

# **2018 IEEE Statistical Signal Processing Workshop (SSP 2018)**

**Freiburg im Breisgau, Germany  
10-13 June 2018**



**IEEE Catalog Number: CFP18SAP-POD  
ISBN: 978-1-5386-1572-0**

**Copyright © 2018 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP18SAP-POD
ISBN (Print-On-Demand):	978-1-5386-1572-0
ISBN (Online):	978-1-5386-1571-3
ISSN:	2373-0803

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# 2018 IEEE Statistical Signal Processing Workshop (SSP)

## Distributed signal processing

<i>Diffusion-Based Bayesian Cluster Enumeration in Distributed Sensor Networks</i> Freweyni K Teklehaymanot (Darmstadt University of Technology, Germany), Michael Muma (Darmstadt University of Technology, Germany), Abdelhak M Zoubir (Darmstadt University of Technology, Germany) .....	1
<i>A Distributed Transmission Scheduling Algorithm For Wireless Networks Based On The Ising Model</i> Xi Li (Xi'an Jiaotong University, P.R. China & The University of Melbourne, Australia), Pavel Tolmachev (The University of Melbourne, Australia), Michael Pauley (The University of Melbourne, Australia), Jonathan H. Manton (School of Engineering, The University of Melbourne, Australia) .....	6
<i>On Convergence Analysis of Gradient Based Primal-Dual Method of Multipliers</i> Guoqiang Zhang (University of Technology Sydney, The Netherlands), Matthew O'Connor (Victoria University of Wellington, New Zealand), Le Li (Northwestern Polytechnical University, P.R. China) .....	11
<i>Optimal Filter Design for Consensus on Random Directed Graphs</i> Stephen Kruzick (Carnegie Mellon University, USA), Jose Moura (Carnegie Mellon University, USA) .....	16
<i>Distributed Wiener-Based Reconstruction of Graph Signals</i> Elvin Isufi (Delft University of Technology, The Netherlands), Paolo Di Lorenzo (Sapienza University of Rome, Italy), Paolo Banelli (University of Perugia, Italy), Geert Leus (Delft University of Technology, The Netherlands) .....	21
<i>Dempster-Shafer Theory Based Robust Sequential Detection in Distributed Sensor Networks</i> Mark Ryan Leonard (Technische Universität Darmstadt, Germany), Christian Schroth (Technische Universität Darmstadt, Germany), Abdelhak M Zoubir (Darmstadt University of Technology, Germany) .....	26

## Sparsity aware processing

<i>Parametric channel estimation for massive MIMO</i> Luc Le Magoarou (BCOM, France), Stéphane Paquelet (B-com, France) .....	30
<i>Bias Compensation in Iterative Soft-Feedback Algorithms with Application to (Discrete) Compressed Sensing</i> Susanne Sparrer (Ulm University, Germany), Robert F.H. Fischer (Ulm University, Germany) .....	35
<i>Generalized adaptive weighted recursive least squares dictionary learning for Retinal vessel inpainting</i> Yashar Naderahmadian (Ryerson University, Canada), Soosan Beheshti (Ryerson University, Canada) .....	40
<i>The statistical restricted isometry property for Gabor systems</i> Alihan Kaplan (Technical University of Munich, Germany), Volker Pohl (Technische Universität München, Germany), Dae Gwan Lee (Katholische Universität Eichstätt-Ingolstadt, Germany) .....	45
<i>A Network Compatibility Condition for Compressed Sensing over Complex Networks</i> Nguyen Tran (Aalto University, Finland), Henrik Ambos (Aalto University, Finland), Alexander Jung (Aalto University, Finland) .....	50
<i>Coupled Compressive Sensing: Sequential Reinforcement Approach</i> Shashini De Silva (Oregon State University, USA), Jinsub Kim (Oregon State University, USA) .....	55

## Machine learning and pattern recognition

<i>Least-Squares Based Layerwise Pruning of Convolutional Neural Networks</i> Lukas Mauch (University of Stuttgart, Germany), Bin Yang (University of Stuttgart, Germany) .....	60
<i>Simultaneous Sparsity and Parameter Tying for Deep Learning using Ordered Weighted <math>\ell_1</math> Regularization</i> Dejiao Zhang (University of Michigan, USA), Julian Katz-Samuels (University of Michigan, USA), Mario A. T. Figueiredo (Instituto Superior Técnico & Instituto de Telecomunicações, Portugal), Laura Balzano (University of Michigan, USA) .....	65
<i>Network Intrusion Detection Using Flow Statistics</i> Buse Atli (Aalto University, Finland), Yoan Miche (Nokia Solutions and Networks, Finland), Alexander Jung (Aalto University, Finland) .....	70
<i>Learning DAGs using Multiclass Support Vector Machines</i> Fabio Nikolay (Communication Systems Group, Germany), Marius Pesavento (Technische Universität Darmstadt & Merckstr. 25, Germany) .....	75
<i>Edge Consensus Computing for Heterogeneous Data Sets</i> Kenta Niwa (NTT Media Intelligence Laboratories & Victoria University of Wellington, Japan), Guoqiang Zhang (University of Technology Sydney, The Netherlands), W. Bastiaan Kleijn (Victoria University of Wellington, New Zealand) .....	80
<i>Differential Privacy for Positive and Unlabeled learning with known class priors</i> Anh Pham (Oregon State University, USA), Raviv Raich (Oregon State University, USA) .....	85
<i>Combining SVMs For Classification on Class Imbalanced Data</i> Sergey Sukhanov (AGT International, Germany), Andreas Merentitis (AGT International, Germany), Christian Debes (AGT International, Germany), Jürgen Hahn (AGT International, Germany), Abdelhak M Zoubir (Darmstadt University of Technology, Germany) .....	90
<i>The p-value as a New Similarity Function for Spectral Clustering in Sensor Networks</i> Mael Bompais (IMT Atlantique, France), Hamza Ameer (IMT Atlantique, France), Dominique Pastor (TELECOM Bretagne, France), Elsa Dupraz (IMT Atlantique, France) .....	95
<i>Weakly Supervised Learning of Multiple-scale Dictionaries</i> Zeyu You (Oregon State University, USA), Raviv Raich (Oregon State University, USA), Xiaoli Fern (Oregon State University, USA), Jinsub Kim (Oregon State University, USA) .....	100
<i>Parameter estimation in a Gibbs-Markov field texture model based on a coding approach</i> Jorge Martinez (Universidad Nacional del Sur, Argentina), Silvina Pistonesi (Universidad Nacional del Sur, Argentina), Maria Cristina Maciel (Universidad Nacional del Sur, Argentina), Ana Georgina Flesia (Universidad Nacional de Córdoba & Conicet, Argentina) .....	105

## Signal processing for opportunistic rain monitoring

<i>Rainfall monitoring using microwave links from cellular communication networks: The Dutch experience</i> Aart Overeem (Royal Netherlands Meteorological Institute & Wageningen University, The Netherlands), Hidde Leijnse (Royal Netherlands Meteorological Institute, The Netherlands), Remko Uijlenhoet (Wageningen University, The Netherlands) .....	110
<i>Wireless Communication Links as Opportunistic IoT for Near Ground Rain Monitoring</i> Hagit Messer (Tel-Aviv University, Israel) .....	115
<i>The potential of SmartLNB networks for rainfall estimation</i> Filippo Giannetti (University of Pisa, Italy), Marco Moretti (Università di Pisa - Dipartimento Ingegneria dell'Informazione, Italy), Ruggero Reggiannini (University of Pisa, Italy), Antonio Petrolino (MBI Srl, Italy), Giacomo Bacci (MBI srl, Italy), Elisa Adirosi (CNIT, Italy), Luca Baldini (Consiglio Nazionale delle Ricerche, Italy), Luca Facheris (University of Florence, Italy), Samantha Melani (CNR, Italy), Alberto Ortolani (CNR, Italy) .....	120
<i>Tomographic reconstruction of rainfall fields using heterogeneous frequency microwave links</i> Michele D'Amico (Politecnico di Milano, Italy), Luca Cerea (Politecnico di Milano, Italy), Carlo De Michele (Politecnico di Milano, Italy), Roberto Nebuloni (Ieii - Cnr, Italy), Mattia Cubaiu (Consiglio Nazionale delle Ricerche, Italy) .....	125

<i>Learning-Based Rainfall Estimation Via Communication Satellite Links</i> Ahmad Gharanjik (University of Luxembourg & SnT Center, Luxembourg), Kumar Vijay Mishra (The University of Iowa, Iowa City, USA, USA), Bhavani Shankar Mysore R (Interdisciplinary Centre for Security, Reliability and Trust & University of Luxembourg, Luxembourg), Björn Ottersten (University of Luxembourg, Luxembourg) .....	130
<i>Quantifying hardware related attenuation from the analysis of nearby microwave links</i> Martin Fencel (Technical University of Denmark, Denmark), Vojtech Bares (Czech Technical University in Prague, Czech Republic) .....	135

## Signal and system modelling

<i>Jeffrey's Divergence Between Fractionally Integrated White Noises</i> Mahdi Saleh (Lebanese University, Lebanon), Eric J. Grivel (Université de Bordeaux, France), Samir Omar (Lebanese International University, Lebanon) .....	139
<i>A geometrical study of the bivariate fractional gaussian noise</i> Jeanne Lefèvre (Gipsa-Lab, France), Nicolas Le Bihan (CNRS / GIPSA-Lab, France), Pierre-Olivier Amblard (CNRS/GIPSA-lab, France) .....	144
<i>Rényi Divergence to Compare Moving-Average Processes</i> Fernando Merchan (Universidad Tecnológica de Panamá, Panama), Eric J. Grivel (Université de Bordeaux, France), Roberto Diversi (DEIS – University of Bologna, Italy) .....	149
<i>Linear filtering of bivariate signals using quaternions</i> Julien Flamant (University of Lille, CNRS, Centrale Lille, France), Pierre Chainais (University of Lille, CNRS, Centrale Lille, France), Nicolas Le Bihan (CNRS / GIPSA-Lab, France) .....	154
<i>Secrecy Capacity Analysis of Transmit-Receive Diversity Systems</i> Kiattisak Maichalernnukul (Rangsit University, Thailand) .....	159
<i>SETI detection strategies for single dish radio telescopes</i> Gregory Hellbourg (University of California, USA) .....	164
<i>Geometry and Radiometry Invariant Matched Manifold Detection and Robust Homography Estimation</i> Ziv Yavo (Ben Gurion University, Israel), Joseph M. Francos (Ben Gurion University, Israel) .....	169
<i>Tempered fractional Brownian motion: wavelet estimation and modeling of turbulence in geophysical flows</i> Benjamin Cooper Boniece (Tulane University, USA), Farzad Sabzikar (Iowa State University, USA), Gustavo Didier (Tulane University, USA) .....	174
<i>Non-Stationarity and Offset Coherence Information in Geomagnetic Applications</i> David Riegert (Queen's University, Canada, Canada), David Thomson (Queen's University, Canada) .....	179

## Signal and information processing with coarsely quantized data

<i>Sliding Window Based Linear Signal Detection using 1-bit Quantization and Oversampling for Large-Scale Multiple-Antenna Systems</i> Zhichao Shao (Pontifícia Universidade Católica do Rio de Janeiro, Brazil), Lukas T N Landau (Pontifícia Universidade Católica do Rio de Janeiro, Brazil), Rodrigo C. de Lamare (Pontifical Catholic University of Rio de Janeiro & University of York, Brazil) .....	183
<i>Massive MIMO Channel Estimation Using Signed Measurements with Antenna-Varying Thresholds</i> Fangqing Liu (University of Science and Technology of China, P.R. China), Heng Zhu (University of Science and Technology of China, P.R. China), Jian Li (University of Florida, USA), Pu Wang (Mitsubishi Electric Research Labs, USA), Philip Orlik (Mitsubishi Electric Research Laboratories, USA) .....	188

<i>Low Resolution Sampling for Joint Millimeter-Wave MIMO Communication-Radar</i> Preeti Kumari (UT Austin, USA), Khurram Usman (The University of Texas at Austin, USA), Amine Mezghani (The University of Texas at Austin, USA), Robert Heath (The University of Texas at Austin, USA) .....	193
<i>On the Timing Synchronization under 1-bit Quantization and Oversampling</i> Martin Schlüter (Dresden University of Technology, Germany), Meik Dörpinghaus (TU Dresden, Germany), Gerhard P. Fettweis (Dresden University of Technology, Germany) .....	198
<i>Taking the edge off quantization: projected back projection in dithered compressive sensing</i> Chunlei Xu (Université Catholique de Louvain, Belgium), Vincent Schellekens (UCLouvain, Belgium), Laurent Jacques (University of Louvain, Belgium) .....	203
<i>One-bit sigma-delta modulation on a closed loop</i> Sara Krause-Solberg (Technische Universität München, Germany), Olga Graf (Technical University of Munich, Germany), Felix Kraemer (Technische Universität München, Germany) .....	208
<i>Quantized Constant Envelope Precoding for Frequency Selective Channels</i> Hela Jemma (Technische Universität München, Germany), Josef A. Nossek (TU Munich, Germany & Federal University of Ceara, Fortaleza, Brazil) .....	213
<i>All-digital massive MIMO with a fronthaul constraint</i> Sven Jacobsson (Ericsson Research & Chalmers University of Technology, Sweden), Yasaman Ettfagh (Chalmers University of Technology, Sweden), Giuseppe Durisi (Chalmers University of Technology, Sweden), Christoph Studer (Cornell University, USA) .....	218
<i>In A One-Bit Rush: Low-Latency Wireless Spectrum Monitoring With Binary Sensor Arrays</i> Manuel S. Stein (Universität Bayreuth, Germany, Germany), Michael Fauß (Technische Universität Darmstadt, Germany) .....	223

## Bayesian techniques

<i>Hierarchical Bayesian MCMC Estimation of Airport Operations Counts</i> John H. Mott (Purdue University, USA) .....	228
<i>Triplet Markov trees for image segmentation</i> Jean-Baptiste Courbot (Inria Paris, France), Emmanuel Monfrini (Institut Telecom, Telecom SudParis, France), Vincent Mazet (ICube & Université de Strasbourg, CNRS, France), Christophe Collet (ICube, University of Strasbourg - CNRS, France) .....	233
<i>A double proposal normalized importance sampling estimator</i> Roland Lamberti (Télécom SudParis, France), Yohan Petetin (Telecom SudParis, France), François Septier (IMT Lille Douai, Université Lille, CNRS UMR CRISTAL, Lille, France), François Desbouvries (Telecom SudParis, France) .....	238
<i>Shape parameter estimation for k-distribution using variational Bayesian approach</i> Anish Turlapaty (Indian Institute of Information Technology, India) .....	243
<i>A Probabilistic Approach for Adaptive State-Space Partitioning</i> Jordi Vilà-Valls (Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Spain), Pau Closas (Northeastern University, USA), Monica F. Bugallo (Stony Brook University, USA), Joaquin Míguez (Universidad Carlos III de Madrid, Spain) .....	248
<i>Crypto-Aided Bayesian Detection of False Data in Short Messages</i> Sang Wu Kim (Iowa State University, USA), Xudong Liu (Iowa State University, USA) .....	253
<i>Non-Parametric Bayesian Inference for Change Point Detection in Neural Spike Trains</i> Bastian Alt (Technische Universität Darmstadt, Germany), Michael Messer (Goethe Universität, Frankfurt (Main), Germany), Jochen Roeper (Goethe Universität, Frankfurt (Main), Germany), Gaby Schneider (Goethe Universität, Frankfurt (Main), Germany), Heinz Koepl (Technische Universität Darmstadt, Germany) .....	258
<i>Misspecified Bayesian Cramer-Rao Bound for Sparse Bayesian Learning</i> Milutin Pajovic (Mitsubishi Electric Research Laboratories (MERL), USA) .....	263
<i>A projection-based Rao-Blackwellized particle filter to estimate parameters in conditionally conjugate state-space models</i> Milan Papez (Brno University of Technology, Czech Republic) .....	268

*A Probabilistic Approach for Heart Rate Variability Analysis using Explicit Duration Hidden Markov Models*

Ju Gao (The Ohio State University, USA), Diyan Teng (The Ohio State University, USA), Emre Ertin (The Ohio State University, USA) ..... 273

## Sampling and reconstruction

*A Smoothing Stochastic Phase Retrieval Algorithm for Solving Random Quadratic Systems*

Samuel Pinilla (Universidad Industrial de Santander, Colombia), Jorge Bacca (Universidad Industrial de Santander, Colombia), Jean-Yves Tournieret (University of Toulouse & ENSEEIHT, France), Henry Arguello (Universidad Industrial de Santander, Colombia) ..... 278

*Robust Formulation For Solving Underdetermined Random Linear System of Equations via ADMM*

Edwin Vargas (Universidad Industrial de Santander, Colombia), Samuel Pinilla (Universidad Industrial de Santander, Colombia), Jorge Bacca (Universidad Industrial de Santander, Colombia), Henry Arguello (Universidad Industrial de Santander, Colombia) ..... 283

*Multi-Branch Binary Modulation Sequences for Interferer Rejection*

Dian Mo (University of Massachusetts, USA), Marco F Duarte (University of Massachusetts, USA) ..... 288

*Block-Sparse Signal Recovery from Binary Measurements*

Niklas Koep (RWTH Aachen University, Germany), Rudolf Mathar (RWTH Aachen University, Germany) ..... 293

*Convolutional Gaussian Mixture Models with Application to Compressive Sensing*

Ren Wang (Tsinghua, P.R. China) ..... 298

*Deconvolution of Irregularly Subsampled Images*

Ahmed Karam Eldaly (Heriot-Watt University, United Kingdom (Great Britain)), Yoann Altmann (Heriot-Watt University, School of Engineering and Physical Sciences, United Kingdom (Great Britain)), Antonios Perperidis (Heriot-Watt University, United Kingdom (Great Britain)), Steve McLaughlin (Heriot Watt University, United Kingdom (Great Britain)) ..... 303

*Adaptive Reconstruction Along Mobile Sensing Paths*

Ariel Shallom (Technion, Israel), Hagai Kirshner (EPFL, Switzerland), Moshe Porat (Technion, Israel) ..... 308

*Subsampling with  $k$  determinantal point processes for estimating statistics in large data sets*

Pierre-Olivier Amblard (CNRS/GIPSA-lab, France), Simon Barthelme (GIPSA-lab/CNRS, France), Nicolas Tremblay (CNRS & GIPSA-lab, France) ..... 313

## Geometry in signal processing and machine learning

*Extending Polymatroid Set Functions with Curvature and Bounding the Greedy Strategy*

Yajing Liu (Colorado State University, USA), Edwin K. P. Chong (Colorado State University, USA), Ali Pezeshki (Colorado State University, USA) ..... 318

*Subspace averaging for source enumeration in large arrays*

Ignacio Santamaria (University of Cantabria, Spain), David Ramírez (Universidad Carlos III de Madrid, Spain), Louis Scharf (Colorado State, USA) ..... 323

*Influence Estimation on Social Media Networks Using Causal Inference*

Steven T Smith (Massachusetts Institute of Technology & Lincoln Laboratory, USA), Edward K Kao (MIT Lincoln Laboratory, USA), Danelle Shah (MIT Lincoln Laboratory, USA), Olga Simek (MIT Lincoln Laboratory, USA), Donald Rubin (Harvard University, USA) ..... 328

*Provably and robust blind source separation of ill-conditioned hyperspectral mixtures*

Chia-Hsiang Lin (University of Lisbon, Taiwan), José Bioucas Dias (Technical University Lisbon / Instituto de Telecomunicacoes Lisbon, Portugal) ..... 333

*A new approach to signal processing of spatiotemporal data*

Joanna Slawinska (University of Wisconsin Milwaukee, USA), Abbas Ourmazd (University of Wisconsin Milwaukee, USA), Dimitrios Giannakis (New York University, USA) ..... 338

<i>The Geometry of Constrained Random Walks and an Application to Frame Theory</i> Clayton Shonkwiler (Colorado State University, USA) .....	343
<i>The Geometry of Coherence And Its Application To Cyclostationary Time Series</i> Stephen D Howard (Defence Science and Technology Group, Australia), Songsri Sirianunpiboon (Defence Science and Technology Group, Australia), Douglas Cochran (Arizona State University, USA) .....	348
<i>Manifold Curvature from Covariance Analysis</i> Javier Álvarez-Vizoso (Colorado State University, USA), Michael Kirby (Colorado State University, USA), Chris Peterson (Colorado State University, USA) .....	353
<i>Shape-Constrained and Unconstrained Density Estimation Using Geometric Exploration</i> Sutanoy Dasgupta (Florida State University, USA), Debdeep Pati (Texas A&M University, USA), Ian Jermyn (Durham University, United Kingdom (Great Britain)), Anuj Srivastava (Florida State University, USA) .....	358

## Matrix and tensor methods

<i>Minimax Lower Bounds for Nonnegative Matrix Factorization</i> Mine Alsan (National University of Singapore, Singapore), Zhaoqiang Liu (National University of Singapore, Singapore), Vincent Y. F. Tan (National University of Singapore, Singapore) .....	363
<i>CONVMD: Convolutional Matrix Decomposition for Classification of Matrix data</i> Phung Lai (Oregon State University, USA), Raviv Raich (Oregon State University, USA), Molly Megraw (Oregon State University, USA) .....	368
<i>A Low-rank Tensor Regularization Strategy for Hyperspectral Unmixing</i> Tales Imbiriba (Federal University of Santa Catarina, Brazil), Ricardo Augusto Borsoi (Federal University of Santa Catarina, Brazil), Jose Carlos Moreira Bermudez (Federal University of Santa Catarina, Brazil) .....	373
<i>Hyperspectral Super-Resolution: Exact Recovery in Polynomial Time</i> Qiang Li (University of Electronic Science and Technology of China, P.R. China), Wing-Kin Ma (The Chinese University of Hong Kong, Hong Kong), Qiong Wu (The Chinese University of Hong Kong, Hong Kong) .....	378
<i>A Convex Low-Rank Regularization Method For Hyperspectral Super-Resolution</i> Ruiyuan Wu (The Chinese University of Hong Kong, Hong Kong), Qiang Li (University of Electronic Science and Technology of China, P.R. China), Xiao Fu (Oregon State University, USA), Wing-Kin Ma (The Chinese University of Hong Kong, Hong Kong) .....	383
<i>On the statistical properties of the generalized discrete Teager Kaiser operator applied to uniformly distributed random signals</i> Meryem Jabloun (Université d'Orléans, France), Philippe Ravier (Université d'Orléans, France), Olivier Buttelli (Université d'Orléans, France) .....	388
<i>Characterization of finite signals with low-rank STFT</i> Konstantin Usevich (CNRS & Université de Lorraine, France), Valentin Emiya (Aix-Marseille Université, France), David Brie (CRAN, Nancy Université, CNRS, France), Caroline Chauv Marseille Université & CNRS UMR 7373, France) .....	393

## Signal separation methods

<i>A Non-convex Approach to Joint Sensor Calibration and Spectrum Estimation</i> Myung Cho (Carnegie Mellon University, USA), Wenjing Liao (Georgia Institute of Technology, USA), Yuejie Chi (Carnegie Mellon University, USA) .....	398
<i>Independent Component Analysis Using Semi-Parametric Density Estimation via Entropy Maximization</i> Zois Boukouvalas (University of Maryland, USA), Yuri Levin-Schwartz (Icahn School of Medicine at Mount Sinai, USA), Rami Mowakeea (University of Maryland, Baltimore County, USA), Gengshen Fu (Amazon, USA), Tulay Adali (University of Maryland, Baltimore County, USA) .....	403

<i>Acoustic Echo Cancellation During Doubletalk Using Convolutional Blind Source Separation of Signals Having Temporal Dependence</i>	
Todd Moon (Utah State University, USA), Jake Gunther (Utah State University, USA)	408
<i>Bounds on Passive TDOA Estimation in Mixtures</i>	
Amir Weiss (Tel-Aviv University, Israel), Arie Yeredor (Tel-Aviv University, Israel)	413
<i>On-line blind unmixing for hyperspectral pushbroom imaging systems</i>	
Ludivine Nus (University of Lorraine, France), Sebastian Miron (CRAN, Université de Lorraine, CNRS, France), David Brie (CRAN, Nancy Université, CNRS, France)	418
<i>Least-squares signal synthesis from modified S-transform</i>	
Yazan Abdoush (University of Bologna, Italy), Giacomo Pojani (University of Bologna, Italy), Giovanni Emanuele Corazza (University of Bologna, Italy)	423
<i>Ladle estimator for time series signal dimension</i>	
Klaus Nordhausen (Vienna University of Technology, Austria), Joni Virta (Aalto University, Finland)	428
<i>A Variational Bayesian Estimation Scheme for Parametric Point-like Pollution Source of Groundwater Layers</i>	
Boujemaa Ait-El-Fquih (King Abdullah University of Science and Technology (KAUST), Saudi Arabia), Jean-François Giovannelli (IMS, UMR CNRS 52 18, Université Bordeaux 1, France), Nicolas Paul (EDF R&D, France), Alexandre Girard (Electricité de France, France), Ibrahim Hoteit (King Abdullah University of Sciences and Technology, Saudi Arabia)	433
<i>Adaptive Step Size Momentum Method for Deconvolution</i>	
Trung Vu (Oregon State University, USA), Raviv Raich (Oregon State University, USA)	438

## Random matrix advances for big data machine learning

<i>On the non-detectability of spiked large random tensors</i>	
Antoine Chevreuil (Universite de Paris-Est/Marne-la-Vallee, France), Philippe Loubaton (Université de Marne La Vallée, France)	443
<i>Scaling up Echo-State Networks with multiple light scattering</i>	
Jonathan Dong (Laboratoire Kastler-Brossel, France), Sylvain Gigan (Ecole Normale Supérieure, France, France), Florent Krzakala (Ecole Normale Supérieure, France), Gilles Wainrib (ENS Ulm, Paris, France)	448
<i>Random matrix-improved kernels for large dimensional spectral clustering</i>	
Hafiz Tiomoko Ali (Centralesupelec, France), Abia Kammoun (Kaust, Saudi Arabia), Romain Couillet (CentraleSupélec, France)	453
<i>Random Hyperplanes, Generalized Singular Values, and What's my Beta?</i>	
Yuyang Wang (Amazon, USA), Alan Edelman (Massachusetts Institute of Technology, USA)	458
<i>Asymptotic behavior of margin-based classification methods</i>	
Hanwen Huang (University of Georgia, USA)	463
<i>From random matrices to Monte Carlo integration via Gaussian quadrature</i>	
Rémi Bardenet (CNRS, France), Adrien Hardy (Université de Lille, France)	468
<i>Random Matrix-Optimized High-Dimensional MVDR Beamforming</i>	
Liusha Yang (Hong Kong University of Science and Technology, Hong Kong), Matthew R McKay (Hong Kong University of Science and Technology, Hong Kong), Romain Couillet (CentraleSupélec, France)	473

## Signal processing over graphs and networks

<i>Properties and Applications of Gromov Matrices in Network Inference</i>	
Feng Ji (Nanyang Technological University, Singapore), Wenchang Tang (Nanyang Technological University, Singapore), Wee Peng Tay (Nanyang Technological University, Singapore)	478

<i>How can we naturally order and organize graph Laplacian eigenvectors?</i>	
Naoki Saito (University of California, Davis, USA) .....	483
<i>Canonical Correlation Analysis with Common Graph Priors</i>	
Jia Chen (University of Minnesota, USA), Gang Wang (University of Minnesota, USA), Yanning Shen (University of Minnesota, USA), Georgios B. Giannakis (University of Minnesota, USA) .....	488
<i>Multidimensional analytic signal with application on graphs</i>	
Mikhail Tsitsvero (ENS de Lyon, France), Pierre Borgnat (ENS Lyon, CNRS, France), Paulo Goncalves (INRIA, France) .....	493
<i>Channel estimation using Type-III even Discrete Cosine Transform in Multicarrier Communications</i>	
Elena Domínguez-Jiménez (Universidad Politecnica de Madrid, Spain), David Luengo (Universidad Politecnica de Madrid (UPM), Spain), Fernando Cruz-Roldán (Universidad Alcalá, Spain) .....	498
<i>Temporal Block Spectral Clustering For Multi-layer Temporal Functional Connectivity Networks</i>	
Esraa Al-Sharwa (Michigan State University, USA), Mahmood Al-khassaweneh (Yarmouk University, Jordan), Selin Aviyente (Electrical and Computer Engineering, Michigan State University, MI, USA) .....	503
<i>Network Topology Inference from Input-Output Diffusion Pairs</i>	
Santiago Segarra (Massachusetts Institute of Technology, USA), Antonio G. Marques (Universidad Rey Juan Carlos, Spain), Mohak Goyal (Indian Institute of Technology Bombay, India), Samuel Rey-Escudero (King Juan Carlos University, Spain) .....	508
<i>On Approximate Nonlinear Gaussian Message Passing on Factor Graphs</i>	
Eike Petersen (University of Luebeck, Germany), Christian Hoffmann (University of Lübeck, Germany), Philipp Rostalski (University of Lübeck & Institute for Electrical Engineering in Medicine, Germany) .....	513

## Adaptive signal processing

<i>Recursive Least Complex Signum Algorithm</i>	
Shin'ichi Koike (Consultant, Japan) .....	518
<i>Optimal Constraint Vectors for Set-membership Proportionate Affine Projection Algorithms</i>	
Marcelo Spelta (Universidade Federal do Rio de Janeiro, Brazil), Wallace A. Martins (Federal University of Rio de Janeiro, Brazil) .....	523
<i>An <math>\ell_1</math>-Penalization of Adaptive Normalized Quasi-Newton Algorithm for Sparsity-aware Generalized Eigenvector Estimation</i>	
Kengo Uchida (Tokyo Institute of Technology, Japan), Isao Yamada (Tokyo Institute of Technology, Japan) .....	528
<i>Sparsity-aware adaptive proximal forward-backward splitting under the principle of minimal disturbance</i>	
Masao Yamagishi (Tokyo Institute of Technology, Japan), Isao Yamada (Tokyo Institute of Technology, Japan) .....	533
<i>Non-parametric online change-point detection with kernel LMS by relative density ratio estimation</i>	
Ikram Bouchikhi (Université côte d'Azur, France), André Ferrari (Université de Nice Sophia-Antipolis, France), Cédric Richard (Université de Nice Sophia-Antipolis, France), Anthony Bourrier (Thales Alenia Space, France), Marc Bernot (Thales Alenia Space, France) .....	538
<i>An Adaptive Learning Approach to Parameter Estimation for Hybrid Petri Nets in Systems Biology</i>	
Peter Vieting (RWTH Aachen University, Germany), Rodrigo C. de Lamare (Pontifical Catholic University of Rio de Janeiro & University of York, Brazil), Lukas Martin (University Hospital RWTH Aachen, Germany), Guido Dartmann (University of Applied Sciences Trier, Germany), Anke Schmeink (RWTH Aachen University, Germany) .....	543
<i>Union of subspaces signal detection in subspace interference</i>	
Muhammad Asad Lodhi (Rutgers, USA), Waheed U. Bajwa (Rutgers University-New Brunswick, USA) .....	548

## Data driven methods

<i>Distributed Particle Metropolis-Hastings schemes</i> Luca Martino (University of Helsinki, Finland), Víctor Elvira (IMT Lille Douai, France), Gustau Camps-Valls (Universitat de València, Spain) .....	553
<i>A comparison of clipping strategies for importance sampling</i> Luca Martino (University of Helsinki, Finland), Víctor Elvira (IMT Lille Douai, France), Joaquin Míguez (Universidad Carlos III de Madrid, Spain), Antonio Artés-Rodríguez (Universidad Carlos III de Madrid, Spain), Petar M. Djurić (Stony Brook University, USA) .....	558
<i>Wavelet domain bootstrap for testing the equality of bivariate self-similarity exponents</i> Herwig Wendt (University of Toulouse, CNRS, France), Patrice Abry (Ecole Normale Supérieure, Lyon, France), Gustavo Didier (Tulane University, USA) .....	563
<i>Audio classification based on weakly labeled data</i> Chieh-Feng Cheng (Georgia Institute of Technology, USA), David Anderson (Georgia Institute of Technology, USA), Mark Davenport (Georgia Institute of Technology, USA), Abbas Rashidi (University of Utah, USA) .....	568
<i>Multivariate Time-Series Analysis Via Manifold Learning</i> Pedro L. C. Rodrigues (GIPSA-lab, France), Marco Congedo (GIPSA-lab, France), Christian Jutten (GIPSA-Lab, France) .....	573
<i>Multipath Mitigation in Global Navigation Satellite Systems Using a Bayesian Hierarchical Model with Bernoulli Laplacian Priors</i> Julien Lesouple (University of Toulouse & TESA Laboratory, France), Jean-Yves Tourneret (University of Toulouse & ENSEEIHT, France), Mohamed Sahnoudi (Telespazio France, France), Franck Barbiero (CNES, France), Frédéric Faurie (M3 Systems, France) .....	578

## Sparsity in estimation

<i>A Low-Complexity Sub-Nyquist Blind Signal Detection Algorithm for Cognitive Radio</i> Kai Cao (National Digital Switching Engineering Technological Research Center, P.R. China), Peizhong Lu (Fudan University, P.R. China) .....	583
<i>Hierarchical Sparsity Within and Across Overlapping Groups</i> Ilker Bayram (Analog Devices Inc., USA) .....	588
<i>Adaptive Period Estimation for Sparse Point Processes</i> Hans-Peter Bernhard (Johannes Kepler University Linz, Austria), Andreas Springer (Johannes Kepler University Linz, Austria) .....	593
<i>Blind Sparse Recovery Using Imperfect Sensor Networks</i> Peter Jung (TU-Berlin, Communications and Information Theory Group & Fraunhofer HHI - Heinrich Hertz Institute, Germany), Martin Genzel (Technische Universität Berlin, Germany) .....	598
<i>Signal-to-noise-ratio Analysis of Compressive Data Acquisition</i> Radmila Pribić (Thales Nederland BV Delft, The Netherlands), Geert Leus (Delft University of Technology, The Netherlands), Christos Tzotzadinis (Delft University of Technology, The Netherlands) .....	603
<i>Sparsity-Enabled Step Width Adaption for Linearized Bregman based Algorithms</i> Michael Lunglmayr (Johannes Kepler University Linz, Austria), Mario Huemer (Johannes Kepler University Linz, Austria) .....	608
<i>Joint Sensing Matrix Design and Recovery Based on Normalized Iterative Hard Thresholding for Sparse Systems</i> Qianru Jiang (Zhejiang University of Technology, P.R. China), Rodrigo C. de Lamare (Pontifical Catholic University of Rio de Janeiro & University of York, Brazil), Yury Zakharov (University of York, United Kingdom (Great Britain)), Sheng Li (Zhejiang University of Technology, P.R. China), Xiong Xiong He (Zhejiang University of Technology, P.R. China) .....	613
<i>Sparsity problem involving rational basis functions</i> Péter Kovács (Eötvös L. University, Hungary) .....	618

<i>Sparse Bayesian Learning for Directions of Arrival on an FPGA</i>	
Herbert Groll (TU Wien, Austria), Christoph F Mecklenbräuker (Vienna University of Technology, Austria), Peter Gerstoft (University of California, San Diego, USA) .....	623

## Bayesian modeling and inference for localization and tracking

<i>Multiple Target Tracking with Uncertain Sensor State Applied to Autonomous Vehicle Data</i>	
Markus Fröhle (Chalmers University of Technology, Sweden), Karl Granström (Chalmers University of Technology, Sweden), Henk Wymeersch (Chalmers University of Technology, Sweden) .....	628
<i>On the Use of MPC Amplitude Information in Radio Signal Based SLAM</i>	
Erik Leitinger (Lund University & Graz University of Technology, Austria), Stefan Grebien (Graz University of Technology, Austria), Xuhong Li (Lund University, Sweden), Fredrik Tufvesson (Lund University, Sweden), Klaus Witrisal (Graz University of Technology, Austria) .....	633
<i>Linear distributed algorithms for localization in mobile networks</i>	
Sam Safavi (Tufts University, USA), Usman Khan (Tufts University, USA), Soumya Kar (Carnegie Mellon University, USA), Jose Moura (Carnegie Mellon University, USA) .....	638
<i>A Single Satellite Geolocation Solution of an RF Emitter Using a Constrained Unscented Kalman Filter</i>	
Patrick Ellis (University of California at Santa Cruz & Southwest Research Institute, USA), Farid Dowla (University of California at Santa Cruz, USA) .....	643
<i>Precise Vehicle Positioning by Cooperative Feature Association and Tracking in Vehicular Networks</i>	
Mattia Brambilla (Politecnico di Milano, Italy), Gloria Soatti (Politecnico di Milano, Italy), Monica Nicoli (Politecnico di Milano, Italy) .....	648
<i>Target Tracking Using a Distributed Particle-PDA Filter with Sparsity-Promoting Likelihood Consensus</i>	
Rene Repp (TU Wien, Austria), Pavel Rajmic (Brno University of Technology, Czech Republic), Florian Meyer (Massachusetts Institute of Technology, USA), Franz Hlawatsch (Vienna University of Technology, Austria) .....	653
<i>Estimation of Spatial Fields of NLOS/LOS Conditions for Improved Localization in Indoor Environments</i>	
Eva Arias-de-Reyna (University of Seville, Spain), Davide Dardari (University of Bologna, Italy), Pau Closas (Northeastern University, USA), Petar M. Djurić (Stony Brook University, USA) .....	658
<i>Sequential MCMC with the discrete bouncy particle sampler</i>	
Soumyasundar Pal (McGill University, Canada), Mark Coates (McGill University, Canada) .....	663

## Detection and estimation

<i>Quadratic-Inverse Estimates of Autocorrelation</i>	
David Thomson (Queen's University, Canada) .....	668
<i>Limitations of Constrained CRB and an Alternative Bound</i>	
Eyal Nitzan (Ben-Gurion University of the Negev, Israel), Tirza Routtenberg (Ben Gurion University of the Negev, Israel), Joseph Tabrikian (Ben-Gurion University of the Negev, Israel) .....	673
<i>An Edge Exclusion Test for Complex Gaussian Graphical Model Selection</i>	
Jitendra Tugnait (Auburn University, USA) .....	678
<i>Classification of Local Field Potentials using Gaussian Sequence Model</i>	
Taposh Banerjee (Harvard University, USA), John Choi (NYU, USA), Bijan Pesaran (NYU, USA), Demba E Ba (Massachusetts Institute of Technology, USA), Vahid Tarokh (Harvard University, USA) .....	683

<i>Detecting and Estimating Multivariate Self-Similar Sources in High-Dimensional Noisy Mixtures</i> Patrice Abry (Ecole Normale Supérieure, Lyon, France), Herwig Wendt (University of Toulouse, CNRS, France), Gustavo Didier (Tulane University, USA) .....	688
<i>Limitations of Decision Based Pile-up Correction Algorithms</i> Christopher Mclean (The University of Melbourne, Australia), Michael Pauley (The University of Melbourne, Australia), Jonathan H. Manton (School of Engineering, The University of Melbourne, Australia) .....	693
<i>A Group Invariance Approach To A Very Weak LFM Signal Detection</i> Songsri Sirianunpiboon (Defence Science and Technology Group, Australia), Stephen D Howard (Defence Science and Technology Group, Australia), Stephen Elton (Defence Science and Technology Organisation, Australia) .....	698
<i>A Multitaper Test for the Detection of Non-stationary Processes using Canonical Correlation Analysis</i> François Marshall (Queen's University, Canada), Glen Takahara (Queen's University, Canada), David Thomson (Queen's University, Canada) .....	702
<i>A Unified Framework of Third Order Time and Frequency Domain Analysis for Neural Spike Trains</i> Yaoru Yang (University of York, United Kingdom (Great Britain)), David Halliday (University of York, United Kingdom (Great Britain)) .....	707

## Communication systems and networks

<i>Maximizing miss detection for covert communication under practical constraints</i> Gregory Dvorkind (Rafael, Israel), Asaf Cohen (Ben-Gurion University of the Negev, Israel) .....	712
<i>Regularized lattice reduction-aided ordered successive interference cancellation for MIMO detection</i> Jun Tong (University of Wollongong, Australia), Qinghua Guo (University of Wollongong, Australia), Jiangtao Xi (University of Wollongong, Australia), Yanguang Yu (University of Wollongong, Australia), Peter J. Schreier (Universitaet Paderborn, Germany) .....	717
<i>Improper Signaling for OFDM Underlay Cognitive Radio Systems</i> Mohammad Soleymani (The University of Tehran, Iran), Christian Lameiro (University of Paderborn, Germany), Peter J. Schreier (Universitaet Paderborn, Germany), Ignacio Santamaria (University of Cantabria, Spain) .....	722
<i>Minimum Symbol Error Rate-Based Constant Envelope Precoding for Multiuser Massive MISO Downlink</i> Mingjie Shao (The Chinese University of Hong Kong, P.R. China), Qiang Li (University of Electronic Science and Technology of China, P.R. China), Wing-Kin Ma (The Chinese University of Hong Kong, Hong Kong), Anthony Man-Cho So (The Chinese University of Hong Kong, Hong Kong) .....	727
<i>Adaptive EM-based algorithm for cooperative spectrum sensing in mobile environments</i> Jesus Perez (University of Cantabria, Spain), Ignacio Santamaria (University of Cantabria, Spain), Javier Vía (University of Cantabria, Spain) .....	732
<i>Detection of Pilot Spoofing Attack over Frequency Selective Channels</i> Jitendra Tugnait (Auburn University, USA) .....	737
<i>Robust Low Complexity Digital Self Interference Cancellation for Multi Channel Full Duplex Systems</i> Shachar Shayovitz (University of Tel Aviv, Israel), Dan Raphaeli (Tel Aviv University, Israel) .....	742
<i>Adaptive state estimation over lossy sensor networks fully accounting for end-to-end distortion</i> Bohan Li (University of California, Santa Barbara, USA), Tejaswi Nanjundaswamy (University of California, Santa Barbara, USA), Kenneth Rose (University of California, Santa Barbara, USA) .....	747

## Array processing

<i>Target Resolution Properties of the Multi-Tone Sinusoidal Frequency Modulated Waveform</i> David Hague (Naval Undersea Warfare Center, USA) .....	752
<i>Selective Cramer-Rao Bound for Estimation After Model Selection</i> Elad Meir (Ben Gurion University of the Negev, Israel), Tirza Routtenberg (Ben Gurion University of the Negev, Israel) .....	757
<i>Statistical Characterization of the Optimal Detector for a Signal with Time-Varying Phase Based on the Edgeworth Series</i> David Gómez-Casco (Universitat Autònoma de Barcelona, Spain), José A. López-Salcedo (Universitat Autònoma de Barcelona, Spain), Gonzalo Seco-Granados (Universitat Autònoma de Barcelona, Spain) .....	762
<i>Occupancy grid mapping for personal radar applications</i> Anna Guerra (University of Bologna, Italy), Francesco Guidi (CEA LETI, France), Jacopo Dall'Ara (University of Bologna, Italy), Davide Dardari (University of Bologna, Italy) .....	766
<i>An Efficient Greedy Algorithm for Finding the Nearest Simultaneous Diagonalizable Family</i> Riku Akema (Tokyo Institute of Technology, Japan), Masao Yamagishi (Tokyo Institute of Technology, Japan), Isao Yamada (Tokyo Institute of Technology, Japan) .....	771
<i>Constant Modulus Beamforming via Low-Rank Approximation</i> Amir Adler (MIT, USA), Mati Wax (Technion, USA) .....	776

## Optimization

<i>Robust Semi-Variance Downside Risk Portfolio Problems: A Convex Optimization Approach</i> Maobiao Yang (Guangdong University of Technology, P.R. China), Yongwei Huang (Guangdong University of Technology, P.R. China) .....	781
<i>Tight MMSE bounds for the AGN channel under KL divergence constraints on the input distribution</i> Michael Fauß (Technische Universität Darmstadt, Germany), Alex Dytso (Princeton University, USA), Abdelhak M Zoubir (Darmstadt University of Technology, Germany), Vincent Poor (Princeton University, USA) .....	786
<i>Global Optimisation for Time of Arrival-Based Localisation</i> Michael Pauley (The University of Melbourne, Australia), Jonathan H. Manton (School of Engineering, The University of Melbourne, Australia) .....	791
<i>Stochastic FISTA algorithms: so fast ?</i> Gersende Fort (CNRS, France), Laurent Risser (CNRS, France), Yves Atchadé (University of Michigan, France), Eric Moulines (Ecole Polytechnique, France) .....	796
<i>Optimal Portfolio Design for Statistical Arbitrage in Finance</i> Ziping Zhao (The Hong Kong University of Science and Technology, Hong Kong), Rui Zhou (The Hong Kong University of Science and Technology, Hong Kong), Zhongju Wang (Hong Kong Applied Science and Technology Research Institute (ASTRI), Hong Kong), Daniel P Palomar (Hong Kong University of Science and Technology, Hong Kong) .....	801
<i>A Riemannian Approach for Graph-Based Clustering by Doubly Stochastic Matrices</i> Ahmed Douik (California Institute of Technology, USA), Babak Hassibi (California Institute of Technology, USA) .....	806
<i>Sparse reduced rank regression with nonconvex regularization</i> Ziping Zhao (The Hong Kong University of Science and Technology, Hong Kong), Daniel P Palomar (Hong Kong University of Science and Technology, Hong Kong) .....	811
<i>Sparse Power Factorization with refined peakiness conditions</i> Dominik Stöger (Technical University of Munich, Germany), Jakob Geppert (Georg-August- Universität Göttingen, Germany), Felix Kraemer (Technische Universität München, Germany) .....	816
<i>The performance of box-relaxation decoding in massive MIMO with low-resolution ADCs</i> Christos Thrampoulidis (MIT, USA), Weiyu Xu (University of Iowa, USA) .....	821

*Optimal Privacy-enhancing and Cost-efficient Energy Management Strategies for Smart Grid Consumers*

Yang You (KTH Royal Institute of Technology, Sweden), Zuxing Li (CentraleSupélec & L2S, France), Tobias J. Oechtering (KTH Royal Institute of Technology, Sweden) ..... 826

**Online algorithms for static and dynamic robust PCA and compressive sensing**

*A Two-Stage Approach to Robust Tensor Decomposition*

Seyyid Emre Sofuoglu (Michigan State University, USA), Selin Aviyente (Electrical and Computer Engineering, Michigan State University, MI, USA) ..... 831

*Robust PCA and Robust Subspace Tracking: A Comparative Evaluation*

Sajid Javed (University of Warwick, United Kingdom (Great Britain)), Praneeth Narayanamurthy (Iowa State University, USA), Thierry Bouwmans (University of La Rochelle, France), Namrata Vaswani (Iowa State University, USA) ..... 836

*Online Estimation of Coherent Subspaces with Adaptive Sampling*

Greg Ongie (University of Michigan, USA), David Hong (University of Michigan, USA), Dejiao Zhang (University of Michigan, USA), Laura Balzano (University of Michigan, USA) ..... 841

*Compressive online decomposition of dynamic signals via  $n$ - $l_1$  minimization with clustered priors*

Huynh Van Luong (University of Erlangen-Nuremberg, Germany), Nikos Deligiannis (Vrije Universiteit Brussel, Belgium), Soren Forchhammer (Technical University of Denmark, Denmark), Andre Kaup (University of Erlangen-Nuremberg, Germany) ..... 846

*Online Power Iteration for Subspace Estimation Under Incomplete Observations: Limiting Dynamics and Phase Transitions*

Hong Hu (Harvard University, USA), Yue M. Lu (Harvard University, USA) ..... 851

*Data clustering using matrix factorization techniques for wireless propagation map reconstruction*

Junting Chen (University of Southern California, USA), Urbashi Mitra (University of Southern California, USA) ..... 856