[2814] M. Costache, M. Lienou, and M. Datcu. On Bayesian Inference, Maximum Entropy and Support Vector Machines Methods. In *MaxEnt 2006*, Paris, France, July 2006.
[2815] M. Costache, H. Maître, and M. Datcu. Categorization based relevance feedback search engine for Earth observation images repositories. In *IEEE IGARSS 2006*, Denver (Colorado), July 2006.
[2816] D. Craciun, N. Paparoditis, and F. Schmitt. Automatic pyramidal intensity-based laser scan matcher for 3D modeling of large scale unstructured environments. In *CRV 08 - Fifth Canadian Conference on Computer and Robot Vision*, Windsor, Ontario, Canada, May 2008.
[2817] D. Craciun, N. Paparoditis, and F. J. M. Schmitt. Automatic gigapixel mosaicing in large scale unstructured underground environments. In *IAPR Machine Vision Applications*, Yokohama, Japan, May 2009.
[2818] J. Darbon and C. B. Akgul. An efficient algorithm for attribute openings and closings. In *European Signal Processing Conference*, volume 13, Antalya (Turkey), September 2005.
[2819] J. Darbon, M. Sigelle, and F. Tupin. The use of levelable regularization functions for MRF restoration of SAR images while preserving reflectivity. In *S&T/SPIE 19th Annual Symposium Electronic Imaging Conf. E112*, San Jose (USA), January 2007.
[2820] M. Datcu, M. Soccorsi, D. Solimini, and F. Del Frate. Rate distortion theory method for eo data assessment and

model selection. In *ESA EUSC Conference on Information Mining*, Frascati (Italy), October 2005.
[2821] J. Dellière, A. Maruani, H. Maître, and P. Benjamin. A full electromagnetic SAR image simulator for urban structures. In *4th IEEE-GRSS - ISPRS workshop - URBAN 2007*, Paris (France), April 2007.
[2822] J. Dellière, A. Maruani, H. Maître, P. Benjamin, and J. P. Piau. A full electromagnetic SAR simulator for urban structures. In *Physics in Signal and Image Processing, PSIP'07*, Mulhouse, January 2007.
[2823] L. Denis, F. Tupin, J. Darbon, and M. Sigelle. A regularization approach for InSAR and optical data fusion. In *IGARSS'08*, Boston, USA, July 2008.
[2824] L. Denis, F. Tupin, J. Darbon, and M. Sigelle. Joint filtering of SAR interferometric phase and amplitude data in urban areas by TV minimization. In *IGARSS'08*, Boston, USA, July 2008.
[2825] L. Denis, F. Tupin, M. Sigelle, and J. Darbon. Sar amplitude filtering using tv prior and its application to building delineation. In *EUSAR 08*, Friedrichhaffen, Allemagne, June 2008.
[2826] S. Dib, M. Barkat, J. M. Nicolas, and M. Grimes. A reduced rank STAP with change of PRF. In *EUSIPCO*, Poznan, Pologne, September 2007.
[2827] Q. Duan, E. Angelini, O. Gerard, S. Homma, and A. Laine. Comparing optical-flow based methods for quantifiation of myocardial deformations on RT3D ultrasound. In *IEEE International Symposium on Biomedical Imaging (ISBI)*, volume 1, pages 173–176, Arlington USA, April 2006.
[2828] Q. Duan, E. Angelini, S. Herz, C. Ingrassia, O. Gerard, K. Costa, J. Holmes, and A. Laine. Cardiac dynamic information from optical flow using three-dimensional ultrasound. In *IEEE EMBS conference*, Shangai, China, September 2005.
[2829] Q. Duan, E. Angelini, S. Herz, C. Ingrassia, O. Gerard, K. Costa, J. Holmes, and A. Laine. Evaluation of optical flow algorithms for tracking endocardial surfaces on three-dimensional ultrasound data. In *SPIE Medical Imaging*, San Diego, CA, USA, February 2005.
[2830] Q. Duan, E. Angelini, S. Homma, and A. Laine. Tracking the endocardium using optical flow along iso-value curves. In *IEEE EMBS Annual International Conference*, pages 707–710, New York USA, August 2006.
[2831] Q. Duan, E. Angelini, S. Homma, and A. Laine. Validation of optical-flow for quantification of myocardial deformations on simulated RT3D ultrasound. In *IEEE Internation Symposium on Biomedical Imaging*, pages 944–947, Arlington, USA, April 2007.
[2832] Q. Duan, E. D. Angelini, S. L. Herz, O. Gerard, P. Allain, C. M. Ingrassia, K. D. Costa, J. W. Holmes, S. Homma, and A. F. Laine. Tracking of lv endocardial surface on real-time three-dimensional ultrasound with optical flow. In *Functional Imaging and Modeling of the Heart*, volume 1, pages 434–445, Barcelona, Spain, June 2005.
[2833] Q. Duan, E. D. Angelini, S. Homma, and A. F. Laine. Real-time segmentation of 4d ultrasound by active geometric functions. In *ISBI*, pages 233–236, Paris, France, May 2008.
[2834] Q. Duan, E. D. Angelini, A. Lorsakul, S. Homma, J. Holmes, and A. F. Laine. Coronary occlusion detection with 4d optical flow. In *Functional Imaging and Modeling of the Heart (FIMH)*, volume 1, pages 211–219, Nice, France, June 2009.
[2835] Q. Duan, P. Moireau, E. D. Angelini, D. Chapelle, and A. Laine. Simulation of 3D ultrasound with a realistic electromechanical model of the heart. In *Functional Imaging and Modeling of the Heart (FIMH)*, volume LNCS 4466, pages 463–473, Salt Lake City, USA, June 2007.
[2836] Q. Duan, K. Parker, A. Lorsakul, E. Angelini, E. Hyodo, S. Homma, J. Holmes, and A. Laine. Quantitative validation of optical flow based myocardial strain measures using sonomicrometry. In *IEEE International Symposium on Biomedical Imaging (ISBI)*, June 2009.
[2837] F. Duguet, C. Hernandez, G. Drettakis, and F. Schmitt. Level of detail continuum for huge geometric data. In *ACM SIGGRAPH 2005*, volume Posters, Los Angeles, August 2005.
[2838] M. Eitz, K. Hildebrand, T. Boubekeur, and M. Alexa. A descriptor for large scale image retrieval based on sketched feature lines. In *Eurographics Symposium on Sketch-Based Interfaces and Modeling 2009*, New Orleans (co-located with SIGGRAPH), USA, August 2009.
[2839] M. Eitz, K. Hildebrand, T. Boubekeur, and M. Alexa. Photosketch: A sketch based image query and compositing system. In *ACM SIGGRAPH 2009 Talk Program*, New Orleans, USA, August 2009.
[2840] R. El-Berbari, I. Bloch, A. Redheuil, E. Angelini, E. Mousseaux, F. Frouin, and A. Herment. An Automated Myocardial Segmentation in Cardiac MRI. In *Engineering in Medicine and Biology Conference, EMBC 2007*, pages 4508–4511, Lyon, France, August 2007.
[2841] R. El-Berbari, I. Bloch, A. Redheuil, E. Angelini, E. Mousseaux, F. Frouin, and A. Herment. Automated segmentation of the left ventricle including papillary muscles in cardiac magnetic resonance images. In *Functional Imaging and Modeling of the Heart (FIMH)*, volume LNCS 4466, pages 453–462, Salt Lake City, USA, June 2007.
[2842] R. El-Berbari, N. Kachenoura, F. Frouin, A. Herment, E. Mousseaux, and I. Bloch. An automated quantification of the transmural myocardial infarct extent using cardiac de-mr images. In *31st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'09)*, Minneapolis, USA, September 2009.
[2843] R. El-Berbari, N. Kachenoura, A. Redheuil, I. Bloch, E. Mousseaux, and F. Frouin. Using Cine MR Images to Evaluate Myocardial Infarct Transmurality on Delayed Enhancement Images. In *Third IEEE International Symposium on Biomedical Imaging ISBI 2006*, pages 145–148, Arlington, Virginia, USA, 2006.
[2844] M. Ferecatu and H. Sahbi. TELECOM ParisTech at ImageClefphoto 2008: Bi-modal text and image retrieval with diversity enhancement. In *QUAERO/CLEF workshop*, September 2008.
[2845] G. Ferraioli, A. Shabou, F. Tupin, and V. Pascazio. Fast InSAR multichannel phase unwrapping for DEM generation. In *Joint Urban Remote Sensing Event*, Shanghai-China, May 2009.
[2846] G. Fouquier, J. Atif, and I. Bloch. Local Reasoning in Fuzzy Attributes Graphs for Optimizing Sequential Segmentation. In *6th IAPR-TC15 Workshop on Graph-based Representations in Pattern Recognition, GbR'07*, volume 1, pages 138–147, Alicante, Spain, June 2007.

[2847] G. Fouquier, J. Atif, and I. Bloch. Incorporating a pre-attention mechanism in fuzzy attribute graphs for sequential image segmentation. In *International Conference on Information Processing and Management of Uncertainty*, pages 840–847, Torremolinos (Malaga), Spain, June 2008.

[2848] G. Fouquier, J. Atif, and I. Bloch. Sequential Spatial Reasoning in Images based on Pre-Attention Mechanisms and Fuzzy Attribute Graphs. In *European Conference on Artificial Intelligence ECAI*, pages 611–615, Patras, Greece, July 2008.

[2849] G. Fouquier, L. Likforman, J. Darbon, and B. Sankur. The Biosecure Geometry-based System for Hand Modality. In *IEEE ICASSP 32nd International Conference on Acoustics, Speech, and Signal Processing*, number I, pages 801–804, Honolulu, Hawaii, USA, April 2007.

[2850] F. Galland, F. Tupin, J. M. Nicolas, and H. Maître. Registering of SAR and optical data. In *IGARSS 2005*, Corée, July 2005.

[2851] M. Gastaud, S. Ladjal, and H. Maître. Blind filter identification and image superresolution using subspace methods. In *Eusipco 2007*, Poznan (Poland), September 2007.

[2852] A. Ghaleb, L. Vignaud, and J. M. Nicolas. Fine micro-Doppler analysis in ISAR imaging. In *IGARSS 2007*, Barcelone, Espagne, July 2007.

[2853] A. Ghaleb, L. Vignaud, and J. M. Nicolas. Micro-doppler analysis of pedestrians in ISAR imaging. In *RADAR'08*, Rome, Italie, May 2008.

[2854] A. Ghaleb, L. Vignaud, and J. M. Nicolas. A refined micro-doppler analysis of pedestrians in ISAR imaging. In *EUSAR 08*, Frierichhaffen, Allemagne, June 2008.

[2855] D. Girardeau-Montaut, M. Roux, R. Marc, and G. Thibault. Change detection on point cloud data acquired with a ground laser scanner. In *ISPRS workshop Laser scanning 2005*, Enschede, the Netherlands, September 2005.

[2856] D. Gleich and M. Datcu. Wavelet based feature extraction for sar data. In *ESA EUSC Conference on Information Mining*, Frascati (Italie), October 2005.

[2857] J.-F. Goudou and S. Ladjal. Noises study in super-resolution. In *PSIP 2007*, Mulhouse, France, January 2007.

[2858] Y. Gousseau and F. Roueff. A geometrical a priori for capturing the regularity of images. In *EUSIPCO 2005*, August 2005.

[2859] A. B. V. Graciano, R. M. Cesar Junior, and I. Bloch. Graph-based Object Tracking Using Structural Pattern Recognition. In *SIBGRAPI*, pages 179–186, Belo Horizonte, Brazil, October 2007.

[2860] L. Gueguen and M. Datcu. Spatio-temporal textures characterization based on information bottleneck principle. In *ESA EUSC Conference on Information Mining*, Frascati (Italie), October 2005.

[2861] L. Gueguen and M. Datcu. Spatio-temporal structures characterization based on multi-information bottleneck. In *ESA-EUSC 2006: Image Information Mining for Security and Intelligence*, Madrid, November 2006.

[2862] L. Gueguen and M. Datcu. The Model Based Similarity Metric. In *DCC*, page 382, Snowbird, Utah, USA, March 2007.

[2863] L. Gueguen, C. Le Men, and M. Datcu. Analysis of Satellite Image Time Series based on Information Bottleneck. In *MaxEnt 2006*, pages 367–374, Paris, July 2006.

[2864] L. Gueguen, M. Trocan, B. Pesquet-Popescu, A. Giros, and M. Datcu. Comparison of Multispectral Satellite Sequence Compression Appoaches. In *International Symposium on Signal, Circuits and Systems*, volume 1, pages 87–90, Iasi - Romania, July 2005.

[2865] A. Hadjem, D. Lautru, N. Gadi, I. Bloch, C. Dale, M. F. Wong, V. F. Hanna, and J. Wiart. Influence of the Ear's Morphology on Specific Absorption Rate (SAR) Induced in a Child Head Using two Source Models. In *IEEE MTT-S 2005 International Microwave Symposium*, volume 3, pages 1453 – 1456, Long Beach, Ca, USA, June 2005.

[2866] O. Harant, R. Fallourd, L. Bombrun, M. Gay, E. Trouvé, G. Vasile, and J. M. Nicolas. Preliminary terrasar-X observations for temperate glaciers on the Chamonix Mont Blanc test site. In *IGARSS 2009*, Cape Town, Afrique du Sud, July 2009.

[2867] G. Hochard, R. Binet, and J. M. Nicolas. Stable coherent area in SAR interferometry. In *IGARSS 2009*, Cape Town, Afrique du Sud, July 2009.

[2868] S. Homayouni and M. Roux. A non-supervised material mapping technique for hyperspectral image analysis in urban area. In *URBAN2005*, Phenix, Arizona, USA, March 2005.

[2869] C. Hudelot, J. Atif, and I. Bloch. An Ontology of Spatial Relations using Fuzzy Concrete Domains. In *AISB symposium on Spatial Reasoning and Communication*, Newcastle, UK, April 2007.

[2870] C. Hudelot, J. Atif, and I. Bloch. A Spatial Relation Ontology Using Mathematical Morphology and Description Logics for Spatial Reasoning. In *ECAI-08 Workshop on Spatial and Temporal Reasoning*, pages 21–25, Patras, Greece, July 2008.

[2871] C. Hudelot, J. Atif, O. Nempont, B. Batrancourt, E. Angelini, and I. Bloch. GRAFIP: a Framework for the Representation of Healthy and Pathological Anatomical and Functional Cerebral Information. In *Human Brain Mapping*, Florence, Italy, June 2006.

[2872] T. Hurtut, H. Dalazoana, Y. Gousseau, and F. Schmitt. Spatial color image retrieval without segmentation using thumbnails and the earth mover's distance. In *CGIV 2006*, pages 54–59, Leeds (UK), June 2006.

[2873] T. Hurtut, Y. Gousseau, F. Cheriet, and F. Schmitt. Pictorial analysis of line-drawings. In *International Symposium on Computational Aesthetics in Graphics, Visualization, and Imaging (CAe 2008)*, Lisbon, Portugal, June 2008.

[2874] C. Iorga and M. Datcu. Survey on methods for feature extraction of sar data, esa eusc conference on information mining. In *ESA EUSC Conference on Information Mining*, Frascati (Italie), October 2005.

[2875] V. Israel-Jost, E. Breton, E. Angelini, P. Choquet, I. Bloch, and A. Constantinesco. Vectorial Multi-Phase Mouse Brain Tumor Segmentation in T1-T2 MRI. In *IEEE International Symposium on Biomedical Imaging (ISBI)*, pages 5–8, Paris, France, May 2008.

[2876] A. Katouzian, E. D. Angelini, and A. F. Laine. Classification of blood regions in IVUS images using three dimensional brushlet expansions. In *International Conference of the IEEE Engineering in Medicine and Biology Society*, Minneapolis, USA, September 2009.

[2877] A. Katouzian, E. D. Angelini, A. Lorsakul, B. Sturm, and A. F. Laine. Lumen border detection of intravascular ultrasound via denoising of directional wavelet representations. In *Functional Imaging and Modeling of the Heart FIMH*, volume 1, pages 104–113, Nice, France, June 2009.

[2878] A. Kermi, M. T. Laskri, and I. Bloch. A Three-Dimensional Computerized Facial Reconstruction Using Non-Linear Registration of a Reference Head. In *First Mediterranean Conference on Intelligent Systems and Automation CISA'08*, pages 9–14, Annaba, Algeria, June 2008.

[2879] H. Khotanlou, J. Atif, E. Angelini, H. Duffau, and I. Bloch. Adaptive Segmentation of Internal Brain Structures in Pathological MR Images Depending on Tumor Types. In *IEEE International Symposium on Biomedical Imaging (ISBI)*, pages 588–591, Washington DC, USA, April 2007.

[2880] H. Khotanlou, J. Atif, O. Colliot, and I. Bloch. 3D Brain Tumor Segmentation Using Fuzzy Classification and Deformable Models. In *WILF*, volume LNCS 3849, pages 312–318, Crema, Italy, September 2005.

[2881] H. Khotanlou, O. Colliot, and I. Bloch. Automatic Brain Tumor Segmentation using Symmetry Analysis and Deformable Models. In *International Conference on Advances in Pattern Recognition ICAPR*, pages 198–202, Kolkata, India, January 2007.

[2882] F. Kurz and M. Datcu. On the problematic of data integrity for communication of large eo repositories and information mining systems. In *ESA EUSC Conference on Information Mining*, Frascati (Italie), October 2005.

[2883] I. Kyrgyzov, H. Maître, and M. Campedel. Combining clustering results for the analysis of textures of SPOT5 images. In *ESA-EUSC: Image Information Mining*, Frascati (Italy), October 2005.

[2884] I. O. Kyrgyzov, O. O. Kyrgyzov, H. Maître, and M. Campedel. Kernel mdl to determine the number of clusters. In *5th International Conference on Machine Learning and Data Mining MLDM 2007, (Perner Ed, LNAI, 4571)*, pages 203–217, Leipzig, Germany, July 2007.

[2885] I. O. Kyrgyzov, H. Maître, and M. Campedel. A method of clustering combination applied to satellite image analysis. In *IEEE - International Conference on Image Analysis and Processing ICIAP 2007*, pages 81–86, Modena, Italy, September 2007.

[2886] C. Lahanier, O. Feihl, M. Jeanlin, D. Pitzalis, and F. Schmitt. 3D modelling of archaeological objects for conservation, visualisation, colour and shape characterisation, details comparison. In *ICOM-2005*, The Hague, The Netherlands, September 2005.

[2887] T. Landes, M. Gay, E. Trouvé, J. M. Nicolas, L. Bombrun, G. Vasile, and I. Hajnsek. Monitoring temperate glaciers by high resolution Pol-InSAR data: First analysis of Argentière E-SAR acquisitions and in-situ measurements. In *IGARSS 2007*, Barcelone, Espagne, July 2007.

[2888] C. Le Men, A. Julea, N. Méger, M. Datcu, P. Bolon, and H. Maître. Radiometric evolution classification in a high resolution satellite image time series (STIS). In *ESA-EUSC on Image Information Mining: pursuing automation of geospatial intelligence for environment and security*, Frascati, Italy, May 2008.

[2889] V. Le Moigne, F. Galland, J. M. Nicolas, and F. Tupin. Statistical polygonal snakes with Fisher distribution. In *EUSAR 2006*, Dresde, Allemagne, May 2006.

[2890] V. Le Moigne, F. Tupin, and J. M. Nicolas. Statistical Polygonal Snakes for 3D building reconstruction using High Resolution SAR data. In *URBAN - 2007 - IEEE/ISPRS Joint Workshop on Remote Sensing and data fusion over urban areas*, Paris, FRANCE, April 2007.

[2891] G. Lehureau, F. Tupin, C. Tison, G. Oller, and D. Petit. Registration of metric resolution sar and optical images in urban areas. In *EUSAR 08*, Friedrichhaffen, Allemagne, June 2008.

[2892] D. Lesage, E. Angelini, I. Bloch, and G. Funka-Lea. Medial-based Bayesian Tracking for Vascular Segmentation: Application to Coronary Arteries in 3D CT Angiography. In *IEEE International Symposium on Biomedical Imaging (ISBI)*, pages 268–271, Paris, France, May 2008.

[2893] D. Lesage, E. Angelini, I. Bloch, and G. Funka-Lea. Design and Study of Flux-based Features for 3D Vascular Tracking. In *IEEE International Symposium on Biomedical Imaging (ISBI)*, Boston, USA, 2009.

[2894] D. Lesage, E. D. Angelini, G. Funka-Lea, and I. Bloch. Bayesian maximal paths for coronary artery. In *MICCAI*, London, UK, September 2009.

[2895] D. Lesage, J. Darbon, and C. B. Akgul. An efficient algorithm for connected attribute thinnings and thickenings. In *International Symposium on Visual Computing (ISVC'06)*, volume 4292, pages 393–404, Lake Tahoe, Nevada, USA, November 2006.

[2896] X. Li, M. Roux, M. He, and F. Schmitt. A new method of image fusion based on redundant wavelet transform. In *5th Int. Conf. on Visual Information Theory, VIE 2008*, pages 12–17, July 2008.

[2897] A. Lindner, N. Bonnier, Ch. Leynadier, and F. Schmitt. Evaluation of characterization methods of printer mtf. In *Electronic Imaging Science and Technology, IS&T/SPIE 20th Annual Symposium*, number 6808, pages 6808061–68080612, San Jose, California, USA, January 2008.

[2898] A. Lindner, N. Bonnier, Ch. Leynadier, and F. Schmitt. Measurement of printer mtfs. In *Electronic Imaging, San Jose, United States Of America*, volume 7242, San Jose, California, USA, January 2009.

[2899] P. Lopez Quiroz, J. M. Nicolas, F. Tupin, P. Briole, and F. Chaabane. Permanent scatterers: comparison of identification methods. In *EUSAR 2006*, Dresden, Allemagne, May 2006.

[2900] P. Lopez Quiroz, F. Tupin, P. Briole, M. P. Doin, and J. M. Nicolas. Spatial and temporal analysis of Mexico city subsidence by means of interferometric techniques. In *AGU 2007 Joint Assembly*, Acapulco, Mexico, May 2007.

[2901] B. Luo, J. F. Aujol, Y. Gousseau, and S. Ladjal. Extrapolation of wavelet features for satellite images with different resolutions. In *IEEE IGARSS-06*, Denver, Colorado, July 2006.

[2902] B. Luo, J. F. Aujol, Y. Gousseau, S. Ladjal, and H. Maître. Characteristic scale in satellite images. In *IEEE*

ICASSP-06, volume 2, pages II 809– II 812, Toulouse, France, May 2006.

[2903] M. Marim, E. Angelini, and J.-C. Olivo-Marin. A compressed sensing approach for biological microscopic image processing. In *IEEE International Symposium on Biomedical Imaging (ISBI)*, Boston, USA, June 2009.

[2904] J. Marquez, P. Delmas, I. Bloch, and F. Schmitt. Morphological Averaging of Anatomical Shapes Using Three-Dimensional Distance Transforms. In *Image and Vision Computing New Zealand IVCNZ*, pages 337–342, Great Barrier Island, New Zealand, November 2006.

[2905] D. Martinez, I. Bloch, and J. T. Hernandez. Assessing the Variability of Internal Brain Structures Using PCA on Sampled Surface Points. In *International Conference on Computer Vision Theory and Applications VISAPP 2009*, volume 2, pages 172–179, Lisbon, Portugal, February 2009.

[2906] N. Milisavljevic and I. Bloch. Possibilistic Multi-Sensor Fusion for Humanitarian Demining. In *IGARSS*, pages 14–17, Barcelona, 2007.

[2907] C. Millet, I. Bloch, P. Hède, and P. A. Moellic. Using Relative Spatial Relationships to Improve Individual Region Recognition. In *European Workshop on the Integration of Knowledge, Semantics and Digital Media Technologies, EWIMT'05*, pages 119–126, London, UK, 2005.

[2908] C. Millet, I. Bloch, and A. Popescu. Using the Knowledge of Object Colors to Segment Images and Improve Web Image Search. In *RIAO*, Pittsburgh, PA, USA, 2007.

[2909] C. Millet, G. Grefenstette, I. Bloch, P. A. Moellic, and P. Hède. Automatically populating an image ontology and semantic color filtering. In *Ontoimage 2006, Language Resources for Content-Based Image Retrieval*, pages 34–39, Genoa, Italy, May 2006.

[2910] A. Moreno, S. Chambon, A. Santhanam, R. Brocardo, P. Kupelian, J. Rolland, E. Angelini, and I. Bloch. Thoracic CT-PET Registration Using a 3D Breathing Model. In *MICCAI 2007*, volume LNCS 4791, pages 626–633, Brisbane, Australia, 2007.

[2911] A. Moreno, G. Delso, O. Camara, and I. Bloch. CT and PET Registration using Deformations Incorporating Tumor-Based Constraints. In *10th Iberoamerican Congress on Pattern Recognition, CIARP*, number LNCS 3773, pages 1–12, La Havana, Cuba, November 2005.

[2912] A. Moreno, G. Delso, O. Camara, and I. Bloch. Non-linear Registration Between 3D Images Including Rigid Objects: Application to CT and PET Lung Images With Tumors. In *Workshop on Image Registration in Deformable Environments (DEFORM'06)*, pages 31–40, Edinburgh, UK, September 2006.

[2913] A. Moreno, C. M. Takemura, O. Colliot, O. Camara, and I. Bloch. Heart Segmentation in Medical Images Using the Fuzzy Spatial Relation "Between". In *Information Processing and Management of Uncertainty in Knowledge-Based Systems, IPMU*, pages 2052–2059, Paris, France, 2006.

[2914] F. Mosca, J. M. Nicolas, L. Kopp, and M. Couade. Temporal approach of the synthetic aperture imaging using hadamard matrix. In *Acoustics 2008*, Paris, July 2008.

[2915] B. Mougel and C. Lelong. Classification and information extraction in very high resolution satellite images for tree crops monitoring. In *28th EARSeL Symposium and Workshops*, Istanbul, June 2008.

[2916] B. Mougel, C. Lelong, A. Bégué, and J. M. Nicolas. Comparison of three segmentation methods for groves recognition in very high resolution satellite images. In *PSIP 2007*, Mulhouse, France, January 2007.

[2917] Th. Napoléon, T. Adamek, F. Schmitt, and N. E. O'Connor. Shrec'08 entry: Multi-view 3D retrieval using multi-scale contour representation. In *IEEE International Conference on Shape Modeling and Applications - SMI'08*, pages 227–228, Stony Brook University, NY, USA, June 2008.

[2918] O. Nempont, J. Atif, E. Angelini, and I. Bloch. Combining Radiometric and Spatial Structural Information in a New Metric for Minimal Surface Segmentation. In *Information Processing in Medical Imaging (IPMI 2007)*, volume LNCS 4584, pages 283–295, Kerkrade, The Netherlands, July 2007.

[2919] O. Nempont, J. Atif, E. Angelini, and I. Bloch. Fuzzy Attribute Openings Based on a New Fuzzy Connectivity Class. Application to Structural Recognition in Images. In *IPMU'08*, pages 652–659, Malaga, Spain, June 2008.

[2920] O. Nempont, J. Atif, E. Angelini, and I. Bloch. A New Fuzzy Connectivity Class. Application to Structural Recognition in Images. In *Discrete Geometry for Computer Imagery DGCI*, volume LNCS 4992, pages 446–457, Lyon, 2008.

[2921] O. Nempont, J. Atif, E. Angelini, and I. Bloch. Structure Segmentation and Recognition in Images Guided by Structural Constraint Propagation. In *European Conference on Artificial Intelligence ECAI*, pages 621–625, Patras, Greece, July 2008.

[2922] O. Nempont, J. Atif, A. Herment, I. Bloch, and P. Carlier. Graph-Based Segmentation of Muscles on NMR Images: Preliminary Results. In *2005 Workshop on Investigation of Human Muscle Function*, Nashville, TN, USA, 2005.

[2923] O. Nempont, P. Carlier, A. Herment, and I. Bloch. Towards Automatic Muscle and Fat Volume Quantitation on NMR Images: Preliminary Results. In *International Congress of Myology*, page 106, Nantes, France, May 2005.

[2924] J. M. Nicolas, F. Tupin, G. Vasile, and E. Trouvé. SAR processing in the temporal domain. application to direct interferogram generation and mountain glacier monitoring. In *advanced ASAR 2005*, Longueil, CANADA, November 2005.

[2925] G. Palma, I. Bloch, and S. Muller. Fuzzy Connected Filters for Fuzzy Gray Scale Images. In *IPMU'08*, pages 667–674, Malaga, Spain, June 2008.

[2926] G. Palma, I. Bloch, S. Muller, and R. Iordache. Fuzzifying Images using Fuzzy Wavelet Denoising. In *IEEE International Conference on Fuzzy Systems FUZZ-IEEE'09*, Jeju, Korea, 2009.

[2927] G. Palma, S. Muller, I. Bloch, and R. Iordache. Convergence Areas Detection in Digital Breast Tomosynthesis Volumes using a Contrario Modeling. In *SPIE Symposium on Medical Imaging: Computer-Aided Diagnosis*, Lake Buena Vista, FL, USA, February 2009.

[2928] G. Palma, S. Muller, I. Bloch, and R. Iordache. Fast Detection of Convergence Areas in Digital Breast Tomosynthesis. In *IEEE International Symposium on Biomedical Imaging (ISBI)*, Boston, USA, 2009.

[2929] G. Palma, G. Peters, S. Muller, and I. Bloch. Masses Classification using Fuzzy Active Contours and Fuzzy Decision Trees. In *SPIE Medical Imaging: Computer-Aided Diagnosis*, number 6915, San Diego, CA, USA, February 2008.

[2930] X. Perrotton, M. Sturzel, and M. Roux. Automatic object detection on aerial images using local descriptors and image synthesis. In *6th International Conference on Computer Vision Systems, ICVS 2008*, Santorin, Greece, May 2008.

[2931] G. Peters, S. Muller, S. Bernard, and I. Bloch. A Hybrid Active Contour Model for Mass Detection in Digital Breast Tomosynthesis. In *SPIE Medical Imaging*, San Diego, CA, USA, February 2007.

[2932] G. Peters, S. Muller, S. Bernard, R. Iordache, and I. Bloch. Reconstruction-Independent 3D CAD for Mass Detection in Digital Breast Tomosynthesis using Fuzzy Particles. In *SPIE Medical Imaging*, San Diego, CA, USA, February 2006.

[2933] G. Peters, S. Muller, S. Bernard, R. Iordache, F. Wheeler, and I. Bloch. Reconstruction-Independent 3D CAD for Calcification Detection in Digital Breast Tomosynthesis Using Fuzzy Particles. In *10th Iberoamerican Congress on Pattern Recognition, CIARP*, number LNCS 3773, pages 400–408, Havana, Cuba, November 2005.

[2934] G. Piella, M. Campedel, and B. Pesquet-Popescu. Adaptive wavelets for image representation and classification. In *EUSIPCO'05*, September 2005.

[2935] J. Puentes, B. Batrancourt, L. Lecornu, J. Atif, A. Zemirline, G. Coatrieux, E. Angelini, I. Bloch, and C. Roux. Enhancing Electronic Patient Record Functionality through Information Extraction from Images. In *IEEE International Conference on Information and Communication Technologies: From Theory To Applications ICTTA 2006*, pages 978–983, Damascus, Syria, April 2006.

[2936] J. Rabin, J. Delon, and Y. Gousseau. Circular earth mover's distance for the comparison of local features. In *ICPR 08*, Tampa, Etats-Unis, December 2008.

[2937] J. Rabin, J. Delon, and Y. Gousseau. A contrario matching of SIFT-like features. In *ICPR 08*, Tampa, Etats-Unis, December 2008.

[2938] C. K. Reinbothe, T. Boubekeur, and M. Alexa. Hybrid ambient occlusion. In *Eurographics 2009 - Areas Papers*, pages 51–57, Munich, Germany, April 2009.

[2939] A. Ribés and F. Schmitt. Improving spectral reflectance reconstruction accuracy using bootstrap. In *MCS'07 - Int. Symp. on Multispectral Color Science and Application*, Taipei, Taiwan, May 2007.

[2940] S. Rital, M. Costache, and M. Campedel. Plato for information mining in satellite imagery. In *Semantic and Digital Media Technologies (SAMT)*, Koblenz, Germany, December 2008.

[2941] M. Rodriguez, J. Preciozzi, G. Facciolo, and A. Almansa. Simulation and real-time visualization of changing baseline in a stereo pair. In *The Eighth IASTED International Conference on Visualization, Imaging and Image Processing VIIP 2008*, number 630-075, Palma de Mallorca, Espagne, September 2008.

[2942] F. Rossant and I. Bloch. Optical Music Recognition based on Fuzzy Modeling of Symbol Classes and Music Writing Rules. In *ICIP 2005*, volume II, pages 538–541, Genova, Italy, September 2005.

[2943] F. Rossant, I. Ghorbel, I. Bloch, M. Pâques, and S. Tick. Automated Segmentation of Retinal Layers in OCT Imaging and Derived Ophtalmic Measures. In *IEEE International Symposium on Biomedical Imaging (ISBI)*, Boston, USA, 2009.

[2944] H. Sahbi, J.-Y. Audibert, and R. Keriven. Graph-cut transducers for relevance feedback in content based image retrieval. In *International Conference on Computer Vision*, October 2007.

[2945] H. Sahbi, J.-Y. Audibert, J. Rabarisoa, and R. Keriven. Context dependent kernel design for object matching and recognition. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR),*, June 2008.

[2946] H. Sahbi, J.-Y. Audibert, J. Rabarisoa, and R. Keriven. Object recognition and retrieval by context dependent similarity kernels (best regular paper award). In *Sixth International Workshop on Content-Based Multimedia Indexing, CBMI*, June 2008.

[2947] H. Sahbi, J.-Y. Audibert, J. Rabarisoa, and R. Keriven. Robust matching and recognition using context-dependent kernels. In *International Conference on Machine Learning (ICML)*, July 2008.

[2948] H. Sahbi, P. Etyngier, J.-Y. Audibert, and R. Keriven. Graph Laplacian for interactive image retrieval. In *International Conference on Acoustics, Speech, and Signal Processing (Image/Video Storage and Retrieval)*, April 2008.

[2949] H. Sahbi, P. Etyngier, J.-Y. Audibert, and R. Keriven. Manifold learning using robust graph Laplacian for interactive image retrieval. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, June 2008.

[2950] F. Schmitt, G. Aitken, G. Alquié, H. Brettel, M. B. Chouikha, P. Colantoni, P. Cotte, J. Cupitt, C. De Deyne, D. Dupraz, C. Lahanier, H. Liang, R. Pillay, A. Ribes, and D. Saunders. Crisatel multispectral imaging system. In *10th Congress of the International Colour Association AIC'05*, volume 1, pages 463–467, Granada, Spain, May 2005.

[2951] G. Schwarz and M. Datcu. Image information mining: perspectives seen by dlr. In *ESA EUSC*, Frascati (Italie), March 2008.

[2952] G. Schwarz, D. Espinoza Molina, H. Breit, and M. Datcu. Adapting multilooking for joint radiometrical and geometrical SAR image enhancement. In *ESA EUSC*, Frascati (Italie), March 2008.

[2953] G. Schwarz, D. Espinoza Molina, and M. Datcu. A new look at feature selection. In *ESA-EUSC*, Frascati (Italie), March 2008.

[2954] S. Servigne, T. J. Tanzi, and G. Noel. Telegeomatic system and real time spatio-temporal database. In *UDMS 2006, 25th Urban Data Management Symposium*, Aaloborg (DK), May 2006.

[2955] C. Sintes, J. M. Nicolas, and R. Garello. Radar interferometry vs. sonar interferometry. In *EUSAR 2006*, Dresde, Allemagne, May 2006.

[2956] M. Soccorsi and M. Datcu. Bayesian texture based analysis of hr slc sar images. In *ESA-EUSC 2006*, Torrejon

(Spain), 2006.
[2957] M. Soccorsi and M. Datcu. Space-variant model fitting and selection for image information extraction. In *MaxEnt 2006*, Paris (France), 2006.
[2958] M. Soccorsi and M. Datcu. Phase characterization of polsar image. In *SPIE Europe Remote Sensing 2007*, Florence (Italy), 2007.
[2959] M. Soccorsi and M. Datcu. Stochastic models of slc hr sar images. In *IGARSS'07*, Barcelona (Spain), 2007.
[2960] M. Soccorsi and M. Datcu. Terra SAR-X Data Feature Extraction. In *ESA-EUSC*, Frascati (Italie), March 2008.
[2961] P. Soler, G. Delso, N. Villain, E. Angelini, and I. Bloch. Superresolution Spatial Compunding Techniques, with Application to 3D Breast Ultrasound Imaging. In *SPIE Medical Imaging*, volume 6147, San Diego, CA, USA, February 2006.
[2962] P. Soler, O. Gerard, P. Allain, E. Saloux, E. Angelini, and I. Bloch. Comparison of fusion techniques for RT3D echocardiography acquisitions from different acoustic windows. In *Computers in Cardiology*, pages 141–144, Lyon, France, September 2005.
[2963] P. Soler, N. Villain, I. Bloch, and E. D. Angelini. Volume Reconstruction of Breast Echography from Anisotropically Degraded Scans. In *IASTED International Conference on Biomedical Engineering*, volume 9, pages 349–355, Innsbruck, Austria, February 2005.
[2964] H. Sportouche, F. Tupin, and L. Denise. Building Detection by Fusion of Optical and SAR Features in Metric Resolution Data. In *IGARSS - 2009*, Cap Town, SOUTH AFRICA, July 2009.
[2965] H. Sportouche, F. Tupin, and L. Denise. Building Extraction and 3D Reconstruction in Urban Areas from High-Resolution Optical and SAR Imagery. In *URBAN - 2009 - IEEE GRSS / ISPRS Joint Workshop on Data Fusion And Remote Sensing over Urban Areas*, Shangai, CHINA, May 2009.
[2966] C. M. Takemura, R. M. Cesar Junior, and I. Bloch. Fuzzy Modeling and Evaluation of the Spatial Relation "Along". In *10th Iberoamerican Congress on Pattern Recognition, CIARP*, number LNCS 3773, pages 837–848, La Havana, Cuba, November 2005.
[2967] H. Tang, H. Maître, and N. Boujemaa. Similarity measure for satellite images with heterogeneous contents. In *URBAN - 2007 - IEEE/ISPRS Joint Workshop on Remote Sensing and data fusion over urban areas*, Paris (France), April 2007.
[2968] T. J. Tanzi. ITS, the issues: sharing and using information. In *The 5th International Conference on ITS Telecommunications*, "le Quartz" Congress Center, Brest - FRANCE, June 2005.
[2969] S. Tilie, I. Bloch, and L. Laborelli. A Contrario False Alarms Removal for Improving Blotch Detection in Digital Film Restoration. In *EC-SIPMCS*, Maribor, Slovenia, June 2007.
[2970] S. Tilie, L. Laborelli, and I. Bloch. Blotch Detection for Digital Archives Restoration based on the Fusion of Spatial and Temporal Detectors. In *FUSION 2006*, Florence, Italy, 2006.
[2971] C. Tison, F. Tupin, and H. Maître. A Markovian scheme for joint retrieval of classification and height map from urban interferometric SAR images. In *IEEE Int. Conf. on Image Processing (ICIP'05)*, Genova (Italie), September 2005.
[2972] C. Tison, F. Tupin, J. M. Nicolas, and H. Maître. Validation of a feature fusion scheme for urban DEM retrieval from high resolution SAR interferogram. In *IEEE Int. Geoscience and Remote Sensing Symposium (IGARSS'05)*, Seoul (Korea), July 2005.
[2973] E. Trouvé, I. Petillot, P. Bolon, M. Gay, L. Bombrun, J. M. Nicolas, F. Tupin, A. Walpersdorf, N. Cotte, I. Hajnsek, and M. Keller. Monitoring alpine glacier activity by a combined use of TerraSAR-X images and continuous GPS measurements – the Argentière glacier experiment. In *EUSAR 08*, Frierichhaffen, Allemagne, June 2008.
[2974] E. Trouvé, G. Vasile, M. Gay, P. Grussenmeyer, and J. M. Nicolas. Combining optical and SAR data to monitor temperate glaciers. In *IGARSS 2005*, Séoul, Corée, July 2005.
[2975] T. Tung and F. Schmitt. Shrec'08 entry: Shape retrieval of noisy watertight models using amrg. In *IEEE International Conference on Shape Modeling and Applications - SMI'08*, Stony Brook University, NY, USA, June 2008.
[2976] T. Tung, F. Schmitt, and T. Matsuyama. Topology matching for 3D video compression. In *IEEE conf. on Computer Vision and Patern Recognition - CVPR 2007*, pages 1–8, Minneapolis, USA, June 2007.
[2977] F. Tupin. Fusion of interferometric and optical data for 3D reconstruction. In *IGARSS'06*, Denver, USA, August 2006.
[2978] F. Tupin and F. Galland. 3D information extraction by score optimization between SAR and optical data. In *EUSAR 2006*, Dresde, Allemagne, May 2006.
[2979] F. Tupin, M. Roux, and S. Homayouni. Evaluation of correlation criteria for sar images. In *Urban 2005*, Tempe, USA, March 2005.
[2980] B. Vallet, E. Angelini, and A. Laine. Variational segmentation framework in prolate spheroidal coordinates for 3D real-time echocardiography. In *SPIE Conference on Medical Imaging*, volume 6144, pages 1370–1380, San Diego USA, February 2006.
[2981] C. Vanegas, I. Bloch, H. Maître, and J. Inglada. Approximate Parallelism Between Fuzzy Objects: Some Definitions. In *International Workshop on Fuzzy Logic and Applications WILF*, volume LNAI 5571, pages 12–19, Palermo, Italy, June 2009.
[2982] M.-C. Vanegas, I. Bloch, H. Maître, and J. Inglada. Fuzzy Spatial Relations for High Resolution Rmote Sensing Image Analysis: The Case of "To Go Across". In *IEEE IGARSS 2009*, Cape Town, 2009.
[2983] Y. Wang, D. Kim, E. Angelini, and A. Laine. Recognition of micro-array protein crystals images using multi-scale representation. In *SPIE Medical Imaging*, San Diego, CA, USA, February 2005.
[2984] Y. Wang, F. Tupin, C. Han, and J. M. Nicolas. Building detection from high resolution POLSAR data by combining region and edge information. In *IGARSS 2008*, Boston, USA, July 2008.

[2985] G.-S. Xia, J. Delon, and Y. Gousseau. Locally invariant texture analysis from the topographic map. In *ICPR 08*, Tampa, Etats-Unis, December 2008.
[2986] B. Zhang, J. Zerubia, and J.-C. Olivo-Marin. A study of Gaussian approximations of fluorescence microscopy PSF models. In *SPIE Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XIII*, volume 6090, pages 104–114, March 2006.

13.3.5 ACTN: Articles in Proceedings of French Conferences

[2987] E. Aldea and I. Bloch. Vers une utilisation améliorée de relations spatiales pour l'apprentissage de données dans les modèles graphiques. In *Extraction et Gestion des Connaissances EGC'2009*, pages 271–282, Strasbourg, France, January 2009.
[2988] E. Aldea, G. Fouquier, J. Atif, and I. Bloch. Classification d'images par fusion d'attributs flous de graphes, relations spatiales et noyaux marginalisés. In *Rencontres Francophones sur la Logique Floue et ses Applications (LFA 2007)*, pages 25–32, Nimes, France, November 2007.
[2989] J. Atif, C. Hudelot, and I. Bloch. Adaptation de connaissances génériques pour l'interprétation d'images médicales : représentations par ontologies et par graphes et modélisation floue. In *7e journées francophones Extraction et Gestion des Connaissances - Extraction de Connaissances et Images (EGC-ECOI'07)*, pages 51–61, Namur, Belgique, January 2007.
[2990] D. Benboudjema, F. Tupin, W. Pieczynski, M. Sigelle, and J. M. Nicolas. Modélisation et segmentation non supervisée d'images RSO par champs de markov triplets et lois de fisher. In *GRETSI*, Troyes, September 2007.
[2991] R. Bizamba and T. J. Tanzi. Système télé-géomatique pour la gestion des risques d'inondation - application au département de la réunion. In *IASI 2005 Observation et analyse de la transformation des territoires ruraux*, IASI Roumanie, April 2005.
[2992] I. Bloch. Squelette par zones d'influence flou - application à l'interpolation entre ensembles flous. In *Rencontres francophones sur la Logique Floue et ses Applications, LFA 2006*, pages 395–402, Toulouse, France, October 2006.
[2993] I. Bloch. Représentation d'informations spatiales par des ensembles flous bipolaires et morphologie mathématique. In *Rencontres Francophones sur la Logique Floue et ses Applications (LFA 2007)*, pages 33–40, Nimes, France, November 2007.
[2994] I. Bloch. Morphologie mathématique floue bipolaire pour l'ordre lexicographique. In *LFA 2009*, Annecy, France, 2009.
[2995] I. Bloch, O. Colliot, and R. Cesar. Modélisation floue des relations "entre" et "le long de". In *Plate-forme AFIA, Atelier "Représentation et raisonnement sur l'espace et le temps"*, pages 19–24, Nice, May 2005.
[2996] I. Bloch, O. Colliot, and R. Cesar. Modélisation de la relation spatiale "entre" pour des objets d'extensions spatiales très différentes. In *Reconnaissance des Formes et Intelligence Artificielle, RFIA'06*, Tours, France, January 2006.
[2997] M. Campedel, I. Kyrgyzov, and H. Maître. Sélection non supervisée d'attributs - application à l'indexation d'images satellitaires. In *SFC'07*, Paris, September 2007.
[2998] M. Campedel, M. Lienou, I. Kyrgyzov, and H. Maître. Vers la construction d'une ontologie appliquée à l'imagerie satellitaire. In *EGC'07 (atelier ECOI)*, Sophia Antipolis, January 2008.
[2999] M. Campedel and E. Moulines. Méthodologie de sélection de caractéristiques pour la classification d'images satellitaires. In *CAP05*, pages 107–108, Nice - France, June 2005.
[3000] S. Chambon, A. Moreno, A. Santhanam, R. Brocardo, J. Rolland, E. Angelini, and I. Bloch. Introduction d'un modèle de respiration dans une méthode de recalage à partir de points d'intérêt d'images tep et tdm du poumon. In *Reconnaissance des Formes et Intelligence Artificielle RFIA*, pages 779–788, Amiens, France, January 2008.
[3001] Ch.-A. Deledalle, L. Denis, and F. Tupin. Débruitage non-local itératif fondé sur un critère de similarité probabiliste. In *GRETSI*, Dijon, 2009.
[3002] R. El-Berbari, I. Bloch, N. Kachenoura, E. Mousseaux, A. Herment, and F. Frouin. Quantification automatisée de la transmuralité de l'infarctus du myocarde sur des images de rehaussement tardif en irm. In *Journées de Recherche en Imagerie et Technologies de la Santé RITS*, Lille, France, March 2009.
[3003] R. El-Berbari, N. Kachenoura, F. Frouin, A. Redheuil, A. Herment, I. Bloch, and E. Mousseaux. Evaluation d'une segmentation automatique de l'endocarde pour l'estimation des temps moyens et vitesses radiales de contraction. In *Groupe de Recherche sur les Applications du Magnétisme en Médécine (GRAMM)*, page 70, Lyon, France, March 2008.
[3004] R. Fallourd, J. M. Nicolas, E. Trouvé, and F. Tupin. La phase en imagerie cohérente : application au suréchantillonnage d'images rso. In *GRETSI*, Dijon, September 2009.
[3005] M. Gastaud, S. Ladjal, and H. Maître. Superrésolution aveugle d'images par la méthode des sous-espaces. In *GRETSI-07*, Troyes (France), September 2007.
[3006] D. Ghorbel, J. Anquez, V. Merzoug, C. Falip, E. Angelini, I. Bloch, and C. Adamsbaum. Quelle séquence T2 pour le poumon foetal ? In *Journées Francaises de Radiologie*, Paris, France, October 2008.
[3007] C. Hudelot, J. Atif, and I. Bloch. Ontologie de relations spatiales floues pour l'interprétation d'images. In *Rencontres francophones sur la Logique Floue et ses Applications, LFA 2006*, pages 363–370, Toulouse, France, October 2006.
[3008] C. Hudelot, J. Atif, and I. Bloch. Intégration de la morphologie mathématique floue dans une logique de description pour le raisonnement spatial. In *LFA*, pages 336–343, Lens, France, October 2008.
[3009] A. Kermi, I. Bloch, and M. Laskri. Une approche intégrant recalage non rigide et modèle déformable pour la reconstruction faciale tridimensionnelle. In *JETIM*, pages 91–96, Alger, Algérie, November 2006.
[3010] A. Kermi, I. Bloch, and M. Tayeb-Laskri. Recalage non rigide utilisant des déformations de forme libre (ffd) pour

la reconstruction faciale tridimensionnelle. In *8ième Colloque Africain sur la Recherche en Informatique CARI'06*, pages 377–384, Cotonou, Benin, 2006.
[3011] H. Khotanlou, J. Atif, B. Batrancourt, O. Colliot, E. Angelini, and I. Bloch. Segmentation de tumeurs cérébrales et intégration dans un modèle de l'anatomie. In *Reconnaissance des Formes et Intelligence Artificielle, RFIA'06*, Tours, France, January 2006.
[3012] S. Ladjal. Evaluation du flou dans les images naturelles. In *RFIA*, Tours, January 2006.
[3013] B. Luo, J. F. Aujol, Y. Gousseau, and S. Ladjal. Interpolation d'attributs ondelettes pour l'indexation de bases d'images satellitaires à différentes résolutions. In *GRETSI2007*, pages 221–224, September 2007.
[3014] G. Palma, O. Nempont, I. Bloch, and S. Muller. Extraction de "zones plates floues" dans des images de quantités floues. In *LFA*, pages 364–371, Lens, France, October 2008.
[3015] X. Perrotton, M. Sturzel, and M. Roux. Détection automatique d'objets dans les images aériennes. In *RFIA 2008*, Amiens, France, January 2008.
[3016] J. Rabin, Y. Gousseau, and J. Delon. Mise en correspondance de descripteurs géométriques locaux par méthode a contrario. In *GRETSI 2007*, Troyes, September 2007.
[3017] F. Rossant and I. Bloch. Amélioration de la reconnaissance de partitions musicales par modélisation floue et indication des erreurs possibles. In *GRETSI 2005*, pages 937–940, Louvain-La-Neuve, Belgique, September 2005.
[3018] F. Rossant, I. Ghorbel, I. Bloch, M. Pâques, and S. Tick. Segmentation des images oct de la rétine pour l'étude quantitative de la variabilité rétinienne. In *GRETSI*, Dijon, France, September 2009.
[3019] E. Rousseau and I. Bloch. Gestion de la saturation et des conflits en cascade en transport ferroviaire prenant en compte les imprécisions. In *ROADEF*, Lille, France, 2006.
[3020] T. Tanzi. Communication & transports. In *4^o rencontres technologiques Mobilite, Objets Communicants, Haut débit*, volume CD, Brest, ENSIETA, November 2005.
[3021] T. Tanzi and F. Lefeuvre. Apport des radio-sciences à la gestion des catastrophes. In *journées Scientifiques 2009 d'URSI-France, Propagation et Télédétection*, page 28, Paris France, June 2009.
[3022] T. J. Tanzi. Système de décision temps réel. In *IASI 2005 Observation et analyse de la transformation des territoires ruraux*, IASI, Roumanie, April 2005.
[3023] T. J. Tanzi and S. Servigne. Surveillance vidéo des transports de matières dangereuses. In *INFORSID 2005*, pages 5 – 14, Grenoble France, May 2005.
[3024] N. Widynski, S. Dubuisson, and I. Bloch. Intégration de relations spatiales floues dans un filtre particulaire pour le suivi d'objets. In *GRETSI*, Dijon, France, September 2009.

13.3.6 COM: Talks in Conferences Which Do Not Publish Proceedings

[3025] M. Costache and M. Datcu. Bayesian enhancement of a svm based image search engine. In *ESA EUSC 2006*, Spain Madrid, November 2006.
[3026] L. Denis, F. Tupin, J. Darbon, and M. Sigelle. Sar image regularization with graph-cuts based fast approximate discrete minimization. In *Approximation and Optimization in Image Restoration and Reconstruction*, Ile de Porquerolles, France, June 2009.
[3027] T. Hurtut, H. Dalazoana, Y. Gousseau, F. Schmitt, and F. Cheriet. Recherche automatique dans une base de données d'enluminures selon l'organisation spatiale des couleurs. In *Signal Image et Arts, organisée par la Section Signal et Image du club EEA*, Paris, June 2006.
[3028] M. Lienou, H. Maître, and M. Datcu. Is it possible to automatically produce a CORINE land cover map from a single SPOT image? In *ESA EUSC*, Madrid, Espagne, November 2006.
[3029] M. Marim, E. Angelini, and J.-C. Olivo-Marin. A compressed sensing approach for biological microscopic image denoising. In *SPARS*, Saint Malo, April 2009.
[3030] F. Schmitt, C. Hernandez, and T. Tung. Indexation and 3d-modeling developed in sculpteur project. In *Digital Semantic Content across Cultures*, Paris, the Louvre, France, May 2006.

13.3.7 OS: Books and Book Chapters

[3031] I. Bloch. Discrete Representations. In *Image Processing (H. Maître Ed.)*, chapter 3, pages 41–74. ISTE Wiley, London, UK, 2008.
[3032] I. Bloch. *(Ed). Information Fusion in Signal and Image Processing*. ISTE-Wiley, London, UK, 2008.
[3033] I. Bloch. Fuzzy Representations of Spatial Relations for Spatial Reasoning. In *Handbook of Granular Computing (W. Pedrycz, A. Skowron and V. Kreinovich, Eds.)*, chapter 28, pages 629–655. John Wiley & Sons, 2008.
[3034] I. Bloch. Mathematical Morphology. In *Image Processing (H. Maître Ed.)*, chapter 5, pages 97–140. ISTE Wiley, London, UK, 2008.
[3035] I. Bloch. Bipolar Fuzzy Spatial Information: First Operations in the Mathematical Morphology Setting. In R. K. De, D. P. Mandal, and A. Ghosh, editors, *Machine Interpretation of Patterns: Image Analysis, Data Mining and Bioinformatics*. World Scientific Press, 2009.
[3036] I. Bloch. Ensembles flous et morphologie mathématique. In *Morphologie Mathématique (L. Najman and H. Talbot ed.)*. Hermès, Paris, France, 2009.
[3037] I. Bloch. Fuzzy methods in medical imaging. In *The Handbook of Biomedical Image Analysis (N. Ayache, J. Duncan and N. Paragios Eds.)*. Springer, 2009.

[3038] I. Bloch. Knowledge-driven recognition and segmentation of internal brain structures in 3D MRI. In *Computional Surgery and Dual Training*. Springer, 2009.
[3039] I. Bloch, H. Heijmans, and C. Ronse. Mathematical Morphology. In M. Aiello, I. Pratt-Hartman, and J. van Benthem, editors, *Handbook of Spatial Logics*, chapter 13, pages 857–947. Springer, 2006.
[3040] C. Cavaro-Ménard, A. Nait-Ali, J.-Y. Tanguy, E. Angelini, C. Lebozec, and J.-J. Le Jeune. Spécificités des signaux physiologiques et des images médicales. In *Compression des Images et des Signaux Médicaux*, chapter 3, pages 65–98. Hermes Science, Lavoisier, 2007.
[3041] C. Cavaro-Ménard, A. Nait-Ali, J.-Y. Tanguy, E. Angelini, C. Lebozec, and J.-J. Le Jeune. Specificities of Physiological Signals and Medical Images. In *Compression of Biomedical Images and Signals*, pages 43–74. Wiley, 2008.
[3042] J. Delon and A. Almansa. Reconstruction stéréo en imagerie satellitaire ou aérienne. In *Problèmes inverses en imagerie et en vision*, chapter 12. Hermès, 2008.
[3043] Q. Duan, E. Angelini, O. Gerard, K. D. Costa, J. W. Holmes, S. Homma, and A. Laine. Cardiac motion analysis based on optical-flow of real-time 3-d ultrasound data. In *Advances in Diagnostic and Therapeutic Ultrasound Imaging*, chapter 9, pages 227–246. J. S. Suri, C. Kathuria, R.-F. Chang, F. Molinari, A. Fenster (Artech House), 2008.
[3044] Q. Duan, E. Angelini, S. Homma, and A. Laine. Tracking endocardium using optical flow along isovalue curve. In *Principles and Advanced Methods in Medical Imaging and Image Analysis*, chapter 14, pages 337–360. World Scientific Publishing, Singapore, 2008.
[3045] S. Essid, M. Campedel, G. Richard, T. Piatrik, R. Benmokhtar, and B. Huet. Machine learning techniques for multimedia analysis. In *The Multimedia Semantics Handbook*, chapter 5. Wiley, 2009.
[3046] M. Gschwind, H. Brettel, and I. Rentschler. Prior knowledge and learning in 3D object recognition. In N. Osaka, I. Rentschler, and I. Biederman, editors, *Object Recognition, Attention, and Action*, chapter 7, pages 105–117. Springer, Tokyo, 2007.
[3047] C. Imieliska, J. Udupa, D. Metaxas, Y. Jin, E. Angelini, T. Chen, and Y. Zhuge. Hybrid segmentation methods. In T. Yoo, editor, *Principles and Practice for Segmentation, Registration, and Image Analysis*, chapter 12, pages 351–388. A.K. Peters, Wellesey, MA, USA, 2005.
[3048] H. Maître. *(Ed). Image Processing*. ISTE Wiley, London, UK, 2008.
[3049] N. Milisavljevic and I. Bloch. Improving Mine Recognition through Processing and Dempster-Shafer Fusion of Multisensor Data. In M. Sarfraz, editor, *Computer-Aided Intelligent Recognition, Techniques and Applications*, chapter 17, pages 319–343. J. Wiley, 2005.
[3050] N. Milisavljevic, I. Bloch, and M. Acheroy. Multi-Sensor Data Fusion Based on Belief Functions and Possibility Theory: Close Range Antipersonnel Mine Detection and Remote Sensing Mined Area Reduction. In *Humanitarian Demining: Innovative Solutions and the Challenge of Technology, M. K. Habib Ed.*, chapter 4, pages 392–418. ARS I-Tech Education and Publishing, Vienna, Austria, 2008.
[3051] N. Milisavljevic, I. Bloch, V. Alberga, and G. Satalino. Three strategies for fusion of land cover classification results of polarimetric SAR data. In *Sensor and Data Fusion (N. Milisavljevic Ed.)*, chapter 16, pages 277–298. InTech, Croatia, 2009.
[3052] A. Moreno, C. M. Takemura, O. Colliot, O. Camara, and I. Bloch. Using the Fuzzy Spatial Relation 'Between' to segment the Heart in Computerized Tomography Images. In B. Bouchon-Meunier, R.R. Yager, C. Marsala, and M. Rifqi, editors, *Uncertainty and Intelligent Information Systems*, chapter 26, pages 359–374. World Scientific, 2008.
[3053] P. Muse, F. Sur, F. Cao, Y. Gousseau, and J.-M. Morel. Shape recognition based on an a contrario methodology. In H. Krim and A. Yezzi, editors, *Statistic and Analysis of Shapes*, pages 107–136. Birkhauser, 2006.
[3054] G. Peters, S. Muller, S. Bernard, and I. Bloch. Wavelets and Fuzzy Contours in 3D-CAD for Digital Breast Tomosynthesis. In M. Nachtegael, D. van der Weken, E. Kerre, and W. Philips, editors, *Soft Computing in Image Processing: Recent Advances*, pages 296–326. Springer, 2006.
[3055] T. Tanzi and F. Delmer. *Ingénierie du risque*. Hermes, Coll. Sciences et technologies, Paris, 2006.
[3056] T. Tanzi and P. Perrot. *Télécoms et ingénierie des risques*. Collection Technique et Scientifique des Télécoms, Paris - France, 2009.

13.3.8 AP-P: Patents

[3057] E. Angelini, E. Mandonnet, and J. Delon. Procédé de quantification de l'évolution des changements de volumes de corps, notamment de tumeurs (submitted). (patent application 09 53578), May 2009.
[3058] N. Bonnier and F. Schmitt. Method, apparatus and computer program for transforming digital colour images. (patent application Europa: 07117464.3.), September 2007.

13.3.9 AP-R: Selected Technical Reports and Preprints

[3059] M. Campedel. Performance evaluators for relevance feedback and classifiers. Technical report, École Nationale Supérieure des Télécommunications, July 2007.
[3060] F. Cao, Y. Gousseau, S. Masnou, and P. Pérez. Geometrically guided exemplar-based inpainting. Technical Report 2009D012, Telecom ParisTech, May 2009.
[3061] V. Duval, J. F. Aujol, and Y. Gousseau. The tvl1 model : a geometric point of view. Technical Report 2009D011, Telecom ParisTech, May 2009.

[3062] T. Hurtut, Y. Gousseau, F. Cheriet, and F. Schmitt. Pictorial content analysis of line-drawings using geometrical shape information. Technical report, 2008E001 TELECOM ParisTech, March 2008.

[3063] V. Israel-Jost, J. Daron, E. Angelini, and I. Bloch. Multi-Phase and Multi-Channel Region Segmentation and Application in Brain MRI. Technical report, UCLA, CAM08-75, November 2008.

[3064] I. O. Kyrgyzov, M. Campedel, M. Roux, T. Tanzi, and S. Rital. Exiter 08 final report. Technical Report 00, Télécom ParisTech, January 2009.

[3065] S. Ladjal, J.-F. Aujol, and S. Masnou. Exemplar-based inpainting from a variational point of view. Technical Report CMLA Preprint 2008-42, CMLA, ENS Cachan, December 2008.

[3066] M. Lienou, M. Campedel, M. Datcu, and H. Maître. Apprentissage automatique de la production de cartes d'occupation des sols. Technical Report R-S05 - OT-0004-015, École Nationale Supérieure des Télécommunications, December 2006.

[3067] Th. Napoléon, T. Adamek, F. Schmitt, and N. E. O'Connor. Multi-view 3d retrieval using silhouette intersection and multi-scale contour representation. Technical Report In: Remco C. Veltkamp, Frank B. ter Haar (eds.), SHREC2007, 3D Shape Retrieval Contest, Technical Report UU-CS-2007-015, Department of Information and Computing Sciences, Utrecht University, June 2007.

[3068] Th. Napoléon and H. Sahbi. From 2d photography to 3d object retrieval: Contributions and benchmarking. Technical report, TELECOM ParisTech, February 2009.

[3069] J. M. Nicolas. Les approches temporelles en imagerie cohérente. Technical report, TELECOM ParisTech, 2008D016, October 2008.

[3070] J. Rabin, J. Delon, and Y. Gousseau. Une approche à contrario pour la mise en correspondance de descripteurs locaux. Technical Report 2008D015, Telecom ParisTech, May 2008.

[3071] H. Sahbi, J.-Y. Audibert, J. Rabarisoa, and R. Keriven. Context-dependent kernel design for object matching and recognition. Technical report, Telecom ParisTech, 2007D018, December 2007.

[3072] T. Tung and F. Schmitt. Shape retrieval of watertight models and cad models using amrg. Technical Report In: Remco C. Veltkamp, Frank B. ter Haar (eds.), SHREC2007, 3D Shape Retrieval Contest, Technical Report UU-CS-2007-015, Department of Information and Computing Sciences, Utrecht University, June 2007.

[3073] G.-S. Xia, J. Delon, and Y. Gousseau. Invariant texture indexing using topographic maps. Technical Report 2009D007, Telecom ParisTech, 2009.


INSTITUT
TELECOM


TELECOM
ParisTech


cnrs