RESEARCH CENTER
Rennes - Bretagne-Atlantique

FIELD

Activity Report 2019

Section Highlights of the Team

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CAIRN Project-Team (section vide)

CELTIQUE Project-Team (section vide)

CIDRE Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

This year we highlight two key events in the team's life:

- We have organized the SILM semester on the Security of Software/Hardware Interfaces. The goal of this semester is to promote the scientific, teaching and industrial transfer activities on the security of software/hardware interfaces. This semester is supported by DGA.
- We have concluded the transfer of a license to use GroddDroid our Android malware analysis framework.

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.

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-Evo^2 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-primes-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

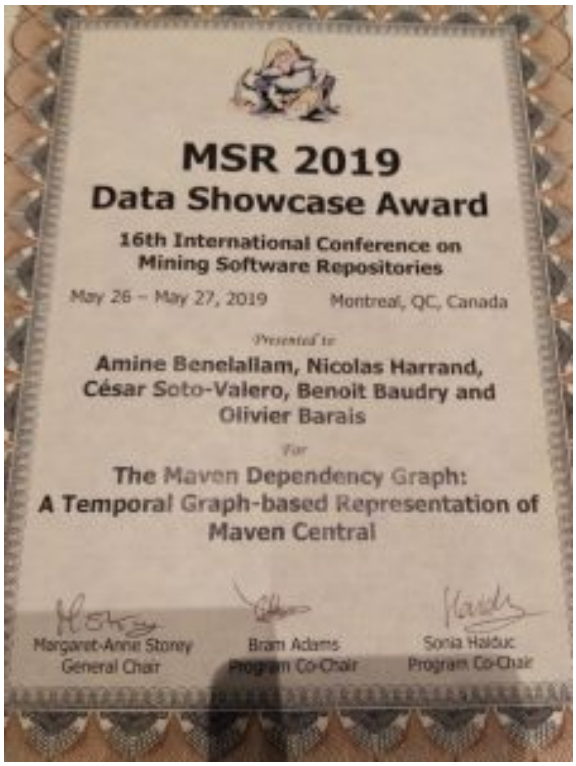

Figure 2. Data Showcase Award, MSR'19

DYLISS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

The AuReMe software for metabolic network reconstruction has been selected for the Service Delivery Plan of the French Institute of Bioinformatics (IFB).

5.1.1. Awards

Lucas Bourneuf is the World champion of man vs. machine challenge of the Angry Birds AI competition (during IJCAI) where humans can challenge the four best AI agents. Note that Lucas was the human, not the AI and that there is no direct connection with his PhD project. World champion nonetheless!

Nicolas Guillaudeux (with Grégoire Siekaniec from the GenScale team) won the public's prize at the short scientific film festival "Sciences en cour[t]s" for their movie about Nicolas's PhD thesis.

EASE Project-Team (section vide)

EMPENN Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. New NIRS system at the Neurinfo platform

An MRI and EEG-compatible functional near-infrared spectroscopy (fNIRS) system was installed at the Neurinfo platform in September 2019.

5.1.2. Sciences en Cour[t]s

This event is a festival of short films, which offers doctoral students the opportunity to make short films about their thesis work. Raphael Truffet, Antoine Legouhy and Xavier Rolland won the high school award in science en Cour[t]s event https://www.youtube.com/watch?v=IKgqv-iCwak.

5.1.3. Second neuroscience hackathon in Rennes

We organized the second edition of hackathon in the Empenn team, November 14-15 as part of the international event Brainhack Global 2019.

FLUMINANCE Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Awards

Best paper award 2019 Romain Schuster "Visualisation et mesure du flux d'aspiration d'une Sorbonne", ContaminExpert 2019. Paris, FR
BEST PAPERS AWARDS :
[43]
R. SCHUSTER, D. HEITZ, E. MÉMIN.*Visualisation et mesure du flux d'aspiration d'une Sorbonne*, in "ContaminExpert 2019", Paris, France, March 2019, p. 1-8, https://hal.archives-ouvertes.fr/hal-02330348

GALLINETTE Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Permanents members

Gaëtan Gilbert, currently PhD student in the Gallinette team, will be promoted expert engineer for the Coq consortium, staying in the Gallinette team.

Matthieu Sozeau, Inria Junior Researcher and leader of the Coq development team, is joining the Gallinette team end of 2019-beginning of 2020.

Nicolas Tabareau is now director of research (DR2) at Inria since October 2019.

4.1.2. Awards

Marie Kerjean has been awarded a L'Oréal - Unesco Foundation grant.

L'Oréal - Unesco Grants for Women in Science are awarded to talented young female researchers.

GENSCALE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

The Gilles Kahn *accessits* **prize was awarded to Camille Marchet** for her PhD thesis: *From reads to transcripts: de novo methods for the analysis of transcriptome second and third generation sequencing* [8]. This thesis was prepared in the GenScale team under the supervision of P. Peterlongo.

The Gilles Kahn prize is awarded each year by the SIF, the French Society of Computer Science, for an excellent PhD thesis in the field of computer science.

The thesis of Camille dealt with the processing of transcriptome sequencing data. More precisely, the question was how to take advantage of the characteristics of the data produced by third generation sequencing technologies, as they produce large sequences covering the total length of RNA molecules. The core work of this thesis consisted in the methodological development and implementation of new algorithms allowing the clustering of third generation sequences by gene, then their correction and finally the detection of the different isoforms of each gene.

HYBRID Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Mélanie Cogné (Medical Doctor, PhD, CHU Rennes) has joined the Hybrid team as a new External Collaborator.
- Hybrid team has been strongly involved in the organization of the IEEE Virtual Reality Conference 2019 (IEEE VR), with F. Argelaguet (Program Chair) and A. Lécuyer (Panels Chair) and Jean-Marie Normand (Program Committee).
- The Immersia VR platform has celebrated its 20 years of existence at Inria Rennes/IRISA center, within the “20ans d’Immersia” event (November 2019).
- Hybrid team has organized a “VR Hackathon” at the Inria Rennes/IRISA Center, gathering around 20 participants (May 2019).

5.1.1. Awards

- IEEE VGTC Virtual Reality Technical Achievement Award 2019 was obtained by Anatole Lécuyer.
- IEEE VR Best 3DUI Contest Demo Award 2019: was obtained by Team Hybrid (Hugo Brument, Rebecca Fribourg, Gerard Gallagher, Thomas Howard, Flavien Lecuyer, Tiffany Luong, Victor Mercado, Etienne Peillard, Xavier de Tinguy, and Maud Marchal), for the demo entitled “Pyramid Escape: Design of Novel Passive Haptics Interactions for an Immersive and Modular Scenario” [11].

BEST PAPERS AWARDS :

[31]
E. PEILLARD, T. THEBAUD, J.-M. NORMAND, F. ARGELAGUET SANZ, G. MOREAU, A. LÉCUYER.*Virtual Objects Look Farther on the Sides: The Anisotropy of Distance Perception in Virtual Reality*, in "VR 2019 - 26th IEEE Conference on Virtual Reality and 3D User Interfaces", Osaka, Japan, IEEE, March 2019, p. 227-236 [*DOI :* 10.1109/VR.2019.8797826], https://hal.archives-ouvertes.fr/hal-02084069

[18]
R. GAUGNE, T. NICOLAS, Q. PETIT, M. OTSUKI, V. GOURANTON.*Evaluation of a Mixed Reality based Method for Archaeological Excavation Support*, in "ICAT-EGVE 2019 - International Conference on Artificial Reality and Telexistence - Eurographics Symposium on Virtual Environments", Tokyo, Japan, September 2019, p. 1-8, https://hal.inria.fr/hal-02272910

[23]
J. LACOCHE, T. DUVAL, B. ARNALDI, E. MAISEL, J. ROYAN.*Machine Learning Based Interaction Technique Selection For 3D User Interfaces*, in "EuroVR 2019 - 16th EuroVR International Conference", Tallinn, Estonia, Springer, October 2019, p. 33-51 [*DOI :* 10.1007/978-3-030-31908-3_3], https://hal.archives-ouvertes.fr/hal-02292434

HYCOMES Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

The Hycomes team has reached in 2019 an important milestone in the team's research objectives: the design and implementation of an implicit structural analysis algorithm supporting multimode DAE systems. This method is based on an encoding of the varying structure of a multimode DAE as Boolean functions, represented with Binary Decision Diagrams (BDD). This enables a complete strucutral analysis of a multimode DAE system, without enumerating its modes.

I4S Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Awards

- Our former PhD student Nicolas Le Touz received the Abertis Prize France for his thesis “Design and study of positive energy transport infrastructure: from thermomechanical modelling to the optimisation of such energy systems“, defended in November 2018. The Abertis Prize is awarded for research in transport infrastructure management.
- Nassif Berrabah, industrial PhD student of the I4S Team in collaboration with EDF, has defended his thesis on “Inverse problems for diagnosis of electric cables from reflectometry measurements” in November 2017. The research work of his thesis received the award of Scientific Prize from EDF R&D.

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.

LACODAM Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Elisa Fromont was awarded a Junior Member position at the Institut Universitaire de France (IUF). This is a prestigious position given for 5 years (2019-2024), the selection process is especially competitive.
- Tassadit Bouadi (MCF Univ Rennes 1) joined the team in July 2019. Her research topics are skyline queries and preference mining. Her work will especially contribute to the design of approaches having results easier to grasp by human users.

LINKMEDIA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Highlights of the year

- Our activities in relation with fake news were extensively highlighted in 2019. Ewa Kijak and Vincent Claveau gave a few interviews in newspapers, in a nationwide radio broadcast as well as in several TV shows.
- A chaire position in Artificial Intelligence for Defense has been granted to Teddy Furon. This chaire is supported by the national Defense Innovation Agency. The chaire will last 4 years, starting early 2020.
- Laurent Amsaleg (General Chair), Guillaume Gravier (Program Committee Chair), Yannis Avrithis (Workshops Chair) as well as almost all students of LINKMEDIA (as volunteers) were involved in running the 27th ACM Multimedia conference in Nice. This edition, very successful, was attended by close to 800 people.

5.1.2. Awards

Oriane Siméoni received the best presentation award from the International Computer Vision Summer School (ICVSS) 2019 [0].

[0] https://iplab.dmi.unict.it/icvss2019/

MIMETIC Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Members of the MimeTIC team / M2S laboratory carried out a PIA3 EUR (Ecole Universitaire de Recherche) project (DIGISPORT project) for the University of Rennes, which brings together the universities and Grandes Ecoles of the Rennes site. This project, with a total budget of €86 million, is funded by the Ministry of Higher Education, Research and Innovation to the tune of €5.9 million. The objective of DIGISPORT is to create a unique graduate school of international excellence in interdisciplinary training and research in digital sport sciences. This project aims to offer students in initial and continuing training an opportunity to build a study strategy suited to their professional goals and to the labor market. The digital revolution in sports and exercise is indeed already underway, at the confluence of the fast-growing markets of sport (€80 billion worldwide) and digital technology and connected objects (€207 billion worldwide). It leads to the emergence of new professions at the interface of these domains requiring skills in sports science, digital, electronics, and human and social sciences. Currently, education system is not designed to train this type of multi-skilled and agile students able to integrate an evolving labor market. DIGISPORT aims to link and structure training courses and research to promote a transversal approach uniting teaching and research staff around the new discipline of digital sport science and to address the new skills generated by the entry of sport into the digital age. The EUR will provide a coordinated training offer, from masters to doctoral level, that is resolutely interdisciplinary and strongly linked to research and innovation.
Based on previous scientific results in dynamic motion analysis, MimeTIC has developed an efficient software platform to carry-out biomechanical analysis based on motion capture data. "Customizable Toolbox for Musculoskeletal simulation" (CusToM) was delivered as an open source software available on a repository (https://github.com/anmuller/CusToM) and documented in [22]. CusToM is a MATLAB toolbox aiming 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 available with no restriction.

The Immersia VR platform has celebrated its 20 years of existence at Inria Rennes/IRISA center, within the “20ans d’Immersia” event (November 2019).

MINGUS Project-Team (section vide)

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

PACAP Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Benjamin Rouxel, Stefanos Skalistis, Steven Derrien and Isabelle Puaut received an Outstanding paper award for their paper entitled “Hiding Communication Delays in Contention-Free Execution for SPM-based Multi-Core Architectures” at the Euromicro conference on real time systems .

BEST PAPERS AWARDS :

[28]

B. ROUXEL, S. SKALISTIS, S. DERRIEN, I. PUAUT.*Hiding Communication Delays in Contention-Free Execution for SPM-Based Multi-Core Architectures*, in "ECRTS 2019 - 31st Euromicro Conference on Real-Time Systems", Stuttgart, Germany, July 2019, p. 1-24 [*DOI :* 10.4230/LIPICS.ECRTS.2019.25], https://hal.archives-ouvertes.fr/hal-02190271

PANAMA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- The **Premier Prix de Thèse de la Fondation Rennes 1** in the area of *Mathématiques, Sciences et Technologies de l'Information et de la Communication*, was awarded to **Himalaya Jain** for his Ph.D. [73] titled "Learning compact representations for large scale image search", conducted under the joint supervision of R. Gribonval and Patrick Perez, Technicolor R & I, Rennes.
- The **Prix Jeune Chercheur** from the *Journée Science et Musique 2019 (Rennes)* was awarded to **Corentin Louboutin** for a contribution titled "Modélisation multi-échelle et multi-dimensionnelle de la structure musicale", in relation to his PhD thesis [13].

RAINBOW Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

- J. Pettré is the unit PI of the new H2020 ICT project “PRESENT” started on Sep 2019

4.1.1. Awards

- P. Robuffo Giordano received the Prix Michel Monpetit – Inria from the Académie des sciences
- B. Penin (former PhD student), P. Robuffo Giordano and F. Chaumette received at ICRA 2019 the IEEE RA-L 2018 Best Paper Award for the paper “Vision-Based Reactive Planning for Aggressive Target Tracking while Avoiding Collisions and Occlusions”
- M. Babel received the Innovation Award from the Société Française de Médecine physique et de Réadaptation (SOFMER) for the power wheelchair simulator in virtual reality described in Sect. 6.4.6

SERPICO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- The SERPICO team organized the 7th International Conference on “Quantitative BioImaging” (QBI, https://www.quantitativebioimaging.com/qbi2019/) in January 2019 (350 attendees) in Rennes. The Quantitative BioImaging conference encourages scientific communication between researchers with interest in quantitative imaging in biological and biomedical sciences. A particular emphasis is to promote interdisciplinary interactions between physicists, computer scientists, chemists, mathematicians, and biologists.
- Emmanuel Moebel and Sandeep Manandhar defended their PhD theses in 2019.
- The DeepFinder algorithm was ranked first at the international SHREC’19 Challenge: "classification in cryo-electron tomograms" (Eurographics Workshop on 3D Object Retrieval – SHREC - 3D Shape Retrieval Contest (2019), Genova, Italy).

SIMSMART Project-Team (section vide)

SIROCCO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- C. Guillemot has received the 2019 EURASIP Technical Achievement Award.

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 accross 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 decentrlaized) [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** Hélène 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 Hélène 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, déploiement 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 Hélène 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.

SUMO Project-Team

5. Highlights of the Year

5.1. Changes in 2019

SUMO was evaluated in spring 2019, and we took this opportunity to make several changes. First, we adapted the research axes of the team in our scientific foundations to reflect a slight topic drift over the last four years, which is also a consequence of modifications in the team composition. In particular, we now put emphasis on one emergent topic, namely population models. Last but not least, Éric Fabre stepped down as project-team leader and Nathalie Bertrand replaces him since April 2019.

TAMIS Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

4.1.1. Kick-off of the ANR JCJC AHMA project

The ANR JCJC project lead by Annelie Heuser was kicked-off, and a PostDoc (Matthieu Mastio) and PhD (Duy Phuc Pham) have been hired. The team already created a first platform for automated hardware malware analysis. See below and in the following.

4.1.2. New results in the TeamPlay H2020 project, coordinator

The project is coordinated by Olivier Zendra. The TeamPlay H2020 project had a successful mid-term review in October 2019, where the reviewers stressed the quality of the overall work. We TAMIS also achieved new results on security modelling in this TeamPlay project in 2019 (see in the following).

4.1.3. New software and platforms

In 2019, we continued the development of several software and platforms (hardware and software), and build up four new ones:

- E-PAC, an Evolving Packer Classifier,
- The SABR (Semantic-driven Analysis of BinaRies) platform
- Orqal, an efficient schedueler for docker images.
- A Side-channel deep learning evaluation platform,
- The AHMA (IoT malware classification through side-channel information) platform and tools.

TEA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Loïc Besnard was promoted to the rank of Senior Engineer Exceptional Class by CNRS, acknowledging his remarkable career of research engineer as principal developer of Signal and Polychrony, as project manager and integrator with project teams EPATR (Signal), ESPRESSO (Polychrony), TEA (ADFG) and PACAP (Heptane).

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