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IEEE Signal Processing Magazine

SPM e-Newsletter

April 2007

Welcome to the opening issue of SPM e-Newsletter, a new form of publication introduced by the IEEE Signal Processing Magazine. The e-Newsletter will complement the bi-monthly Magazine to serve the members in the IEEE Signal Processing Society (SPS). Through email notification and expanded coverage on its website, the e-Newsletter will provide members with timely updates on:

- society and technical committee news,
- conference and publication opportunities, new books, and Ph.D. theses,
- signal processing related research opportunities, and
- activities in industry consortiums, local chapters, and government programs.

The e-Newsletter is a gateway to reach out to signal processing professionals around the world. We invite you to contribute and share your news with tens of thousands of SPS members through this monthly electronic publication with fast turn-around cycle! At the bottom of this web page you may find [instructions to submit news items and contact information of the e-Newsletter Team](#). Contributions submitted by **the 20th day of each month** will be considered for inclusion in the next month's e-Newsletter.

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1. Society News

SPS 2006 Major Awards Announced: IEEE Signal Processing Society congratulates the following SPS members who will receive the Society's 2006 prestigious awards during ICASSP 2007 in Honolulu, Hawaii.

SOCIETY AWARD

Petre Stoica, "for outstanding contributions to the theory and applications of statistical signal processing through fundamental research papers and prominent books."

TECHNICAL ACHIEVEMENT AWARDS

Arye Nehorai, "for fundamental contributions to sensor array processing with applications to radar, sonar, biomedicine, and the environment."

Chin-Hui Lee, "for exceptional contributions to the field of automatic speech recognition."

MERITORIOUS SERVICE AWARD

Richard V. Cox, "for exceptional and dedicated service over many years as a leader of the IEEE Signal Processing Society."

IEEE SIGNAL PROCESSING MAGAZINE BEST PAPER AWARD

Zixiang Xiong, Angelos D. Liveris and Samuel Cheng, for the paper entitled, "[Distributed Source Coding for Sensor Networks](#)," published in the *IEEE Signal Processing Magazine*, Volume 21, Number 5, September 2004.

BEST PAPER AWARDS

Eduard A. Jorswieck and Holger Boche, for the paper entitled, "[Optimal Transmission Strategies and Impact of Correlation in Multiantenna Systems with Different Types of Channel State Information](#)," published in the *IEEE Transactions on Signal Processing*, Volume 52, Number 12, December 2004.

Dinggang Shen and Christos Davatzikos, for the paper entitled, "[HAMMER: Hierarchical Attribute Matching Mechanism for Elastic Registration](#)," published in the *IEEE Transactions on Medical Imaging*, Volume 21, Number 11, November 2002.

Richard J. Kozick and Brian M. Sadler, for the paper entitled, "[Source Localization with Distributed Sensor Arrays and Partial Spatial Coherence](#)," published in the *IEEE Transactions on Signal Processing*, Volume

52, Number 3, March 2004.

Martin Vetterli, Pina Marziliano, and Thierry Blu for the paper entitled, "[Sampling Signals with Finite Rate of Innovation](#)," published in the *IEEE Transactions on Signal Processing*, Volume 50, Number 6, June 2002.

Gerald D. T. Schuller, Bin Yu, Dawei Huang, and Bernd Edler for the paper entitled, "[Perceptual Audio Coding Using Adaptive Pre- and Post-Filters and Lossless Compression](#)," published in the *Transactions on Speech and Audio Processing*, Volume 10, Number 6, September 2002.

YOUNG AUTHOR BESTER PAPER AWARD

Herbert Buchner and Robert Aichner, for the paper co-authored with Walter Kellermann entitled, "[A Generalization of Blind Source Separation Algorithms for Convolutional Mixtures Based on Second-Order Statistics](#)," published in the *IEEE Transactions on Speech and Audio Processing*, Volume 13, Number 1, January 2005.

Jean-François Chamberland, for the paper co-authored with Venugopal V. Veeravalli entitled, "[Decentralized Detection in Sensor Networks](#)," published in the *IEEE Transactions on Signal Processing*, Volume 51, Number 2, February 2003.

Joakim Jaldén, for the paper co-authored with Björn Ottersten entitled, "[On the Complexity of Sphere Decoding in Digital Communications](#)," published in the *IEEE Transactions on Signal Processing*, Volume 53, Number 4, April 2005.

Michael L. Seltzer, for the paper co-authored with Bhiksha Raj and Richard M. Stern entitled, "[Likelihood-Maximizing Beamforming for Robust Hands-Free Speech Recognition](#)," published in the *IEEE Transactions on Speech and Audio Processing*, Volume 12, Number 5, September 2004.

For more information about SPS awards, visit <http://www.ieee.org/organizations/society/sp/awards.html> .

37 SPS members elevated to IEEE Fellow: The IEEE Signal Processing Society congratulates these Society Members who were elevated to Fellow as of 1 January 2007. Each year, the IEEE Board of Directors confers the grade of Fellow on up to one-tenth percent of the members. To qualify for consideration, an individual must have been a Member, normally for five years or more, and a Senior Member at the time for nomination to Fellow. The grade of Fellow recognizes unusual distinction in IEEE's designated fields. Visit [this link](#) for full citations of these new fellows and more information about the Fellow program.

Ronald Aarts, Paul Antonik, Gregory Bottomley, Kwang-Cheng Chen, Tsuhan Chen, Grace Clark, Pierre Comon, Gary Elko, Wanda Gass, Fulvio Gini, John L. Hansen, Hsiao-Wuen Hon, Reginald Lagendijk, Sang-Uk Lee, Steven Leeb, Jerome Liang, Alexander Loui, Zhi-Quan Luo, Urbashi Mitra, Marc Moonen, Antonio Ortega, Ioannis Pitas, Nalini Ratha, Brian Sadler, Hideaki Sakai, Seiichi Sampei, Kiyohiro Shikano, John Smith, Athanasios Stouraitis, Reiner Thomae, Annamaria Varkonyi-Koczy, Rodney Vaughan, Maximus Viergever, Bo Wahlberg, Lihua Xie, Zixiang Xiong, Jar-Ferr Yang.

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2. Conference News

ICASSP 2007 Call for Participation. April 15-20, 2007, Honolulu, Hawaii. <http://www.icassp2007.com/>

The IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) is the world's largest and comprehensive technical conference focused on signal processing and its applications. The conference will feature world-class speakers, tutorials, exhibits, and over 50 lecture and poster sessions.

This year 2912 papers were submitted, out of which 1344 papers were accepted for presentation. The conference features 12 special sessions and 16 tutorials, offering a broad spectrum of choices for the attendees. Four outstanding [plenary speakers](#) will discuss the following emerging topics:

- Expanding Utility of the Amazing and Ubiquitous Cell Phone (*Irwin Mark Jacobs, Co-Founder and Chairman, QUALCOMM*)
- Fifty Years of Progress in Speech Recognition Technology -- Where we are, and where we should go (*Sadaoki Furui, Tokyo Institute of Technology*)
- Embedded Intelligence: Beyond Sensor Webs (*Shankar Sastry, University of California, Berkeley*)
- Network Media Distribution: A Decade of Revolution (*Philip R. Wiser, President and Chairman, Building B; Former Chief Technology Officer of Sony Corporation of America*)

Upcoming SPS Conferences	Location	Date	Tutorial/ Special Session	Submission Deadline
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'07)	Honolulu, Hawaii	Apr 16-20 2007		
IEEE Information Processing in Sensor Networks (IPSN'07)	Cambridge, MA	Apr 25-27 2007		
IEEE International Workshop on Genomic Signal Processing and Statistics (GENSIPS'07)	Tuusula, Finland	Jun 10-12, 2007		
IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC'07)	Helsinki, Finland	Jun 17-20, 2007		
IEEE International Conference on Multimedia & Expo (ICME'07)	Beijing, China	Jul 2-5, 2007		
IEEE Workshop on Statistical Signal Processing (SSP'07)	Madison, WI	Aug 26-30, 2007		
IEEE International Workshop on Machine Learning for Signal Processing (MLSP'07)	Thessaloniki, Greece	Aug 27-29, 2007	Apr 13, 2007 (competition)	Apr 13, 2007
IEEE International Conference on Image Processing (ICIP'07)	San Antonio, TX	Sep 16-19, 2007		
IEEE International Workshop on Multimedia Signal Processing (MMSP'07)	Chania, Crete	Oct 1-3, 2007		Apr 13, 2007
IEEE Conference on Signal Processing Systems (SIPS'07)	Shanghai, China	Oct 17-19, 2007		Apr 16, 2007
IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA'07)	New Paltz, NY	Oct 21-24, 2007		May 18, 2007
International Packet Video Workshop (PV'07)	Lausanne, Switzerland	Nov 12-13, 2007		May 15, 2007
IEEE Automatic Speech Recognition and Understanding Workshop (ASRU'07)	Kyoto, Japan	Dec 9-13, 2007	Sept. 24, 2007 (demo)	July 16, 2007
IEEE International Workshop on Computational Advances in Multi-channel Sensor Array Processing (CAMSAP'07)	U.S. Virgin Islands	Dec 12-14, 2007		Jun 1, 2007

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3. Publication News

Upcoming deadlines for **Signal Processing Magazine**: <http://www.ieee-spm.org/?i=cfp>

- Special Issue on [Spoken Language Technology](#): white paper June 1, 2007
- Special Issue on [Visual Cultural Heritage](#): white paper due July 1, 2007
- SPM [Columns/Forums](#) rolling submission deadlines

Journal of Selected Topics in Signal Processing (JSTSP) - A new SPS journal:

J-STSP is a new journal of the IEEE Signal Processing Society that emphasizes emerging technical areas within the discipline. The first issue of the journal will appear in June, and will be on the topic of "Adaptive Waveform Design for Agile Sensing and Communication." Other special issues with open submission dates are:

- "[Signal Processing and Networking for Dynamic Spectrum Access](#)" - Deadline: **15 April 2007**
- "[MIMO-Optimized Transmission Systems for Delivering Data and Rich Content](#)" - Deadline: 15 July 2007
- "[Genomic and Proteomic Signal Processing](#)" - Deadline: 1 September 2007

For more information on submitting papers to these special issues, or how to propose a topic for the journal, please visit the J-STSP website: <http://www.ece.byu.edu/jstsp> . Inquiries can be addressed to Prof. A. Lee Swindlehurst, *Editor-in-Chief* (Brigham Young University, UT, USA) - Email: swindle@ee.byu.edu

Recent Issues of SPS Sponsored and Co-sponsored Publications

IEEE Signal Processing Magazine ([Volume: 24, Issue: 2](#); [Cover](#); [Contents](#))
Special Section on "**Computer Generated Sounds and Music for All**"

IEEE Transactions on Audio, Speech and Language Processing ([Volume: 15, Issue: 3](#); [Table of contents](#))

IEEE Transactions on Image Processing ([Volume: 16, Issue: 4](#); [Table of contents](#))

IEEE Transactions on Information Forensics and Security ([Volume: 2, Issue: 1](#); [Table of Contents](#))

IEEE Transactions on Signal Processing ([Volume: 55, Issue: 4](#); [Table of Contents](#))

IEEE Signal Processing Letters ([Volume: 14, Issue: 4](#); [Table of Contents](#))

IEEE Transactions on Medical Imaging ([Volume: 26, Issue: 3](#))

IEEE Transactions on Mobile Computing ([Volume: 6, Issue: 4](#))

IEEE Transactions on Multimedia ([Volume: 9, Issue: 3](#))

IEEE Sensors Journal ([Volume: 7, Issue: 4](#))

IEEE Transactions on Wireless Communications ([Volume: 6, Issue: 3](#))

Computing in Science & Engineering Magazine ([Volume: 9, Issue: 2](#))

IEEE MultiMedia ([Volume: 14, Issue: 1](#))

Expanded Content Offering on IEEE Xplore - Online Course and Standards Subscriptions

IEEE members can now purchase individual courses from the "IEEE Expert Now" collection directly through the IEEE Xplore digital library. IEEE Expert Now courses feature IEEE's educational content delivered in one-hour, online courses. The interactive, multimedia, peer-reviewed course material contains the latest information on emerging technologies and cutting-edge trends presented by the leading experts in IEEE fields of interest. IEEE members can purchase each one-hour course for \$69.95, with unlimited online access for 30-days from date of purchase. To review the course catalog, visit <http://ieeexplore.ieee.org/modules/modulebrowse.jsp> .

Also newly available through the IEEE Xplore digital library are the IEEE Standards Online subscription packages. Subscribers can sign up for email notifications of new content and multiple search options, including searches by standard status and industry grouping. For more information on the IEEE Standards Online subscription packages, visit <http://www.ieee.org/digitalsubs> .

For more information and resources about IEEE educational activities, visit the IEEE Educational Activities Board (EAB) at <http://www.ieee.org/portal/pages/education/aboutus.html> .

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4. TC News

Speech and Language Processing Technical Committee (SLTC)

The IEEE Speech and Language Processing Technical Committee ([SLTC](#)) has undergone significant changes over the past year. One of the most significant and symbolic changes is the change in the TC's name from the Speech Processing Technical Committee to the Speech and Language Processing Technical Committee. This change is one of several outcomes of the efforts by the "SPS Ad-Hoc Committee of Advancing and Strengthening Speech" to help the IEEE Signal Processing Society embrace newer areas of spoken language processing in addition to the well-represented areas of speech coding, recognition, and synthesis. Outcomes of this committee's efforts include renaming the IEEE Transactions on Speech and Audio Processing to IEEE Transactions on Audio, Speech, and Language Processing, broadening the EDICS to reflect the range of topics within speech and spoken language processing, and creating a new biannual workshop on Spoken Language Technology.

Learn more about the first biannual workshop, the SLTC leadership and members, and SLTC's recent major effort through this [in-depth report](#).

Signal Processing Theory and Methods (SPTM) Technical Committee

The Signal Processing Theory and Methods ([SPTM](#)) Technical Committee of the IEEE Signal Processing Society promotes activities within the technical areas of DSP and statistical signal processing theory and methods. The scope of interests to SPTM have a broad span ranging from digital filtering and adaptive signal processing to statistical signal analysis, estimation and detection. The SPTM TC sponsors the annual IEEE Statistical Signal Processing (SSP) workshop. This year's SSP workshop will be held August 26-29, 2007, in Madison, Wisconsin, a vibrant city situated on a narrow isthmus between two large lakes. The scope of the workshop includes basic theory, methods and algorithms, and applications of statistical methods in signal processing. Prospective attendees are invited to visit the workshop's webpage at <http://ssp07.org> or the SPTM's webpage at <http://www.sptm.gatech.edu/> .

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5. Chapter News and Distinguished Lectures

Do you know? IEEE SPS provides travel support for local chapters to invite **SPS Distinguished Lecturers**. See [a list of 2006 and 2007 SPS DLs](#), and check below for upcoming **SPS Distinguished Lectures** near you.

Chapter	Dates	SPS Distinguished Lectures
Chicago, IL	9-10 April, 2007	Tsuhhan Chen: "Multiview Imaging: Convergence of Image, Vision, and Graphics" (April 9, Univ. Illinois at Chicago) and "Content Retrieval: Marriage of Signal Processing and Machine Learning" (April 10, Univ. of Illinois at Urbana-Champaign). Contact: [dans AT uic.edu]
Princeton / Central Jersey	24-Apr-2007	Robert Gray: "Extracting discrete information from a continuous world: Quantization, Compression, and Classification" (contact: hcheng AT sarnoff.com)
Washington / Maryland	27-Apr-2007	Robert Gray: "Quantization, Compression, and Classification: Extracting discrete information from a continuous world" (announcement)
Dallas, TX	10-Apr-2007	Luis Torres: "Distributed Video Coding: The New Video Coding Paradigm" (announcement)
Greece	5-14 June, 2007	Giorgios Giannakis: "Distributed Estimation Using Wireless Sensor Nets" (5-Jun-2007) and "Wireless Cooperative Communications" (14-Jun-2007) Contact: [thanos AT ee.upatras.gr]
Turkey	7-12 June, 2007	At METU Informatics Institute, Ankara (contact: yardimy AT ii.metu.edu.tr) <ul style="list-style-type: none"> · Giorgios Giannakis: "Distributed Estimation Using Wireless Sensor Nets" (7-Jun-2007) · Luis Torres: "Face Detection and Recognition" (8-Jun-2007) At Eskisehir Anadolu University (contact: atalaybarkan AT anadolu.edu.tr) <ul style="list-style-type: none"> · Giorgios Giannakis: "Wireless Cooperative Communications" (11-Jun-2007) · Luis Torres: "Distributed Video Coding" (12-Jun-2007)
Chapter	Dates	Other Upcoming Events
Long Island, NY	15-May-2007	Shervin Erfani (SUNY Farmingdale): " The Laplace and Fourier Transform: A Personal Perspective "

Chapter Activities at A Glance

IEEE SPS United Kingdom and Republic of Ireland Chapter

The United Kingdom and Republic of Ireland (UKRI) Chapter has been very active organizing scientific seminars on innovative research work by leading experts from academia and industry. From December to March, the Chapter has hosted three seminars, two SPS Distinguished Lectures, and a research exchange visit between an industry regulator and university research group. Learn more from this exclusive [in-depth report](#).

IEEE SPS Chicago Chapter

The Chicago Chapter of the IEEE Signal Processing Society held a series of seminars in various technical areas. Among the speakers presenting were several IEEE Signal Processing Society Distinguished Lecturer Speakers including C.C. Jay Kuo from the University of Southern California, Robert M. Gray from Stanford University, and Georgios B. Giannakis from the University of Minnesota. The chapter is scheduled to host another IEEE Signal Processing Society Distinguished Lecturer this month, Tsuhan Chen from Carnegie-Mellon University. For additional information about upcoming events, please contact Dan Schonfeld from the University of Illinois at Chicago or consult the IEEE Signal Processing Society [Chicago Chapter web site](#). Dan Schonfeld also serves as the Representative of Regions 1-6 to the SPS Chapters Committee. Please contact him if you need assistance in creating a new signal processing chapter in your section.

IEEE SPS Washington Chapter Established

Over 200 SPS members from the D.C. metropolitan area have formed a new SPS local chapter in 2006. The new SPS Washington chapter will foster interactions among members, create opportunities for them to share common interests, and facilitate collaborations and career development. Dr. Rama Chellappa, Minta Martin Professor of Engineering at University of Maryland, delivered a lecture at the opening event on September 20, 2006. Chellappa spoke on the subject of face and gait recognition research, by which the latest advances are enabling the integration of biometrics into video-based surveillance systems for homeland security and other applications. He discussed the challenges in getting these biometrics to work reliably, and how innovative research can help address these problems. Click here to check out the [full story](#), and contact [washington.sps AT ieee.org] for more information about the chapter activities.

Interested in organizing a new SPS chapter, or participating activities in a SPS local chapter near you? Visit **Local Chapter Resources** at <http://www.ieee.org/organizations/society/sp/chapter.html> .

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6. Standard/Industry News

Learn [Standards in a Nutshell](#) from the latest issue of SPM on "**The H.264/AVC Video Coding Standard**" by T. Wiegand and G.J. Sullivan (March 2007, pp. 148-153).

Exploratory Stream Processing Research at IBM

The Exploratory Stream Processing Systems (ESPS) team at IBM's T.J. Watson Research Center is investigating fundamental research issues for the production and management of information from continuous data streams, from both a systems and algorithmic perspective. More and more applications seek to exploit valuable information captured from sensors ranging from cameras, to network packet capture devices, to instrumentation embedded in manufacturing machinery, to health or environmental sensors. Obtaining actionable information from these distributed, unstructured, noisy data streams requires applying machine learning, data mining, and signal processing techniques. Traditional database and transactional systems are not equipped to handle these processing requirements nor the volumes and real-time nature of incoming data streams. Stream processing systems provide a high performance and scalable alternative to transactional systems, but come with a wealth of research challenges. Learn more about stream processing and collaboration opportunities in the [in-depth report](#).

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7. Collaborative and Cross-disciplinary News

European Collaboration Project - SPEED (Signal Processing in the EncryptEd Domain)

[SPEED](#) is a new collaboration project funded by the European Commission's Information Security Technologies program, as part of a range of ideas for future and emerging technologies to be explored and realized. The goal of SPEED is to foster the advancement of the marriage between Signal Processing and Cryptographic techniques. By initiating and developing a totally new and unexplored interdisciplinary framework and technologies for signal processing in the encrypted domain, entirely new solutions will potentially emerge to the problem of security in multimedia communication/consumption and digital signal manipulations. [Click here](#) to learn more.

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8. New PhD Theses

Pedro Comesaña Alfaro (University of Vigo, Spain):

"Side-informed data hiding: robustness and security analysis," June 2006.

Advised by Prof. Fernando Pérez-González.

Whenever a researcher faces the design of a data hiding method, probably the two basic requirements that he/she will always take into account (besides perceptual imperceptibility) will be the robustness and security of that method. The core of this thesis is devoted to the analysis of these requirements for those data hiding methods with side information available at the embedder, i.e., where the embedder takes advantage of deterministically knowing the document to be watermarked. These methods, which currently constitute the state of the art of data hiding methods, have been extensively studied in the literature; there are however several important aspects which deserve attention and which have been analyzed in this thesis. Concerning the robustness analysis, one can highlight the computation of the exact probability of error of Distortion-Compensated Dither Modulation based on uniform quantizers and repetition coding under a wide range of attacks. Furthermore, a novel sensitivity attack, named the Blind Newton Sensitivity Attack, was proposed, showing to be effective against a wide range of state-of-the-art data hiding methods.

[Click here](#) to download the dissertation, or [contact the author](#).

Javier Latorre (Tokyo Institute of Technology, Japan):

"A study on speaker-adaptable multilingual synthesis," July 2006.

Advised by Prof. Sadaoki Furui.

In this thesis, a new method to synthesize multiple languages with any speaker's voice, regardless of the languages actually spoken by that speaker, is proposed. This permits, for example, to synthesize Japanese, Spanish or other language with the voice of a speaker who only speaks German. The hypothesis of this approach is that given a sufficient number of speakers, their average voice is the same for any language. To create this average voice, speech data from multiple speakers of different languages are normalized and used to train a set of speaker-independent multilingual Hidden Markov models. These models are then adapted to a target speaker by means of maximum likelihood linear regression and some minutes of speech data from that speaker. From these adapted models, HMM-based synthesis can now generate speech in any of the languages included in the initial models with a voice that resembles that of the target speaker.

[Click here](#) to download the dissertation, or contact the author at <javier.latorre AT toshiba.co.jp>.

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9. New Books

Multidimensional Signal, Image and Video Processing and Coding, John W. Woods, Academic Press, 2006.

[Contents] 1: Two-Dimensional Signals and Systems; 2: Sampling in Two-Dimensions; 3: Two-Dimensional Systems and Z-transforms; 4: 2-D Discrete Transforms; 5: Two-Dimensional Filter Design; 6: Introductory Image Processing; 7: Image Estimation and Restoration; 8: Digital Image Compression; 9: Three-Dimensional Signals and Systems Properties of 3-D Fourier Transform, 3-D Filters, 3-D Sampling Theorem; 10: Digital Video Processing; 11: Digital Video Compression; 12: Video Transmission over Networks.

Read the [book review](#) in the latest issue of SPM (March 2007, pp. 160-161) or visit the [publisher's site](#).

MIMO Wireless Communications, E. Bilgieri, A. R. Calderbank, A. G. Constantinides, A. Goldsmith, A. Paulraj and H. V. Poor (eds), Cambridge, UK: Cambridge University Press, 2006.

[Book Description From the Publisher](#): Multiple-input multiple-output (MIMO) technology constitutes a breakthrough in the design of wireless communications systems, and is already at the core of several wireless standards. Exploiting multipath scattering, MIMO techniques deliver significant performance enhancements in terms of data transmission rate and interference reduction. This book is a detailed introduction to the analysis and design of MIMO wireless systems. Beginning with an overview of MIMO technology, the authors then examine the fundamental capacity limits of MIMO systems. Transmitter design, including precoding and space-time coding, is then treated in depth, and the book closes with two chapters devoted to receiver design. Written by a team of leading experts, the book blends theoretical analysis with physical insights, and highlights a range of key design challenges. It can be used as a textbook for advanced courses on wireless communications, and will also appeal to researchers and practitioners working on MIMO wireless systems.

[Contents] Preface; Abbreviations; 1. Introduction; 2. Capacity limits of MIMO Systems; 3. Precoding design; 4. Space-time coding for wireless communications: principles and applications; 5. Fundamentals of receiver design; 6. Multiuser receiver design.

Multimedia over IP and Wireless Networks – Compression, Networking and Systems, M. van der Schaar, P. Chou (eds), Elsevier, 2007.

[Book Description From the Publisher](#): This all-inclusive, expertly structured contributed volume will serve as an indispensable guide for professionals or researchers working in areas like networking, communications, data compression, multimedia processing, streaming architectures, and computer graphics. Beginning with a concise overview of the fundamental principles and challenges of multimedia communication and networking, this book then branches off organically to tackle compression and networking next before moving on to systems, wireless multimedia and more advanced topics. The Compression section advises on the best means and methodology to ensure multimedia signal (images, text, audio and data) integrity for transmissions on wireless and wired systems. The Networking section addresses channel protection and performance. In the Systems section the focus is on streaming media on demand, live broadcast and video and voice's role in real-time communication. Wireless multimedia transmission and Quality of Service issues are discussed in the Wireless Multimedia section. An Advanced Topics section concludes the book with an assortment of topics including Peer-to-Peer multimedia communication and multipath networks.

[Contents] Ch1: Multimedia Networking And Communication / Ch2: Error Resilient Video / Ch3: Error Resilient Audio / Ch4: Bandwidth Adaptation Mechanisms / Ch5: Scalable Video Coding For Adaptive Streaming Applications / Ch6: Scalable Audio Coding / Ch7: Channel Protection Fundamentals / Ch8: Channel Modeling And Analysis For The Internet / Ch9: Forward Error Control / Ch10: Network-Adaptive Media Transport / Ch11: Mac-Layer Wireless Channel Models / Ch12: Cross-Layer Wireless Multimedia / Ch13: QoS Support In Wireless Environments / Ch14: Streaming Media On Demand / Ch15: Real Time Communication / Ch16: Adaptive Media Layout / Ch17: Path Diversity / Ch18: Distributed Video Coding And Applications / Ch19: Media Overlays

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10. Job Listing Portals

<http://careers.ieee.org/>

<http://jobs.phds.org/jobs/engineering/>

http://engineering.academickeys.com/seeker_job.php

Contributors of articles in this issue:

Marwan Al-Akaidi, Lisa Amini, Roberto Pieraccini, Mike Seltzer, Dan Schonfeld, and G. Tong Zhou.

Submission Instructions - Contribution for the May'07 Issue Due April 20, 2007

Please contact the Associate Editors of the corresponding sections as listed below to provide your input or if you have questions. Make sure that you include your name, affiliation, and email and phone contact information. Contributions submitted by **April 20, 2007** will be considered for inclusion in the **next issue** of the SPM e-Newsletter.

Contact Information of the SPM e-Newsletter Team

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Conference and publication news

Alessandro Piva, *Associate Editor*, University of Florence, Italy (piva AT lci.det.unifi.it)
News and activities in local chapters and research groups (including new Ph.D. theses)

Mihaela van der Schaar, *Associate Editor*, University of California, Los Angeles, USA (mihaela AT ee.ucla.edu)
News and activities of SPS Technical Committees, industry consortiums and international standards

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* Please replace "AT" in the email addresses with @.

In-Depth Articles of April 2007 SPM eNews

**Exclusive TC Report
from Speech and Language Processing Technical Committee**

Contributors: Mike Seltzer, Chair of the SLTC Electronic Newsletter Subcommittee
Roberto Pieraccini, SLTC Chair



The IEEE Speech & Language Processing Technical Committee has undergone significant changes over the past year. Perhaps the most significant and symbolic change is the change in the TC's name from the Speech Processing Technical Committee to the Speech and Language Processing Technical Committee. This change is one of several outcomes of the efforts of the "Ad-Hoc Committee of Advancing and Strengthening Speech" that was formed in March 2005 in response to concerns that while speech coding, recognition, and synthesis are well-represented in the SPS, research in the newer areas of spoken language processing was being published and presented in journals and conferences outside the IEEE. The committee worked with the IEEE SPS Board of Governors to bring to fruition a number of changes that significantly increase the activity in spoken language technology within the IEEE SPS. Outcomes of this committee's efforts include renaming the IEEE Transactions on Speech and Audio Processing to IEEE Transactions on Audio, Speech, and Language Processing, broadening the EDICS to reflect the range of topics within speech and spoken language processing, and creating a new biannual workshop on Spoken Language Technology.

The first of these Spoken Language Technology workshops was held from December 10-13, 2006 in Aruba. It was co-sponsored by the IEEE and the ACL. The SLT workshop addressed spoken language communication technologies including language understanding, dialog, mining, translation, multimodal, summarization, user interface, topic detection, and generation. The workshop program lasted 2.5 days and included keynote speeches from Steve Young, David Nahamoo, and Kevin Knight. The highlight of the workshop was an open discussion among almost all 110 workshop attendees, moderated by Roberto Pieraccini and Roger Moore. Two recurring themes of this discussion were whether improvements in spoken language systems can be attributed to better algorithms or simply from the availability of more training data, and how to better unite the speech and natural language processing communities. It was agreed that this SLT workshop is an excellent way to bring together multi-disciplinary researchers from speech processing and computational linguistics.

Most recently, the SLTC had a change in leadership, as the term of SLTC chair Mazin Gilbert ended, and Roberto Pieraccini was elected as the new committee chair. Gilbert fostered a tremendous amount of positive change to the SLTC during his tenure including a more efficient review process for ICASSP, expanding the scope of the SLTC to include spoken language technology, and supporting better communication with the speech and language community at large through an electronic newsletter and website. Pieraccini's term as committee chair began in January 2007. In a welcome message to the community, he discussed the need to increase awareness and communication across the various scientific and industrial societies and communities that have similar interests, such as ACL, ISCA, SpeechTek, AVIOS, and W3C. He also advocated that in order to keep up with the speed at which information is created and shared, our papers, articles, books, and conferences, should to be complemented by emerging means of communications such as blogs and wikies.

The major effort accomplished by the SLTC in December 2006, which also defines one of its main roles, is the execution of the ICASSP review process for the speech and language area. Under the leadership of the former Chair, Mazin Gilbert, the SLTC reviewed 670 papers belonging to 105 different topics (EDICS). The process resulted in the acceptance of 279 corresponding to 43% of the submissions.

The SLTC is currently composed of 35 elected and 3 guest members. The three guests are Mazin Gilbert, the former TC Chair, Mari Ostendorf, current Editor in Chief of the IEEE Trans. on Audio Speech and Language Processing, and Steve Young, currently a member of the SPS Awards Board. For more details about the SLTC and its activities, visit the [website of SLTC's electronic newsletter](#). To receive notice about new issues of the newsletter, send an email with "subscribe speechnewsdist" in the message body to <listserv AT listserv.ieee.org>.

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Activities At-A-Glance:

IEEE SPS United Kingdom and Republic of Ireland (UKRI) Chapter

Contributor: Marwan Al-Akaidi, UKRI Chapter Chair

The IEEE Signal Processing Society UKRI Chapter has been very active organizing scientific seminars on innovative research work by leading experts from academia and industry. From December to March, the Chapter has hosted three seminars, two SPS Distinguished Lectures, and a research exchange visit between an industry regulator and university research group.

On 11 December 2006, Dr Vladimir Stankovic, a lecturer at Lancaster University, presented a network-aware cross-layer

design for multimedia multicast over heterogeneous wireless-wireline networks. On 24 January 2007, Prof Madjid Merabti from Liverpool John Moores University presented a framework for managing networked devices and their services within wireless home environments. On 1 February 2007, David Mulvey, a senior project manager in the Telecommunications Solutions Division at LogicaCMG gave a seminar on the recent and forthcoming developments in 3G mobile communications. The talk emphasized the business and implementation factors likely to influence the future development of mobile networks over the next 5-10 years.

The Chapter also organized two SPS Distinguished Lectures given by Prof. Georgios B. Giannakis, ADC Chair in Wireless Telecommunications at the University of Minnesota. The first lecture took place on 20 February 2007 and was hosted by Prof Athanassios Manikas at the Imperial College, London. The second lecture took place the next day at De Montfort University. In the lectures, Prof Giannakis who is an IEEE Signal Processing Society Distinguished Lecturer for 2007, spoke about dimensionality reduction and distributed estimation using wireless sensor networks with noisy links. He showed how canonical correlations and distributed principal component analysis can be used to compress observations and explore the fundamental information-theoretic limits dictated by distortion-rate analysis in a decentralized estimation setup where reduced dimensionality sensor observations have to be severely quantized before transmission to a fusion center in a star topology.

Another highlight of the Chapter activities was to organize a visit made by Professor William Webb to the Wireless and Multimedia Communications and Signal Processing (WMCSPP) group in the School of Engineering and Technology at De Montfort University in January 2007. Professor Webb is the head of research and development at the regulator [Ofcom](#) and is responsible for guiding Ofcom's approach to new technologies. At the meeting, research projects carried out within the WMCSPP group were presented. These projects include work on mobile ad-hoc networks, software radio, frequency spectrum optimization, and rate-distortion optimized video streaming.

More details on the Chapter activity can be found at <http://www.ieee.org.uk/sp.html>.

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Exploratory Stream Processing Research at IBM

Contributor: Lisa Amini

The Exploratory Stream Processing Systems (ESPS) team at IBM's T.J. Watson Research Center is investigating fundamental research issues for the production and management of information from continuous data streams, from both a systems and algorithmic perspective. More and more applications seek to exploit valuable information captured from sensors ranging from cameras, to network packet capture devices, to instrumentation embedded in manufacturing machinery, to health or environmental sensors. Obtaining actionable information from these distributed, unstructured, noisy data streams requires applying machine learning, data mining, and signal processing techniques. Traditional database and transactional systems are not equipped to handle these processing requirements nor the volumes and real-time nature of incoming data streams.

Stream processing systems provide a high performance and scalable alternative to transactional systems, but come with a wealth of research challenges. In a stream processing system, applications are deployed as distributed processing graphs, where nodes are operators performing feature extraction and classification tasks and edges are data streams. Workloads are bursty and applications compete for resources on shared, resource-constrained, heterogeneous processing nodes. To address these issues, the team is designing distributed algorithms for fair and efficient resource allocation across competing processing graphs.

Additionally, novel signal processing and data mining algorithms are required to cope with large numbers of potentially compressed and high bandwidth data streams. New models and algorithms are needed to enable fast and adaptive feature extraction and classification for intelligent and aggressive data reduction. For example, classifiers operating solely on volumetric or compressed-domain features can, in some cases, achieve orders of magnitude reduction in complexity and sacrifice accuracy minimally, relative to state of the art techniques. A key aspect of this research is characterizing complexity-accuracy tradeoffs for such algorithms.

Managing continuous queries over data streams requires making the system adaptive to the addition and removal of data sources, failure and recovery of compute resources, and arrival and departure of queries. However, modeling the practical factors in such large-scale, distributed, and adaptive systems and applications is especially difficult. The team is building a real system and evaluating their algorithms theoretically and empirically.

The research group is multi-disciplinary, and has conducted research in the areas of multimedia, content distribution, web caching, operating systems, wireless networking, and signal processing. The Watson team is interested in hearing from researchers who would like to work with them in the areas of distributed, high performance systems, algorithms for autonomic control of such systems, and novel analytics for stream mining. Additional information can be found at <http://www.research.ibm.com/esps>.

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European Collaboration Project - SPEED (Signal Processing in the EncryptEd Domain)

Contributor: Alessandro Piva

SPEED is a new collaboration project funded by the European Commission's Information Security Technologies program, as part of a range of ideas for future and emerging technologies to be explored and realized. The goal of SPEED is to foster the advancement of the marriage between Signal Processing and Cryptographic techniques. By initiating and developing a totally new and unexplored interdisciplinary framework and technologies for signal processing in the encrypted domain, entirely new solutions will potentially emerge to the problem of security in multimedia communication/consumption and digital signal manipulations.

The SPEED project was motivated by the observation that most currently available technological solutions for secure manipulation of signals simply try to apply cryptographic primitives in order to build a secure layer on top of the signal processing modules to protect them from leakage of critical information. This is, however, insufficient in many cases, since the data owner may not trust the processing devices, or those actors that are required to manipulate them, resulting in a lack of security of the overall system. Having a new set of signal processing algorithms that work directly on the encrypted data would be of great help for application scenarios where "valuable" signals must be securely produced, processed or exchanged. For example, the possibility of embedding or detecting a digital watermark directly in the encrypted domain, the possibility of transcoding an encrypted signal without first decrypting it, the availability of diagnostic tools that operate on encrypted data would be extremely useful to ensure the security of the digital contents.

Research teams from Belgium, Germany, Italy, and Netherlands have joined the SPEED Consortium, a partnership chosen for the partners' individual strengths and expertise. The consortium has been formed in such a way to balance the contribution from the cryptography research field as well as from the signal processing world. The SPEED project was launched in December 2006. The results achieved within the SPEED project will be available to the scientific community through publications in international journals and conference proceedings, organizing events such as special sessions at international conferences or special issues in relevant journals, as well as through organizing a workshop.

Learn more about the SPEED project at <http://www.speedproject.eu/>.

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