

## CALL FOR PAPERS

### IEEE Signal Processing Magazine Special Issue on Source Separation and Applications

Data-driven methods are based on a simple generative model such as matrix or tensor decompositions and hence can minimize the assumptions on the nature of the data and the latent variables. They have emerged as promising alternatives to the traditional model-based approaches in many applications where the underlying dynamics are hard to characterize. Source separation has been at the heart of data-driven approaches. It has found wide applicability, has been an active area of research, and it still is.

Historically, the source separation problem has been posed with flexible and general assumptions and minimal priors, hence leading to the designation *blind source separation*. The first methodology for successful blind source separation was Independent component analysis (ICA). Even though it has initially started with ICA, the data-driven research now covers a broader range of topics that emphasize incorporation of various priors and different types of decompositions to take the natural dimensionality of the observed data into account. New trends of research include joint analysis of large-scale heterogeneous multidimensional sets of data, *e.g.*, associated to multimodal data acquisition as in hyperspectral or brain imaging. In addition, underdetermined problems, *i.e.*, those with a weak diversity and a large number of sources, are practically very interesting, and can be solved through the use of additional priors such as sparsity. Indeed, many connections between source separation and the fields of sparse representations, compressive sensing and dictionary learning have emerged, leading to new avenues for research. Hence, addressing the theory and problems at the junction of these topics, along with other exciting directions such as morphological component analysis, sparse component analysis, and nonnegative matrix factorization is of particular interest.

Our aim in this special issue is to provide a comprehensive view of the main advances in the field through a number of overview papers as well as contributions that emphasize the key areas of development in the area. In particular, in a number of fundamental areas such as the role of different types of diversity, convolutive source separation, nonlinear source separation, tensor decompositions and joint source separation, there is a need for accessible and comprehensive review articles.

#### **The topics of interest include, but are not limited to**

- Joint source separation, group ICA
- Sparse component analysis
- Sparse representations, dictionary learning and blind calibration
- Nonnegative matrix factorization
- Nonlinear mixtures, mixtures over different algebraic fields
- Complex-valued source separation
- Constrained source separation
- Independent subspace analysis
- Approaches based on sample dependence, higher-order statistics, and their connections
- Tensor and matrix decompositions, multi-way component analysis
- Time-frequency based source separation
- Iterative methods for source separation and tensor factorizations
- Algebraic methods for source separation
- Performance analysis and bounds in various BSS scenarios
- Applications in medical imaging, geophysical signal processing, remote sensing, communications, audio and speech processing, time series analysis, compressed sensing, feature extraction and clustering, astronomy, and image processing among others

## Timeline for the Special Issue

### Schedule

- White papers due: May 15, 2013
- Acceptance notification for white papers: June 17, 2013
- Manuscripts due: August 15, 2013
- Manuscript acceptance notification: September 30, 2013
- Revised manuscript due: October 30, 2013
- Final acceptance notification: November 30, 2013
- Final material due from authors: December 15, 2013 (strict)

### Submission

White papers, limited to four double-space pages, should summarize the motivation, the significance of the topic, a brief summary, an outline of the content, and key references. Prospective authors should use the web submission system at: <http://mc.manuscriptcentral.com/spmag-ieee>.

Please note that in the final paper—and hence the proposal—it is important to have a broader scope and present work that is accessible by a broader signal processing audience.

### Guest Editors

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