Activity Report 2016

Section Highlights of the Team

4. Highlights of the Year

4.1. Highlights of the Year

Anne Marie Kermarrec has been named an ACM Fellow "for her contributions to large-scale distributed computing."

George Giakkoupis was the General Chair of the 35th ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (PODC 2016).

Michel Raynal renewed his appointment as an Adjunct Professor at the University of Hong Kong.

4.1.1. Awards

BEST PAPERS AWARDS :

[30] **IEEE IC2E'16**. S. DELBRUEL, D. FREY, F. TAÏANI.

[27] **The International Conference on Networked Systems NETYS**. N. CHILUKA, A.-M. KERMARREC, J. OLIVARES.

CIDRE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Mounir Assaf, a former PhD student, has received the "prix de thèse du GDR GPL" in June 2016. His PhD thesis is entitled "évaluation des fuites d'information dans les logiciels critiques" and has been defended in 2015.

Emmanuelle Anceaume has received the Most Prolific Author Award during the NCA conference.

BEST PAPERS AWARDS :

[28] **9th International Conference on Security of Information and Networks (SIN 2016)**. D. SUBRAMANIAN, G. HIET, C. BIDAN.

[24] **Symposium on Network Computing and Applications**. Y. MOCQUARD, B. SERICOLA, S. ROBERT, E. ANCEAUME.

COAST Project-Team (section vide)

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

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Outstanding publications

Results from our work in the ANR project Ctrl Green (see Section 7.2.1) were published in IEEE Transactions on Software Engineering [16].

Our work on Control of Autonomic Parallelism Adaptation on Software Transactional Memory [20] was nominated in the short list for best papers at the International Conference on High Performance Computing & Simulation (HPCS 2016), Innsbruck, Austria, July 2016.

5.1.2. Community

We have been invited to participate to the organization of events, which highlight our active presence in the scientific life in the two domains which we are bridging :

- autonomic computing:

  Eric Rutten is PC co-chair of the International Workshop on Autonomic High Performance Computing (AHPC 2016) (http://hpcs2016.cisedu.info/2-conference/workshops—hpcs2016/workshop08-ahpc) as part of the International Conference on High Performance Computing & Simulation (HPCS 2016) (http://hpcs2016.cisedu.info or http://cisedu.us/rp/hpcs16), July 18 - July 22, 2016, The University of Innsbruck, Innsbruck, Austria ; and PC member of the two major conferences on the topic : the 13th IEEE International Conference on Autonomic Computing (ICAC 2016) Wuerzburg, Germany, July 19-22, 2016 (http://icac2016.uni-wuerzburg.de) and the 4th International Conference on Cloud and Autonomic Computing (ICCAC 2016), Augsburg, Germany on September 12-16, 2016 (http://iccac2016.se.rit.edu), Part of FAS* - Foundation and Applications of Self* Computing Conferences, Collocated with the IEEE Self-Adaptive and Self-Organizing System Conference.

  He is PC member of the 2017 edition of these two conferences as well.

  He is invited editor of Cluster Computing, The Journal of Networks, Software Tools and Applications (Springer), foe the special issue of ICCAC 2015 Best Papers (http://link.springer.com/journal/10586/19/2/page/1).

  He is PC member for the SEfSAS Book 3 (Software Engineering for Self-Adaptive Systems: Assurances) Volume 3 to be published by Springer LNCS as nr. 9640 in 2017.

  Gwenaël Delaval is PC member of the International Workshop on Autonomic High Performance Computing (AHPC 2016).

- control:

  Eric Rutten is organizer of an Open Invited Track on "Control for Computing Systems" at the 20th IFAC World Congress, to be held in Toulouse, July 9-14, 2017, (https://www.ifac2017.org/OIT#geht5).

  He is PC member of the 13th International Workshop on Discrete Event Systems (WODES 2016), Xi'an, China on May 30 - June 1, 2016 (http://wodes2016.diee.unica.it).

  He is on the IFAC Technical Committee 1.3 on Discrete Event and Hybrid Systems, (http://tc.ifac-control.org/1/3/) and on the IEEE Control Systems Society Discrete Event Systems Technical Committee (http://discrete-event-systems.ieeecss.org).

5.1.3. Invited talk

Eric Rutten was invited to give a talk at the 9th Cloud Control Workshop (by invitation only), Stockholm, June 27-29 2016 (http://cloudresearch.org/workshops/9th) and at the séminaire LIP / Avalon, 16 février 2016, ENS Lyon (https://intranet.inria.fr/Actualite/SEMINAIRE-16-02-16-ERIC-RUTTEN-ENS-DE-LYON).

<p style="text-align:center">**MIMOVE Team**</p>

5. Highlights of the Year

5.1. Highlights of the Year

Members of MiMove are co-founders of the Ambiciti start-up (http://ambiciti.io) together with the Inria team CLIME, and the NUMTECH and the Civic Engine SMEs. Ambiciti's technology is a single platform delivering real-time data on street-by-street exposure and risks on multiple environmental pollutants. The platform's technology leverages open data along with cloud, IoT, mobile and data analytics technologies. Ambiciti collects real-time, street-by-street pollution data and provides urban citizens with a means to personalize their decisions with regard to environmental hazards. The aim is to enable citizens to make more informed choices about their activities, personal behavior and location, and to protect their own health. Ambiciti also supplies businesses with crucial data that allows to better inform consumers and to increase the valuation of services (e.g., real estate). Eventually, Ambiciti supports governments in protecting citizens' health and in growing cities more sustainably in providing the necessary urban pollution data. Key elements of the Ambiciti platform include the Ambiciti mobile app that leverages mobile phone sensing middleware solutions to monitor the individual and collective exposure of citizens to environmental pollutions in a resource-efficient way (more at https://www.inria.fr/en/centre/paris/news/ambiciti-an-application-a-start-up). The first version of the Ambiciti App (successor of SoundCity) deals with noise and air pollution. In particular, Inria and the Paris city council were awarded a *Décibel d'Argent* prize for the App (more at https://www.inria.fr/en/centre/paris/news/2016-decibel-d-or-golden-decibel-competition-ambiciti-receives-the-decibel-d-argent-silver-decibel-prize-in-the-research-category).

MYRIADS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- The PaaSage European project was successfully completed in November 2016 with an excellent rating from the reviewers. The PaaSage project developed a model-based, cross-cloud development and deployment platform that overcomes platform heterogeneity while enabling dynamic, fully-automated application scaling and cloud bursting. The main Myriads contribution is the Adapter subsystem, responsible for supporting dynamic, cross-cloud application adaptation.

5.1.1. Awards

- Baptiste Goupille-Lescar won the prize of the organizing committee of MMS Challenge 2016 (INSA Science Day).
- Anna Giannakou won the "Most Promising Experiment" award at the Grid'5000 winter school in February 2016 for her work "Towards Self Adaptable Security Monitoring in IaaS Clouds".

REGAL Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

- We initiate a collaboration with ICL Lab (University of Tennessee) to study failure detection in Exascale computing. We designed and evaluated a new robust failure detector. This result is published at SC 2016 [26].

SPIRALS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Makitoo, the start-up company founded by Martin Monperrus and Nicolas Petitprez received the Bpifrance *Création d'entreprise innovante* award, which is a major award in France for startup companies, in the category *Création-développement*.

Makitoo won also a NETVA award from the French ministry of foreign affairs in order to develop its activities in the USA.

Romain Rouvoy has been awarded a Institut Universitaire de France (IUF) junior fellowship for 5 years (2016-21). IUF is an excellence award that is only granted to the top 2% of faculty members in French universities. The award recognizes the excellence of the research activities conducted by Romain Rouvoy.

Laurence Duchien has been elected for a 2-year term in the executive committee of the IEEE Technical Council on Software Engineering (TCSE). The IEEE TCSE helps advance software engineering research and practice. The executive committee determines TCSE policy and the nature of TCSE activities.

<p style="text-align:center">**WHISPER Project-Team**</p>

5. Highlights of the Year

5.1. Highlights of the Year

The main highlight of the year is the continuous spreading of Coccinelle within the developer community of the Linux kernel. We submitted the first patches to the Linux kernel based on Coccinelle in 2007. Since then, over 4500 patches have been accepted into the Linux kernel based on the use of Coccinelle, including around 3000 by over 500 developers from outside our research group. Another testimonial of the impact of our work is the signature of a Memorendum Of Understanding (MOU) with the Linux Foundation. As part of the MOU, Greg Kroah-Hartman will spend a year with Whisper starting in October 2016. Kroah-Hartman is one of the leading developers of the Linux kernel, and is one of only a few developers employed by the Linux Foundation, with another being Linus Torvalds. Greg participated in the activities of the Whisper team around the use of Coccinelle and research projects related to the Linux kernel, and he is a convinced ambassador of our research work.

Our work on Remote Core Locking (RCL) [10] was accepted in ACM Transaction in Computer Systems (TOCS) which is the most prestigious journal in systems. RCL is currently one of the most efficient locks for multicore architectures.

ALPINES Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

5.1.1.1. SIAM Siag on Supercomputing Best Paper Prize 2016

for the most outstanding paper published in 2012-2015 in a journal in the field of high performance computing. Co-authors are J. Demmel, L. Grigori, M. Hoemmen, and J. Langou, for the paper Communication-Optimal Parallel and Sequential QR and LU Factorizations, published in SIAM Journal on Scientific Computing 2012. Citation of the jury: *This is a cornerstone paper in Numerical Linear Algebra and Parallel Processing that lays down both theoretical and practical algorithmic frameworks for communication-avoiding algorithms. The paper provides powerful insights and renews attention on communication reduction both of which will have long-lasting and practical impact in parallel and distributed computing.*

5.1.1.2. Bull-Joseph Fourier 1st Prize 2015 (15 000 euros)

for our work *Imaging of cerebrovascular accident through High Performance Computing* by V. Dolean, F. Hecht, P. Jolivet, F. Nataf and P-H. Tournier. This was the sixth edition of this competition which corresponds to the French "Gordon Bell Prize".

AVALON Project-Team (section vide)

DATAMOVE Team (section vide)

HIEPACS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Conference organization

We organized the 9th International workshop on Parallel Matrix Algorithms and Pllication (PMAA'16 - July 6-8) in collaboration with Bordeaux INP, CNRS and Université de Bordeaux. The conference that was composed of 4 invited plenary presentations and 76 regular talks. Arround 120 people attended the conference, 70 % were from Europe, 20 % from North America, 7 % from Asia; among them more than 25 % were students. We succeeded to offer free registration to the students thanks to the sponsorship we arose from Airbus DS, CEA, CERFACS, Clustervision, Labex CPU, DELL, EDF, IBM and Total that contributed to balance our budget.

More details can be found on http://pmaa16.inria.fr

KERDATA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

SC16: Best Student Paper Finalist. The paper entitled *Týr: Blob Storage Meets Built-In Transactions* presented by Pierre Matri at the Supercomputing (SC16) Conference was one of the 7 papers selected for the Best Student Paper award.

This work was carried out in the context of the BigStorage project, under the supervision of Alexandru Costan, Gabriel Antoniu, María Pérez , and Jesús Montes.

There were 442 submissions, and 81 accepted papers.

ACM Graduate Student Research Competition SC16. Nathanaël Cheriere received the third prize in the SC16 ACM Student Research Competition for his work on optimizing the algorithms for the MPI collective *Scatter* and *AllGather* routines on the Dragonfly topology [1].

This work was carried out at the Argonne National Laboratory in the context of the JLESC, under the supervision of Matthieu Dorier, Rob Ross, Shadi Ibrahim, and Gabriel Antoniu.

As many as 62 posters were submitted for the Student Research Competition, out of which 14 have been selected in the Graduate category. After the presentation of their posters, 4 students have been invited to make a presentation of their work in front of a jury.

5.1.2. 9 papers in international journals

This year the team published 9 papers in high-quality journals including *ACM Transactions on Parallel Computing*, *IEEE Transactions on Parallel and Distributed Systems*, *Future Generation Computer Systems*, *Concurrency and Computation: Practice and Experience* and *IEEE Transactions on Cloud Computing*.
BEST PAPERS AWARDS :
[25] **IEEE ACM SC16 - The International Conference for High Performance Computing, Networking, Storage and Analysis 2016**. P. MATRI, A. COSTAN, G. ANTONIU, J. MONTES, M. S. PÉREZ.

POLARIS Team (section vide)

ROMA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Anne Benoit was the program chair of HiPC 2016 and the Algorithm-track vice-chair for SC'16.

5.1.1. Awards

- Yves Robert was awarded the *2016 Outsanding Service Award* of the *IEEE Technical Committee on Parallel Processing* (TCPP)

STORM Team (section vide)

<p style="text-align:center">**TADAAM Team**</p>

5. Highlights of the Year

5.1. Highlights of the Year

The NETLOC (See Section 6.1) tools have been run on one of the largest European supercomputers (the TGCC/Genci CURIE machine) and successfully modeled its 5200 nodes and its interconnection network (more than 800 switches). This is a joint work with CEA and the COLOC European project.

ASCOLA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

This year the team has produced major results in the domains of the foundations of computer science as well as capacity management for large-scale distributed software systems.

Concerning the foundations of computer science, we have presented new results on the provably correct execution of programs that are only partially typed [22] and generalized the use of dependent types with side effects [26].

As to distributed systems, we have introduced a new cloud model that provides QoS-levels and SLA as first-class citizens of cloud-based systems [19]. Furthermore, we have provided new mechanisms for the privacy-preserving storage of data of a user over clouds managed by different cloud providers [30].

DIVERSE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

H2020 project accepted in the call ICT-10-2016 'Software Technologies', as coordinator.

The book "Engineering Modeling Languages" has been published by CRC Press. This book, co-authored by Benoit Combemale, Robert B. France, Jean-Marc Jézéquel, Bernhard Rumpe, Didier Vojtisek and Jim Steel, is the result of our respective expertise in model-driven engineering and software language engineering.

5.1.1. Awards

Silver Medal of the CNRS for Jean-Marc Jézéquel.

Second position for the ACM Student Research Competition: Thomas Degueule.

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

5. Highlights of the Year

5.1. Highlights of the Year

- Valeria Vignudelli has won the "Outstanding Master Thesis Award", for best master thesis in logic in computer science. Awarded by the Vienna Center for Logic and Algorithms, as part of the VCLA International Student Awards (http://logic-cs.at/award/)

INDES Project-Team (section vide)

PHOENIX Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- The paper "Designing Parallel Data Processing for Large-Scale Sensor Orchestration" by Milan Kabac and Charles Consel received a Best Paper award at UIC 2016, the 13th IEEE International Conference on Ubiquitous Intelligence and Computing, held in July 2016 in Toulouse, France.

- The web application "It's my life. I choose it!", developed by the Phoenix team in collaboration with the University of Bordeaux (Laboratoire handicap action cognition santé), the University of Mons (Service d'ortho-pédagogie clinique), and the association Trisomie 21 France, received the Universal Accessibility Prize at APAJH 2016, held on November 14th, 2016, in Paris. The web application is available at http://www.monprojetdevie.trisomie21-france.org/.

- The pitch for a startup based on technology from the HomeAssist project received a prize at the "Journée Horizon Startup", held on December, 1st, 2016, in Paris.

BEST PAPERS AWARDS :

[26] **13th IEEE International Conference on Ubiquitous Intelligence and Computing (UIC 2016)**. M. KABÁČ, C. CONSEL.

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

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Release of Pharo 5.0

We released a new version Pharo (Pharo 5.0) completly revisited with fundamental changes in the VM (object representation, compiler, ...)

5.1.2. HDR defenses

Anne Etien defended her HDR thesis.

5.1.3. Pharo web for the enterprise

A new book on Pharo.

5.1.4. Guillermo Polito hired as a CNRS engineer

Guillermo Polito a former PhD student in RMod was hired as a CNRS research engineer. This acknolewdges the quality of his research and work.

TACOMA Team (section vide)

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

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

David Coudert and Nathann Cohen (LRI) won the Flinders Hamiltonian Cycle Problem (FHCP) Challenge 2016 (http://fhcp.edu.au/fhcpcs).

Fatima Zahra Moataz, former PhD student of COATI, is the recipient of an accessit to the PhD prize Graphes "Charles Delorme" 2016 for her PhD thesis entitled "Towards Efficient and Fault-Tolerant Optical Networks: Complexity and Algorithms".

DANTE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Network Science Semester

Dante organised in 2016 a full semester on Network Science (https://project.inria.fr/netspringlyon/) in conjunction with the SiSyPhe team at ENS de Lyon, the Centre de Physique Théorique of Marseille, the Excellence Laboratory MILYON and the Institute of Scientific Interchange of Turino. This program intends to cover both the basics of and recent advances in Network Science. These questions, which are in the focus of contemporary network science, set the scope of the actual proposal where we aim to bring together world-known experts from the fields of mathematics, physics, signal processing, computer science, social science, epidemiology and linguistic to discuss and enhance our understanding about the interaction between the structure, evolution, and coupled dynamical processes of complex networks. The semester gathered 2 workshops and 1 conference. during the two workshop, 14 invited speakers spend time within Dante in short or long visit. Members of Dante also organised in June Socionet (http://www.socionet2016.fr) for young researchers and focus on the interdisciplinary meeting on social network: description, data, modelling, interpretation. It was a great success with a Datathon organised by the PhD student and PostDoc of DANTE.

5.1.2. Frutfull collaboration with GranData (http://www.grandata.com/)

Grandata integrates first-party and telco partner data to understand key market trends, predict customer behaviour, and deliver novel business results. We have published several papers [12], [41], [36], [11], [10] in collaboration with them on the socioeconomic correlations and stratification in social-communication networks, on the impact of university admission on freshmen' social egocentric network, on the correlations of consumption patterns in social-economic networks but also to validate DTN like protocols by taking benefits of the density and locality of urban communication patterns.

<p style="text-align:center">**DIANA Project-Team**</p>

4. Highlights of the Year

4.1. Highlights of the Year

The R^2lab testbed, part of the national FIT facility, was inaugurated on the SophiaTech campus this year. This new anechoic chamber can be used to remotely perform reproducible wireless network experimentation (5G/software-defined radio). The live public demonstration at the inauguration presented a 4G network being deployed remotely in merely three minutes. For more details see http://r2lab.inria.fr/news.md.

The soTweet project studying the impact Twitter on Media web sites popularity has triggered worldwide media coverage (*Washington Post, Les échos, Le Vif, El Diaro, BFM TV*, etc.) Details and links are in http://www-sop.inria.fr/members/Arnaud.Legout/Projects/sotweet.html. The results are published in [18].

This year witnessed the publication of three RFCs (7834 [36], 7835 [35] and 7927 [31]). These RFCs are the result of a long term contribution by Damien Saucez to the activities on the LISP protocol and in parallel on Information Centric Networking at the IETF and IRTF.

A third session of the Python MOOC by Arnaud Legout and Thierry Parmentelat has been programmed in 2016 and it was also a very big success: 12954 persons registered to the course, out of them 1603 qualified for the final attestation of achievement. This MOOC is adopted by several universities and engineering schools: UPMC L3 program (200 students), first year in CentralSupelec (529 students), SIO Master in CentralParis (16 students), first year of ESISAR school from the Institut Polytechnique de Grenoble group (67 students).

<p style="text-align:center">**DIONYSOS Project-Team**</p>

5. Highlights of the Year

5.1. Highlights of the Year

Pierre L'Ecuyer received the 2016 ACM SIGSIM Distinguished Contributions Award.

BEST PAPERS AWARDS :

[75] **Symposium on Network Computing and Applications**. Y. MOCQUARD, B. SERICOLA, S. ROBERT, E. ANCEAUME.

[49] **International Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems (MSWIM 2016)**. M. BOUZOUITA, Y. HADJADJ-AOUL, N. ZANGAR, G. RUBINO, S. TABBANE.

DYOGENE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

F. Baccelli received a Honorary Doctorate of Heriot-Watt University. The graduation took place on November 17, 2016, in Edinburgh, United Kingdom.

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

5. Highlights of the Year

5.1. Highlights of the Year

Awards

- Prof. Steven Glaser (UC Berkeley) and **Thomas Watteyne** recipients of the France-Berkeley Fund award for the project "SHRIMP: Smart Harbor Implementation", August 2016.

- Keoma Brun-Laguna and **Thomas Watteyne**, together with Ana Laura Diedrichs, Javier Emilio Chaar, Diego Dujovne, Juan Carlos Taffernaberry, Gustavo Mercado. Runner up IEEE SECON 2016 Best Demo Award with "A Demo of the PEACH IoT-based Frost Event Prediction System for Precision Agriculture", London, UK, 28 June 2016.

- Remy Leone and **Thomas Watteyne**. Recipient Google IoT Technology Research Award on "6TiSCH and WiFi coexistence with OpenWSN", March 2016.

- Tengfei Chang and **Thomas Watteyne**, together with Pedro Henrique Gomes, Pradipta Gosh, Bhaskar Krishnamachari. EWSN dependability competition 4th place with project "Reliability through Time-Slotted Channel Hopping and Flooding-based Routing", 16 February 2016.

Meeting & Seminars

Organization of Workshops and Conferences

- *PEMWN 2016* international conference on Performance Evaluation and modeling in Wired and wireless Networks, co-chaired by Leila Saidane and **Pascale Minet** and Farouk Kamoun , held in Paris, France, November 2016. Pascale Minet was general co-chair with Leila Saidane from ENSI (Tunisia) of the PEMWN 2016 conference, the 5th IFIP international conference on Performance Evaluation and Modeling of Wired and Wireless Networks, technically co-sponsored by IFIP WG6.2 and IEEE ComSoc (see https://sites.google.com/site/pemwn2016/). This conference was held at CNAM in Paris, 22-24 November 2016. It was sponsored by Inria, CNAM and ENSI. The organization co-chairs were Samia Bouzefrane and Selma Boumerdassi. Three tutorials were given:
  - *Internet of Vehicles: From Intelligent Grid to Autonomous Cars and Vehicular Clouds* by Mario Gerla, Professor, University of California, Los Angeles.
  - *5G: Can we make it by 2020?* by Merouane Debbah, Mathematical and Algorithmic Sciences Lab, Huawei, France.
  - *Internet of Things, hyper-massive wireless networks, where are the theoretical limits?* by Philippe Jacquet, NOKIA, France.

  Sixteen papers have been selected by the technical program committee and presented during the three days of the PEMWN 2016 conference.

- *InterIoT 2016* The 2nd EAI International Conference on Interoperability in IoT was co-organized by Nathalie Mitton, Thomas Noël (general co-chairs) and Thomas Watteyne (TPC chair). It took place 26-27 October 2016 in Paris, France.

Tutorials

- Standards for the Industrial IoT: a Hands-on Tutorial with OpenWSN and OpenMote. Xavier Vilajosana, Pere Tuset-Peiro, Tengfei Chang, **Thomas Watteyne**. IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC), Valencia, Spain, 4-8 September 2016.

- Introduction to the IETF 6TiSCH stack with OpenWSN & OpenMote. **Thomas Watteyne**, Xavier Vilajosana, Pere Tuset-Peiro, Tengfei Chang. International Conference on Telecommunications (ICT), Thessaloniki, Greece, 16-18 May 2016.

Standardization Activities

- *Standardization* *meeting co-chaired by Inria-EVA*
  6TiSCH working group meeting at IETF 97, 17 November 2016, Seoul, South Korea.

- *Standardization* *meeting co-chaired by Inria-EVA*
  6TiSCH working group meeting at IETF 96, 18 July 2016, Berlin, Germany.

- *Interop event* *organized by ETSI and Inria-EVA*
  ETSI 6TiSCH 3 plugtests, 15-16 July 2016, Berlin, Germany.

- *Standardization* *meeting co-chaired by Inria-EVA*
  6TiSCH working group meeting at IETF 95, 4 April 2016, Buenos Aires, Argentina.

- *Standardization* *meeting co-chaired by Inria-EVA*
  ETSI 6TiSCH 2 plugtests, 2-4 February 2016, Paris, France.

Real-World Deployments

The networking technology developed at Inria-EVA has reached the level of maturity for it to be used in real-world deployment. We have worked on 3 main sets of deployments in 2016:

- **Save the Peaches** (http://www.savethepeaches.com/), a 23-node network in Western Argentina which monitors temperature and humidity to be predict frost events in peach orchards.

- **SnowHow** (http://www.snowhow.io/), a set of 18 low-power wireless networks (945 sensors total) deployed throughout the Californian Sierra Nevada to monitor the snowpack.

- *(current work)* A Smart Building deployment in the Inria-Paris research center.

From a networking point of view, these deployments SolSystem (see Section 6.8) as a back-end solution. Sensor data and network statistics are available at our Inria-Paris servers (https://sol.paris.inria.fr/) seconds after they were measured in the field.

Distinguished Visitors

- ***Invited Professor Mario Gerla***, from UCLA, USA. He stayed in the EVA team during 2 1-week stays (31 August-23 September, 10-20 December) to work with the EVA team on shock-wave mitigation using vehicular ad hoc networks.

- ***Invited Professor Leila Saidane***, from ENSI, Tunisia. She stayed in the EVA team from 28 November to 2 December 2016 to prepare common publications and identify further research directions.

- ***Invited Professor Diego Dujovne***, from Universidad Diego Portales, Chile. He stayed in the EVA team for a 1-week visit (22-31 July 2016) to integrate sensors in the low-power wireless platforms, to be deployed in Argentina as part of the PEACH project.

- ***Invited Professor Steven Glaser***, from UC Berkeley, USA. He stayed in the EVA team for a 1-week visit (21-25 June 2016) to explore funding opportunities beyond the REALMS associate team.

- ***Invited Professor Branko Kerkez***, from U. Michigan, USA. He stayed in the EVA team for a 1-week visit (17-22 June 2016) to work on the Internet of Water (2 papers submitted). This visit was part of the REALMS associate team.

<p style="text-align:center">**FUN Project-Team**</p>

5. Highlights of the Year

5.1. Highlights of the Year

- The FIT facility has become an "Infrastructure de Recherche" (Infrastructure for Research) by the CD TGIR.

5.1.1. Awards

- Aziz Mbacke and Jad Nassar won the of the Hackaton at the SenZations summer school 2016, which opened them the doors of the UpRise Festival (http://uprisefestival.co/).

- Best paper award at the PIMRC 2016 conference .

- Viktor Toldov recipient of the award "Pepite 2016": (http://www.enseignementsup-recherche.gouv.fr/cid108805/3e-edition-du-prix-pepite-tremplin-pour-l-entrepreneuriat-etudiant-53-projets-recompenses.html)

BEST PAPERS AWARDS :

[47] **27th annual IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC)**. V. TOLDOV, L. CLAVIER, V. LOSCRÍ, N. MITTON.

GANG Project-Team (section vide)

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

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Conferences and Presentations

We organized a high-profile conference in May 2016 at the Institut Henri Poincaré on "Networks: learning, information and complexity" (see: http://www.msr-inria.fr/conferences-workshops/workshop-on-networks-learning-information-and-complexity/) which gathered leading scientists in computer science, maths and statistical physics.

We organized in January 2016 a workshop at the Turing building involving top executives of LVMH and Inria researchers to exchange on innovation opportunities for LVMH notably around advertising with online social networks, data visualization, and computer vision.

We gave several invited talks at: Stochastic Networks Conference, UCSD; CIRM workshop on random matrices; Institut Henri Poincaré's "Nexus" of Information and Computation Theories; EPFL workshop for birthdays of Shannon, Urbanke and Telatar (see: http://www.etru50.com/invited-speakers/) ; LINCS scientific advisory board.

4.1.2. RIOT Summit

We successfully organized in July 2016 the first RIOT Summit in Berlin. The RIOT Summit 2016 gathered 100+ enthusiastic industrial participants, makers and academics involved in RIOT. Relevant partners such as Cisco, Samsung, Siemens, Nordic Semiconductors, 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/#speakers.

4.1.3. Opening of the IoT-LAB experimental platform at the site Saclay

The project Equipex FIT deploys experimental facilities on several sites. In 2016, at the site of Saclay, the opening of the FIT IoT-LAB site followed the move from its previous location at Rocquencourt.

The platform of Saclay is an Internet-of-Things testbed and includes more than 300 nodes (175 A8-M3, 12 M3 and 120 WSN430), deployed in large experimentation rooms and space. All A8 nodes are equipped with GPS.

More information about the topology and the resources of this new site is available here: https://www.iot-lab.info/deployment/saclay/.

4.1.4. Awards

The team members have received a number of awards:

M1 intern Davi Castro de Silva received best internship prize of LIX for his work on modifying spectral methods for community detection to increase their robustness.

Best Poster Award   [26] O. Hahm, C. Adjih, E. Baccelli, T. C. Schmidt, M. Waehlisch.
   ICN over TSCH: Potentials for Link-Layer Adaptation in the IoT, September 2016, pp. 195-196, ACM-ICN '16 Proceedings of the 3rd ACM Conference on Information-Centric Networking , Poster. [DOI:10.1145/2984356.2985226] https://hal.inria.fr/hal-01369704

Best Demo Award   [18] H. Petersen, C. Adjih, O. Hahm, E. Baccelli.
   Demo: IoT Meets Robotics - First Steps, RIOT Car, and Perspectives, in: ACM International Conference on Embedded Wireless Systems and Networks (EWSN), Graz, Austria, February 2016. https://hal.inria.fr/hal-01262638

Best Papers Awards :

[15]   **5th IFIP International Conference on Performance Evaluation and Modeling in Wired and Wireless Networks (PEMWN 2016)**. F. Somaa, C. Adjih, I. E. Korbi, L. A. Saidane.

MADYNES Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Masdin associate team

Thanks to previously existing collaborations, a new associate team with SnT at University of Luxembourg has been created in 2016 with a focus on softwarization of networks.

MAESTRO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. *Awards*

The paper "Access-time Aware cache Algorithms" by Giovanni Neglia; Damiano Carra; Mingdong Feng; Vaishnav Janardhan; Pietro Michiardi and Dimitra Tsigkari got the Best Paper Award at ITC 28 in Würzburg.

The article "Sonorous Cartography for Sighted and Blind People" by Didier Josselin, Andelbery Saidi, Dorian Roussel, Said Boularouk, Olivier Bonin, Eitan Altman, Driss Matrouf got the Best Short Paper Award at the conference 19th AGILE International on Geographic Information Science, Helsinki, Finland, June 14-17, 2016.

S. Alouf has received a "Recognition of Service Award" from the ACM in September 2016.

BEST PAPERS AWARDS :

[46] **International Teletraffic Congress ITC-28**. G. NEGLIA, D. CARRA, M. FENG, V. JANARDHAN, P. MICHIARDI, D. TSIGKARI.

[40] **AGILE'2016 - 19th AGILE International Conference on Geographic Information Science**. D. JOSSELIN, D. ROUSSEL, S. BOULAROUK, A. SAIDI, D. MATROUF, O. BONIN, E. ALTMAN.

MUSE Team (section vide)

RAP Project-Team (section vide)

SOCRATE Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

- The SPIE group's digital services subsidiary, and INSA Lyon announce their joint inauguration of a teaching and research chair in the Internet of Things (IoT). Backed by the CITI laboratory (Centre of Innovation in Telecommunications and Integration of service), this chair is being set up within the context of the future technological and social upheaval entailed by the Internet of Things. It will closely involve the skills of the laboratory within the IoT theme and will aim to develop and promote the know-how of SPIE ICS, the first digital services provider to appoint a chair, and INSA Lyon, through a research program aimed at innovation. Jean-Marie Gorce will be responsible for administration the chair funding within the Citi lab.

- The numap memory profiling library (developed in the team during Manuel Selva's PhD work) has been officially integrated into the Turnus dataflow profiler. Turnus [54] is a profiler dedicated to dynamic dataflow programs.

- Samir M. Perlaza and Selma Belhadj Amor delivered the tutorial **"Simultaneous Energy and Information Transmission"** in: (a)**International Conference on Telecommunications** (ICT), Thessaloniki, Greece, May, 2016; (b)**International Conference on Cognitive Radio Oriented Wireless Networks** (CROWNCOM), Grenoble, France, May, 2016; (c)**European Wireless Conference** (EW), Oulu, Finland, May, 2016, together with Ioannis Kikridis (University of Cyprus, Cyprus).

URBANET Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

The paper by A. Boubrima *et al.* - "Cost-Precision Tradeoffs in 3D Air Pollution Mapping using WSN" received the Best Paper Award at the 2nd International Symposium on Ubiquitous Networking (UNET 2016).

Ahmed Boubrima was awarded the third place in the Best MS Thesis competition by IEEE ComSoc Chapter Francefor his work on optimal deployment of wireless sensor networks to monitor urban pollution (supervised by Walid Bechkit and Hervé Rivano).

BEST PAPERS AWARDS :

[13] **UNET 2016 - 2nd International Symposium on Ubiquitous Networking**. A. BOUBRIMA, W. BECHKIT, H. RIVANO, L. SOULHAC.