



RESEARCH CENTER  
Lille - Nord Europe

FIELD

Activity Report 2014

# Section Highlights of the Team

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## **ATEAMS Project-Team**

### **5.1. Highlights of the Year**

- Davy Landman, Jurgen Vinju received a Best paper award nomination, for their paper “Empirical analysis of the relationship between CC and SLOC in a large corpus of Java methods”(ICSM’14).

## **DREAMPAL Team**

### **5.1. Highlights of the Year**

The papers [4] and [6] are published in journals (Software Testing Verification and Analysis, resp. Formal Aspects of Computing) that are among the best in their respective fields.

## **DOLPHIN Project-Team**

### **6.1. Highlights of the Year**

In [23], we have revisited the design and implementation of the Branch and Bound algorithm for solving on large scale distributed environments challenging permutation-based optimization problems such as Q3AP. The new approach includes original ways to efficiently deal with some crucial issues mainly, dynamic adaptive load balancing and fault tolerance. The approach allowed to solve to optimality for the first time a difficult Q3AP instance (Nug15) on the nation-wide Grid'5000 computational grid. The resolution was completed within less than 12 days using an average of 1,123 processing cores distributed over 6 Grid'5000 sites and peaked at 3,427.

## **MEPHYSTO Team**

### **6.1. Highlights of the Year**

A. Gloria, S. Neukamm, and F. Otto published their recent contribution [17] on quantitative homogenization in *Inventiones Mathematicae*.

As a plenary speaker of the World Congress of Computational Mechanics in Barcelone in July 2014, P. Le Tallec (Ecole polytechnique) presented our joint results [15], [25].

## **MODAL Project-Team**

### **6.1. Highlights of the Year**

Thanks to the development technological action MPAGenomics, the team has created one of the first french instances of Galaxy publicly available on the French Bioinformatics cloud. This instance is original as it offers complex statistical tools for genomic data analysis in a user-friendly interface (see [5.9](#) ).

The team obtained bilateral contracts with companies as Auchan or RougeGorge thanks to its just emerging, but promising, clustering software MixtComp (see [5.14](#) ), dedicated to full mixed and missing data.



## **NON-A Project-Team**

### **6.1. Highlights of the Year**

- We are becoming world-recognized on homogeneous approach to estimation and control [13], [24].
- New method of stability analysis and control design for time-delay systems: Implicit Lyapunov-Krasovski Functionals [72].
- New dynamical model of population of oysters for water quality monitoring [44].
- New local path planning algorithm for mobile robots based on intermediate objectives [33].
- New patent on method and device for detecting a failure on an aircraft [85].
- New book on robust control design [82].

## **SEQUEL Project-Team**

### **6.1. Highlights of the Year**

- New startup by Rémi Coulom on AI in games (go, chess, ...).
- Successful Collaboration with Deezer and the victory at the ACM RecSys Recommendation Systems Challenge
- We were selected and working on preparation of ICML 2015 in Lille. ICML is the most important conference in the field of machine learning. This is the first time after more than 30 years of existence, that this conference will be held in France.

## **BONSAI Project-Team**

### **6.1. Highlights of the Year**

- Amandine Perrin received the best paper award and the best oral presentation at the ISCB-LA 2014 international conference for the work on reconstruction of ancestral gene orders.
- H el ene Touzet was invited as a keynote speaker at the ALGO 2014 international conference. The topic of the talk was RNA bioinformatics.

BEST PAPERS AWARDS :

[7] **ISCB-Latin America**. A. PERRIN, J.-S. VARR E, S. BLANQUART, A. OUANGRAOUA.

## **FUN Project-Team**

### **5.1. Highlights of the Year**

- Opening of the 256 M3 sensor nodes of the Lille's FIT IoT Lab platform.
- We have designed a novel single-based localization method, UNS, for accurate localization of mobile devices that only needs a small aperture array unlike all previous works. UNS is currently under patenting.
- We have provided a set of recognized contributions in the area of Smart Cities, re-thinking their architecture and break vertical silos between every network and application.

## **RMOD Project-Team**

### **6.1. Highlights of the Year**

- Pharo 3.0 has been released in April 2014.
- Moose 5.0 has been released in December 2014.
- The book Deep into Pharo has been released publicly <http://www.deepintopharo.com>.
- RMOD entered in a sponsoring agreement with LAM Research, Inc.

## **SPIRALS Team**

### **6.1. Highlights of the Year**

In 2014, we are proud to have organized the 17th ACM SIGSOFT International Conference on Component-Based Software Engineering and Software Architecture (**CompArch**) that has been held in Lille from 30 June to 3 July 2014.

CompArch is the main conference of the ACM SIGSOFT group on software architectures and software components. The conference is held alternatively in North America and in Europe. The 17th edition has been held this year in France for the first time. The conference brings together about 100 researchers from the academia and the industry.

## LINKS Team

### 5.1. Highlights of the Year

In the objective Querying Heterogeneous Linked Data, Slawomir Staworko and Iovka Boneva have developed new ways to define schema for Graph Database and RDF [19]. This work has been influencing a group work of W3C on defining a schema for the DF format. This work is a continuation of [3] (by Iovka Boneva, Radu Ciucanu and Slawomir Staworko) developing a new schema for unordered trees over XML. Due to these works, Boneva is now a member of the Data Shapes Working Group which mission is to produce a language for defining structural constraints on RDF graphs. <http://www.w3.org/2014/data-shapes/charter>

In the objective Managing Dynamic Linked Data, the main break through is the development of QuixPath that now covers 100 per cent of the XPathMark, a W3C benchmark for the language Xpath (querying XML trees). In particular, it includes aggregation operators, joins and arithmetics operations. The core of QuixPath is based on techniques presented in [6] (by Tom Sebastian, Denis Debardieux and Joachim Niehren).

In the objective Linking Data Graphs, different methods have been developed to learn queries over graph. More precisely, the queries learned are conjunctive queries with joins. These techniques have been presented in [13] and demonstrated in [4] at the conference VLDB.

## **MAGNET Team**

### **6.1. Highlights of the Year**

We developed a new framework for high order learning [4].

We have illustrated the usefulness of automatically annotated examples in complex learning supervised by few training examples [2], [1].

We propose a new algorithm for semi-supervised spectral clustering and apply it to the NLP task of noun phrase coreference resolution [6].



## MINT Project-Team

### 6.1. Highlights of the Year

- “Adoiraccourcix : sélection de commandes sur écrans tactiles multi-points par identification des doigts” [31] received the *best paper award* from the IHM 2014 conference;
- “L’ordinateur portable comme instrument de musique” [41] received the *best demo award* from the IHM 2014 conference.