Activity Report 2013

Section highlights of the Team

PERCEPTION, COGNITION, INTERACTION

AXIS Project-Team

2.2. Highlights of the Year

- Y. Lechevallier gave an **invited talk** "Partitioning Methods On Dissimilarity Matrices Set" related to this publication [20] (cf. Section 6.2.8) at the First European Conference on Data Analysis (ECDA 2013) (with around 300 participants) jointly hosted by the two Classification Societies (GkKI in Germany and SFC in France) in July at Luxembourg.

- **BIOVISION 2013**, the World Life Sciences Forum: B. Trousse was invited as **panellist** in the prospective session "eHealth: a coming medical revolution?" at the major event BIOVISION 2013, held March 24-26, 2013 in Lyon, France. With over 3,000 participants, 200 high-level speakers and more than 30,000 Internet followers, BIOVISION is the most-attended multi-stakeholder meeting for all life sciences'players. B. Trousse illustrated the notion of living lab with three concrete e-health experiences from three French living labs (Autonom'lab - Limousin, e-care - Lyon, Living Lab High Alps Living Lab -05) and argued on the importance for the public authorities to appropriate this type of instruments which are living labs;

- **2030 Prospective (ADEME)**: B. Trousse was invited by ADEME and Chronos firm among relevant interdisciplinary experts for analysing the ICT & Building challenges at 2030 horizon and for participating at one 2-days seminar at ADEME (Sophia Antipolis);

- **MyGreenServices - Good Practice Prize** (Category: Project proposals, initiatives, methodologies and studies) by the **International Design for All Foundation** for Awards 2014 which will be at Paris in February 2014; AxIS managed a complete deployment of a Living Lab Experiential Design process involving more than 50 active citizen and 13 citizen pollution fixed and mobile sensors. The impact in terms of behaviour change using MyGreenServices was very promising;

- **FocusLab Platform (CPER Telius 2010-2013)**: we completed a first web-based application allowing the reservation of hardware, software or books (cf. Section 6.6);

- **Signature of a Memorandum of Understanding** (MoU) between B. Trousse, President of France Living Labs as Inria representative of ICT Usage Lab and Jarmo Eskelinen, Chair of ENoLL the European Network of Living Labs;

- D. Robache is member of the Department of Research Team Assistants of Inria Sophia Antipolis which receives the Research Support Department Inria Award in 2013.

GALAAD Project-Team

2.1. Highlights of the Year

The paper [15] has been awarded the best paper price, 1st place, of the SIAM conference on Geometric and Physical Modeling 2013 (Denver, USA, Nov. 11-14).

AOSTE Project-Team

2.2. Highlights of the Year

The 2013 edition of the RTNs conference was organized in Sophia-Antipolis, with Robert de Simone as General Chair and Liliana Cucu-Grosjean as keynote speaker. Rob Davis, from the University of York, was granted a five-year Inria International Chair position in our team at Rocquencourt.

GEOMETRICA Project-Team

2.2. Highlights of the Year

Jean-Daniel Boissonnat has obtained an "advanced" grant from the ERC (European Research Council) for his project Gudhi : Geometry Understanding in Higher Dimensions.

INDES Project-Team (section vide)

MARELLE Project-Team (section vide)

APICS Project-Team (section vide)

MCTAO Project-Team (section vide)

NACHOS Project-Team (section vide)

OPALE Project-Team

2.3. Highlights of the Year

Opale now participates in the KIC EIT ICT Labs activity, IMS - Intelligent Mobility and Transportation Systems, "Multimodal Mobility". In this area, a new contract with Autoroute Trafic on "Design and validation of traffic flow models on processed data" has been set up.

In the area of multi-disciplinary optimization, technical collaboration with research and industrial partners (Arcelor Mittal) have been enforced and new axes (nanoelectronics with CEA/LETI Grenoble) developed.

Régis Duvigneau defended his habiltation thesis (HdR).

SCIPORT Team (section vide)

TOSCA Project-Team (section vide)

ABS Project-Team (section vide)

ASCLEPIOS Project-Team

2.2. Highlights of the Year

- Nicholas Ayache the received MICCAI 2013 "Enduring Impact Award" for his scientific contributions since the inception of the conference in 1998.

- Nicholas Ayache was elected by the Collège de France to the Chair "Informatics and Computational Sciences" for the academic year 2013-2014.

- The company Therapixel, spin-off of the Inria project teams Asclepios (Olivier Clatz) and Parietal (Pierre Fillard), received an OSEO award in the category "Creation-Development" of start-up companies.

ATHENA Project-Team

2.2. Highlights of the Year

Rachid Deriche was awarded the 2013 French Academy of Sciences Grand Prize of the EADS CORPORATE FOUNDATION in Computer Science. This award recognizes the achievement of a scientist in a French laboratory who has made exceptional contributions to the vitality and influence of computer-science research while building outstanding cooperation with industry. It has been officially awarded at the Institut de France on October 15th, 2013.

Demian Wassermann has been recruited as junior research scientist (CR2 Inria). He joined the ATHENA project-team by the end of Decembre 2013.

4 PhD students have been recruited : Brahim Belaoucha, Kai Dang, Rutger Fick and Marco Pizzolato.

2 PhD students defended their thesis at Nice Sophia Antipolis University : Sylvain Merlet (Sept. 11) and Anne-Charlotte Philippe (Dec. 19).

2 ANR projects have been accepted : ANR Mosifah and ANR Vibrations (see the dedicated part in this report).

BIOCORE Project-Team

2.2. Highlights of the Year

- Based on simple microalgae models, optimal operating conditions were theroretically identified for the biomass productivity under day/night cycles using Pontryagin's maximum principle [25]. This results paves the way for the theoretical and numerical development of (near)-optimal control laws for lipid production based on more complex models.

- The dynamical behaviour of biological networks can often be qualitatively described by piecewise affine systems. We developed a probabilistic approach for describing the trajectories and predicting periodic orbits in such models. In the state transition graph, a *transition probability* between two nodes can be defined in terms of model parameters [22]. This approach could be used for design or control of genetic networks.

CASTOR Team (section vide)

COFFEE Project-Team (section vide)

DEMAR Project-Team (section vide)

MODEMIC Project-Team

2.4. Highlights of the Year

A lectures program submitted by the team and R. Arditi (AgroParis Tech) entitled "Mathematics, Computer sciences and Theoretical Ecology" has been accepted by the "Centre Interfacultaire Bernoulli" at EPFL (Lausanne, Switzerland) for a semester in 2014 (see Section 7.4.3.2).

A patent has been deposited jointly with Moise/Lemon Inria project-team concerning an algorithm for "intelligent" pumps, that provides an efficient treatment of natural water resources [69].

<p style="text-align:center; color:red;">**MORPHEME Project-Team**</p>

2.2. Highlights of the Year

- Laure Blanc Féraud has obtained the "prix Montbonnot Inria" from the Academy of Science.

NEUROMATHCOMP Project-Team

2.2. Highlights of the Year

Our PhD student H. Nasser has obtained an award and some financial support from Nice University to create a start up to develop a software (DataSpot) based on the methods developed in Enas.

VIRTUAL PLANTS Project-Team

2.2. Highlights of the Year

- Participation to the Functional-Structural Plant Model (FSPM) international conference. The FSPM conference is an important event for the plant modeling community. At this occasion, the team made several oral presentations:
    - reconstruction methods of branching systems and foliage from laser scanner data [30], [29], or of root systems from images [33]),
    - analysis methods for Mango tree phenology [32], ramification of apple trees [40], [34] or environmental effect on growth of forest trees[38])
    - simulation (disease propagation on crops [36], [35] or fruit physiology [31]).

- Publication of a joint work with RDP at ENS-Lyon in the journal 'Nature'. In December 2013, a joint work on phyllotaxy with the RDP lab from ENS-Lyon was published online in the journal Nature [13]. Based on the analysis of phyllotaxis perturbations in mutants, this study sheds a new light on our interpretation of phyllotaxis, revisiting the standard model and suggesting that several fields based on auxin and cytokinin with different properties are required to provide robustness to phyllotaxis.

COATI Project-Team (section vide)

DIANA Team

2.2. Highlights of the Year

Our paper , got the Best Paper Award at the ns-3 Workshop (WNS3) at SimuTools, March 2013, Workshop ns-3, Cannes, France.

BEST PAPERS AWARDS :

[26] **Workshop on NS3 (WNS3)**. H. TAZAKI, F. URBANI, T. TURLETTI.

FOCUS Project-Team

2.2. Highlights of the Year

- Jacopo Mauro's PhD thesis "Constraints Meet Concurrency" has won the 2013 award for Best Italian PhD Theses in Theoretical Computer Science (track Logics, Semantics and Programming Theory). The prize is awarded by the Italian Chapter of EATCS.

- Davide Sangiorgi has received the "LICS Test-of-Time" award (this award recognizes a paper from the proceedings of the conference "Logics in Computer Science" from 20 years prior that has best met the "test of time" in term of impact).

- the EU project Envisage (FP7), on the theme of cloud computing, has been approved and has started its activities.

LOGNET Team

2.2. Highlights of the Year

- The contrat Alcotra Interreg *myMed: a peer-to-peer programmable social network and cloud platform* 2010-2013 ends. LogNet was the head of this ambitious project. The project can be visited at the page http://www.mymed.fr Please have a try, see Fig 2 !
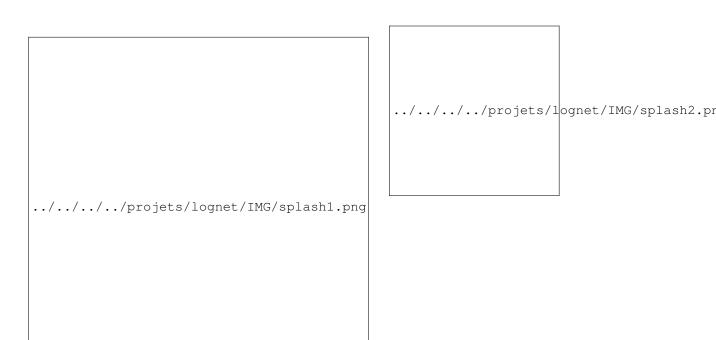
```
../../../../projets/lognet/IMG/splash1.png
```

```
../../../../projets/lognet/IMG/splash2.pr
```

Figure 2. http://www.mymed.fr

- Four articles on myMed has been published in the newspaper "Nice Matin"
    - http://www.nicematin.com/article/lapplication-myriviera-lancement-en-fevrier.689848.html
    - http://www.nicematin.com/papier/tout-sur-la-riviera%E2%80%A6-a-portee-de-doigt.831703.html
    - http://www.nicematin.com/derniere-minute/myriviera-bientot-sur-les-smartphones.831394.html
    - See Fig 3 .
- A quite nice "artistic video" on myMed can be seen on www-sop.inria.fr/teams/lognet/multimedia/myMed_v3.mov. Please enjoy it!
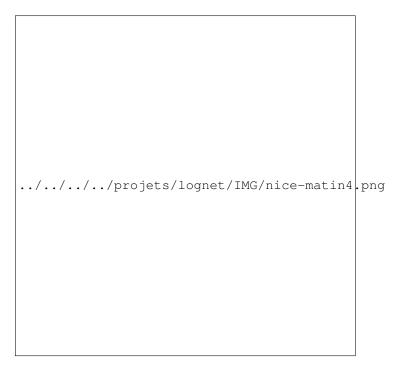
../../../../projets/lognet/IMG/nice-matin4.png

Figure 3. Nice Matin

MAESTRO Project-Team

2.2. Highlights of the Year

The book by K. Avrachenkov, J. Filar and P. Howlett, "Analytic Perturbation Theory and Its Applications" [68] has been completed and published in December 2013. The book provides a unifying treatment of analytic perturbations with particular emphasis on singular perturbations. The applications considered in the book include: linear and non-linear optimization, Markov chains, Markov Decision Processes.

G. Neglia got the one-minute madness award at the conference IFIP 12th Intl. Conference on Networking (IFIP Networking 2013), for his one-minute presentation of the paper [49].

BEST PAPERS AWARDS :

[58] **ACM PM2HW2N - 8th Workshop on Performance Monitoring and Measurement of Heterogeneous Wireless and Wired Networks**. K. IBRAHIMI, E. ALTMAN, M. HADDAD.

[60] **IEEE VTC - 77th Vehicular Technology Conference**. G. NEGLIA, X. ZHANG, J. KUROSE, D. TOWSLEY, H. WANG.

OASIS Project-Team

2.2. Highlights of the Year

Oasis, together with the Coati team, have signed in Dec. 2013 an industrial grant with the Amadeus company, about distributed algorithms for searching paths in very large graphs.

Oasis started in Sep. 2013 the FP7 project DC4Cities. This will promote the data centres role as an "eco-friendly" through the usage of renewable energies. Accordingly, Oasis will propose innovative scheduling techniques to match such a powering method.

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.

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].

LAGADIC Project-Team (section vide)

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.

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.

TITANE Team

2.2. Highlights of the Year

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

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.

<h1 style="color:red; text-align:center">ZENITH Project-Team</h1>

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

COPRIN Project-Team (section vide)