Foreword

This volume of Journal of Physics: Conference Series is dedicated to the scientific contributions presented during the 6th International Workshop on New Computational Methods for Inverse Problems, NCMIP 2016 (http://complement.farman.ens-cachan.fr/NCMIP_2016.html). This workshop took place at Ecole Normale Supérieure de Cachan, on May 20, 2016. The prior editions of NCMIP also took place in Cachan, France, firstly within the scope of ValueTools Conference, in May 2011, and secondly at the initiative of Institut Farman, in May 2012, May 2013, May 2014 and May 2015.

The New Computational Methods for Inverse Problems (NCMIP) workshop focused on recent advances in the resolution of inverse problems. Indeed, inverse problems appear in numerous scientific areas such as geophysics, biological and medical imaging, material and structure characterization, electrical, mechanical and civil engineering, and finances. The resolution of inverse problems consists in estimating the parameters of the observed system or structure from data collected by an instrumental sensing or imaging device. Its success firstly requires the collection of relevant observation data. It also requires accurate models describing the physical interactions between the instrumental device and the observed system, as well as the intrinsic properties of the solution itself. Finally, it requires the design of robust, accurate and efficient inversion algorithms. Advanced sensor arrays and imaging devices provide high rate and high volume data; in this context, the efficient resolution of the inverse problem requires the joint development of new models and inversion methods, taking computational and implementation aspects into account. During this one-day workshop, researchers had the opportunity to bring to light and share new techniques and results in the field of inverse problems.

The topics of the workshop were: algorithms and computational aspects of inversion, Bayesian estimation, Kernel methods, learning methods, convex optimization, free discontinuity problems, metamodels, proper orthogonal decomposition, reduced models for the inversion, non-linear inverse scattering, image reconstruction and restoration, and applications (bio-medical imaging, non-destructive evaluation...).

NCMIP 2016 was a one-day workshop held in May 2016 which attracted around seventy attendees. Each of the submitted papers has been reviewed by two reviewers. There have been eleven accepted papers. In addition, three international speakers were invited to present a longer talk.

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Eric Vourc'h and Thomas Rodet

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Invited speakers

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Michel Defrise, Department of Nuclear Medicine, Vrije Universiteit Brussel, Belgium.
Houssem Haddar, INRIA, CMAP, Ecole Polytechnique, Palaiseau, France.