



RESEARCH CENTER  
**Sophia Antipolis - Méditerranée**

FIELD

# Activity Report 2017

## Section Highlights of the Team

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**ABS Project-Team (section vide)**

**ACUMES Project-Team (section vide)**

**APICS Project-Team (section vide)**

**AROMATH Project-Team (section vide)**

## ASCLEPIOS Project-Team

# 4. Highlights of the Year

## 4.1. Highlights of the Year

### 4.1.1. Awards

- Nina Miolane won the second prize of the competition “My thesis in 180 seconds” at the regional level, among 20 PhD students.
- Xavier Pennec was elected Fellow of the MICCAI scientific Society for “pioneering theoretical contributions grounding the field of computational anatomy, shape statistics and medical image computing”.
- Sophie Giffard-Roisin won the best electrophysiology paper award at the Functional Imaging and Modelling of the Heart 2017 conference.
- Matthieu Lê receives the SGBM Research Award for his PhD Thesis.
- Nicholas Ayache was named Chevalier de l’Ordre des Palmes Académiques (Order of Academic Palms), promotion of July 2017.
- Nicholas Ayache was elected member of the Académie Nationale de chirurgie (National Academy of Surgery).

BEST PAPERS AWARDS :

[37] **Functional imaging and modelling of the heart 2017.** S. GIFFARD-ROISIN, H. DELINGETTE, T. JACKSON, L. FOVARGUE, J. LEE, A. RINALDI, N. AYACHE, R. RAZAVI, M. SERMESANT.



## ATHENA Project-Team

# 5. Highlights of the Year

## 5.1. Highlights of the Year

### 5.1.1. Awards

- D. Wassermann has been awarded an ERC Starting Grant from the European Research Council. NEUROLANG is a 5-years project about *Accelerating Neuroscience Research by Unifying Knowledge Representation and Analysis Through a Domain Specific Language*.. Since October, Demian Wassermann moved to Inria Saclay where he joined the PARIETAL project-team.
- B. Belaoucha has received the Best Student Paper Award at PRNI'17 and Medal of excellence from UCA for the paper [28].

BEST PAPERS AWARDS :

[28] **PRNI 2017 - 7th International Workshop on Pattern Recognition in NeuroImaging**. B. BELAOUCHA, T. PAPADOPOULO.

## **BIOCORE Project-Team**

# **5. Highlights of the Year**

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

- Determining ways of preventing the appearance of virulent pathogenic strains that are capable of infecting resistant plants is crucial to the durability of a resistant trait as a crop protection method. Genetic drift could be used in such a way by eliminating initially rare resistant breaking pathogens, but it is necessary to quantify this drift in the considered/developed plant strains to know if it can be of any help. In this work, we developed a method to disentangle the relative role of genetic drift and selection during within-host pathogen evolution, by the development and identification of the parameters of a Wright-Fisher model, based on time-series of the frequencies of the various pathogen variants [31].
- We have proposed a metabolic model [15] of the diauxic growth of microalgae on different substrates. The model, with 172 metabolic reactions is derived using the Drum approach [2]. This model was successfully validated for a broad variety of cases where algae grow under heterotrophic, autotrophic or mixotrophic conditions, and the transient accumulation of metabolites.

## **BIOVISION Team**

# **5. Highlights of the Year**

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

### **5.1.1. Awards**

The article "Bio-inspired computer vision: towards a synergistic approach of artificial and biological vision" (published in Computer Vision and Image Understanding in 2016 [10]) was selected as part of the **21st Annual Best of Computing**.

## **CAMIN Team**

# **4. Highlights of the Year**

## **4.1. Highlights of the Year**

### **4.1.1. Awards**

A part of CAMIN team is in the process of creating a spin-off: Neurinnov which has been awarded with the i-Lab 2017 prize by the French Minister of Research and Innovation, that encourage the most innovative and promising startups in France.

## **CASTOR Project-Team**

# **5. Highlights of the Year**

## **5.1. Highlights**

- Invited presentation at EPS Conference on Plasma Physics, 26 - 30 June 2017 Liu, F., Huijsmans, G.T., Alberto, L., Garofalo, A.M., Solomon, W.M., Nkonga, B., Hoelzl, M., Pamela, S., Becoulet, M., Orain, F. Non-linear MHD simulations of QH-mode and Type I ELMy H-mode DIII-D plasmas and implications for ITER high Q scenarios
- B. Nkonga, Elected member of the managing board, as treasurer, of the European Community on Computational Methods in Applied Sciences (ECCOMAS).

### **5.1.1. Awards**

Jacques Blum has obtained the "Grand Prix de la ville de Nice" for 2017.

## COATI Project-Team

# 5. Highlights of the Year

## 5.1. Highlights of the Year

### 5.1.1. Awards

David Coudert and Nathann Cohen (LRI) won the Flinders Hamiltonian Cycle Problem (FHCP) Challenge 2016 (<http://fhcp.edu.au/fhcpcs>).

Guillaume Ducoffe, former PhD student of COATI, is the recipient of an accessit to the PhD prize Graphes “Charles Delorme” 2017 for his PhD thesis entitled “Metric properties of large graphs”.

Frédéric Giroire and Joanna Moulherac are recipients of the Wilkes Award 2017 for the paper "Energy Efficient Content Distribution" [1] (The Wilkes Award is given once a year to the authors of the best paper published in the volume of *The Computer Journal* from the previous year).

**COFFEE Project-Team (section vide)**

## **DATASHAPE Project-Team**

# **5. Highlights of the Year**

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

### **5.1.1. Chairs**

Jean-Daniel Boissonnat was elected a professor at the Collège de France, on the Chair Informatics and Computational Sciences for the academic year 2016-2017.



## **DIANA Project-Team**

# **4. Highlights of the Year**

## **4.1. Highlights of the Year**

### **4.1.1. Reproducibility'17 workshop**

Our team was strongly involved in the Reproducibility'17@SIGCOMM workshop. Damien Saucez served as a co-chair of the workshop. Chadi Barakat and Mohamed Naoufal Mahfoudi participated to the workshop discussions. Mohamed Naoufal also presented our paper Lessons Learned while Trying to Reproduce the OpenRF Experiment [21]. See section 6.3.1 for more details about the workshop results.

### **4.1.2. R2lab demonstration at SIGCOMM**

We have demonstrated the deployment of a standalone 5G network in less than 5 minutes in the R2lab tesbed. All the network components (base station, subscriber management, serving and packet gateways, network traffic analyzers) were run automatically using the nepi-ng experiment orchestration tool. Download and upload performance to the Internet from a commercial phone located in the anechoic chamber was also performed. This demo has been presented at the ACM SIGCOMM conference in August 2017 [33].

### **4.1.3. MOOC Python 3**

Arnaud Legout and Thierry Parmentelat are co-authors of the MOOC: "Python 3 : des fondamentaux aux concepts avancés du langage" that lasts 9 weeks on FUN, UCA. For the first session there were 11677 registered persons. This MOOC is a brand new version of the past MOOC on Python 2, and has been funded by UCA.

**ECUADOR Project-Team (section vide)**

## **FOCUS Project-Team**

# **5. Highlights of the Year**

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

### **5.1.1. Awards**

- Fabrizio Montesi, external collaborator in Focus, has been awarded the “Innovation Award 2017” from his university (University of Southern Denmark), for his work and contributions in the language Jolie.

## **GRAPHDECO Project-Team**

### **4. Highlights of the Year**

#### **4.1. Highlights of the Year**

This year marked the start of the ERC Starting grant  $D^3$  coordinated by Adrien Bousseau, on interpreting drawing for 3D design. This activity already includes the principal investigator, one postdoc (Y. Gryaditskaya) and one engineer (B. Wailly) and will be growing over the next year. The scientific production this year included four ACM Transactions on graphics papers (three at SIGGRAPH and one at SIGGRAPH Asia, of which 2 were work performed by our visiting International Chair F. Durand during his stay in our group), one paper at Eurographics and several other top-level publications.

## **GRAPHIK Project-Team**

# **5. Highlights of the Year**

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

Organization of the 30th Workshop on Description Logics (Montpellier, July 2017), which is the major annual event of the Description Logics research community.

### **5.1.1. Awards**

BEST PAPERS AWARDS :

[36] **EGC 2017 - Conférence Extraction et Gestion des Connaissances.** H. VILMART, J.-C. LÉON, F. ULLIANA.

## HEPHAISTOS Project-Team

# 5. Highlights of the Year

## 5.1. Highlights of the Year

### 5.1.1. Science

- strong advances on the analysis of cable-driven parallel robots (section 7.1.1 )
- collaboration with lawyers on the ethical and legal aspects of assistance robotics [11]
- strong collaboration with the medical community on walking analysis, rehabilitation (section 7.2.1 ) and activities detection (section 7.2.2 )
- Eric Wajnberg, an INRA senior researcher, has joined the team this year. He will bring his expertise in statistics, an element which is essential when dealing with medical problems

### 5.1.2. Experimentation

- preliminary test of our immersive environment for rehabilitation (section 7.2.1 )
- start of the daily activities monitoring in a day hospital (section 7.2.2 )

**INDES Project-Team (section vide)**

**KAIROS Team (section vide)**



## 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 bars), with a final peg-in-hole task demonstrated live at the Hannover fair in April 2017.

**LEMON Team (section vide)**

## **MARELLE Project-Team**

# **4. Highlights of the Year**

## **4.1. Highlights of the Year**

Our effort to setup a consortium around the Coq system has made significant progress this year as illustrated by two noticeable events: the first engineer was hired by InriaSoft for this consortium (Maxime Dénès) and the first funding was collected from academic partners (the first is Princeton University).

**MATHNEURO Team (section vide)**

**MCTAO Project-Team (section vide)**

**MORPHEME Project-Team (section vide)**

**NACHOS Project-Team (section vide)**

## NEO Project-Team

# 5. Highlights of the Year

## 5.1. Highlights of the Year

The NEO team underwent Inria's project-team creation process and was officially created as a project-team on 1/12/2017. Before then, it was a research team of Inria's research center Sophia-Antipolis Méditerranée.

### 5.1.1. Awards

The paper "Real-Time Fair Resource Allocation in Distributed Software Defined Networks", by Zaid Allybokus, Konstantin Avrachenkov, Jérémie Leguay and Lorenzo Maggi, received the Best Paper Award at *ITC'29*.

The paper "Ontology for a Voice Transcription of OpenStreetMap Data, The Case of Space Apprehension by Visually Impaired Persons", by Said Boularouk, Didier Josselin and Eitan Altman, received the WASET Best Paper Award.

The CEFIPRA project "Monte Carlo" received an excellent evaluation and was awarded an exceptional extension.

Eitan Altman was awarded the IEEE Technical Committee on Big Data (TCBD) the Distinguished Technical Achievement Recognition Award, for his outstanding technical leadership and achievement in stochastic modeling and big data analysis.

Giovanni Neglia has been nominated IEEE Infocom 2017 Distinguished TPC member based on "excellent performance in the review process."

BEST PAPERS AWARDS :

[17] **ITC 29 - 2017 29th International Teletraffic Congress.** Z. ALLYBOKUS, K. AVRACHENKOV, J. LEGUAY, L. MAGGI.

[34] **World Academy of Science, Engineering and Technology.** S. BOULAROUK, D. JOSSELIN, E. ALTMAN.



## STARS Project-Team

# 5. Highlights of the Year

## 5.1. Highlights of the Year

### 5.1.1. Awards

Antitza Dantcheva has been awarded with the prestigious ANR Jeunes chercheuses / Jeunes chercheurs grant and is Principal Investigator of the project “ENVISION (see [9.2.1.3](#) ). Computer Vision for Automated Holistic Analysis of Humans” 2017–2020.

Antitza Dantcheva has received the Best Paper Award (Runner Up) at the 3rd IEEE International Conference on Identity, Security and Behavior Analysis (ISBA 2017) for the work “Spoofing Faces Using Makeup: An Investigative Study” , co-authored by Cunjian Chen, Thomas Swearingen and Arun Ross from the Michigan State University, USA.

BEST PAPERS AWARDS :

**[26] IEEE International Conference on Identity, Security and Behavior Analysis 2017. C. CHEN, A. DANTCHEVA, T. SWEARINGEN, A. ROSS.**

## **TITANE Project-Team**

# **5. Highlights of the Year**

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

We obtained five ANR grants end of 2017, including a young researcher grant EPITOME (principal investigator Yuliya Tarabalka). We started a collaboration with the Google Chrome/Youtube team, on the progressive compression of 3D models.

Pierre Alliez is now a member of the Steering Committee of the EUROGRAPHICS Symposium on Geometry Processing. He was also elected Executive Board Member for the Solid Modeling Association, for 4 years.

## **TOSCA Project-Team**

# **5. Highlights of the Year**

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

### **5.1.1. Awards**

BEST PAPERS AWARDS :

- **A simple spiking neuron model based on stochastic STDP.**

## VIRTUAL PLANTS Project-Team

### 4. Highlights of the Year

#### 4.1. Highlights of the Year

- To obtain efficient data-structures from segmented images that can be used for later physical simulations, we developed a computational tool, DRACO-STEM, that interprets cell population images as 3D cell meshes. DRACO-STEM has been released as an independent package to enable biomechanical simulations on real-world data [33].
- *Modeling cell fate decisions during Acsidian embryo development.* Canalization of developmental processes ensures the reproducibility and robustness of embryogenesis within each species. In its extreme form, found in ascidians, early embryonic cell lineages are invariant between embryos within and between species, despite rapid genomic divergence. To resolve this paradox, we used live light-sheet imaging to quantify individual cell behaviors in digitalized embryos and explore the forces that canalize their development. This quantitative approach revealed that individual cell geometries and cell contacts are strongly constrained, and that these constraints are tightly linked to the control of fate specification by local cell inductions. While in vertebrates ligand concentration usually controls cell inductions, we found that this role is fulfilled in ascidians by the area of contacts between signaling and responding cells. We propose that the duality between geometric and genetic control of inductions contributes to the counterintuitive inverse correlation between geometric and genetic variability during embryogenesis [Submitted in Dec 2017].

## **WIMMICS Project-Team**

# **5. Highlights of the Year**

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

### **5.1.1. Awards**

We received a best paper presentation award for the paper about the WebAudio Guitar Tube Amp Simulator of the Wasabi Project at WebAudio Conference in August [49].

We received an UCA distinction for this award.

We received an UCA distinction for a spotlight paper at ISWC [32].

BEST PAPERS AWARDS :

[56] **AnSWeR 2017 - 1st International Workshop on Application of Semantic Web technologies in Robotics.** J. YOUNG, V. BASILE, M. SUCHI, L. KUNZE, N. HAWES, M. VINCZE, B. CAPUTO.

[31] **ICAIL-2017 - 16th International Conference on Artificial Intelligence and Law.** C. CARDELLINO, M. TERUEL, L. ALONSO ALEMANY, S. VILLATA.

## **ZENITH Project-Team**

# **5. Highlights of the Year**

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

### **5.1.1. Awards**

BEST PAPERS AWARDS :

[32] **SBBD 2017: 32th Brazilian Symposium on Databases.** R. SOUZA, V. SILVA, P. MIRANDA, A. LIMA, P. VALDURIEZ, M. MATTOSO.