



RESEARCH CENTER

FIELD

Perception, Cognition and Interaction

Activity Report 2013

Section highlights of the Team

Edition: 2014-03-20

DATA AND KNOWLEDGE REPRESENTATION AND PROCESSING

1. DAHU Project-Team	5
2. DREAM Project-Team	6
3. EXMO Project-Team	7
4. GRAPHIK Project-Team	8
5. LINKS Team	9
6. MAGNET Team	10
7. MAIA Project-Team	11
8. OAK Project-Team	12
9. ORPAILLEUR Project-Team	13
10. SMIS Project-Team (section vide)	14
11. TYREX Team	15
12. WIMMICS Project-Team	16
13. ZENITH Project-Team	17

INTERACTION AND VISUALIZATION

14. ALICE Project-Team (section vide)	18
15. AVIZ Project-Team	19
16. HYBRID Project-Team	20
17. IMAGINE Project-Team	21
18. IN-SITU Project-Team	22
19. MANAO Team	23
20. MAVERICK Project-Team	24
21. MIMETIC Project-Team	25
22. MINT Project-Team	26
23. POTIOC Team	27
24. REVES Project-Team	28
25. TITANE Team	29

LANGUAGE, SPEECH AND AUDIO

26. ALPAGE Project-Team	30
27. PANAMA Project-Team	31
28. PAROLE Project-Team (section vide)	32
29. SÉMAGRAMME Project-Team	33

ROBOTICS

30. COPRIN Project-Team (section vide)	34
31. IMARA Project-Team	35

ROBOTICS AND SMART ENVIRONMENTS

32. E-MOTION Project-Team	36
33. FLOWERS Project-Team	37
34. LAGADIC Project-Team (section vide)	38

VISION, PERCEPTION AND MULTIMEDIA INTERPRETATION

35. AYIN Team	39
---------------	----

36. LEAR Project-Team	40
37. MAGRIT Project-Team	41
38. MORPHEO Team	42
39. PERCEPTION Team	43
40. Prima Project-Team (section vide)	44
41. SIROCCO Project-Team	45
42. STARS Project-Team	46
43. TEXMEX Project-Team	47
44. WILLOW Project-Team	48

DAHU Project-Team

2.2. Highlights of the Year

Serge Abiteboul was awarded the 2013 Milner awards.

DREAM Project-Team

2.3. Highlights of the Year

Prof. Torsten Schaub (Potsdam University, Germany) has been awarded an Inria international senior grant from 2103 to 2017 for a research project with EPI-DREAM. This research will be concerned with using ASP for data stream post-mining.

EXMO Project-Team

2.2. Highlights of the Year

This year saw the publication of the second edition, largely revised and augmented, of our reference book *Ontology matching* [12].

GRAPHIK Project-Team

2.5. Highlights of the Year

- Rallou Thomopoulos defended her HDR, entitled *Aide à la décision dans les filières agroalimentaires*, on Dec. 2013.
- Three papers from the team were accepted at IJCAI 2013 (International Joint Conference in Artificial Intelligence), the major conference in Artificial Intelligence [41], [37], [42].

LINKS Team

2.2. Highlights of the Year

Our paper ‘A trichotomy for regular simple path queries on graphs’ has been accepted for publication in the Proceedings of the 32nd ACM SIGMOD-SIGACT-SIGART Symposium on *Principles of Database Systems*, PODS 2013, the top conference in the field of theoretical databases. The paper addresses an open problem, i.e. giving a complete classification of regular languages with respect to regular simple path queries (RSPQs), the latter being regular path queries (RPQs) with an additional constraint that prevents traversing two nodes multiple times. In particular, we have characterized the boundary between tractability and intractability, and proved a trichotomy: the evaluation of RSPQs is either AC⁰, NL-complete or NP-complete in data complexity.

Pierre Bourhis has been recruited as CNRS researcher at LIFL and joined the team in October.

MAGNET Team

2.2. Highlights of the Year

As first highlight, we are happy to report that our paper “Fiedler Random Fields: A Large-Scale Spectral Approach to Statistical Network Modeling” has been accepted for publication at *Journal of Machine Learning Research*, the top journal in the field of machine learning. This paper’s contributions are twofold. First, we introduce the Fiedler delta statistic, based on the Laplacian spectrum of graphs, which allows to dispense with any parametric assumption concerning the modeled network properties. Second, we use the defined statistic to develop the Fiedler random field model, which allows for efficient estimation of edge distributions over large-scale random networks. After analyzing the dependence structure involved in Fiedler random fields, we estimate them over several real-world networks, showing that they achieve a much higher modeling accuracy than other well-known statistical approaches.

The second highlight of the year is the publication of our paper “Improving pairwise coreference models through feature space hierarchy learning” at the annual *Meeting of the Association for Computational Linguistics (ACL 2013)*, the premier conference in the field of Natural Language Processing. This paper proposes a new method for significantly improving the performance of pairwise coreference models. Given a set of indicators, our method learns how to best separate types of mention pairs into equivalence classes for which we construct distinct classification models. In effect, our approach finds an optimal feature space (derived from a base feature set and indicator set) for discriminating coreferential mention pairs. Although our approach explores a very large space of possible feature spaces, it remains tractable by exploiting the structure of the hierarchies built from the indicators. Our experiments on the CoNLL-2012 Shared Task English datasets (gold mentions) indicate that our method is robust relative to different clustering strategies and evaluation metrics, showing large and consistent improvements over a single pairwise model using the same base features.

MAIA Project-Team

2.2. Highlights of the Year

- the MAIA team was rewarded as “*the most influential team of the research field*” during the French conference on Planification, Decision and Learning (JFPDA 2013).
- M. Tlig, O. Buffet, O. Simonin got the Best Paper Award for their paper presented at RJCIA-13 [38].

OAK Project-Team

2.1. Highlights of the Year

The year has seen the finalization of five major research activities: XML materialized view maintenance [4], XML static type analysis [5], document management through semantic annotations [7], scalable dissemination of Web data [8], and XML type-based projection [13]. The respective five publications appeared in A* journals (according to the CORE ERA ranking).

ORPAILLEUR Project-Team

2.2. Highlights of the Year

For the highlights of the year, we would like to mention the work of Anisah Ghoorah on the KBDOCK system which was accepted in the Database issue of Nucleic Acids Research [6] and as well her paper on “Protein Docking Using Case-Based Reasoning” for the special issue CAPRI [21].

SMIS Project-Team (section vide)

TYREX Team

2.2. Highlights of the Year

Pierre Genevès, CNRS researcher, received the bronze medal of CNRS in a ceremony organized on october 4th, 2013, in Grenoble. This medal was awarded by the CNRS INS2I institute.

WIMMICS Project-Team

2.2. Highlights of the Year

Best Paper Award at IEEE International Conference on Cognitive Infocommunications: Franck Berthelon and Peter Sander, *Regression Algorithm for Emotion Detection* [53].

Best Demo Award at ESWC: Nicolas Marie, Myriam Ribière, Fabien Gandon and Damien Legrand, *Exploratory search on the top of DBpedia chapters with the Discovery Hub application*.

Second best poster at SSSW, the 10th Summer School on Ontology Engineering and the Semantic Web, Rakebul Hasan and Fabien Gandon, *Linked Justifications*.

First ANR LabCom (joint laboratory SMILK) in computer science with the company Viseo.

The project *The Showcase Machine*, follow-up of DiscoveryHub, wins the challenge *Jeune Pousse* at Telecom Valley in Sophia Antipolis.

BEST PAPER AWARD :

[31] **ESWC - 10th International Conference on The Semantic Web: Semantics and Big Data - 2013**. E. CABRIO, S. VILLATA, F. GANDON.

ZENITH Project-Team

2.2. Highlights of the Year

- BigdataNet: an associated team between Zenith and the distributed systems team of Profs. Amr El Abbadi and Divy Agrawal at University of California, Santa Barbara, since January 2013.
- Since October, Zenith participates in the European FP7 IP CoherentPaaS Project.
- The release of PlantNet iPhone App ¹, an image sharing and retrieval application for the identification of plants integrating several research contributions of Alexis Joly.

¹<https://itunes.apple.com/en/app/plantnet/id600547573>

ALICE Project-Team (section vide)

AVIZ Project-Team

2.3. Highlights of the Year

AVIZ received one best paper award and one best paper honorable mention award at the ACM CHI Conference on Human Factors in Computing Systems.

AVIZ received one best paper honorable mention award and one best poster award [30] at the IEEE Visualization conference.

AVIZ received one best paper honorable mention award at the IFIP TC13 Conference on Human-Computer Interaction (INTERACT).

Petra Isenberg co-organized the Dagstuhl seminar on “Interaction with Information for Visual Reasoning”, August 25–30.

Aviz hired a Fab manager for Digiscope’s Fab Lab (<http://fablabdigiscope.wordpress.com/>).

Aviz organized a Workshop on The New Statistics: Estimation for Better Research (<http://www.aviz.fr/Research/NewStatisticsWorkshop>).

Aviz organized a visit with demos for the CHI 2013 conference attendees (<http://www.aviz.fr/Research/Visit2013>).

Aviz co-organized the International Workshop on Interactive Ultra-High-Resolution Displays (<http://www.powerwall.mdx.ac.uk/>) as part of CHI 2013.

Yvonne Jansen and Pierre Dragicevic were interviewed by Enrico Bertini and Moritz Stefaner (<http://datastori.es/episode17-data-sculptures/>) on physical visualizations.

Petra Isenberg was interviewed by Enrico Bertini and Moritz Stefaner (<http://datastori.es/ds26-visualization-beyond-desktop/>) about her work on Visualization Beyond the Desktop.

BEST PAPERS AWARDS :

[28] **Proceedings of the 2013 Annual Conference on Human Factors in Computing Systems (CHI 2013).**

B. ALPER, B. BACH, N. HENRY RICHE, T. ISENBERG, J.-D. FEKETE.

[36] **Proceedings of the Conference on Human Factors in Computing Systems (CHI).** J. FUCHS, F. FISCHER, F. MANSMANN, E. BERTINI, P. ISENBERG.

[] **IEEE Transactions on Visualization and Computer Graphics.** C. PERIN, R. VUILLEMOT, J.-D. FEKETE.

[38] **Proceedings of the IFIP TC13 Conference on Human-Computer Interaction (INTERACT).** S. HURON, P. ISENBERG, J.-D. FEKETE.

HYBRID Project-Team

2.2. Highlights of the Year

- Anatole Lécuyer was awarded the Inria-Académie des Sciences (French Academy of Sciences) "Young Researcher" Prize 2013.
- Paper from Anthony Talvas, Maud Marchal and Anatole Lécuyer received the "Best Technote Award" at IEEE Symposium on 3D User Interfaces 2013 (IEEE 3DUI'13).
- Paper from Ferran Argelaguet, David Gómez Jáuregui, Maud Marchal and Anatole Lécuyer was selected as one of the best papers at ACM Symposium on Applied Perception 2013 (ACM SAP'13).
- Paper from Charles Pontonnier, Thierry Duval and Georges Dumont was selected as one of the best papers at IEEE Conference on Cognitive Infocommunication 2013 (IEEE CogIncoCom'2013).
- Two projects in which Hybrid is involved were awarded at the trophies "Loading the Future 2013" organized by French Competitivity Cluster "Images et Réseaux": ACOUSTIC (Grand Prize) (section 8.2.4) and W3D (SME Prize) (section 8.1.2).
- Project OpenViBE2 (section 8.2.5) coordinated by Hybrid has received the "Projet Phare" label by French ANR (National Research Agency). It successfully ended in January 2013 year with a press release and a press conference which generated a massive media coverage.

BEST PAPERS AWARDS :

[42] **IEEE Symposium on 3D User Interfaces.** A. TALVAS, M. MARCHAL, A. LÉCUYER.

[] **ACM Transactions on Applied Perception.** F. ARGELAGUET SANZ, D. A. GÓMEZ JÁUREGUI, M. MARCHAL, A. LÉCUYER.

[40] **IEEE international conference on cognitive infocommunication.** C. PONTONNIER, T. DUVAL, G. DUMONT.

IMAGINE Project-Team

2.2. Highlights of the Year

- One publication was accepted at SIGGRAPH 2013 [14], and two publications at SIGGRAPH Asia 2013 [5], [8].
- Prof. Michael Gleicher from University of Wisconsin is visiting our team during one year.
- France 3 made a video reportage about our team.
- An interview of Marie-Paule Cani was published in People of ACM.
- Marie-Paule Cani became vice chair of Eurographics.
- Computer Vision and Image Understanding 2013 Most cited paper award : *A survey of vision-based methods for action representation, segmentation and recognition*, by Daniel Weinland, Remi Ronfard and Edmond Boyer.

IN-SITU Project-Team

2.3. Highlights of the Year

- InSitu received two best paper awards, one at INTERACT [21] (Brian Shackel award) and the other at IEEE/VRST [28], and one honorable mention at ACM/CHI [34].
- InSitu (Wendy Mackay, General Chair, Michel Beaudouin-Lafon, Technical Program co-chair) organised the 31st ACM Conference on Human Factors in Computing Systems (CHI '13), which took place in Paris and was a great success (3500 participants, 1000 presentations).
- W. Mackay's ERC Advanced Grant, "CREATIV: Creating Human Computer Partnerships", started on June 1, 2013

BEST PAPERS AWARDS :

[21] **INTERACT 2013 - 14th IFIP TC13 Conference on Human-Computer Interaction.** M. ELIAS, M.-A. AUFAURE, A. BEZERIANOS.

[28] **VRST '13: 19th ACM Symposium on Virtual Reality Software and Technology.** C. PINDAT, E. PIETRIGA, O. CHAPUIS, C. PUECH.

[34] **CHI'13 - 31st International Conference on Human Factors in Computing Systems.** J. WAGNER, M. NANCEL, S. GUSTAFSON, S. HUOT, W. E. MACKAY.

MANAO Team

2.3. Highlights of the Year

The first highlight of the year was the team’s strong participation at SIGGRAPH: three full technical papers, one talk, and the organization of Inria booth at the exhibition. As a result, the projects got major media coverage (100 000 views of paper videos, publications in internet media) and strong industrial interest (Zeiss, Schneider-Kreuznach, Blender, The Foundry, 3DS).

As a second highlight, the *Eigen* library – whose main contributors include Gaël Guennebaud and Desiré Nuyts – has received the “High Quality Software in Geometry Processing Award 2013” at the Symposium on Geometry Processing (SGP), a prestigious prize for software development. This prize shows that the library has become a quasi-standard in the field.

The third highlight is shared with our partners of the ANR SeARCH project (see Section 7.2.1). The results of our collaborative work on the Isis statue was one of the key events of a 6 months exhibition at the “Musée Royal de Mariemont” in Brussels. We also had a major success with our interactive installation “The Revealing Flashlight” (cf. Figure 3). These results were made possible by the new visualization and re-assembly tools developed in our team.



Figure 3. The installation “The Revealing Flashlight” lets visitors explore ancient artifacts interactively.

MAVERICK Project-Team

2.2. Highlights of the Year

Our paper on “Diffusion Curves” [2], originally published in 2008, was featured in the “Research Highlights” section of *Communications of the ACM* [14].

Our work on using the covariance matrix for illumination simulation, in cooperation with F. Durand at MIT, have been published in *ACM Transactions on Graphics* [5].

Our work on on efficient sampling and filtering for displacement maps and texture maps have been published at *Siggraph Asia* and *ACM Transactions on Graphics* [8]. This work was done in cooperation with University of Lyon and University of Montreal. Initial response by the community has been enthusiastic.

BEST PAPER AWARD :

[17] **I3D’13 - ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games**. E. HEITZ, D. NOWROUZEZAHRAI, P. POULIN, F. NEYRET.

MIMETIC Project-Team

2.2. Highlights of the Year

Finalist of best manipulation paper award in ICRA 2013 for the paper entitled: .

Best Paper Award in IEEE Coginfocom 2013 for the paper entitled:

BEST PAPERS AWARDS :

[24] **IEEE International Conference on Robotics and Automation ICRA.** Y. LI, J.-P. SAUT, A. SAHBANI, P. BIDAUD, J. PETTRÉ, F. MULTON.

[28] **IEEE international conference on cognitive infocommunication.** C. PONTONNIER, T. DUVAL, G. DUMONT.

MINT Project-Team

2.2. Highlights of the Year

Gery Casiez was hired as full Professor.

Fanny Chevalier has been recruited as an Inria Researcher.

POTIOC Team

2.2. Highlights of the Year

- Potioc has organized **IHM 2013**, the French conference on Human-Computer Interaction, in cooperation with the AFIHM association. This conference gathered about 125 participants. A **dedicated collection** has been created on HAL.
- A tutorial about interaction techniques for 3D environments was presented at Eurographics 2013 [13] and Web3D 2013 [14].

REVES Project-Team

2.2. Highlights of the Year

The past year was highly productive, with a large number of top-level publications. Most notably, 4 papers ([11], [14], [12], [18]) were presented at ACM SIGGRAPH 2013 in Los Angeles. These ACM Transactions on Graphics papers are the best publication in our field.

The continuing industrial interest in our work, both via bilateral contracts and EU initiatives with companies has grown in this year, on the topics of image-based relighting, image-based rendering and materials for vector art. This is a very promising trend for the future.

TITANE Team

2.2. Highlights of the Year

We obtained the second best paper award at the EUROGRAPHICS Symposium on Geometry Processing.

ALPAGE Project-Team

2.2. Highlights of the Year

2.2.1. *Nomination at the Institut Universitaire de France*

Laurence Danlos is a Senior Member of the Institut Universitaire de France since October 2013

2.2.2. *Statistical Parsing of Morphologically Rich Languages*

Since several years, Djamé Seddah, together with Marie-Hélène Candito and more generally the whole Alpage team, has played a major role in setting up and animating an international network of researchers focusing on parsing morphologically rich languages (MRLs).

This year, Djamé Seddah has led the organization of the **first shared task on parsing MRLs**, hosted by the fourth SPMRL workshop [29]. Its primary goal was to bring forward work on parsing morphologically ambiguous input in both dependency and constituency parsing, and to show the state of the art for MRLs. We compiled data for as many as 9 languages, which represents an immense scientific and technical challenge.

Alpage participated to this shared task with two systems. The first one, applied to French only, belongs to the Bonsai series of parsers, adapted in collaboration with the LIGM in order to better deal with multi-word units [19]. It was **ranked first**, and is therefore the best known parser for French to date.

The other Alpage system which took part to this shared task is Éric Villemonte De La Clergerie's new DyALog-based shift-reduced parser [30], which was applied to all 9 languages. It is the **second best system overall**.

PANAMA Project-Team

2.4. Highlights of the Year

R. Gribonval was elevated to the grade of IEEE Fellow *for contributions to the theory and applications of sparse signal processing*.

Frédéric Bimbot was General Chairman of the Interspeech 2013 Conference in Lyon which gathered around 1400 participants.

The IEEE 2012 SPS Young Author Best Paper Award has been awarded to Ngoc Duong [4], former Ph.D. student in the METISS team.

PAROLE Project-Team (section vide)

SÉMAGRAMME Project-Team

2.2. Highlights of the Year

Dr. Ekatarina Lebedeva (together with Wesley H. Holliday, Stanford University) won the E.W. Beth Dissertation Prize, awarded by FoLLI (the Association for Logic, Language, and Information) to outstanding dissertations in the fields of Logic, Language, and Information. Dr. Ekatarina Lebedeva prepared her PhD thesis in the Sémagramme team, under the supervision of Philippe de Groote. She obtained her PhD degree from the *Université de Lorraine* in April 2012.

COPRIN Project-Team (section vide)

IMARA Project-Team

2.2. Highlights of the Year

- The Grand Prix National de l'Ingénierie 2013 (Grand National Engineering Award 2013 ²) has been awarded to AKKA Technologies and Inria for the Link & Go project: the first dual-mode concept for an electric vehicle.
- Best paper award for the paper entitled "ABV- A Low Speed Automation Project to Study the Technical Feasibility of Fully Automated Driving" [41] at the workshop on Mobility Assistance and Service Robotics (November 9th, 2013, Kumamoto, Japan).
- Carrefour du PREDIT 2013 Prize: Fawzi Nashashibi was the winner of the Carrefour du PREDIT 2013 for the project SPEEDCAM he coordinated (Speed limit determination using camera and maps). The other partners of this 3-years ANR-DEUFRAKO project are: ARMINES, VALEO, DAIMLER, HOSCHULE AALEN.
- As a member of the Robotics Theme in the field "perception, cognition and interaction" at Inria, IMARA passed successfully the evaluation of the theme organized in March 2013. The evaluation committee was composed of international experts from both academia and industrial backgrounds.

²<http://www.cgedd.developpement-durable.gouv.fr/le-grand-prix-national-de-l-r159.html>

E-MOTION Project-Team

2.2. Highlights of the Year

Awards :

- C. Laugier, Ph. Martinet and C. Stiller have received the “Most Active IEEE RAS Technical Committee Award of the year 2013” for the Technical Committee they are co-chairing on “Autonomous Ground Vehicles and Intelligent Transportation Systems”. This prize has been announced during the award ceremony of the annual IEEE ICRA conference in Karlsruhe.
- C. Laugier has been invited by the French Ministry of Foreign Affairs and by the Taiwan Office in Paris to participate as a French Robotics Expert, to the high level French delegation conducted by Mme Edith Cresson (former prime minister), October 2013.
- C. Laugier was a member of the Best paper Award Committee of the IEEE ICRA 2013 conference, Karlsruhe, May 2013.
- C. Laugier was chair of the Best paper Award Committee of the 5th PPNIV Workshop organized in the scope of the IEEE/RSJ IROS 2013 conference. The prize was given by the IEEE RAS Technical Committee on “Autonomous Ground Vehicles and Intelligent Transportation Systems”.

Patents:

- S. Lefevre, C. Laugier, and J. Ibanez-Guzman have submitted a patent (Inria and Renault) on “Method and process for the evaluation of the risk of collision at intersections”. The patent has initially been submitted in 2012 and finalized in 2013.
- I. Paromtchik and C. Laugier have submitted in 2013 a patent on “Method and apparatus for improving driving safety of a vehicle travelling on a road”. Patent no. 13305275.3-1803.
- S. Lefevre, C. Laugier and R. Bajcsy have submitted in 2013 a patent (Inria and UC Berkeley) on "Decision Making for Collision Avoidance Systems". Patent no. 13306495.6-1810.

Invited talks:

- C. Laugier has given an invited talk entitled "Road Scene Understanding using Bayesian Perception & Risk Assessment" at the Colloquium on Intelligent Robots and Systems, Osaka, June 14th 2013.
- C. Laugier has given an invited talk entitled "Embedded Bayesian Perception and Situation Awareness for Mobile Robots" at a NTU-iCeIRA Seminar on Intelligent Robotics, Taipei, May 2013.
- C. Laugier has given an invited lecture entitled "Embedded Bayesian Perception and Situation Awareness Robots & Intelligent Vehicles" at Toyota Technological Institute, Nagoya, June 2013.
- C. Laugier has given an invited talk entitled “Embedded Perception & Risk Assessment for Intelligent Vehicles” at the Workshop “Vehicle Autonomy in Urban Transportation Systems” IEEE ICRA 2013, Karlsruhe, May 10th 2013.
- C. Laugier has given a keynote talk entitled “Road Scenes Understanding & Risk Assessment using Embedded Bayesian Perception” at the 5th PPNIV Workshop, IEEE IROS 2013, Tokyo, November 2013.
- C. Laugier has given an introductory talk entitled “Embedded Perception for Future Cars” at the Seminar In’Tech “Perception embarquée pour les véhicules de demain”, Inria Grenoble Rhône-Alpes, Grenoble, October 24th 2013.
- C. Laugier and A. Spalanzani have given a tutorial on “Autonomous Robotics” at the ISIE 2013 Conference, Taipei, May 2013.

FLOWERS Project-Team

2.2. Highlights of the Year

In April 2013 at the International Conference on Robotics and Automation in Karlsruhe, Freek Stulp received the “King-Sun Fu Best Paper Award of the IEEE Transactions on Robotics”. As T-RO has one of the highest impact factors, this is considered to be the highest paper prize in robotics. It is the first time this prize has been awarded to an article on machine learning.

The team has announced in October 2013 the open-source release of the Poppy humanoid robot. Poppy is to our knowledge the first humanoid robot in the world to be at the same time open-source (hardware and software) and based on 3D printing techniques. It is based on robust, flexible, easy-to-use hardware and software. Its development aims at providing an affordable and hackable humanoid robot for science, education, art and geeks. Poppy was initially made for our research project about understanding the role of morphology in biped locomotion, and full-body physical and social interaction in robots and humans. The robot has generated a huge enthusiasm from geeks, academic laboratories, and educational institutions, and within the first two months already 200 beta-testers registered to rebuild their own copy of the robot. Dozens of articles appeared on the internet and printed press, and the Poppy videos were viewed nearly 40k times. Web site: <http://www.poppy-project.org>.

The Flowers team made major achievements in diffusing science and technology towards the general public. Pierre-Yves Oudeyer published a popular science book entitled "Aux sources de la parole" at Odile Jacob, and was invited to talk about our research on major radio channels (e.g. France Inter, France Culture, France Info). <http://www.pyoudeyer.com/AuxSourcesDeLaParole.htm>

The team also initiated the development of educational activities in "écoles primaires" and "collèges" to have kids discover robotics and programming, as well as ran experiments in "écoles primaires" in Aquitaine to test novel educational software to help children learn mathematics, and developed within the KidLearn ADT project. This was achieved thanks to the arrival of Didier Roy, former math teacher in college, in the team.

The Flowers team is now coordinating the European project "Semi-autonomous 3rdHand" (coord. Manuel Lopes). The goal is to develop a semi-autonomous robot assistant that acts as a third hand of a human worker in factories, which may be a transformative technology for industry in the coming years. It aims to elaborate techniques allowing to instruct even by an untrained layman worker, allow for efficient knowledge transfer between tasks and enable an effective collaboration between a human worker with a robot third hand. <http://3rdhandrobot.eu>

The Flowers team started the work on Intelligent Tutoring Systems. The project KidLearn is a research project studying how machine learning can be applied to intelligent tutoring systems. It aims at developing methodologies and software which adaptively personalize sequences of learning activities to the particularities of each individual student. First experiments were realized in elementary schools of Région Aquitaine, where 6-7 year old kids learnt elements of mathematics with our software. <https://flowers.inria.fr/research/kidlearn/>

An associated team, called Neurocuriosity, was created between Flowers and the Cognitive Neuroscience lab of Jacqueline Gottlieb at Univ. Columbia, NY. The goal of this associated team is to investigate mechanisms of spontaneous exploration and learning in humans by setting up experiments allowing to confirm or falsify predictions made by computational models previously developed by the team. This constitutes a crucial collaboration between developmental robotics and cognitive neuroscience. This joint work already led to a major publication on curiosity and information seeking, in the prestigious Trends in Cognitive Science journal (impact factor: 16.5).[10]

Thomas Cederborgs PhD thesis "A Formal Approach to Social Learning: Exploring Language Acquisition Through Imitation" won the "ThésAqt" prize, awarded by Région Aquitaine who gives this award to excellent theses in the region.

LAGADIC Project-Team (section vide)

AYIN Team

2.2. Highlights of the Year

- Ian Jermyn rejoined Inria as a CR1 in the Ayin team in October 2013.
- Yuliya Tarabalka was invited to present the work of the Ayin team at the India-France Technology Summit in New Delhi, India in October.
- Josiane Zerubia was invited to present Ayin's research on remote sensing at the Institute of Mathematics and its Applications, University of Minnesota, USA, in September.

LEAR Project-Team

2.2. Highlights of the Year

- **TrecVid Multimedia Event Detection challenge.** We participated in the Multimedia Event Detection track of TrecVid 2013, one of the major benchmarks in automatic video analysis. We ranked first out of 18 participants [35].
- **ICCV'13 THUMOS Challenge.** We participated in the action recognition challenge THUMOS, organized in conjunction with ICCV '13. We were ranked first among 16 participants.
- **Optical Flow Benchmark SINTEL.** Our optical flow method DeepFlow [31] was ranked first to the online evaluation benchmark SINTEL from Max Planck Institute.
- **Cor Baayen Award.** Julien Mairal received the Cor Baayen prize, which is awarded annually by ERCIM to a promising young researcher in the field of Informatics and Applied Mathematics.
- **Best Phd prize.** Thomas Mensink, a former PhD student of LEAR, was awarded the best PhD thesis prize from AFRIF.

MAGRIT Project-Team

2.2. Highlights of the Year

- Several members of the team received the *best paper-honourable mention* at ISMAR 2013 for the paper : *Image-guided Simulation of Heterogeneous Tissue Deformation For Augmented Reality during Hepatic Surgery*, by by Nazim Haouchine, Jeremie Dequidt, Igor Peterlik, Erwan Kerrien, Marie-Odile Berger, Stéphane Cotin.
- Gilles Simon received the *Lasting Impact Award* at ISMAR 2013 for the paper: *Markerless Tracking using Planar Structures in the Scene* by Simon Gilles, Andrew W. Fitzgibbon, Andrew Zisserman in *Proceedings of the IEEE and ACM International Symposium on Augmented Reality, 2000 (ISAR)*, pages 120-128 .

BEST PAPERS AWARDS :

[18] **ISMAR - IEEE International Symposium on Mixed and Augmented Reality 2013**. N. HAOUCHINE, J. DEQUIDT, I. PETERLIK, E. KERRIEN, M.-O. BERGER, S. COTIN.

MORPHEO Team

2.2. Highlights of the Year

The work on human motion capture, done in collaboration with the technical university of Munich, received the best paper runner up award at the 3DV conference for the article: This work contributes to the field with an approach that recovers both the shape and the articulated pose of a human body over time sequences and using multiple videos.

BEST PAPERS AWARDS :

[7] **3DV - International Conference on 3D Vision - 2013.** C.-H. HUANG, E. BOYER, S. ILIC.

PERCEPTION Team

2.2. Highlights of the Year

2.2.1. European project HUMAVIPS.

The European project **HUMAVIPS** – Humanoids with Auditory and Visual Abilities in Populated Spaces – is a 36-month FP7 STREP project coordinated by Radu Horaud and which started in 2010. The project addressed multimodal perception and cognitive issues associated with the computational development of a social robot. The objective was to endow humanoid robots with audiovisual (AV) abilities: exploration, recognition, and interaction, such that they exhibit adequate behavior when dealing with a group of people. Research and technological developments emphasized the role played by multimodal perception within principled models of human-robot interaction and of humanoid behavior. The HUMAVIPS project was successfully terminated in January 2013.

An article about *Integrating Smart Robots into Society* refers to HUMAVIPS. The article stresses the role of cognition in human-robot interaction and refers to HUMAVIPS as one of the FP7 projects that has paved the way towards the concept of audio-visual robotics. The article was published in **HORIZON**, which is Europe's Research & Innovation Magazine.

2.2.2. ERC Advanced Grant VHIA.

The PERCEPTION team is pleased to announce that Radu Horaud was awarded an ERC Advanced Grant for his project “Vision and Hearing in Action” (VHIA). This five year project (2014-2019) will develop the concept of social robots.

2.2.3. Best Paper Award at IEEE MMSP'13.

The article received the “Best Paper Award” at the IEEE International Workshop on Multimedia Signal Processing (MMSP'13), Pula, Italy, September-October 2013. The paper addresses the problem of aligning visual and auditory data using a sensor that is composed of a camera-pair and a microphone-pair. The original contribution of the paper is a method for audio-visual data aligning through estimation of the 3D positions of the microphones in the visual centred coordinate frame defined by the stereo camera-pair. Please consult http://www.mmsp2013.org/mmsp2013_awards.php and [24].

BEST PAPERS AWARDS :

[24] **MMSP 2013 - IEEE International Workshop on Multimedia Signal Processing**. V. KHALIDOV, F. FORBES, R. HORAUD.

Prima Project-Team (section vide)

SIROCCO Project-Team

2.6. Highlights of the Year

- A joint contribution between Inria/SIROCCO, Qualcomm and Mediatek has been adopted to be part of the HEVC backward compatible 3DV standard, in July 2013.
- Nomination of C. Guillemot as IEEE Fellow.

STARS Project-Team

2.2. Highlights of the Year

Stars designs cognitive vision systems for activity recognition based on sound software engineering paradigms.

During this period, we have designed several novel algorithms for activity recognition systems. In particular, we have extended an efficient algorithm for tuning automatically the parameters of the people tracking algorithm.

We have designed a compact system for activity recognition running on a mini-PC which is easily deployable using RGBD video cameras. This algorithm has been tested on more than 70 videos of older adults performing 15 min of physical exercises and cognitive tasks. This evaluation has been part of a large clinical trial with Nice Hospital to characterize the behaviour profile of Alzheimer patients compared to healthy older people.

We have also been able to demonstrate the tracking and the recognition of group behaviours in live in Paris subway. We have stored efficiently in a huge database the meta-data (e.g. people trajectories) generated from the processing of 8 video cameras, each of them lasting several days. From these meta-data, we have automatically discovered few hundreds of rare events, such as loitering, collapsing, ... to display them on the screen of subway security operators.

Monique Thonnat has been at the head of the Inria Bordeaux Center since the first of November 2013. She is still working part-time in Stars team.

TEXMEX Project-Team

2.2. Highlights of the Year

- We have won the FGcomp'2013 challenge, in conjunction with Imagenet, for fine-grain classification of images.
- Best paper award to Cédric Penet at Content-Based Multimedia Indexing .

BEST PAPERS AWARDS :

[51] **CBMI - 11th International Workshop on Content Based Multimedia Indexing - 2013.** C. PENET, C.-H. DEMARTY, G. GRAVIER, P. GROS.

WILLOW Project-Team

2.2. Highlights of the Year

- J. Sivic was awarded a Starting ERC Grant (2014-2018).
- J. Sivic, I. Laptev and J. Ponce (together with C. Schmid, Inria Grenoble) co-organized one week summer school on visual recognition and machine learning <http://www.di.ens.fr/willow/events/cvml2013/>. The school has attracted 177 participants from 34 countries including Australia, Brazil, Canada, China, Japan, Korea, Russia, Singapore and the United States.