Activity Report 2012

Section highlights of the Team

ALGORILLE Project-Team

2.2. Highlights of the Year

- Our team (composed of Luc Sarzyniec, Sébastien Badia, Emmanuel Jeanvoine and Lucas Nussbaum) won the **best challenge entry award during the Grid'5000 winter school**. We successfully demonstrated the deployment of 4500 virtual machines using Kadeploy3 in less than an hour. An earlier iteration of this work was selected as a **finalist of the SCALE challenge, held with CCGrid'2013**.

ALICE Project-Team

2.2. Highlights of the Year

Sylvain Lefebvre received an ERC Starting grant for his project ShapeForge. The project will start in December 2012, for five years, and is funded for 1.3M euros.

BIGS Project-Team

2.2. Highlights of the Year

For 2012 we stress the following noticeable events:

- HdR defense of Céline Lacaux, 12/6 (see [1]).

- Cybernano, an incubating start-up specialized in nano-cancerology created by Thierry Bastogne, has received the "emergence" award in 2012 from the French Research ministry for the creation of start-up based on innovative technology.

CALVI Project-Team

2.2. Highlights of the Year

January 2012 : Anaïs Crestetto and Philippe Helluy have been awarded the fourth prize of the international "OpenCL Innovation Challenge" organized by the AMD company. They have simulated the electron beam inside an X ray generator on GPU. See http://developer.amd.com/community/events/amd-opencl-coding-competition-2/

September 2012 : Eric Sonnendrücker has obtained a position at the Max Planck Institute in Garching.

October 2012 : Michel Mehrenberger has defended his 'Habilitation à diriger des recherches'.

CAMUS Team

2.2. Highlights of the Year

- CAMUS takes part of the Laboratory of Excellence (LabEx) IRMIA (Institut de Recherche en Mathématiques, ses Interactions et Applications) whose proposal has been accepted by the french government.

- Alexandra Jimborean defended her PhD thesis September the 14th at the University of Strasbourg. She presented the first version of the dynamic and speculative code parallelizer VMAD (Virtual Machine for Advanced Dynamic analysis & transformation). Her jury was composed bu Albert Cohen (reviewer), Senior researcher at Inria, André Seznec (reviewer), Senior researcher at Inria, John Cavazos (reviewer), Professor at the University of Delaware, USA, François Bodin (examiner), Professor at the University of Rennes, Jean Christophe Beyler, HPC Software Engineer at Intel (examiner), Philippe Clauss and Vincent Loechner, advisors.

- Alain Ketterlin and Philippe Clauss published a paper on data dependence profiling at the The 45th Annual IEEE/ACM International Symposium on Microarchitecture [18].

CARAMEL Project-Team

2.2. Highlights of the Year

- The ANR proposal "CATREL" (in French, "Cribles, Améliorations Théoriques et Résolution Effective du Logarithme discret") has been one of the eight accepted proposals among 59 submitted to the "programme blanc" in computer science for the year 2012. The ANR-CATREL project is beginning on January 1st, 2013.

- A new (second place) integer factorization record was set using the CADO-NFS software developed by the team, namely the factorization of RSA-704.

- Members of the team received the "Prix La Recherche" 2012 for their work on integer factorization.

CARTE Project-Team

2.2. Highlights of the Year

- We solved a problem that has been open for 15 years, relating three notions of complexity and information: Shannon information and entropy, Kolmogorov algorithmic information and Martin-Löf randomness [23].

- We developed a tool which is able to retrieve implementations of cryptographic primitives inside a trace of a binary. This result is published at CCS [22].

- We presented our work on behavioural malware detection using rewriting and model checking at ESORICS 2012 [20].

- For the Alan Turing year, we published an invited paper in the journal Phil. Trans. R. Soc. [16].

CASSIS Project-Team

2.4. Highlights of the Year

Cl-Atse Version 2.5-21 has been released by Mathieu Turuani. This efficient security protocol analyser offers advanced tracing options, supports set semantics as well as multiset one for modeling protocols, allows for Horn clause local deductions (for verifying assertions), and can handle in a complete and decidable manner negative constraints on the intruder's knowledge (for expressing non-disclosure policies).

CORIDA Project-Team

2.2. Highlights of the Year

BEST PAPER AWARD :

[45] **2nd International Symposium on Environement-Friendly Energies and Applications, EFEA 2012**.
T. MANRIQUE-ESPINDOLA, H. MALAISE, M. FIACCHINI, T. CHAMBRION, G. MILLÉRIOUX.

CORTEX Project-Team

2.2. Highlights of the Year

We designed a computational model of the primary somatosensory cortex that is able to develop topographic maps, maintain and reorganize them in the face of lesions. We used neural fields as a mathematical and computational framework and focused on area 3b innervated by hand mechanoreceptors. The combination of such neural field with a simple Hebbian/anti-Hebbian like learning rule advocates for an unsupervised, distributed, robust and biologically plausible model of a (simplified) somatosensory cortical model where thalamocortical connections are the main sites of plasticity. The major finding of our model is that a topographic map can emerge as a consequence of the interaction between thalamus and cortical excitatory afferent connections. These results were recently published in PLoS ONE [6].

MADYNES Project-Team (section vide)

MAGRIT Project-Team (section vide)

MAIA Project-Team

2.2. Highlights of the Year

- A paper on non-stationary policies for infinite-horizon Markov decision processes written by Boris Lesner and Bruno Scherrer (see Section 6.1.9 for more details) was accepted at NIPS'2012 with a *full oral presentation* (1467 papers were submitted, 370 were accepted for publication, among which only 20 were selected for *full oral presentation*).

- The Cartomatic projet which was part of the French robotics contest Defi CAROTTE organized by the General Delegation for Armaments (DGA) and French National Research Agency (ANR), has won the third and final edition of the contest. The aim of the Cart-O-matic project was to design and build a multi-robot system able to autonomously map an unknown building and to recognize various objects inside. The scientific issues of this project deal with Simultaneous Localization And Mapping (SLAM), multi-robot collaboration, and object recognition and classification. The research teams involved in this project have developed innovative approaches to each of these fields.

- The paper "MOMDPs: a Solution for Modelling Adaptive Management Problems", cosigned by Olivier Buffet has won the best paper award in this year's Special Track on Computational Sustainability and Artificial Intelligence at the Association for the Advancement of Artificial Intelligence (AAAI-12) conference in Toronto.

- Emil Keyder, Joerg Hoffmann and Patrik Haslum (ANU/NICTA) won the best paper award of the International Conference on Automated Planning and Scheduling (ICAPS-12) for their paper "Semi-Relaxed Plan Heuristics" [24].

MASAIE Project-Team

2.4. Highlights of the Year

Malaria infection is characterized by the fact that only the peripheral infected red blood cells (young parasites), also called circulating, can be observed (can be seen on peripheral blood smears) and the other ones (sequestered), hidden in some organs like brain and heart, can not be observed. There is no clinical method of measuring those sequestered infected cells. We have developed a simple tool to estimate the sequestered parasites and hence the total parasite burden for *Plasmodium falciparum* malaria patients [14].

ORPAILLEUR Project-Team

2.2. Highlights of the Year

A best paper award was granted to a paper published in the proceedings of ICCBR-2012 (the international conference on case-based reasoning) [41] . This paper presents an approach for adapting cases in the formalism of qualitative algebras, with an application in a temporal algebra, dedicated to adaptation of cooking recipe preparations, and an application in a spatial algebra, dedicated to the allocation of crops in a farmland.
BEST PAPERS AWARDS :

[41] **International Conference for Case-Based Reasoning**. V. DUFOUR-LUSSIER, F. LE BER, J. LIEBER, L. MARTIN.

PAREO Project-Team

2.2. Highlights of the Year

Best Paper Award :

[14] **Turing-100, The Alan Turing Centenary Conference**. S. Stratulat.

PAROLE Project-Team

2.2. Highlights of the Year

The movie "Je peux voir les mots que tu dis" (ADT Handicom) won the award for the best documentary at the "festival universitaire pédagogique" in Lyon, April 2012

SCORE Team (section vide)

SEMAGRAMME Team (section vide)

SHACRA Project-Team

2.3. Highlights of the Year

2.3.1. *Two full papers at MICCAI'2012 in Nice*

Two full papers have been accepted in the International Conference on Medical Imaging Computing and Computer Assisted Intervention (MICCAI, ERA's Ranking A).

2.3.2. *IHU Mix-Surg and Haystack Project*

The team is involved in the creation of the IHU Mix-Surg in Strasbourg, a new institute dedicated to minimally invasive therapies, guided by image and simulation. It involves interdisciplinary expertise of medical groups, academic partners and strong industry partnerships. IHU has provided financial support for a project named Haystack (image guided surgery for brachyterapy).

2.3.3. *HelpMeSee Project*

The team has been involved on a project funded by the non-governmental organization *HelpMeSee*[1]. HelpMe-See aims at providing ways to treat cataract surgery in third world countries. Their main objective is to develop a simulator to train surgeons. Shacra has been involved for its expertise in real-time simulation of soft anatomical structures.

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[1]http://www.helpmesee.org

TOSCA Project-Team (section vide)

TRIO Project-Team

2.2. Highlights of the Year

- The release of the Open-PEOPLE platform.

- The organization of the 20th International Conference on Real-Time and Network Systems (RTNS2012).

- The acceptance of two TRIO papers to the two premier real-time conferences: the 33rd IEEE Real-time Systems Symposium (RTSS 2012) and the 24th Euromicro Conference on Real-Time Systems (ECRTS 2012).

- Successful completion of the TIMMO-2-USE project in September 2012 in which TRIO was leader of the work package on the algorithms and tools within the project.

VEGAS Project-Team

2.2. Highlights of the Year

Best Paper Award :

[18] **Symposium on Computational Geometry - SoCG '12**. É. C. de Verdière, G. Ginot, X. Goaoc.

VERIDIS Project-Team (section vide)