CALL FOR PAPERS
IEEE International Conference on Multimedia and Expo (ICME) 2013
July 15-19, 2013 • Fairmont Hotel, San Jose, California, USA

With nearly 1200 submissions in 2011, the IEEE International Conference on Multimedia & Expo (ICME) has been the flagship multimedia conference sponsored by four IEEE societies since 2000. It serves as a forum to promote the exchange of the latest advances in multimedia technologies, systems, and applications from both the research and development perspectives of the circuits and systems, communications, computer, and signal processing communities. In 2013, an Exposition of multimedia products, animations and industries will be held in conjunction with the conference.

Authors are invited to submit a full paper (two-column format, 6 pages maximum) according to the guidelines available on the conference website at www.icme2013.org. Only electronic submissions will be accepted. Topics of interest include, but are not limited to:

- Speech, audio, image, video, text processing
- Signal processing for media integration
- 3D visualization, animation and virtual reality
- 3D imaging and 3DTV
- Multi-modal multimedia computing systems and human-machine interaction
- Multimedia communications and networking
- Multimedia security and content protection
- Multimedia databases and digital libraries
- Multimedia applications and services
- Media content analysis
- Multimedia standards and related issues
- Multimedia quality assessment

ICME 2013 aims to have high quality oral and poster presentations. Several awards sponsored by industrial and scholarly organizations will be presented. Best papers will be presented in a single-track session to all participants. Accepted papers must be presented at the conference in order to be included in the IEEE Xplore Library.

A number of Workshops will be organized by the sponsoring societies. To further foster new emerging topics, ICME 2013 also welcomes researchers, developers, and practitioners to organize regular Workshops. Potential organizers please contact the Workshop Chairs for further details. Proposals for Tutorials, Demos, and Exhibitions are also encouraged. Please visit the ICME 2013 website for submission details.

Regular Paper Abstract Submission: December 10, 2012
Regular Paper Submission: December 15, 2012
Workshop & Demo Paper Submission: February 20, 2013
Industrial & Application Short Paper Submission: March 31, 2013
Notification of Regular Paper Acceptance: March 1, 2013
Notification of Workshop and Demo Paper Acceptance: April 15, 2013
Camera-Ready Paper Due: April 30, 2013
Workshop Proposal Due: December 31, 2012
Tutorial Proposal Due: January 31, 2013

Conference Website: www.icme2013.org
Contact Email: webmaster@icme2013.org
This publication offers open access options for authors

IEEE Open Access Publishing

What does IEEE Open Access mean to an author?

- Top quality publishing with established impact factors
- Increased exposure and recognition as a thought leader
- A consistent IEEE peer-review standard of excellence
- Unrestricted access for readers to discover your publications
- Great way to fulfill a requirement to publish open access

Learn more about IEEE Open Access Publishing:
www.ieee.org/open-access

IEEE
Advancing Technology for Humanity
REGULAR PAPERS

Room Acoustics and Acoustic System Modeling
Spatial Encoding of Finite Difference Time Domain Acoustic Models for Auralization
http://dx.doi.org/10.1109/TASL.2012.2203806
A. Southern, D. T. Murphy, and L. Savioja

A Ray Tracing Simulation of Sound Diffraction Based on the Analytic Secondary Source Model
http://dx.doi.org/10.1109/TASL.2012.2203809
M. Okada, T. Onoye, and W. Kobayashi

Loudspeaker and Microphone Array Signal Processing
Stochastic and Analytic Optimization of Sparse Aperiodic Arrays and Broadband Beamformers With Robust Superdirective Patterns
http://dx.doi.org/10.1109/TASL.2012.2203808
M. Crocco and A. Trucco

A Modal Analysis of Spatial Discretization of Spherical Loudspeaker Distributions Used for Sound Field Synthesis
http://dx.doi.org/10.1109/TASL.2012.2208625
J. Ahrens and S. Spors

Optimal Real-Weighted Beamforming With Application to Linear and Spherical Arrays
http://dx.doi.org/10.1109/TASL.2012.2208626
V. Tourbabin, M. Agmon, B. Rafaely, and J. Tabrikian

Echo Cancellation
Novel Acoustic Feedback Cancellation Approaches in Hearing Aid Applications Using Probe Noise and Probe Noise Enhancement
http://dx.doi.org/10.1109/TASL.2012.2206025
M. Guo, S. H. Jensen, and J. Jensen

Source Separation and Signal Enhancement
A Generalized Directional Laplacian Distribution: Estimation, Mixture Models and Audio Source Separation
http://dx.doi.org/10.1109/TASL.2012.2201804
N. Mitianoudis
Content-Based Audio Processing
Selective Sampling for Beat Tracking Evaluation http://dx.doi.org/10.1109/TASL.2012.2205244 ................................. A. Holzapfel, M. E. P. Davies, J. R. Zapata, J. L. Oliveira, and F. Gouyon 2539

Audio for Multimedia
Audio Watermarking Using Spatial Masking and Ambisonics http://dx.doi.org/10.1109/TASL.2012.2205810 .............................. R. Nishimura 2461

Audio Processing Systems
Bayesian Restoration of Audio Signals Degraded by Impulsive Noise Modeled as Individual Pulses http://dx.doi.org/10.1109/TASL.2012.2203811 .................................................. F. R. Ávila and L. W. P. Biscainho 2470

Speech Synthesis and Generation
Statistical Voice Conversion Techniques for Body-Conducted Unvoiced Speech Enhancement http://dx.doi.org/10.1109/TASL.2012.2205241 ...................................... T. Toda, M. Nakagiri, and K. Shikano 2505

Speech Enhancement
A CASA-Based System for Long-Term SNR Estimation http://dx.doi.org/10.1109/TASL.2012.2205242 ........................ A. Narayanan and D. Wang 2518
Supervised Graph-Based Processing for Sequential Transient Interference Suppression http://dx.doi.org/10.1109/TASL.2012.2205245 ........................................ R. Talmor, I. Cohen, S. Gannot, and R. R. Coifman 2528

Acoustic Modeling for Automatic Speech Recognition
Analysis of Extended Baum–Welch and Constrained Optimization for Discriminative Training of HMMs http://dx.doi.org/10.1109/TASL.2012.2203805 ................................. J. Pylkkönen and M. Karimo 2409

Speaker Characterization and Recognition
Statistical Utterance Comparison for Speaker Clustering Using Factor Analysis http://dx.doi.org/10.1109/TASL.2012.2204090 .......................... W. Jeon, C. Ma, and D. Macho 2482

Spoken Language Understanding
Automatic Parliamentary Meeting Minute Generation Using Rhetorical Structure Modeling http://dx.doi.org/10.1109/TASL.2012.2215592 ................................. J. J. Zhang and P. Fung 2492

Speech Data Mining and Document Retrieval

CORRESPONDENCE
Speech Analysis
An FIR Implementation of Zero Frequency Filtering of Speech Signals http://dx.doi.org/10.1109/TASL.2012.2207114 ................................. K. S. S. Srinivas and K. Prahallad 2613

EDICS—Editor’s Information and Classification Scheme ................................. 2618
Information for Authors .............................................................................. 2620
EDITORIAL

Message from the Vice President of Publications on New Developments in Signal Processing Society Publications

http://dx.doi.org/10.1109/TIP.2012.2218440 ............................................. M. Ostendorf 4506

PAPERS

Image and Video Representation

SNMFCA: Supervised NMF-Based Image Classification and Annotation http://dx.doi.org/10.1109/TIP.2012.2206040 ................................................................. L. Jing, C. Zhang, and M. K. Ng 4508

Multiresolution Processing of Images and Video

3D Steerable Wavelets in Practice http://dx.doi.org/10.1109/TIP.2012.2206044 .......................................................... N. Chenouard and M. Unser 4522

Restoration and Enhancement

Multiplicative Noise Removal via a Learned Dictionary http://dx.doi.org/10.1109/TIP.2012.2205007 ................................................................. Y.-M. Huang, L. Moisan, M. K. Ng, and T. Zeng 4534

Interpolation, Super-Resolution, and Mosaicing

Single Image Super-Resolution With Non-Local Means and Steering Kernel Regression http://dx.doi.org/10.1109/TIP.2012.2208977 ................................ K. Zhang, X. Gao, D. Tao, and X. Li 4544

Formation and Reconstruction

Alternating Direction Method for Balanced Image Restoration http://dx.doi.org/10.1109/TIP.2012.2206043 .......... S. Xie and S. Rahardja 4557

Biomedical and Biological Image Processing

Overlapping Cell Nuclei Segmentation Using a Spatially Adaptive Active Physical Model http://dx.doi.org/10.1109/TIP.2012.2206041 .......... M. E. Plissiti and C. Nikou 4568
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lossy Coding of Images and Video</td>
<td>Z. Chen, G. Barrenetxea, and M. Vetterli</td>
<td>4581</td>
</tr>
<tr>
<td>Distributed Successive Refinement of Multiview Images Using Broadcast Advantage</td>
<td><a href="http://dx.doi.org/10.1109/TIP.2012.2205008">http://dx.doi.org/10.1109/TIP.2012.2205008</a></td>
<td></td>
</tr>
<tr>
<td>Image and Video Processing for Watermarking and Security</td>
<td>C.-Y. Hsu, C.-S. Lu, and S.-C. Pei</td>
<td>4593</td>
</tr>
<tr>
<td>Image Feature Extraction in Encrypted Domain With Privacy-Preserving SIFT</td>
<td><a href="http://dx.doi.org/10.1109/TIP.2012.2204272">http://dx.doi.org/10.1109/TIP.2012.2204272</a></td>
<td></td>
</tr>
<tr>
<td>Tomographic Imaging</td>
<td>W. van Aarle, K. J. Batenburg, and J. Sijbers</td>
<td>4608</td>
</tr>
<tr>
<td>Automatic Parameter Estimation for the Discrete Algebraic Reconstruction Technique (DART)</td>
<td><a href="http://dx.doi.org/10.1109/TIP.2012.2206062">http://dx.doi.org/10.1109/TIP.2012.2206062</a></td>
<td></td>
</tr>
<tr>
<td>Tomographic Imaging</td>
<td>V. Venkataraman, G. Fan, J. P. Havlicek, X. Fan, Y. Zhai, and M. B. Yeary</td>
<td>4622</td>
</tr>
<tr>
<td>Image and Video Storage and Retrieval</td>
<td>J. Yu, M. Wang, and D. Tao</td>
<td>4636</td>
</tr>
<tr>
<td>Semisupervised Multiview Distance Metric Learning for Cartoon Synthesis</td>
<td><a href="http://dx.doi.org/10.1109/TIP.2012.2207395">http://dx.doi.org/10.1109/TIP.2012.2207395</a></td>
<td></td>
</tr>
<tr>
<td>Multimodal Graph-Based Reranking for Web Image Search</td>
<td>M. Wang, H. Li, D. Tao, K. Lu, and X. Wu</td>
<td>4649</td>
</tr>
<tr>
<td>CORRESPONDENCE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hardware and Software Systems for Computational Imaging</td>
<td>T. Treibitz and Y. Y. Schechner</td>
<td>4662</td>
</tr>
<tr>
<td>Turbid Scene Enhancement Using Multi-Directional Illumination Fusion</td>
<td><a href="http://dx.doi.org/10.1109/TIP.2012.2208978">http://dx.doi.org/10.1109/TIP.2012.2208978</a></td>
<td></td>
</tr>
<tr>
<td>Region, Boundary, and Shape Analysis</td>
<td>R. Hu, W. Jia, H. Ling, and D. Huang</td>
<td>4667</td>
</tr>
<tr>
<td>Multiscale Distance Matrix for Fast Plant Leaf Recognition</td>
<td>Z. G. Li, J. H. Zheng, and S. Rahardja</td>
<td>4672</td>
</tr>
<tr>
<td>Image and Video Synthesis, Rendering, and Visualization</td>
<td><a href="http://dx.doi.org/10.1109/TIP.2012.2207396">http://dx.doi.org/10.1109/TIP.2012.2207396</a></td>
<td></td>
</tr>
<tr>
<td>Detail-Enhanced Exposure Fusion</td>
<td>Z. G. Li, J. H. Zheng, and S. Rahardja</td>
<td>4677</td>
</tr>
<tr>
<td>EDICS-Editors Information Classification Scheme</td>
<td><a href="http://dx.doi.org/10.1109/TIP.2012.2207396">http://dx.doi.org/10.1109/TIP.2012.2207396</a></td>
<td></td>
</tr>
<tr>
<td>Information for Authors</td>
<td></td>
<td>4678</td>
</tr>
</tbody>
</table>
The International Conference on Image Processing (ICIP), sponsored by the IEEE Signal Processing Society, is the premier forum for the presentation of technological advances and research results in the fields of theoretical, experimental, and applied image and video processing. ICIP 2013, the twentieth in the series that has been held annually since 1994, and brings together leading engineers and scientists in image and video processing from around the world. Research frontiers in fields ranging from traditional image processing applications to evolving multimedia and video technologies are regularly advanced by results first reported in ICIP technical sessions. Topics include, but are not limited to:

- **Image/video coding and transmission**: Still image and video coding, stereoscopic and 3-D coding, distributed source coding, source/channel coding, image/video transmission over wireless networks
- **Image/video processing**: Image and video filtering, restoration and enhancement, image segmentation, video segmentation and tracking, morphological processing, stereoscopic and 3-D processing, feature extraction and analysis, interpolation and super-resolution, motion detection and estimation, color and multispectral processing, biometrics
- **Image formation**: Biomedical imaging, remote sensing, geophysical and seismic imaging, optical/natural hybrid image systems
- **Image scanning, display, and printing**: Scanning and sampling, quantization and halftoning, color reproduction, image representation and rendering, display and printing systems, image quality assessment
- **Image/video storage, retrieval, and authentication**: Image and video databases, image and video search and retrieval, multimodal image/video indexing and retrieval, authentication and watermarking
- **Applications**: Biomedical sciences, mobile imaging, geosciences and remote sensing, astronomy and space exploration, document image processing and analysis, other applications

**Paper Submission**: Prospective authors are invited to submit papers of not more than four (4) pages including results, figures and references. Papers will be accepted only by electronic submission at www.IEEEicip.org.

- **Submission of papers**: January 11, 2013
- **Notification of acceptance**: April 12, 2013
- **Submission of camera-ready papers**: May 10, 2013
- **Author registration**: June 6, 2013

**Tutorials**: Tutorials will be held on September 15, 2013. Brief proposals should be submitted by January 25, 2013 at the conference web site. Proposals for tutorials must include a title, an outline of the tutorial and its motivation, a short description of the material to be covered, contact information including name, affiliation, email, and mailing address for each presenter, and a two-page CV for each presenter.

**Special Sessions**: Special sessions expressions of interest should be submitted by November 30, 2012, at the conference web site. Final proposals for special sessions must include a session title, rationale, session outline, contact information and biography for the session chair(s), list of authors who have agreed to present a paper in the session, and a tentative title and abstract for each paper.

- **Special sessions expressions of interest due**: November 30, 2012
- **Notification of special sessions acceptance**: December 21, 2012
- **Tutorial proposals due**: January 25, 2013
- **Notification of tutorial acceptance**: March 6, 2013
IEEE TRANSACTIONS ON
INFORMATION FORENSICS
AND SECURITY
A PUBLICATION OF THE IEEE SIGNAL PROCESSING SOCIETY

www.signalprocessingsociety.org

OCTOBER 2012 VOLUME 7 NUMBER 5 ITIFA6 (ISSN 1556-6013)

EDITORIAL

New Developments in Signal Processing Society Publications http://dx.doi.org/10.1109/TIFS.2012.2217664 .......... M. Ostendorf 1425

PAPERS

System Models
Antivirus Software Shield Against Antivirus Terminators http://dx.doi.org/10.1109/TIFS.2012.2208026 ......... F.-H. Hsu, M.-H. Wu, C.-K. Tso, C.-H. Hsu, and C.-W. Chen 1439

Watermarking and Data Hiding/Embedding
Line-Based Cubism-Like Image—A New Type of Art Image and its Application to Lossless Data Hiding http://dx.doi.org/10.1109/TIFS.2012.2206250 .......... S.-C. Liu and W.-H. Tsai 1448
Spectral Watermarking for Parameterized Surfaces http://dx.doi.org/10.1109/TIFS.2012.2204251 .......... Y. Liu, B. Prabhakaran, and X. Guo 1459

Cryptographic and Related Techniques
Polar Coding for Secure Transmission and Key Agreement http://dx.doi.org/10.1109/TIFS.2012.2207382 ..... O. O. Koayluoglu and H. El Gamal 1472
Exploiting Channel Diversity in Secret Key Generation From Multipath Fading Randomness http://dx.doi.org/10.1109/TIFS.2012.2206385 ..... Y. Liu, S. C. Draper, and A. M. Sayeed 1484

Biometrics
Robust and Efficient Algorithms for Separating Latent Overlapped Fingerprints http://dx.doi.org/10.1109/TIFS.2012.2204254 .......... J. Feng, Y. Shi, and J. Zhou 1498
The OU–ISIR Gait Database Comprising the Large Population Dataset and Performance Evaluation of Gait Recognition http://dx.doi.org/10.1109/TIFS.2012.2206253 ..... H. Iwama, M. Okumura, Y. Makihiara, and Y. Yagi 1511
Memetically Optimized MCWLD for Matching Sketches With Digital Face Images http://dx.doi.org/10.1109/TIFS.2012.2204252 .......... H. S. Bhatt, S. Bharadwaj, R. Singh, and M. Vatsa 1522
Analysis of Facial Marks to Distinguish Between Identical Twins

3-D Face Recognition Using eLBP-Based Facial Description and Local Feature Hybrid Matching

Forensics

Image Forgery Localization via Fine-Grained Analysis of CFA Artifacts

Near-Duplicate Image Detection in a Visually Salient Riemannian Space

Video Query Reformulation for Near-Duplicate Detection

Security and Privacy Analysis

Enhancement of Secrecy of Block Ciphered Systems by Deliberate Noise

On the Characteristics of the Worm Infection Family Tree

Tipping Pennies? Privately. Practical Anonymous Micropayments

Applications

Performance Analysis of Content-Based Identification Using Constrained List-Based Decoding

EDICS—Editor’s Information Classification Scheme

Information for Authors
AVSS is the premier annual international conference in the field of video and signal-based surveillance that brings together experts from academia, industry, and government to advance theories, methods, systems, and applications related to surveillance. AVSS is sponsored by the IEEE and, in particular, by its two societies, the Signal Processing Society (IVMSP TC) and the IEEE Computer Society (PAMI TC).

AVSS will celebrate its 10th anniversary in Kraków in 2013. It has been steadily growing in both stature and attendance, from about 70 attendees in 1998 (Genova, Italy) to 125 in 2010 (Boston, USA) and 140 in 2011 (Klagenfurt, Austria). Even more attendees are expected in 2012 in Beijing, China.

AVSS focuses on underlying theory, methods, systems, and applications of surveillance and invites submissions in areas listed below, especially cross-disciplinary and game-changing ones. The list of topics of interest includes, but is not limited to:

- **Sensor-Centric Processing**
  - Sensors (visible/infrared/3D/mm-wave/audio/radio, etc.)
  - Ground, airborne, satellite based (fixed/mobile/UAV)
  - Crowdsourcing (cellular, social networks)
  - Calibration and positioning (GPS, etc.)
  - Communications and networked sensing

- **Data Management & Human-Computer Interaction**
  - Compression and summarization
  - Archival, search and retrieval
  - Human-computer interfaces
  - Visualization algorithms
  - Mobile and distributed interaction

- **Security and Privacy**
  - Data authenticity
  - Privacy in surveillance
  - Forensics
  - Biometrics (standoff, multi-modal, voice, etc.)
  - Cybersecurity for surveillance (wireless, network, computer)

- **Processing, Detection, Tracking & Recognition**
  - Modeling and feature selection
  - Detection and estimation (change, motion, anomaly, saliency, pattern)
  - Data association and (multi) target tracking
  - Classification and recognition
  - Multi-modal fusion

- **Analytics, Situation Awareness & Decision Making**
  - Activity/interaction analysis and monitoring
  - Intention estimation and situation awareness
  - Crowdsourcing-based methods
  - Cognitive dynamic systems and bio-inspired methods

- **Surveillance Systems and Applications**
  - Hardware and software architectures
  - Research prototypes
  - Simulators
  - Civilian, industrial, and military
  - Transportation (road, rail, air, maritime)
  - Performance evaluation

**About Kraków:** The royal capital of Poland until late 16th century, today Kraków is home to a quarter of the country’s museum resources. Visiting Kraków amounts to an encounter with the most splendid time in Polish history. Its Old City, where AVSS will be held, the Wawel Hill and the district of Kazimierz were all entered into the 1978 UNESCO World Heritage List. Beyond history, Kraków offers scenic walks, lots of artistic and cultural events, and rich gastronomy. Located in the heart of Central Europe, Kraków is easily accessible by air, rail and roadway.

**Paper Submission:** Prospective authors are invited to submit full-length papers, up to 6 pages long, by March 18, 2013. Detailed submission instructions will be posted on the conference website at www.avss2013.org in due time. Each submission will be double-blind peer-reviewed by at least two experts. The conference proceedings will be published in IEEE Xplore digital library.

**Call for Workshops:** AVSS-2013 will host workshops on August 27, 2013 prior to the technical program of the conference. Prospective organizers are invited to submit workshop proposals by February 18, 2013. Please visit the conference website at www.avss2013.org for additional information.

**Important dates:**

- **Workshop proposals:** February 18, 2013
- **Paper submission:** March 18, 2013
- **Paper acceptance:** May 20, 2013
- **Camera ready:** June 17, 2013
- **Early registration:** June 17, 2013
PAPERS

Media Conversion and Transcoding

A Transcoding System for Audio Standards http://dx.doi.org/10.1109/TMM.2012.2197191 ................................................. M. F. Mansour 1381

Feature Extraction and Representation

Audio-Based Objectionable Content Detection Using Discriminative Transforms of Time-Frequency Dynamics http://dx.doi.org/10.1109/TMM.2012.2195481 ................................................................. M. J. Kim and H. Kim 1390

Content Understanding and Knowledge Models

Learning Hierarchical Semantic Description Via Mixed-Norm Regularization for Image Understanding http://dx.doi.org/10.1109/TMM.2012.2194993 ................................................................. L. Li, S. Jiang, and Q. Huang 1401


Audio/Image/Video Segmentation for Interactive Services

Object Co-Segmentation Based on Shortest Path Algorithm and Saliency Model http://dx.doi.org/10.1109/TMM.2012.2197741 ................................................................. F. Meng, H. Li, G. Liu, and K. N. Ngan 1429

Quality of Service


Multimedia Streaming

Wireless Multimedia Communication
Correlation-Aware QoS Routing With Differential Coding for Wireless Video Sensor Networks
http://dx.doi.org/10.1109/TMM.2012.2194992 .............................................
R. Dai, P. Wang, and I. F. Akyildiz 1469

Wireless H.264 Video Quality Enhancement Through Optimal Prioritized Packet Fragmentation
http://dx.doi.org/10.1109/TMM.2012.2196308 .............................................
K. K. R. Kambhatla, S. Kumar, S. Paluri, and P. C. Cosman 1480

Consumer Electronics and Entertainment
Purposive Hidden-Object-Game: Embedding Human Computation in Popular Game
http://dx.doi.org/10.1109/TMM.2012.2198801 .............................................
J. Feng, Y. Ni, J. Dong, Z. Wang, and S. Yan 1496

EDICS—Editors Classification Scheme .......................................................... 1508
Information for Authors ................................................................................. 1509

ANNOUNCEMENTS
Call for Papers—IEEE International Conference on Multimedia and Expo (ICME) 2013 ............................................. 1511
EDITORIAL

Introduction to the Issue on Filtering and Segmentation With Mathematical Morphology
http://dx.doi.org/10.1109/JSTSP.2012.2217793 ........................................ L. Najman, J. Barrera, B. S. D. Sagar, P. Maragos, and D. Schonfeld 737

Tutorial on Connective Morphology
http://dx.doi.org/10.1109/JSTSP.2012.2220120 ......................................... J. Serra 739

Random Projection Depth for Multivariate Mathematical Morphology
http://dx.doi.org/10.1109/JSTSP.2012.2211336 ........................................ S. Velasco-Forero and J. Angulo 753

Non-Local Morphological PDEs and p-Laplacian Equation on Graphs With Applications in Image Processing and Machine Learning
http://dx.doi.org/10.1109/JSTSP.2012.2216504 ...................................... A. Elmoataz, X. Desquesnes, and O. Lézoray 764

Active Contours on Graphs: Multiscale Morphology and Graphcuts
http://dx.doi.org/10.1109/JSTSP.2012.2213675 ...................................... K. Drakopoulos and P. Maragos 780

First Departure Algorithms and Image Decompositions Into Peaks and Wells
http://dx.doi.org/10.1109/JSTSP.2012.2220694 ...................................... F. Meyer 795

Salience Adaptive Structuring Elements
http://dx.doi.org/10.1109/JSTSP.2012.2213578 ...................................... V. Ćurić, C. L. L. Hendriks, and G. Borgefors 809

Spatially and Intensity Adaptive Morphology
http://dx.doi.org/10.1109/JSTSP.2012.2214582 ...................................... J.-C. Pinoli and J. Debayle 820

Efficient Robust d-Dimensional Path Operators
http://dx.doi.org/10.1109/JSTSP.2012.2213578 ...................................... F. Cokelaer, H. Talbot, and J. Chanussot 830

One-Dimensional Openings, Granulometries and Component Trees in $O(1)$ Per Pixel
http://dx.doi.org/10.1109/JSTSP.2012.2210694 ...................................... V. Morard, P. Dokládal, and E. Decencière 840

Fast Morphological Image Processing Open-Source Extensions for GPU Processing With CUDA
http://dx.doi.org/10.1109/JSTSP.2012.2210695 ...................................... M. J. Thurley and V. Danell 849

Classification of Remote Sensing Optical and LiDAR Data Using Extended Attribute Profiles
http://dx.doi.org/10.1109/JSTSP.2012.2210177 ...................................... M. Pedergnana, P. R. Marpu, M. Dalla Mura, J. A. Benediktsson, and L. Bruzzone 856

Morphology-Based Crack Detection for Steel Slabs
http://dx.doi.org/10.1109/JSTSP.2012.2212436 ...................................... A. Landström and M. J. Thurley 866

Multiple Luminaire Identification in Airborne Images of Airport’s Approach Lighting Using Mathematical Morphology With Variable Length Structuring Elements
http://dx.doi.org/10.1109/JSTSP.2012.2214763 ...................................... S. P. Chowdhury, K. Rafferty, and S. Ferguson 876

Information for Authors ................................................................. 886
Call for Papers
IEEE Signal Processing Society
IEEE Journal of Selected Topics in Signal Processing

Special Issue on Video Coding: HEVC and beyond

Currently, video communication represents about half of the entire network traffic, with tendency for further increase. Therefore, techniques aiming at efficient compression of video are of paramount importance; an example is how to potentially avoid the “spectrum crunch” which is foreseen due to increasing traffic in mobile networks. Substantial amount of effort have been made in this area during the recent past years, which resulted in the new generation of video compression standard, called High Efficiency Video Coding (HEVC). For similar quality, the current architecture of HEVC only consumes half of the transmission bandwidth of the previous AVC/H.264 standard. The compression capability of HEVC establishes a new benchmark both in video and still image coding. This special issue is intended to provide a forum for recent research in HEVC standardization and possible add-on techniques, which would have potential to further improve its performance, or could even be used for future developments beyond HEVC.

We invite original and unpublished research contributions relevant to the following areas:

- **High coding efficiency techniques**
  Techniques proposed in the course of standardization, either relevant in the context of the HEVC standard or methods that have potential future development of video coding technology.

- **Video coding with high visual fidelity**
  Whereas conventional video codecs often target for optimization of PSNR, this does not necessarily match the visual quality related to human perception. The special issue solicits new techniques to improve visual quality, either in the context of HEVC or beyond.

- **Parallel visual signal coding techniques**
  Visual signal coding and communication must meet the challenges of processing resource constraints. Papers with new video coding architectures are particularly suitable for parallel coding implementation.

- **Analysis and synthesis coding**
  Visual information analysis before and during the coding process showed the future trends of visual signal coding. This special issue solicits emerging ideas and techniques of analysis and synthesis coding.

Prospective authors should visit [http://www.signalprocessingsociety.org/publications/periodicals/jstsp/](http://www.signalprocessingsociety.org/publications/periodicals/jstsp/) for information on paper submission. Manuscripts should be submitted using the Manuscript Central system at [http://mc.manuscriptcentral.com/jstspieee](http://mc.manuscriptcentral.com/jstspieee). Manuscripts will be peer reviewed according to the standard IEEE process.

Manuscript submission due: January 10, 2013
First review completed: March 10, 2013
Revised manuscript due: April 10, 2013
Second review completed: June 10, 2013
Final manuscript due: June 25, 2013

Guest editors:
Yun He, Tsinghua University, hey@tsinghua.edu.cn
Joern Ostermann, Leibniz Universität Hannover, ostermann@tnt.uni-hannover.de
Marek Domański, Poznań University of Technology, domanski@et.put.poznan.pl
Oscar C. Au, Hong Kong University of Science and Technology, eeaau@ust.hk
Nam Ling, Santa Clara University, nling@scu.edu
Call for Papers
IEEE Signal Processing Society
IEEE Journal of Selected Topics in Signal Processing

Special Issue on Non-cooperative Localization Networks

Localization of non-cooperative subjects refers to the process of locating subjects who are not intentionally participating in the localization process but still affect the radio spectrum in some way. The subjects may be actively avoiding localization, or they may be passive and not emitting any useful signals; however, a wireless network deployed to locate them may contain elements which actively transmit. Applications of this area include anti-terrorism or law enforcement, patient monitoring in medical facilities, and location-aware services and data-mining. In anti-terrorism and law-enforcement, the subjects are generally hostile and are trying to maintain a low radio profile; whereas in location-aware commercial services, the subjects may not mind being located, but they are still unlikely to actively assist the process.

Non-cooperative localization methods tend to fall under three categories: exploitation of a subject’s radio shadow, as in radio tomographic imaging (RTI); exploitation of a subject’s radio reflectance, as in multistatic radar or ultra wideband through-the-wall imaging; and exploitation of a subject’s radio emissions, as in radio frequency identification (RFID) tag tracking or tracking spurious emissions from a radio device’s local oscillator. This special issue covers the signal processing theory, modeling, and implementation issues particular to localization of non-cooperative subjects. The sensor network may consist of a single or multiple sensing modalities. Specific topics of interest include, but are not limited to:

• Localization of passive or device-free subjects
• Radio tomographic imaging
• Passive subject ultra wideband position location networks and through-the-wall human tracking
• Passive, multistatic radar and multi-target tracking
• Localization of RFID tags
• Localization of a radio device via its spurious or evasive emissions
• Signal processing for sparse localization networks: compressive sensing and statistical inversion
• Passive localization in the presence of multipath, non-line-of-sight, jamming, and/or interference
• Ad-hoc passive localization with a sparse matrix of nodes and/or with nodes dropping in and out
• Communication and routing protocols for RTI networks or RFID tag tracking networks

Prospective authors should visit http://www.signalprocessingsociety.org/publications/periodicals/jstsp/ for information on paper submission. Manuscripts should be submitted using the Manuscript Central system at http://mc.manuscriptcentral.com/jstsp-ieee. Manuscripts will be reviewed via the standard IEEE process.

Manuscript submission due: Jan. 17, 2013
First review completed: Apr. 10, 2013
Revised manuscript due: Jun. 10, 2013
Second review completed: Sep. 10, 2013
Final manuscript due: Oct. 1, 2013

Lead guest editor:
R. Michael Buehrer, Dept. of Electrical & Comp. Engineering, Virginia Tech., buehrer@vt.edu

Guest editors:
Christopher Anderson, Dept. of Electrical & Comp. Eng., The U.S. Naval Academy, canderso@usna.edu
Richard Martin, Dept. of Electrical & Comp. Eng., The Air Force Inst.of Technology, richard.martin@afit.edu
Neal Patwari, Dept. of Electrical & Comp. Engineering, The University of Utah, npatwari@ece.utah.edu
Michael Rabbat, Dept. of Electrical & Comp. Engineering, McGill University, michael.rabbat@mcgill.ca
A Message from the Vice President of Publications on New Developments in Signal Processing Society Publications

http://dx.doi.org/10.1109/LSP.2012.2217774 ............................................ M. Ostendorf 715

Audio and Electroacoustics

On the Noise Reduction Performance of a Spherical Harmonic Domain Tradeoff Beamformer

http://dx.doi.org/10.1109/LSP.2012.2220351 ............................................. D. P. Jarrett and E. A. P. Habets 773

Digital and Multirate Signal Processing

Signal Reconstruction in Multi-Windows Spline-Spaces Using the Dual System

http://dx.doi.org/10.1109/LSP.2012.2213591 ............................................. D. M. Onchis 729

A Reciprocal-Orthogonal Parametric Transform and Its Fast Algorithm

http://dx.doi.org/10.1109/LSP.2012.2220354 ............................................. S. Bouguezel 769

Image and Multidimensional Signal Processing

Object Tracking via 2DPCA and \( \ell_1 \)-Regularization

http://dx.doi.org/10.1109/LSP.2012.2215320 ............................................. D. Wang and H. Lu 711

Continuous Pose Normalization for Pose-Robust Face Recognition

http://dx.doi.org/10.1109/LSP.2012.2215586 ............................................. L. Ding, X. Ding, and C. Fang 721

Gaussian Mixture Model on Tensor Field for Visual Tracking

http://dx.doi.org/10.1109/LSP.2012.2215289 ............................................. X. Zhan and B. Ma 733

A Fast Template Matching Method With Rotation Invariance by Combining the Circular Projection Transform Process and Bounded Partial Correlation

http://dx.doi.org/10.1109/LSP.2012.2212010 ............................................. W.-C. Lee and C.-H. Chen 737

Non-Local Euclidean Medians

http://dx.doi.org/10.1109/LSP.2012.2217329 ............................................. K. N. Chaudhury and A. Singer 745

Boosting Object Retrieval With Group Queries

http://dx.doi.org/10.1109/LSP.2012.2216875 ............................................. Y. Chen, X. Li, A. Dick, and A. van den Hengel 765
Signal Processing for Communications

Cognitive Relay Networks With Multiple Primary Transceivers Under Spectrum-Sharing
http://dx.doi.org/10.1109/LSP.2012.2217327
T. Q. Duong, P. L. Yeoh, V. N. Q. Bao, M. Elkashlan, and N. Yang

741

Statistical Bit Allocation and Statistical Precoding for Correlated MIMO Channels With Decision Feedback
http://dx.doi.org/10.1109/LSP.2012.2202648
Y.-P. Lin and S.-M. Phoong

761

Speech Processing

FASTSUBS: An Efficient and Exact Procedure for Finding the Most Likely Lexical Substitutes Based on an N-Gram Language Model
http://dx.doi.org/10.1109/LSP.2012.2215587
D. Yuret

725

Statistical and Adaptive Signal Processing

A Low Complexity NSAF Algorithm
http://dx.doi.org/10.1109/LSP.2012.2215321
M. Rabiee, M. A. Attari, and S. Ghaemmaghami

716

Fault Detection and Mitigation in Kirchhoff Networks
http://dx.doi.org/10.1109/LSP.2012.2215328
I. Shames, A. M. H. Teixeira, H. Sandberg, and K. H. Johansson

749

Generalized Chernoff Information for Mismatched Bayesian Detection and Its Application to Energy Detection
http://dx.doi.org/10.1109/LSP.2012.2215585
Y. Lee and Y. Sung

753

Multi-Way Compressed Sensing for Sparse Low-Rank Tensors
http://dx.doi.org/10.1109/LSP.2012.2210872
N. D. Sidiropoulos and A. Kyrillidis

757

CORRESPONDENCE

Signal Processing for Communications

Errata to “Frequency Domain Echo Canceller for DMT-Based Systems”
http://dx.doi.org/10.1109/LSP.2012.2216571
F. Lindqvist and A. Fertner

720
LOUD AND CLEAR

FUNDAMENTAL TECHNOLOGIES
IN MODERN SPEECH RECOGNITION

BRAIN POWER
PREDICTING PROTEIN FUNCTIONAL SITES
THE MNIST DATABASE
SCOPE: IEEE Signal Processing Magazine publishes tutorial-style articles on signal processing research and applications, as well as columns and forums on issues of interest. Its coverage ranges from fundamental principles to practical implementation, reflecting the multidimensional facets of interests and concerns of the community. Its mission is to bring up-to-date, emerging and active technical developments, issues, and events to the research, educational, and professional communities. It is also the main Society communication platform addressing important issues concerning all members.

IEEE SIGNAL PROCESSING MAGAZINE (ISSN 1053-5888) (ISPREG) is published bimonthly by the Institute of Electrical and Electronics Engineers, Inc., 3 Park Avenue, 17th Floor, New York, NY 10016-5997 USA (+1 212 419 7900). Responsibility for the contents rests upon the authors and not the IEEE, the Society, or its members. Annual member subscriptions included in Society fee. Nonmember subscriptions available upon request. Individual copies: IEEE Members $20.00 (first copy only), non-members $157.00 per copy. Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limits of U.S. Copyright Law for private use of patrons: 1) those post-1977 articles that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923 USA; 2) pre-1978 articles without fee. Instructors are permitted to photocopy isolated articles for noncommercial classroom use without fee. For all other copying, reprint, or republication permission, write to IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854 USA. Copyright©2012 by the Institute of Electrical and Electronics Engineers, Inc. All rights reserved. Periodicals postage paid at New York, NY, and at additional mailing offices. Postmaster: Send address changes to IEEE Signal Processing Magazine, IEEE, 445 Hoes Lane, Piscataway, NJ 08854 USA. Canadian GST #125634188.

Digital Object Identifier 10.1109/MSP.2012.2212082

CONTENTS

SPECIAL SECTION—FUNDAMENTAL TECHNOLOGIES IN MODERN SPEECH RECOGNITION

16 FROM THE GUEST EDITORS
Sadaoki Furui, Li Deng, Mark Gales, Hermann Ney, and Keiichi Tokuda

18 LARGE- VOCABULARY CONTINUOUS SPEECH RECOGNITION SYSTEMS
George Saon and Jen-Tzung Chien

34 HEARING IS BELIEVING
Richard M. Stern and Nelson Morgan

44 SUBWORD MODELING FOR AUTOMATIC SPEECH RECOGNITION
Karen Livescu, Eric Fosler-Lussier, and Florian Metze

58 DISCRIMINATIVE TRAINING FOR AUTOMATIC SPEECH RECOGNITION
Georg Heigold, Hermann Ney, Ralf Schluter, and Simon Wiesler

70 STRUCTURED DISCRIMINATIVE MODELS FOR SPEECH RECOGNITION
Mark Gales, Shinji Watanabe, and Eric Fosler-Lussier

82 DEEP NEURAL NETWORKS FOR ACOUSTIC MODELING IN SPEECH RECOGNITION
Geoffrey Hinton, Li Deng, Dong Yu, George E. Dahl, Abdel-rahman Mohamed, Navdeep Jaitly, Andrew Senior, Vincent Vanhoucke, Patrick Nguyen, Tara N. Sainath, and Brian Kingsbury

98 EXEMPLAR-BASED PROCESSING FOR SPEECH RECOGNITION
Tara N. Sainath, Bhuvana Ramabhadran, David Nahamoo, Dimitri Kanevsky, Dirk Van Compernolle, Kris Demuynck, Jort Florent Gemmeke, Jerome R. Bellegarda, and Shiva Sundaram

114 MAKING MACHINES UNDERSTAND US IN REVERBERANT ROOMS
Takuya Yoshioka, Armin Sehr, Marc Delcroix, Reisuke Kinoshita, Roland Maas, Tomohiro Nakatani, and Walter Keller

127 MICROPHONE ARRAY PROCESSING FOR DISTANT SPEECH RECOGNITION
Kenichi Kumatani, John McDonough, and Bliksna Raj

FROM THE EDITOR
Open Access Publications: More Than a Business Model?
Abdelhak Zoubir

PRESIDENT’S MESSAGE
Open Access: Opportunity or Hype?
K.J. Ray Liu

SPECIAL REPORTS
Brain Power
John Edwards

READER’S CHOICE
Top Downloads in IEEE Xplore

BEST OF THE WEB
The MNIST Database of Handwritten Digit Images for Machine Learning Research
Li Deng

LIFE SCIENCES
Computational Prediction of Important Regions in Protein Sequences
Natalia Pietrosemoli, Daniel López, Aldo Segura-Cabrera, and Florencio Pazos

IN THE SPOTLIGHT
Application of Signal Processing to Address Wireless Data Demand
Allen B. MacKenzie and Luiz A. DaSilva

SOCIAL NEWS
148 DATES AHEAD
149 2012 INDEX
### 1. PERSONAL INFORMATION

Name as it should appear on IEEE MAILINGS: ___Home Address OR ___Business/School Address

If not indicated, a mail will be sent to home address. Note: Enter your name as you wish it to appear on membership card and all correspondence.

PLEASE PRINT: Do not exceed 40 characters or spaces per line. Abbreviate as needed. Please circle your last/first name as a key identifier for the IEEE database.

<table>
<thead>
<tr>
<th>TITLE</th>
<th>FIRST OR GIVEN NAME</th>
<th>MIDDLE NAME</th>
<th>SURNAME/(LAST NAME)</th>
<th>HOME ADDRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CITY</th>
<th>STATE/PROVINCE</th>
<th>POSTAL CODE</th>
<th>COUNTRY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Are you now or were you ever a member of IEEE? ___Yes ___No

If yes, please provide, if known:

MEMBERSHIP NUMBER _______________________

Grade ___________________ Year Membership Expired: ________________

### 3. BUSINESS/PROFESSIONAL INFORMATION

Company Name

Department/Division

Title/Position Years in Current Position

Years in the Profession Since Graduation ___PE State/Province

Street Address

City State/Province Postal Code Country

### 4. EDUCATION

A baccalaureate degree from an IEEE recognized educational program assures assignment of "Member" grade. For others, additional information and references may be necessary for grade assignment.

A. Baccalaureate Degree Received

Program/Course of Study

College/University Campus

State/Province Country Mo./Yr. Degree Received

B. Highest Technical Degree Received

Program/Course of Study

College/University Campus

State/Province Country Mo./Yr. Degree Received

### 5. Full signature of applicant

### 6. DEMOGRAPHIC INFORMATION

- ALL APPLICANTS -

<table>
<thead>
<tr>
<th>Date Of Birth</th>
<th>Day</th>
<th>Month</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 7. CONTACT INFORMATION

Office Phone/Office Fax

Home Phone/Home Fax

### 8. 2012 IEEE MEMBER RATES

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>$183.00</td>
<td>$91.50</td>
</tr>
<tr>
<td>Canada (incl. GST)</td>
<td>$163.90</td>
<td>$81.95</td>
</tr>
<tr>
<td>Norway (HST for Nrl. Nf and Orn)</td>
<td>$174.04</td>
<td>$87.47</td>
</tr>
<tr>
<td>Canada (incl. HST for Nova Scotia)</td>
<td>$177.70</td>
<td>$88.85</td>
</tr>
<tr>
<td>Canada (incl. HST for BC)</td>
<td>$177.85</td>
<td>$88.93</td>
</tr>
<tr>
<td>Africa, Europe, Middle East</td>
<td>$151.00</td>
<td>$75.50</td>
</tr>
<tr>
<td>Latin America</td>
<td>$142.00</td>
<td>$71.00</td>
</tr>
<tr>
<td>Asia, Pacific</td>
<td>$143.00</td>
<td>$71.50</td>
</tr>
</tbody>
</table>

Canadian Fees (GST/HST):

*All supplies, which include dues, Society membership fees, online products and publications (except CD-ROM and DVD media), shipped to locations within Canada are subject to the GST of 5% or the HST of 12% of which 13% or 15% depending on the Province to which the materials are shipped. GST and HST do not apply to Regional Assessments. (IEEE Canadian Business Number 125625118RT0001)

Value Added Tax (VAT) in the European Union: In accordance with the European Union Council Directive 2006/112/EC and 77/388/ECC, amended by Council Regulation (EC)2002/2008, IEEE is required to charge and collect VAT on electronic/digitalized products available to private consumers residing in the European Union. The VAT rate applied to the EU member country standard rate where the consumer is resident. (IEEE’s VAT registration number is GB205001507)

### 9. IEEE Membership Dues (See pricing in Section 8)

Signal Processing Society Fees

Canadian residents pay 5% GST or 13% HST Reg. No. 125634188 on Society payment(s) & pays only Tax $ ________

AMOUNT PAID WITH APPLICATION TOTAL $

Prices subject to change without notice

<table>
<thead>
<tr>
<th>Check or money order enclosed Payable to IEEE on a U.S. Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Express</td>
</tr>
<tr>
<td>Visa</td>
</tr>
<tr>
<td>MasterCard</td>
</tr>
</tbody>
</table>

Cardholder’s Name and Card Number Statement Address: IEEE USA Only

### 10. WERE YOU REFERRED?

___Yes ___No

If yes, please provide the following information:

Member Recruiter Name:

IEEE Recruiter’s Member Number (Required): ________

Full signature of applicant using card name

Date
Information for Authors
(Updated March 2012)

The IEEE TRANSACTIONS are published monthly covering advances in the theory and application of signal processing. The scope is reflected in the EDICS: the Editor’s Information and Classification Scheme. Please consider the journal with the most appropriate scope for your submission.

Authors are encouraged to submit manuscripts of Regular papers (papers which provide a complete disclosure of a technical premise), or Correspondences (brief items that describe a use for or magnify the meaning of a single technical point, or provide comment on a paper previously published in the TRANSACTIONS). Submissions/resubmissions must be previously unpublished and may not be under consideration elsewhere.

Every manuscript must (a) provide a clearly defined statement of the problem being addressed, (b) state why it is important to solve the problem, and (c) give an indication as to how the current solution fits into the history of the problem.

By submission/resubmission of your manuscript to this TRANSACTIONS, you are acknowledging that you accept the rules established for publication of manuscripts, including agreement to pay all overlength page charges, color charges, and any other charges and fees associated with publication of the manuscript. Such charges are not negotiable and cannot be suspended.

New and revised manuscripts should be prepared following the “New Manuscript Submission” guidelines below, and submitted to the online manuscript system ScholarOne Manuscripts. After acceptance, final manuscripts should be prepared following the “Final Manuscript Submission Guidelines” below. Do not send original submissions or revisions directly to the Editor-in-Chief or Associate Editors; they will access your manuscript electronically via the ScholarOne Manuscripts system.

New Manuscript Submission. Please follow the next steps.

1. Account in ScholarOne Manuscripts. If necessary, create an account in the online submission system ScholarOne Manuscripts. Please check first if you already have an existing account which is based on your e-mail address and may have been created for you when you reviewed or authored a previous paper.

2. Electronic Manuscript. Prepare a PDF file containing your manuscript in double-spaced format (one full blank line between lines of type) using a font size of 11 points or larger, having a margin of at least 1 inch on all sides. For a regular paper, the manuscript may not exceed 30 double-spaced pages, including title, names of authors and their complete contact information; abstract; text; all images, figures and tables; and all references.

Upload your manuscript as a PDF file “manuscript.pdf” to the ScholarOne Manuscripts site, then proofread your submission, confirming that all figures and equations are visible in your document before you “SUBMIT” your manuscript. Proofreading is critical; once you submit your manuscript, the manuscript cannot be changed in any way. You may also submit your manuscript as a PostScript or MS Word file. The system has the capability of converting your files to PDF, however it is your responsibility to confirm that the conversion is correct and there are no font or graphics issues prior to completing the submission process.

3. Double-Column Version of Manuscript. You are required to also submit a rough formatted version of the manuscript in single-spaced, double column IEEE format (10 points for a regular submission or 9 points for a Correspondence) using the IEEE style files (it is allowed to let long equations stick out). If accepted for publication, over length page charges are levied beginning with the 11th published page of your manuscript. You are, therefore, advised to be conservative in your submission. This double-column version submitted will serve as a confirmation of the approximate publication length of the manuscript and gives an additional confirmation of your understanding that over length page charges will be paid when billed upon publication.

Upload this version of the manuscript as a PDF file “double.pdf” to the ScholarOneManuscripts site.

4. Additional Material for Review. Please upload pdf versions of all items in the reference list which are not publicly available, such as unpublished (submitted) papers. Other materials for review such as supplementary tables and figures, audio fragments and QuickTime movies may be uploaded as well. Reviewers will be able to view these files only if they have the appropriate software on their computers. Use short filenames without spaces or special characters. When the upload of each file is completed, you will be asked to provide a description of that file.

5. Submission. After uploading all files and proofreading them, submit your manuscript by clicking “Submit.” A confirmation of the successful submission will open on screen containing the manuscript tracking number and will be followed with an e-mail confirmation to the corresponding and all contributing authors. Once you click “Submit,” your manuscript cannot be changed in any way.

6. Copyright Form and Consent Form. By policy, IEEE owns the copyright to the technical contributions it publishes on behalf of the interests of the IEEE, its authors, and their employers; and to facilitate the appropriate reuse of this material by others. To comply with the IEEE copyright policies, authors are required to sign and submit a completed “IEEE Copyright and Consent Form” prior to publication by the IEEE.

The IEEE recommends authors to use an effective electronic copyright form (eCF) tool within the ScholarOne Manuscripts system. You will be redirected to the “IEEE Electronic Copyright Form” wizard at the end of your original submission; please simply sign the eCF by typing your name at the proper location and click on the “Submit” button.

Correspondence Items. Correspondence items are short disclosures with a reduced scope or significance that typically describe a use for or magnify the meaning of a single technical point, or provide brief comments on material previously published in the TRANSACTIONS. These items may not exceed 12 pages in double-spaced format (3 pages for Comments), using 11 point type, with margins of 1 inch minimum on all sides, and including: title, names and contact information for authors, abstract, text, references, and an appropriate number of illustrations and/or tables. Correspondence items are submitted in the same way as regular manuscripts (see “New Manuscript Submission” above for instructions).

Manuscript Length. Papers published on or after 1 January 2007 can now be up to 30 pages, and any paper in excess of 10 pages will be subject to over length page charges. The IEEE Signal Processing Society has determined that the standard manuscript length shall be no more than 10 published pages (double-column format, 10 point type) for a regular submission, or 6 published pages for a Correspondence item, respectively. Manuscripts that exceed these limits will incur mandatory over length page charges, as discussed below. Since changes recommended as a result of peer review may require additions to the manuscript, it is strongly recommended that you practice economy in preparing original submissions.

Exceptions to the 30-page (regular paper) or 12-page (Correspondences) manuscript length may, under extraordinary circumstances, be granted by the Editor-in-Chief. However, such exception does not obviate your requirement to pay any and all over length or additional charges that attach to the manuscript.

Resubmission of Previously Rejected Manuscripts. Authors of rejected manuscripts are allowed to resubmit their manuscripts only once. The Signal Processing Society strongly discourages resubmission of rejected manuscripts more than once. At the time of submission, you will be asked whether you consider your manuscript to be a new submission or a resubmission of an earlier rejected manuscript. If you choose to submit a new version of your manuscript, you will be asked to submit supporting documents detailing how your new version addresses all of the reviewers’ comments.

Full details of the resubmission process can be found in the Signal Processing Society “Policy and Procedures Manual” at http://www.signalprocessingsociety.org/about/governance/policy-procedure/. Also, please refer to the decision letter and your Author Center on the on-line submission system.

Author Misconduct. This Author Misconduct Policy: Plagiarism includes copying someone else’s work without appropriate credit, using someone else’s work without clear delineation of citation, and the uncited reuse of an author's previously published work that also involves other authors. Plagiarism is unacceptable.

Self-plagiarism involves the verbatim copying or reuse of an author's own prior work without appropriate citation; it is also unacceptable. Self-plagiarism includes duplicate submission of a single journal manuscript to two different journals, and submission of two different journal manuscripts which overlap substantially in language or technical contribution.

Authors may only submit original work that has not appeared elsewhere in a journal publication, nor is under review for another journal publication. Limited overlap with prior journal publications with a common author is allowed only if it is necessary for the readability of the paper. If authors have used their own previously published work as a basis for a new submission, they are required to cite the previous work and very briefly indicate how the new submission offers substantively novel contributions beyond those of the previously published work.

It is acceptable for conference papers to be used as the basis for a more fully developed journal submission. Still, authors are required to cite related prior work; the papers cannot be identical; and the journal publication must include new aspects.

Author Misconduct Procedures: The procedures that will be used by the Signal Processing Society in the investigation of author misconduct allegations are described in the IEEE SPS Policies and Procedures Manual.
Author Misconduct Sanctions: The IEEE Signal Processing Society will apply the following sanctions in any case of plagiarism, or in cases of self-plagiarism that involve an overlap of more than 25% with another journal manuscript:
1) immediate rejection of the manuscript in question;
2) immediate withdrawal of all other submitted manuscripts by any of the authors, submitted to any of the Society’s publications (journals, conferences, workshops), except for manuscripts that also involve innocent co-authors; immediate withdrawal of all other submitted manuscripts by any of the authors, submitted to any of the Society’s publications (journals, conferences, workshops), except for manuscripts that also involve innocent co-authors;
3) prohibition against each of the authors for any new submissions, either individually, in combination with the authors of the plagiarizing manuscript, or in combination with new co-authors, to all of the Society’s publications (journals, conferences, workshops). The prohibition shall continue for one year from notice of suspension.

Further, plagiarism and self-plagiarism may also be actionable by the IEEE under the rules of Member Conduct.

Submission Format. Authors are encouraged to prepare manuscripts employing the on-line style files developed by IEEE. All manuscripts accepted for publication will require the authors to make final submission employing these style files. The style files are available on the web at http://www.ieee.org/publications_standards/publications/authors/authors_journals.html#sect2 under “Template for all Transactions.” (LaTeX and MS Word)

Authors using LaTeX: the two PDF versions of the manuscript submission for both can be produced by the IEEEtran.cls style file. A double-spaced document is generated by including \documentclass[12pt,draftcls,onecolumn]{IEEEtran}[IEEEtran] as the first line of the manuscript source file, and a single-spaced double-column document for estimating the publication page charges via \documentclass[10pt,twocolumn,twoside]{IEEEtran} for a regular submission, or \documentclass[10pt,twocolumn,twoside]{IEEEtran} for a Correspondence item.

• Title page and abstract: The first page of the manuscript shall contain the title, names and contact information for all authors (full mailing address, institutional affiliations, phone, fax, and e-mail), the abstract, and the EDICS. An asterisk * should be placed next to the name of the Corresponding Author who will serve as the main point of contact for the manuscript during the review and publication processes. An abstract should not have more than 200 words for a regular paper, or 50 words for a Correspondence item. The abstract should indicate the scope of the paper or Correspondence, and summarize the author’s conclusions. This will make the abstract, by itself, a useful tool for information retrieval.

• EDICS: All submissions must be classified by the author with an EDICS (Engineering Information Classification Scheme) selected from the list of EDICS published online at http://www.signalprocessingsociety.org/publications/periodicals/tpsp/TPSP-EDICS/

NOTE: EDICS are necessary to begin the peer review process. Upon submission of a new manuscript, please choose the EDICS categories that best suit your manuscript. Failure to do so will likely result in a delay of the peer review process.

• The EDICS category should appear on the first page—i.e., the title and abstract page—of the manuscript.

• Illustrations and tables: Each figure and table should have a caption that is intelligible without requiring reference to the text. Illustrations/tables may be inserted into the text of a newly-submitted manuscript, or placed at the end of the manuscript. (However, for the final submission, illustrations/ tables must be submitted separately and not interwoven with the text.) Illustrations in color may be used, but, unless the final publishing will be in color, the author is responsible that the corresponding grayscale figure is understandable.

In preparing your illustrations, note that in the printing process, most illustrations are reduced to single-column width to conserve space. This may result in as much as a 4:1 reduction from the original. Therefore, make sure that all words are in a type size that will reduce to a minimum of 9 points or 3/16 inch high in the printed version. Only the major grid lines on graphs should be indicated.

• Abbreviations: This TRANSACTIONS follows the practices of the IEEE on units and abbreviations, as outlined in the Institute’s published standards. See http://www.ieee.org/portal/cms_docs_iportal/tpsp/publications/authors/transjnl/unitsfo07.pdf for details.

• Mathematics: All mathematical expressions must be legible. Do not give derivations that are easily found in the literature; merely cite the reference.

Final Manuscript Submission Guidelines.

Upon formal acceptance of a manuscript for publication, instructions for providing the final materials required for publication will be sent to the Corresponding Author. Finalized manuscripts should be prepared in LaTeX or MS Word, and are required to use the style files established by IEEE, available at http://www.ieee.org/publications_standards/publications/authors/authors_journals.html#sect2.

Instructions for preparing files for electronic submission are as follows:
• Files must be self-contained; that is, there can be no pointers to your system setup.
• Include a header to identify the name of the TRANSACTIONS, the name of the author, and the software used to format the manuscript.
• Do not import graphics files into the text file of your finalized manuscript (although this is acceptable for your initial submission). If submitting on disk, use a separate disk for graphics files.
• Do not create special macros.
• Do not send PostScript files of the text.
• File names should be lower case.
• Graphics files should be separate from the text, and not contain the caption text, but include callouts like “(a)”, “(b)”. 
• Graphics file names should be lower case and named fig1.eps, fig2.tif, etc.
• Supported graphics types are EPS, PS, TIFF, or graphics created using Word, PowerPoint, Excel or PDF. Not acceptable is GIF, JPEG, WMF, PNG, BMP or any other format (JPEG is accepted for author photographs only). The provided resolution needs to be at least 600 dpi (400 dpi for color).
• Please indicate explicitly if certain illustrations should be printed in color; note that this will be at the expense of the author. Without other indications, color graphics will appear in color in the online version, but will be converted to grayscale in the print version.

Additional instructions for preparing, verifying the quality, and submitting graphics are available via http://www.ieee.org/publications_standards/publications/authors/authors_journals.html.

Multimedia Materials. IEEE Xplore can publish multimedia files and Matlab code along with your paper. Alternatively, you can provide the links to such files in a README file that appears on Xplore along with your paper. For details, please see http://www.ieee.org/publications_standards/publications/authors/authors_journals.html#sect6 under “Multimedia.” To make your work reproducible by others, the TRANSACTIONS encourages you to submit all files that can recreate the figures in your paper.

Page Charges.

Voluntary Page Charges. Upon acceptance of a manuscript for publication, the author(s) or his/her/their company or institution will be asked to pay a charge of $110 per page to cover part of the cost of publication of the first ten pages that comprise the standard length (six pages, in the case of Correspondences). Mandatory Page Charges. The author(s) or his/her/their company or institution will be billed $220 per each page in excess of the first ten published pages for regular papers and six published pages for correspondence items. These are mandatory page charges and the author(s) will be held responsible for them. They are not negotiable or voluntary. The author(s) signifies his/willfulness to pay these charges simply by submitting his/her/their manuscript to the TRANSACTIONS. The Publisher holds the right to withhold publication under any circumstance, as well as publication of the current or future submissions of authors who have outstanding mandatory page charge debt.

Color Charges. Color figures which appear in color only in the electronic (Xplore) version can be used free of charge. In this case, the figure will be printed in the hardcopy version in grayscale, and the author is responsible that the corresponding grayscale figure is intelligible. Color reproduction in print is expensive, and all charges for color are the responsibility of the author. The estimated costs are as follows. There will be a charge of $62.50 for each figure; this charge may be subject to change without notification. In addition, there are printing preparation charges which may be estimated as follows: color reproductions on four or fewer pages of the manuscript: a total of approximately $1045; color reproductions on five pages through eight pages: a total of approximately $2090; color reproductions on nine through 12 pages: a total of approximately $3135, and so on. Payment of fees for color reproduction is not negotiable or voluntary, and the author’s agreement to publish the manuscript in the TRANSACTIONS is considered acceptance of this requirement.

2013 IEEE International Workshop on Multimedia Signal Processing
Pula (Sardinia), Italy, September 30 – October 2, 2013

www.mmsp2013.org

MMSP 2013 is the 15th International Workshop on Multimedia Signal Processing. The workshop is organized by the Multimedia Signal Processing Technical Committee of the IEEE Signal Processing Society. This year’s event has a multimedia forensics theme. The workshop will bring together researchers and developers in both multimedia signal processing and multimedia forensics to share their latest achievements and explore future directions and synergies in these exciting areas.

Papers are solicited in (but not limited to) the following topics, covering this year’s theme and the general scope of multimedia signal processing:

- **Multimedia forensics**: Signal and data authentication, video surveillance, content identification, steganography and fingerprinting, counter-forensics, channel and source identification.
- **Client-cloud multimedia systems, applications, and experiences**: Image and video search, map-based applications, mobile-based multimedia applications, conferencing, virtual classrooms and distance learning, multimodal collaboration, telemedicine, online multiplayer gaming, context-aware multimedia experiences.
- **Multimedia for communication and collaboration**: Ad-hoc broadband sensor array, microphone and camera array, loudspeaker and display array, sensor calibration and synchronization, source separation, localization, de-noising, enhancement and spatialization.
- **Virtual reality signal processing**: Virtual reality and 3D imaging, 2D and 3D graphics/geometry animation, distributed virtual reality communication, 3D audio and video processing, haptics.
- **Scene analysis**: Audiovisual scene analysis; object detection, identification, and tracking; gesture, face, and human pose recognition; presence detection and activity classification; multimodal sensor fusion.
- **Coding**: Distributed/centralized source coding for sensor arrays, scalable source coding for multiparty conferencing, error/loss resilient coding, channel coding and error protection, multiview and depth coding.
- **Networking**: Voice and video over IP and wireless, quality monitoring and management, security, forensics, priority-based QoS, ad-hoc and real time communications, channel coding, packetization, synchronization.
- **Emerging topics in multimedia signal processing**: Crowdsourcing for multimedia, cloud-based video processing, compressed sensing, social networking, global/local image and video descriptors, and other emerging techniques.

**Top 10% Paper Award**
This award is granted to as many as 10% of the total paper submissions, and is open to all accepted papers. Papers will be evaluated based on originality, technical contribution, and presentation quality during the workshop.

**On-going Work Track**
Authors are invited to submit a 2-4 page description of new research ideas and on-going projects from all areas related to multimedia signal processing. The On-going Work Track aims to present research that is not mature enough to warrant a full paper but which would be of interest to the general community. Accepted papers will be presented as posters and included in the digital media of the workshop.

**Important Dates**

- Proposals for Special Sessions: February 15, 2013
- Full Paper (4-6 pages) Submissions (Regular and Special Sessions): April 1, 2013
- On-going Work Paper Submissions: June 30, 2013
- Notification to Authors: May 20, 2013
- Camera-ready Paper Submission: June 10, 2013
The first IEEE China Summit & International Conference on Signal and Information Processing (ChinaSIP 2013) will be held 6-10 July 2013 at the China National Convention Center (CNCC), Beijing, China.

Sponsored by the IEEE Signal Processing Society (SPS), ChinaSIP® is a new annual summit and international conference held in China for domestic and international scientists, researchers, and practitioners to network and discuss the latest progress in theoretical, technological, and educational aspects of signal and information processing. ChinaSIP is a unique platform developed by IEEE SPS to help colleagues in China engage with the global community, and offer global colleagues opportunities to network and develop international collaborations.

As the inaugural summit and conference, ChinaSIP 2013’s features include:

- **Technical tracks and industry forum.** Papers and presentations along the regular technical tracks as listed below focus on novel and significant research contributions. An industry forum provides a platform for exchange and networking among SIP industries as well as between academia and industries.

- **Invited papers and open-call papers.** Special invitations will be extended to major influential research groups in China to submit their latest contributions. Invited papers will be peer reviewed, and only papers with sufficient quality and significance will be accepted. In parallel, papers are also accepted through an open call from the community at large on a competitive basis.

- **Journal poster sessions.** Journal poster sessions provide a venue for overview and showcase of recent publications accepted by SPS journals. These already published journal papers will not be re-published with the ChinaSIP proceedings onto the IEEE Xplore®; a weblink and/or a reprint copy will be made available to attendees to facilitate-at-conference exchanges.

- **Professional development program.** Several professional development activities will be organized, such as townhall meetings with the SPS leadership, trends/overview sessions, publication (EIC/AE) panels, and Fellows development sessions.

- **Summer schools.** The conference will set up summer schools before the regular sessions begin for students, researchers and practitioners to learn the state-of-the-art technologies and tools.

The regular technical program tracks and topics include (but not limited to):

- Signal/Information Processing Theory and Methods
- Speech, Language, and Audio
- Image, Video, and Multimedia
- Signal Processing for Communications and Networking
- Signal Sensing, Radar, Sonar, and Sensor Networks
- SIP Hardware/Software Designs and Systems
- Information Forensics and Security
- Pattern Recognition and Machine Learning
- Signal/Info Processing for Bioinformatics & Bio/Medicine

**Submission of Papers**

The official language of the conference is English. Prospective authors are invited to submit up to 4 pages in length (with an optional 5th page containing only references). The conference proceedings will be published at the IEEE Xplore®, and will be indexed by both IEEE Xplore® and EI Compendex.

The IEEE Signal Processing Society enforces a “no-show” policy. Any accepted paper included in the final program is expected to have at least one author or qualified proxy attend and present the paper at the conference. Authors of the accepted papers included in the final program who do not attend and present at the conference will be added to a “No-Show List”, compiled by the Society. The “no-show” papers will not be published by IEEE on IEEE Xplore® or other public access forums, but these papers will be distributed as part of the on-site electronic proceedings and the copyright of these papers will belong to the IEEE.

**Important Dates**

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submission of Regular Full Papers</td>
<td>10 Jan 2013</td>
</tr>
<tr>
<td>Submission of Special Sessions &amp; Invited Papers</td>
<td>1 Feb 2013</td>
</tr>
<tr>
<td>Notification of Paper Acceptance</td>
<td>10 Apr 2013</td>
</tr>
<tr>
<td>Authors Registration Deadline</td>
<td>10 May 2013</td>
</tr>
<tr>
<td>Attendees Advanced Registration Deadline</td>
<td>1 Jun 2013</td>
</tr>
<tr>
<td>Summer School Dates</td>
<td>6-7 Jul 2013</td>
</tr>
<tr>
<td>Summit and Conference Dates</td>
<td>8-10 Jul 2013</td>
</tr>
</tbody>
</table>
SPAWC 2013
The 14th IEEE International Workshop on Signal Processing Advances in Wireless Communications

Call for Papers

SPAWC 2013, the 14th IEEE International Workshop on Signal Processing Advances for Wireless Communications, will be held in Darmstadt, Germany from June 16th to 19th 2013

The workshop is devoted to recent advances in signal processing for wireless and mobile communications, information and network theory. The technical program will feature keynote addresses and tutorials by leading researchers, as well as invited and contributed papers.

IMPORTANT DATES:
Submission deadline: February 4th, 2013
Notification of acceptance: March 29th, 2013
Final paper due: April 10th, 2013

PAPER SUBMISSION
Prospective authors are invited to submit papers in the following areas:

- Smart antennas, MIMO systems, and space-time coding
- Single-carrier, multi-carrier, and multi-rate systems
- Multiple access and broadcast channels, multi-user receivers
- Fundamental limits on capacity and performance analysis
- Cross-layer issues: from physical to networking and application layers
- Signal processing tools for ad-hoc, multi-hop, and sensor networks
- Cooperative communication, coordinated multipoint transmission and reception
- Cognitive networking
- Cooperative sensing and compressed sensing
- Distributed resource allocation and scheduling
- Ultra-wideband radio and RFID
- Time, frequency, spatial, multi-user diversity in fading channels
- Modeling, estimation and equalization of time-varying channels
- Acquisition, synchronization, and tracking (data aided or blind)
- Signal separation and interference rejection
- Source-channel coding
- Interference alignment
- Low-complexity implementations
- Novel communication modalities and technologies
- Signal Processing for nanonetworks and molecular communication

Up to a four page full paper, including figures, references, and paper classification categories should be submitted via EDAS. The paper must contain the name of the authors, affiliation, and contact information, including phone, and email. Comprehensive guidelines for paper preparation and submission can also be found on the paper preparation page.

General Co-Chairs:
Abdelhak M. Zoubir, TU Darmstadt, Germany
Slawomir Stanczak, TU Berlin, Germany

Technical Co-Chairs:
Ali H. Sayed, UCLA, USA
Sergio Barbarossa, Univ. Rome, Italy

Special Session Co-Chairs:
Nikos Sidiropoulos, Univ. of Minnesota, USA
Holger Boche, TU Munich, Germany

Tutorial Session Co-Chairs:
Fulvio Gini, Univ. Pisa, Italy
Anja Klein, TU Darmstadt, Germany

Finance Chair:
M. Pesavento, TU Darmstadt, Germany

Publication Chairs:
R. Cavalcante, HHI, Berlin, Germany
P. Pawelczak, HHI, Berlin, Germany

Organisation Chair:
D. Hildenbrand, TU Darmstadt, Germany

Publicity Chair:
Martin Schubert, TU Berlin, Germany

Secretary:
Christine Cramer, TU Darmstadt, Germany
The Fifth International Workshop on Computational Advances in Multi-Sensor Adaptive Processing
December 15-18, 2013, Radisson Blu Resort, Marina & Spa, Saint Martin, France

CALL FOR PAPERS
Following the success of the first four editions of the IEEE workshop on Computational Advances in Multi-Channel Sensor Array Processing, we are pleased to announce the fifth workshop in this series, sponsored by the Sensor Array and Multi-Channel Signal Processing Technical Committee of the IEEE Signal Processing Society. CAMSAP 2013 will be held at the Radisson Blu Resort, Marina & Spa in Saint Martin, a French-Dutch island in the Caribbean, and will feature a number of plenary talks from the world’s leading researchers in the area, special focus sessions, and contributed papers. All papers will undergo peer review in order to provide feedback to the authors and ensure a high-quality program.

COMMITTEE
General Co-Chairs
Aleksandar Dogandžić, Iowa State University, USA
Martin Haardt, Ilmenau University of Technology, Germany

Technical Program Co-Chairs
Saeed Gazor, Queen’s University, Canada
Volkan Cevher, EPFL, Switzerland

Finance Chair
Hongya Ge, New Jersey Institute of Technology, USA

Publicity Chair
Pu Wang, Stevens Institute of Technology, USA

Local Arrangement Chair
Jean-Yves Tourneret, University of Toulouse, France

IMPORTANT DATES
Special session proposals:
March 15, 2013
Full Four-Page Paper Submission:
July 12, 2013
Notification of Acceptance:
September 13, 2013
Final Paper Submission:
October 11, 2013

TOPICS OF INTEREST:
• Convex optimization and relaxation
• Computational linear & multi-linear algebra
• Computer-intensive methods in statistical SP (bootstrap, MCMC, EM, particle filtering)
• Distributed computing, estimation, and detection algorithms
• Sparse signal processing
• Emerging techniques

APPLICATIONS:
• Array processing, radar, sonar, waveform design, space-time processing
• Communication systems
• Sensor networks
• Smart grids
• Biomedical signal processing
• Computational imaging
• Emerging topics

For more information visit the website at: http://www.stevens.edu/camsap2013