Guest Editorial
Special Section on Blind Signal Processing and Its Applications

WELCOME to this Special Section of the IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS I on Blind Signal Processing and Its Applications. Blind signal processing (BSP) is currently one of the most exciting areas of research in statistical signal processing, unsupervised machine learning, neural networks, information theory, and exploratory data analysis. It has applications at the intersection of many science and engineering disciplines concerned with understanding and extracting useful information from data as diverse as neuronal activity and brain images, bioinformatics, communications, the World Wide Web, audio, video, and sensor signals. Because BSP is an interdisciplinary research area, the combination of ideas from the above disciplines is a developing avenue of research.

The aim of this Special Section is to offer an opportunity to link these techniques in different areas and to find effective ways of solving this problem. The Special Section constitutes a vehicle whereby researchers can present new studies of BSP, thus paving the way for future developments in the field. We received 20 submissions for consideration. After the review process, we selected the following eight papers for publication that span the approaches identified above. These are complex blind source extraction from noisy mixtures using second order statistics by Javidi *et al.*; complex independent component analysis by entropy bound minimization by Li *et al.*; real-time independent vector analysis for convolutive blind source separation by Kim; a nonnegative blind source separation model for binary test data by Schachtner *et al.*; a matrix pseudoinversion lemma and its application to block-based adaptive blind deconvolution for MIMO

systems by Kohno *et al.*; colored subspace analysis: dimension reduction based on a signal's autocorrelation structure by Theis; blind adaptive equalization of MIMO systems: new recursive algorithms and convergence analysis by Radenkovic *et al.*; and noise estimation using mean square cross prediction error for speech enhancement by Wang *et al.*

We hope that this Special Section will stimulate interest in the challenging area of BSP, and look forward to seeing an increasing body of high-quality research aligned to this idea. We would like to express our gratitude to the authors of the papers in this special section, and also to the more than 60 reviewers who helped us evaluate the submissions. We also thank Gianluca Setti, the Editor-in-Chief who initiated this project, and Wouter Serdijn, the Editor-in-Chief under whom it was concluded.

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He joined NTT in 1981. He is now a Professor at the University of Tsukuba, Japan. He is the author or coauthor of more than 200 articles in journals and conference proceedings and is responsible for more than 150 patents. His research interests include adaptive filtering technologies, the realization of acoustic echo cancellation, blind source separation of convolutive mixtures of speech, and acoustic signal processing for speech and audio applications.

Prof. Makino is an Institute of Electronics, Information, and Communication Engineers (IEICE) Fellow, a Council Member of the Acoustical Society of Japan (ASJ), and a Member of EURASIP. He received the ICA Unsupervised Learning Pioneer Award in 2006, the IEEE MLSP Competition Award in 2007, the TELECOM System Technology Award in 2004, the Achievement Award of the IEICE in 1997, and the Outstanding Technological Development Award of the ASJ in 1995, the Paper Award of the IEICE in 2005 and 2002, the Paper Award of the ASJ in 2005 and 2002. He was a Keynote Speaker at ICA 2007, a Tutorial Speaker at ICASSP 2007. He has served on IEEE SPS Awards Board (2006–2008) and IEEE SPS Conference Board (2002–2004). He is a Member of the James L. Flanagan Speech & Audio Processing Award

Committee. He was an Associate Editor of the IEEE TRANSACTIONS ON SPEECH AND AUDIO PROCESSING (2002–2005) and is an Associate Editor of the *EURASIP Journal on Advances in Signal Processing*. He is the Chair of the Blind Signal Processing Technical Committee of the IEEE Circuits and Systems Society and a member of the Audio and Electroacoustics Technical Committee of the IEEE Signal Processing Society. He was the Vice President of the Engineering Sciences Society of the IEICE (2007–2008), and the Chair of the Engineering Acoustics Technical Committee of the IEICE (2006–2008). He is a Member of the International IWAENC Standing committee and a member of the International ICA Steering Committee. He was the General Chair of WASPAA 2007, the General Chair of IWAENC 2003, the Organizing Chair of ICA 2003, and is the designated Plenary Chair of ICASSP 2012. He is an IEEE SPS Distinguished Lecturer (2009–2010).

Andrzej Cichocki received the M.Sc. (with honors), Ph.D., and Dr.Sc. (habilitation) degrees, all in electrical engineering, from Warsaw University of Technology, Poland.

Since 1972, he has been with the Institute of Theory of Electrical Engineering, Measurement and Information Systems, Faculty of Electrical Engineering at the Warsaw University of Technology, where he obtained a title of a full Professor in 1995. He also spent several years at University Erlangen-Nuerenberg, Germany, at the Chair of Applied and Theoretical Electrical Engineering directed by Prof. Rolf Unbehauen, as an Alexander-von-Humboldt Research Fellow and Guest Professor. In 1995–1997 he was also a Team Leader in the Laboratory for Artificial Brain Systems, at Frontier Research Program RIKEN, Japan, in the Brain Information Processing Group. He is currently a Senior Team Leader of the Laboratory for Advanced Brain Signal Processing, at RIKEN Brain Science Institute, JAPAN. He is coauthor of more than 250 technical papers and 4 internationally recognized monographs (two of them translated to Chinese): *Non-Negative Matrix and Tensor Factorizations—Applications to Exploratory Multi-Way Data Analysis and Blind Source Separation* (Wiley, 2009), *Adaptive Blind Signal and Image Processing* (Wiley, 2003—rev. ed.), *CMOS Switched-Capacitor and Continuous-Time Integrated Circuits and Systems* (Springer-Verlag, 1989) and *Neural Networks for Optimizations and Signal Processing* (Teubner-Wiley, 1994). He is Editor-in-Chief of *International Journal Computational Intelligence and Neuroscience*.

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Dr. Zheng has received several science prizes, including the Chinese National Natural Science Prize awarded by the Chinese Government in 1991. He has served on the technical program or organizing committee of numerous international conferences, such as the 42nd IEEE International Symposium on Circuits and Systems (ISCAS 2009), the 15th IFAC Symposium on System Identification (SYSID 2009) and the 49th IEEE Conference on Decision and Control (CDC 2010). He has also served on several IEEE or IFAC technical committees, and has been the Chair of IEEE Circuits and Systems Society's Technical Committee on Neural Systems and Applications, the Chair of IEEE Circuits and Systems Society's Technical Committee on Blind Signal Processing, a Member of IEEE Control Systems Society's Technical Committee on System Identification and Adaptive Control, and a Member of IFAC Technical Committee on Modelling, Identification and Signal Processing. He has served as an Associate Editor for four flagship journals: IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS I: FUNDAMENTAL THEORY AND APPLICATIONS (2002–2004), IEEE TRANSACTIONS ON AUTOMATIC CONTROL (2004–2007), IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS II: EXPRESS BRIEFS (2008–2009), and IEEE SIGNAL PROCESSING LETTERS (2007–present). Since 2000, he has also been an Associate Editor of the IEEE Control Systems Society's Conference Editorial Board.

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Prof. Uncini is a Member of the Audio Engineering Society (AES), the Associazione Elettrotecnica ed Elettronica Italiana (AEI), and the Società Italiana Reti Neuroniche (SIREN).