

Call for Papers  
IEEE Signal Processing Society  
IEEE Journal of Selected Topics in Signal Processing  
**Special issue on Stochastic Simulation and Optimisation in Signal Processing**

Many modern signal processing (SP) methods rely very strongly on probability and statistics tools to solve problems; for example, they use stochastic models to represent the data observation process and the prior knowledge available and they obtain solutions by performing statistical inference (e.g., using maximum likelihood or Bayesian strategies). Statistical SP methods are, in particular, routinely applied to many and varied tasks and signal modalities, ranging from resolution enhancement of medical images to hyperspectral image unmixing; from user rating prediction to change detection in social networks; and from source separation in music analysis to automatic speech recognition.

However, expectations and demands are constantly rising and such methods are now expected to deal with ever more challenging SP problems that require ever more complex models, and more importantly ever more sophisticated novel methodologies to tackle them. This has driven the development of computation-intensive SP methods based on stochastic simulation and optimisation. This field, at the interface of SP and computational statistics, has gained considerable attention of late because of its capacity to handle complex models and underpin sophisticated (often Bayesian) statistical inference techniques delivering accurate and insightful results. Promising areas of research in the field include the development of adaptive block-coordinate stochastic optimisation algorithms and of efficient simulation techniques for high-dimensional inverse problems.

This special issue will provide a venue for the publication of cutting edge research on advanced stochastic simulation and optimisation methodologies, and their application to challenging SP problems that are **not** well addressed by existing methodologies.

**Topics of interest include (but are not limited to):**

- High-dimensional Monte Carlo and Quasi-Monte Carlo methods in signal processing.
- Simulation-driven stochastic optimisation algorithms for intractable optimisation problems.
- Connections between stochastic methods, convex analysis and proximal optimisation algorithms.
- Adaptive, variable-metric and infinite dimensional stochastic methods in signal and image processing.
- Stochastic methods for blind, semi-blind, unsupervised and nonparametric inverse problems.
- Stochastic methods for doubly intractable statistical problems and for model selection.
- High-dimensional sequential Monte Carlo, particle filters and data assimilation algorithms.
- Deterministic surrogates for stochastic methods, such as variational Bayes and message passing.
- Randomized algorithms such as stochastic gradient, random projections, and random matrix approaches.

Prospective authors should visit <http://www.signalprocessingsociety.org/publications/periodicals/jstsp/> for information on paper submission. Manuscripts should be submitted via Manuscript Central at <http://mc.manuscriptcentral.com/jstsp-ieee>.

**Important Dates**

- Manuscript Submission due: ~~April 15, 2015~~ **Revised: May 14, 2015**
- First review completed: July 15, 2015
- Revised manuscript due: September 1, 2015
- Second review completed: November 1, 2015
- Final manuscript due: December 1, 2015
- Publication date: March 2016

**Guest Editors**

- Steve McLaughlin, Heriot Watt University, UK, [s.mclaughlin@hw.ac.uk](mailto:s.mclaughlin@hw.ac.uk) (Lead GE)
- Alfred Hero, University of Michigan, USA, [hero@eecs.umich.edu](mailto:hero@eecs.umich.edu)
- Marcelo Pereyra, University of Bristol, UK, [marcelo.pereyra@bristol.ac.uk](mailto:marcelo.pereyra@bristol.ac.uk)
- Jean-Christophe Pesquet, University of Paris Est, France, [pesquet@univ-mlv.fr](mailto:pesquet@univ-mlv.fr)
- Jean-Yves Tournieret, University of Toulouse, France, [jean-yves.tournieret@enseeiht.fr](mailto:jean-yves.tournieret@enseeiht.fr)