



RESEARCH CENTER  
Saclay - Île-de-France

FIELD

# Activity Report 2013

## Section Popularization

Edition: 2015-04-10



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

## GEOMETRICA Project-Team

### 9.3. Popularization

Jean-Daniel Boissonnat, Au delà de la dimension 3, Caféin Inria Sophia Antipolis.

Jean-Daniel Boissonnat, Geometry Understanding in Higher Dimensions. Conference for the students of ENS Lyon (Inria Sophia Antipolis)

Monique Teillaud, “à quoi sert un triangle ?”, 2x2h, Collège Le Prés des Roures, Le Rouret, in the framework of the national Week of Mathematics.

Steve Oudot was coordinator of the *Photomaton 3d* booth at the *Nuit des chercheurs* event at École polytechnique in September 2013. Marc Glisse, Maks Ovsjanikov, Mickaël Buchet, and Thomas Bonis also participated.

## **GRACE Project-Team**

### **9.5. Popularization**

- Alain Couvreur gave a talk at *UniThé ou Café*, a monthly science popularization event dedicated to all the employees of Inria Saclay.
- Daniel Augot presented bit operations, the Hamming code, the one-time pad and a bit of steganography to high school students in Courcouronnes, 10/04/2013.

## MEXICO Project-Team

### 8.3. Popularization

**Benedikt Bollig** gave an invited talk at the German Workshop “Automaten und Logik”, held on September 25, 2013, in Ilmenau.

**Paul Gastin** has given a talk on “*Automates: Applications et Algorithmique*” during the *Rencontres Algorithmiques et Programmation*, addressing secondary teachers of the *classes préparatoires* level, at CIRM Marseille, 6 to 10 May. He also gave an invited talk on *Evaluation of Weighted Specifications over Nested Words* for the opening of the research training group *Quantitative Logics and Automata (QuantLa)*, Leipzig, on April 30.

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

## SECSI Project-Team

### 8.3. Popularization

- Stéphanie Delaune, member of the scientific mediation committee at Inria Saclay. (“Mediation” is the new name for popularization.)
- Rémy Chrétien and Stéphanie Delaune, *La protection des informations sensibles*, article in *Pour La Science*, Nov. 2013.

## Specfun Team

### 9.3. Popularization

- A. Mahboubi has given a lecture to laureates of the *Olympiades académiques de mathématiques, académie de Créteil*.  
<http://maths.ac-creteil.fr/spip/spip.php?article463>.
- A. Mahboubi has been involved in the scientific committee for the elaboration of the board game *Mémoire Vive* produced by the Inria communication services.
- A. Mahboubi has given a talk at the forum STIC Paris-Saclay (Palaiseau, France) in November 2013.

**TOCCATA Team**

## **COMMANDS Project-Team**

### **8.3. Popularization**

Pierre Martinon presented an “Unithé ou Café” talk about optimal control on November 8th, entitled “Quand le mieux n’est pas l’ennemi du bien”.

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

## **DISCO Project-Team**

### **9.3. Popularization**

Catherine Bonnet spoke at the "Cérémonie de remise des prix des Olympiades de Mathématiques, Ministère de l'éducation nationale, juin 2013. She gave a talk and met high school students groups at the event "Sciences au Carré" in the context of Fête de la Sciences, CNES, October 2013.

Alban Quadrat was invited to give a popularization talk on the development of ideas in mathematics and physics at the conference "Lieux de passage en Science-Fiction", University of La Rochelle (France), Lettres, Langues, Arts et Sciences Humaines (FLASH), 11-13/04/13.

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

## **Maxplus Project-Team**

### **9.3. Popularization**

- J.P. Quadrat :
  - Administre le site d'intérêt général <http://www.maxplus.org>, dédié à l'algèbre max-plus.

## POEMS Project-Team

### 9.3. Popularization

Marc Bonnet:

- Opening workshop of UCL Centre for Inverse Problems (London, UK, March 2013),
- Conference honoring Andreas Kirsch for his 60th birthday (Bad Herrenalb, Germany, April 2013),
- International Conference on Novel Directions in Inverse Scattering (Newark DE, USA, July 2013),
- Singular Days (Rennes, France, August 2013)

Laurent Bourgeois

- *On sampling methods to identify defects in a periodic waveguide from far field data*, Inverse Problems: Scattering, Tomography and Parameter Identification, Conference honoring Andreas Kirsch for his 60th birthday, Bad Herrenalb - Germany, 8-11/4/2013
- *On Lipschitz stability for a class of inverse problems*, Inverse Problems and Nonlinear equations, Ecole Polytechnique, Palaiseau, 22-24/05/2013
- *On the far field of scattering solutions in a periodic waveguide. Part II : The inverse problem*, Waves conference, Gammarth, Tunisie, 3-7/6/2013

Aliénor Burel

- *Using potentials in elastodynamics : a challenge for FEM*, WONAPDE, Concepción (Chile), January 14-18th
- *Utilisation des potentiels en élastodynamique : un challenge pour les méthodes éléments finis ?*, GTN Orsay, Université Paris-Sud, February, 19th
- *Effective Transmission Conditions for Thin-Layer Transmission Problems in Elastodynamics*, WAVES '13, Gammarth (Tunisia), June 3-7th
- *Utilisation des potentiels en élastodynamique : un challenge pour les méthodes éléments finis ?*, Poems Seminar, Palaiseau, June 27th

Camille Carvalho

- *Plasmonic cavity modes with sign-changing permittivity*, WAVES, Tunis, June
- *Plasmonic cavity modes: black-hole phenomena captured by Perfectly Matched Layers*, PIERS, Stockholm, August

Maxence Cassier

- *Space-time focusing on unknown obstacles*, International conference in applied mathematics, Heraklion, Greece, September 2013.
- *Space-time focusing for acoustic waves* (poster session), International conference on novel directions in inverse scattering, honoring David Colton, Newark, United states, July 2013.
- *Selective focusing on unknown scatterers*, Maxence Cassier, Christophe Hazard and Patrick Joly, Waves conference, Tunis, Tunisia, June 2013.
- *Selective focusing for time-dependent waves*, Maxence Cassier, Christophe Hazard and Patrick Joly, Workshop: Inverse problems and imaging, institut Henri Poincaré, Paris, France, February 2013.
- *Selective focusing for time-dependent waves*, Maxence Cassier, Christophe Hazard and Patrick Joly, Workshop: Computational electromagnetism and acoustics, Oberwolfach, Germany, January 2013.

Stéphanie Chaillat

- *Fast multipole accelerated boundary integral equation method for 3-D elastodynamic problems in a half-space*, Séminaire EDP LJK, Grenoble, France, November 2013.
- *Fast multipole accelerated boundary integral equation method for 3-D elastodynamic problems in a half-space*, Séminaire Equipe ENI MSSMAT, Chatenay-Malabry, France, November 2013.
- *A fast and adaptive algorithm for the inverse medium problem based on Singular Value Decomposition*, 3rd European Conference on Computational Optimization, Chemnitz, Germany, July 2013.
- *An Adapted Fast Multipole Accelerated Boundary Element Method for 3D Elastodynamics*, SIAM in the Geosciences, Padua, Italy, June 2013.
- *Fast Multipole Accelerated Boundary Element Method for problems in an elastic Half-Space*, WAVES 2013, Tunis, Tunisia, June 2013.
- *Fast multipole accelerated boundary integral equation method for 3-D elastodynamic problems in a half-space*, Séminaire ISTERRE, Grenoble, France, February 2013.
- *Fast multipole accelerated boundary integral equation method for 3-D elastodynamic problems in a half-space*, Séminaire du LMA, Marseille, France, January 2013.
- *Comparison of two Fast Multipole Accelerated BEMs for 3D elastodynamic problems in semi-infinite media*, IABEM 2013, Santiago, Chile, January 2013.

Patrick Ciarlet

- *Strong convergence for Gauss' law with edge elements*, Mafelap'13, Uxbridge (G.-B.), 10-14/06/2013
- *Numerical approximation of transmission problems with sign changing coefficients*, Journées Singulières Augmentées, Rennes, 26-30/08/2013

Sonia Fliss

- *DtN approach for the exact computation of guided modes in a photonic crystal waveguides*, Séminaire EDP de Metz, Metz, January 18th.
- *Sufficient conditions for existence of guided modes in photonic crystal waveguide or how useful can be a numerical method*, Mathematical Methods for spectral problems, University of Helsinki, March 5th-7th
- *Transparent boundary conditions in periodic media*, HF 2013, Nancy, March 19th-21th
- *Scattering in locally perturbed periodic waveguides : forward and inverse problems*, Applied Analysis for the Material Sciences with a special hommage to Michael Vogelius, CIRM Marseille, May 27th-31st
- *On the far field of scattering solutions in a periodic waveguide. Part 1: the forward problem*, Waves 2013, Tunis, June 3rd-7th

Patrick Joly

- *Numerical simulation of a grand piano*, Conference WONAPDE, Concepcion, Chile, January 2013
- *A rigorous approach to the propagation of electromagnetic waves in co-axial cables*, Workshop EMSCA, Weierstrass Institute, Berlin, Germany, May 2013
- *Simulation numérique d'un piano de concert*, Journées EDPs, Contrôle et Musique, Université Pierre et Marie Curie, Paris, May 2013
- *A rigorous approach to the propagation of electromagnetic waves in co-axial cables*, Conference WAVES2013, Gammarth, Tunisia, June 2013
- *Quasi-local transmission conditions and iterative domain decomposition methods for time harmonic wave propagation*, International Conference on Novel Directions in Inverse Scattering, Newark (Delaware), USA, Juillet 2013

- *Riesz potentials and quasi-local transmission condition for iterative non overlapping domain decomposition methods for the Helmholtz equation*, Conference JSA 2013, Rennes, France, August 2013
- *Perfectly Matched Layers for time domain wave propagation : overview and recent progress*, Conference CEDYA 2013, Castellon, Spain, September 2013
- *Conditions de transmission quasi-locales et méthodes de décomposition de domaine pour la propagation d'ondes en régime harmonique*, CMAP Seminar, Ecole Polytechnique, Palaiseau, France, December 2013

Simon Marmorat

- *An improved linear sampling method in the time domain*, WONAPDE 2013, Concepción, Chile, January.
- *Time domain computation of the scattering of waves by small heterogeneities*, Waves 2013, Tunis, Tunisia, June.
- *An asymptotic model for the scattering of waves by small heterogeneities*, Inria Junior Seminar, Rocquencourt, France, November.
- *Méthodes d'échantillonnage pour la diffraction inverse en fréquence et en temps*, POems Seminar, ENSTA, France, December.

Jean-François Mercier

- *Aeroacoustics in a waveguide with a shear flow*, Anne-Sophie Bonnet-BenDhia, Jean-François Mercier et Florence Millot, 11<sup>th</sup> International Conference on Mathematical and Numerical Aspects of Wave Propagation (WAVES'13), Tunisia (june 2013)
- *Numerical modeling of nonlinear acoustic waves with fractional derivatives*, B. Lombard et J.-F. Mercier, 11<sup>th</sup> International Conference on Mathematical and Numerical Aspects of Wave Propagation (WAVES'13), Tunisia (june 2013)

Nicolas Salles

- *Explicit evaluation of integrals arising in Galerkin BEM*, XIV International Conference on Boundary Element & Meshless Techniques, Palaiseau (France), July 2013

Antoine Tonnoir

- *New transparent boundary conditions for time harmonic acoustic diffraction in anisotropic media*, Waves International conference on Mathematical and numerical aspects of waves, Tunis, June 2013

Elizaveta Vasilevskaya

- *Localized modes in perturbed ladder-like periodic waveguides*, Workshop on waveguides, ENSTA ParisTech, Palaiseau, France, October 2013

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

## **SELECT Project-Team**

### **9.3. Popularization**

Erwan Le Pennec takes care of a Math en Jeans group at lycée Joliot Curie from Nanterre.

## TAO Project-Team

### 9.3. Popularization

- Michèle Sebag is interviewed at the *Palais de la Découverte* about Artificial Intelligence, and the video, by "Société de production Stand Alone Media", is visible on YouTube at <http://www.youtube.com/watch?v=uEW32KikKJ8>; talk in "Questions de science et enjeux citoyens" (QSEC), opération culturelle de la région Île-de-France (Ulm, May 2013);
- Yann Ollivier co-organized a bi-monthly math seminar for undergrad students on Saturdays at Institut Henri Poincaré, with 100+ participants at each session.
- Yann Ollivier takes part in the organization of the European Union Contest for Young Scientists (science fair for high school students from 30+ countries organized by the European Commission).
- Yann Ollivier was part of the scientific steering committee for the booklet *L'explosion des mathématiques* presenting a wide range of applications of mathematics, edited by the SMF and SMAI (planned diffusion: 10,000–20,000 copies).

## AMIB Project-Team

### 7.3. Popularization

- Outreach seminar at *Lycée Blaise Pascal* (Orsay, France) – Yann Ponty – Popular science seminar (2h), jointly organised by INRIA (Saclay) and Académie de Versailles.
- Unite ou café, Inria Saclay Popularization seminar, *Les briques de construction de la vie*, see: <https://intranet.saclay.inria.fr/vie-du-centre/unithe-cafe/rencontres-2013/briques-construction-vie>.

We also had the opportunity to be part of a few valorization related events. RNA structural studies were presented at the Rencontres Inria Industrie - Modélisation, simulation et calcul intensif in June 2013 <http://www.inria.fr/centre/saclay/innovation/rii-modelisation-simulation-calcul-intensif/presentation>. This led to an invitation at Sanofi Pharmacometry and Bioinformatics day in December 2013.

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

## **M3DISIM Team**

### **8.3. Popularization**

TV News Story “**la météo du coeur**” (how to predict the heart weather) on France5 “Magazine de la santé” (11 March 2013)

D. Chapelle invited speaker at “**Horizon Maths 2013**”

## **PARIETAL Project-Team**

### **8.3. Popularization**

PARIETAL presented a game designed by Virgile Fritsch to illustrate our research activities on brain activity decoding, at the Salon de jeux et culture mathématique (May 30<sup>th</sup>-June 2<sup>nd</sup>, 2013).

## Popix Team

### 9.3. Popularization

We have built a comprehensive online wiki (WikiPopix, <https://wiki.inria.fr/popix>) for the population approach with mixed-effects models. This wiki aims to be an invaluable resource for all pharmacometricians, statisticians, teachers, graduate and undergraduate students in academia, industry and regulatory agencies. It is freely available online for all these communities.

Furthermore, the team developed an online animated film called *Introduction to PK modeling* for interested members of the public and for teaching and training purposes. It can be seen at <https://team.inria.fr/popix/files/2013/02/PKmodelling.swf>, and joins two previous animated films already developed by the team (see <http://team.inria.fr/popix/files/2011/11/PopulationApproach.swf>).

## **GRAND-LARGE Project-Team**

### **7.3. Popularization**

Christine Eisenbeis est membre du conseil scientifique des programmes du centre d'Alembert, Centre Interdisciplinaire d'Étude de l'Évolution des Idées, des Sciences et des Techniques (CIEEIST), de l'université Paris-Sud.

## **AVIZ Project-Team**

### **9.3. Popularization**

Samuel Huron: 9.3. News Paper and press cover : 04/2013, "Zeitgeist Borders shows a world of Google searches", NewScientist, Hal Hodson 11/2013, "Les flux de données visualisés en temps réel", La Recherche, Samuel Huron, Romain Vuillemot, Jean Daniel Fekete

## **DAHU Project-Team**

### **7.3. Popularization**

Serge Abiteboul participated to a popularization book on mathematics, « Mathématiques, l'explosion continue », with an article, Chercher sur le Web : juste un point fixe et quelques algorithmes.

Serge Abiteboul wrote with Pierre Senellart an article on “ Un déluge de données”, in Pour la science sur le Big bang numérique, 2013.

## IN-SITU Project-Team

### 9.3. Popularization

Wendy Mackay was interviewed for Inria/Technoscope: "L'interaction homme-machine en ligne de mire", February, 2013, and for an article in "Science & Vie" on the topic of Google Glass, November 12, 2013.

Wendy Mackay was interviewed on two *France Culture* radio shows: "Place de la Toile" on the topic of tomorrow's computers ("l'ordinateur de demain") on September 7, 2013 and on "Science Publique" on the topic of whether augmented reality will change our vision of the world ("La réalité augmentée va-t-elle changer notre vision du monde?") on November 1, 2013.

Wendy Mackay and Michel Beaudouin-Lafon were each interviewed as the scientist of the day ("savant du jour") on the *France Inter* radio show "On va tous y passer", on October 30 and November 20, 2013 respectively.

## **OAK Project-Team**

### **8.3. Popularization**

- T. Ghosh, I. Manolescu, A. Tzompanaki, A. Roatiş and S. Zampetakis have presented a graph-based game to the audience of *Fête de la Science* in October 2013.
- Still part of *Fête de la Science* 2013, I. Manolescu has participated to a “speed dating” event between researchers and high-school students in Paris.