RESEARCH CENTER
Rennes - Bretagne-Atlantique

FIELD

Activity Report 2013

Section highlights of the Team

Edition: 2014-03-19

ACES Project-Team (section vide)

ALF Project-Team (section vide)

ASAP Project-Team

2.3. Highlights of the Year

- Google Focused Award (only 2 in Europe this year).
- ERC Proof of Concept Grant AllYours (2013)
- New associate team with the University of Calgary, Canada (RADCON).
- Michel Raynal published two new books on Concurrent Programming and Distributed Algorithms.
- Anne-Marie Kermarrec was elected the Vice Chair of *ACM Eurosys (ACM European Chapter of SIGOPS)*.
- Anne-Marie Kermarrec is a member of *Academia Europea* since Sept 2013.
- Michel Raynal has been nominated adjunct professor of University of Hong Kong.

ASCOLA Project-Team

2.2. Highlights of the Year

This year we have published two groups of major results. In the domain of efficient resource management in the Cloud, we have proposed an elastic consolidation service, new techniques for enforcing SLA guarantees, and new simulation methods for Cloud environments. These results have all been published in major conferences of the domain: IEEE Cloud, IEEE/ACM CCGrid and IEEE CloudCom, see Sec. 6.3 for more information.

The team has also presented several major results on the foundations of software composition. These include new programming language mechanisms for the correct definition of aspects and techniques for their semantic, in particular type-based, definition. These results have also been published through major dissemination channels: Elsevier's journal Science of Computer Programming and the international conference Modularity.aosd, see Sec. 6.2 for more information.

Moreover, Ismael Figueroa Palet, a PhD student co-supervised by Nicolas Tabareau and Prof. Éric Tanter from University of Chile, has finished first place at the ACM Student Research Competition at Modularity:aosd'13 with the work "Taming Aspects with Monads and Membranes."

Finally, Adrien Lèbre has been appointed in September on an Inria research position for three years.

ASPI Project-Team (section vide)

ATLANMOD Project-Team

2.3. Highlights of the Year

Two new European projects to support new research directions for the team.

AtlanMod becomes an official Inria team.

CAIRN Project-Team

2.2. Highlights of the Year

The paper has been nominated for the best paper award at IEEE/ACM ICCAD, one of the major event in Design Automation.

BEST PAPERS AWARDS :

[56] **IEEE/ACM International Conference on Computer-Aided Design (ICCAD)**. K. PARASHAR, D. MENARD, O. SENTIEYS.

CELTIQUE Project-Team

2.2. Highlights of the Year

The European Association for Programming Languages and Systems (EAPLS) Best PhD Dissertation Award 2012 has been won by Delphine Demange (ENS Cachan - Brittany Extension and the Celtique team at IRISA / Inria Rennes, advisors Thomas Jensen and David Pichardie), for her dissertation on "Semantic Foundations of Intermediate Program Representations".

The thesis prize Gilles Kahn 2013, awarded by the Société Informatique de France (SiF) and sponsored by Academy of Sciences, was awarded to Delphine Demange for her dissertation "Semantic Foundations of Intermediate Program Representations" (ENS Cachan - Brittany Extension and the Celtique team at IRISA / Inria Rennes, advisors Thomas Jensen and David Pichardie).

CIDRE Project-Team

2.2. Highlights of the Year

As highlights of the year, we wish to mention four best paper awards.

Mounir Assaf PhD thesis focusses on the verification of security properties in C programs. While investigating the domain, Mounir Assaf has created a static analysis for programs written in an imperative language with pointer aliases whose objective is to verify a property called Terminating-Insensitive Non Interference (TINI). Briefly speaking, this property guarantees that the content of secret variables of a program do not leak into public ones. Hence, this property is of paramount importance for the security of some critical software components. This work has conducted to the publication of two articles. The first one appeared in (IFIP SEC 2013, a renowned international conference in the domain of security), while the second one has been published in [45] (SAR-SSI 2013), a national conference dedicated to the spreading of work in progress to the French speaking security community. Both papers received the best paper award.

Stephane Geller has proposed a language (namely BSPL) for specifying and composing information flow policies. Such policies detail how a piece of data owned by an application is allowed to disseminate in an operating system. Thomas Saliou, Radoniaina Andriatsimandefitra and Valerie Viet Triem Tong have experimented the relevance of this language. They have proposed a semi-automatic way to compute such policies. They have also show that when such policies are enforced it is possible to detect if an application is infected by a malware. This work has led to the publication of an article in an international conference of the security domain . This article received the best student paper award of the conference.

In , we propose an inference attack called the de-anonymization attack, by which an adversary tries to infer the identity of a particular individual behind a set of mobility traces. The implementation of this attack is based on a mobility model called Mobility Markov Chain (MMC), which is built out from the mobility traces observed during the training phase and is used to perform the attack during the testing phase. Experiments led on real datasets demonstrate that the attack is both accurate and resilient to sanitization mechanisms such as downsampling. This paper has received the IEEE best student paper award at the conference TrustCom 2013.
BEST PAPERS AWARDS :

[27] **SEC**. M. ASSAF, J. SIGNOLES, F. TRONEL, E. TOTEL.

[25] **IAS - Information assurance and security - 2013**. R. ANDRIATSIMANDEFITRA, T. SALIOU, V. VIET TRIEM TONG.

[31] **The 12th IEEE International Conference on Trust, Security and Privacy in Computing and Communications (IEEE TrustCom-13)**. S. GAMBS, M.-O. KILLIJIAN, M. NUNEZ DEL PRADO CORTEZ.

DIONYSOS Project-Team

2.2. Highlights of the Year

This year three books produced by the team appeared: "Markov Chains. Theory, Algorithms and Applications" at Wiley, written by Bruno Sericola first in English, then in French, and "Telecommunication Network Economics: From Theory to Applications", written by Bruno Tuffin with Patrick Maillé, at Cambridge University Press.

DREAM Project-Team

2.3. Highlights of the Year

Prof. Torsten Schaub (Potsdam University, Germany) has been awarded an Inria international senior grant from 2103 to 2017 for a research project with EPI-DREAM. This research will be concerned with using ASP for data stream post-mining.

DYLISS Project-Team

2.2. Highlights of the Year

The collaboration with Universidad de Chile was strengthened by the organization of a workshop in Chile gathering Chilean, French and German partners about the modeling of biological systems [website], the defense of a co-supervised Ph-D thesis [13], and a graduate-level course given by a Dyliss member in Chile.

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

2.4. Highlights of the Year

Polarsys is an Eclipse Industry Working Group focusing on open source tools for the development of embedded systems. After previous years experimentation, POP, A Polychronous Modeling Environment on Polarsys, has been approved as open source project under the Polarsys Top-Level Project, which is operating under the auspices of the Polarsys Industry Working Group.

FLUMINANCE Project-Team (section vide)

GENSCALE Project-Team

2.2. Highlights of the Year

- Creation of KoriScale, an Inria Innovation Laboratory (I-LAB) to promote technology transfers between GenScale and the Korilog Company. The research thematic is focusing on intensive genomic sequence comparison. It covers innovative string algorithm aspects together with multi-level parallelism implementation. [Letter in Emergences]

- For the 2nd consecutive year the GenScale team won the best poster award from the annual Jobim conference. We demonstrate the efficiency of our low memory footprint NGS assembly tools to assemble the *C. Elegans* genome on the Raspberry Pi board, a very low cost computer (< $ 50) equipped with limited memory resources (512 MB). [42] [Letter in Emergences]

HYBRID Project-Team

2.2. Highlights of the Year

- Anatole Lécuyer was awarded the Inria-Académie des Sciences (French Academy of Sciences) "Young Researcher" Prize 2013.

- Paper from Anthony Talvas, Maud Marchal and Anatole Lécuyer received the "Best Technote Award" at IEEE Symposium on 3D User Interfaces 2013 (IEEE 3DUI'13).

- Paper from Ferran Argelaguet, David Gómez Jáuregui, Maud Marchal and Anatole Lécuyer was selected as one of the best papers at ACM Symposium on Applied Perception 2013 (ACM SAP'13).

- Paper from Charles Pontonnier, Thierry Duval and Georges Dumont was selected as one of the best papers at IEEE Conference on Cognitive Infocommunication 2013 (IEEE CogIncoCom'2013).

- Two projects in which Hybrid is involved were awarded at the trophies "Loading the Future 2013" organized by French Competitivity Cluster "Images et Réseaux": ACOUSTIC (Grand Prize) (section 8.2.4) and W3D (SME Prize) (section 8.1.2).

- Project OpenViBE2 (section 8.2.5) coordinated by Hybrid has received the "Projet Phare" label by French ANR (National Research Agency). It successfully ended in January 2013 year with a press release and a press conference which generated a massive media coverage.

BEST PAPERS AWARDS :

[42] **IEEE Symposium on 3D User Interfaces**. A. TALVAS, M. MARCHAL, A. LÉCUYER.

[] **ACM Transactions on Applied Perception**. F. ARGELAGUET SANZ, D. A. GÓMEZ JÁUREGUI, M. MARCHAL, A. LÉCUYER.

[40] **IEEE international conference on cognitive infocommunication**. C. PONTONNIER, T. DUVAL, G. DUMONT.

Hycomes Team

2.1. Highlights of the Year

Albert Benveniste has been elected IFAC Fellow [1] for his fundamental contributions to stochastic systems theory, and for connecting control, signal processing, and real-time software development.

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[1] http://www.ifac-control.org/awards/ifac-fellows

I4S Project-Team

2.2. Highlights of the Year

- Prize Bretagne Jeune Chercheur 2013 for Michael Doehler.
- PEGASE 2 launch

IPSO Project-Team

2.3. Highlights of the Year

- A. Debussche was the main organizer of the thematic semester "Perspectives in Analysis and Probability" organized by the Lebesgue Center in Nantes and Rennes from april to september 2013 (see: http://www.lebesgue.fr/content/sem2013-perspectives-analysis-and-probability).

- E. Faou received the Blaise Pascal prize (GAMNI/SMAI and French Academy of Sciences).

- G. Vilmart defended his Habilitation to supervise research (HDR) in Mathematics, [12], July.

- G. Vilmart receives the "Prix Bretagne Jeune Chercheur 2013" from the Region Bretagne, December.

KERDATA Project-Team

2.2. Highlights of the Year

Team: Shadi Ibrahim, a former Post-Doc fellow at the KerData project-team, has been hired as a permanent Junior Researcher at Inria (CR2) starting in October 2013.

A-Brain MSR-Inria project: The TomusBlobs data-storage layer developed in the framework of the A-Brain MSR-Inria project was demonstrated to scale up to 1000 cores on 3 Azure data centers; it exhibits improvements in execution time up to 50 % compared to standard solutions based on Azure BLOB storage. Based on this storage infrastructure, the A-Brain project has provided the first statistical evidence of the heritability of functional signals in a failed stop task in basal ganglia, using a ridge regression approach, while relying on the Azure cloud to address the computational burden.

Joint Lab for Petascale Computing: The Damaris middleware for I/O and in-situ visualization, initiated in 2010 in the framework of the Joint Laboratory for Petascale Computing, was ported to NCSA's Blue Waters supercomputer and provided in-situ visualization capabilities to the CM1 atmospheric simulation on up to 6400 cores.

LAGADIC Project-Team (section vide)

MIMETIC Project-Team

2.2. Highlights of the Year

Finalist of best manipulation paper award in ICRA 2013 for the paper entitled: .

Best Paper Award in IEEE Coginfocom 2013 for the paper entitled:

BEST PAPERS AWARDS :

[24] **IEEE International Conference on Robotics and Automation ICRA**. Y. LI, J.-P. SAUT, A. SAHBANI, P. BIDAUD, J. PETTRÉ, F. MULTON.

[28] **IEEE international conference on cognitive infocommunication**. C. PONTONNIER, T. DUVAL, G. DUMONT.

MYRIADS Project-Team

2.5. Highlights of the Year

- Eugen Feller has been awarded the second PhD prize of the MATISSE doctoral school by the Fondation Rennes 1 in March 2013 for his thesis entitled *Autonomic and Energy-Efficient Management of Large-Scale Virtualized Data Centers* [53] defended in December 2012 under the supervision of Christine Morin.

- Matthieu Simonin, Eugen Feller, Yvon Jégou, David Margery, Christine Morin and Anne-Cécile Orgerie have been awarded the second prize at the Scale Challenge organized with the ACM/IEEE CC-Grid 2013 conference held in Delft, the Netherlands in May 2013. They demonstrated the scalability and resilience of Snooze IaaS management system [26], developed as part of Eugen Feller's PhD thesis and that has been supported by an Inria technology development action since October 2012.

- The paper entitled *Resilin: Elastic MapReduce over Multiple Clouds* presented by Ancuta Iordache was amongst the three best paper finalists at the CCGRID'2013 conference [31].

PANAMA Project-Team

2.4. Highlights of the Year

R. Gribonval was elevated to the grade of IEEE Fellow *for contributions to the theory and applications of sparse signal processing*.

Frédéric Bimbot was General Chairman of the Interspeech 2013 Conference in Lyon which gathered around 1400 participants.

The IEEE 2012 SPS Young Author Best Paper Award has been awarded to Ngoc Duong [4], former Ph.D. student in the METISS team.

S4 Project-Team

2.2. Highlights of the Year

SAGE Project-Team

2.2. Highlights of the Year

Year 2013 was declared Mathematics of the Planet Earth by UNESCO. In relation with this domain, the team Sage participated in the prospective think tank "MATHématiqueS en INteractions pour la TERRE" (ANR project) and in various popularization actions:

- the french blog "un jour une brève". See http://mpt2013.fr/.
- the TDC journal "les mathématiques de la terre" (no 1062, october 2013),
- papers on the website Interstices. See http://www.interstices.info.
- panels and conferences for scholars.

SERPICO Project-Team

2.6. Highlights of the Year

- Serpico is an Inria Team-Project from July 2013.

- New computing (7 nodes with 2 CPU x 8 cores, 64 GigaBytes and 128 GigaBytes of RAM including in the IGRIDA computing grid) and storage (207 TeraBytes controlled by a server with 2 CPU x 6 cores, 32 GigaBytes of RAM) facilities dedicated to calculations and algorithm runs.

- Finalist for Best Student Paper Award [16]: D. Fortun et al. Aggregation of patch-based estimations for illumination-invariant optical flow in live cell imaging. IEEE Int. Symp. Biomedical Imaging (ISBI'13), San-Francisco CA, April 2013.

SIROCCO Project-Team

2.6. Highlights of the Year

- A joint contribution between Inria/SIROCCO, Qualcomm and Mediatek has been adopted to be part of the HEVC backward compatible 3DV standard, in July 2013.
- Nomination of C. Guillemot as IEEE Fellow.

SUMO Team

2.2. Highlights of the Year

- Loïc Hélouët and Hervé Marchand were co-chairs of the conference MSR 2013 (Modélisation des Systèmes Réactifs), located in Rennes this year and organized by SUMO (Laurence Dinh, Loïc Hélouët, Hervé Marchand and Paulin Fournier).

- ANR Stoch-MC has been accepted in 2013, led by SUMO (Blaise Genest (PI), Nathalie Bertrand and Éric Fabre). Its aim is to provide scalable algorithms to analyse stochastic systems.

TASC Project-Team

2.2. Highlights of the Year

1. Best young researcher paper for Jean-Guillaume Fages and Tanguy Lapègue at the 19th International Conference on Principles and Practice of Constraint Programming.

2. Silver medal for the library Choco at the MiniZinc International Challenge 2013 in the *open class* category.

3. Silver medal for the library Choco at the MiniZinc International Challenge 2013 in the *parallel search* category.

4. Bronze medal for Florian Richoux at the AI competitions organized at the conferences AIIDE 2013 and CIG 2013 for developing an artificial intelligence, AIUR, to play the real time strategy game $StarCraft^{tm}$, using both machine learning and constraint-based techniques.

BEST PAPERS AWARDS :

[30] **19th International Conference on Principles and Practice of Constraint Programming (CP'13)**. J.-G. FAGES, T. LAPÈGUE.

TEXMEX Project-Team

2.2. Highlights of the Year

- We have won the FGcomp'2013 challenge, in conjunction with Imagenet, for fine-grain classification of images.

- Best paper award to Cédric Penet at Content-Based Multimedia Indexing .

BEST PAPERS AWARDS :

[51] **CBMI - 11th International Workshop on Content Based Multimedia Indexing - 2013**. C. PENET, C.-H. DEMARTY, G. GRAVIER, P. GROS.

TRISKELL Project-Team

2.2. Highlights of the Year

- Prof. Robert France (Colorado State University, USA) has been awarded an Inria International Chair. He will join the team in the next five years to develop a research project on multi-concern software modeling and variability.

- The paper Generating Counterexamples of Model-based Software Product Lines: An Exploratory (J. B. Ferreira Filho, O. Barais, M. Acher, J. Le Noir, B. Baudry.) received a best student paper award at the International Software Product Line Conference

- 9 PhD students defended their thesis in 2013

BEST PAPERS AWARDS :

[49] **SPLC - 17th International Software Product Line Conference**. J. B. FERREIRA FILHO, O. BARAIS, M. ACHER, J. LE NOIR, B. BAUDRY.

VISAGES Project-Team

2.2. Highlights of the Year

- The VISAGES team was awarded by the Brittany INPI Trophee for research and innovation in the *research structure* category (http://www.bretagne-innovation.tm.fr/Temoignages/Laureats-Trophees-INPI-Bretagne-2013-Laboratoire-VisAGeS-Video).

- H. Raoult received a Magna Cum Laude Merit Award at the 21th Annual ISMRM 2013