RESEARCH CENTER

FIELD

Activity Report 2018

Section Highlights of the Team

Edition: 2019-03-07

ABS Project-Team (section vide)

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).

AGORA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Walid Bechkit holds the PEDR (2017-2021).
- Khaled Boussetta obtained his HDR from the University Paris 13, in December 2018.
- Khaled Boussetta holds the PEDR (2018-2022).
- Khaled Boussetta was promoted MCF *Hors Classe* in September 2018.
- Hervé Rivano holds the PEDR (2017-2021).
- Razvan Stanica holds the PEDR (2016-2020).
- Pascale Vicat Blanc joined Agora as Inria Senior Researcher, in September 2018.

AIRSEA Project-Team (section vide)

ALICE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

In February 2018, Sylvain Lefebvre created the MFX team (Matter from Graphics). The new team will focus on synthesizing and designing complex shapes for additive manufacturing.

5.1.1. Awards

Jérémie Dumas, who was advised by Sylvain Lefebvre within the ALICE team, received the 2018 PhD prize from IG-RV https://prixigrv2018.sciencesconf.org/.

ALMAnaCH Team (section vide)

ALPINES Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Laura Grigori was awarded with E. Cances, Y. Maday, and J.-P. Piquemal an ERC Syngergy Grant for the Extreme-scale Mathematically-based Computational Chemistry project (EMC2), 2018. A description of the project can be found here.

ANGE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Human resources

A major event in the year was new positions of J. Sainte-Marie (Détachement at Inria, 2 years position) and of Y. Penel (Advanced Research Position, 3 years position). Two new students have started a PhD (Liudi Lu and Nelly Boulos Al Makary).

Evaluation of the team

This year, the team went through the first evaluation since its creation. The report was very positive, as this excerpt shows:

The activity of the team in modeling and mathematical and numerical analysis has lead to significant contributions in various areas. In particular, we mention the study of models that can reproduce specific 'dispersive effects,' observed in nature, or the review of several multi-physics models that incorporate the coupling of heterogeneous systems. The theoretical analysis of the models has often led to the proposal of new algorithmic developments and new numerical techniques and, in general, it has resulted in a significant advancement of scientific knowledge.

Scientific activities There has been major achievements within the team in the framework of dispersive models.

As detailed in Section 10.1 , members of the team were involved in the organisation of a substantial number of scientific events, either in the framework of national initiatives or due to the expertise in the field. Members are is particularly involved in the mathematical community.

5.1.1. Awards

- Léa Boittin received the award of the best presentation at GDR-EGRIN summer school in June,
- Léa Boittin was rewarded by Best Phd Student Poster Award, at CMWR XXII, Saint-Malo,
- Janelle Hammond received a post-doctoral grant from DIM Math Innov 2018.

ANTIQUE Project-Team (section vide)

AOSTE2 Team

5. Highlights of the Year

5.1. Highlights of the Year

This is the last activity report of the team AOSTE2 since it ends in 2018.

The ATT StatInf project, prepared by Liliana Cucu-Grosjean and Adriana Gogonel has been accepted in July 2018. The associated start-up creation has been selected for participation to the Digital Start-up program (jointly supported by EMLyon and Inria). The start-up will be created beginning of 2019 by Adriana Gogonel, Cristian Maxim and Liliana Cucu-Grosjean as founding members.

ARAMIS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- The team has been awarded a “Fondation pour la Recherche sur la maladie d’Alzheimer” research grant.

5.1.1. Awards

- Ninon Burgos received the Galileo Galilei Award 2017, best publication in the European Journal of Medical Physics - Physica Medica in 2017, for the paper ‘Evaluation of a multi-atlas CT synthesis approach for MRI-only radiotherapy treatment planning’.
- S. Durrleman successfully defended his "habilitation à diriger des Recherches" from Sorbonne University
- F. De Vico Fallani received the Young Investigator award from Complex Systems Society (CSS)
- Stéphane Epelbaum was awarded the Joel Ménard prize from the “Fondation Alzheimer”.

ARIC Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Damien Stehlé was nominated IUF junior member.

5.1.2. Book

Publication of the second edition of the “Handbook of Floating-Point Arithmetic” [43].
BEST PAPERS AWARDS :
[42]
G. VILLARD.*On Computing the Resultant of Generic Bivariate Polynomials*, in "ISSAC 2018, 43rd International Symposium on Symbolic and Algebraic Computation, New York, USA, July 16-19, 2018", New York, United States, July 2018, https://hal.archives-ouvertes.fr/hal-01921369

AROMATH Project-Team (section vide)

ATHENA Project-Team (section vide)

AUCTUS Team

5. Highlights of the Year

5.1. Highlights of the Year

- David Daney and Cyril Dané (AIO) were invited to the Élysée Palace to present the Numii system,
- Anna Pugach and David Daney have filed a patent entitled “Intelligent Textile Adapted for Motion and/or Deformation Detection”

AVALON Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Henri Casanova, Arnaud Legrand, Martin Quinson and Frédéric Suter. "SMPI Courseware: Teaching Distributed-Memory Computing with MPI in Simulation" received the "Best Paper Award" of the Workshop on Education for High-Performance Computing (EduHPC-18).
- Anchen Chai, Sorina Camarasu-Pop, Tristan Glatard, Hugues Benoit-Cattin and Frédéric Suter. "Evaluation through Realistic Simulations of File Replication Strategies for Large Heterogeneous Distributed Systems" received the "Best Workshop Paper on Heterogenous Systems" of the 24th International European Conference on Parallel and Distributed Computing (EuroPar'2018).

BEST PAPERS AWARDS :

[15]
H. CASANOVA, A. LEGRAND, M. QUINSON, F. SUTER.*SMPI Courseware: Teaching Distributed-Memory Computing with MPI in Simulation*, in "EduHPC-18 - Workshop on Education for High-Performance Computing", Dallas, United States, November 2018, p. 1-10, https://hal.inria.fr/hal-01891513

[17]
A. CHAI, S. CAMARASU-POP, T. GLATARD, H. BENOIT-CATTIN, F. SUTER.*Evaluation through Realistic Simulations of File Replication Strategies for Large Heterogeneous Distributed Systems*, in "Europar 2018 - 24th International European Conference on Parallel and Distributed Computing ; Workshop HeteroPar 2018", Turin, Italy, Lecture Notes in Computer Science (LNCS), August 2018, forthcoming, https://hal.archives-ouvertes.fr/hal-01887369

AVIZ Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

- Steve Haroz joined Aviz as a research scientist (SRP) for three years.
- Catherine Plaisant joined Aviz as an International Chair for 5 years.
- The team welcomed two invited professors (Claudio Silva and Michael McGuffin).
- Aviz members presented seven papers at IEEE VIS 2018 and won a best paper award at Eurovis 2018.
- Former Aviz PhD student Lonni Besançon received a PhD thesis prize honorable mention award from GDR, AFIG, AFRV, and EGFR for his thesis "An interaction Continuum for 3D Data Visualization."
- Aviz started an Associated Team with the ilab at the University of Calgary on the topic of Situated and Embedded Visualization.

BEAGLE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

We had several remarkable publications in 2018, including 3 in the highest standard journals and 2 best paper awards.

Cui Y, Yang Y, Ni Z, Dong Y, Cai G, Foncelle A, Ma S, Sang K, Tang S, Li Y, Shen Y, Berry H, Wu S and Hu H (2018). Astroglial-Kir4.1 in Lateral Habenula Drives Neuronal Bursts to Mediate Depression. *Nature* 554:323-327 [15]

Davin AA, Tannier E, Williams TA, Boussau B, Daubin V, Szollosi GJ (2018) Gene transfers can date the tree of life, *Nature ecology and evolution*, vol. 2 pp.904-909. [16]

Berta Verd, Erik Clark, Karl R Wotton, Hilde Janssens, Eva Jiménez-Guri, Anton Crombach, Johannes Jaeger (2018) A damped oscillator imposes temporal order on posterior gap gene expression in Drosophila *PLoS biology* 16 (2), e2003174 [35]

5.1.1. Awards

BEST PAPERS AWARDS :
[28]
V. F. LIARD, D. P. PARSONS, J. ROUZAUD-CORNABAS, G. BESLON.*The Complexity Ratchet: Stronger than selection, weaker than robustness*, in "ALIFE 2018 - the 2018 conference on artificial Life", Tokyo, Japan, July 2018, p. 1-8 [*DOI :* 10.1162/ISAL_A_00051], https://hal.archives-ouvertes.fr/hal-01882628

[26]
S. PEIGNIER, C. RIGOTTI, A. ROSSI, G. BESLON.*Weight-based search to find clusters around medians in subspaces*, in "SAC 2018 - ACM Symposium On Applied Computing", Pau, France, Proceedings of the 33rd ACM Symposium On Applied Computing, April 2018, p. 1-10, https://hal.archives-ouvertes.fr/hal-01869974

BIGS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- BIGS organised the annual meeting of the European Network of Business and Industrial Statistics (ENBIS), 150 participants, 3 days of conference (3-5 september) plus 3 tutorials.
- Romain Azaïs and Florian Bouguet edited a book “Statistical Inference for Piecewise-deterministic Markov Processes” [33]. The idea for this book stemmed from a workshop organized in Nancy in the 2016-17 winter. Two chapters [48] [31] have been co-authored by one or more BIGS members.
- T. Bastogne created of a new start-up specialized on the automatic analysis of cardiac signals from cells up to patients.

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)

BONSAI Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

The team was actively involved in the organization of the international conference RECOMB in Paris (April 2018), that was attended by more than 800 people.

4.1.1. Awards

First place at the metagenomics assembly challenge organized by the company Mosaic DNANexus: https://www.businesswire.com/news/home/20180620005408/en/DNAnexus-Powered-Mosaic-Microbiome-Platform-Announces-Winners-Community

BONUS Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Patent with Beckman & Coulter on the optimization of large medical laboratories (Prof. E-G. Talbi, S. Faramarzi-oghani, M. Bué).

CAGE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Emmanuel Trélat has been invited speaker at the International Congress of Mathematicians (ICM2018) in Rio, Brazil, in the session “Control theory and optimization".

5.1.1. Awards

- The poster “Adaptive Stimulation Strategy for Selective Brain Oscillations Disruption in a Neuronal Population Model with Delays" by **Jakub Orlowski**, Antoine Chaillet, **Mario Sigalotti**, and Alain Destexhe, has received the CPHS 2018 Best Poster Prize at the 2nd IFAC Conference on Cyber-Physical & Human Systems.

CAGIRE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

ANR MONACO_2025

The ANR MONACO_2025 project started in March 2018. The consortium of this project, coordinated by [RM], consists in an academic partner, the institute PPrime of Poitiers, and two industrial partners, PSA and EDF. It is focused on the the development of a CFD methodology for transient, buoyancy-affected turbulent flows, that are crucial for the two industrial partners. Four PhD students, Saad Jameel (CIFRE PSA grants), Puneeth Reddy (ANR grant), Gaëtan Mangeon (CIFRE EDF) and Vladimir Duffal (CIFRE EDF) are involved in this project, which plays a major role in the active collaboration among these students.

A new industrial partner

A collaboration started in 2018 with a new industrial partner, Dassault Aviation, via the CIFRE PhD of Gustave Sporschill supervised by Rémi Manceau.

A new regional initiative

Cagire is part of the 3-year program HPC scalable ecosystem funded by Région Nouvelle-Aquitaine in the framework of its 2018 call.

HTLES in the commercial code CONVERGE

In the framework of the IFPEN PhD thesis of Al Hassan Afailal (supervision by Rémi Manceau), the hybrid RANS/LES method developed in the project-team CAGIRE has been implemented in the commercial software CONVERGE (https://convergecfd.com).

CAIRN Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Petr Dobias received the A. Richard Newton Young Fellow Award at IEEE/ACM Design Automation Conference (DAC), San Francisco, 2018.

Davide Pala received the A. Richard Newton Young Fellow Award at IEEE/ACM Design Automation Conference (DAC), San Francisco, 2018.

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 IFRATH [0] 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.

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

CAMUS Team

5. Highlights of the Year

5.1. Highlights of the Year

Bérenger Bramas, Inria Research Scientist, has joined the team in September 2018.
Matthew Wahab, Inria Research Engineer, has joined the team in August 2018.

CAPSID Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Isaure Chauvot de Beauchêne has obtained H2020 funding for two international PhD students under the MSCA-ITN programme. The project will study protein/RNA interactions, and will start on 01/01/2019.

CARAMBA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Several Invited talks: Pierrick Gaudry was an invited speaker at the ECC 2018 workshop (Osaka, Japan); Emmanuel Thomé was an invited speaker at the ANTS-XIII conference in Madison, WI, USA (The biennial ANTS conference is the main international conference on algorithmic number theory); Paul Zimmermann was an invited speaker at the 75th anniversary celebration of the journal *Mathematics of Computation* (Providence, RI, USA).
- Cécile Pierrot was awarded the DGA (Direction Générale de l'Armement) Prize from Florence Parly, the Minister of the Armed Forces, for her PhD Thesis.

BEST PAPER AWARD :
[11]
M. SCOTT, A. GUILLEVIC.*A New Family of Pairing-Friendly elliptic curves*, in "International Workshop on the Arithmetic of Finite Fields - WAIFI", Bergen, Norway, L. BUDAGHYAN, F. RODRIGUEZ-HENRIQUEZ (editors), June 2018, https://hal.inria.fr/hal-01875361

CARDAMOM Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- On Tuesday, 19 June, the Project AMDECC (Adaptation de Maillage Dynamique et massivement parallèle pour la simulation aux grandes Echelles des Chambres de Combustion aéronautiques), launched 5 years ago within a partnership with Safran Tech and the CORIA (UMR6614 CNRS Université de Rouen and INSA Rouen), received the Award for Best Collaborative Project, one of the Digital Simulation Trophies awarded by Teratec and Usine Digitale. The aim of this project is to design helicopter engines that afford better, and cleaner, performance. To achieve this, the team uses large-scale simulations of engine combustion chambers with a view to improving quality-to-cost ratio. Optimising the simulations is key to the project's success since this approach requires intensive use of high-performance computing. Adaptation is performed with the MMG platform developed by C. Dobrzynski. For more information see `https://www.inria.fr/en/centre/bordeaux/news/amdecc-project-wins-award-at-teratec-forum` and `https://www.mmgtools.org`.
- One of the articles of M. Colin, 'Standing waves for the nonlinear Schrödinger equation coupled with the Maxwell equation', published in Nonlinearity, has been selected for the journal's 2017 Highlights Collection<http://iopscience.iop.org/journal/0951-7715/page/Highlights-of-2017>.

CARMEN Project-Team (section vide)

CASCADE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Melissa Rossi received a 2018 Google's WomenTechmakers Scholarship.

CASH Team

5. Highlights of the Year

5.1. Highlights of the Year

- CASH has been validated as a *équipe projet commune* (EPC) by the *comité des projets*.
- We designed a dataflow transformation which always recovers all the FIFO in our dataflow model (DPN) after a loop tiling [1], [9], a program transformation widely used in automatic parallelization. This is an important enabling transformation which reinforces DPN as an intermediate representation in the CASH HLS project.
- We obtained new results on the comparison between different forms of synchronisation on futures, bringing a better understanding on the impact dataflow synchronisation and future typing on program synchronisation.

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.

CEDAR Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Conference Chair

Ioana Manolescu has been a general chair of the IEEE International Conference on Data Engineering (ICDE) 2018.

Keynotes

Ioana Manolescu has given invited keynote talks at the Extended Semantic Web Conference (ESWC) 2018 [25], and at the *34ème Conférence sur la Gestion de Données – Principes, Technologies et Applications* (BDA) 2018 [24].

PVLDB paper

A paper on "Optimization for active learning-based interactive database exploration" by Enhui Huang and co-authors has been accepted at PVLDB 2018 [10].

Prix de stage de l'Ecole Polytechnique

Camille Chanial, third-year (M1) student at Ecole Polytechnique, has been awarded a Prix de Stage for his work on the ConnectionLens prototype [9].

CELTIQUE Project-Team

3. Highlights of the Year

3.1. Highlights of the Year

3.1.1. Awards

- The ERC Consolidator grant VESTA on verified static analysis was awarded to David Pichardie and launched in September 2018.
- The ANR project SCRYPT led by Frédéric Besson was accepted and starts in February 2019.

BEST PAPERS AWARDS :
[19]
A. SALIM AL-SIBAHI, A. S. DIMOVSKI, T. JENSEN, A. WASOWSKI.*Verification of High-Level Transformations with Inductive Refinement Types*, in "GPCE 2018 - 17th International Conference on Generative Programming: Concepts & Experience", Boston, United States, November 2018, p. 1-14, https://hal.inria.fr/hal-01898058

Chroma Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Best student paper, 15th International Conference on Control, Automation, Robotics and Vision, Nov 2018, Singapore, Singapore (ICARCV 2018), Pavan Vasishta, Dominique Vaufreydaz, Anne Spalanzani

5.1.2. Other highlights of 2018

- Success for several project applications in the field of Autonomous Vehicles : ANR"Hianic", PIA Ademe "CAMPUS", FUI "STAR" and "TORNADO".
- In 2018, Chroma published several papers in Artificial Intelligence A+ ranked conferences: CVPR [21], NIPS [27], ICML [26], AAMAS [32].
- Strong involvement of Chroma in the IEEE/RSJ IROS 2018 Conference (Madrid, October 2018, more than 4000 people): C. Laugier was Program co-chair and co-organized three interconnected events on Autonomous Vehicles: a one day Workshop having attracted more than 360 people [0], an Industrial Forum involving international companies (e.g. Renault, Nvidia, Baidu, EasyMile, Ambarella, etc) and having attracted about 80 people, and an Autonomous Vehicles Demonstration involving 5 international teams (including Chroma with our Autonomous Renault Zoe car) [0] [46].
- First participation to the international RoboCup competition (Montréal, Juin, 2018) : we created the 'LyonTech' team to compete in the robocup@Home Pepper league. We ranked 5th over 21 participants. LyonTech is composed of members from Chroma (F. Jumel, L. Matignon, J. Saraydaryan, O. Simonin, C. Wolf) and two engineers from CPE Lyon (R. Leber) and LIRIS lab/CNRS (E. Lombardi). In October 2018, we qualified for the next RoboCup final, to be organized in Sydney, on July 2019.
- Participation in several International Award Committees (C. Laugier): Several IEEE/RSJ IROS 2018 Award Committees (Best Paper Award, Fellow Award, Harashima Award, Distinguished Service Award, Young Professional Award), IEEE ICARCV 2018 Best Paper Award Committee, IEEE Chapter Award Committee 2018.
- French Robotics GDR : co-animation of the new GT « Apprentissage et Robotique » by Christian Wolf (with David Filiat), started in November 2018 ; O. Simonin will chair, with F. Charpillet (Inria Larsen), the next National Conference on Robotics Reseacrh (JNRR), on October 2019.

BEST PAPERS AWARDS :
[36]
P. VASISHTA, D. VAUFREYDAZ, A. SPALANZANI.*Building Prior Knowledge: A Markov Based Pedestrian Prediction Model Using Urban Environmental Data*, in "ICARCV 2018 - 15th International Conference on Control, Automation, Robotics and Vision", Singapore, Singapore, November 2018, p. 1-12, https://arxiv.org/abs/1809.06045 , https://hal.inria.fr/hal-01875147

[0]See website: http://project.inria.fr/ppniv18
[0]see website: http://avdemo.car.upm-csic.es/

CIDRE Project-Team (section vide)

Coast Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

In 2018 we organised in Nancy the 16th European Conference on Computer-Supported Cooperative Work: The International venue on Practice-centred computing and the Design of cooperation technologies (ECSCW 2018).

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 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, algorithmics, 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.

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.

COMETE Project-Team (section vide)

COML Team (section vide)

COMMANDS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Variational analysis for options with stochastic volatility and multiple factors

Publication of the paper [3] in the SIAM J. finance. This paper clarifies the issue of well-posedness of some PDEs arising in finance.

A stochastic data-based traffic model applied to vehicles energy consumption estimation

Publication [10] of a new method for the analysis of road traffic, in relation with energy consumption.

CONVECS Project-Team (section vide)

CORSE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Christodoulis, G., Broquedis, F., Muller, O., Selva, M., Desprez, F., *An FPGA target for the StarPU heterogeneous runtime system*. ReCoSoC 2018

BEST PAPERS AWARDS :
[25]
G. CHRISTODOULIS, M. SELVA, F. BROQUEDIS, F. DESPREZ, O. MULLER.*An FPGA target for the StarPU heterogeneous runtime system*, in "13th International Symposium on Reconfigurable Communication-centric Systems-on-Chip (RECOSOC 2018)", Lille, France, IEEE, July 2018, p. 1-8, http://hal.univ-grenoble-alpes.fr/hal-01858951

CQFD Project-Team (section vide)

CTRL-A Project-Team (section vide)

DANTE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Machine Learning & Data Science for Complex and Dynamical Models

The Dante team is part of a consortium (including the LIP, the Physics Lab from ENS de Lyon, the LabHC from U. Jean Monnet and LIRIS from U. Lyon 1) that got funded a 4 years project within the call "Scientific Breakthrough" of **IDEX de Lyon**.

With a total envelope of 1.2M euros, the project "mAChine LeArning & Data sciEnce for coMplex and dynamICal modelS" (ACADEMICS) combines **Machine Learning (ML) and Data Science (DS)** for the purpose of scientific research into two challenging directions:

1. **Computing and information processing** – develop new theoretical frameworks and learning algorithms adapted to difficult scientific contexts involving heterogeneous, irregular, error-prone, dynamic and complex data, while taking into account prior knowledge whenever it is relevant.
2. **Complex and dynamic models learning** – leverage the synergy between ML and DS to devise data-driven models in two scientific domains: **climate modeling**, and **quantitative understanding of social systems**. Focusing on these two case studies, the project will tackle the key issue of how to learn intricate models from numerous, heterogeneous and dynamic data.

The **research program** is elaborated along specific scientific issues that can reasonably lead to significant results within the 3-year lifetime of the project. The two case studies are instrumental to frame the way ML and DS can combine to yield relevant models. The methodological axes are:

- **Representation and model learning for complex data:** How to find sparse latent spaces for complex data or graphs, and how to learn compressed models? How to identify exceptional phenomena?
- **Estimation and learning from multi-source and/or dynamic data:** How to transfer a model learned from *source* data to related but different *target* data? How to learn from multi-source complex data?
- **Distributed and adaptive machine learning for graphs and complex models:** How to design distributed optimization-based learning? How to develop adaptive and distributed model inference in high dimension?

In close connexion with these methodological questions, the climate modeling use-case raises the central interrogation of **how to learn effective dynamic models**, firstly in a nonparametric way by means of ML tools and secondly, by mixing several data sources (from observations and simulations). As for computational social science, the challenge is **to embed together in ML approaches, individual features, global structures and dynamics of social networks**. The goal here, is to benefit from their complementarity to infer latent correlations, to identify behavioral mechanisms and to better model emergent social phenomena.

5.1.2. Books on Dynamic Networks by Márton Karsai

After a book chapter on *Control Strategies of Contagion Processes in Time-varying Networks* in Temporal Network Epidemiology in collaboration with Nicola Perra [65], a full book on *Bursty Human Dynamics* was just released at the end of the year in collaboration with Hang-Hyun Jo and Kimmo Kaski [40].

5.1.3. Awards

- Márton Karsai received the Junior Scientific Award of the Complex System Society, Sept. 2018.
- Márton Karsai, awarded Fellow of the ISI Foundation (Torino, Italy), 2018.
- Samuel Unicomb (PhD of Márton Karsai) obtained the best poster award at the NetSci'18 conference in Paris in June 2018.

DATAMOVE 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.

DATASPHERE Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Kavé Salamatian has been awarded in 2018 a President's International Fellowship of the Chinese Academy of Sciences.

DEDUCTEAM Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Logipedia

We have launched in September the first system independent encyclopedia of formal proofs: LOGIPEDIA.

Awards

Serge Abiteboul and Gilles Dowek have received the Award *La science se livre* in January.

DEFI Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Fellowship for the participation to the Center for Turbulence Research Summer Program in Stanford University, June-July 2018 (PM Congedo, G. Gori).

DEFROST Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Award from the Robotics Society of Japan

We received a best paper award from the *Robotics Society of Japan* for the paper entitled "Software toolkit for modeling, simulation, and control of soft robots" that have been published in the *Advanced Robotics* journal. This paper presents the SoftRobots plugin as a first unified software framework dedicated to modeling, simulation and control of soft robots.

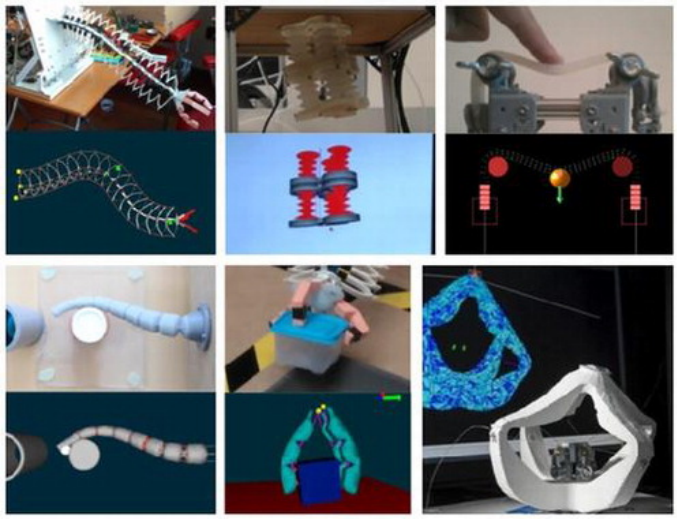


Figure 2. A unified software framework dedicated to modeling, simulation and control of soft robots [2].

5.1.2. Development of a New Open-Source Plugin for SOFA - Model Order Reduction

The plugin Model Order Reduction (MOR) was developed based on the work of the paper [11]. It allows to reduce a SOFA finite element model to gain simulation speed while keeping a good accuracy. It can be used in the SOFA community not only for robotics, but for any application where computational time is an issue, e.g. medical simulations. It is distributed under the GPL license and is available on github: https://github.com/SofaDefrost/ModelOrderReduction.

The plugin is a combination of C++ and Python Code. The user can define the reduction parameters using a python Script or a Graphical User Interface (GUI).

5.1.3. Echelon III: A compliant manipulator

We have participated to the grand challenge of RobotSoft conference that took place in Linorvo, Italy. We have build a robot dedicated to the manipulation competition and we got the 2nd place. A new version of the robot has been developed for the Inria Showroom, installed at Euratechnology in Lille. This version, equipped with a camera, demonstrates the ability of the robot to perform inspection tasks in a limited workspace. We plan to build a new version in 2019 to use it as a research platform, in particular to test planning and control algorithms.

Figure 3. From a computationally intensive simulation to a surrogate version saving accuracy

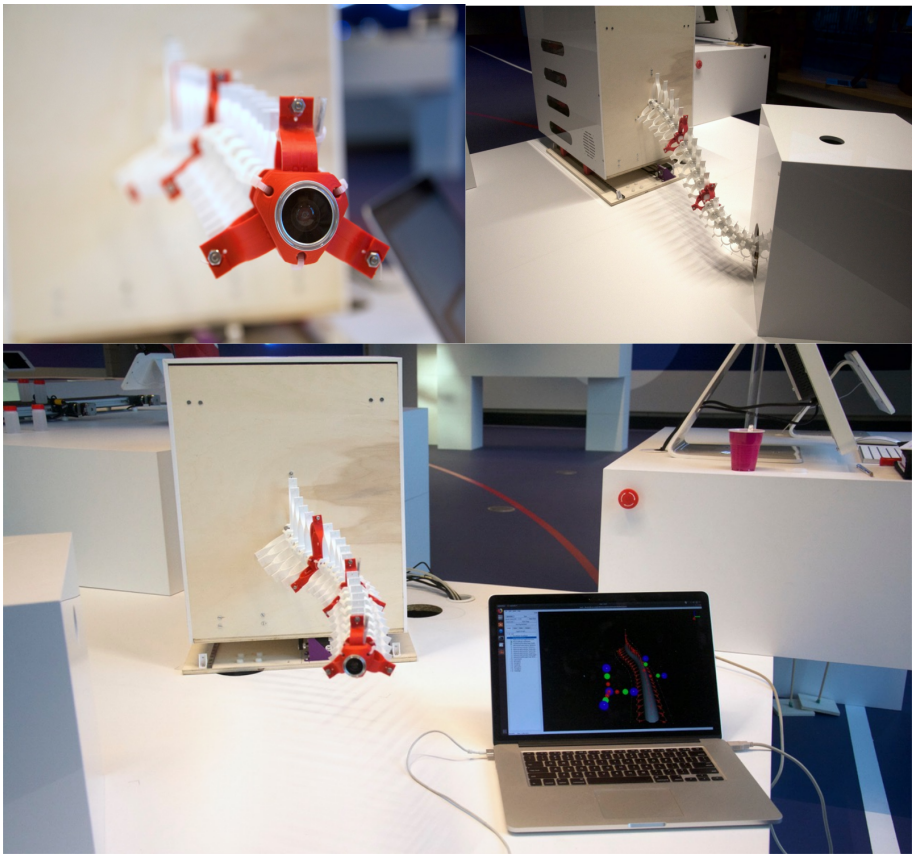


Figure 4. Echelon III in action

5.1.4. Collaboration with Allison Okamura's team at Stanford

This year we had a very close collaboration with the CHARM Lab directed by Allison Okamura at Stanford University. This collaboration resulted in two exchanges: A Stanford PhD student, Margaret Koehler came for 6 months from September 2017 to February 2018 in the team in Lille and Christian Duriez left 7 months of February to August 2018, (thanks to a Fulbright fellowship). We mainly investigated two projects: the haptic rendering on deformable interfaces (A publication in the RAL journal has just been accepted and will be published in 2019) and on the project "Vine Robot" (eversion locomotion). Our teams continue to work on these project. We have also applied to the "Equipe Associée" program.

BEST PAPERS AWARDS :

[2]

E. COEVOET, T. MORALES BIEZE, F. LARGILLIERE, Z. ZHANG, M. THIEFFRY, M. SANZ-LOPEZ, B. CARREZ, D. MARCHAL, O. GOURY, J. DEQUIDT, C. DURIEZ.*Software toolkit for modeling, simulation, and control of soft robots*, in "Advanced Robotics", 2017, https://doi.org/10.1080/01691864.2017.1395362

DELYS Team

4. Highlights of the Year

4.1. Highlights of the Year

In 2018, the DELYS team published papers at major conferences in Systems, Distributed Systems, Theoretical Computer Science, Verification, and AI:

- Scheduling under Uncertainty: A Query-based Approach. L. Arantes, E. Bampis, A. Kononov, M. Letsios, G. Lucarelli, P. Sens. IJCAI, [19].
- Byzantine Gathering in Polynomial Time. S. Bouchard, Y. Dieudonné, A. Lamani. ICALP [22].
- The Battle of the Schedulers: FreeBSD ULE vs. Linux CFS. J. Bouron, S. Chevalley, B. Lepers, W. Zwaenepoel, R. Gouicem, J. Lawall, G. Muller, J. Sopena. ATC [24].
- Distributed transactional reads: the strong, the quick, the fresh & the impossible. A. Z. Tomsic, M. Bravo, M. Shapiro. Middleware [31].
- Co-design and verification of an available file system. M. Najafzadeh, M. Shapiro, P. Eugster. VMCAI [28].

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 badges [0]. 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

DIONYSOS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

We organized the *13th International Conference in Monte Carlo & Quasi-Monte Carlo Methods in Scientific Computing*, in Rennes, July 1-6, 2018. The MCQMC Conference is a biennial meeting on Monte Carlo and quasi-Monte Carlo methods and the premier event on the topic; it has attracted 300 people from all over the world.

5.1.1. Awards

Pierre L'Ecuyer received the 2018 Outstanding Simulation Publication Award by Informs (recognizing outstanding contributions to the simulation literature) for his article published in 2016 in *Operations Research* [84] on arrival rates modeling with application to call centers.

BEST PAPERS AWARDS :

[59]

Q. T. A. PHAM, Y. HADJADJ-AOUL, A. OUTTAGARTS.*Deep Reinforcement Learning based QoS-aware Routing in Knowledge-defined networking*, in "Qshine 2018 - 14th EAI International Conference on Heterogeneous Networking for Quality, Reliability, Security and Robustness", Ho Chi Minh City, Vietnam, December 2018, p. 1-13, https://hal.inria.fr/hal-01933970

DISCO Project-Team (section vide)

DIVERSE Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

This year, we would like to highlight the following results:

- In terms of publications:
  - Among the many articles published this year, articles [25] and b [28] have been published at the highest level but above all they represent perfectly the type of research conducted within the team: open research based on studies of major open-source software and in connection with the developer communities.
  - The results of this year's SLE conference also make us very proud. 4 accepted papers including 1 best vision paper [33], 1 best artifact (hal-01890446) and the award for the best reviewer for a former doctoral student of the team recently appointed associate professor at the University of Nantes.
- A former PhD student of the team, Pierre Laperdrix was awarded the "*Le prix de thèse Gilles Kahn 2018 (premier accessit), décerné par la SiF et patronné par l'Académie des Sciences*" for his PhD entitled *Browser Fingerprinting: Exploring Device Diversity to Augment Authentication and Build Client-Side Countermeasures*.
- Three new PhDs and one new HDR have been succesfully defended this year.
- A new CNRS junior researcher, Djamel Eddine Khelladi, will join the team in 2019.
- Mathieu Acher succesfully submitted its ERC starting grant program: Killing and Resurrecting Software Variability (REVARY). This research program fully structures the Variability axis of the team for the next years.
- Didier Vojtisek, research engineer hosted since many years within the team was awarded the Inria award (*appui à la recherche*) with Guillaume Cassonnet, Christophe Demarey, Herve Mathieu, Florent Pruvost for the Sonarqube project. As a research team in the field of software engineering, we study and produce many open source software artefacts. In this context, we regularly test and deploy internally support services to produce high-quality software. Sonar (SonarQube ancestor) had been deployed internally since 2008. Embedding research engineers into software engineering research teams as often as possible is undoubtedly a win-win operation for both parties (the research team but also the SED and therefore Inria as a whole)

4.1.1. Awards

Paper was awarded the best vision paper at SLE'18.
Paper was awarded the best artefact associated to a scientific paper at SLE'18.

Paper was awarded the best paper at ICMT'18.
BEST PAPERS AWARDS :
[33]
F. COULON, T. DEGUEULE, T. VAN DER STORM, B. COMBEMALE.*Shape-Diverse DSLs: Languages without Borders (Vision Paper)*, in "SLE 2018 - 11th ACM SGIPLAN International Conference on Software Language Engineering", Boston, United States, ACM, November 2018, p. 215-219 [*DOI :* 10.1145/3276604.3276623], https://hal.archives-ouvertes.fr/hal-01889155

[36]
M. LEDUC, T. DEGUEULE, B. COMBEMALE.*Modular Language Composition for the Masses*, in "SLE 2018 - 11th ACM SIGPLAN International Conference on Software Language Engineering", Boston, United States, November 2018, p. 1-12 [*DOI :* 10.1145/3276604.3276622], https://hal.inria.fr/hal-01890446

[32]
J.-M. BRUEL, B. COMBEMALE, E. GUERRA, J.-M. JÉZÉQUEL, J. KIENZLE, J. DE LARA, G. MUSSBACHER, E. SYRIANI, H. VANGHELUWE.*Model Transformation Reuse across Metamodels - A classification and comparison of approaches*, in "ICMT 2018 - International Conference on Theory and Practice of Model Transformations", Toulouse, France, LNCS, Springer, June 2018, vol. 10888, p. 92-109 [*DOI :* 10.1007/978-3-319-93317-7_4], https://hal.inria.fr/hal-01910113

DRACULA Project-Team (section vide)

DYLISS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

The main novelty of the year is the publication associated with software AuReMe for metabolic network reconstruction in Plos Computational Biology [12], and the development of Miscoto, a tool to design synthetic microbial communities [14], presented at the ECCB conference.

DYOGENE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Publication of a monograph *Stochastic Geometry Analysis of Cellular Networks* by Cambridge University Press [30] that presents latest analytic techniques and results from stochastic geometry for modelling of heterogeneous cellular networks.

5.1.1. Awards

Our paper " Optimal Algorithms for Non-Smooth Distributed Optimization in Networks" by K. Scaman, F. Bach, S. Bubeck, Y.T. Lee and L. Massoulié won a best paper award at the NeurIPS 2018 conference.

EASE Team (section vide)

ECUADOR Project-Team (section vide)

ELAN Team (section vide)

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).

ERABLE Project-Team (section vide)

EVA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Finalist, best paper award at the Global IoT Summit 2018, for paper “Why Channel Hopping Makes Sense, even with IEEE 802.15.4 OFDM at 2.4 GHz”.
- **Thomas Watteyne** identified as “Key Innovator” by the European Commission’s Innovation Radar, category “commitment” for the innovation “Online platform of testing tools for the Internet of Things”.

5.1.2. Transfer

- Creationg of the Wattson Element startup, which commercializes the Falco solution (https://wefalco.fr/).
- Publication of RFC8480

EX-SITU Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- ANR ELEMENT project was accepted.
- CNRS PEPS project was accepted.
- ERC CREATIV was extended for a year.
- Wanyu Liu, Olivier Rioul, Joanna McGrenere, Wendy Mackay, and Michel Beaudouin- Lafon: Honorable Mention award at ACM CHI 2018 for “BIGFile: Bayesian Information Gain for Fast File Retrieval” [22]

FACTAS Team (section vide)

FLOWERS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- PY Oudeyer was awarded the prize Inria of Académie des Sciences (category young researchers, http://www.academie-sciences.fr/fr/Laureats/laureats-2018-prix-inria.html)
- The Poppy Education ecosystem of educational robotics kits, associated technologies and educational community created by the Flowers team has been transferred to the newly created Poppy Station association (the creation process being coordinated by Didier Roy), gathering large scale national organizations including Ligue de l'enseignement, Hesam, IFE, EPFL, Arts et Métiers ParisTech, CESI, Le Cnam, Generation Robots, Pollen Robotics, Konex inc, see https://www.poppystation.org/
- PY Oudeyer co-authored with his collaborator Jacqueline Gottlieb (Columbia Univ., NY) a review article [22] in the high impact journal Nature Reviews Neuroscience, entitled "Towards a neuroscience of active sampling and curiosity", https://www.nature.com/articles/s41583-018-0078-0
- PY Oudeyer co-organized (with J. Gottlieb, A. Shankar and P. Zurn) the international conference "Curiosity: Emerging Sciences and Educational Innovations" at University of Pennsylvania, US, gathering researchers from multiple disciplines (neuroscience, psychology, artificial intelligence, HCI, robotics, philosophy, education) around the topic of curiosity, learning and education. https://www.sp2.upenn.edu/sp2-event/curiosity-emerging-sciences-and-educational-innovations.

FLUMINANCE Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Awards

Best thesis award 2018 Applied and Industrial Mathematics Society - Group for the Advancement of Engineering Numerical Methods (SMAI-GAMNI) http://smai.emath.fr/spip.php?article165 Valentin Resseguier "Mixing and fluid dynamics under location uncertainty" https://tel.archives-ouvertes.fr/tel-01504524/document

FOCUS Project-Team (section vide)

FUN Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Valeria Loscrí has been elevated to the IEEE Senior Membership degree.
- Valeria Loscrí and Nathalie Mitton highlighted as Women in Computer Science 2018 by Elsevier https://www.elsevier.com/physical-sciences-and-engineering/computer-science/journals/women-in-computer-science.

5.1.1. Awards

Paper [65] has been awarded Top Paper from 2017 in Transactions on Emerging Telecommunications Technologies, as selected by the Editorial Board. See https://onlinelibrary.wiley.com/page/journal/21613915/homepage/ett_best_paper_awards.htm.

VITALOS, issued from the FP7 VITAL project from which the FUN team is one of the main contributors, has been awarded as one of the 50 most transformative smart projects: https://spring.smartcitiesconnect.org/Smart50Awards/.

GAIA Team

5. Highlights of the Year

5.1. Highlights of the Year

Computer Algebra in Scientific Computing

The GAIA team organized the conference *Computer Algebra in Scientific Computing* (CASC), University of Lille, 17–21 September 2018.

GALEN-POST Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

The work on graph-based text categorization by F. Malliaros et al. [39] has received the best paper award at the 12th NAACL-HLT Workshop on Graph-Based Natural Language Processing (TextGraphs), held in New Orleans, Louisiana in June 2018.

Riza Alp Güler obtained the 2nd place at Prix du Doctorant for the Doctoral School STIC of Univ. Paris Saclay.

M. Papadomanolaki and M. Vakalopoulou got the 2nd place at the Earth Observation Challenge organised by Digital Globe and ESA for the project UrbanMonitor: Mapping Changes in Urban Environments towards Resilient Cities and Urban Sustainability. http://blog.digitalglobe.com/news/earth-observation-challenge-the-three-winners/

A. Pirayre whose PhD thesis was advised by J.-C. Pesquet received the Yves Chauvin PhD award (IFPEN).

Our M.Sc. program in Data Sciences and Business Analytics (with ESSEC Business School) was ranked 4th worldwide in the QS World University Rankings.

GALLINETTE Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Creation and new permanents members

The team has been created as a project team on June 2018. Two new permanent members have joined the team:

- Guilhem Jaber, as an assistant professor of the University of Nantes (September 2018).
- Pierre-Marie Pédrot as an Inria researcher (October 2018).

4.1.2. Awards

BEST PAPERS AWARDS :

[7]

N. TABAREAU, É. TANTER, M. SOZEAU.*Equivalences for Free: Univalent Parametricity for Effective Transport*, in "Proceedings of the ACM on Programming Languages", September 2018, p. 1-29 [*DOI :* 10.1145/3234615], https://hal.inria.fr/hal-01559073

[14]

É. MIQUEY.*A sequent calculus with dependent types for classical arithmetic*, in "LICS 2018 - 33th Annual ACM/IEEE Symposium on Logic in Computer Science", Oxford, United Kingdom, LICS '18 Proceedings of the 33rd Annual ACM/IEEE Symposium on Logic in Computer Science, ACM, July 2018, p. 720-729, https://arxiv.org/abs/1805.09542 [*DOI :* 10.1145/3209108.3209199], https://hal.inria.fr/hal-01703526

GALLIUM Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

In 2018, Xavier Leroy received the “Grand prix” jointly awarded by Inria and Académie des sciences.

Gergö Barany received the Best Paper Award for the paper “Finding Missed Compiler Optimizations by Differential Testing” [19] at the 27th International Conference on Compiler Construction (CC 2018).

GAMBLE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Given a set of possibly intersecting polygons in 3D, we presented a breakthrough result on the problem of computing a set of interior-disjoint triangles whose geometry is close to that of the input and such that the output vertices have coordinates of fixed precision, typically integers or floating-point numbers of bounded precision (eg. int, float, double). This problem is important in academic and industrial contexts because many 3D digital models contain self intersections and many applications require models without self intersections. Despite the theoretical and practical relevance of this problem, there was almost no literature on the subject and we presented its first satisfactory solution [12].

GAMMA3 Project-Team

3. Highlights of the Year

3.1. Highlights of the Year

3.1.1. Awards

- Adrien Loseille. Deuxième Prix FIEEC de la Recherche Appliquée.

GANG Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

WENDY: Workshop on Emergent Algorithms and Network Dynamics

GANG/Inria Paris was the institutional organizer of WENDY workshop at Institut Henri-Poincaré, Paris, October 10-11, 2018, https://wendy.paris (chair: Adrian Kosowski).

The goal of the project was to facilitate the exchange of ideas between researchers working on distributed computing theory, modeling random structures, and discrete dynamical systems.

The main theme of the workshop was programming local interaction dynamics on networks, so as to obtain the desired emergent effects on the system as a whole. Central topics included:

- Evolving graph models and dynamics on random graphs
- Bio-inspired computing and computing with biological agents
- Chemical reaction networks
- Markovian and non-Markovian processes on networks.

BDA: Workshop on Biological Distributed Algorithms

Amos Korman chaired the organizing committee and co-chaired the program committee of the 6th workshop on Biological Distributed Algorithms (BDA, http://www.snl.salk.edu/~navlakha/BDA2018/), co-located with ACM PODC in London on July 23rd, 2018.

BDA was focused on the relationships between distributed computing and distributed biological systems and in particular, on analysis and case studies that combine the two. Such research can lead to better understanding of the behavior of the biological systems while at the same time developing novel algorithms that can be used to solve basic distributed computing problems.

The workshop featured 6 invited talks and over a dozen accepted contributed submissions, with generous financial support offered to participants by Amos Korman's ERC grant.

GENSCALE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Our new tool, Carnac-LR, dedicated to the clustering of third generation sequencing data, has been published in the high impact journal *Nucleic Acid Research* (NAR) [16].

5.1.1. Awards

BEST PAPERS AWARDS :
[26]
S. FRANCOIS, R. ANDONOV, D. LAVENIER, H. DJIDJEV.*Global optimization approach for circular and chloroplast genome assembly*, in "BICoB 2018 - 10th International Conference on Bioinformatics and Computational Biology", Las Vegas, United States, March 2018, p. 1-11 [*DOI :* 10.1101/231324], https://hal.inria.fr/hal-01666830

GEOSTAT Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Technology transfer and socio-economic impact: InnovationLab i2S-GEOSTAT. Three year contract with I2S company on the transfert of award winning H. Badri PhD results (AFRIF PhD price in 2016). The contract is being transformed in 2018 in the form of an Inria Innovation Lab. The Innovation Lab is focused on non convex optimization methods in image processing and digital acquisition devices. People involved in GEOSTAT: H. Yahia, N. Brodu, K.Daoudi, M. Martin, A. Zebadua. Budget: 900 000 € on 3 years. The InnovationLab is intended at transferring non-convex optimization methods to solve efficiently the fundamental steps of an imaging acquisition chain built by i2S company. In particular, the following thematics receive new algorithmic solutions through proximal operators and non-convex optimization:
  - Image smoothing
  - Image denoising
  - Efficient block-matching implementation
  - Denoising through learning
  - Low rank transfert
  - Debayerisation
  - Image stitching
  - Deconvolution
  - 3D reconstruction from corrupted gradients
  - Super-resolution
  - Image enhancement

  This InnovationLab is operated by GEOSTAT researchers, 1 PhD, 2 post-docs and 1 engineer. C++ libraries are developed and transferred into the algorithmic chain at i2S.
- Research results done by GEOSTAT and LEGOS on greenhouse gases partial pressures at the atmosphere/ocean interface layers put forward on ESA site. Read : "Increasing the effective resolution of not well-resolved Essential Ocean Variables".
- IFCAM (Indo-French Center for Applied Mathematics) project accepted: "Generalization for land cover classification" by Dharmendra Singh and Nicolas Brodu.

GRACE Project-Team (section vide)

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

HIEPACS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

The year 2018 was rich in regional, national and European calls for projects. This year, our success rate was quite high for the proposals we submitted; four of them went through: one ANR, namely SASHIMI, a major regional project, namely hpc-ecosystem benefiting many EPIs in Inria Bordeaux Sud-Ouest, and two H2020 projects, namely EoCoE and PRACE-6IP. These projects will provide new applications and collaborative frameworks to support our ongoing and future research and transfert activities.

HYBRID Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- This year, the Hybrid team has again been strongly involved in the organization of the IEEE Virtual Reality Conference (IEEE VR) in 2018, with M. Marchal: Program Chair, F. Argelaguet: Workshops Chair, A. Lécuyer: Tutorials Chair.
- Hybrid was involved in the publication of a book [48] on Virtual and Augmented Reality, titled "Virtual Reality, Augmented Reality: myths and realities". This book was co-edited by B. Arnaldi and G. Moreau, with contributions [44] [42] [43] from F. Argelaguet, V. Gouranton, A. Lécuyer, M. Marchal, and J.M. Normand.
- Hybrid was involved in the organization of the ACM/Eurographics Symposium on Computer Animation (SCA), in Paris, July 2018, with M. Marchal serving as General Chair.
- Hybrid organized, together with Inria team Visages, a press conference in Paris on the topic of "Neurofeedback" in November 2018, followed by various media coverages.

5.1.1. Awards

- Maud Marchal is junior member of Institut Universitaire de France (IUF) since October 2018.
- Best Paper Award IEEE VR 2018 - Honorable Mention: Paper from Jeunet et al. [18]
- Best Paper Award Euro VR 2018 - Honorable Mention: Paper from Costes et al. [30]
- Best Demo Award IEEE 3DUI Contest 2018 - Runner-Up: Demo from Nouviale et al. [28]

HYCOMES Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

The highlights of the year are:

- The start of two industrial collaborations of crucial importance for the Hycomes team: (i) the FUI ModeliScale project, in the context of which the Hycomes team design novel algorithms for the structural analysis of multimode DAE systems, with the objective of supporting a larger class of multimode Modelica models; and (ii) the Glose project, in collaboration with Safran Tech., on the topics of cyber-physical systems modeling and cosimulation.
- Albert Benveniste, Benoît Caillaud and co-authors have published a book on contract-based reasoning for cyber-physical systems design. This book is the result of more than 10 years of research on contract and interface theories.
- Albert Benveniste, Benoît Caillaud and co-authors have published a paper in *The Proceedings of the IEEE* on the design of Hybrid Systems modeling languages, based on our past work on ODE-based synchronous languages (namely the Zélus language).

I4S Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Awards

BEST PAPERS AWARDS :
[30]
X. LORANG, S. KERBAL, L. LEMARCHAND, V. LE CAM, J.-J. MOGORO.*New detection criteria and shunting monitoring in railway track circuit receivers*, in "IWSHM-RS 2018 - 2nd International Workshop on Structural Health Monitoring for Railway Systems", Qingdao, China, October 2018, p. 1-10, https://hal.inria.fr/hal-01898678

IBIS Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

Two new projects with participation from IBIS started this year: the ANR project RIBECO and the IXXI project MuSE (Section 7.2). The web application WellInverter was made available through the new cloud of the French Institute of Bioinformatics (IFB) (Section 5.2). A publication summarizing several conference contributions on the stochastic modeling and inference of gene regulatory networks was published in the main control journal *Automatica* this year [16].

ILDA Project-Team (section vide)

IMAGINE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

This is a transition year where the team has been actively involved in starting new projects with new PhD students along new research directions, which will be further emphasized in the future team ANIMA, due to start after the termination of the IMAGINE team in July 2019.

Figure 1. Filming rehearsals of jean-Francois Peyret's La fabrique des monstres, Théâtre de Vidy, Lausanne, January 2018.

We are now actively involved in the Performance Lab, a joint cross-disciplinary research program of IDEX Univ. Grenoble Alpes. In this new project started in January 2018 for three years, we will investigate "digital dramaturgies" mixing real-time computer graphics, augmented and virtual reality with live performances. We will also continue to develop our Kino Ai video capture, analysis and editing system.

As a follow-up to ADT ULTRAHD, we recorded three weeks of rehearsals from the play "La fabrique des monstres", a theatre adaptation of Mary Shelley's Frankenstein by Jean-Francois Peyret (Fig. 1). Our Kino Ai system was used to automatically generate six hours of cinematographic rushes from those recordings. Those rushes were edited by professional film editors into three short documentaries and published online (see episode 1, episode 2 and episode 3 to watch the full movies).

5.1.1. Awards

In December 2018, PhD laureate Guillaume Cordonnier was awarded the prestigious ETH Zurich Postdoctoral Fellowship and will join the Computer Graphics Lab's simulation group in 2019.

5.1.2. Patents

As part of Youna Le Vaou's CIFRE PhD thesis with PSA, we filed a joint patent application:

Y La Vaou, S Masfrand, M Mika, S Hahmann, J-C Léon: Procédé de modification de la forme d'un objet virtuel tridimensionnel représenté dans un espace immersif et système immersif mettant en œuvre ledit procédé, December 2018.

This new result will also be submitted for publication at an international conference in 2019.

INDES Project-Team (section vide)

INFINE-POST Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Awards

Together with his co-authors, Emmanuel Baccelli was awarded the **best demo award** at the 3rd Cloudification of the Internet of Things Conference, in Paris, July 2018, for the demo on **Orchestration of IoT Device and Business Workflow Engine on Cloud** (collaboration with S. Kikuchi, I. Thomas, O. Jallouli, J. Dörr, A. Morgenstern, and K. Schleiser).

RIOT Summit 2018

We successfully organized in September 2018 the thrid RIOT Summit, in Amsterdam. The RIOT Summit 2018 gathered 100+ enthusiastic industrial participants, makers and academics involved in RIOT. Relevant partners such as Ericsson, HERE Technologies, CodeCoup, Wolf SSL, as well as a number of SMEs and startups from various places in Europe gave talks on aspects of IoT communication, use cases IoT hardware, IoT open source community aspects and concepts for future IoT software and networks, as well as hands-on sessions and tutorials. See: http://summit.riot-os.org.

Associated team - EMBRACE

2018 was the second year of the EMBRACE Associated team. The EMBRACE (lEveraging huMan Behavior for Resource AlloCation and services orchestration modEls) team is composed by members of the INFINE and by three Brazilian teams from three different Brazilian Universities. The EMBRACE project addresses the topic of designing efficient solutions for 5G networks taking into account human behavior, uncertainty, and heterogeneity of networking resources.

More information is available here: https://team.inria.fr/embrace/

INOCS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Martim Joyce-Moniz, former INOCS PhD student supervised by Bernard Fortz, won the Best Dissertation Award of the INFORMS Section on Telecommunications and Network Analytics.
- Bernard Fortz, Enrico Gorgone and Dimitri Papadimitriou received the 2017 Glover-Klingman prize for the best paper published in *Networks* (an international journal) [6].
- Wenjuan Gu, together with co-authors Diego Cattaruzza, Maxime Ogier and Frédéric Semet, has been classified finalist for the best article GT2L (Groupe de Travail Transport et Logistique) award with the paper titled *Adaptive large neighborhood search for multicommodity VRP* [49]. The work has been presented during the conference Roadef 2018 held in Lorient, France.

5.1.2. Publications & dissemination

- Luce Brotcorne was the EURO Plenary Speaker at the XIX Latin-Iberoamerican Conference on Operations Research (CLAIO 2018) in Lima, Peru, September 2018 [28].
- Martine Labbé was plenary speaker at the «Journées de l'optimisation» in Montreal, Canada, May 2018 [31].

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

KERDATA Project-Team (section vide)

LACODAM Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Honorable Mention in the ACM SIGMOD Jim Gray Dissertation Award. ACM SIGMOD conference, June 2018 (L. Galárraga).

LARSEN Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

BEST PAPER AWARD :
[17]
A. GAIER, A. ASTEROTH, J.-B. MOURET.*Data-efficient Neuroevolution with Kernel-Based Surrogate Models*, in "GECCO 2018 - Genetic and Evolutionary Computation Conference", Kyoto, Japan, July 2018, https://arxiv.org/abs/1804.05364 [*DOI :* 10.1145/3205455.3205510], https://hal.inria.fr/hal-01768248

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 officilly exist as "Equipe Projet" as of 2019.
- 3 new members joined the team in 2018: Fatima Palacios Rodrigouez (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.

LFANT Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

Chloe Martindale defended her PhD thesis on *Isogeny Graphs, Modular Polynomials, and Applications*.

Antonin Riffaut defended his PhD thesis on *Effective computation of special points*.

A new release of PARI/GP, 2.11.0, has been published. This is a major stable release ending a development cycle which started in November 2016; it includes among others an extensive new package for modular forms.

2018 was also a year with more workshops on PARI/GP than ever: Besides two general workshops uniting developers and users, organised together with the universities of Besançon and Rome in the respective cities, the team participated with lectures on PARI/GP at the École jeunes chercheurs en théorie des nombres à Besançon (https://indico.math.cnrs.fr/event/2735/) and at the summer school ZETAS 2018 at Le Bourget du Lac (https://etzetas2018.sciencesconf.org/).

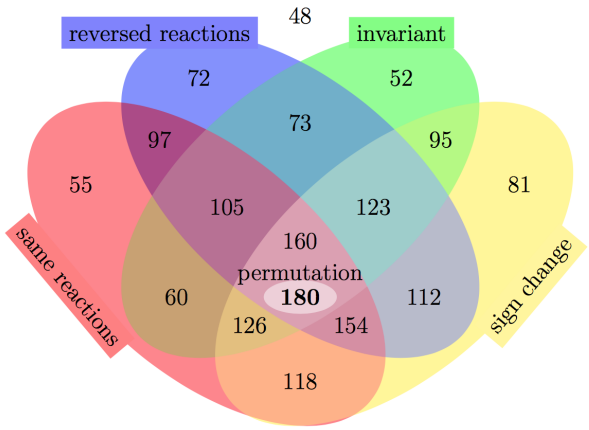
LIFEWARE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- **Multistationarity Analysis in CRNs**

  The non-existence of multiple steady states in very large chemical reaction networks, out of reach of symbolic computation methods, can be predicted by a remarkably fast graph rewriting algorithm, based on Soliman 2013's theorem [0]. Study published in the *Journal of Theoretical Biology* [1] (graphical abstract in Fig. 1).



Number of models for which multistationarity can be ruled out
by using original Thomas's positive circuit condition
and Soliman's label conditions respectively
among the 506 curated reaction models of BioModels.

Figure 1. Graphical abstract of [1].

- **Distinguishing resistence from resilience to prolong antibiotic potency**

  Biomedical engineers at Duke University, in collaboration with Grégory Batt and Virgile Andréani, have shown experimentally that there is more than one flavor of antibiotic resistance and that it could – and should – be taken advantage of to keep first-line antibiotics in our medical arsenal. While an individual bacterium can be resistant to antibiotics, resilience only arises within a community. This happens when bacterial cells produce enough beta-lactamases to degrade the antibiotics, but not enough to save themselves from the initial onslaught. As some cells die and release more and more of the enzyme, the population as a whole eventually rids their environment of the antibiotic. Study published in *Science Advances* [6].

- **Biochemical Programs in Synthetic Cell-like Microreactors**

[0] Sylvain Soliman. A stronger necessary condition for the multistationarity of chemical reaction networks. Bulletin of Mathematical Biology, 75(11):2289–2303, 2013.

Researchers at Lab. CNRS-ALCEDIAG Sys2Diag in Montpellier, in collaboration with François Fages, have shown that an algorithm for the differential diagnosis of diabetes can be specified by three Boolean circuits and robustly implemented with real enzymes encapsulated in artificial vesicles that become fluorescent according to 5 different forms of diabetes. The robustness of the circuit was optimized in BIOCHAM by optimizing the initial concentrations of the enzymes with respect to a behavior specification in quantitative temporal logic. The protocells built with a microfluidic device were validated on a cohorte of patients' urines from Montpellier's Hospital. Study published in *Molecular Systems Biology* [3] (see Fig. 2).

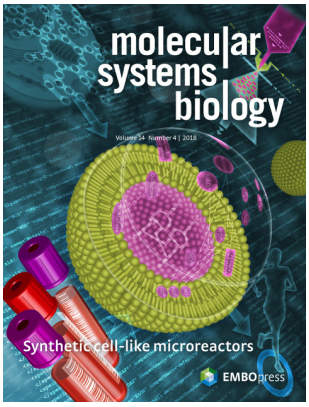


Figure 2. Artistic illustration by Courbet in cover page of Molecular Systems Biology [3].

5.1.1. Awards

- **La Recherche magazine 2019 Award - mention Information Sciences**

  The article[6] "Strong Turing Completeness of Continuous Chemical Reaction Networks and Compilation of Mixed Analog-Digital Programs" by F. Fages, G. Le Guludec, O. Bournez and A. Pouly, presented and awarded Best Paper at CMSB'17 last year has received the 2019 Award of magazine "La Recherche" - in Information Sciences.

LINKMEDIA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Our activities in relation with fake news was highlighted in a number of occasions such an audition at the French National Assembly by the parliamentary group *Économie numérique de la donnée, de la connaissance et de l'intelligence artificielle*, at the Forum des sciences cognitives in Nancy, in a press conference organized by the CNRS in May 2018, through a Fake News hackathon organized in Rennes by Irisa and Inria, through many articles in the press as well as during the European cyber-week conference held in November 2018.

5.1.1. Awards

- Miaojing Shi was selected as the Forty under Forty Talents by French Tech hubs China.
- Miaojing Shi was in the final pitch (in progress) of the 2018 Innovation Awards by Comité France Chine.

LINKS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Containment for RDF Schemas

The ShEx language for defining RDF schemas was proposed and developed earlier by the Links team in cooperation with the W3C. Slawek Staworko et al. now studied the containment problem for ShEx schemas for RDF documents. They showed at **PODS** [7] – the best database theory conference – that the problem is decidable, but co-NEXP-hard. This is joined work with P. Wieczorek from the University of Wrazlaw.

Foundations of AI: Knowledge Compilation

Florent Capelli et al. showed at **STACS** [15] – a top conferences in theoretical computer science – a new knowledge compilation procedure for quantified boolean formulas allowing to decide the satisfiability quantified boolean formulas with bounded tree width in polynomial time. This can be applied in particular to first-order database queries with quantifiers. This is joined work with S. Mengel from the CNRS in Lens.

Foundations of AI: Constrained Topologial Sort

Charles Paperman et al. showed at **ICALP** [8] – a top conferences in theoretical computer science – how to compute efficiently topological sorts of graphs under regular constraints. The problem was initially introduced in the context of preferential query answer for uncertain databases, where on usually wants to sort the query answers by some preferences, that are known only partially. It becomes then crucial to look for total orders on the answer set satisfying regular constraints that specify the preferences. Finding such an order for regular constraints was know to be infeasible in general. In this article, a class of regular constraints is identified for which this problem becomes tractable. A (partial) decidable dichotomy theorem is proven drawing the frontier between the kind of constraints which are feasible from those which are not. This is joined work with A. Amarilli from Telecom Paristech.

LOKI Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Personnel

Géry Casiez has been appointed junior member of the Institut Universitaire de France.

Géry Casiez has been appointed at the rank of Adjunct Professor by the University of Waterloo, Canada (2018-2020).

5.1.2. Publications

Loki presented 6 papers at ACM CHI and 1 paper at ACM UIST, the most prestigious conferences in our field.

5.1.3. Awards

"Honorable mention" (top 4% of the 2500+ submissions) from the ACM CHI conference to the paper "Storyboard-Based Empirical Modelling of Touch Interface Performance", from A. Goguey, G. Casiez, A. Cockburn, & C. Gutwin .
BEST PAPERS AWARDS :
[19]
A. GOGUEY, G. CASIEZ, A. COCKBURN, C. GUTWIN.*Storyboard-Based Empirical Modeling of Touch Interface Performance*, in "Adjunct Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI 2018), Demonstration", Montreal, Canada, April 2018 [*DOI :* 10.1145/3170427.3186479], https://hal.inria.fr/hal-01736699

M3DISIM Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

During the 8th World Congress of Biomechanics in Dublin, Martin Genet received the Young Investigator Award from the Francophone Society of Biomechanics for his talk on “A continuum relaxed growth framework for controlling growth-induced residual stresses in living tissues”.

MAGIQUE-3D Project-Team (section vide)

MAGNET Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Strengthening of the privacy aware machine learning activity with a new associate team with the Alan Turing Institute and the organization of a workshop at NeurIPS (formerly NIPS).
- New collaboration with Multispeech (Inria Nancy) on decentralized and private machine learning for speech processing leading to an ANR and an H2020 project.

5.1.1. Awards

AURÉLIEN BELLET received a best reviewer award (top 200 out of 3000) at the conference NeurIPS 2018.
PASCAL DENIS received a Distinguished Senior Program Committee award at IJCAI-ECAI 2018.

MAGRIT Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Vanishing point detection is and old problem of computer vision. We introduced this year a new method based on the a contrario methodology to solve this problem. By fractioning the 2-D search of meaningful vanishing points into three 1-D searches of meaningful events (Zenith line, Horizon line, and Vanishing points), we not only achieve state-of-the-art performance w.r.t. computation times and accuracy of the horizon line, but also yields more relevant vanishing points than the previous top-ranked methods. This work was presented at ECCV 2018 [23] and the associated code is freely distributed.

MAMBA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

We welcome a new team member, Nastassia Pouradier-Duteil, junior research scientist since September 2018.

We welcome Ayman Moussa in delegation since September 2018; he defended his habilitation thesis on December 13th.

Marie Doumic finished her two-year sabbatical stay in September 2018.

Jean Clairambault is emeritus DR since March 2018.

5.1.1. Awards

In December 5, 2017, Benoit Perthame has been elected at the Académie des Sciences, and was received in the Académie on May 28, 2018.

Christian Schmeiser, associate member of Mamba through the associated team MaMoCeMa with the university of Vienna, being the laureate of the ”chaire d’excellence” of the FSMP, is for six months in Paris (september 2018 to february 2019).

MANAO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Our paper on instant computation of transport maps was accepted for presentation at the prestigious conference Siggraph Asia and will be published in the journal ACM Transcations on Graphics [5].

5.1.1. Awards

Best paper and presentation award at EGSR 2018 .
BEST PAPERS AWARDS :
[3]
P. BARLA, R. PACANOWSKI, P. VANGORP.*A Composite BRDF Model for Hazy Gloss*, in "Computer Graphics Forum", 2018, vol. 37 [*DOI :* 10.1111/CGF.13475], https://hal.inria.fr/hal-01818666

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

MATHERIALS Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Awards

Claude Le Bris was selected to deliver the Coxeter lectures at the Fields Institute in Toronto and the Aziz lectures at the University of Maryland.

Florent Hédin received the “Best student/postdoc oral presentation” award at the 7^{th} Workshop on Parallel-in-Time methods, Roscoff, France, May.

MATHNEURO Team (section vide)

MATHRISK Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

The project team Mathrisk has been evaluated in March. The report was very positive.

MAVERICK Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- the paper "MNPR: A Framework for Real-Time Expressive Non-Photorealistic Rendering of 3D Computer Graphics" [13], co-authored by Santiago Montesdeoca, Hock Soon Seah, Amir Semmo, Pierre Bénard, Romain Vergne, Joëlle Thollot and Davide Benvenuti, has received the "Best Paper Award" during the conference Expressive 2018.
- the paper "High-performance By-Example Noise using a Histogram-Preserving Blending Operator" [4], co-authored by Eric Heitz and Fabrice Neyret, has received the "Best Paper Award" during the conference High-performance Graphics 2018.
- the paper "A New Microflake Model with Microscopic Self-Shadowing for Accurate Volume Downsampling" [5], co-authored by Guillaume Loubet and Fabrice Neyret, has received the "Best Paper Award" during the conference Eurographics 2018.

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.

MEMPHIS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Turbulent flow simulations using Octrees

We have initially developed and tested a 3D first-order Octree code for unsteady incompressible Navier-Stokes equations for full windmill simulations with an LES model and wall laws. We have validated this code on Occigen for complex flows at increasing Reynolds numbers. This step implied identifying stable and feasible schemes compatible with the parallel linear Octree structure. The validation has been conducted with respect to the results of a fully Cartesian code (NaSCAR) that we run on Turing (with significantly more degrees of freedom) and with respect to experimental results.

Subsequently, we have developed a second-order Octree scheme that has been validated on Occigen for a sphere at a moderate Reynolds number ($\mathrm{Re} = 500$), see Table 1 . Then, for a cylinder at ($\mathrm{Re} = 140000$) (Figures 5 (a) and 5 (b)), close to real applications, we have preliminary validation results for the second-order scheme with respect to experimental drag coefficient (Table 2). Additional resources will be asked on Occigen to complete the study.

Table 1. Flow past a sphere at Re =500. Results in the literature are spread between C D =0.48 and C D =0.52.

Mesh	$\Delta x_{\min}$	number of cells	C_{D} (1^{st}-order scheme)	C_{D} (2^{nd}-order scheme)
1	0.094	$0.72 \cdot 10^5$	N.A.	0.526
2	0.047	$4.9 \cdot 10^5$	0.595	0.522
3	0.023	$4.7 \cdot 10^6$	0.546	0.492
4	0.012	$37.6 \cdot 10^6$	0.555	0.496

Table 2. Flow past a sphere at Re =14000.

Case	C_{D}
Octree, 1^{st}-order scheme	1.007
Octree, 2^{nd}-order scheme	1.157
Cartesian	1.188
Experimental estimate [31]	1.237

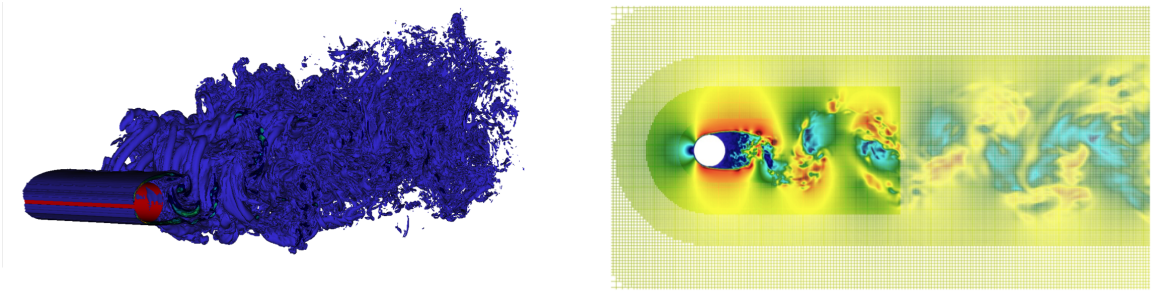


Figure 5. flow past a cylinder at $\mathrm{Re} = 140000$*. Left: vorticity contour lines. Right: streamwise velocity section and grid for the second-order Octree scheme.*

MEPHYSTO-POST Team (section vide)

MEXICO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Reaching agreement in unstable times

Reaching approximate agreement in a distributed system among a set of local input values is a problem that often is repeatedly solved in artificial and natural distributed systems. Time efficient algorithms for this problem are thus of great theoretical and practical relevance. In [28] we studied the performance of such algorithms in dynamic networks. We showed lower time complexity bounds, demonstrating that already relatively simple broadcast and averaging algorithms achieve optimal time complexity. The results also imply new tight lower time complexity bounds for approximate agreement in classic distributed computing models with stable network architectures; solving a previously open problem.

5.1.2. New Semantics and State Spaces for Biological networks (and beyond)

We have gained major new insights into the dynamics of biological networks by

- obtaining [34], on the one hand, bi-directional translations between Contextual nets and BNs and correspondences between results on synchronism sensitivities. Taking advantage of CPN semantics enabling more behaviour than the generalized asynchronous updating mode, we propose an encoding of BNs that ensures correct abstraction of any multivalued refinement; and
- [20], [32] investigating update modes for discrete networks. It is commonly expected that Boolean networks produce an over-approximation of behaviours (reachable configurations), and that subsequent refinements would only prune some impossible transitions. However, we show that even generalized asynchronous updating of Boolean networks, which subsumes the usual updating modes including synchronous and fully asynchronous, does not capture all transitions doable in a multivalued or timed refinement. We introduce a new semantics for interpreting BNs which meets with a correct abstraction of any multivalued refinements, with any update mode. This semantics subsumes all the usual updating modes, while enabling new behaviours achievable by more concrete models. Moreover, it appears that classical dynamical analyses of reachability and attractors have a simpler computational complexity: – reachability can be assessed in a polynomial number of iterations (instead of being PSPACE-complete with update modes); – attractors are hypercubes, and deciding the existence of attractors with a given upper-bounded dimension is in NP (instead of PSPACE-complete with update modes). The computation of iterations is in NP in the very general case, and is linear when local functions are monotonic, or with some usual representations of functions of BNs (binary decision diagrams, Petri nets, automata networks, etc.). In brief, the most permissive semantics of BNs enables a correct abstract reasoning on dynamics of BNs, with a greater tractability than previously introduced update modes. These works open new perspectives in concurrent semantics, and at the same time will allow to capture hitherto inaccessible phenotypes and pathways in biological networks.

5.1.3. Awards

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MFX Team

5. Highlights of the Year

5.1. Highlights of the Year

Academic Life

We had 3 publications in the top journal in our field, ACM Transactions on Graphics, including 2 from the proceedings of the ACM SIGGRAPH conference [11], [12], [13].

Cédric Zanni has been awarded an ANR JCJC 2018 project entitled IMPRIMA (Implicit modeling for additive manufacturing). IMPRIMA aims at exploring representations for the modeling, visualization and processing of both geometry and control fields for material properties within the authoring pipeline for additive manufacturing. The project will effectively start in March 2019.

Sylvain Lefebvre co-organized the first multidisciplinary workshop on academic research in additive manufacturing within the Lorraine area, which hosted 70 participants over two days. The two days workshop started on May 31, 2018 at Inria-Nancy Grand Est and was co-organized with Sandrine Hoppe (LRGP), Samuel Kenzari (IJL) and Hakim Boudaoud (ERPI). See https://www.inria.fr/centre/nancy/agenda/workshop-fa.

Creativ'Lab

Figure 1. The new MFX space within the Creativ'Lab.

The newly created experimental space for the MFX team was finished in September 2018. We are gradually moving our equipment. We worked to maximize usability and create a logical layout, organized in several spaces: one for powder devices, one for resin machines and another for filament 3D printers.

This new lab will greatly improve our capability to experiment, produce and test results.

5.1.1. Awards

Jérémie Dumas, who was advised by Sylvain Lefebvre and defended in February 2017, received the 2018 PhD prize from IG-RV (https://prixigrv2018.sciencesconf.org/).

MIMESIS Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Stéphane Cotin received the Inria – French Académie des Sciences – Dassault Systèmes Innovation Award. The committee underlined the professional experience of Stéphane Cotin at the cutting edge of research into numerical simulation. "*Stéphane Cotin is leading the MIMESIS team, working in close collaboration with IHU Strasbourg since its creation in 2014. Besides the development of SOFA, the team is mainly dedicated to real-time simulation in operating theaters. Its flagship projects include the development of 3D models that are to be projected on the livers of patients having a tumour removed, or the development of highly realistic virtual images that would improve interventional radiology techniques by limiting exposure to X-rays.*"

Andrea Mendizabal received the Student Travel Award at MICCAI 2018 Granada. Spotlight presentation on the paper *A Combined Simulation & Machine Learning Approach for Image-based Force Classification during Robotized Intravitreal Injections*.

Fanny Morin and Yinoussa Adagolodjo received their PhD with awards respectively in October 2017 and September 2018.

MIMETIC Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Franck Multon has been recruited as full-time researcher with a national coordination task for the Olympic Games 2024 (SportInria project). He is the national contact for Performance2024, a national initiative from the French Ministry of Sports, and the French Ministry of Research (MESRI) to support fundamental and applied research in collaboration with sports federation for the Olympic Games 2024. Together with Richard Kulpa and Benoit Bideau, they have been responsible to write a call for national proposals "Liv Lab Sports" from the French Ministry of Sports, to develop areas where people can test and train to sports using new technologies, such as virtual and augmented reality. MimeTIC is also globally involved in the Sciences2024 project leaded by Ecole Polytechnique to enhance collaborations between research groups and French Sports federations. All these involvements demonstrate the national visibility of MimeTIC as a leading research group in applying new technologies for sports.

Two papers on the topic of drone cinematography were presented at SIGGRAPH 2018, the main conference in Computer Graphics and Interaction. The first paper focused on reactive path planning techniques in a specific parametric space (Toric Space) to move cinematographic drones with respect to dynamic targets and obstacles, and to coordinate the motion of multiple drones. The second paper focused on static path planning techniques to construct aesthetic overviews of buildings by integrating viewpoint quality metrics and motion quality metrics.

The team released the CusToM OpenSource Software. Customizable Toolbox for Musculoskeletal simulation (CusToM) is a MATLAB toolbox aimed at performing inverse dynamics-based musculoskeletal analyzes. This type of analysis is essential to access mechanical quantities of human motion in different fields such as clinic, ergonomics and sports. CusToM exhibits several features. It can generate a personalized musculoskeletal model, and can solve from motion capture data inverse kinematics, external forces estimation, inverse dynamics and muscle forces estimation problems with a high level of customization for research purposes. It is also designed for non-expert users interested in motion analysis. CusToM is an OpenSource Software with a github repository available with no restriction.

5.1.1. Awards

Best presentation award for Amaury Louarn in ACM Motion Interaction and Games in Cyprus, November 2018, for the paper "Automated Staging for Virtual Cinematography" .

Kimea project has been granted by national innovation committee: "French IoT La Poste challenge" in June 2018.

BEST PAPERS AWARDS :

[45]

A. LOUARN, M. CHRISTIE, F. LAMARCHE.*Automated Staging for Virtual Cinematography*, in "MIG 2018 - 11th annual conference on Motion, Interaction and Games", Limassol, Cyprus, November 2018, p. 1-10 [*DOI :* 10.1145/3274247.3274500], https://hal.inria.fr/hal-01883808

MIMOVE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Renata Teixeira was named ACM Distinguished member for outstanding scientific contributions to computing in 2018.
- Our paper “Narrowing the gap between QoS metrics and Web QoE using Above-the-fold metrics” received the Best Dataset Award at the Passive and Active Measurement Conference 2018.

BEST PAPERS AWARDS :
[27]
R. GOMES, G. BOULOUKAKIS, F. COSTA, N. GEORGANTAS, R. DA ROCHA.*QoS-Aware Resource Allocation for Mobile IoT Pub/Sub Systems*, in "2018 International Conference on Internet of Things (ICIOT)", Seattle, United States, June 2018, https://hal.inria.fr/hal-01797933

MINGUS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Arnaud Debussche has been awarded the senior IUF.

5.1.2. Contracts

- New associated team ANTIpODE with the University of Wisconsin.
- New contract with the startup RAVEL.
- New contract with the startup CAILABS.

MISTIS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Scholarships:

- Alexandre Constantin supervised by S. Girard (MISTIS) and M. Fauvel (INRA Toulouse) was granted a PhD scholarship on "Analyse de séries temporelles massives d'images satellitaires: Applications à la cartographie des écosystèmes" from CNES and the IDEX Université Grenoble Alpes – Initiatives de Recherche Stratégiques (IRS).
- Meryem Bousebata supervised by S. Girard (MISTIS) and G. Enjolras (CERAG Grenoble) was granted a PhD scholarship on "Bayesian estimation of extreme risk measures: Implication for the insurance of natural disasters" from the Idex project named Risk@UGA.

Projects:

- In the context of another Idex project named Data@UGA, a 2-year multi-disciplinary project entitled "Tracking and analysis of large population of dynamic single molecules" was granted in November 2018 to MISTIS in collaboration with the GIN, coordinated by F. Forbes (MISTIS) and V. Stoppin-Mellet (GIN).

Editorial and publishing activities:

- A new book entitled *Handbook of mixture analysis*, edited at CRC Press by Gilles Celeux (Inria), Sylvia Früwirth-Schnatter (Wien University), and Christian P. Robert (Université Paris-Dauphine) is now available (December 2018). Florence Forbes and Julyan Arbel have written 2 of the chapters in the book [49], [51].
- Marianne Clausel and Jean-Baptiste Durand co-published a chapter [48] on generative models in data science in the book *Data Science. Cours et exercices*, edited by Eyrolles (Paris).
- Stéphane Girard and Julyan Arbel have co-edited a book of proceedings following the Summer School Stat4Astro they organized in Autrans in 2017 [64].

New appointments:

- Stéphane Girard has been hired as a research collaborator by the CMAP (Centre de Mathématiques Appliquées de l'école Polytechnique) in the context of the Chair Stress Test, RISK Management and Financial Steering, led by the French Ecole polytechnique and its Foundation and sponsored by BNP Paribas.

MNEMOSYNE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

We published this year an important article [3], together with neuroscientist colleagues in our laboratory. We are particularly proud of this paper because it illustrates a very fruitful cooperation between modeling and experimental analysis, particularly allowing to revisit current views about a dogma in neuroscience, concerning the place where habits are learned and their role in cognition.

MOCQUA Team

5. Highlights of the Year

5.1. Highlights of the Year

Completeness of the ZX-Calculus

We have proved this year the completeness of the ZX-calculus. The completeness of the ZX-calculus was the main open question in the field of categorical quantum mechanics and was open for about 10 years. This results has been published at LiCS'18 [17], [16] and also presented at TQC'18 and QIP'19, the main two conferences in quantum information processing.

MODAL Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Hemant Tyagi has been recruited as CR in the team.
- Three new ANR funded (one began in 2018, two will start in 2019).
- One H2020 European project funded (started in November 2018).
- One-year EIT European project called SysBooster with ApSys and Nokia.
- Creation of a startup using MODAL's technology (MixtComp software).

MOEX Project-Team (section vide)

MOKAPLAN Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Awards

G. Carlier was a John von Neumann invited Professor at TUM (Munich) in 2018.

MONC Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- S. Benzekry was nominated expert within the scientific board of the national multi-thematic institute (ITMO) Cancer of the French alliance for health sciences (AVIESAN).
- In collaboration with the experimental team of the SMARTc unit of the Center of Cancer Research of Marseille (CRCM), we published the results of a four-years long study for optimizing the sequence and schedule of antiangiogenic-cytotoxics combinations in the treatment of non-small cell lung cancer [7]. With the objective to determine an optimal interval between the administration of the two types of drugs (currently administered concomitantly in the clinic), we validated a research strategy that consisted in three steps: 1) Initial experiments, 2) Calibration and refinement of a mathematical model adapted to the data and 3) experimental validation of the predictions of the calibrated model (superiority of a 3 days time interval).

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)

MORPHEO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

MORPHEO created holograms for an augmented reality application developed for the clothing retailer Zara. This application enables the brand's customers to enjoy a virtual and interactive shopping experience via their smartphones in one of the 120 stores across the world taking part in this experiment. Last January, all of the holograms presented in the Zara AR application were captured using the Kinovis 4D platform. The challenge with regard to the acquisition of the 12 sequences created was to accurately reproduce the models in sweeping movements and with complex clothing effects due to the materials and styles chosen.

MOSAIC Team

4. Highlights of the Year

4.1. Highlights of the Year

The year 2018 was marked by the following events:

- **Creation of the team.** The team MOSAIC started in January 2018 at the Inria Grenoble Rhône-Alpes Research Center and is part of the laboratoire de reproduction des plantes (RDP research unit) at ENS de Lyon campus. Romain Azaïs joint the team in March 2018 and Guillaume Cerutti was hired as an Inra research engineer in September 2018.
- **Edition of *Statistical Inference for Piecewise-deterministic Markov Processes*.** Piecewise-deterministic Markov processes form a class of stochastic models with a sizeable scope of applications. Such processes are defined by a deterministic motion punctuated by random jumps at random times, and offer simple yet challenging models to study. The issue of statistical estimation of the parameters ruling the jump mechanism is far from trivial. Responding to new developments in the field as well as to current research interests and needs, the book "Statistical Inference for Piecewise-deterministic Markov Processes" edited by Romain Azaïs and Florian Bouguet [10] gather 7 chapters by different authors on the topic. The idea for this book stemmed from a workshop organized in Nancy in the 2016-17 winter.
- **Invited talk at the Jacques Monod conference in Roscoff**. Christophe Godin was invited in Sep 2018 at the prestigious Jacques Monod series of international conferences in Roscoff, France, to present an overview of the current research on phyllotaxis. The talk was entitled *Phyllotaxis at the era of molecular and computational biology: the revival of an old enigma* and prepared with Teva Vernoux.
- **First prototype of the software platform Gnomon**. A first, fully functional, prototype of the Gnomon software platform, dedicated to the modeling and simulation of plant and animal morphogenesis, was developed during a series of intensive coding sessions in Lyon and Sophia-Antipolis. This new concept of platform dedicated to the study of morphogenesis was presented in November 2018 to a panel of modelers and biologists at the RDP lab, who will contribute next year to the further testing and refining the platform. This prototype is a clear milestone and results from a strong collaboration between the Inria software engineering group from Sophia-Antipolis (who provides the software architecture kernel - DTK)) and the Mosaic team and is supported by Inria (Action de Developpement Tecnologique, ADT).

MULTISPEECH Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

E. Vincent has co-edited a 500-page book on audio source separation and speech enhancement, which provides a unifying view of various established and recent methods [64].

5.1.1. Awards

2018 ISCA Award for the best paper published in *Computer Speech and Language* (2013–2017) [1].

Best paper award of MISSI 2018 (11th International Conference on Multimedia and Network Information Systems) [44].

BEST PAPERS AWARDS :

[1]

J. BARKER, E. VINCENT, N. MA, H. CHRISTENSEN, P. GREEN.*The PASCAL CHiME Speech Separation and Recognition Challenge*, in "Computer Speech and Language", February 2013, vol. 27, n^{o} 3, p. 621-633 [*DOI :* 10.1016/J.CSL.2012.10.004], https://hal.inria.fr/hal-00743529

[44]

K. SMAÏLI, D. FOHR, C. GONZÁLEZ-GALLARDO, M. GREGA, L. JANOWSKI, D. JOUVET, A. KOMOROWSKI, A. KOZBIAL, D. LANGLOIS, M. LESZCZUK, O. MELLA, M. A. MENACER, A. MENDEZ, E. LINHARES PONTES, E. SANJUAN, D. SWIST, J.-M. TORRES-MORENO, B. GARCIA-ZAPIRAIN.*A First Summarization System of a Video in a Target Language*, in "MISSI 2018 - 11th edition of the International Conference on Multimedia and Network Information Systems", Wrocław, Poland, September 2018, p. 1-12, https://hal.archives-ouvertes.fr/hal-01819720

MYRIADS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Best Doctoral Symposium paper award for Clément Elbaz at Foundations and Applications of Self* Systems (FAS* 2018, the event colocating SASO 2018 and ICAC 2018) for the paper entitled “Reactive and Adaptive Security Monitoring in Cloud Computing”

BEST PAPERS AWARDS :
[20]
C. ELBAZ, L. RILLING, C. MORIN.*Reactive and Adaptive Security Monitoring in Cloud Computing*, in "FAS* Doctoral Symposium 2018", Trento, Italy, September 2018, p. 1-3, https://hal.inria.fr/hal-01884739

NACHOS Project-Team (section vide)

NANO-D Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

- This year we have very successfully participated in the blind assessment of protein structure prediction methods exercise CASP13. We have evaluated the performance of several knowledge-based potentials for protein model quality and protein docking, small-angle scattering approaches Pepsi-SAXS and Pepsi-SANS, cross-linking developments, methods based on normal mode analysis and more. Our team was ranked 1st in three data-assisted CASP13 sub-challenges (SAXS, SANS, and crosslinks), and got into the top-10 predictors in the main category of the prediction of regular targets. We were also interviewed on this subject by the Le Figaro newspaper [88].
- The OneAngström startup was created this year around the development of the SAMSON software platform. Four team members have joined the startup : Stephane Redon, Jocelyn Gate, Dmitriy Marin, and Yassine Naimi.
- Our Ananas analytical symmetry detection method [70] was used in the official assessment of protein assemblies in CASP13 and was also transferred to the PDBe European resource for the collection, organisation and dissemination of data on biological macromolecular structures [30].

4.1.1. Awards

- Our paper "Analytical symmetry detection in protein assemblies. II. Dihedral and cubic symmetries" covered the September 2018 issue of the Journal of Structural Biology [20].
- Our paper "A novel fast Fourier transform accelerated off-grid exhaustive search method for cryo-electron microscopy fitting" covered the the August 2017 issue of Journal of Applied Crystallography [58].
- Our paper "NOLB: Nonlinear Rigid Block Normal Mode Analysis Method" covered May 2017 issue of Journal of Chemical Theory and Computation [57].
- Our predictions were ranked 1st in the SAXS-assisted category of the CASP13 protein structure prediction challenge (cumulative SAXS-assisted z-scores).
- Our predictions were ranked 1st in the SANS-assisted category of the CASP13 protein structure prediction challenge (cumulative SANS-assisted z-scores).
- Our predictions were ranked 1st in the X-link-assisted category of the CASP13 protein structure prediction challenge (cumulative X-link-assisted z-scores).

NECS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- The team organized the international ERC Scale-FreeBack workshop on "Analysis and Control of Large-Scale Complex Networks", Grenoble, September 10-11th, 2018 (http://scale-freeback.eu/workshop-on-analysis-and-control-of-large-scale-complex-networks-10-11-sept-2018-grenoble/)
- P. Frasca is Senior Member of the IEEE

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

NEUROSYS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

BEST POSTER AWARD
Amélie Aussel, Laure Burhy and colleagues obtained the Best student poster award at the 27th Annual Computational Neuroscience Meeting CNS*2018 (Seattle, US) [7].
FEATURED ARTICLE
The journal article by L. Bougrain and colleagues, *A review of classification algorithms for EEG-based brain–computer interfaces: a 10 year update, has been identified as a Featured article i.e. a recent article of high-interest across the entire IOP content (containing more than 70 science journal titles including Journal of Neural Engineering) [4].*

NON-A POST Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Awards

- Gabriele Perozzi (a PhD student of the team) get the creativity prize of FR CNRS TTM (La Fédération de Recherche Transports Terrestres & Mobilité);
- Hafiz Ahmed (a former PhD student of the team) is a winner of Annual European PhD Award on Control for Complex and Heterogeneous Systems.

NUMED Project-Team (section vide)

ORPAILLEUR Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

This year we would like to mention two publications as highlights of the year.

- The first highlight is related to the Snowball Inria Associated Team supervised by Adrien Coulet (see § 8.4.1). The participants to Snowball have obtained very good results in AI and Medicine which have been recently published in the selective journal "Scientific Reports" [4]. In addition, the same participants have obtained a "Grant Seed" funded by Stanford University, to pursue their research efforts in building fair and equitable predictive models for medicine (see http://medicine.stanford.edu/news/current-news/standard-news/presenceannouncesseedgrantawardees.html).
- The second highlight is related to the stay of Chedy Raïssi at NASA lab in 2018 (see § 8.4.3.1). Chedy Raïssi worked with some other researchers on a machine-learning model for classifying signals from local and global views of the light curves. The researchers had the idea of associating expert domain knowledge with the model and they were able to obtain very good results unseen until now (see https://aasnova.org/2018/12/07/using-machine-learning-to-find-planets/?fbclid=IwAR0UI9LcjlSYKh8JNDiJzztwK0OUqxkhtzdTGod20U10JLKO4vm6sPPU990). A publication on this work was accepted and published [2].

OURAGAN Team

5. Highlights of the Year

5.1. Highlights of the Year

- In [24], Antonin Guilloux and Julien Marché propose a closed formula for the Mahler measure of a class of bivariate polynomials with rational coefficients (exact polynomials). This class of polynomials contains A-polynomials of knot complements and the authors express the Mahler Measure of a volume function defined on the vanishing set of the polynomial.

  As computing Mahler measures is a well known challenge in number theory and as computing volumes of knots complements is a critical objective for our research on character varieties, this result make an original bridge between our two main research directions.
- A key encapsulation message named Mersenne-756839 has been submitted at the NIST call for standard on Post-Quantum Cryptography. This submission is a complement to the article [13] presented in three invited lectures by Antoine Joux (JFLI (UMI CNRS) / Tokyo university , Nanyang Technological University, LATtice Crypto and Algorithms conference).
- Our agreement with WATERLOO MAPLE INC. has been reviewed for a two years term in 2018. Out next objective is the diffusion of our new solver for univariate polynomials with real coefficients.

PACAP Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

André Seznec won the three tracks of the 1st Championship of Value Prediction with the EVES predictor.

Arthur Perais, former PhD student in the project-team, and André Seznec received the best paper award at the conference ACM PACT 2018 for their paper “Cost Effective Speculation with the Omnipredictor”.
BEST PAPERS AWARDS :
[39]
A. SEZNEC.*Exploring value prediction with the EVES predictor*, in "CVP-1 2018 - 1st Championship Value Prediction", Los Angeles, United States, June 2018, p. 1-6, https://hal.inria.fr/hal-01888864

[35]
A. PERAIS, A. SEZNEC.*Cost Effective Speculation with the Omnipredictor*, in "International conference on Parallel Architectures and Compilation Techniques (PACT ’18),", Limassol, Cyprus, November 2018 [*DOI :* 10.1145/3243176.3243208], https://hal.inria.fr/hal-01888884

PANAMA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

The 2018 **prix de thèse Signal, Image et Vision** was jointly awarded by the Club EEA, the GRETSI and the GdR ISIS to **Mrs Marwa Chafii** for her thesis entitled : *Étude d'une nouvelle forme d'onde multiporteuses à PAPR réduit*. This thesis was conducted within the IETR Lab at CentraleSupélec on the campus of Rennes, under the supervision of Jacques Palicot, Professeur, CentraleSupélec, Rennes and Rémi Gribonval, Directeur de recherche, Inria, Rennes.

5.1.2. Other highlights

Frédéric Bimbot is the new Editor-in-Chief of the journal "Speech Communication".
BEST PAPERS AWARDS :
[2]
M. CHAFII.*Study of a new multicarrier waveform with low PAPR*, CentraleSupélec, October 2016, https://hal.archives-ouvertes.fr/tel-01399509

PARIETAL Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Pierre Ablin got a best student paper award at the LVA-ICA conference for his paper [34].
- First PhD prize from STIC doctoral school for Tom Dupré la Tour.

PARKAS Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

Guillaume Baudart was awarded the **ACM SIGBED Paul Caspi Memorial Dissertation Award** for his thesis “A Synchronous Approach to Quasi-Periodic Systems” [27] prepared in the PARKAS Team under the supervision of Marc Pouzet and Timothy Bourke and defended in 2017.

PARSIFAL Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

D. Miller has been made General Chair of the LICS Conference Series for three years, starting July 2018.

PERCEPTION Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

- As an ERC Advanced Grant holder, Radu Horaud was awarded a Proof of Concept grant for his project Vision and Hearing in Action Laboratory (VHIALab). The project started in February 2018 for a duration of 12 months. Software packages enabling companion robots to robustly interact with multiple users are being developed.
  Website: https://team.inria.fr/perception/projects/poc-vhialab/
- The 2018 winner of the prestigious ACM Special Interest Group on Multimedia (SIGMM) Rising Star Award is Perception team member Dr. Xavier Alameda-Pineda. The award is given in recognition of Xavier's contributions to multimodal social behavior understanding.
  Website: http://sigmm.org/news/sigmm_rising_star_award_2018
- A book was published by Academic Press (Elsevier), entitled "Multimodal Behavior Analysis in the Wild", co-edited by Xavier Alameda Pineda, Elisa Ricci (Fondazione Bruno Kessler and University of Trento) and Nicu Sebe (University of Trento). The book gathers 20 chapters written by 75 researchers from all over the world [53].

PERVASIVE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

James Crowley has received the ICMI Sustained Achievements award at the 2018 International Conference on Multimodal Interaction at Boulder Colorado in Oct. 2018.

PESTO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Analysis of the 5G Standard

The work on the security analysis of the upcoming 5G mobile phone standard presented at CCS'18 [13] was acknowledged in the GSMA "Mobile Security Research Hall of Fame" and picked up by media in France, Switzerland and the UK (Daily Mail, 20 Minutes, Est Républicain, Tagesanzeiger, CNRS Le Journal, etc.).

5.1.1. Awards

BEST PAPERS AWARDS :
[18]
V. CHEVAL, S. KREMER, I. RAKOTONIRINA.*DEEPSEC: Deciding Equivalence Properties in Security Protocols - Theory and Practice*, in "39th IEEE Symposium on Security and Privacy", San Francisco, United States, May 2018, https://hal.inria.fr/hal-01763122

PETRUS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Creation of the Inria Innovation Lab 'OwnCare'

PETRUS has set up the OwnCare Inria Innovation Lab (IILab) with UVSQ and the Hippocad company in January 2018. The objective of this IILab is to industrialize PlugDB, a flagship software/hardware platform initiated in the SMIS team and today pursued in PETRUS, and deploy it in the medical/social field. A first deployment over 10.000 patients is planned in the Yvelines district (see Section 8.1.1 for details).

PHOENIX-POST Team (section vide)

PI.R2 Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Awards

Matthieu Sozeau received a Distinguished Paper award at ICFP 2018 for his work on "Equivalences for Free!"[36], together with co-authors Nicolas Tabareau and Eric Tanter.

Amina Doumane received in January 2018 the best paper award given by *La Recherche* for her paper in LICS 2017 entitled *Constructive Completeness for the Linear-Time mu-Calculus* for which she already received the Kleene Award from the LICS conference in 2017.

Amina Doumane received the Ackermann Award from the EACSL committee. As a result, she was invited to give a lecture at CSL 2018.

PLEIADE Team

5. Highlights of the Year

5.1. Highlights of the Year

Pascal Durrens was promoted this year to the new grade of *Chargé de Recherche Hors Classe* of the CNRS.

POEMS-POST Team

5. Highlights of the Year

5.1. Highlights of the Year

- POEMS project-team reached the deadline of 12 years at the end of 2017. We have devoted a large part of our time during the first half-year to conceive and write a text of 20 pages which describes the new project that we submit to the management of Inria, in order to pursue our research on the modeling and simulation of wave phenomena. This project is currently discussed by several experts, in interaction with ourselves, before the final decision of creation of the new project-team.
- S. Chaillat co-organized with X. Claeys (Sorbonnes & EPI ALPINES) the symposium of the *International Association for Boundary Element Methods (IABEM)*, which took place in Paris in June 2018. There were about 140 attendees.
- A.-S. Bonnet-Ben Dhia co-organized a workshop entitled *"Advanced Theoretical and Numerical Methods for waves in structured Media"* in Paris in March 2018, in the framework of the GDR Ondes. There were about 90 attendees.
- P. Ciarlet is co-author of a book entitled *"Mathematical Foundations of Computational Electromagnetism"*, published in the serie *Applied Mathematical Sciences* by Springer.

POLARIS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Bruno Gaujal joined the scientific committee of the GDR IM (Informatique Mathématique).
- Arnaud Legrand co-created a MOOC on “Recherche reproductible : principes méthodologiques pour une science transparente” hosted on the FUN platform https://www.fun-mooc.fr/courses/course-v1:inria+41016+session01bis/about.

5.1.1. Awards

- The paper by Nicolas Gast and co-authors received the Best Paper Award at ACM SIGMETRICS 2018.
- The paper by Patrick Loiseau and co-authors was nominated for the Best Paper Award at ACM FAT* 2018.
- The work on “Multi-Agent Online Learning with Imperfect Information” by Panayotis Mertikopoulos and co-authors was shortlisted for the INFORMS George Nicholson Best Student Paper Award.
- Panayotis Mertikopoulos received an Outstanding Reviewer Award at NIPS 2018.
- Benjamin Roussillon was co-laureate of the “Prix de mémoire de master 2018 en RO/AD” (best MSc thesis in operations research) from ROADEF for his Master thesis on “Development of adversarial classifiers using Bayesian games” under the supervision of Patrick Loiseau.

BEST PAPERS AWARDS :

[24]
N. GAST, B. V. HOUDT.*A Refined Mean Field Approximation*, in "ACM SIGMETRICS 2018", Irvine, France, June 2018, 1, https://hal.inria.fr/hal-01891642

[30]
T. SPEICHER, M. ALI, G. VENKATADRI, F. RIBEIRO, G. ARVANITAKIS, F. BENEVENUTO, K. P. GUMMADI, P. LOISEAU, A. MISLOVE.*Potential for Discrimination in Online Targeted Advertising*, in "FAT 2018 - Conference on Fairness, Accountability, and Transparency", New-York, United States, February 2018, vol. 81, p. 1-15, https://hal.archives-ouvertes.fr/hal-01955343

POLSYS Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

Jean-Charles Faugère and Ludovic Perret received the Atos-Joseph Fourier 2018 prize [0] for their project on Quantum Safe Security.

[0] https://atos.net/fr/2018/communiques-de-presse_2018_07_06/atos-et-genci-annoncent-les-laureats-du-prix-atos-joseph-fourier-2018

POTIOC Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Inner Garden will be presented at CES 2019 for which the Ullo company won an award ”Tech for a better world”
- Publication of "Virtual Reality and Augmented Reality: Myths and Realities" [42]. This book has been written by 30 academics and engineers working in french labs and companies under the supervision of Bruno Arnaldi (INSA Rennes), Pascal Guitton (Potioc) and Guillaume Moreau (Centrale Nantes). It discusses various aspects : hardware, software, applications, ethics issues... It covers the previous 10 years and give some prospective elements for the future. (the french edition is also available [41]).
- Winner of Bourse Déclic jeunes, Fondation de France, Lauren Thévin

5.1.1. Awards

- Best Demonstration award IHM 2018 [61],
- Hackathon BR41N.IO, 7th BCI Meeting 2018, Asilomar, May 20-21st 2018, 1st winning group, Léa Pillette
- UIST conference hackathon winner, Berlin, Germany, October 2018, Aurélien Appriou
- Student Travel Award (Asilomar BCI Meeting, California) (May 2018), Jelena Mladenovic
- Student Travel Award (UbiComp conference, Singapore) (October 2018), Jelena Mladenovic

PRIVATICS Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

Cédric Lauradoux, Vincent Roca with the participation of Claude Castelluccia have created a MOOC on Privacy which has been followed this year by more than 20000 persons.

PROSECCO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- We published 20 papers at top-tier conferences and journals such as POPL (5), ICFP (2), PLDI (1), OOPSLA (1), ACM CCS (1), IEEE S&P (1), IEEE CSF (1), TOPLAS (1), and JCS (1).
- The HACL* verified cryptographic library developed in our group was integrated by Linux (WireGuard) and Tezos, and more verified crypto primitives were integrated in Mozilla Firefox.
- We organized a Dagstuhl Seminar on Secure Compilation (18201)
- Catalin Hritcu served as Program Chair for the Workshop on Principles of Secure Compilation at POPL'18

QUANTIC Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Pierre Rouchon was the main organizer of the spring thematic quarter at Institut Henri Poincaré entitled "Measurement and control of quantum systems: theory and experiments" (16 April – 13 July 2018). This thematic quarter included courses, lectures and conferences. In particular, a research school of one week at CIRM, two 3-day workshops in May and June and the 2018 issue of PRACQSYS conference in July were organized throughout the quarter. This thematic quarter involved several hundred of participants. See IHP web page (http://www.ihp.fr/en/CEB/T2-2018), CIRM web page (https://conferences.cirm-math.fr/1732.html) and the specific quarter web site (https://sites.google.com/view/mcqs2018/home).
- QUANTIC has received a sub-award from Yale university for pursuing the collaborations of Mazyar Mirrahimi and his students/postdocs. In the framework of a new ARO (Army Research Office) grant received by our collaborators at Yale, QUANTIC receives 500k dollars over 4 years to fund the hiring of PhD students/ postdocs working on the collaborative subjects with Yale and also to cover the travels between Inria and Yale.
- Alain Sarlette has received a JCJC ANR grant entitled HAMROQS "High-accuracy model reduction for open quantum systems". This grant of 212k euros over 4 years will fund the activities of Alain Sarlette and his students/postdocs on systematic methods for quantum systems model reduction.
- PhD students of Alain Sarlette, Arash Farnam and Simon Apers, defended their PhD at his previous institution (Ghent university, Belgium).
- Mazyar Mirrahimi was an invited speaker at the American Physical Society March Meeting in Los Angeles.
- Mazyar Mirrahimi was a semi-plenary speaker at MTNS in Hong Kong (Mathematical Theory of Networks and Systems).

RAINBOW Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Julien Pettré is coordinator of the H2020 ICT CrowdBot project which started in Jan 2018
- Claudio Pacchierotti is the unit PI of the new H2020 FET-OPEN project "H-Reality," started on October 2018. The project gathers 5 academic partners - Univ. Birmingham (UK, coordinator), TU Delft (NL), CNRS (France) - as well as 2 industrial partners - Ultrahaptics (UK) and Actronika SAS (France)
- Claudio Pacchierotti has been elected Secretary of the Eurohaptics Society

5.1.1. Awards

- Firas Abi Farraj was finalist for the IEEE/RSJ IROS 2018 Best Paper Award on Safety, Security and Rescue Robotics
- Claudio Pacchierotti has been selected as "Top 1% Reviewer" by field, 2018 Peer Review Awards, Publons (https://publons.com/awards/2018/esi/?name=Pacchierotti&esi=23)
- Louise Devigne was one of the five finalists of Best Paper Award for the IEEE SMC 2018 conference for the paper [60]
- Louise Devigne received the Best Paper Award of the IFRATH Handicap 2018 conference [80]
- Salma Jiddi received the Best Demo Award at the Asia Pacific Workshop on Mixed and Augmented Reality, APMAR'18, Taipe, Taiwan [63]

RANDOPT Team

5. Highlights of the Year

5.1. Highlights of the Year

A. Auger appointed general chair of the ACM GECCO 2019 conference (GECCO being the largest most selective conference in EC)

RAPSODI Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

In 2018, the RAPSODI project-team was strongly involved in the organization of scientific events. In particular, in the framework of the LabEx CEMPI thematic semester on Numerical Analysis and PDEs, the following events were organized by RAPSODI members:

- the Mathematics-Enterprises Study Week, co-organized at LILLIAD Learning Center by E. Creusé from January 29 to February 2;
- the third edition of the ABPDE conference (on Asymptotic Behavior of systems of PDEs arising in physics and biology), co-organized at LILLIAD Learning Center by C. Cancès, C. Chainais-Hillairet, I. Lacroix-Violet, and T. Rey on August 28-31;
- the second edition of the One-day conference on Calculus of Variations, co-organized at Laboratoire Paul Painlevé by I. Lacroix-Violet and B. Merlet on October 12;
- the fifth edition of the Lille days on Numerical Analysis (dedicated to domain decomposition and its applications to PDEs), co-organized at Laboratoire Paul Painlevé by C. Calgaro Zotto and E. Creusé on November 13-14.

A research school on Mathematics for Nuclear Energy was also co-organized at the Roscoff Marine Station by C. Cancès on July 2-6, in partnership with the GdR MaNu. Let us as well mention the organization in the CANUM (national NUMerical Analysis Congress) at Cap d'Agde from May 28 to June 1 of three mini-symposia by members of the team: one by C. Cancès on cross-diffusion systems, one by S. Lemaire on polytopal discretization methods, and one co-organized by T. Rey on kinetic models. Team contributions finally include the co-organization by E. Creusé of the Maths Jobs Forum that was held in Paris on December 13, and the co-organization by A. Zurek of the Young Mathematicians Regional Tournament that was held in Laboratoire Paul Painlevé on April 14-15.

REALOPT Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

François Vanderbeck was chair of the organizing committee of ISMP'2018. ISMP is the triennial international congress of mathematical optimization, where scientists from all over the world as well as industrial practitioners of mathematical optimization meet in order to present their most recent developments and results and to discuss new challenges from theory and practice. It is the symposium of the Mathematical Optimization Society (MOS). More than 1900 scientists attended the conference this year in Bordeaux.

Olivier Beaumont was the program chair of the IEEE-ACM HiPC conference held in Bangalore in December 2018.

The team decided to develop an open-source platform, called coluna, to allow the scientific committee to use our state-of-the-art algorithms for extended formulations.

A first spinoff company is being created by RealOpt members.

REO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Chloé Audebert was awarded the AMIES PhD prize 2018 for her PhD thesis under the supervision of J.-F. Gerbeau and I. Vignon Clementel, in the framework of a collaboration with the SME company Fluoptics and with clinicians from Hôpital Paul Brousse (E. Vibert PUPH, Inserm 1193).

RESIST Team

5. Highlights of the Year

5.1. Highlights of the Year

- Raouf Boutaba gave his inaugural conference as Inria Internationale Chair and Professor@Lorraine about *Convergence of telecommunications and information technologies: towards programmable, intelligent and resilient networks*.
- The team (Jérôme François and Isabelle Chrisment) organized the RESSI'18 (Rendez-vous de la Recherche et de l'Enseignement de la Sécurité des Systèmes d'Information).

RITS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Mohammad Abualhoul, with the paper , won the Runner-up Best Paper Award at ICVES 2018 (2018 IEEE International Conference on Vehicular Electronics and Safety, September 12-14, Madrid, Spain).
BEST PAPERS AWARDS :
[17]
M. ABUALHOUL, E. TALAVERA MUNOZ, F. NASHASHIBI.*The Use of Lane-Centering to Ensure the Visible Light Communication Connectivity for a Platoon of Autonomous Vehicles*, in "ICVES'2018 - 20th IEEE International Conference on Vehicular Electronics and Safety", Madrid, Spain, September 2018, https://hal.inria.fr/hal-01888549

RMOD Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Release of Pharo 7

We released a release candidate for Pharo 7, with a release to be expected early 2019. More information at http://pharo.org.

5.1.2. Awards

- Guillermo Polito, Pablo Tesone, Esteban Lorenzano and Nicolás Passerini won the 1st place in the Innovation Technologies Award at ESUG 2018.
- Christian Marlon Souza Couto, Henrique Rocha, and Ricardo Terra. A Quality-oriented Approach to Recommend Move Method Refactorings. 1st place in 17th Brazilian Symposium on Software Quality, SBQS p. 11—20, ACM, New York, NY, USA, 2018.

ROMA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Anne Benoit was the program chair of 32nd IEEE IPDPS conference (IEEE International Parallel & Distributed Processing Symposium), held in Vancouver, Canada, May 21–25, 2018.
- Bora Uçar was the general chair of 32nd IEEE IPDPS conference (IEEE International Parallel & Distributed Processing Symposium), held in Vancouver, Canada, May 21–25, 2018.

5.1.1. Awards

BEST PAPERS AWARDS :
[29]
T. HÉRAULT, Y. ROBERT, A. BOUTEILLER, D. ARNOLD, K. B. FERREIRA, G. BOSILCA, J. DONGARRA.*Optimal Cooperative Checkpointing for Shared High-Performance Computing Platforms*, in "APDCM", Vancouver, Canada, 2018, https://hal.inria.fr/hal-01968441

SECRET Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- **Keynote at Eurocrypt:** A. Canteaut bas been an invited keynote speaker at Eurocrypt 2018 in Tel-Aviv.
- **Cryptanalysis of candidates to the NIST post-quantum competition:** The members of the project-team are involved in the design of several attacks against submissions to the NIST standardization effort for post-quantum cryptography. This work has led to the break of `EDON-K` key encapsulation mechanism, of `RLCE` encryption scheme, of `RankSign`, and of a recently proposed IBE scheme.
- **Quantum fault-tolerance with constant overhead:** In a couple of papers published at STOC 2018 and FOCS 2018, A. Grospellier and A. Leverrier together with O. Fawzi (from ENS Lyon) proved that quantum expander codes can be combined with quantum fault-tolerance techniques to achieve constant overhead: the ratio between the total number of physical qubits required for a quantum computation with faulty hardware and the number of logical qubits involved in the ideal computation is asymptotically constant, and can even be taken arbitrarily close to 1 in the limit of small physical error rate. This improves on the polylogarithmic overhead promised by the celebrated threshold theorem.

SELECT Project-Team (section vide)

SEMAGRAMME Project-Team (section vide)

SEQUEL Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Daniele Calandriello is awarded with the AFIA price for his PhD defended in December 2017. As a side note, this is the 5th time a PhD student of SEQUEL receives this award since our first PhD defense in 2010.
- We organized the 14th European Workshop on Reinforcement Learning in Lille. This event gathered 200 researchers; there were a dozen invited presentations by world research leaders, including Prof. Richard Sutton (U. Alberta), the founder of modern RL, Prof. Tze Leung Lai (Stanford U.), one of the key reference in bandit research, and also Nicolò Cesa-Bianchi (U. Milan), Peter Auer (U. of Leoben), Rémi Munos (Deepmind Paris), and Joelle Pineau (Mc Gill and FAIR).

5.1.1. Awards

- Former 2017 intern M. Asadi got a It was "Best Poster Award" at Transylvania Machine Learning Summer School (TMLSS), July 2018 for the work she did while in SEQUEL
- É. Kaufmann is among the top 10 reviewers at ICML 2018 (out of 1800 reviewers)
- Ph. Preux was among the 24 "level-2 Distinguished Senior Program Committee Members" for IJCAI 2018 (out of 498 SPC members, 115 were distinguished, 23 at level 2, the highest level)
- M. Valko is among the top 10 reviewers at ICML 2018 (out of 1800 reviewers)

SERENA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Alexandre Ern co-edited with Daniele Di Pietro (Montpellier) and Luca Formaggia (Milano) a book on Numerical Methods for PDEs, SEMA SIMAI Springer Series, Vol. 15, Springer, 2018. ISBN 978-3-319-94675-7.

Many new results of the ERC GATIPOR project in the ERC GATIPOR Gallery.

SERPICO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

The joint project team Serpico (Inria, CNRS-INSB, Institut Curie, UPMC, PSL Research University) is officially created in 2018.

The Serpico team will be the organizer of the 7th International Conference on “Quantitative BioImaging” (QBI) in January 2019 (300 attendees) in Rennes.

Bertha Mayela Toledo Acosta defended her PhD thesis in 2018.

SIERRA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Francis Bach, Lagrange Prize in Continuous Optimization, Society for Industrial and Applied Mathematics 2018

Francis Bach, Best Paper Award, NeurIPS 2018.

Francis Bach included in the report *Highly cited researchers, year 2018*, Clarivate Analytics, 2018

Nicolas Flammarion, PhD thesis award in the *Programme Gaspard Monge*, Fondation Mathématique Jacques Hadamard, 2018.

Adrien Taylor, Tucker Prize (finalist) 2018 (dissertation prize by the Math- ematical Optimization Society for 2015-2017).

Adrien Taylor, IBM/FNRS innovation award 2018 (dissertation prize for original contributions to informatics).

Adrien Taylor, Icteam thesis award 2018 (dissertation award by the icteam institute of UCLouvain, Belgium).

Adrien Taylor, Best paper award 2018 from the journal Optimization Letters for the paper *On the worst-case complexity of the gradient method with exact line search for smooth strongly convex functions*, Etienne De Klerk, François Glineur, Adrien Taylor. journal=.

SIMSMART Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

The contribution [10] received the “best poster award” of the conference Curves and Surfaces 2018.

SIROCCO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- The paper [20] has received the best student paper award at the European Signal Processing (EUSIPCO) conference, Roma, Sept. 2018.
- The video light field dataset captured by the team has been retained by MPEG-I as test dataset (April 2018) [24].

BEST PAPERS AWARDS :
[20]
M. RIZKALLAH, F. DE SIMONE, T. MAUGEY, C. GUILLEMOT, P. FROSSARD.*Rate Distortion Optimized Graph Partitioning for Omnidirectional Image Coding*, in "EUSIPCO 2018 - 26th European Signal Processing Conference", Rome, Italy, September 2018, p. 1-5, https://hal.inria.fr/hal-01807613

SISTM Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Launch of the Graduate's School Digital Public Health (PI: R Thiebaut) including the Master of Public Health Data Sciences

- Launch of the IMI project EBOVAC3 in which R Thiebaut is leader of the workpackage "Modelling". Concomitantly, we have obtained the first results of the modelling of the response to the Ebola vaccine developped with Janssen company (submitted to Journal of Virology).

- A new step of the work on IL-7 therapy in HIV infected patients has been achieved through the optimization of the administration of the injections. Approaches from statistical modelling and control theory demonstrated the feasibility of reducing the administration of IL-7 while improving its efficacy.

- The project on the automatic recognition of cell populations through high dimensional cytometry data has reached a successful stage with two important publications. It is now applied to clinical trial datasets available through the Vaccine Research Insitute.

- The data warehouse system developed through the EHVA European consortium is settled in its version 1.0 and will be used for the storage of all SISTM datasets as well as to implement the software developed for the analysis of immunological data.

- Funding of the EDCTP Prevac-UP in which M Prague is leader of the workpackage "System vaccinology approach". The aim is to develop an integrative analysis of all immunological data generated to understand antibodies response to Ebola vaccination.

- Funding of the Franco-Sino INSERM project on NiPAH virus in which M Prague is leader of the workpackage "Modeling, biostatistics and bioinformatics". The aim of this workpackage is to conduct state of the art quantitative analyses of effects of therapeutic and vaccine strategies, as well as providing a framework to bridge results from in vitro to in vivo and between different animal models.

- Marta Avalos undertook a 6-month research visit to Data61 (CSIRO, Canberra, Australia) in 2017. This collaboration has reached a successful stage with one publication in NeurIPS 2018.

SOCRATE Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Various

Two new workshop organized by the team in relation with CorteXlab:

- First French GNU Radio days: https://gnuradio-fr-18.sciencesconf.org/
- ISP-IoT : First Winter School on Information Theory and Signal Processing for Internet of Things : https://isp-iot.sciencesconf.org

4.1.2. Awards

The PhD of Victor Quintero (former PhD in Socrate) received the best PhD award in the area of digital society in Nov 2018.

Samir M. Perlaza is Visiting Research Collaborator (Honorific Position) Oct. 2018; Term 2018 - 2019. Department of Electrical Engineering, Princeton University

Samir M. Perlaza has been awarded a “Make our Planet Great Again” Fellowship, Sep. 2018 by Embassy of France in the United States of America and Thomas Jefferson Foundation in New York, NY.

The article *Karatsuba with Rectangular Multipliers for FPGAs* , presented by Florent de Dinechin, obtained the Best Paper Award of the Arith 2018 conference in Amherst, MA.
BEST PAPERS AWARDS :
[17]
M. KUMM, O. GUSTAFSSON, F. DE DINECHIN, J. KAPPAUF, P. ZIPF.*Karatsuba with Rectangular Multipliers for FPGAs*, in "ARITH 2018 - 25th IEEE International Symposium on Computer Arithmetic", Amherst, United States, IEEE, June 2018, p. 13-20, Best paper award [*DOI :* 10.1109/ARITH.2018.8464809], https://hal.inria.fr/hal-01773447

SPADES Project-Team (section vide)

SPECFUN Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Georges Gonthier, Martìn Abadi and Cédric Fournet receiver the 20 year test-of-time award for their LICS 1998 paper *Secure Implementation of Channel Abstractions*, during LICS 2018 in Oxford.

SPHINX Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Recruitments

Ludovick Gagnon has been recruited as a junior researcher (Chargé de recherche) in the team (from September 2018).

SPIRALS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Thomas Durieux, who defended his PhD thesis [11] in September 2018 on automated software repair, has obtained two best paper awards in 2018: at the 29th IEEE International Symposium on Software Reliability Engineering (ISSRE) [26] for his work on self-healing web applications based on HTML and JavaScript rewriting, and at the 6th Workshop on Software Visualization, Evolution and Maintenance (VEM) [38] for his contribution to the automatic detection of bug fixing patterns, which is a joint work with Fernanda Madeiral and colleagues from the Federal University of Uberlândia in Brazil.

Browser fingerprinting [48] has emerged as a technique to track users without their consent. Studying the implication of this technique on user privacy, and proposing software systems that can self-protect against such techniques, have become an important topic in the research activities of Spirals on self-adaptation. In 2018, two papers authored by Spirals members in the context of the ongoing PhD thesis of Antoine Vastel have been published in A* conferences of the domain of security: [36] at the 39th IEEE Symposium on Security and Privacy, and [35] at 27th USENIX Security Symposium.

In 2018, we published at the 40th International Conference on Software Engineering, Track Software Engineering in Practice, a paper on Repairnator [34], which this is the very first bot for automated software repair. This work has been conducted by Simon Urli and his coworkers in Spirals in the context of Inria ADT Librepair. An article on Repairnator has also been published on the Inria web site.

Stéphanie Challita won the Prix L'Oréal-UNESCO For Women in Science. She is among the 30 laureates rewarded out of 900 candidates. Stéphanie Challita has defended her PhD thesis in December 2018 on FCLOUDS, a framework to achieve semantic interoperability in multi-cloud computing systems.

Xscalibur is a transfer project led by Christophe Gourdin and Philippe Merle that aims at creating a startup company with innovative solutions for the management of multi-cloud systems. The project has been selected by Serre Numérique Valenciennes. The research activities that led to this project have been, in part, conducted in the context of the joint lab between Spirals and the Scalair cloud hosting company. Several papers in relation with these research activities have also been published in 2018: [30], [25], [24], [13], [23].

BEST PAPERS AWARDS :

[26]

T. DURIEUX, Y. HAMADI, M. MONPERRUS.*Fully Automated HTML and Javascript Rewriting for Constructing a Self-healing Web Proxy*, in "Proceedings of the 29th IEEE International Symposium on Software Reliability Engineering (ISSRE 2018)", Memphis, United States, October 2018, https://arxiv.org/abs/1803.08725 [*DOI :* 10.1109/ISSRE.2018.00012], https://hal.inria.fr/hal-01746141

[38]

F. MADEIRAL, T. DURIEUX, V. SOBREIRA, M. MAIA.*Towards an automated approach for bug fix pattern detection*, in "VEM '18 - Proceedings of the VI Workshop on Software Visualization, Evolution and Maintenance", São Carlos, Brazil, September 2018, https://arxiv.org/abs/1807.11286 , https://hal.archives-ouvertes.fr/hal-01851813

STACK Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Remarkable results: research and third-party funding

Regarding scientific results, the team has produced a number of outstanding results on resource and data managements in large-scale infrastructures, notably on how to place VMs in Clouds [5], and on how to manage VM images in geo-distributed clouds [18]. On the software side, the team has proposed a new model-based Architecture to design and implement autonomic and heterogeneous Cloud Systems [12]. Finally on the energy side, the team has deployed the SeDuce platform that allows researchers to investigate energy concerns in data-centers thanks to a numerous of energy sensors deployed across the dedicated facility [19], [20], [34].

Concerning third-party funding, 2018 has seen the acceptance of the VERDI “Etoiles Montantes” project. "Etoiles Montantes" is a highly-competitive call with the goal of bootstraping ERC submissions.

5.1.2. Awards

In 2018, the team has received two best paper awards and one individual award:

- **Programme Jeunes Talents France Chine 2018** Shadi Ibrahim was selected for the “Programme Jeunes Talents France Chine" award.

BEST PAPERS AWARDS :

[12]

H. BRUNELIERE, Z. AL-SHARA, F. ALVARES, J. LEJEUNE, T. LEDOUX.*A Model-based Architecture for Autonomic and Heterogeneous Cloud Systems*, in "CLOSER 2018 - 8h International Conference on Cloud Computing and Services Science", Funchal, Portugal, March 2018, vol. 1, p. 201-212, Best Paper Award [*DOI :* 10.5220/0006773002010212], https://hal.archives-ouvertes.fr/hal-01705248

[19]

J. PASTOR, J.-M. MENAUD.*SeDuCe: a Testbed for Research on Thermal and Power Management in Datacenters*, in "GREEN 2018 - Third International Conference on Green Communications, Computing and Technologies", Venise, Italy, September 2018, p. 1-6, https://hal.inria.fr/hal-01855452

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).

STEEP Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

The STEEP research team has initiated in 2016 a series of conferences-debates entitled “Understanding & Acting” (« Comprendre et agir ») that examines sustainability issues in order to help researchers and citizens to increase their awareness of the various issues at stake in order to initiate relevant individual and collective actions. The presentations are captured on video and then made directly accessible on the YouTube Channel “Comprendre et Agir”. At the end of 2018 the YouTube channel reached more than **150,000 views with a rate of integral viewings remaining at above 25%.** This rate is quite important since the YouTube videos of the conferences last between 35 and 45 minutes. Our Youtube channel now has more than 2000 subscribers.

STORM Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- “Habilitation à diriger les recherches” (HDR) of Samuel Thibault, Dec.2018.

SUMO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- The ANR project TickTac led by Ocan Sankur was accepted and starts in March 2019.
- New partnership with Mitsubishi Electric (MERCE): one PhD thesis started in Fall 2018, and a member of MERCE will be hosted by SUMO in 2019.

5.1.1. Awards

BEST PAPERS AWARDS :
[11]
G. BACCI, P. BOUYER, U. FAHRENBERG, K. G. LARSEN, N. MARKEY, P.-A. REYNIER.*Optimal and Robust Controller Synthesis: Using Energy Timed Automata with Uncertainty*, in "FM 2018 - International Symposium on Formal Methods", Oxford, United Kingdom, LNCS, Springer, July 2018, vol. 10951, p. 203-221 [*DOI :* 10.1007/978-3-319-95582-7_12], https://hal.archives-ouvertes.fr/hal-01889222

TADAAM Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Guillaume MERCIER is the chairman of the Hardware Topologies Management Working Group of the MPI Forum. This working group was created officially in December by Inria's impulse and has been rallied since by many institutions taking part in the MPI Forum. The goal of this working group is to standardize hardware topologies management mechanisms and abstractions in the MPI standard.

TAMIS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Change of team leader

Participants: Olivier Zendra, Axel Legay

Olivier Zendra was appointed team leader instead of Axel Legay on 12 Oct 2018.

"Chaire Analyse de Menaces" (Threat Analysis)

Participants: Fabrizio Biondi

Fabrizio Biondi resigned from Centrale Supelec and from the "Chaire Analyse de Menaces" (Threat Analysis) on 31 Dec 2018.

TeamPlay H2020 project, coordinated by Olivier Zendra

Participants: Olivier Zendra, Cécile Bouton, Yoann Marquer, Céline Minh, Tania Richmond

Launch on Jan 2018 of the TeamPlay (https://www.teamplay-h2020.eu) H2020 project (that had been submitted 25 April 2017), about the integration of nonfunctional properties in programs. TAMIS is in charge of security properties.

TAU Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- *GECCO 2018 10-years impact award*, awarded to the paper published in GECCO 2008 that had the greatest impact, seen from 10 years later, for the paper

  Adaptive operator selection with dynamic multi-armed bandits, by Luis DaCosta, Alvaro Fialho, Marc Schoenauer, and Michèle Sebag, in Maarten Keijzer (Ed), Proc. ACM-GECCO, pp 913-920, 2008.

- Nacim Belkhir, Winner ACM-GECCO 2018 **BBComp single-objective** and **expensive single-objective** tracks. Nacim completed his PhD in TAU in 2017 [71], co-supervised by Marc Schoenauer, Johann Dréo and Pierre Savéant (Thalès TRT).

5.1.2. Visibility

- Marc Schoenauer, member of the core team responsible for the *Villani mission* regarding the French strategy on Artifical Intelligence. The mission started Sept. 2017 and the final report was delivered on March 29. 2018.
- Michèle Sebag, elected member of French Académie des Technologies, Apr. 2018.
- Michèle Sebag, chevalière de la Légion d'Honneur, Dec. 2018.

TEA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Inria created a new International Chair in collaboration with Insa-Rennes and appointed American computer engineer Shuvra Bhattacharyya, Professor at the University of Maryland, to the part-time position. Shuvra will hold the International Chair for a period of five years, fostering our joint collaboration with the CNRS-Insa laboratory IETR.

TEA becomes the first Inria group to host two International Chairs: last year, Rajesh Gupta, Director of UC San Diego Data Science Institute, was appointed Inria International Chair with project-team TEA.

Jean-Pierre Talpin spent the first semester to prepare an ERC advanced grant. He also gave a keynote presentation at the FDL'18 conference on "refinement types for system design".

Thierry Gautier and Albert Benveniste gave an invited seminar at the Collège de France in Gérard Berry's 2017-2018 lecture course [15].

THOTH Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Alberto Bietti received the Jean-Claude Dodu 2018 prize at Journees SMAI-MODE, Autrans.
- Pauline Luc was one of the top-200 reviewers at NeurIPS 2018.
- Grégory Rogez and Cordelia Schmid received an Amazon Academic Research Award.
- Cordelia Schmid received the Koenderink prize for fundamental contributions in computer vision that have withstood the test of time at ECCV 2018.

5.1.2. Dissemination

- The team co-organized PAISS 2018, an international AI summer school in Grenoble. This event brought together 200 participants representing 44 different nationalities. The participants were selected from 700 applications, with 60% students, 15% academics, and 25% industrials. 25% of these participants were women.

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.

TOCCATA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

J.-C. Filliâtre served as judge at the ICPC regional programming contests SWERC 2017 and 2018. These two editions were organized in Paris and gathered each year 80 teams of three students from universities and schools from South-West Europe. https://swerc.eu/

The 2nd edition of the Handbook of Floating-Point arithmetic was published [28]

5.1.1. Awards

R. Rieu-Helft received the "Student Gold Medal" award, and J.-C. Filliâtre the "Best challenge submitted" award, at the *VerifyThis@ETAPS2018 verification competition*http://www.pm.inf.ethz.ch/research/verifythis/Prizes.html

TONUS Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Boundary conditions for kinetic relaxation methods

We have provided a new rigorous analysis for the stability of boundary conditions in kinetic relaxation methods. This analysis allows us to design stable and high order boundary conditions for this kind of schemes. This will lead to many practical applications in the future years.

5.1.2. Electromagnetic simulation on large computer

Bruno Weber has been able to run the CLAC software, jointly developed with the AxesSim company, for simulating a Bluetooth antenna interaction with a full human body. The computations were done on the supercomputer PizDaint, which is 5th at the "Top 500" ranking.

TOSCA Project-Team (section vide)

TRIPOP Team (section vide)

TROPICAL Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- The paper [89] has been included in a list of "10 notable papers published over the last 50 years by the journal Linear Algebra and its applications", at the occasion of the golden anniversary of the journal.
- The article [17] answers an old question in the theory of interior point methods: it provides a counter example showing that log-barrier interior point methods are not strongly polynomial.

TYREX Project-Team (section vide)

VALDA Project-Team (section vide)

VERIDIS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Marie Duflot-Kremer received the Serge Hocquenghem prize awarded biannually by *Association pour l'Innovation Didactique* for her contributions to the popularization of computer science and in particular her work on developing and promoting unplugged computer science activities.

Thomas Sturm was a plenary invited speaker at ISSAC 2018, the leading conference in Symbolic Computation.

VISAGES Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. New permanent team members

- Julie Coloigner was recruited as CNRS Researcher, starting from October 2018.
- Michael Kain was recruited as Research Engineer, starting from December 2018.

5.1.2. New MRI at the Neurinfo platform

A new 3T Siemens Prisma MRI scanner was installed at the Neuroinfo platform in February 2018. An official ceremony was organised with all the funders in November 2018.

5.1.3. First neuroscience hackathon in Rennes

We organized the first hackathon in the Visages team, April 25-26 as part of the international event Brainhack Global 2018.

5.1.4. Award

Best paper award by the French Institute of Psychiatry for our communication at its annual Forum .
BEST PAPERS AWARDS :
[50]
J. COLOIGNER, J.-M. BATAIL, I. COROUGE, D. DRAPIER, C. BARILLOT.*White matter connectivity analysis in patients suffering from depression*, September 2018, 1, 2018 - 7ème Forum de l'Institut de Psychiatrie, Poster, https://hal.archives-ouvertes.fr/hal-01890087

WHISPER Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

The Whisper team published three papers at USENIX ATC, one of the major conferences of our domain:

- Coccinelle: 10 Years of Automated Evolution in the Linux Kernel. J. Lawall and G.Muller. [14]
- DSAC: Effective Static Analysis of Sleep-in-Atomic-Context Bugs in Kernel Modules. J.-J. Bai, Y.-P. Wang, J. Lawall, S.-M. Hu. [12]
- The Battle of the Schedulers: FreeBSD ULE vs. Linux CFS. J. Bouron, S. Chevalley, B. Lepers, W. Zwaenepoel, R. Gouicem, J. Lawall, G. Muller, J. Sopena. [13]

Gilles Muller was co-PC chair of DSN 2018, the premier venue for dependable systems.

Julia Lawall was co-PC chair of the ASE 2018 Tool Demo track, in preparation for being the co-PC chair of the main ASE research paper track in 2019.

5.1.1. Awards

The original work on Coccinelle “Documenting and automating collateral evolutions in Linux device drivers” [8] received an ACM EuroSys Test-of-Time award, recognizing it as the paper from EuroSys 2008 that is having the most lasting and current impact (http://eurosys2018.org/awards/).

WIDE Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

Awards

Michel Raynal is the recipient of the 2018 IEEE award for Outstanding Technical Achievement in Distributed Computing.

WILLOW Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Prizes and Awards

Antoine Miech, winner of a 2018 Google Fellowship.

5.1.2. Visibility

- J. Ponce co-organized the PRAIRIE AI Summer School, Grenoble, 2018, which brought together 200 participants representing 44 different nationalities, and selected from 700 applications, with 60% students, 15% academics , and 25% industrials. 25% of these participants were women.
- I. Laptev served as Program Chair for the IEEE Conference on Computer Vision and Pattern Recognition, Salt Lake City, USA, 2018. CVPR is the largest computer vision conference. The 2018 edition has 3,309 paper submissions, 979 accepted papers and 6,128 registered attendees.
- J. Ponce has been a key person in creating the PRAIRIE Institute for AI research in Paris, announced on the occasion of the AI for Humanity summit organized by President Emmanuel Macron in 2018 (https://www.inria.fr/en/news/news-from-inria/launch-of-the-prairie-institute). He has also been a key player in bringing together its industrial and international partners.

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 Intelligence [0], 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/

XPOP Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Version 1.0 of the SPIX software was available in November 2018.

ZENITH Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. VLDB Conference

The VLDB conference (http://vldb2018.lncc.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.