

**Foreword to the
Proceedings of the *Congrès SMAI 2013***

Every two years since 2001, the *Société de Mathématiques Appliquées et Industrielles* (SMAI) co-organizes, jointly with one or several French laboratories, a conference entitled *Congrès SMAI 2001 + 2n* which gathers together the *Congrès National d'Analyse Numérique* (CANUM) and the annual conferences of the five thematic groups of the SMAI, namely the GAMNI (*Groupe pour l'Avancement des Méthodes Numériques de l'Ingénieur*), MAIRCI (*Mathématiques Appliquées, Informatique, Réseaux, Industrie*), MAS (*Modélisation Aléatoire et Statistique*), MODE (*Mathématiques de l'Optimisation et de la Décision*), and SIGMA (*Signal, Image, Géométrie, Modélisation, Approximation*). The *Congrès SMAI 2001 + 2n* are concerned with a wide spectrum of topics going from theoretical to numerical issues.

In 2013 the *Congrès SMAI 2013* was organized by SMAI and by five laboratories, namely the CEREMADE (*Centre de Recherche en Mathématiques de la Décision, Université Paris Dauphine*), LAGA (*Laboratoire Analyse, Géométrie et Applications, Université Paris Nord*), LJLL (*Laboratoire Jacques-Louis Lions, Université Pierre et Marie Curie*), LPMA (*Laboratoire de Probabilités et Modèles Aléatoires, Universités Pierre et Marie Curie et Paris Diderot*) and MAP5 (*Mathématiques Appliquées à Paris 5, Université Paris Descartes*), coordinated by the FSMP (*Fondation Sciences Mathématiques de Paris*). An afternoon session entitled *Demi-journée Maths-Entreprises* was organized by the *Agence pour les Mathématiques en Interaction avec l'Entreprise et la Société* (AMIES) and by the SMAI.

The conference was organized under the guidance of a Scientific Committee chaired by Jean-François Delmas which comprised Fabienne Castell, Frédéric Chazal, Stéphane Cordier, Georges-Henri Cottet, Aris Daniilidis, Stéphane Descombes, Jocelyne Erhel, Enrique Fernández Cara, Isabelle Gallagher, Gábor Lugosi and Simon Masnou. The Organizing Committee of the conference comprised Emmanuel Audusse, Gilles Barès, François Bolley, Matthieu Bonnard, Célia Chauveau, Maya de Buhan, Jérôme Dedecker,

Jean-Stéphane Dhersin, Jean Dolbeault, Romuald Elie, Bruno Galerne, Natacha Giraud, Vivette Girault, Olivier Glass, Etienne Gouin-Lamourette, Laurence Halpern, Caroline Japhet, Raphaël Lachièze-Rey, Antoine Lemenant, Sébastien Li-Thiao-Té, Yvon Maday, François Murat, Gilles Pagès, Yohan Penel, Gabriel Peyré, Colette Picard, Annie Raoult, Tabea Rebařka, Liliane Ruprecht, Noura Sahtout, Marie Théret, and Emmanuel Trélat.

The conference received the support of numerous sponsors, namely INSMI-CNRS, INRIA, Ministère de l'Enseignement Supérieur et de la Recherche, Conseil Général des Landes, Mairie de Paris, Arianespace, CASDEN, CEA, EDF, LVMH, MAIF, Maison de la Simulation, Rte, Safran, TOTAL, Fédération de Recherche Mathématiques de Paris Centre, Université Paris-Dauphine, Université Paris Descartes, ANR BARESAFE, ANR Do Well B., ANR MANEGE, ANR TOMMI, GdR Théorie des Jeux : Modélisation Mathématique et Applications, GdR IM, GdR MASCOT-NUM, GdR MIA, Global Systems Dynamics & Policy, Groupe CALCUL, ITN SADCO, Labex MME-DII, Mathématiques en Interactions pour la Terre, Programme Emergences Instabilités hydrodynamiques.

The *Congrès SMAI 2013* took place from May 27th to May 31st, 2013, at the Club Belambra of Seignosse le Penon; the web page of the conference can be found at the address

<http://smai.emath.fr/smai2013/>

More than 410 persons participated in the conference. Almost 200 scientific contributions were presented, namely 8 plenary lectures by Michel Campillo, Pierre Degond, Francis Filbet, Stéphane Gaubert, Paola Goatin, Claude Le Bris, Marta Sanz-Solé, and Nizar Touzi (unfortunately Vicent Caselles, who passed away August 14, 2013, was already badly suffering and was unable to participate in the conference), 5 lectures during the *Demi-journée Maths-Entreprises*, which also comprised a round table and a poster session, 3 lectures during the *Table ronde Enseignement*, 160 lectures in 48 mini-symposia, 64 communications in 8 parallel sessions, and 55 poster presentations in 2 poster sessions.

As far as posters are concerned, 16 prizes were awarded to poster presentations. For the first poster session, the winners were: 1. Pierre Jounieaux, 2. Lionel Boillot, 3. Manon Costa, 4. Wissal Sabbagh, 5. Jeaniffer Vides, Jérémy Espinas, and Mickaël Buchet; for the second one, the winners were:

1. Nina Aguillon, 2. Fabien Dubot, 3. Paul Charton, 4. Loïc Lacouture, 5. Flore Nabet, Georgios Michailidis, and Mahamar Dicko.

The detailed program of the conference can be download at the address
<http://smai.emath.fr/smai2013/programme/SMAI2013-programme.pdf>

The present issue of *ESAIM: Proceedings and Surveys* gathers together contributions by participants to the conference. It consists of 4 articles by plenary speakers (Pierre Degond, Paola Goatin, Claude Le Bris and Nizar Touzi), of 26 articles corresponding to lectures given during the *Demi-journée Maths-Entreprises*, the *Table ronde Enseignement*, and in mini-symposia, of 9 articles corresponding to communications in parallel sessions, and of 15 articles corresponding to poster presentations. All the authors of these 54 articles are warmly thanked for their contributions to this issue of *ESAIM: Proceedings and Surveys*.

Finally, all the sponsors of the conference are very gratefully acknowledged, as well as all the persons who took part in its organization.

Grégoire Allaire, Président de la SMAI
Jean Dolbeault, Directeur de la FSMP
Olivier Glass, Directeur du CEREMADE
Philippe Souplet, Directeur du LAGA
Benoît Perthame, Directeur du LJLL
Gilles Pagès, Directeur du LPMA
Annie Raoult, Directrice du MAP5