



RESEARCH CENTER
Sophia Antipolis - Méditerranée

FIELD

Activity Report 2018

Section Highlights of the Team

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ALGORITHMICS, PROGRAMMING, SOFTWARE AND ARCHITECTURE

1. AROMATH Project-Team (section vide)	4
2. DATASHAPE Project-Team	5
3. KAIROS Team	6
4. MARELLE Project-Team	7

APPLIED MATHEMATICS, COMPUTATION AND SIMULATION

5. ACUMES Project-Team	8
6. ECUADOR Project-Team (section vide)	9
7. FACTAS Team (section vide)	10
8. MCTAO Project-Team	11
9. NACHOS Project-Team (section vide)	12
10. TOSCA Project-Team (section vide)	13

DIGITAL HEALTH, BIOLOGY AND EARTH

11. ABS Project-Team (section vide)	14
12. ATHENA Project-Team (section vide)	15
13. BIOCORE Project-Team	16
14. BIOVISION Project-Team (section vide)	17
15. CAMIN Team	18
16. CASTOR Project-Team	19
17. COFFEE Project-Team	20
18. EPIONE Project-Team	21
19. LEMON Team	22
20. MATHNEURO Team (section vide)	23
21. MORPHEME Project-Team	24

NETWORKS, SYSTEMS AND SERVICES, DISTRIBUTED COMPUTING

22. COATI Project-Team	25
23. DIANA Project-Team	26
24. FOCUS Project-Team (section vide)	27
25. INDES Project-Team (section vide)	28
26. Neo Project-Team	29

PERCEPTION, COGNITION AND INTERACTION

27. GRAPHDECO Project-Team	30
28. GRAPHIK Project-Team	31
29. HEPHAISTOS Project-Team	32
30. STARS Project-Team	33
31. TITANE Project-Team	34
32. WIMMICS Project-Team	35
33. ZENITH Project-Team	36

AROMATH Project-Team (section vide)

DATASHAPE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Books

- Jean-Daniel Boissonnat, Frédéric Chazal, Mariette Yvinec. *Geometric and Topological Inference*. Cambridge Texts in Applied Mathematics, vol. 57, Cambridge University Press, 2018.

5.1.2. Awards

- Mathieu Carrière was awarded the Prix de thèse solennel Thiessé de Rosemont / Schneider in Mathematics by the Chancellerie des Universités de Paris for his Ph.D. work under Steve Oudot's supervision (Ph.D. funded by ERC grant Gudhi), December 2018.

KAIROS Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

BEST PAPERS AWARDS :

[16]

A. SCHULZ-ROSENGARTEN, R. VON HANXLEDEN, F. MALLET, R. DE SIMONE, J. DEANTONI. *Time in SCCharts*, in "Forum on specification & Design Languages", Munich, Germany, September 2018, p. 5-16, Best Paper Award [DOI : 10.1109/FDL.2018.8524111], <https://hal.inria.fr/hal-01898285>

MARELLE Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Awards

The paper by Barthe, Grégoire, and Laporte at *Computer Security Foundations* on cryptographic constant-time was awarded a distinguished paper award.

BEST PAPERS AWARDS :

[16]

G. BARTHE, B. GRÉGOIRE, V. LAPORTE. *Secure Compilation of Side-Channel Countermeasures: The Case of Cryptographic “Constant-Time”*, in "CSF 2018 - 31st IEEE Computer Security Foundations Symposium", Oxford, United Kingdom, July 2018, <https://hal.archives-ouvertes.fr/hal-01959560>

ACUMES Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Tunisian Women Mathematicians' Association (TWMA) awarded B. Yahyaoui (Acumes PhD) with the Best 2017 PhD Thesis in Applied Mathematics (October 2018).

ECUADOR Project-Team (section vide)

FACTAS Team (section vide)

MCTAO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Let us mention two events

- Lamberto Dell'Elce was hired as a permanent researcher in 2018. This is not a scientific achievement in itself, but it is an important point in the life of a research team.
- Alessio Figalli **recieved a Fields Medal** at ICM 2018 in Rio. He is a close collaborator of Ludovic Rifford, member of the team.

NACHOS Project-Team (section vide)

TOSCA Project-Team (section vide)

ABS Project-Team (section vide)

ATHENA Project-Team (section vide)

BIOCORE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- A graph theoretical tool for analysis of the coupling between two Boolean networks. This tool generalizes the asymptotic graph (previously developed in [96] and [78]), by adding a quantitative dimension through the computation of relative probabilities. This tool is used for coupling two biological networks and predicting the possible attractors or asymptotic behaviors of the full system. The outcome of the probabilistic asymptotic graph is the set of attractors the full system, each attractor with an associated probability. This work was published in the journal *Frontiers in Physiology* [22].
- A study that predicts the evolution of phytoplankton biodiversity with global warming. After calibration of our models with experimental data on growth of various species of the microalgae *Micromonas*, we have shown that the pattern of temperature response is strongly related to the site where cells were isolated. With this approach, we proved that the oceanwide diversity of *Micromonas* species is very similar to the oceanwide diversity of the phytoplankton. Using Adaptive Dynamics theory to understand how temperature drives evolution in microalgae, we could then predict the evolution of this biodiversity in a warming ocean and show that phytoplankton must be able to adapt within 1000 generations to avoid a drastic reduction in biodiversity. This work was published in the *ISME* journal [23].

BIOVISION Project-Team (section vide)

CAMIN Team

4. Highlights of the Year

4.1. Highlights of the Year

- The startup NEURINNOV was created in November 2018, David Andreu and David Guiraud will leave CAMIN team to join the company. A first research collaboration was established between CAMIN and Neurinnov as part of the Isite MUSE, through the Spin Stim project. The Spin Stim project focuses on severe impairments of vesico-sphincteric functions. It is a deep partnership based on the implementation of Neurinnov staff directly in the research unit.
- François Bonnetblanc was laureat of the French Scholars Lecture Series 2018 – Peter Wall Institute of Advanced Studies - University of British Columbia / Embassy of France in Canada, (<https://pwias.ubc.ca/program/french-scholars-lecture-series>) and laureat of the TOR Program 2018 between France and Sweden, (<https://www.institutfrancais-suede.com/tout-sur-tor/>).
- Benoît Sijobert was finalist of the Handitech Trophy (<https://www.lahanditech.fr/>), presenting a project related to his Phd work in CAMIN team, among 156 projects awarding inclusive technologies.
- Wafa Tigra got the 2017 IFRATH⁰ PhD thesis price on October 2018.
- Ana Claudia Lopes (UnB, Brazil) presented the paper « Quadriceps electrical stimulation to assist sitting pivot transfer by a person with paraplegia » at IFESS conference 2018 and won the Vodovnik Award student paper competition (2nd position). This work was done within the context of CACAO associate team.

⁰Institut Fédératif de Recherche sur les Aides Techniques pour les personnes Handicapées

CASTOR Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Jacques Blum has received the "Grand Prix de la Ville de Nice".
- Blaise Faugeras and Holger Heumann have been nominated as ITER Scientist Fellows.

COFFEE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Stéphane Junca received an invitation at the LMA (Laboratory of Mechanics and Acoustics, Marseille, France), 6 months, from February to July 2018.
- Florent Berthelin had a Inria delegation from January to June 2018 to work with teams ACUMES and TOSCA. In particular he worked with P. Goatin on models for traffic flows.

EPIONE Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Awards

- Xavier Pennec received an ERC advanced grant on geometric statistics for life sciences.
- Shuman Jia ranked 2nd in the AI Data Challenge organized by the French Society of Radiology.
- Shuman Jia earned 2nd prize at the Pierre Lafitte PhD competition.
- Fanny Orlhac was awarded for the L'Oréal-UNESCO grant for women in science 2018.
- Wen Wei received a travel award at the MICCAI conference.
- Wen Wei received a travel award from the SFRMBM (french society of magnetic resonance in biology and medicine) for the Joint Annual Meeting ISMRM-ESMRMB 2018.
- Nina Miolane received the second prize (special mention) for the AFRIF (french association for shape interpretation and recognition) PhD prize for her PhD entitled "Geometric Statistics for Computational Anatomy" realized in the context of the associated team GeomStats under the direction of Xavier Pennec (Inria Sophia Antipolis) and Susan Holmes (Stanford University).

LEMON Team

5. Highlights of the Year

5.1. Highlights of the Year

- Undoubtedly the most important highlight is the "go" decision of Inria's Project Committee for the creation of the LEMON team. This decision was made at the end of 2018 and the team will officially exist as "Equipe Projet" as of 2019.
- 3 new members joined the team in 2018: Fatima Palacios Rodriguez (funding source: Inria) started a PostDoc as of November 2018. Joao Guilherme Caldas Steinstraesser (funding source: Inria) and Joseph Luis Kahn Casapia (funding sources: ANR/Inria) started their PhD in October and November this year.
- The publication of the depth-dependent porosity model [4] is the result of a three year, joint research effort carried out by the team. With Vincent Guinot , Carole Delenne and Antoine Rousseau from LEMON and Olivier Boutron from Tour du Valat as co-authors, this publication is emblematic of the team's activities in the field of porosity model development.

MATHNEURO Team (section vide)

MORPHEME Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Awards

Emmanuel Soubies won the Phd Prize of the GdR MIA (Mathématiques de l'Imagerie et de ses Applications)

COATI Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Guillaume Ducoffe, former PhD student of COATI, is the recipient of the second PhD prize delivered jointly by GDR RSD and Association ACM SIGOPS France (ASF), edition 2018, for his PhD thesis entitled "Metric properties of large graphs".

5.1.2. *Habilitation à Diriger des Recherches*

Frédéric Giroire has defended his Habilitation à Diriger des Recherches, entitled "*Optimisation des infrastructures réseaux. Un peu de vert dans les réseaux et autres problèmes de placement et de gestion de ressources*" [1], at Univ. Côte d'Azur on October 23, 2018.

Abstract: Pushed by the new sensitivity of the society, politics, and companies to energy costs and global warming, he investigated the question of how to build green networks. He first studied some practical scenarios to answer the question: how much energy could be saved for Internet Service Providers by putting into practice energy efficient protocols? It led him to study fundamental problems of graph theory.

At the core of these energy efficient methods, there is a dynamic adaptation to the changes of demands, which is impossible to do in legacy networks which are mostly manually operated. The emergence of two new paradigms, software defined networking (SDN) and network function virtualization (NFV), leads to a finer control of networks and thus bears the promise to put energy efficient solutions into practice. He thus studied how to use SDN to implement dynamic routing.

His approach has been to use theoretical tools to solve problems raised by the introduction of new technologies or new applications. His tools come mainly from combinatorics and in particular from graph theory, algorithms, optimization and probabilities. When he was able to propose new methods of resolution, he then tried to evaluate their practical impact by numerical evaluation, simulation or experimentation with realistic scenarios.

5.1.3. *New team members*

- Alexandre Caminada has been recruited as a University Professor of Univ. Nice Sophia Antipolis since September 2018 and he is now a member of COATI. Since September 2017, he is the director of the Polytech'Nice engineering school of Univ. Nice Sophia Antipolis.
- Emanuele Natale has been recruited as a Junior researcher at CNRS in 2018. He will join COATI in January 2019.

DIANA Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Awards

Karyna Gogunska's paper on "On the Cost of Measuring Traffic in a Virtualized Environment" [20] got the Best Student Paper Award at the IEEE Cloudnet 2018 in Japan.

4.1.2. ANR JCJC DET4ALL

Damien Saucez's project titled DET4ALL was accepted in the JCJC programme (2019-2021). The goal of this project is to apply the concept of network programmability to the world of industrial communicating systems.

4.1.3. ACM SIGCOMM Artefact Evaluation Committee

Our team organized the Reproducibility'17@SIGCOMM workshop (proposed and co-chaired by Damien Saucez). Based on the results of the workshop, we put in place the ACM SIGCOMM *Artefact Evaluation Committee* (AEC). The role of the AEC is to assess the reproducibility level of papers accepted to any ACM SIGCOMM sponsored conferences and journals during the year 2018. The reproducibility quality is awarded by ACM reproducibility badges⁰. Authors volunteered to be evaluated and we received 33 demands. In parallel to this effort, the organisers of the ACM CoNEXT'18 conference asked us to assess the reproducibility level of CoNEXT papers in 2018 as part of the publication process. We accepted and out of the 32 CoNEXT papers, 14 volunteered to be evaluated and 12 received an award. The result is that ACM CoNEXT'18 is the first ever ACM SIGCOMM sponsored conference to award reproducibility. Based on that the main ACM SIGCOMM conference has decided to make a trial in 2019 and integrate reproducibility evaluation as part of the publication process for 2019.

⁰<http://www.acm.org/publications/policies/artifact-review-badging>

FOCUS Project-Team (section vide)

INDES Project-Team (section vide)

Neo Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

NEO started a collaboration with QWANT within the joint QWANT-Inria laboratory, with two research projects. One is a direct collaboration, the other one is within the PIA ANSWER project. See Sections 8.1.2 and 9.2.1 .

The book “Constrained Markov Decision Processes” by Eitan Altman is cited over 1000 times in Google Scholar.

Giovanni Neglia has been nominated IEEE Infocom 2018 Distinguished TPC member (Jan. 2018).

5.1.1. Awards

BEST PAPERS AWARDS :

[36]

E. HARGREAVES, D. S. MENASCHÉ, G. NEGLIA, C. AGOSTI. *Visibilidade no Facebook: Modelos, Medições e Implicações*, in "Brazilian Workshop on Social Network Analysis and Mining (BraSNAM)", Natal, Brazil, July 2018, <https://hal.inria.fr/hal-01956316>

[33]

K. VEERARUNA, S. MEMON, M. K. HANAWAL, E. ALTMAN, R. DEVANAND. *User Response Based Recommendations: A Local Angle Approach*, in "COMSNETS 2018 - 10th International Conference on COMMunication Systems & NETworkS", Bangalore, India, January 2018, p. 1-8, <https://hal.inria.fr/hal-01702355>

GRAPHDECO Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

This year marked the start of the ERC Starting grant FunGraph coordinated by George Drettakis, on managing uncertainty in rendering of captured content. This activity already includes the principal investigator, one engineer (S. Morgenthaler), one postdoc (R. Deeb), and an intern (S. Diolatzis). The scientific production this year included three papers in ACM Transactions on Graphics (two at SIGGRAPH and one at SIGGRAPH Asia), three papers in Computer Graphics Forum (two at EGSR and one at Eurographics), and two papers at the ACM Symposium on Interactive 3D Graphics and Games.

4.1.1. Awards

George Drettakis received a medal from University Côte d'Azur for his ERC grant.

GRAPHIK Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Highlights

- A new ANR project led by GraphIK on *Complex ontological Queries over Federated and heterogeneous Data (CQFD)* has been accepted. This project, starting in January 2019, is on a core issue for GraphIK and gathers main national teams on this subject. The consortium has a long standing history of research collaboration and the current project will build upon these results.

5.1.2. Awards

The work of two PhD students of our group was recognized by international event awards:

- Stathis Delivorias and co-authors were awarded the best paper award at the International Joint Conference on Rules and Reasoning (RuleML+RR 2018) for the paper entitled “On the k-Boundedness for Existential Rules”
- Bruno Yun participated to the 3rd Summer School on Argumentation (SSA 2018): Computational and Linguistic Perspectives, and got the best student paper prize for his presentation entitled “How can you Mend a Broken Inconsistent KB in Existential Rules Using Argumentation?” (no formal proceedings available).

BEST PAPERS AWARDS :

[23]

S. DELIVORIAS, M. LECLÈRE, M.-L. MUGNIER, F. ULLIANA. *On the k-Boundedness for Existential Rules*, in "RuleML+RR: Rules and Reasoning", Luxembourg, Luxembourg, September 2018, vol. LNCS, n^o 11092, p. 48-64, <https://arxiv.org/abs/1810.09304> [DOI : 10.1007/978-3-319-99906-7_4], <https://hal-lirmm.ccsd.cnrs.fr/lirmm-01921140>

HEPHAISTOS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Science

- strong advances on the analysis of cable-driven parallel robots (section 7.1.1)
- collaboration with lawyers on the ethical and legal aspects of assistance robotics
- strong collaboration with the medical community on walking analysis, rehabilitation (section 7.2.1) and activities detection (section 7.3)

5.1.2. Experimentation

- completion of the first version of our immersive environment for rehabilitation (section 7.2.1)
- continuation of the daily activities monitoring in a day hospital (section 7.3)

5.1.3. Awards

J-P. Merlet has received the best paper award at the Eucomes conference .

BEST PAPERS AWARDS :

[15]

J.-P. MERLET. *Some properties of the Irvine cable model and their use for the kinematic analysis of cable-driven parallel robots*, in "EUCOMES", Aachen, Germany, 2018, <https://hal.archives-ouvertes.fr/hal-01965230>

STARS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Abhijit Das, Antitza Dantcheva and Francois Brémond were winners of the Bias Estimation in Face Analytics (BEFA) Challenge at the European Conference on Computer Vision (ECCV 2018).

TITANE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

The TITANE project-team has been evaluated by Inria in October 2018. We obtained three new ANR projects, the renewal of a collaborative contract with Google and a new Cifre PhD thesis with Dorea technology. Since September 2018 Pierre Alliez is head of science (délégué scientifique) of the Inria Sophia Antipolis center. He is also full paper co-chair of the Eurographics 2019 conference.

WIMMICS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Serena Villata has been invited to deliver an Early Career Spotlight Talk at the main conference in Artificial Intelligence (IJCAI), namely the 27th International Joint Conference on Artificial Intelligence⁰, on July 2018 in Stockholm (Sweden). The topic of this invited Early Career Spotlight Talk, *Artificial Argumentation for Humans*, is detailed in the related publication [62].

BEST PAPER AWARD :

[51]

O. RODRÍGUEZ ROCHA, C. FARON ZUCKER. *Automatic Generation of Quizzes from DBpedia According to Educational Standards*, in "The 3rd Educational Knowledge Management Workshop (EKM 2018)", Lyon, France, April 2018, <https://hal.inria.fr/hal-01758737>

⁰<https://www.ijcai-18.org/early-career-talks/>

ZENITH Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. VLDB Conference

The VLDB conference (<http://vldb2018.incc.br>) was in Rio de Janeiro. Its organization is a major outcome of the SciDISC associate team, with key positions held by members of the project: F. Porto: general chair, P. Valduriez: sponsor chair and many SciDISC members in the local organization. E. Ogasawara and P. Valduriez were chairs of the LADaS VLDB workshop. E. Pacitti was chair of the VLDB workshop on Big Social Data and Urban Computing (BiDU). The VLDB conference was a great success with about 700 participants.

5.1.2. New Book

A. Joly co-authored the book "Multimedia Tools and Applications for Environmental & Biodiversity Informatics" [69], which demonstrates how the latest advancements in data science impact the wide range of environmental and biodiversity studies.