

Inria

RESEARCH CENTER

FIELD

**Networks, Systems and Services,
Distributed Computing**

Activity Report 2019

Section Highlights of the Team

Edition: 2020-03-21

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COAST Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

In collaboration with Valerie Shalin (Department of Psychology, Wright State University), we proposed a novel validation methodology for automatic trust assessment of users based on their collaboration behavior. Our validation methodology relies on experimental game theory, namely trust game. In the large scale collaboration context of our team research, results of our experimental design [7] suggest that trust score could enhance or even replace traditional identity mechanisms.

CTRL-A Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

The Ctrl-A team co-organised, in cooperation with the Gipsa-lab laboratory, the 40th International Summer School in Grenoble, with a special topic on Control of Computing Systems, on 9-13th of September 2019.

Invited speakers were international specialists of the field, from USA, Europe and France. Full information and programme are available : <http://www.gipsa-lab.fr/summerschool/auto2019>

DELYS Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Awards

In 2019, DELYS obtained a best paper award at ICDCN 2019 (distributed computing track) .

Alejandro Tomsic, former PhD student of the Delys group, was awarded the Prize for Best French PhD in Systems and Networking 2019 for his thesis titled “Exploring the design space of highly-available distributed transactions” . The prize is awarded yearly by ASF (the French chapter of ACM Sigops) and by RSD (the French research network in Networked and Distributed Systems). The award ceremony and presentation of Alejandro’s work took place at the COMPAS 2019 conference in Anglet, France.

The US patent, titled “Distributing computing system implementing a non-speculative hardware transactional memory and a method for using same for distributed computing,” was awarded to inventors Julien Peeters, Nicolas Ventroux, Tanguy Sassolas and Marc Shapiro in April 2019, with number US 10 416 925 B2 [4].

BEST PAPERS AWARDS :

[28]

E. MAUFFRET, D. JEANNEAU, L. ARANTES, P. SENS. *The Weakest Failure Detector to Solve the Mutual Exclusion Problem in an Unknown Dynamic Environment*, in "20th International Conference on Distributed Computing and Networking (ICDCN 2019)", Bangalore, India, January 2019, Extended version: <https://hal.archives-ouvertes.fr/hal-01661127v3>, <https://hal.archives-ouvertes.fr/hal-01929224>

[7]

A. Z. TOMSIC. *Exploring the design space of highly-available distributed transactions*, Université Pierre et Marie Curie, Paris, France, April 2018

MIMOVE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

The Wall Street Journal published an article, “The Truth About Faster Internet: It’s Not Worth It” (on the front page of the printed version of the paper on August 21, 2019) based on the results of the models we have developed to infer video quality from encrypted network traffic and the Network Microscope system.

Myriads Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- SimGrid was named as one of ten “French scientific successes in year 2018” in the French government report “Vers une loi de programmation pluriannuelle de la Recherche”⁰
- The FogGuru European project has started a real-life experimentation in València (Spain) of Fog computing technologies applied to smart water supply management, in collaboration with Emivasa, the public-private company in charge of water supply.
- The RI/RE project (funded by the CNRS Momentum call) has started in 2019. This project will strengthen our exploration of Smart Grids relations with computing systems.

⁰“Vers une loi de programmation pluriannuelle de la Recherche.” French government’s press release, Feb 2019, page 6. https://cache.media.enseignementsup-recherche.gouv.fr/file/Recherche/91/7/dp-loi_programmation_1069917.pdf

SPIRALS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

In 2019, Christophe Gourdin and Philippe Merle have created the **XScalibur** company. XScalibur is a startup company that sells an innovative software solution to design, deploy and monitor software systems in a multi-cloud environment. The company is the result of a transfert activity initiated by Philippe Merle and Christophe Gourdin around the **OCCIware Studio** software tool suite. This model-driven based solution for cloud management is the result of several years of research [26], [15] and has especially been developed in the context of the **OCCIware** collaborative project from 2014 to 2017. XScalibur has been selected in March 2019 by the *Alliancy* magazine in the top-13 of startup companies in the domain of cloud computing to "follow closely"⁰.

In 2019, Laurence Duchien has been general chair of the 13th edition of the European Conference on Software Architecture (ECSA) [49], [48] and program co-chair of the 23rd edition of the International Systems and Software Product Line Conference (SPLC) [47], [46]. These two events have been co-located in Paris from 9 to 13 September 2019. The fact that a member of the Spirals project-team was proposed by the software architecture research community to serve in these two major events is a testimony of the recognition and of the visibility of our research activities in this domain.

5.1.1. Awards

Walter Rudametkin and Pierre Laperdrix were awarded in January 2019 the *Prix Inria CNIL protection de la vie privée*. The award was announced during the 12th edition of the International Computers, Privacy and Data Protection (CPDP) conference, and rewards research undertaken with a view to creating a trustworthy digital society. The award was granted thanks to the work of Walter Rudametkin, Pierre Laperdrix, and Benoit Baudry [63] on browser fingerprinting.

Thomas Durieux was awarded in June 2019 a honorable mention (*accessit*) at *Prix de thèse GDR GPL* for his PhD work on software automated repair that was defended in September 2018 [55]. GDR GPL (*Génie de la Programmation et du Logiciel*) is the group that gathers the French research community on software engineering and programming languages. This is the third time that a PhD student from the Spirals project-team wins either this prize or an honorable mention (Clément Quinton won the prize in 2014, and Maria Gomez won a honorable mention in 2017).

Lakhdar Meftah and Romain Rouvoy won a Best Paper award at the 19th International Conference on Distributed Applications and Interoperable Systems (DAIS 2019) [37]. This award distinguishes their work on improving user privacy in crowdsourced mobile datasets. They propose a decentralized approach, named Fougere, to convey data samples from user devices to third-party servers. By introducing an a priori data anonymization process, they show that Fougere defeats state-of-the-art location-based privacy attacks with little impact on the quality of crowd-sourced datasets. This work takes place in the context of the Inria Project Lab **BetterNet** and involves Isabelle Chrisment, who is heading the BetterNet IPL, and who is co-supervising with Romain Rouvoy the PhD thesis of Lakhdar Meftah [13] that was defended in December 2019.

Philippe Merle won a Best Demo Paper award at the 5th IEEE International Conference on Network Softwarization (NetSoft 2019) [39]. This award distinguishes his work on the formal verification of virtualized network and cloud environments. Philippe Merle and his co-authors demonstrate a lightweight toolchain for validating descriptors of network functions compliant with the latest ETSI NFV standards, visualizing these descriptors in the form of various diagrams (i.e. network-oriented, function-oriented, and UML2-based), analyzing these descriptors formally with Alloy Analyzer, and deploying these virtualized network functions

⁰<https://www.alliancy.fr/a-laffiche/cloud/2019/03/13/13-start-up-du-cloud-a-suivre-de-pres>

on OpenStack. This work takes place in the context of a funded project that ended in 2019 with the Orange telecom operator and that involved, in addition to Philippe Merle, Jean-Bernard Stefani from the Inria Grenoble - Rhône-Alpes research center.

Laurence Duchien was awarded the rank of Chevalière de l'Ordre National du Mérite (JO du 29 mai 2019).

BEST PAPERS AWARDS :

[37]

L. MEFTAH, R. ROUYOY, I. CHRISMENT. *FOUGERE: User-Centric Location Privacy in Mobile Crowdsourcing Apps*, in "19th IFIP International Conference on Distributed Applications and Interoperable Systems (DAIS)", Kongens Lyngby, Denmark, J. PEREIRA, L. RICCI (editors), Distributed Applications and Interoperable Systems, Springer International Publishing, 2019, vol. LNCS-11534, p. 116-132 [DOI : 10.1007/978-3-030-22496-7_8], <https://hal.inria.fr/hal-02121311>

[39]

P. MERLE, A. NDEYE SYLLA, M. OUZZIF, F. KLAMM, K. GUILLOUARD. *A Lightweight Toolchain to Validate, Visualize, Analyze, and Deploy ETSI NFV Topologies*, in "NetSoft 2019 - The 5th IEEE International Conference on Network Softwarization", Paris, France, June 2019 [DOI : 10.1109/NETSOFT.2019.8806632], <https://hal.archives-ouvertes.fr/hal-02124164>

STACK Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Regarding scientific results, the team has produced a number of outstanding results on the management of resources and data in large-scale infrastructures, notably on how speeding up VM and Docker boot time by reducing the I/O operations [16], on how to place container images across edge servers in such a way that an image can be retrieved from any edge server fast and in a predictable time [14], and how the placement challenge of data and computations across multiple sites can be addressed by using Constraint Programming techniques in a general manner [22].

We also deliver two other important contributions. In the first one, we propose an efficient graph partitioning method named Geo-Cut, which takes both the cost and performance objectives into consideration for large graph processing in geo-distributed DCs [8]. In the second one, we propose a model and a first implementation of a simulator to compare the energy footprint of different cloud architectures (single sites vs fully decentralized) [3].

On the software side, the team has pursued its efforts on the development of the EnosLib library and the resulting artifacts to help researchers perform experiment campaigns: <https://discovery.gitlabpages.inria.fr/enoslib/theyuseit.html>. We would like also to point it out the development of the field of dynamic reconfiguration of distributed software systems, in particular through the Concerto and Mad softwares: <http://helene-coullon.fr/verdi/page/software/>

On the platform side, the deployment of the SeDuCe testbed that allows researchers to investigate energy concerns in data-centers thanks to a numerous of energy sensors deployed across the dedicated facility is now fully operational: <https://seduce.fr>. Moreover, the team is still strongly involved in the different actions that aim to setup the SILECS platform.

5.1.1. Awards

In 2019, the team has received two individual award:

- **Outstanding Leadership Award** Shadi Ibrahim received an outstanding leadership award as program chair of the SmartData-2019 (<http://cse.stfx.ca/~cybermatics/2019/smartdata/>).
- **Best Tech Pitch** H el ene Coullon received the best tech pitch award at the IMT 5G event from a jury composed of both academic experts in 5G and experts from the Qualcomm company. Moreover, a grant has been awarded by France Brevet to H el ene Coullon to push further her efforts on Fog and Edge computing.

We would like also to highlight two other elements that underline the visibility and recognition of the team nationally and internationally. First, Thomas Ledoux became head of the teaching chair "ArchOps : architecture, d eploiement et administration des infrastructures IT agiles" supported by Bodet Software. The ArchOps chair aims to develop skills in the design of distributed software architectures for engineering students at IMT Atlantique. Second, Shadi Ibrahim and H el ene Coullon, two members of the team, act as program track chairs of 20th IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing (CCGrid 2020), a major conference in the area of distributed systems.

WHISPER Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

The Whisper team published one paper at USENIX ATC, one at ASPLOS, one at EuroSys, one at RTSS, and one at PLDI which are five of the major conferences in the scope of our team:

- Effective Static Analysis of Concurrency Use-After-FreeBugs in Linux Device Drivers. USENIX 2019. [13]
- DCNS: Automated Detection of Conservative Non-SleepDefects in the Linux Kernel. ASPLOS 2019. [14]
- When eXtended Para-Virtualization (XPV) meets NUMA. EuroSys 2019. [15]
- Improving Prediction Accuracy of Memory Interferences for Multicore Platforms, RTSS 2019 [18]
- Usuba: high-throughput and constant-time ciphers, by construction. PLDI 2019. [23]

Julia Lawall was co-PC chair of the ASE 2019 research paper track.

WIDE Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Awards

Florestan De Moor is the recipient of the “Prix National Jeunes André Blanc-Lapierre 2019” from the SEE society (Société de l’électricité, de l’électronique et des technologies de l’information et de la communication), for his work during his master thesis .

During the SRDS 2019 conference which took place in Lyon, France, from October 1st to 4th, Michel Raynal received an Outstanding Career Award for his contributions to distributed systems and algorithms.

BEST PAPERS AWARDS :

[42]

F. DE MOOR. *A Biclustering Approach to Recommender Systems*, University of Rennes 1, June 2019, p. 1-46, <https://hal.inria.fr/hal-02369708>

ALPINES Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- HPDDM software is now available through PETSc PCHPDDM routine, for details see [the routine](#). Both Geneo and its multilevel extension presented in [\[32\]](#) are available.
- ERC Synergy EMC2 project [kick off meeting](#) took place in September 2019, at Sorbonne University.

AVALON Project-Team (section vide)

DATAMOVE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Pierre Neyron received the Médaille de Cristal CNRS 2019 (<http://www.cnrs.fr/fr/personne/pierre-neyron>)
- Denis Trystram leading the Edge Intelligence chair of the new Institute of Artificial Intelligence of Univ. Grenoble Alpes (MIA@Grenoble-Alpes).
- Best Paper Awards at CCGrid 2019
- Outstanding Paper Award at HPCS 2019

BEST PAPERS AWARDS :

[12]

D. CARASTAN-SANTOS, R. Y. DE CAMARGO, D. TRYSTRAM, S. ZRIGUI. *One can only gain by replacing EASY Backfilling: A simple scheduling policies case study*, in "CCGrid 2019 - International Symposium in Cluster, Cloud, and Grid Computing", Larnaca, Cyprus, IEEE, May 2019, p. 1-10 [DOI : 10.1109/CCGRID.2019.00010], <https://hal.archives-ouvertes.fr/hal-02237895>

[15]

F. ZANON BOITO, R. NOU, L. LIMA PILLA, J. LUCA BEZ, J.-F. MÉHAUT, T. CORTES, P. O. NAVAUX. *On server-side file access pattern matching*, in "HPCS 2019 - 17th International Conference on High Performance Computing & Simulation", Dublin, Ireland, IEEE, 2019, p. 1-8, outstanding paper award, <https://hal.inria.fr/hal-02079899>

HIEPACS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- **HIEPACS** was extremely pleased to welcome two new permanent Inria members, namely O. Beaumont and L. Eyraud-Dubois, whose scientific expertises clearly strengthen the impact of the team on the HPC research.
- We are very delighted to report that seven new PhD students have joined the team this year on research topics covering the full range of those addressed by the team. These PhD students, with gender parity, come from different places in France (Bordeaux, Strasbourg) as well as other places worldwide (China, Italy and Russia). This cultural and scientific variety will surely lead to a nice and fruitful blend and will contribute to the stimulating research atmosphere within the team.
- In June 2019, we organized the **14th Scheduling for Large Scale Systems Workshop**, in the campus of Victoire in Bordeaux. 48 participants from all over the world registered to the workshop and gave 36 presentations over 3 days, covering topics like Numerical Algorithms, Resilience, Performance Evaluation, Job and DAG Scheduling.
- **Inria's Autumn school**, November 4-8 2019, Inria Bordeaux Sud-Ouest co-organized by E. Agullo (**HIEPACS**), H. Beaugendre (**CARDAMON**) and J. Diaz (**MAGIQUE3D**)

The school aimed at simulating a physical problem, from its modeling to its implementation in a high performance computing (HPC) framework. The school offered both plenary courses and hands-on sessions that involved many members of the three teams. The physical problem considered was the harmonic wave propagation.

The first day was dedicated to the modeling of the problem and its discretization using a Discontinuous Galerkin scheme. The following two days were dedicated to linear algebra for solving large sparse systems. Background on direct, iterative and hybrid methods for sparse linear systems were discussed. Hands-on on related parallel solvers were then be proposed. Has followed a session dedicated to advanced parallel schemes using task-based paradigms, including a hands-on with the starpu runtime system. The ultimate hands-on session was devoted to the use of parallel profiling tools. The school was closed with plenary talks illustrating the usage of such a workflow in an industrial context.

The hands-on session were conducted on the Federative Platform for Research in Computer Science and Mathematics (PlaFRIM) machine in a **guix-hpc** reproducible environment

The school was attended by about 40 participants mostly PhDs and postdocs from Inria teams.

KERDATA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Contributions to the ETP4HPC agenda

The KerData team contributed to the new **ETP4HPC** Strategic Agenda (to appear). It will serve as a reference for the future EU funding strategy for HPC. Gabriel Antoniu served as a co-leader of the Programming Environment working group. He also served as a co-leader of 2 transversal ("*cross-working group*") research clusters: "*HPC and the Digital Continuum*" and "*Data Everywhere*". Alexandru Costan served as a member of these groups.

5.1.2. Paper co-authored with the LACODAM team published in a major AI conference

In 2019, Pedro Silva initiated a multi-disciplinary collaboration with the LACODAM Inria team and the team of Manish Parashar at Rutgers University. It addresses Machine Learning in the context of Edge stream processing. The target application is early earthquake detection from motion sensors distributed on the ground.

This collaboration resulted in a co-authored paper titled *Distributed Multi-Sensor Machine Learning Approach to Earthquake Early Warning* [21]. It will be presented at the 34th AAAI Conference on Artificial Intelligence (AAAI-20), a top conference for Machine Learning (CORE Rank: A*). It is the first paper published by the team in a major AI venue.

5.1.3. Awards

Pierre Matri, earned a PhD in May 2018 co-advised by **Maria Pérez** (Universidad Politécnica de Madrid, UPM), Alexandru Costan (INSA Rennes) and Gabriel Antoniu (Inria). This PhD was defended at UPM and it received the Outstanding PhD Award (*Premio Extraordinario*) of UPM.

POLARIS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- N. Gast received an ANR JCJC grant.
- The team was highly involved in the 3IA institute MIAI @ Grenoble Alpes: P. Loiseau is co-holder of the chair “Explainable and Responsible AI” of which N. Gast and B. Pradelski are members; and P. Mertikopoulos is a member of the chair “Optimization & Learning”.
- Arnaud Legrand participated in the writing of a book [39] on Reproducible Research, which aims at helping students and engineers and researchers to find efficient and accessible ways leading them to improve their reproducible research practices.

5.1.1. Awards

- The paper “Privacy Risks with Facebook’s PII-based Targeting: Auditing a Data Broker’s Advertising Interface” by P. Loiseau and co-authors (IEEE S&P ’18) was runner up for the 2019 Caspar Bowden Award for Outstanding Research in Privacy Enhancing Technologies.
- The paper “Investigating ad transparency mechanisms in social media: A case study of Facebook’s explanations” by P. Loiseau and co-authors (NDSS ’18) was runner up for the 2019 CNIL-Inria Award for Privacy Protection.

ROMA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Jean-Yves L'Excellent co-created the MUMPS technologies start-up and left the team to work full time for MUMPS technologies.
- Grégoire Pichon joined the team as an Associate Professor of University Claude Bernard, Lyon 1.
- Anne Benoit was elected chair of the IEEE Technical Committee on Parallel Processing.
- Anne Benoit received on February 2019 the award for Editorial Excellence as Associate Editor of the IEEE Transactions on Parallel and Distributed Systems during 2018.
- Yves Robert received the 2020 IEEE-CS Charles Babbage Award *for contributions to parallel algorithms and scheduling techniques*. This award covers all aspects of parallel computing including computational aspects, novel applications, parallel algorithms, theory of parallel computation, parallel computing technologies, among others. Further information about the award, including a list of past recipients, may be found at <https://www.computer.org/web/awards/charles-babbage>. The award consists of a \$1,000 honorarium, certificate, and the invitation to present a paper and/or presentation at the annual IEEE-CS International Parallel and Distributed Processing Symposium (IPDPS).

5.1.1. Awards

BEST PAPERS AWARDS :

[16]

F. DUFOSSÉ, K. KAYA, I. PANAGIOTAS, B. UÇAR. *Effective heuristics for matchings in hypergraphs*, in "SEA2 2019 - International Symposium on Experimental Algorithms - Special Event", Kalamata, Greece, Springer, 2019, p. 248-264 [DOI : 10.1007/978-3-030-34029-2_17], <https://hal.inria.fr/hal-02417475>

STORM Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- 1st year for the CoHPC team in collaboration with the Lawrence Berkeley National Lab. (9.4.1.1). A PhD student of the team obtained a joint postdoc with InriaSiliconValley at this lab to initiate the collaboration.

TADAAM Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Guillaume PALLEZ was an invited speaker at the Royal Society <https://royalsociety.org/science-events-and-lectures/2019/04/high-performance-computing/>
- Brice GOGLIN is co-chair of the Architecture & Networks area of the SuperComputing 2020 conference.
- François PELLEGRINI has been re-appointed a member of the French *Commission Nationale de l'Informatique et des Libertés* (French data protection authority) by the President of the French Senate.

5.1.1. Awards

- Guillaume PALLEZ was one of the recipient of the IEEE Computer Society TCHPC Early Career Researchers Award for Excellence in High Performance Computing
- François PELLEGRINI was bestowed *Chevalier dans l'Ordre des Palmes Académiques* (Order of Academic Palms), promotion of July 2019.

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 [37], [28] and [25] 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.
- We received the "Data Showcase Award" (Figure 2) at the MSR'19 conference (Mining Software Repositories 2019) for the dataset described in the following paper [55] and publicly available on Zenodo (<https://zenodo.org/record/1489120>).
- Since this year two former PhD students of the team now have a full time researcher position at CNRS: Pierre Laperdrix and Thomas Degueule.
- Four new PhDs and one new HDR have been successfully defended this year.
- A new CNRS junior researcher, Djamel Eddine Khelladi, has joined the team in February 2019. Since his arrival, he submitted a Marie Skłodowska-Curie Action (MSCA) Individual Fellowships (IF), as well as an ANR JCJC in phase 1. Both projects, respectively, CoEvoCCT and MC-Evo² are on the topics of software evolution and co-evolution. His research amplifies a new axis around software evolution and maintenance. First results led to the publication at 42nd International Conference on Software Engineering, ICSE, 2020, Seoul, South Korea, an A* top conference in the field of software engineering.

4.1.1. Awards

Most Influential Paper (MIP) award at SLE 2019 <https://ins2i.cnrs.fr/fr/cnrsinfo/des-scientifiques-primess-pour-leurs-travaux-sur-les-feature-models>

BEST PAPERS AWARDS :

[55]

A. BENELALLAM, N. HARRAND, C. SOTO-VALERO, B. BAUDRY, O. BARAIS. *The Maven Dependency Graph: a Temporal Graph-based Representation of Maven Central*, in "MSR 2019 - 16th International Conference on Mining Software Repositories", Montreal, Canada, ACM, May 2019, p. 344-348 [DOI : 10.1109/MSR.2019.00060], <https://hal.archives-ouvertes.fr/hal-02080243>



Figure 2. Data Showcase Award, MSR'19

EASE Project-Team (section vide)

FOCUS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Ugo Dal Lago has been awarded an ERC CoG for his project “Differential Program Semantics” (DIAPASoN), which started on March 1st, 2019.
- Francesco Gavazzo has received the award for “Best Italian PhD Thesis in Theoretical Computer Science”, by the Italian Chapter of EATCS (European Association for Theoretical Computer Science)
- Raphaëlle Crubillé has been awarded the “prix de thèse Gilles Kahn 2019 (Société Informatique de France and Académie des Sciences)

INDES Project-Team (section vide)

RMOD Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Steven Costiou was hired as CR.
- We released Pharo 7. More information at <http://pharo.org>.
- The paper *Rotten Green Tests* has been accepted at ICSE.
<https://hal.inria.fr/hal-02002346>

5.1.1. Awards

- Best paper award: *SATToSE 2019 Migrating GWT to angular 6 using MDE*.
<https://hal.inria.fr/hal-02304301>
- 2nd place best paper award IWST 2019: *Illicium: a modular transpilation toolchain from Pharo to C*.
<https://hal.archives-ouvertes.fr/hal-02297860>
- 3rd place best paper award IWST 2019: *GildaVM: a Non-Blocking I/O Architecture for the Cog VM*.
<https://hal.archives-ouvertes.fr/view/index/docid/2379275>

AGORA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Walid Bechkit holds the PEDR (2017-2021).
- Khaled Boussetta holds the PEDR (2018-2022).
- Hervé Rivano holds the PEDR (2017-2021).
- Razvan Stanica holds the PEDR (2016-2020).
- Razvan Stanica obtained his HDR from the University Lyon 1 / INSA Lyon, in November 2019.

5.1.1. Awards

- Ahmed Boubrima is runner-up (*accessit*) for the Gilles Kahn thesis prize 2019.

COATI Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Julien Bensmail: “Jeunes Talents France-Chine” funding for one travel to China in 2019;
- Christelle Caillouet: UCA Excellence award;
- Emilio Cruciani: recipient of a 2019 Testing and Verification research award;
- François Dross: recipient of an accessit to the PhD prize Graphes "Charles Delorme" 2019 for his PhD entitled *Vertex partition of sparse graphs* [87];
- William Lochet: recipient of the PhD prize Graphes "Charles Delorme" 2019 for his PhD entitled *Substructures in digraphs* [92];
- Emanuele Natale: awarded the "Best Italian Young Researcher in Theoretical Computer Science" by the Italian Chapter of the EATCS.

5.1.2. Promotions

- Patricia Riveill: promoted to Administrative Engineer.

BEST PAPERS AWARDS :

[47]

C. CAILLOUET, T. RAZAFINDRALAMBO, D. ZORBAS. *Optimal placement of drones for fast sensor energy replenishment using wireless power transfer*, in "WD 2019 - Wireless Days 2019", Manchester, United Kingdom, April 2019, Best Paper Award, <https://hal.inria.fr/hal-02043123>

DANTE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Dante is member of the following new projects accepted in 2019, for funding by ANR:

- **DataRedux** Big data reduction for predictive computational modelling. Consortium: Dante (ENS de Lyon), Centre Physique Théorique Marseille (CNRS), Pierre Louis Institute of Epidemiology and Public Health (INSERM).
- **Darling** Distributed adaptation and learning over graphs. Consortium: Observatoire Côte d'Azur (U. Nice), Dante & LP (ENS de Lyon), L2S (Centrale Supélec).
- **CCS 2021** Márton Karsai and IXXI obtained the right to organise Conference on Complex Systems in Lyon in 2021.

5.1.1. Awards

- Article [10] has been highlighted as the cover page article of the journal MDPI.

BEST PAPERS AWARDS :

[25]

R. FONTUGNE, E. BAUTISTA, C. PETRIE, Y. NOMURA, P. ABRY, P. GONÇALVES, K. FUKUDA, E. ABEN. *BGP Zombies: an Analysis of Beacons Stuck Routes*, in "PAM 2019 - 20th Passive and Active Measurements Conference", Puerto Varas, Chile, Springer, March 2019, p. 197-209, Best paper award. [DOI : 10.1007/978-3-030-15986-3_13], <https://hal.inria.fr/hal-01970596>

DIANA Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Ekinops

We have started a collaboration with EKINOPS on the topic of Multi-access Edge Computing. The activity started with a CIFRE thesis. The PhD student Mamoutou Diarra started his PhD on this topic on November 2019.

4.1.2. ACM CoNEXT 2019 Artefact Evaluation Committee

As a continuation of our long lasting efforts in encouraging reproducibility [17], Damien Saucez and Mohamed Naoufal Mahfoudi from our project-team have co-chaired the ACM CoNEXT 2019 Artefact Evaluation Committee. In 2019, 11 papers out of the 32 accepted at the conference have requested for being evaluated, resulting in 10 artefacts being awarded with a badge. Interestingly, we are witnessing an important improvement in the quality of the artefacts proposed by the SIGCOMM community.

DIONYSOS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Bruno Tuffin was among the five finalists for the Best Contributed Theoretical Paper Award at the Winter Simulation Conference 2019 for his paper “Randomized Quasi-Monte Carlo for Quantile Estimation” co-authored with Z. Kaplan, Y. Li, M. Nakayama (New Jersey Institute of Technology, USA).

5.1.2. Conference

Yassine Hadjadj-Aoul was General co-chair of the 6th International Conference on Information and Communication Technologies for Disaster Management (ICT-DM), Paris, France. The conference took place on December 18-20 2019. Its proceedings will appear in the IEEE xPlore Digital Library.

DYOGENE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

ERC NEMO

ERC NEMO, led by F. Baccelli, started in January 2019; see [9.3.1.1](#) .

Inria International Chair

Sean Meyn obtained Inria International Chair for the period 2019–2023 and joined Dyogene.

Markov Lecture

L. Massoulié gave the Markov Lecture at the Annual Meeting of the INFORMS society, in October in Seattle <https://connect.informs.org/aps/participate46/markov>.

EVA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Startup Falco wins the Innovation Competition at the Paris Nautic Show (200.000 visitors), December 2019
- Startup Falco wins the Favorite Startup Pitch battle at MassChallenge, Boston, November 2019
- Startup Falco wins the Amplify Pitch battle, October 2019
- Startup Falco awardee of the prestigious Netva “Deeptech North America” program, June 2019
- Startup Falco awardee of the prestigious WILCO/WILCOMET accelerator program
- Amar Abane and **Paul Muhlethaler** receive the best student paper award at PEMWN 2019 for the paper “Modeling and Improving Named Data Networking over IEEE 802.15.4”
- Abdallah Sobehy, under the supervision of **Paul Muhlethaler** and Eric Renault from EVA, secured the first place in the Indoors Positioning Competition held during the IEEE’s Communication Theory Workshop 2019, Selfoss, Iceland. The objective was to localize a transmitter using Channel State Information (CSI) received at a Massive MIMO antenna which is one of the main drivers of the 5G. The contestants were provided with training data to develop algorithms that predict the transmitter’s position from CSI. On the competition day, the teams were given 2000 CSI readings to predict the corresponding positions using the developed algorithms. The evaluation criterion is the Mean Square Error (MSE) of the predicted positions. The proposed method relies on CSI preprocessing and Deep Learning (Multi-Layer Perceptron Neural Network). With an MSE of 2.3 cm, the proposed solution clinched the first place among 8 teams from top universities around the world such as: University of Toronto (Canada), Ruhr University Bochum (Germany), Heriot-Watt University (England), University of Padova (Italy), IMdea networks institute (Spain), Aalborg University (Denmark), and Yuan Ze University (Taiwan).
- Abdallah Sobehy receives the “Le premier prix du jury” during the fifth edition of “la journée doctorants de Samovar”

5.1.2. Transfer

- Internet Engineering Steering Group (IESG) approval of draft-ietf-6tisch-minimal-security to be published as RFC
- Malisa Vucinic named co-chair of the IETF LAKE standardization working group
- Thomas Watteyne co-chairs IETF working group 6TiSCH
- Thomas Watteyne co-chairs IETF design team of fragment forwarding
- Thomas Watteyne part of the IETF IoT directorate
- Startup Falco had a booth at the Paris Nautic Show (Dec 2019, 200.000 visitors)
- Startup Falco had a booth at the Cap d’Agde Nautic Show (Oct-Nov 2019, 50.000 visitors)
- Startup Falco selected to join the Parisian Incubator Agoranov, April 2019

FUN Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Awards

Paper [17] has been awarded best paper of the 34th ACM/SIGAPP Symposium On Applied Computing (SAC 2019).

BEST PAPERS AWARDS :

[17]

A. BLANCHARD, N. KOSMATOV, F. LOULERGUE. *Logic against Ghosts: Comparison of Two Proof Approaches for a List Module*, in "SAC 2019 - The 34th ACM/SIGAPP Symposium On Applied Computing", Limassol, Cyprus, April 2019 [DOI : 10.1145/3297280.3297495], <https://hal.inria.fr/hal-02100515>

GANG Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Amos Korman won the 2020 prize of innovations in distributed computing.

Pierre Fraigniaud and his co-authors obtained the best paper award at SSS 2019:

BEST PAPERS AWARDS :

[19]

A. CASTAÑEDA, P. FRAIGNIAUD, A. PAZ, S. RAJSBAUM, M. ROY, C. TRAVERS. *Synchronous t -Resilient Consensus in Arbitrary Graphs*, in "SSS 2019 - 21st International Symposium on Stabilization, Safety, and Security of Distributed Systems", Pisa, Italy, October 2019 [DOI : 10.1007/978-3-030-34992-9_5], <https://hal.inria.fr/hal-02433524>

GANG Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Amos Korman won the 2020 prize of innovations in distributed computing.

Pierre Fraigniaud and his co-authors obtained the best paper award at SSS 2019:

BEST PAPERS AWARDS :

[19]

A. CASTAÑEDA, P. FRAIGNIAUD, A. PAZ, S. RAJSBAUM, M. ROY, C. TRAVERS. *Synchronous t-Resilient Consensus in Arbitrary Graphs*, in "SSS 2019 - 21st International Symposium on Stabilization, Safety, and Security of Distributed Systems", Pisa, Italy, October 2019 [DOI : 10.1007/978-3-030-34992-9_5], <https://hal.inria.fr/hal-02433524>

MARACAS Team

5. Highlights of the Year

5.1. Highlights of the Year

Over the last year, the MARACAS team has made a number of significant contributions in the form of journal publications and international conference proceedings, invited lectures in international conferences and schools, as well as contributions in the form of organization of international conferences and editorial roles in international IEEE journals. These include 9 high quality journal publications and over 10 international conference proceedings, spanning many areas of communication and information theory as well as signal processing. In particular, these results contribute to the ongoing development of 5G wireless communication systems and also to emerging areas of communications in the form of the smart grid and molecular communications.

5.1.1. Awards

- Samir Perlaza: Visiting Research Collaborator (Honorific Position), Term 2019 - 2020, at the Department of Electrical Engineering, Princeton University. Annual Renew under evaluation of a Departmental Committee.
- Samir Perlaza: Fellowship of The Finnish Society of Sciences and Letters for visiting the School of Energy Systems at Lappeenranta University of Technology, Finland. April, 2019.
- Bayram Akdeniz: 2nd place in the Molecular MIMO Competition at the IEEE Communication Theory Workshop.
- Cyrille Morin: 1st place in the Machine learning challenge at the 6th Training School on Machine and Deep Learning Techniques for (Beyond) 5G Wireless Communication Systems.

NEO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Maximilien Drevet, PhD student in NEO, has co-authored a book: *Leçons pour l'agrégation de mathématiques* [61].

The members of NEO have edited three collections: [64], [65], [66]. One collection is a result of the very successful EU Project CONGAS: Multilevel Strategic Interaction Game Models for Complex Networks.

Sara Alouf has been elected member of the Board of Directors of the ACM SIGMETRICS.

A workshop in the honor of Eitan Altman, at the occasion of his 60th birthday, took place at the University of Avignon on June, 3rd, 2019. Recordings of the presentations are available, see https://www.canal-u.tv/producteurs/universite_d_avignon_et_des_pays_de_vaucluse/colloque/wiopt_2019.

RESIST Team

5. Highlights of the Year

5.1. Highlights of the Year

The impact of the RESIST team in network and service management community has been highly recognized and awarded this year in recognition of their exceptional contributions and leadership in this research area.

- R. Badonnel has been elected as the chair of the IFIP (International Federation for Information Processing) WG6.6 (Working Group 6.6).
- J. François has been appointed as co-chair of NMRG (Network Management Research Group) of IRTF (Internet Research Task Force).
- T. Cholez gets involved in the new H2020 European project Concordia (section [9.3.1.4](#)).

5.1.1. Awards

- O. Festor has received the *Dan Stokesberry award*.
- J. François has received the *IEEE Young Professional in Network and Service Management award*.

SOCRATE Project-Team (section vide)

TRIBE Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Awards

Together with his co-authors, Aline Carneiro Viana was awarded: (1) the **best poster award** at the main conference on the scientific analysis of mobile phone datasets (NetMob) in Oxford, UK, Jul. 2019, for the poster on **Complete Trajectory Reconstruction from Sparse Mobile Phone Data** (collaboration with G. Chen, M. Fiore, and C. Sarraute); (2) the **top-six best paper award** at the 27th International Conference on Advances in Geographic Information Systems 2019 (ACM SIGSPATIAL), in Chicago, USA, Nov. 2019, for the paper on **Deciphering Predictability Limits in Human Mobility**.

4.1.2. RIOT Summit 2019

We successfully organized in September 2019 the fourth RIOT Summit, in Helsinki. The RIOT Summit 2019 gathered ~100 enthusiastic industrial participants, makers and academics involved in RIOT. Highlights included a keynote from IoT expert and former IETF general chair Jari Arkko (Ericsson Research), and a new car-sharing product using RIOT announced by Continental (and now deployed on thousands of vehicles). Aside of big companies and academics, 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>.

4.1.3. Associated team - EMBRACE

2019 was the third and last year of the EMBRACE Associated team. The EMBRACE (IEveraging huMan Behavior for Resource AlloCation and services orchestration modELs) team was composed by members of the INFINE and by three Brazilian teams from three different Brazilian Universities. The EMBRACE project addressed the topic of designing efficient solutions for 5G networks taking into account human behavior, uncertainty, and heterogeneity of networking resources. A proposal requesting the extension of the project was submitted in Nov. 2019.

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

4.1.4. IETF Hackathons

Concerning Internet Standardization, we contributed to all three IETF Hackathons in 2019. In particular, Oumaima Attia and Cedric Adjih were some major contributors (with many others including Vincent Roca, EPI Privatics) in the NWCRG Hackathon which allowed to release in first prototype of SWIF-codec, a sliding-window forward-error correction codec, see: <https://github.com/irtf-nwcr/swif-codec>. Cedric Adjih is also a major contributor to the LPWAN Hackathon on the SCHC protocol (IPv6 compression for IoT networks), which resulted this year in code at <https://github.com/openshc/openshc>, a working prototype of the protocol.