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IEEE Signal Processing Magazine

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Inside Signal Processing E-Newsletter

March 2008

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| Society News | Conference News | Publication News | TC News | Chapter/DL News |
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Highlights of This Issue

- [Society News](#): SPS 2007 awards announced; Nikias & Fettweis honored with IEEE awards
- [Call for Nomination](#) of Members-at-Large of the Board of Governors - Due 28 March 2008
- [Conference News](#): Free Tutorial at ICASSP'08 on SPS/CONNEXIONS open-source publishing
- [Publication News](#): New Editors-in-Chief selected for SPS journals; Special Issues opportunities
- [Chapter News](#): Exclusive activity report from Santa Clara Valley Chapter
- [Tech Trends/Standards](#): Adoption & application trends of H.264; Webinar on WiMAX network
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From the E-News Team:

We thank all readers for their contributions and feedback in the past year and we look forward to your participation in the new year. Please share the Inside Signal Processing E-Newsletter with your colleagues by emailing and bookmarking <<http://enews.ieee-spm.org>> for current and archived issues. IEEE members may manage their subscription to email notification of the Inside Signal Processing E-Newsletter at <<http://ewh.ieee.org/enotice/options.php?LN=SP001>>.

We would also like to invite you to [preview](#) a new integrated system that will be formally launched later this year to host the Inside Signal Processing E-Newsletter; advanced features such as content search and RSS feed will be incorporated. Your feedback is very welcome.

1. Society News**SPS 2007 Major Awards Announced**

The IEEE Signal Processing Society congratulates the following SPS members who will receive the Society's prestigious awards for 2007 during ICASSP 2008 in Las Vegas, Nevada.

SOCIETY AWARD

Rabab Kreidieh Ward, "for outstanding technical contributions and leadership in advancing the field of signal and image processing."

TECHNICAL ACHIEVEMENT AWARD

H. Vincent Poor, "for fundamental contributions to statistical signal processing and its applications in wireless communications and related fields."

MERITORIOUS SERVICE AWARD

Rama Chellappa, "for exemplary and sustained service in technical leadership capacities."

EDUCATION AWARD

Alan C. Bovik, "for broad and lasting contributions to image processing education, including popular and important image processing books, innovative on-line courseware, and for the creation of the leading research and educational journal and conference in the image processing field."

IEEE SIGNAL PROCESSING MAGAZINE BEST PAPER AWARD

Petar M. Djurić, Jayesh H. Kotecha, Jianqui Zhang, Yufei Huang, Tadesse Ghirmai, Mónica F. Bugallo and Joaquin Miguel, for the paper entitled, "[Particle Filtering](#)," published in the IEEE Signal Processing Magazine, Volume 20, Number 5, September 2003.

IEEE SIGNAL PROCESSING MAGAZINE BEST COLUMN AWARD

Richard Lyons, for the paper entitled, "[Turbocharging Interpolated FIR Filters](#)," published in the IEEE Signal Processing Magazine, Volume 24, Number 5, September 2007.

BEST PAPER AWARD RECIPIENTS -- Click [here](#) for details of award-winning papers

- o Ashish Aggarwal, Shankar L. Regunathan and Kenneth Rose
- o Holger Boche and Martin Schubert
- o Goran Dimić and Nicholas D. Sidiropoulos
- o Jan Eriksson and Visa Koivunen
- o Onur G. Guleryuz
- o Hong-Kwang Jeff Kuo and Yuqing Gao

YOUNG AUTHOR BEST PAPER AWARD RECIPIENTS -- Click [here](#) for details of award-winning papers

- o *Jing Liu*, for the paper co-authored with Jian-Kang Zhang and Kon Max Wong
- o *XuanLong Nguyen*, for the paper co-authored with Martin J. Wainwright and Michael I. Jordan
- o *Ana Petrovic and Oscar Divorra Escoda*, for the paper co-authored with Pierre Vandergheynst
- o *Ami Wiesel*, for the paper co-authored with Yonina C. Eldar and Shlomo Shamai (Shitz)
- o *Qiyue Zou*, for the paper co-authored with Zhiping Lin and Raimund J. Ober

Signal Processing Society Members Receive IEEE Simon Ramo Medal & Gustav Robert Kirchhoff Award

The [IEEE Simon Ramo Medal](#) is being presented to **Chrysostomos L. (Max) Nikias** of University of Southern California. IEEE selected Prof. Nikias to receive the award, "for outstanding leadership in engineering systems research and education, and for pioneering contributions to integrated media systems for the entertainment industry." The Simon Ramo Medal was established by the IEEE Board of Directors in 1982 for exceptional achievement in systems engineering and systems science.

The [IEEE Gustav Robert Kirchhoff Award](#) is being presented to **Alfred L. M. Fettweis** of Ruhr University, Germany. IEEE selected Prof. Fettweis to receive the award, "for sustained contributions to circuits, systems, and signal processing, especially his seminal work on wave digital filters." Established in 2003, the IEEE Gustav Robert Kirchhoff Award is given for outstanding contributions to the fundamentals of any aspect of electronic circuits and systems that has a long-term significance or impact.

Call for BoG Member-at-Large Nominations - Deadline: **March 28, 2008**

In accordance with the Bylaws of the IEEE Signal Processing Society, the membership will elect, by direct ballot, three Members-at-Large to the Board of Governors (BoG) for three-year terms commencing 1 January 2009 and ending 31 December 2011. The Member-at-Large nomination period is open and accepting nominations until 28 MARCH 2008. For full details and submission information, please visit the [nomination website](#).

The BoG is the governing body that oversees the activities of the IEEE Signal Processing Society. Members-at-Large represent the member view point in the Board decision-making. They typically review, discuss, and act upon a wide range of items affecting the actions, activities, and health of the Society. Learn more about the Board of Governors at the [Society's webpage](#).

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2. Conference News

ICASSP 2008 Call for Participation - March 30 - April 4, 2008, Las Vegas, Nevada. <http://icassp2008.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. As the Society's annual flagship conference, ICASSP features world-class speakers, tutorials, exhibits, and over 50 lecture and poster sessions.

This year's conference venue is the city of Las Vegas. This vibrant city continues to build upon its reputation as a showcase for the extraordinary. ICASSP 2008 is being held in one of the grandest and most recognizable hotels on the Las Vegas Strip - the Caesars Palace. The conference features 4 plenary sessions, 15 tutorials, 12 special sessions, and a core technical program selected from nearly 2800 paper submissions.

Learn more from the ICASSP 2008 committee's [welcome message](#).

FREE Tutorial at ICASSP on IEEE SPS/CONNEXIONS Open-Source Publishing

As part of the IEEE Signal Processing Society's [recently announced](#) open-access education and outreach initiative, a free tutorial will be offered at ICASSP on Monday, March 31, 2008. Following an introduction of the [IEEE/Connexions Initiative](#) by Dr. Richard Baraniuk, Founder of [Connexions](#), and Dr. Al Hero, SPS Past President and initiator of the joint effort, the tutorial will be co-taught by two of the most popular and prolific signal processing authors using Connexions, Douglas L. Jones and Catherine A. "Kitty" Schmidt-Jones. They will explain the advantages and opportunities of publishing in Connexions, give hands-on instructions in creating, importing, editing, and publishing modules and courses in Connexions, and present tips on authoring maximally effective online educational materials.

The tutorial will be held on Monday, March 31 from 17:30-20:00 and is free to ICASSP attendees. Sign-up is required. Visit [this link](#) for details about the tutorial and sign-up instructions.

Come and join fellow members in this free tutorial at ICASSP to jump-start your participation in this new SPS initiative and extend your educational impact worldwide. Read more about the initiative from the [E-News December'07 issue](#) and [the November'07 article](#) in the IEEE Signal Processing Magazine.

Signal Proc. Conferences: Call for Papers	Location	Date	Tutorial/Special Session	Submission Deadline
10th International Workshop on Signal Processing for Space Communications (SPSC'08)	Rhodes Island, Greece	Oct. 6-8, 2008		March 30, 2008
International Workshop on Multimedia Security in Communication (MUSIC'08) in conjunction with CHINACOM 2008	Hangzhou, China	Aug. 25-27, 2008		March 31, 2008
IEEE Conference on Sensors (SENSORS 2008)	Lecce, Italy	Oct. 26-29, 2008		March 31, 2008
IEEE Workshop on Signal Processing Systems (SIPS'08)	Washington, DC	Oct. 8-10, 2008		April 2, 2008
IEEE Workshop on Multimedia Signal Processing (MMSP'08)	Cairns, Queensland, Australia	Oct. 8-10, 2008	March 8, 2008	April 18, 2008
IEEE Workshops on Machine Learning for Signal Processing (MLSP'08)	Cancún, Mexico	Oct. 16-19, 2008		May 5, 2008
9th International Conference on Signal Processing (ICSP'08)	Beijing, China	Oct. 26-29, 2008		June 15, 2008

Upcoming Signal Processing Conferences	Location	Advanced Registration	Conference Dates
International Symposium on Communications, Control and Signal Processing (ISCCSP'08)	St. Julians, Malta		March 12-14, 2008, 2008
IEEE Southwest Symposium on Image Analysis and Interpretation (SSIAI'08)	Santa Fe, New Mexico		March 24-26, 2008
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'08)	Las Vegas, NV		Mar. 31 - April 4, 2008

IEEE/ACM Information Processing in Sensor Networks (IPSN'08)	St. Louis, MO		April 22-24, 2008
Symposium in Signal and Multimedia Processing (SMP) at 21st IEEE Canadian Conference on Electrical and Computer Engineering (CCECE)	Niagara Falls, Canada	Mar. 7 (author) / April 4, 2008	May 4-7, 2008
Joint Workshop on Hands-free Speech Communication and Microphone Arrays (HSCMA'08)	Trento, Italy		May 6-8, 2008
IEEE International Symposium on Biomedical Imaging (ISBI'08)	Paris, France	March 25, 2008	May 14-17, 2008
IEEE International Workshop on Genomic Signal Processing and Statistics (GENSIPS'08)	Phoenix, Arizona	TBA	June 8-10, 2008
1st International Workshop on Cognitive Information Processing	Santorini, Greece	TBA	June 9-10, 2008, 2008
IEEE International Conference on Multimedia & Expo (ICME'08)	Hanover, Germany	TBA	June 23-26, 2008
IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC'08)	Recife, Brazil	TBA	July 6-9, 2008
International Conference on Audio, Language and Image Processing (ICALIP'08)	Shanghai, China	TBA	July 7-9, 2008
International Symposium on Image/Video Communications (ISIVC'08)	Bilbao, Spain	TBA	July 9-11, 2008
Fifth IEEE Workshop on Sensor Array and Multi-Channel Signal Processing (SAM'08)	Darmstadt, Germany	TBA	July 21-23, 2008
IEEE International Conference on Image Processing (ICIP'08)	San Diego, CA	TBA	Oct. 12-15, 2008

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3. Publication News

New Editors-in-Chief Selected for SPS Journals

The IEEE Signal Processing Society (SPS) is pleased to announce the selection of Editors-in-Chief for five SPS journals for the term that will run from 1 January 2009 through 31 December 2011. The announcement of these appointments was made by SPS Vice President-Publications K. J. Ray Liu following confirmation by the Society's Executive Committee. The newly elected Editors-in-Chief are:

Konstantinos N. Plataniotis (University of Toronto, Ontario, Canada) has been named Editor-in-Chief for the *IEEE Signal Processing Letters*. He succeeds Dr. Alex B. Gershman (Darmstadt University of Technology, Darmstadt, Germany) who held the post as Editor-in-Chief of the Journal since 2006.

Li Deng (Microsoft Research, Redmond, WA) has been named Editor-in-Chief for *IEEE Signal Processing Magazine*. He succeeds Dr. Shih-Fu Chang (Columbia University, New York, NY) who held the post as Editor-in-Chief of the Magazine since 2006.

Helen Meng (The Chinese University of Hong Kong, China) has been named Editor-in-Chief for the *IEEE Transactions on Audio, Speech, and Language Processing*. She succeeds Dr. Mari Ostendorf (University of Washington, Seattle, WA) who held the post as Editor-in-Chief of the Transactions since 2006.

Nasir Memon (Polytechnic University, Brooklyn, NY) has been named Editor-in-Chief for the *IEEE Transactions on Information Forensics and Security*. He succeeds Dr. Pierre Moulin (University of Illinois-Urbana, Urbana, IL) who served as the first Editor-in-Chief of the Transactions since 2005.

Athina Petropulu (Drexel University, Philadelphia, PA) has been named Editor-in-Chief for the *IEEE Transactions on Signal Processing*. She succeeds Dr. Alle-Jan van der Veen (Delft University of Technology, Delft, The Netherlands) who held the post as Editor-in-Chief of the Transactions since 2006.

In addition, the *IEEE Transactions on Multimedia*, co-sponsored and managed by SPS, welcomed SPS member **Sheila Hemami** (Cornell University, Ithaca, NY) as its new Editor-in-Chief, effective January 2008. She succeeds Dr. Hong-Jiang Zhang (Microsoft Research - Asia, Beijing, China) who served as Editor-in-Chief of the Transactions from 2005 to 2007.

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

- **NEW!** [Special Issue in Digital Forensics](#) - Whitepaper Deadline: **7 April 2008**
- [Columns/Forums](#) rolling submission deadlines

Special Issue Deadlines of SPS Publications

Journal of Selected Topics in Signal Processing

- [fMRI Analysis for Human Brain Mapping](#) - Deadline: **15 March 2008**
- [Digital Image Processing Techniques for Oncology](#) - Deadline: **15 April 2008**
- [Visual Media Quality Assessment](#) - Deadline: **30 April 2008**
- [DSP Techniques for RF/Analog Circuit Impairments](#) - Deadline: 1 June 2008
- [Advanced Signal Processing for GNSS and Robust Navigation](#) - Deadline: 1 July 2008

IEEE Transactions on Multimedia

- [Integration of Context and Content for Multimedia Management](#) - Deadline: **1 April 2008**
- [Communities and Media Computing](#) - Deadlines: 15 May 2008

Recent Issues of SPS Sponsored and Co-sponsored Publications

Journal Title	Latest Issue	Contents (in PDF)	Xplore Link
IEEE Signal Processing Magazine <ul style="list-style-type: none"> • Special Section on Brain-Computer Interfaces • Feature Article on MIMO Radar with Widely Separated Antennas 	vol. 25, no. 1	PDF	Html
IEEE Transactions on Audio, Speech, and Language Processing	vol. 16, no. 3	PDF	Html
IEEE Transactions on Image Processing	vol. 17, no. 3	PDF	Html
IEEE Transactions on Information Forensics and Security	vol. 3, no. 1	PDF	Html
IEEE Transactions on Signal Processing	vol. 56, no. 3	PDF	Html

IEEE Signal Processing Letters	vol. 15		Html
IEEE Journal of Selected Topics in Signal Processing	vol. 2, no. 1	PDF	Html
<ul style="list-style-type: none"> Signal Processing and Networking for Dynamic Spectrum Access 			
Journal Title	Latest Issue	Contents (in PDF)	Xplore Link
IEEE Transactions on Medical Imaging	vol. 27, no. 3	PDF	Html
IEEE Transactions on Mobile Computing	vol. 7, no. 4	PDF	Html
IEEE Transactions on Multimedia	vol. 10, no. 2	PDF	Html
IEEE Sensors Journal	vol. 8, no. 3		Html
IEEE Transactions on Wireless Communications	vol. 7, no. 2	PDF	Html
Computing in Science & Engineering Magazine	vol. 10, no. 2	PDF	Html
IEEE MultiMedia	vol. 14, no. 4	PDF	Html

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4. TC News

Technical Committee Meetings to be Held at ICASSP 2008

The Signal Processing Society has 13 technical committees (TCs) that support a broad selection of signal processing related activities defined by the scope of the Society. Technical committees are actively involved in awards, conferences, publications, and educational activities, and provide technical advice to the Society's leadership. URLs and more information about the 13 TCs in the Society can be found at this [web link](#).

The Society's TCs will hold their regular meetings at ICASSP 2008. In addition, the Society's Technical Review Committee conducts periodical reviews of TCs, and five TCs will be reviewed during this year's ICASSP. TC members can refer to the [schedule page](#) for more information.

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5. Chapter News and Distinguished Lectures

Activity Report from SPS Santa Clara Valley Chapter

The IEEE Signal Processing Society Santa Clara Valley (SCV) chapter is situated in the high-tech center of the Silicon Valley as part of IEEE Region 6 (Western USA). The proximity to high-tech firms and highly ranked universities also helps the SCV Chapter to attract prominent speakers around the world because of their frequent visits here. Learn more about the IEEE SPS Santa Clara Valley Chapter from this exclusive [in-depth report](#).

Do you know? IEEE SPS provides travel support for local chapters to invite **SPS Distinguished Lecturers**. See a list of SPS [2007 and 2008 Distinguished Lecturers](#), and check each issue of the E-News for upcoming SPS Distinguished Lectures near you.

Chapter	Dates	SPS Distinguished Lectures
Japan	20-Mar-2008	Prof. Lin-Shan Lee (National Taiwan University): "Voice-based Information Retrieval: How far are we from the text-based retrieval?" at Sanjo (Hill-top) Conference Hall, University of Tokyo - Hongo Campus, Japan. Contact: SPS Japan Chapter Chair, Keikichi Hirose [hirose AT gavo.t.u-tokyo.ac.jp] for more details.
Washington	11-Apr-2008	Prof. Petar M. Djuri (SUNY Stony Brook): "The Particle Filtering Methodology in Signal Processing," 2pm at 1110 Kim Bldg, University of Maryland, College Park. See the announcement or contact [washington.sps AT ieee.org].
Guadalajara, Mexico	7-8 Apr 2008	Prof. Walter Kellermann (University Erlangen-Nuremberg, Germany): details to be announced. Contact Chapter Chair Oscar Bugarian [obugarin AT dsprojects.com] for more information.
Central New England	9-Apr-2008	Prof. Rama Chellappa (University of Maryland, College Park): details to be announced. Contact Chapter Chair Joe Yeh [jyeh AT ll.mit.edu] for more information.
Central Texas	16-Apr-2008	Prof. Tsuhan Chen (Carnegie Mellon University): title to be announced. At 6:30pm at University of Texas - Austin. See the chapter website or contact Chapter Chair Hanan Potash [potash AT flash.net] for more information.
Dallas and Huston, TX	17-18 Apr 2008	Prof. Tsuhan Chen (Carnegie Mellon University): details to be announced. Contact Steve Crawl [scrawl AT ieee.org] for more information.
Turkey	21-Apr-2008	Prof. Tsuhan Chen (Carnegie Mellon University): "Multiview Imaging." Contact Chapter Chair Yasemin Yardimci [yardimci AT ii.metu.edu.tr] for more information.
Denver, CO	8-May-2008	Prof. Rama Chellappa (University of Maryland, College Park): details to be announced. Contact Joan Mitchell [joanm AT us.ibm.com] for more information.
Chapter	Dates	Other Upcoming Events
Dallas	6-Mar-2008	Dr. Francis Yoo (Texas Instruments): "Image Signal Processor for Camera Phones". See detailed announcement .
Santa Clara Valley	10-Mar-2008	Prof. Min Wu (University of Maryland, College Park): "Digital Fingerprinting for Multimedia Forensics," at National Semiconductor (2900 Semiconductor Dr., Santa Clara, CA 95051). See chapter web site for more information.
Central Texas	20-Mar-2008	Jonathan Ellis (Advanced Communications Concepts, Inc): "Securing Data-in-Motion & Data-at-Rest," at AT&T Labs. See detailed announcement .
Dallas	11-Apr-2008	Prof. Moeness Amin (Villanova University): "Challenges in Through Wall Imaging," . See detailed announcement .

If you are interested in organizing a new SPS chapter, or participating in activities in a SPS local chapter near you, please check out [Local Chapter Resources](#). Additional questions and comments can be addressed to the [SPS Chapters Committee](#).

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6. New Initiatives and Trends

Adoption and Application Trends of H.264 Video Coding Standards

Almost five years have gone by since the first official approval of H.264/MPEG-4 AVC as an international video coding standard from ISO/IEC and ITU-T. Since then, even though originally there were some

concerns about the potential success of this standard in a space full of competing technologies, H.264 has been adopted in a variety of applications and systems. This has been a direct outcome of the standard's wide industry support, improved licensing conditions, and, most importantly, improved coding efficiency and support of new tools that make it attractive for both consumer and professional level applications. Learn more about the adoptions and applications of H.264/AVC standards from [this article](#).

Web Seminar to Offer Updates on Large-Scale Deployment of WiMAX Network

WiMAX, or worldwide interoperability for microwave access, is a wireless standard that introduces orthogonal frequency division multiple access (OFDMA) and other key features to enable mobile broadband services. With an increasing number of Mobile WiMAX trials being converted into commercial contracts, the IEEE 802.16e has the potential to exceed 80 million mobile subscribers globally by the end of 2012. The IEEE Spectrum Online is hosting a FREE web seminar on "Developing Large-Scale WiMAX Networks: An Update" on March 26, 2008 at 2:00pm ET / 11:00am PT / 18:00 GMT. Click [here](#) for more information about this webcast, or check out an on-demand webcast of an earlier webinar on "[WiMAX — Ready for Prime Time](#)". These are two of the many FREE online information presentations for IEEE members to learn about the latest technology and business solutions, products, and innovations from industry experts.

Interested readers may also check out from [a recent article](#) on Mobile Broadband WiMAX standard in the "[Standards in a Nutshell](#)" column of SPM September 2007.

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7. New PhD Theses

Tian-Tsong Ng (Columbia University, New York, NY):

"Statistical and Geometric Methods for Passive-blind Image Forensics," 2007.

Advised by Prof. Shih-Fu Chang.

Passive-blind image forensics (PBIF) refers to passive ways for evaluating image authenticity and detecting fake images. This dissertation proposes a physics-based approach for PBIF. We define image authenticity based on the image generative process comprising the 3D scene and the image acquisition device. With physics-based approach, we address three problems in PBIF. Firstly, for image splicing detection, we show a statistical method for capturing the optical low-pass property of cameras. Secondly, for distinguishing photographic images from photorealistic computer graphics, we propose a geometric method for capturing the properties of object geometry, object surface reflectance, and camera response function (CRF). The resulting geometry feature provides an intuitive understanding on how photographic images are different from photorealistic computer graphics. Thirdly, for estimating CRF from a single-color-channel image, we propose a geometric method based on the novel geometric invariants.

Click [here](#) to download the thesis or contact [the author](#) for more information.

Wenjun Li (North Carolina State University, Raleigh, NC):

"Distributed and Collaborative Processing in Wireless Sensor Networks," August 2007.

Advised by Prof. Huaiyu Dai.

This dissertation addresses several important problems in distributed and collaborative information processing in wireless sensor networks, with the emphasis on efficient use of stringent system resources to achieve certain application-specific objectives. First, a cross-layer framework is adopted to analyze the data gathering problem, where receiver diversity as well as medium access methods are jointly designed to maximize the system throughput and the energy efficiency. Secondly, the distributed detection problem is studied by considering fusion rules over a multiple-access channel and in a multi-hop network (in contrast to the typically-assumed parallel access channel), and benefits in terms of detection performance and energy efficiency are demonstrated. Finally, the distributed consensus problem where nodes compute their average value through iterative local information exchange is studied. Algorithms exploiting clustering as

well as non-reversible Markov chain techniques are proposed, and are shown to achieve significantly faster convergence and reduced communication and computational complexity.

Click [here](#) to download the thesis or contact the author at <wenjunl AT qualcomm.com> for more information.

Interested in submitting or recommending a recent Ph.D. thesis?

Please prepare the following material and visit the [web submission site](#) to provide your input. Contact Associate Editor Prof. Alessandro Piva at <piva AT lci.det.unifi.it> if you have any questions.

- (1) thesis author's information (full name, contact, current affiliation, URL if available), Ph.D. granting institution, thesis advisor's name and contact information;
- (2) title, URL, and a short summary of the thesis (100-150 words); and
- (3) an email from the thesis advisor to Associate Editor at <piva AT lci.det.unifi.it>, confirming that the author has already successfully defended the Ph.D. thesis and that a final version of the thesis has officially been submitted according to the Ph.D. degree requirements of the author's institution.

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8. New Books

Foundations and Applications of Sensor Management,

edited by A.O. Hero, D. Castañón, D. Cochran, and K. Kastella, Springer, 2008.

Description from the publisher: This book presents the emerging theory of sensor management with applications to real-world examples such as landmine detection, adaptive signal and image sampling, multi-target tracking, and radar waveform scheduling. It is written by leading experts in the field for a diverse engineering audience ranging from signal processing, to automatic control, statistics, and machine learning.

The chapters of the book follow a logical development from theoretical foundations to approximate approaches and ending with applications. The coverage includes the following topics: stochastic control foundations of sensor management; multi-armed bandits and their connections to sensor management; information-theoretic approaches; managed sensing for multi-target tracking; approximation methods based on embedded simulation; active learning for classification and sampling; and waveform scheduling for radar. An appendix is included to provide essential background on topics the reader may not have encountered as a first-year graduate student: Markov decision processes; information theory; and stopping times.

Visit the book's [website](#) for more information.

Adaptive Nonlinear System Identification: The Volterra and Wiener Model Approaches,

by Tokunbo Ogunfunmi, Springer, September 2007.

Description from the publisher: This book introduces engineers and researchers to the field of nonlinear adaptive system identification. The book includes recent research results in the area of adaptive nonlinear system identification and presents simple, concise, easy-to-understand methods for identifying nonlinear systems. These methods use adaptive filter algorithms that are well known for linear systems identification. They are applicable for nonlinear systems that can be efficiently modeled by polynomials.

After a brief introduction to nonlinear systems and to adaptive system identification, the author presents the discrete Volterra model approach. This is followed by an explanation of the Wiener model approach. Adaptive algorithms using both models are developed. The performances of the two methods are then compared to determine which model performs better for system identification applications.

Visit the book's [website](#) for more information.

A First Course in Statistics for Signal Analysis, by W.A. Woyczynski, Birkhauser Publishing, 2006.

Description from the publisher: This textbook is designed for a first, one-semester course in statistical signal analysis for a broad audience of students in engineering and the physical sciences. The emphasis throughout is on fundamental concepts and relationships in the statistical theory of stationary random signals, explained in a concise, yet fairly rigorous presentation.

Developed by the author over the course of several years of classroom use, *A First Course in Statistics for Signal Analysis* may be used by junior/senior undergraduates or graduate students in electrical, systems, computer, and biomedical engineering, as well as the physical sciences. The work is also an excellent resource of educational and training material for scientists and engineers working in research laboratories.

Visit the book's [website](#) for more information.

Books Featured in Previous Issues [\[details\]](#)

Embedded Signal Processing with the Micro Signal Architecture,
by Woon-Seng Gan and Sen M Kuo, Wiley-IEEE, February 2007.

Linear Estimation and Detection in Krylov Subspaces, by G. K. E. Dietl, Springer, September 2007.

Robust Signal Processing for Wireless Communications, by F. A. Dietrich, Springer, November 2007.

Resource Allocation in Multiuser Multicarrier Wireless Systems,
by Ian C. Wong and Brian L. Evans, Springer, November 2007.

Computer Graphics Using OpenGL, by Francis S. Hill, Jr. and Stephen M. Kelley,
3rd Edition, Prentice Hall, 2006.

Principles of Embedded Networked Systems Design,
by Gregory Pottie and William Kaiser, Cambridge University Press, 2005.

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9. Research Opportunities

Vice Chancellor's Strategic Research PhD Scholarship Victoria University of Wellington, New Zealand

Research area: Blind Source Separation Algorithm Development for Passive Foetal Heartbeat Detection

Institution: School of Chemical and Physical Sciences, Victoria University of Wellington, New Zealand.

Application Deadline: 15 May 2008. Detailed information and application forms are available [online](#).

Blind Source Separation (BSS) is currently a very active research area. This is the development of signal processing techniques capable of separating signals from signal mixtures with knowledge of neither the signals nor the mixing processes. Such mixtures occur, for example, in communications, audio, and medical imaging. This project is aimed primarily at the development of BSS algorithms and techniques. Specific applications areas are separating foetal heartbeat signals (acoustic or electrical) from maternal heartbeat signals and separating brain (EEG) signals from muscle signals (EMG). Other application areas in communications and acoustics are available if these are of more interest to the student. The primary research focus is on the development of both optimal and robust approaches for separation of the signals of interest, and on identification of the fundamental properties of these signals that make such approaches

desirable. A good foundation in mathematics and signal processing is required.

Research contact: Dr. Paul Teal, School of Chemical and Physical Sciences, Telephone: +64-4-463 5966, Email: [paul.teal AT vuw.ac.nz]. [Click here](#) to learn more about scholarship opportunities at VUW.

Research Position Featured in Previous Issue [\[details\]](#)

- Postdoctoral Position in digital forensics at Dartmouth College

Job Posting Portals

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

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

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

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Contributors of articles in this issue:

Douglas S. Chan, Tokunbo Ogunfunmi, and Alexis Tourapis.

About the Inside Signal Processing E-Newsletter

Since April 2007, the IEEE Signal Processing Magazine has introduced a new form of publication - the Inside Signal Processing E-Newsletter. This monthly electronic 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 Inside Signal Processing 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. IEEE members may manage their subscription of the email notification of the E-Newsletter and related SPS announcements at [this page](#). Please bookmark <<http://enews.ieee-spm.org>> for current and archived issues of the Inside Signal Processing E-Newsletter.

Submission Instructions - Contribution for the April '08 Issue Due March 20, 2008

Visit the [web submission site](#) to provide your input. Make sure that you include your name, affiliation, and email and

phone contact information. Contributions submitted by **March 20, 2008** will be considered for inclusion in the **next issue** of the Inside Signal Processing E-Newsletter. Please contact the Associate Editors of the corresponding sections as listed below if you have questions. Your comments and suggestions on the new submission system are welcome.

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In-Depth E-News Articles

List of Publications Receiving 2007 SPS Paper Awards

BEST PAPER AWARDS

Ashish Aggarwal, Shankar L. Regunathan and Kenneth Rose, for the paper entitled, "[Efficient Bit-Rate Scalability for Weighted Squared Error Optimization in Audio Coding](#)," published in the IEEE Transactions on Audio, Speech, and Language Processing, Volume 14, Number 4, July 2006.

Holger Boche and Martin Schubert, for the paper entitled, "[Resource Allocation in Multiantenna Systems – Achieving Max-Min Fairness by Optimizing a Sum of Inverse SIR](#)," published in the IEEE Transactions on Signal Processing, Volume 54, Number 6, Part I, June 2006.

Goran Dimić and Nicholas D. Sidiropoulos for the paper entitled, "[On Downlink Beamforming With Greedy User Selection: Performance Analysis and a Simple New Algorithm](#)," published in the Transactions on Signal Processing, Volume 53, Number 10, October 2005.

Jan Eriksson and Visa Koivunen, for the paper entitled, "[Identifiability, Separability, and Uniqueness of Linear ICA Models](#)," published in the IEEE Signal Processing Letters, Volume 11, Number 7, July 2004.

Onur G. Guleryuz for the paper entitled, "Nonlinear Approximation Based Image Recovery Using Adaptive Sparse Reconstructions and Iterated Denoising – [Part I: Theory](#), and [Part II: Adaptive Algorithms](#)," published in the IEEE Transactions on Image Processing, Volume 15, Number 3, March 2006.

Hong-Kwang Jeff Kuo and Yuqing Gao for the paper entitled, "[Maximum Entropy Direct Models for Speech Recognition](#)," published in the IEEE Transactions on Audio, Speech, and Language Processing, Volume 14, Number 3, May 2006.

YOUNG AUTHOR BEST PAPER AWARDS

Jing Liu, for the paper co-authored with Jian-Kang Zhang and Kon Max Wong entitled, "[On the Design of Minimum BER Linear Space-Time Block Codes for MIMO Systems Equipped with MMSE Receivers](#)," published in the IEEE Transactions on Signal Processing, Volume 54, Number 8, August 2006.

XuanLong Nguyen, for the paper co-authored with Martin J. Wainwright and Michael I. Jordan entitled, "[Nonparametric Decentralized Detection Using Kernel Methods](#)," published in the IEEE Transactions on Signal Processing, Volume 53, Number 11, November 2005.

Ana Petrovic and Oscar Divorra Escoda, for the paper co-authored with Pierre Vandergheynst entitled, "[Multiresolution Segmentation of Natural Images: From Linear to Nonlinear Scale-Space Representations](#)," published in the IEEE Transactions on Image Processing, Volume 13, Number 8, August 2004.

Ami Wiesel, for the paper co-authored with Yonina C. Eldar and Shlomo Shamai (Shitz) entitled, "[Linear Precoding via Conic Optimization for Fixed MIMO Receivers](#)," published in the IEEE Transactions on Signal Processing, Volume 54, Number 1, January 2006.

Qiyue Zou, for the paper co-authored with Zhiping Lin and Raimund J. Ober entitled, "[The Cramer-Rao Lower Bound for Bilinear Systems](#)," published in the IEEE Transactions on Signal Processing, Volume 54, Number 5, May 2006.

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Exclusive Activity Report from SPS Santa Clara Valley Chapter

by Douglas S. Chan (Chapter Secretary) and Tokunbo Ogunfunmi (Chapter Chair)



The IEEE Signal Processing Society Santa Clara Valley (SCV) chapter is situated in the high-tech center of Silicon Valley as part of IEEE Region 6. It provides a venue for its members to interact and learn the state-of-the-art in signal processing (SP).

The IEEE SPS Santa Clara Valley chapter offers monthly seminars to stimulate interests of its members. The large number of SP professionals in industry and academia in the region has made it possible for the Chapter to find guest speakers who are at the forefront of SP research or at the cutting edge of industry development. The proximity to high-tech firms and highly ranked universities also helps the SCV Chapter to attract prominent speakers around the world because of their frequent visits here. The topics and speakers of the seminars hosted or co-hosted since last year include:

- Mar 21, 2007: "A Simulation Model for IEEE 802.11n," by Thomas Paul, Santa Clara University. .
- May 21, 2007: "Tesla Roadster: Embedded microprocessors and Design trade-offs," by Doug Bourn, Tesla Motors, Inc.
- Sep 10, 2007: "Overview of WiMax Technology and Evolution," by Hassan Yaghoobi, Intel Corp.
- Sep 17, 2007: "Transceiver Designs for Multicarrier Transmission," by Yuan-Pei Lin, National Chiao-Tung University, Taiwan (Circuits & Systems Society Distinguished Lecturer, co-hosted with the Circuits & Systems and Communications Societies).
- Oct 8, 2007: "Overview of Multimedia Signal Processing on Multi-Core Processors," by Yen-Kuang Chen, Intel Corp.
- Nov 12, 2007: "Efficient Techniques for MPEG-2 to H.264 Video Transcoding," by Jun Xin, Xilient, Inc.
- Dec 10, 2007: "Re-Live the Movie The Matrix: From Harry Nyquist to Image-Based Rendering," by Tsuhan Chen, Carnegie Mellon University (SPS Distinguished Lecturer).
- Jan 7, 2008: "An Open Baseband Processing Architecture for Future Mobile Terminal Design," by Willie W. Lu, U.S. Center for Wireless Communications.
- Feb 11, 2008: "Simplified Fast Motion Estimation: Simplified and Unified Multi-Hexagon Search with Context Adaptive Lagrange Multiplier," by Nam Ling, Santa Clara University (co-hosted with the Circuits & Systems Society Distinguished Lecture).

Among the many valued invited speakers are several IEEE Distinguished Lecturers. For example, in the past two quarters, the Chapter hosted two Distinguished Lecturers in the multimedia area in accordance with the chapter's current focus in this area. In the most recent seminar on February 11, 2008, Prof. Nam Ling presented several motion estimation algorithms from his research team, some of which have been adopted into the reference software of international standards such as H.264/MPEG-4 AVC. On December 10, 2007, Prof. Tsuhan Chen presented his latest research in multiview imaging. This SP tool, which is used for creating informative visualization and 3D analysis, lends itself to applications ranging from object tracking to special effects (such as the groundbreaking scenes in the movie "The Matrix").

The seminars also featured speakers from industry. For example, in the area of multimedia, last year we had Dr. Yen-Kuang Chen speaking on the multimedia SP on multi-core processors. In order to fully explore the potential of many-core CPUs, GPUs, and DSPs, researchers and application developers must think about parallelism creatively. The talk discussed related challenges in multimedia SP application developments.

The two co-sponsored Distinguished Lectures described above also highlight the many successes achieved by

co-sponsoring activities with chapters of our sister societies on topics of common interests. These occasions have enabled the SPS chapter to bring more distinguished speakers to the members and present to them a broader spectrum of SP and related topics. In addition, these joint events also offer effective opportunities for members of various societies to network and exchange ideas.

Along with the multimedia focus mentioned above, it is planned to steer the SPS chapter to new emerging areas in SP such as biometrics and genomics, hosting workshops and seminar series by researchers in these areas to cultivate a higher awareness of these topics to our members.

The Chapter's 2007-2008 Executive Committee officers are: Chair – Prof. Tokunbo Ogunfunmi (Santa Clara University); Vice Chair – Xiaoshu Qian (Intel); Secretary – Douglas Chan (Cisco Systems); Treasurer – Vlad Potanin (National Semiconductor); and Program Coordinator – Yen-Kuang Chen (Intel). Please visit the [chapter's website](#) if you are interested in finding out more about or participating in SCV chapter's current and future activities. SCV's upcoming seminar is also listed in the Chapter News section of this E-Newsletter.



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Latest Trends and Standards Update on

Adoptions and Applications of H.264 Video Coding Standards

Contributor: Dr. Alexis Tourapis (Dolby Laboratories)



Almost five years have gone by since the first official approval of H.264/MPEG-4 AVC as an international video coding standard from ISO/IEC and ITU-T. Since then, even though originally there were some serious, and some not as serious, concerns about the potential success of this standard in a space full of competing technologies such as MPEG-2, MPEG-4 SP/ASP, H.263, On-2's VP-6 and VP-7, and Microsoft's VC-1 among others, H.264 has been adopted in a variety of applications and systems, essentially displacing most of its competition. This has been a direct outcome of the standard's wide industry support, improved licensing conditions, and, most importantly, improved coding efficiency and support of new tools that make it attractive for both consumer and professional level applications.

H.264 was originally approved in May 2003 after more than five years of standardization activities, first under the auspices of the ITU-T Video Coding Experts Group (VCEG) and later on jointly with the ISO/IEC Moving Picture Experts Group (MPEG). This initial release was intended primarily for consumer level applications, such as video-conferencing, mobile TV, streaming, digital storage, and broadcasting. The standard received its first major makeover two years later with the addition of the Fidelity Range Extensions (FRExt) which, among others, enabled higher quality video coding by supporting increased sample bit depth precision and higher-resolution color information. This enabled the standard to better target high end professional applications including video editing and post-production, and the digital still and video camera market. Another major addition to the standard was introduced more recently, in November 2007, containing the amendment for Scalable Video Coding (SVC) which, as the name suggests, extends the standard to better support scalable applications at various levels.

As suggested earlier, H.264 has already been adopted by a variety of applications including the Blu-Ray and the soon to be defunct HD-DVD next-generation optical video disk formats, broadcasting (i.e., DVB in Europe, DMB in the Republic of Korea, ISDB-T in Japan, among others) and satellite (i.e., BBC and Sky HD in the UK, DirecTV and Dish Networks in the US, etc.) systems throughout the world, IPTV, mobile multimedia and streaming services, and video conferencing. The standard is also already in use in several high end consumer cameras based on the AVCHD recording format, while there is also some lesser interest in the use of the standard for digital cinema applications. However, H.264 probably gained more popularity due to its integration in popular emerging devices by Apple Inc. such as the iPod/iPod-Touch personal media players, the iPhone, and the Apple TV. A more detailed list of currently deployed H.264 applications can be found at <http://en.wikipedia.org/wiki/H.264#Applications>.

As early numbers suggest, H.264 seems to be the current winner in the space of video coding technologies. As the standard matures and the encoding algorithms improve, so will also its popularity. The big question that remains though is what follows next. Would a new, higher efficiency codec emerge or is there higher interest and value in pursuing a codec that provides new functionalities and possibly a different experience, including the support for High Dynamic Range (HDR) imaging and 3-D? Only time will tell.

To Explore More: Interested readers may read more about H.264 from a "[Standards in a Nutshell](#)" article (SPM, March 2007) and the associated [online resource page](#). Dr. Alexis Michael Tourapis is currently a Senior Staff Engineer with Dolby Laboratories Inc. where he is managing a team working on advanced video coding and processing technologies. He can be reached at [alexis.tourapis AT dolby.com].

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