Activity Report 2017

Section Highlights of the Team

CAIRN Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Members of CAIRN published six papers accepted at IEEE/ACM Design Automation and Test in Europe for 2017, one of the major events in design automation.

[30] was among the few papers nominated for best paper at IEEE FPL.

CELTIQUE Project-Team (section vide)

CIDRE Project-Team

5. Highlights of the Year

5.1. Highlights

This year, the CIDRE team would like to emphasize the following publications that appeared in major academic venues:

- Formal verification of an information flow monitor, presented at SEFM'17 [11]. See below (5.1.1) for a more complete description of this work.

- Automated quantitative information flow analysis for imperative deterministic programs, presented at POPL'17 [8].

- Reconstruction of connectivity graph for cloud infrastructures, presented at NCA'2017 [17]

- Co-processor-based Behavior Monitoring: Application to the Detection of Attacks Against the SMM, presented at ACSAC'17 [10]

5.1.1. *Awards*

Laurent Georget, Mathieu Jaume (LIP6), Guillaume Piolle, Frédéric Tronel and Valérie Viet Triem Tong received the best paper award at the SEFM'17 conference , which is a well established conference focused on the link between software development and formal methods. This publication is based on the work realized by Laurent Georget during his PhD. It focuses on the automated verification of the correctness of an information flow monitor that operates at the kernel level (Linux kernel). This information flow monitor relies on the Linux Security Module (LSM hereafter) framework. This framework has been designed for mandatory access control. This work tries to answer the question of its correctness when used for information flow monitoring. The verification is operated by a GCC plugin during the compilation phase of a full Linux kernel. Based on an ad-hoc static analysis, it can determine if the LSM hooks are correctly placed with respect to a property of complete mediation of systems calls. Each system call that is known to generate an information flow during its execution (34 system calls on a grand total of 340) is analyzed to determine if the LSM framework through the hooks it provides can intercept each execution that potentially generates an information flow. We have demonstrated that for 4 system calls, the hooks are not well placed, and discovered that 4 systems calls are simply lacking LSM hooks. A patch has been produced to improve this situation.

BEST PAPERS AWARDS :

[11] **15th International Conference on Software Engineering and Formal Methods (SEFM 2017)**. L. GEORGET, M. JAUME, G. PIOLLE, F. TRONEL, V. VIET TRIEM TONG.

HYCOMES Project-Team (section vide)

PACAP Project-Team (section vide)

SUMO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. *New partnership*

Several members of the team are involved in the joint research team "Softwarization of Everything", part of the joint research lab of Nokia Bell Labs France and Inria. This activity will finance two PhDs in the team, related to the management and control of software-defined networks.

5.1.2. *Awards*

- Engel Lefaucheux received the best young-researcher-paper award ("Prix Jeune Chercheur") at MSR 2017 for his paper titled *Diagnostic et contrôle de la dégradation des systèmes probabilistes* .

- Nicolas Markey was awarded an *Allocation d'Installation Scientifique* (at senior-researcher level) from Rennes Métropole.

BEST PAPERS AWARDS :

[42] **MSR 2017 - Modélisation des Systèmes Réactifs**. N. BERTRAND, S. HADDAD, E. LEFAUCHEUX.

TAMIS Team

5. Highlights of the Year

5.1. Highlights of the Year

"Chaire Analyse de Menaces" (Threat Analysis)

Participants: Axel Legay, Fabrizio Biondi

Creation of the "Chaire Analyse de Menaces" (Threat Analysis), that has been assigned to Fabrizio Biondi.

Thales Air Operations partnership

Participants: Axel Legay, Louis-Marie Traonouez

Creation of a partnership with Thales Air Operations for machine learning algorithms to detect anomalies in ground-to-air communications.

TEA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Inria created a new International Chair and appointed American computer engineer Rajesh Gupta to the part-time position. Gupta is a professor and former chair of the Computer Science and Engineering (CSE) department in the Jacobs School of Engineering at the University of California San Diego. Rajesh Gupta will hold the International Chair for a period of five years. Starting this summer, he will engage with researchers in Inria's research center in Rennes. The position enables him to spend as much as a year spread out over the five years of his appointment.

ASPI Team (section vide)

<p style="text-align:center; color:red;">**I4S Project-Team**</p>

5. Highlights of the Year

5.1. Highlights of the Year

The Structual Health Monitoring system developed by Vincent Le Cam and SDEL-CC for lightning detection and localization on electrical lines, has received the VINCI Innovation Award for Western France 2017. https://team.inria.fr/i4s/vinci-2017-innovation-award/

5.1.1. Awards

BEST PAPERS AWARDS :

[29] **SPIE - Thermosense: Thermal Infrared Applications XXXIX**. J. DUMOULIN, A. CRINIÈRE.

[30] **IOMAC - 7th International Operational Modal Analysis Conference**. M. DÖHLER, P. ANDERSEN, L. MEVEL.

IPSO Project-Team (section vide)

DYLISS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

The team received a best paper award at the conference ICFCA and a best student paper award at the conference LPNMR .

BEST PAPERS AWARDS :

[24] **International Conference on Formal Concept Analysis 2017**. L. BOURNEUF, J. NICOLAS.

[26] **14th International Conference on Logic Programming and Nonmonotonic Reasoning - LPNMR 2017**. C. FRIOUX, T. SCHAUB, S. SCHELLHORN, A. SIEGEL, P. WANKO.

FLUMINANCE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

First prize of the second Mathematics of Planet Earth international competition. Module "Simulating the melting of ice caps", authors M. Nodet and J. Erhel.

BEST PAPERS AWARDS :

[] **Simulating the melting of ice caps**.

5. Highlights of the Year

5.1. CAMI

GenScale participated to the international CAMI challenge. CAMI stands for Critical Assessment of Metagenome Interpretation. It is a community-led initiative designed to tackle the problem of recovering the complex information encoded in metagenomes by aiming for an independent, comprehensive and bias-free evaluation of methods. We contributed in the "Assembly" section with the Minia pipeline. Results of this competition, presented in the "Nature Methods" journal [20], highlight the good behaviour of our tool compared to other competitors.

<p style="text-align:center;color:red;font-weight:bold">SERPICO Project-Team</p>

5. Highlights of the Year

5.1. Highlights of the Year

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

Juan Manual Perez Ru, Vincent Briane and Hoai-Nam Nguyeen defended their PhD thesis in December 2017.

VISAGES Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Recruitment

- Camille Maumet was recruited as Inria Researcher, starting from November 2017.

ASAP Project-Team

4. Highlights of the Year

4.1. Awards

- Anne-Marie Kermarrec received the Inria/Dassault Systems/Académie des science/ Innovation Award in 2017.

ASCOLA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Remarkable results: research and third-party funding

Regarding scientific results, the team has produced a number of outstanding results on Fog/Edge architectures, notably on how to leverage renewable energy in this context [29], [9], [8], [33]. In the software engineering domain, particularly notable contributions have been made on software adaptability [4], [11].

Concerning third-party funding, 2017 has seen the acceptance of the large industrial/academic Hydda project as well as the start of two individual projects, the Kerdata and ConnectTalent projects, both of which issue of highly-competitive calls.

5.1.2. The future: the Gallinette and Stack teams

After a 10-year adventure, the research path of the Ascola team finishes at the end of 2017 after having given rise to two new teams in 2017: the Gallinette team in April and the Stack team in November. These new teams pursue and diversify Ascola's main research domains, respectively formal methods for programming languages and distributed software systems. Note that because of the rather early split of the Gallinette team, we have not included the corresponding results in this year's Ascola report.

5.1.3. Awards

In 2017 members of the team have been awarded three research-related awards: two personal awards and a best paper award:

- **Programme Jeunes Talents France Chine 2017:**

  Shadi Ibrahim was one of the 12 researchers selected for the "Programme Jeunes Talents France Chine" award (12 out of 54 applicants).

- **ICA3PP-2017 Outstanding Leadership Award:**

  Shadi Ibrahim received an Outstanding Leadership Award as program chair of the ICA3PP-2017.

BEST PAPERS AWARDS :

[27] **The 7th International Conference on Cloud Computing and Services Science (CLOSER 2017)**. J. LEJEUNE, F. ALVARES, T. LEDOUX.

DIONYSOS Project-Team

5. Highlights of the Year

5.1. Awards

BEST PAPER AWARD :

[43] **IEEE NCA 2017 - 16th IEEE International Symposium on Network Computing and Applications**.
C. HARDY, E. LE MERRER, B. SERICOLA.

DIVERSE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Publications
    - Learning-Contextual Variability Models, IEEE Software
    - Correctness Attraction: A Study of Stability of Software Behavior Under Runtime Perturbation, Empirical Software Engineering

    item Great positions for members (KTH, Univ Toulouse, Mc Gill, . . .)

- Three new direct collaborations with Industrial partners: Orange, Nokia, Safran
- Great visibility for AmIUnique and several popularization actions
- Kermeta transfer to Obeo

KERDATA Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

Euro-Par Steering Committee.   Luc Bougé has been elected as the new Steering Commitee Chairman of the Euro-Par international conference on parallel and distributed processing. He is the successor of Prof. Christian Lengauer, University of Passau, Germany.

IEEE Cluster 2017 conference.   Three years after the 2014 edition, the KerData team had again a leading role in the organization of the 2017 edition: Gabriel Antoniu served as Program Chair, Alexandru Costan served as Submissions Chair.

IEEE Big Data 2017 conference.   Alexandru Costan served as Posters Chair.

<p align="center">**MYRIADS Project-Team**</p>

5. Highlights of the Year

5.1. Highlights of the Year

- The FogGuru project was accepted and started on September 1st 2017. FogGuru is a European H2020 Maria-Skłodowska-Curie Action (MSCA) European Industrial Doctorate (EID) training project which aims to to train eight talented PhD students with an innovative and intersectoral research program to constitute the next generation of European Cloud and Fog computing experts. It is coordinated by Guillaume Pierre.

- Cédric Tedeschi defended his *habilitation à diriger des recherches* summarizing his research activity of the last seven years.

5.1.1. Awards

- Best paper award for Timothée Haudebourg and Anne-Cécile Orgerie at the International Conference on Algorithms and Architectures for Parallel Processing (ICA3PP 2017) for the paper entitled "On the Energy Efficiency of Sleeping and Rate Adaptation for Network Devices"

- Christine Morin has been selected to be included in the 2017 list of "N2Women:Stars in Computer Networking and Communications". The "N2Women:Stars in Computer Networking and Communications" is an annual list focusing in amazing women who have had a major impact in networking and/or communications.

BEST PAPERS AWARDS :

[34] **ICA3PP 2017 - 17th International Conference on Algorithms and Architectures for Parallel Processing**. T. HAUDEBOURG, A.-C. ORGERIE.

TACOMA Team (section vide)

<center>**HYBRID Project-Team**</center>

5. Highlights of the Year

5.1. Highlights of the Year

- The Hybrid team has considerably grown this year, reaching a total of nearly 40 team members at the end of 2017. In particular, 10 new PhD Students have been recruited in 2017, and 2 new Associate Members have joined Hybrid this year: Guillaume Moreau (Professor, Ecole Centrale de Nantes), and Jean-Marie Normand (Associate Professor, Ecole Centrale de Nantes).

- The Hybrid team was strongly involved in conference organization this year, in particular with: IEEE ISMAR 2017 and IGRV 2017. The IEEE Symposium on Mixed and Augmented Reality 2017 (IEEE ISMAR 2017) notably took place for the first time in France with around 350 attendees, in Nantes, October 9-13, with G. Moreau and A. Lécuyer: General Chairs, J.-M. Normand: Deputy General Chair, F. Argelaguet: Posters Chair, F. Nouviale: Demos Chair, V. Gouranton and R. Gaugne: VR Tour Chairs.

- The team has also organized a 1-week "hackathon" on Virtual Reality, at Inria Rennes in June 2017, with more than 20 participants and 4 teams. It was a very successful event which ended up with 4 live demos presented at Inria/IRISA Rennes and assessed by a Jury of experts.

- We have officially started to work on the topic of "Augmented Reality" this year, with a first paper published in IEEE ISMAR 2017, and several PhD students recruited on this hot topic (Etienne Peillard, Hakim Si-Mohammed, Guillaume Bataille).

5.1.1. Awards

- IEEE VGTC Virtual Reality Best Dissertation Award 2017 - Honorable Mention : for former PhD student Merwan Achibet for his work "Contributions to the Design of Novel Hand-based Interaction Techniques for Virtual Environments".

- GdR IG-RV Best PhD Thesis Award 2017 - Honorable Mention : for former PhD student Merwan Achibet for his work "Contributions to the Design of Novel Hand-based Interaction Techniques for Virtual Environments".

- b<>com Award for Best Publication of the year 2017 for former PhD student Lucas Royer for his paper :

BEST PAPERS AWARDS :

[] **Medical Image Analysis**. L. ROYER, A. KRUPA, G. DARDENNE, A. LE BRAS, E. MARCHAND, M. MARCHAL.

LACODAM Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

This year's highlight was the exceptional success of LACODAM in the recruiting process: we could hire two new staff members.

- Elisa Fromont joined as a Professor of University of Rennes 1. She brings to the team her skills in Machine Learning, which include a precious expertise on dealing with numerical data.

- Luis Galárraga Del Prado joined as an Inria Researcher. He brings to the team his skills in exploiting knowledge bases, which will be strongly needed for including domain knowledge in our approaches. He will also reinforce our work on rule mining.

LAGADIC Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Claudio Pacchierotti has been elected Chair of the IEEE Technical Committee on Haptics for the term 2018-2020. He also published a review paper on the topic of wearable haptic devices for the hand [29].

- Julien Pettré will coordinate the H2020 ICT 25 EUropean Project CrowdBot starting from January 2018. The project gathers 5 academic partners - UCL (UK), EPFL and ETHZ (Switzerland), RWTH (Germany) and Inria (France) - as well as 2 industrial partners - Locomotec GmbH (Germany) and SoftBank Robotics (France). The project will address the navigation of robots in crowded environment. While having robot moving in crowds can be of crucial importance (e.g., semi-autonomous wheelchairs), the project will design new robot navigation techniques that minimize the risk of negative impact raised by the presence of the robot (traffic perturbation, collision, etc.).

5.1.1. Awards

- Lagadic was a member of the five finalist teams for the KUKA Innovation Award (https://www.kuka.com/en-de/press/events/kuka-innovation-award), together with the RIS group at LAAS (coordinator), the University of Siena, Italy, and the Seoul National University, South Korea. The goal was to address search and rescue operations in regions which are difficult to access or dangerous following disasters. For this, the team explored the collaboration between a quadrotor UAV and a KUKA lightweight arm for cooperative transportation and manipulation of rigid objects (e.g., long bards), with a final peg-in-hole task demonstrated live at the Hannover fair in April 2017.

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

5. Highlights of the Year

5.1. Highlights of the Year

LINKMEDIA organizer of the IEEE Workshop on Information Forensics and Security in Dec. 2017.

5.1.1. Awards

Best demo award at ACM Multimedia 2017 for collaborative work within the FUI project NexGenTV.

Best poster award at Advances in Intelligent Data Analysis.

Best paper award with colleagues of IRISA's EXPRESSION team at 24e conférence sur le Traitement Automatique des Langues Naturelles.

BEST PAPERS AWARDS :

[12] **MM 2017 - 25th ACM International Conference on Multimedia**. O. AHMED, G. SARGENT, F. GARNIER, B. HUET, V. CLAVEAU, L. COUTURIER, R. TRONCY, G. GRAVIER, P. BOUZY, F. LEMÉNOREL.

[28] **IDA 2017 - 16th International Symposium on Intelligent Data Analysis**. A. LODS, S. MALINOWSKI, R. TAVENARD, L. AMSALEG.

[40] **Traitement automatique du langage naturel (TALN)**. R. QADER, G. LECORVÉ, D. LOLIVE, P. SÉBILLOT.

5. Highlights of the Year

5.1. Highlights of the Year

The results of the PhD thesis of Pierre Plantard leaded to the software "Kimea" with a national APP deposit. Faurecia company encouraged us to create a start-up company based on these results. Hence, we get two grants of the SATT "Ouest Valorisation" (total 300K) to transform the thesis prototype into a professionnal solution. The Kimea project has been granted several industrial and innovation prices (see below). A software engineer and an ergonomist have been recruited to create the original team of the future start-up (creation planned beginning of 2018). The software is based on several previously published works [14], and validated in actual industrial context [13]. Franck Multon will be scientific expert in the future start-up as a co-founder of the company.

5.1.1. Awards

Kimea project has been granted by regional and national innovation committees:

- regional Pepite Tremplin competition by the Universities Bretagne Loire, October 2017,
- national Pepite Tremplin competition (53 projects granted among 700), November 2017,
- granted "Projet du futur" if the BPO foundation (10k), 18/10/2017,
- Top 500 national startup, "Hello Tomorrow" challenge, 25-27 october 2017.

PANAMA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. *Awards*

EDF and the French Academy of Technology awarded the 2017 *Paul Caseau Ph.D. prize to Luc Le Magoarou* for his work on "Efficient Matrices for signal processing and machine learning" defended in 2016 [83].

The thesis of Luc Le Magoarou [83] was also awarded a special mention of the AFRIF (the French Association for Shape Recognition and Interpretation) annual Ph.D. prize.

Nicolas Keriven has been awarded the Best Student Paper Award at the international workshop SPARS 2017 .

A 2017 EURASIP best paper award was awarded to the paper *Universal and efficient compressed sensing by spread spectrum and application to realistic Fourier imaging techniques*, co-authored by Gilles Puy, Pierre Vandergheynst, Rémi Gribonval and Yves Wiaux, published in EURASIP Journal on Advances in Signal Processing in 2012 [92].

BEST PAPERS AWARDS :

[] **Random Moments for Sketched Mixture Learning**.

SIROCCO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

BEST PAPERS AWARDS :

[27] **MMSP 2017 - IEEE 19th International Workshop on Multimedia Signal Processing**. P. DAVID, M. LE PENDU, C. GUILLEMOT.