



RESEARCH CENTER

FIELD

**Applied Mathematics, Computation
and Simulation**

Activity Report 2013

Section Popularization

Edition: 2015-04-10

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CAD Team (section vide)

CALVI Project-Team

9.3. Popularization

C. Caldini-Queiros wrote the popularization paper "Les schémas numériques : les mathématiques au service de la physique", published in "Presses universitaires de Franche-Comté", rewarded with Prix A'Doc de la jeune recherche en Franche-Comté 2013.

E. Frénod wrote the following popularization papers

- Mon littoral, c'est de la dynamique. Brève pour : 2013 - Mathématiques pour la planète Terre - <http://mpt2013.fr/mon-littoral-cest-de-la-dynamique/>.
- Aquaculture en milieux confinés : le cas de l'étang de Thau. Brève pour : 2013 Mathématiques pour la planète Terre. - <http://mpt2013.fr/aquaculture-en-milieux-confines-le-cas-de-letang-de-thau/>.
- Un exemple d'application des mathématiques à l'environnement littoral : La dynamique à long terme des dunes marines dans les zones soumises à la marée. Modélisation, Analyse, Homogénéisation et Simulation. Matapli (Smai), No 100, pp 129–140.

CONCHA Project-Team

9.3. Popularization

MICMAC Project-Team (section vide)

SCIPORT Team

8.3. Popularization

- Laurent Hascoët gave a presentation on adjoint Automatic Differentiation at the AboutFlow meeting in Tinos (Greece), may 27-31.
- Laurent Hascoët made a detailed presentation of Automatic Differentiation at Microsoft Research labs in Cambridge (UK) on december 6th.

SIMPAF Project-Team

9.3. Popularization

C. Calgari is in charge of the communication of "Laboratoire Paul Painlevé" and she is in charge of the relation between the University of Lille and high schools. Accordingly, she organizes various events like « Les Mathématiques itinérantes » and « Stage de seconde à contenu scientifique ». With the help of the Communication Department of Inria, C. Calgari, E. Creusé and T. Goudon produced a documentary fiction (in French) for a general audience on how research in applied mathematics is being done. The title is "Avis de recherche" (see <http://www.inria.fr/avisderecherche>).

BACCHUS Team (section vide)

CAGIRE Team

8.3. Popularization

One presentation in Unithé ou Café and presence to the "Inria-Industrie" days [VP]. Participation in the "Visage des Sciences 2013" [PB].

DEFI Project-Team (section vide)

GAMMA3 Project-Team (section vide)

IPSO Project-Team

7.3. Popularization

- Web interview of E. Faou: A l'occasion de la remise de la médaille Blaise Pascal (2013), Inria website.
- In <http://interstices.info/planetes> (2013), popularization article on the field of geometric numerical integration, published in "Interstices". Theme "Mathématiques de la planète Terre 2013" and Theme 2012-2013 "Invariants et similitudes" of TIPE in preparatory classes.
- Interview (June 2012) of M. Lemou for the journal "Science de l'Ouest" on the stability of galactic models. and publication of a popularized article: "Les mathématiciens déchiffrent l'univers" in the the journal "Espace des sciences", Nov 2012.
- M. Lemou and F. Méhats wrote a popularized scientific text in a CNRS letter "Lettre de l'INSMI", june 25th, 2012.

MC2 Project-Team (section vide)

MOKAPLAN Exploratory Action

8.2. Popularization

Jean-David Benamou run a Ipython Notebook web site <https://mathmarx.rocq.inria.fr:9999> on which simple Optimal Mass Transportation algorithm are coded in python and can be tested and modified.

NACHOS Project-Team (section vide)

NANO-D Team

7.3. Popularization

NANO-D presented SAMSON to high school students during the 2103 “Fete de la Science” (Science Fair). The students were using SAMSON to interactively simulate chemical reactions, interact with models of nanotubes, build molecules, etc.

OPALE Project-Team

9.3. Popularization

Jean-Antoine Désidéri gave the lecture “*Modelling and simulating, when engineering becomes numerical*” to the Valbonne International High School (CIV) on October 11, 2013.

Paola Goatin was interviewed twice :

- TV interview on evening news, France 3 Côte d’Azur, January 30, 2013 <http://www.youtube.com/watch?v=VIW4VgoTjEI&feature=youtu.be>.
- Journal interview : “*Une chercheuse au chevet des embouteillages*”, Nice Matin, January 2013 <http://www-sop.inria.fr/members/Paola.Goatin/NiceMatin.pdf>.

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, 11th 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, 11th 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

APICS Project-Team

9.3. Popularization

- J. Leblond is a member of the Committee MASTIC. She gave a communication within the “Café-in” of the Research Center (Sept.).
- M. Olivi is co-president with I. Castellani of the Committee MASTIC (Commission d’Animation et de Médiation Scientifique) <https://project.inria.fr/mastic/>. She is responsible for Scientific Mediation. She held a booth at the APMEP conference 2013 in Marseille (France).
- E. Pozzi was a member of the Committee MASTIC.
- S. Chevillard published a popularization blog post on the website “Mathématiques de la planète Terre 2013” (<http://mpt2013.fr/>) about the problem of inverse magnetization of rocks (cf. Section 4.3)

BIPOP Project-Team (section vide)

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”.

CORIDA Project-Team

7.3. Popularization

In December 2013, Karim Ramdani organized with Estelle Carciofi a **workshop dealing with issues related to scientific edition.**

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 Carrée" 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)

I4S 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.

MCTAO Project-Team

9.4. Popularization

Jean-Baptiste Caillau: “Mathematics for planet Earth 2013”: <http://mpt2013.fr/tout-autour-de-la-terre/>, <http://mpt2013.fr/de-la-terre-a-la-lune/>, <http://mpt2013.fr/tout-autour-de-la-terre-2nde-partie/>.

NECS Project-Team

9.3. Popularization

Carlos Canudas has given a plenary talk on ‘Forecasting and control of traffic systems: a network perspective’ at the International Workshop on Smart City, organized by IEEE Control Systems Society in Hangzhou, China, in August 2013, <http://smartcity.hdu.edu.cn>

NON-A Project-Team (section vide)

CLASSIC Project-Team

8.3. Popularization

Gilles Stoltz

- wrote a blog post for MPT2013 and an article for The Huffigon Post, in the researchers' blog;
- gave a conference for high school teachers in Orléans;
- gave a mini-course on statistics to “classes préparatoires” professors at ENS Paris and a mini-course of game theory at ENS Rennes, targeted to inspectors of high-school-teachers.

DOLPHIN Project-Team

9.3. Popularization

- Fête de la science
- Big Data Event (Mar 2013): Conference for industrial - Intervention on “Modeling and multi-objective optimization for knowledge discovery”

GEOSTAT Project-Team

8.3. Popularization

- H. Yahia made a presentation (title: *Dynamique océanique turbulente à super-résolution*. at the Unithé seminat, on September 2àth, 2013, Inria BSO).
- O. Pont participated to the "Ateliers de Médiation Scientifique" (Inria BSO).
- O. Pont did a radio interview with RFC radio station: "Que cherchent-ils ?".

MISTIS Project-Team (section vide)

MODAL Project-Team

9.3. Popularization

Alain Celisse has given a talk in “30 minutes de science” that is proposed to all Inria team members to illustrate the type research carried out within the different teams in Lille. This talk was about kernel change-point detection.

REALOPT 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.

SequeL Project-Team

9.3. Popularization

- “Small or big (data), make it sequentially!”, J. Mary, Ph. Preux, invited talk at Euratechnologies, March 2013.
- Inria publishes an article about Face Recognition, Michal Valko, <http://www.inria.fr/centre/lille/actualites/intel-collabore-avec-inria>, March 2013
- Jérémie Mary highlighted on TV and on Inria website: you are how you browse: <http://www.inria.fr/en/centre/lille/news/you-are-how-you-browse>, Dec. 2013

SIERRA Project-Team

9.3. Popularization

- A. d'Aspremont, Journée Big Data, ENSAI, Rennes, November 2013.

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).

ALEA Project-Team (section vide)

ASPI Project-Team (section vide)

CQFD Project-Team

9.3. Popularization

B. de Saporta took part in a speed mediation event at Inria Bordeaux Sud Ouest (dec. 2013).

MATHRISK Project-Team (section vide)

REGULARITY Project-Team (section vide)

TOSCA Project-Team

9.3. Popularization

- M. Bossy contributed as a Guest Blogger on the Mathematics of Planet Earth 2013 web site.
- D. Talay gave lectures to scholars in Nice.