

**THIRTY-FOURTH  
ASILOMAR CONFERENCE ON  
SIGNALS, SYSTEMS, AND  
COMPUTERS**



**October 29 - November 1, 2000**  
Asilomar Hotel  
Conference Grounds



**In cooperation with the  
Signal Processing Society of  
the Institute of Electrical and  
Electronics Engineering**

**THIRTY-FOURTH  
ASILOMAR CONFERENCE ON  
SIGNALS, STEMS, AND COMPUTERS**

**ORGANIZED IN COOPERATION WITH  
NAVAL POSTGRADUATE SCHOOL  
MONTEREY, CALIFORNIA**

**MONTEREY BAY AQUARIUM RESEARCH INSTITUTE  
MOSS LANDING, CALIFORNIA**

**AND  
IEEE SIGNAL PROCESSING SOCIETY**

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## **Welcome from the General Chair**

On behalf of the organizing committee for the Thirty-fourth Asilomar Conference on Signals, Systems, and Computers it is my pleasure to welcome you to Pacific Grove and the Monterey Peninsula for this year's meeting. This conference has always attracted both long time attendees and new investigators, and I am sure you will enjoy the opportunity to renew old friendships and make new professional connections. If this will be your first Asilomar conference, you will find that the beautiful conference grounds, lodge, and seashore provide a unique environment for discussions and reflection.

The dedicated efforts of many people have come together to bring you this first conference of the new millennium. Special thanks are extended to the Technical Program Chair, Dr. Brian Agee, and to his committee of technical area chairs. They have organized a stimulating technical program with a complementary mixture of perspectives on technical challenges from both the world of industry and the academic world.

For the opening Sydney Parker Memorial Lecture we are fortunate to have a keynote address by Dr. Richard V. Cox of AT&T Research Laboratories, who is internationally recognized for his work in voice compression technology for telecommunications. He will discuss the issues, evolution, and future of Internet Telephony.

The social program for the conference includes two receptions. You should plan to arrive in time for the Welcome Reception on Sunday night. A conference reception will be held the following evening at the Naval Postgraduate School.

Special thanks and appreciation are also extended to the organizing committee members and the faculty and staff of the Naval Postgraduate School who have worked so hard to make this a memorable conference for you. We all hope that you will enjoy the technical conference and the traditional accompanying events of the social program. We look forward to seeing you this year at Asilomar!!

Dr. Sally Wood  
General Chairman

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# 2000 Asilomar Conference

## Sunday Afternoon, October 29

3:00 - 6:00 Registration  
7:30 - 9:00 Welcoming Reception at Asilomar

## Monday Morning, October 30

8:00 - 6:00 Registration  
7:30 - 9:00 Breakfast is available  
8:15 - 9:45 Conference Opening and Plenary Session - in the Chapel  
9:45 - 10:15 Coffee Social - in front of the Chapel

10:30 - 12:00 Morning Sessions

MA1b- MA2b	Synthetic Aperture Radar I Adaptive Array Processing in the Presence of Motion	Charles Jakowatz Michael Zatman
MA3b MA4b	Object-Based Image and Video Coding DSP Implementations on Programmable Devices	Til Aach Ed Deprettere
MA5b MA6b MA7b	Transmit Diversity Techniques I Special Arithmetic Techniques I Orthogonal-Frequency Division Modulation	Marc Goldberg Neil Burgess Wade Lowdermilk
MA8b	Spectral and Hyperspectral Processing and Data Fusion (Poster)	Randy Roberts

12:00-1:00 Lunch

## Monday Afternoon, October 30

1:30-5:10 1 Break - 3:10-3:30

MP1a MP1b MP2a	Synthetic Aperture Radar II Synchronization Techniques Adaptive Array Processing the Presence of Motion II	Charles Jakowatz Fred Harris Michael Zatman
MP2b	Transmit Diversity Techniques II	Marc Goldberg
MP3 MP4 MP5	Biomedical Processing Field Programmable DSP Arrays Application of Invariance in Signal Processing (Special)	Arye Nehorai Chris Dick Mike Clark
MP6a MP6b MP7	Special Arithmetic Techniques II Subband and Wavelet Filters PDE's and Diffusion for Signal Processing (Special)	Neil Burgess Fred Harris Anthony Yezzi
MP8a MP8b	Space Time Processing (Poster) Advanced Techniques for Direction Finding and Position Location Systems (Poster)	Garret Okamoto Mark Kahn

6:00-7:00 Dinner

# Session SCHEDULE/continued...

## Monday Evening, October 30

6:30 - 8:30 Cocktails and Hors D'oeuvres at the Naval Postgraduate School  
Officers' Club - Ballroom

## Tuesday Morning, October 31

7:30-9:00 Breakfast

8:00-4:00 Registration

8:30-12:10 1 Break - 10:10 -10:30

TA1	Space-Time Adaptive Processing and Sonar	John Taque
TA2	Space-Time Coding	Naofal-Al-Dhahir
TA3	Smart Antennas for MIMO Links	David Gesbert
TA4	Adaptive Filtering Applications and Methods for CDMA	Victor DeBrunner
TA5	Signal Structure, Classification and Detection	Michael Ready
TA6	Computer Arithmetic I	Michael Schulte
TA7	Image Segmentation and Texture Processing	Joseph Havlicek
TA8a	Equalization and Interference Cancellation (Poster)	Arye Nehorai
TA8b	Image Coding and Transmission (Poster)	Mita Desai

12:00-1:00 Lunch

## Tuesday Afternoon, October 31

1:30-5:10 1 Break - 3:10-3:30

TP1	Radar Processing	John Tague
TP2	Signal Separation Techniques for Multiuser Communications	Upamanyu Madhow
TP3	High-Order Statistics and Signal Classification	Chad Spooner
TP4	Signal Processing in Wireless Networks	Lang Tong
TP5	Signal Processing Techniques for Multiuser/Multirate Communications	Naofal Al-Dhahir
TP6	Computer Arithmetic II	Earl Swartzlander, Jr.
TP7	Video Coding and Transmission	Aggelos Katsaggelos
TP8a	Blind Source and Signal Separation (Poster)	Benjamin Friedlander
TP8b	Algorithms for Audio Coding and Speech Processing (Poster)	Keith Teague

## Session SCHEDULE/continued...

### Wednesday Morning, November 1

8:00-12:00	Registration — Papers must be turned in before the registration closes at 12:00 noon	
7:30-9:00	Breakfast	
8:30-12:10	1 Break — 10:10 - 10:30	
WA1	Automatic Target Recognition	Randolph Moses
WA2	Blind and Nonblind Techniques for MIMO Channel Estimation	Yingbo Hua
WA3	Smart Airlinks	Andrea Goldsmith
WA4	Digital Filters	Claude Lindquist
WA5	DSP Programming and Implementation Techniques	Stephen Wilson
WA6	Design for Low Power	David Martinez
WA7	Signal/Image Enhancement	Til Aach
WA8a	Adaptive Techniques for Equalization and Beamforming (Poster)	Alan Lindsey
WA8b	Multimedia Data Security and Watermarks	Min-Yon Wu
12:00-1:00	Lunch	

## 2000 ASILOMAR CONFERENCE SESSION SCHEDULE

Coffee breaks will be at 10:10 am and 3:10 pm.  
(Except Monday morning when refreshments will be served outside the Chapel from 9:45-10:30.)

Monday, October 30

### 8:15- 9:45 Conference Opening and Plenary Session

#### 1. Welcome from the General Chairperson:

Fred Taylor  
University of Florida



## **2. Session MA1a : Distinguished Lecture for the 2000 Asilomar Conference**

**DR. RICHARD V. COX**

SPEECH AND IMAGE PROCESSING SERVICES  
RESEARCH VICE-PRESIDENT

AT&T LABS

### ***Internet Telephony***

In February 1995, VocalTec produced the first Internet Protocol Telephone software. The call quality was poor but the phone calls were free. In that (long ago) era Internet Telephony (IT) was compared to the CB radio craze of a generation ago. Those using, or working on, IT were referred to as 'the lunatic fringe' by those in conventional telephony. Today, Internet Telephony is accepted as mainstream technology. IT has become the logical successor to the circuit switched telephony that evolved over the past 125 years. What is Internet Telephony and why has this rapid change happened? This talk contains an overview of IT, from its start as a cheaper way to make phone calls from PC to PC up through today. This includes both a description of the technology that has already been created and the technical hurdles that still lie ahead. Conventional telephony is complex. Can it be replaced with a simple technology without eliminating the features that consumers know and love? The talk also contains a discussion of the economics of IT. Why are businesses embracing it? Finally, we include some visions of the future. Where will this all lead? Is it all hype? When will we see IT in the marketplace as a mature technology – or is it one already?

## **DR. RICHARD V. COX**

### **Professional Biography**

Richard V. Cox received his Ph.D. in Electrical Engineering from Princeton University. In 1979 he joined the Acoustics Research Department of Bell Laboratories. He conducted research in the areas of speech coding, digital signal processing, analog voice privacy, audio coding, and real-time implementations. In 1987 he was promoted to Supervisor of the Digital Principles Research Group. The group implemented sophisticated digital compression algorithms for speech, audio, image, and video coding. During this period he became engaged in speech coding standards work for digital cellular telephony and within the International Telecommunications Union. He collaborated on the low-delay CELP algorithm that became ITU-T Recommendation G.728 in 1992. He managed the ITU effort that resulted in the creation of ITU-T Rec. G.723.1 in 1995. In 1992 he was appointed Department Head of the Speech Coding Research Department of AT&T Bell Labs. In 1996 as part of the split-up of AT&T, he joined AT&T Labs as Division Manager of the Speech Processing Software and Technology Research Department. In this capacity he had responsibility for AT&T's research efforts in speech coding, audio coding, hearing, speaker identification, and speech recognition. In August 2000 he was appointed Speech and Image Processing Services Research Vice-President. In this capacity he has responsibility for all of AT&T's research in speech, audio, image, video, and multimedia processing research.

Dr. Cox is a Fellow of the IEEE and presently serves as President-Elect of the IEEE Signal Processing Society. He is also a member of the Board of Directors of Recording for the Blind & Dyslexic, the only US provider of textbooks and reference books for people with print disabilities. At RFB&D he is presently helping to lead the effort to develop digital books combining audio, text, images, and graphics for their consumers.

**Program of 2000  
Asilomar Conference  
on  
Signals, Systems, and Computers**

**Dr. Brian Agee**  
Technical Program Chairman

## **Session MA1b — Synthetic Aperture Radar - I**

Session Chair: Charles Jakowatz

- MA1b-1 An  $N^2 \cdot \log N$  Back-Projection Algorithm for SAR Image Formation** 10:30 am  
Shu Xiao, David C. Munson, Jr., Samit Basu, and Yoram Bresler,  
University of Illinois at Urbana-Champaign
- MA1b-2 IFSAR for the Rapid Terrain Visualization Demonstration** 10:55 am  
Bryan L. Burns, Paul H. Eichel, William H. Hensley, and Theodore J. Kim,  
Sandia National Laboratories
- MA1b-3 3-D High-Resolution Spectral Technique to Form 3-D ISAR Cube** 11:20 am  
S. Lawrence Marple, Jr., Orincon Corp
- MA1b-4 The Direction Cosine Method of Scatterer Location Extended to Spotlight Mode IFSAR** 11:45 am  
Paul H. Eichel, Sandia National Laboratories

## **Session MA2b — Adaptive Array Processing in the Presence of Motion I**

Session Chair: Michael Zatman

- MA2b-1 The MVDR-Beamformer for Circular Arrays** 10:30 am  
Benjamin Friedlander, University of California-Santa Cruz
- MA2b-2 Adaptive Interference Cancellation using Time-Varying Beamforming Weights for Wideband LFM Waveforms** 10:55 am  
S.D. Hayward, P. Baxter, and R.J. Shepherd, Dera Malvern
- MA2b-3 Superresolution Direction Finding with Rapidly Rotating Arrays** 11:20 am  
Michael Zatman, MIT Lincoln Laboratory
- MA2b-4 High-Resolution Sensor Array Processing in the Presence of Multiple Wideband Chirp Signals** 11:45 am  
Alex B. Gershman, McMaster University, Moeness G. Amin,  
Villanova University, Marius Pesavento, McMaster University

## **Session MA3b — Object-Based Image and Video Coding**

Session Chair: Til Aach

- MA3b-1 Face Detection and Tracking for Video Coding Applications** **10:30 am**  
Berni Menser and Michael Brunig, Aachen University of Technology
- MA3b-2 MPEG-4 Compliant Video Encoding: Analysis and Rate Control Strategies** **10:55 am**  
Paulo Nunes and Fernando Pereira, Instituto Superior Tecnico
- MA3b-3 Polygonal Shape Descriptors - An Efficient Solution for Image Retrieval and Object Localization** **11:20 am**  
Andre KAUP and Jorg Heuer, Siemens Corporate Technology
- MA3b-4 Segmentation-Based Image Coding by Morphological Local Monotonicity** **11:45 am**  
Joseph Bosworth and Scott T. Acton, The University of Virginia

## **Session MA4b — DSP Implementations of Programmable Devices**

Session Chair: Ed Deprettere

- MA4b-1 An FPGA Based Digital Radar Receiver for Soft Radar** **10:30 am**  
Richard Walke, Defence, Evaluation & Research Establishment,  
David Sadler, Roke Manor Research Ltd.
- MA4b-2 Reconfigurable Architecture Exploration for Wireless Base and Receivers** **10:55 am**  
Ning Zhang and Robert Brodersen, Berkeley Wireless Research Center
- MA4b-3 From Basic Concept to Real-Time Implementation: Prototyping WCDMA Downlink Receiver Algorithms - A Case Study** **11:20 am**  
M. Guillaud, A. Burg, L. Mailaender, B. Haller, Markus Rupp, and E. Beck,  
Lucent Technologies, Bell Labs
- MA4b-4 Configurable Arithmetic Arrays with Data-Driven Control** **11:45 am**  
Behrooz Parhami, University of California-Santa Barbara

## Session MA5b — Transmit Diversity Techniques - I

Session Chair: Marc Goldberg

- MA5b-1 Application of Unitary Transforms to Quasi-Closed-Loop Transmit Diversity Systems** 10:30 am  
Giridhar D. Mandyam, Nokia Research Center
- MA5b-2 Performance of Closed Loop Transmit Diversity with Feedback Delay** 10:55 am  
Balaji Raghothaman, Giridhar D. Mandyam, and R. Thomas Derryberry, Nokia Research Center
- MA5b-3 Optimal Spread Spectrum Transmit Antenna Diversity Utilizing Channel State Information** 11:20 am  
Eko N. Onggosanusi, Barry D. Van Veen, and Akbar M. Sayeed, University of Wisconsin-Madison
- MA5b-4 Closed-Loop Transmit Diversity for FDD WCDMA Systems** 11:45 am  
Jyri Hamalainen and Risto Wichman, Nokia Research Center

## Session MA6b — Special Arithmetic Techniques - I

Session Chair: Neil Burgess, Cardiff University

- MA6b-1 A Novel Area-Efficient Binary Adder** 10:30 am  
S.B. Furber, the University, J. Liu, Intel Corporation
- MA6b-2 Simulated Performance of the Logarithmic Number System** 10:55 am  
J.N. Colemand, University of New Castle Upon Tyne, and J. Kadlec, Academy of Sciences of The Czech Republic
- MA6b-3 Optimised Squaring with Sliding Windows** 11:20 am  
B.J. Phillips and Neil Burgess, Cardiff University
- MA6b-4 High-Speed Arithmetic for MPEG-2 Encoders** 11:45 am  
Amos R. Omondi, Nanyang Technological University

## **Session MA7b — OFDM - Orthogonal-Frequency Division Modulation**

Session Chair: Wade Lowdermilk

- MA7b-1 Code Selection to Eliminate Inter-Channel Interference in a Multi-User OFDM Satellite System** **10:30 am**  
Bryan Usevitch, University of Texas at El Paso
- MA7b-2 OFDM Parameter Estimation a Time Domain Approach** **10:55 am**  
Walter Akmouche and Eric Kerherve, Celar/TCOM/TR, Andre Quinquis, Ensieta
- MA7b-3 Subcarrier and Power Allocation for OFDM** **11:20 am**  
Didem Kivanc and Hui Liu, University of Washington
- MA7b-4 Efficient Matrix Multiplication Methods to Implement a Near-Optimum Channel Shortening Method for Discrete Multitone Transceivers** **11:45 am**  
Jeffrey Wu, Guner Arslan, and Brian L. Evans, The University of Texas-Austin

**Session MA8b — Spectral and  
(Poster Session) Hyperspectral  
10:30 - 12:00 Processing and Data  
Fusion**

Session Chair: Randy Roberts

**MA8b-1 Hyperspectral Detection of Buried Land Mines  
Based on Stochastic Mixture Modeling**

Alan D. Stocker, Space Computer Corporation

**MA8b-2 Stochastic Target Detection for Hyperspectral  
Data**

L.E. Hoff, Hoff Engineering, Scott G. Beaven, Spawar Systems Center,  
Edwin M. Winter, Technical Research Associates, Inc.

**MA8b-3 Effect of Compression on Detection in  
Hyperspectral Data**

Scott G. Beaven, David Stein, and Steve Stewart, Spawar

**MA8b-4 Automatic Normalization of Atmospheric,  
Environmental, and Sensor Effects in  
Hyperspectral Data**

Eric P. Crist, J.N. Cederquist, and J.A. Nunez, Veridian Erim International

**MA8b-5 Characterization of Hyperspectral Data Using  
Genetic Algorithms**

Randy S. Roberts, David W. Paglieroni, Lawrence Livermore National Laboratory

**MA8b-6 Requirements for Anomaly Detection in  
Hyperspectral Data Using Spectral Unmixing**

Edwin M. Winter, Technical Research Associates, Inc.

**MA8b-7 Correction and Analysis of Agricultural  
Imagery Acquired by the TRWIS III  
Hyperspectral Airborne Imager**

Stephanie Sandor-Leahy, TRW

**MA8b-8 A New Neuro-Fuzzy Adaptive Filter for  
Maneuvering Target Tracking**

M.B. Menhaj and S. Amani, Amirkabir University

**MA8b-9 Target Tracking with an Attentive Foveal Sensor**

Laura Li and Douglas Cochran, Arizona State University,  
Ross D. Martin, Lockheed Martin Defense Systems

*Continued on next page...*



**MA8b-10 Perceptual Spectrum Quantization**

Fredrik Norden and T. Eriksson, Chalmers University of Technology

**MA8b-11 A Modified Discrete Fourier Transform with a Doubled Frequency Resolution**

Ben-Dau Tseng, California State University-Chico

**MA8b-12 Approximating the DCT with the Lifting Scheme: Systematic Design and Applications**

Jie Liang and Trac D. Tran, The Johns Hopkins University

**MA8b-13 Generalized Lapped Biorthogonal Transforms Using Lifting Steps**

Masahiro Kawada and Masaaki Ikehara, Keio University

**MA8b-14 Handling Nonnegative Constraints in Spectral Estimation**

Brien Alkire and Lieven Vandenberghe, University of California-Los Angeles

**MA8b-15 Spectral Analysis of Gapped Data**

Erik G. Larsson and Petre Stoica, Uppsala University,  
Jian Li, University of Florida

**MA8b-16 Frequency Domain Step-Size Control in Non-Stationary Environments**

Julia Vogel, Martin Heckman, and Kristian Kroschel, University of Karlsruhe

## **Session MP1a — Synthetic Aperture Radar - II**

Session Chair: Charles Jakowatz

- MP1a-1 Open-Loop Adaptive Filtering for Speckle Reduction in Synthetic Aperture Radar Images 1:30 pm**  
J.A. Rohwer, Sandia National Laboratories,  
Neeraj Magotha, Texas Instruments, Inc., and Sam D. Stearns
- MP1a-2 Modelling SAR Images with a Generalisation of the Rayleigh Distribution 1:55 pm**  
Ercan E. Kuruoglu and Josiane Zerubia, Inria - Sophia Antipolis
- MP1a-3 Lossless Compression of SAR Imagery Using a Multiple-Pass Gradient Adaptive Lattice Filter 2:20 pm**  
Robert Ives, Naval Postgraduate School
- MP1a-4 Analysis of an Adaptive Extrapolation Algorithm on the recovery of Harmonic Signals 2:45 pm**  
Alejandro E. Brito, Shiu H. Chan, and Sergio D. Cabrera,  
The University of Texas at El Paso

**BREAK 3:10 pm**

## **Session MP1b — Synchronization Techniques**

Session Chair: Fred Harris

- MP1b-1 Uplink Frequency Synchronizatin for MC-CDMA 3:30 pm**  
Ufuk Tureli, Didem Kivanc, and Hui Liu, University of Washington
- MP1b-2 Multirate Filters and Processing Techniques for Timing and Carrier Recovery 3:55 pm**  
Fred Harris, San Diego State University
- MP1b-3 Impact of Synchronization on Receiver Performance in Wideband CDMA Networks 4:20 pm**  
Karim Cheikhrouhou, Ecole Nationale d'Ingenieurs de Tunis, Sofiene Affes and Paul Mermelstein, Universite Du Quebec
- MP1b-4 Analysis of a Timing Control Algorithm for QS-CDMA 4:45 pm**  
Ronald Iltis, University of California-Santa Barbara
- MP1b-5 Model Mismatch Studies on OFDM System Frequency Synchronization 5:10 pm**  
Ufuk Tureli, Didem Kivanc, and Hui Liu, University of Washington

## **Session MP2a — Adaptive Array Processing in the Presence of Motion II**

Session Chair: Michael Zatman

- MP2a-1 Passive Target Tracking with Uncertain Sensor Positions** 1:30 pm  
Robert J. Barsanti and Murali Tummala, Naval Postgraduate School
- MP2a-2 Convergence Behavior of the Normalized Least Mean Fourth Algorithm** 1:55 pm  
Azzedine Zerguine, King Fahd University of Petro & Minerals
- MP2a-3 Convergence Analysis of the Variable Weight Mixed-Norm LMS-LMF Adaptive Algorithm** 2:20 pm  
Azzedine Zerguine, King Fahd University of Petro & Minerals, Tyseer Aboulnasr, University of Ottawa
- MP2a-4 Rapid Adaptation in Subspace Leakage Environments via Covariance Matrix Tapering** 2:45 pm  
Joseph R. Guerci, Defense Advanced Research Projects Agency, J.S. Bergin, Isl
- BREAK** 3:10 pm

## **Session MP2b — Transmit Diversity Techniques - II**

Session Chair: Marc Goldberg

- MP2b-1 The Max-Min Capacity Criterion and the Exploitation of Channel Reciprocity** 3:30 pm  
Matthew C. Bromberg, Worcester Polytechnic Institute, Brian G. Agee
- MP2b-2 Massive Scale Radio Link Reciprocity Survey for the PHS System** 3:55 pm  
Serge Barbosa, Athos Kasapi, Adam Kerr, Alissa Nolan, and Anne-Flore Roger, Arraycomm, Inc.
- MP2b-3 Transmit Diversity for Arrays with Correlated Rayleigh Fading** 4:20 pm  
C. Van Rensburg, University of California-Davis, Benjamin Friedlander, University of California-Santa Cruz
- MP2b-4 Transmission Diversity Combining for Fast Fading Vector Channel** 4:45 pm  
Hang LI and Guanghan Xu, The University of Texas-Austin

## Session MP3 — Biomedical Processing

Session Chair: Arye Nehorai, University of Illinois at Chicago

- MP3-1 Spatial-Temporal Analysis of MEG/EEG Using Bayesian Inference** 1:30 pm  
D.M. Schmidt, J.S. George, D.M. Ranken, and C.C. Wood,  
Los Alamos National Laboratory
- MP3-2 Synthetic Aperture Magnetometry (SAM), Linear Beamformers, and MUSIC in MEG Applications** 1:55 pm  
J. Vrba and S.E. Robinson, CTF Systems Inc.
- MP3-3 Multipolar Solutions to MEG Source Imaging Using RAP-MUSIC** 2:20 pm  
John C. Mosher, Los Alamos National Laboratory, Richard M. Leahy,  
University of Southern California, Sylvain Baillet, Hopital de la Salpetriere
- MP3-4 Estimating Current Density in the Heart Using Spatio-Temporal Analysis and ECG/MCG Sensor Arrays** 2:45 pm  
Aleksandar Jeremic and Arye Nehorai, University of Illinois at Chicago
- BREAK** 3:10 pm
- MP3-5 Image Reconstruction for a Novel Compton Scatter Tomograph** 3:30 pm  
Alfred O. Hero, University of Michigan
- MP3-6 An Admissible Solution Approach for Diffuse Optical Tomography** 3:55 pm  
Dana H. Brooks, Richard J. Gaudette, Eric Miller, and Charles DIMARZIO,  
Northeastern University
- MP3-7 Adaptive Filtering of EKG Signals with Little Apriori Information** 4:20 p m  
Peggy Shen, Santa Clara University, Claude S. Lindquist, University of Miami
- MP3-8 Modeling Directionality of Photoreceptors in the Human Eye as a Function of Monochromatic Aberrations** 4:45 pm  
C. Chao, D.R. Iskander, M.J. Collins, and M. Bennamoun,  
Queensland University of Technology
- MP3-9 A Signal Separation Algorithm for Fetal Heart-Rate Monitoring** 5:10 pm  
Kuei-Chiang Lai and John J. Shynk, University of California-Santa Barbara

## Session MP4 — Field Programmable DSP Arrays

Session Chair: Chris Dick

- MP4-1 Bit-Width Optimizatio for Configurable DSP's by Multi-Interval Analysis** 1:30 pm  
Arrigo Benedetti and P. Perona, Caltech
- MP4-2 Implementation of a Reconfigurable Soft Radio Using the Layered Radio Architecture** 1:55 pm  
Srikathyayani Srikanteswara, Virginia Polytechnic Institute,  
Jeffrey H. Reed, Virginia Polytechnic Institute, Peter Athanas, Virginia Polytechnic Institute
- MP4-3 Virtex FPGA Implementation of a polyphase Filter for Sample Rate Conversion** 2:20 pm  
C.N. Ang, R.H. Turner, T. Courtney, and Roger Woods,  
The Queen's University of Belfast
- MP4-4 Perspectives on Custom Computing** 2:45 pm  
Wayne Luk, University of London
- BREAK** 3:10 pm
- MP4-5 FPGA Implementation of Adaptive Heterodyne Filter** 3:30 pm  
Michael A. Soderstrand, Karl E. Nelson, Wen Feng Leong, Hooi Miin Soo,  
and Kah-Howe Tan, Oklahoma State University
- MP4-6 A New RNS Architecture for the Computation of the Scaled 2D-DCT on Field-Programmable Logic** 3:55 pm  
Pedro G. Fernandez, University of Jaen, Javier Ramirez, Antonio Garcia,  
and Antonio Lloris, University of Granada
- MP4-7 Implementation of Canonical and Retimed RNS Architectures for the Orthogonal 1-D DWT over FPL Devices** 4:20 pm  
Javier Ramirez and Antonio Garcia, University of Granada, Pedro G. Fernandez,  
University of Jaen, Antonio Lloris, University of Granada
- MP4-8 A 64-Point FFT Design Example Using A/RT-Designer** 4:45 pm  
Markus Rupp, Bell-Labs, Lucent Technologies
- MP4-9 BIG-SKY - A Tool for Mapping Numerically Intensive Computations into Reconfigurable Hardware** 5:10 pm  
Robert McIlhenny, Zhijun Huang, and Kevin Wong,  
University of California-Los Angeles

## **Session MP5 — Application of Invariance in Signal Processing (Special)**

Session Chair: Mike Clark

- MP5-1 How and Why Should Invariances be Enforced in Detection and Estimation Theory?** 1:30 pm  
Louis Scharf, University of Colorado-Boulder
- MP5-2 Exploitation of Embedded Invariance in Wireless Communication Networks** 1:55 pm  
Brian G. Agee
- MP5-3 When is a Maximal Invariant Hypothesis test Better than the GLRT?** 2:20 pm  
Alfred O. Hero, University of Michigan
- MP5-4 Rock Music: A Reduced Order Correlation Kernel Extension of the Music Algorithm** 2:45 pm  
J. Witzgall and J. Scott Goldstein, Science Applications INTERNATIONAL Corp.,  
Michael Zoltowski, Purdue University, S. Huang, Science Applications INTERNATIONAL Corp.,  
Irving S. Reed, University of Southern California
- BREAK** 3:10 pm
- MP5-5 Coordinate-Free Interpretations of Invariant Statistics** 3:30 pm  
Keith W. Forsythe, MIT Lincoln Laboratory
- MP5-6 Altitude Estimation from Multiple Revisits Using Invariant Statistics** 3:55 pm  
Shawn Kraut, Richard H. Anderson, and Jeffrey Krolik, Duke University

## Session MP6a — Special Arithmetic Techniques - II

Session Chair: Neil Burgess

**MP6a-1A New Pipelined Implementation of the Fast Fourier Transform** 1:30 pm  
Sungwook Yu and Earl E. Swartzlander, JR., University of Texas-Austin

**MP6a-2 Development and Fixed-Point Implementation of a Multiband Dynamic Range Compression (MDRC) Algorithm** 1:55 pm  
Neeraj Magotra, Sanmati Savadatti, Frank Livingston, and Maria HO, Texas Instruments Inc.

**MP6a-3 A Constrained Asymmetry LMS Algorithm for PRML Disk Drive Read Channels** 2:20 pm  
Robert B. Staszewski and Khurram Muhammad, Texas Instruments, Poras T. Balsara, University of Texas at Dallas

**MP6a-4 Computing Haar Transform Using Algebraic Integers** 2:45 pm  
Ramin Baghaie Andvassil S. Dimitrov, Helsinki University of Technology

**BREAK** 3:10 pm

## Session MP6b — Subband and Wavelet Filters

Session Chair: Fred Harris, California State University, San Diego

**MP6b-1 New Optimization Algorithms for Multirate and Cascaded Filters** 3:30 pm  
James L. Sullivan, Honeywell Technical Solutions Inc., John W. Adams, California State University-Northridge

**MP6b-2 Multirate Filtering and Estimation: The Multirate Wiener Filter** 3:55 pm  
Roberto Cristi, D. A. Koupatsiaris, and Charles W. Therrien, Naval Postgraduate School

**MP6b-3 An Indoor Wireless Channel Model Based on Wavelet Packets** 4:20 pm  
Hongbing Zhang and H. Howard Fan, University of Cincinnati

**MP6b-4 Time-Varying Interference Suppression in Communication Systems Using Time-Frequency Signal Transforms** 4:45 pm  
Antonia Papandreou-Suppappola and Sanjay Chetwani, Arizona State University

**MP6b-5 Time-Frequency Analysis of Auditory Evoked Potential Using STFT-Based Adaptive Filters** 5:10 pm  
Yuying Song and Claude S. Lindquist, University of Miami

## **Session MP7 — PDE's and Diffusion for Signal Processing (Special)**

Session Chair: Anthony Yezzi

- MP7-1 A PDE Approach to Image Smoothing and Magnification using the Mumford-Shah Functional** **1:30 pm**  
Andy Tsai, MIT, Anthony Yezzi, Jr., Georgia Institute of Technology, Alan Willsky, MIT
- MP7-2 Nonlinear Diffusion: A Probabilistic View** **1:55 pm**  
Hamid Krim and Y. Bao, North Carolina State University
- MP7-3 On the Relationship Between Parametric and Geometric Active Contours** **2:20 pm**  
Chenyang Xu, Johns Hopkins University, Anthony Yezzi, Jr., Georgia Institute of Technology, Jerry L. Prince, Johns Hopkins University
- MP7-4 An Efficient Variational Multiphase Motion for the Mumford-Shah Segmentation Model** **2:45 pm**  
Tony F. Chan and Luminita A. Vese, University of California-Los Angeles
- BREAK** **3:10 pm**
- MP7-5 Level Set Based Algorithms for Image Restoration, Surface Interpolation and Solving PDES on General Manifolds with Applications to Image Processing and Computer Graphics** **3:30 pm**  
Stanley Osher, University of California-Los Angeles
- MP7-6 Advances in PDE-Based Image Segmentation** **3:55 pm**  
James Sethian, University of California-Berkeley
- MP7-7 Vision, Tangents, and Neural Computation** **4:20 pm**  
Steven W. Zucker, Yale University
- MP7-8 Image Segmentation by Curve Evolution with Clustering** **4:45 pm**  
Nilanjan Ray and Scott T. Acton, The University of Virginia



## **Session MP8a — Space Time Processing (Poster Session)**

1:30 - 3:00

Session Chair: Garret Okamoto

### **MP8a-1 An Improved Algorithm for Dynamic Slot Assignment for the SWL System**

Garret Okamoto, Chih-Wei Chen, Amy Slaughterbeck, and John O'Boyle, Santa Clara University

### **MP8a-2 Variable Rate Transmission for Vector Multiple Access Channels**

Peroor K. Sebastian, Hemanth Sampath, and Arogysawami Paulraj, Stanford University

### **MP8a-3 Capacity Study of a LEO Satellite Communication Link with Multiple Antennas User Terminal**

Nikolai Lebedev and Jean-Francois Diouris, Ecole Polytechnique de L'universite de Nantes

### **MP8a-4 An Iterative Receiver Algorithm for Space-Time Encoded Signals**

Anders Ranheim, Chalmers University of Technology, Andre P. des Rosiers, Paul H. Siegel, and Bhaskar D. Rao, University of California-San Diego

### **MP8a-5 Spatio-Temporal Array Processing for Down-link Transmission in DS-CDMA Systems**

Giuseppe Montalbano, Irfan Ghauri, and Dirk T.M. Slock, Eurecom Institute

### **MP8a-6 Space-Time Blind MOE Detection for DS-CDMA Wireless Systems**

Zhi Tian, Kristine L. Bell, and Harry L. Van Trees, George Mason University

### **MP8a-7 A Blind and Robust Space-Time Receiver for a Turbo Coded System**

Patrik Bohlin and Magnus Lundberg, Chalmers University of Technology

### **MP8a-8 A Virtual MIMO Framework for Multipath Fading Channels**

Ashwin Ganesan and Akbar M. Sayeed, University of Wisconsin-Madison

### **MP8a-9 A Novel Technique for Simulating Space-Time Array Data**

Gary F. Hatke, Massachusetts Institute of Technology

*Continued on next page...*

**MP8a-10 A Space-Time Receiver for Asynchronous Multiuser System Based on Kalman Filter**

Kun Wang and Hongya GE, New Jersey Institute of Technology

**MP8a-11 Turbo Space-Time Equalization of TCM with Receiver Diversity II: Optimum Symbol-by-Symbol Detection**

Mutlu Koca and Bernard C. Levy, University of California-Davis

**MP8a-12 Turbo Space-Time Equalization of TCM with Receiver Diversity I: Maximum Likelihood Detection**

Mutlu Koca, Bernard C. Levy, University of California-Davis

**MP8a-13 Iterative Decoding of Space-Time Trellis Codes and Related Implementation Issues**

Zhipei Chi, University of Minnesota, Zhongfeng Wang, University of Minneapolis, Keshab K. PARHI, University of Minnesota

**MP8a-14 Near-Optimal Selection of Transmit Antennas for a MIMO Channel Based on Shannon Capacity**

Sumeet Sandhu, Rohit U. Nabar, and Dhananjay Gore, Stanford University, Arogyaswami J. Paulraj, Stanford Univ./Gigabit Wireless Inc.

**MP8a-15 Time-Reversal Space-Time Block Coding and Transmit Delay Diversity - Separate and Combined**

Erik Lindskog and Dino Flore, Arraycomm, Inc.

**MP8a-16 Wireless Communication with BICM and GSC over Rayleigh Fading Channels**

Aik Chindapol and James A. Ritcey, University of Washington

**Session MP8b — Advanced Techniques  
(Poster Session) for Direction Finding  
3:30 - 5:00 and Position Location  
Systems**

Session Chair: Mark Kahn

**MP8b-1 Direction-Of-Arrival Estimation Using  
Separated Sub-Arrays**

Fredrik Athley, Chalmers University of Technology, Christer Engdahl, Ericsson  
Microwave Systems AB, Svante Bjorklund, Defence Research Establishment

**MP8b-2 Mobil Position Location with the Constrained  
Bootstrap Filter in a Cellular Communication  
System**

Haekyung Jwa and Joohwan Chun,  
Korea Advanced Institute of Science & Technology

**MP8b-3 Multimode Based Direction Finding**

Thomas Svantesson, Chalmers University of Technology

**MP8b-4 On Pulse Shape Filter Estimation in a  
Multipath Context**

Lisa Perros-Meilhac and Eric Moulines, Enst/Tsi, Pascal Chevalier,  
Thomson-Csf Communications

**MP8b-5 Separable Dimension Subspace Method for  
Joint Signal Frequencies, DOAs and Sensor  
Mutual Coupling Estimation**

Jian Mao, Inrs-Telecommunications, Benoit Champagne, McGill University,  
Mairtin O'Droma, University of Limerick

**MP8b-6 Feedforward DOA Estimation in CDMA with  
Uniform Linear Antenna Array Receivers**

Davide Basetto and Gabriella Olmo, Politecnico di Torino

**MP8b-7 A Modified Expectation Maximum (EM)  
Algorithm for Maximum Likelihood  
Direction-of-Arrival (DOA) Estimation**

Yifeng Zhou and Jim P.Y. Lee, Defence Research Establishment Ottawa

**MP8b-8 Using DSP Technology to Simplify Deep  
Space Ranging**

Scott Bryant, Jet Propulsion Laboratory

**MP8b-9 Adaptive Acquisition of DOA in Space Time  
Cochannel TDMA**

Chia-Chang Hu and Xiaoli Yu, University of Southern California

**MP8b-10 Performance Characterization of External  
Array Self-Calibration Algorithms Using  
Experimental Data**

Gary H. Whipple, Department of Defense, Catherine M. Keller,  
MIT Lincoln Laboratory, Keith W. Forsythe, MIT Lincoln Laboratory

**MP8b-11 Integrated Preprocessing for Direction of  
Arrival Estimation with Unknown Gain,  
Phase and Location Errors**

Youming Li and Y.H. Sng, Nanyang Technological University

**MP8b-12 Time Difference of Arrival Estimation of  
Denoised Unequal SNR Communication  
Signals**

Spiros Mantis and Ralph Hippenstiel, Naval Postgraduate School

# Session TA1 — Space-Time Adaptive Processing and Sonar

Session Chair: John Tague

- TA1-1 Computation Reduction in Space Time Adaptive Processing (STAP) of Radar Signals Using Orthogonal Wavelet Decompositions** 8:30 am  
Shubha Kadambe and Y. Owechko, Hrl Laboratories
- TA1-2 Performance Characterization of STAP Algorithms with Mismatched Steering and Clutter Statistics** 8:55 am  
Keith F. McDonald, The Mitre Corporation, R. S. Blum, Lehigh University
- TA1-3 A Kronecker Product Improvement to PCI for Sapce Time Adaptive Processing** 9:20 am  
Aik Chindapol, University of Washington
- TA1-4 What is Optimal Processing for Nonstationary Data?** 9:45 am  
David Ricks, Paula Cifuentes, and J. Scott Goldstein, Science Applications INTERNATIONAL Corp.
- BREAK** 10:10 am
- TA1-5 Stochastic Matched Field Array Processing for Detection and Nulling in Uncertain Ocean Environments** 10:30 am  
Arthur B. Baggeroer and Peter M. Daly, Massachusetts Institute of Technology
- TA1-6 Performance of Sample-Covariance-Based Adaptive Sonar Detectors** 10:55 am  
Nigel Lee and Nicholas Pulsone, MIT Lincoln Laboratory
- TA1-7 New Comb Waveforms for Sonar** 11:20 am  
James Alsup, Spawar Systems Center
- TA1-8 Experimental Testing of Passive Phase Conjugation for Underwater Acoustic Communication** 11:45 am  
Darrell R. Jackson, Warren L.J. Fox, Christopher D. Jones, and Daniel Rouseff, University of Washington, David R. Dowling, University of Michigan

## Session TA2 — Space-Time Coding

Session Chair: Naofal Al-Dhahir

- |              |  |                 |
|--------------|--|-----------------|
| <b>TA2-1</b> | <b>Performance Analysis of Space-Frequency Coded OFDM</b>  | <b>8:30 am</b>  |
|              | Helmut Bolcskei, Stanford University, Arogyaswami J. Paulraj, Stanford Univ./Gigabit Wireless Inc.         |                 |
| <b>TA2-2</b> | <b>Capacity Scaling in Dual Antenna Array Wireless Systems</b>   | <b>8:55 am</b>  |
|              | D. Tse and Joseph M. Kahn, University of California-Berkeley   |                 |
| <b>TA2-3</b> | <b>Space-Time Group Codes</b>  | <b>9:20 am</b>  |
|              | Brian Hughes, North Carolina State University  |                 |
| <b>TA2-4</b> | <b>Finite-Length Channel-Shortening Space-Time Equalizers for MIMO Linear Frequency-Selective Channels</b> | <b>9:45 am</b>  |
|              | Naofal Al-Dhahir, AT&T Labs  |                 |
|              | <b>BREAK</b>   | <b>10:10 am</b> |
| <b>TA2-5</b> | <b>Concatenated Space-Time Coding</b>  | <b>10:30 am</b> |
|              | Andres Reial and Stephen G. Wilson, University of Virginia   |                 |
| <b>TA2-6</b> | <b>Some Unitary Space-Time Codes for Differential Space-Time Modulation</b>                                | <b>10:55 am</b> |
|              | Xuebin Liang and Xiang-Gen Xia, University of Delaware   |                 |
| <b>TA2-7</b> | <b>Frequency Domain Space Time Coding for MIMO FIR Channels</b>  | <b>11:20 am</b> |
|              | Jonathan H. Manton and Yingbo Hua, The University of Melbourne   |                 |
| <b>TA2-8</b> | <b>Differential Space-Code Modulation for Interference Suppression</b>                                     | <b>11:45 am</b> |
|              | Jian Li, University of Florida, Hongbin Li, Stevens Institute of Technology                                |                 |

## Session TA3 — Smart Antennas for MIMO Links

Session Chair: David Gesbert

- TA3-1 Spatial Characterization of Indoor MIMO Channel Measurements at 5 GHz** 8:30 am  
Rickard Stridh, Peter Karlsson, and Bjorn Ottersten, Royal Institute of Technology
- TA3-2 MIMO Radio Channel Measurements** 8:55 am  
Carol C. Martin, Jack H. Winters, and Nelson R. Sollenberger, AT&T Labs
- TA3-3 Optimal Training in Space-Time Systems** 9:20 am  
Babak Hassibi and Bertrand Hochwald, Lucent Bell Labs
- TA3-4 Performance Models for MIMO Wireless Channels in the Prepresence of Multipath** 9:45 am  
D. Gesbert, Gigabit Wireless, Inc., Helmut Bolcskei, Stanford University, Arogyaswami J. Paulraj, Stanford Univ./Gigabit Wireless Inc.
- BREAK** 10:10 am
- TA3-5 A QoS Based Precoder and Equalizer Design for MIMO Systems Using the Weighted MMSE Criterion** 10:30 am  
Hemanth Sampath, Stanford University, Petre Stoica, Uppsala University, Arogyaswami J. Paulraj, Stanford Univ./Gigabit Wireless Inc.
- TA3-6 New Processing Techniques for Wideband BLAST Systems** 10:55 am  
Constantinos Papadias, Lucent Bell Labs
- TA3-7 MIMO Environmental Capacity Sensitivity** 11:20 am  
Daniel W. Bliss, Massachusetts Institute OF Technology, Keith W. Forsythe, MIT Lincoln Laboratory, Alfred O. Hero, University of Michigan, A. Lee Swindlehurst, Brigham Young University
- TA3-8 A Simple Multiplexing Scheme for MIMO Wireless Channels Using Multiple Spreading Codes** 11:45 am  
Sriram Mudulodu, Stanford University, Arogyaswami J. Paulraj, Stanford Univ./Gigabit Wireless Inc.

## **Session TA4 — Adaptive Filtering Applications and Methods for CDMA**

Session Chair: Victor DeBrunner, The University of Oklahoma

- |              |  |                 |
|--------------|--|-----------------|
| <b>TA4-1</b> | <b>A Ramanujan Spherical Code</b><br>Mohammed Allali and Victor E. DeBrunner, The University of Oklahoma   | <b>8:30 am</b>  |
| <b>TA4-2</b> | <b>Comparative Performance Evaluation of Three Symbol-Level MMSE Equalizers for CDMA Forward Link in Frequency Selective Multipath</b><br>Michael Zoltowski and William Hillery, Purdue University | <b>8:55 am</b>  |
| <b>TA4-3</b> | <b>Adaptive Linear-Quadratic Receivers and Coded Modulation for Uncertain Code-Division-Multiple-Access Fading Channels</b><br>Richard Barton and Jian-Jun Ni, Iowa State University               | <b>9:20 am</b>  |
| <b>TA4-4</b> | <b>Constrained Adaptive Algorithms for Code Acquisition and Interference Cancellation in Asynchronous DS-CDMA Systems</b><br>Milos I. Doroslovacki, George Washington University                   | <b>9:45 am</b>  |
|              | <b>BREAK</b>   | <b>10:10 am</b> |
| <b>TA4-5</b> | <b>A New Scheme for MC-CDMA Systems in the Presence of Imperfections</b><br>Tamer A. Kadous, University of Wisconsin-Madison, Akbar M. Sayeed, University of Wisconsin-Madison                     | <b>10:30 am</b> |
| <b>TA4-6</b> | <b>Data-Record-Based Criteria for the Selection of an Auxiliary-Vector Estimator of the MVDR Filter</b><br>Haoli Qian and Stella N. Batalama, State University of New York at Buffalo              | <b>10:55 am</b> |
| <b>TA4-7</b> | <b>An Adaptive MMSE Rake Receiver</b><br>Garrey W. Rice, Daniel Garcia-Alis, and Robert W. Stewart, University of Strathclyde, Stephan Weiss, University of Southampton                            | <b>11:20 am</b> |
| <b>TA4-8</b> | <b>Subspace Based Blind Detector for Multi-Carrier CDMA over Dispersive Channels</b><br>Chengyang Li and Sumit Roy, University of Washington   | <b>11:45 am</b> |



## **Session TA5 — Signal Structure, Classification and Detection**

Session Chair: Michael Ready

- TA5-1 Characterization of Multipath Distortion of CPFSK Signals** **8:30 am**  
Shawn P. Neugebauer, University of California-Davis, Gary E. Ford, Transcendent Technologies, S.D. Hayward, Dera Malvern
- TA5-2 Separable Nonlinear Least-Squares Methods for Efficient Adaptation of Kautz Filters in Identifying Dynamic Systems** **8:55 am**  
Lester S.H. Ngia, Chalmers University of Technology
- TA5-3 Nonlinear System Modeling Using Independent Component Analysis and Neuro-Fuzzy Method** **9:20 am**  
Sung-Soo Kim, Woosuk University, Keun-Chang Kwak, Jeong-Woong Ryu, Junjin Oh, and Jhoonshik Hong, Chungbuk National University
- TA5-4 Time Delay Estimation Using a Signal Sub-space Model** **9:45 am**  
Charles W. Therrien, S. D. Koutelas, and Kevin S. Smith, Naval Postgraduate School
- BREAK** **10:10 am**
- TA5-5 Suboptimal Robust Estimation for Signal Plus Noise Models** **10:30 am**  
Matthew Green, Anisse Taleb, and Ramon Brich, Curtin University of Technology
- TA5-6 Unsupervised Detection and Parameter Estimation of Multi-component Sinusoidal Signals in Noise** **10:55 am**  
G Tong Zhou and Muhammad Z. Ikram, Georgia Institute of Technology
- TA5-7 Statistics of Blind Spatial Signature Estimators** **11:20 am**  
Thomas E. Biedka, Jeffrey H. Reed, and William H. Tranter, Virginia Polytechnic Institute
- TA5-8 Blind Multipath Parameters Estimation with an Unknown Pulse Shape Filter** **11:45 am**  
Lisa Perros-Meilhac and Eric Moulines, Enst/Tsi, Pascal Chevalier, Thomson-CSF Communications

## Session TA6 — Computer Arithmetic, Part I

Session Chair: Michael Schulte

- TA6-1 Intervals: The Connection Between Computing and the World** 8:30 am  
Bill Walster, Sun Microsystems
- TA6-2 Towards Tight Rounding Error Bounds on Rational Expression Evaluations** 8:55 am  
Ping Tak Peter Tang, Intel Corp
- TA6-3 On Efficient Techniques for Difficult Operations in One and Two Digit DBNS Index Calculus** 9:20 am  
R. Muscedere, G.A. Jullien, V.S. Dimitrov, and W.C. Miller, University of Windsor
- TA6-4 Correctly Rounded Functions for Better Arithmetic** 9:45 am  
Jean-Michel Muller, CNRS-Laboratoire LLP
- BREAK** 10:10 am
- TA6-5 Reducing Power Dissipation in Complex Digital Filters by Using the Quadratic Residue Number System** 10:30 am  
Gian Carlo Cardarilli, Alberto Nannarelli, and Marco RE, University of Rome "Tor Vergata"
- TA6-6 Design and Performance of Residue Number System Based Multicarrier CDMA in Frequency-Selective Rayleigh Fading Channels** 10:55 am  
A.S. Madhukumar and Francois Chin, Centre for Wireless Communications
- TA6-7 On Producing Exactly Rounded Results in Digit-Serial On-Line Arithmetic** 11:20 am  
Behrooz Parhami, University of California-Santa Barbara
- TA6-8 Designs of Counters with Near Minimal Counting/Sampling Periods and Hardware Complexity** 11:45 am  
Chi-Hsiang Yeh, Queen's University, Behrooz Parhami, University of California-Santa Barbara

## Session TA7 — Image Segmentation and Texture Processing

Session Chair: Joseph Havlicek

- TA7-1 Image Interpolation While Retaining Textural Information** **8:30 am**  
Linda S. Debrunner, Victor E. Debrunner, and Minghua Yao,  
The University of Oklahoma
- TA7-2 MRI Brain Image Segmentation Using an AM-FM Model** **8:55 am**  
Marios S. Pattichis, Helen Petropoulos, and William M. Brooks,  
University of New Mexico
- TA7-3 Unsupervised Texture Segmentation Using Dominant Image Modulations** **9:20 am**  
T. Tangsukson, T.B. Yap, N.D. Mamuya, and Joseph P. Havlicek,  
University of Oklahoma
- TA7-4 Texture Segmentation Using Level Set Analysis** **9:45 am**  
B. Raghunathan and Scott T. Acton, The University of Virginia
- BREAK** **10:10 am**
- TA7-5 Maximum Likelihood Texture Analysis and Classification Using Wavelet-Domain Hidden Markov Models** **10:30 am**  
Guoliang Fan and Xiang-Gen Xia, University of Delaware
- TA7-6 A Modified Gray Level Morphological Gradient with Accurate Orientation Estimates and Reduced Noise Sensitivity** **10:55 am**  
Sally L. Wood and Gongyuan Qu, Santa Clara University
- TA7-7 Performance of a Modified Gray Level Morphological Gradient with Low Sensitivity to Threshold Values and Noise** **11:20 am**  
Gongyuan Qu and Sally L. Wood, Santa Clara University
- TA7-8 Edge Enhancement Techniques for Reconstructing Continuous-Tone Images from Error-Diffused Halftones** **11:45 am**  
Xin Li, Princeton University, Litao Gang, New Jersey Institute of Technology

## **Session TA8a — Blind Source and Signal Separation**

(Poster Session)

8:30 - 10:00

Session Chair: Ben Friedlander, University of California-Santa Cruz

### **TA8a-1 Coordinated Training and Transmission for Improved Interference Cancellation in a Cellular Network**

Robert W. Heath, Jr and Sebastian K. Peroor, Stanford University, Jose Tellado, Gigabit Wireless Inc., Arogyaswami J. Paulraj, Stanford Univ./Gigabit Wireless Inc.

### **TA8a-2 Joint Data Detection and Channel Estimation for Interference Cancellation in Multi-Channel Systems**

Cristoff Martin and Bjorn Ottersten, Royal Institute of Technology

### **TA8a-3 Channel Equalization for DMT with Insufficient Cyclic Prefix**

Jie Zhu and Wee Ser, Nanyang Technological University, Arye Nehorai, University of Illinois at Chicago

### **TA8a-4 An Adaptive-Receiver for DS/CDMA Signals**

Richard E. Cagley, Kuei-Chiang Lai, and John J. Shynk, University of California-Santa Barbara

### **TA8a-5 Channel Estimation for Multirate DS-CDMA Systems**

Urbashi Mitra, The Ohio State University, Ashutosh Sabharwal, Rice University

### **TA8a-6 Reduced-Rank Adaptive MMSE Equalization for High-Speed CDMA Forward Link with Sparse Multipath Channels**

Michael Zoltowski and Samina Chowdhury, Purdue University, J. Scott Goldstein, Science Applications INTERNATIONAL Corp.

### **TA8a-7 Channel Estimation Errors Versus Doppler Diversity in Fast Fading Channels**

Marc-Antoine R. Baissas, Texas Instruments, Akbar M. Sayeed, University of Wisconsin-Madison

### **TA8a-8 Finite-Alphabet Based Channel Estimation for Space-Time Block Coded Systems**

B. Muquet, Motorola, S. Zhou and G.B. Giannakis, University of Minnesota

*Continued on next page...*

**TA8a-9 Source Separation by Using a Electromagnetic Vector Sensor**

J. Zhang, National University of Singapore, Peggy Shen, Santa Clara University, Arye Nehorai, University of Illinois at Chicago

**TA8a-10 PTV-CMA Blind Equalization and Interference Suppression**

Giacinto Gelli and Francesco Verde, Universita Degli Studi Federico II Di Napoli

**TA8a-11 A RBF Equalizer Using Fast Clustering Algorithm**

Jung-Su Kim, Bong-Sik Shin, and Jong-Hwa Chong, Hanyang University

**TA8a-12 Performance of Antenna Array Receivers in General Flat Fading Channels**

Ming Yan and Bhaskar D. Rao, University of California-San Diego

**TA8a-13 Subspace Projection Array Processing Suppression of FM Jammer in GPS Receivers**

Liang Zhao and Moeness G. Amin, Villanova University, Alan Lindsey, Air Force Research Laboratory/Ifgc, Yimin Zhang, Villanova University

**TA8a-14 Time-Recursive Maximum Likelihood Based Sequence Estimation for Unknown ISI Channels**

Hai Chen, Kevin Buckley, and Richard Perry, Villanova University

**TA8a-15 A Fast Constant Modulus Algorithm for Blind Equalization**

Nelatury Sudarshan, RAO and Sathyanarayan S. Rao, Villanova University

**TA8a-16 Application of Evolution Programming for Blind Equalization**

Nelatury Sudarshan RAO and Sathyanarayan S. RAO, Villanova University

**Session TA8b — Image Coding and  
(Poster Session) Transmission  
10:30 - 12:00**

Session Chair: Mita Desai

- TA8b-1 Performance Analysis and Optimization of Progressive Image Transmission in Memory Channels (9)**  
Minyi Zhao and Ali N. Akansu, New Jersey Institute of Technology
- TA8b-2 Optimal Refinement/Significance Map Trade-offs in SPIHT-Based Image Compression**  
Charles d. Creusere, New Mexico State University
- TA8b-3 Low-Memory, Fixed-Latency Huffman Encoder for Unbounded-Codelength Codes**  
Robert A. Freking and Keshab K. Parhi, University of Minnesota
- TA8b-4 Error-Resilient Transmission of Compressed Images Over Very Noisy Channels Using Soft-Input Source Decoding**  
Jorg Kliewer and Norbert Gortz, University of Kiel
- TA8b-5 A Fast, Accurate and Forward Rate Prediction and Control Algorithm for Wavelet Image Coders**  
Zhihai HE, Tian-Hu Yu, and Sanjit Mitra, University of California-Santa Barbara
- TA8b-6 Adaptive Image Pyramid Based Compression Algorithm**  
Simant Dube and Li Hong, STMicroelectronics, Inc.
- TA8b-7 A Novel Low Complexity and Efficient Progressive Quadtree Wavelet Encoder**  
Marco Grangetto, Enrico Magli, and Gabriella Olmo, Politecnico di Torino
- TA8b-8 Prediction of the Quality of JPEG-Compressed Color Images Based on the SCIELAB Metric**  
GAMAL F. Fahmy and Lina J. Karam, Arizona State University
- TA8b-9 System Modeling and Software-Based Implementation of MPEG-4 Video**  
Chen He and Shi Zhong, University of Texas-Austin

*Continued on next page...*

**TA8b-10 A Sampling Approach to Region-Selective Image Compression**

Shahmaz Azizi and Douglas Cochran, Arizona State University

**TA8b-11 Wavelet Image Coding Using Trellis Coded Quantization and Blockwise Binary Classification**

Zhihai He, Tian-Hu Yu, and Sanjit Mitra, University of California-Santa Barbara

**TA8b-12 Novel Coding Scheme for Wavelet Image Compression**

Tian-Hu Yu, Zhihai He, and Sanjit Mitra, University of California-Santa Barbara

**TA8b-13 Nonlinear Vector Multiresolutional Analysis**

Maya Gupta, Stanford University, Anna Gilbert, AT&T Shannon Laboratory

**TA8b-14 Design of Denoising Filter for Ultrasound Images Based on Wavelet Method**

Su Cheol Kang, Incom I&C, Seung Hong Hong, Inha University

**TA8b-15 Selection of the Best Wavelet Basis for a Time-Varying Volterra Model**

Matthew Green and Abdelhak M. Zoubir, Curtin University of Technology

**TA8b-16 Channel-Optimized Trellis-Coded Quantization for Channels with Memory**

David Giguët, Arizona State University, Glen P. Abousleman, Motorola SSG, Lina J. Karam, Arizona State University

## Session TP1 — Radar Processing

Session Chair: John A. Tague

- |              |   |                |
|--------------|---|----------------|
| <b>TP1-1</b> | <b>Resource Allocation in Surveillance Radar</b><br>Johannes Wintenby, Chalmers University of Technology  | <b>1:30 pm</b> |
| <b>TP1-2</b> | <b>Target Tracking Using Arbitrarily Located Detectors and a Continuous-State Viterbi Algorithm</b><br>Cary Champlin, Consultant, Darryl Morrell, Arizona State University                              | <b>1:55 pm</b> |
| <b>TP1-3</b> | <b>Matched and Adaptive Subspace Detectors when Interference Dominates</b><br>Louis Scharf, University of Colorado-Boulder  | <b>2:20 pm</b> |
| <b>TP1-4</b> | <b>Probability of Error Metrics for Best Basis Selection</b><br>Todd McWhorter and Michael Clark, Mission Research Corporation  | <b>2:45 pm</b> |
|              | <b>BREAK</b>  | <b>3:10 pm</b> |
| <b>TP1-5</b> | <b>Statistical Analysis of the Nonhomogeneity Detector</b><br>Muralidhar Rangaswamy, Arcon Corporation, B. Himed, US Air Force Rsrch Lab/Snrt, J.H. Michels, US Air Force Rsrch Lab/Snrt                | <b>3:30 pm</b> |
| <b>TP1-6</b> | <b>Adaptive Spectral Conditioning for Improved Radar Detection</b><br>Robert J. Bonneau, Air Force Research Lab   | <b>3:55 pm</b> |
| <b>TP1-7</b> | <b>Adaptive Clutter Cancellation in Bistatic Radar</b><br>William L. Melvin, Georgia Tech Research Institute, Michael J. Callahan, USAF Research Laboratory, Michael C. Wicks, USAF Research Laboratory | <b>4:20 pm</b> |
| <b>TP1-8</b> | <b>24GHz Side Looking Radar for Vehicle Application</b><br>KENJI Inomata, Shinsaku Noda, Katsuji Okazaki, Masahiro Watanabe, Takamasa Fukae, and Katsuji Matsuoka, Mitsubishi Electric Corp.            | <b>4:45 pm</b> |
| <b>TP1-9</b> | <b>Analysis of Array Antenna Measurements with a Rough Surface Reflector</b><br>Svante Bjorklund, Per Grahn, and Anders Nelander, Defence Research Establishment (FOA)                                  | <b>5:10 pm</b> |



## Session TP2 — Signal Separation Techniques for Multiuser Communications

Session Chair: Upamanyu Madhow

- TP2-1 Reduced-Rank Interference Suppression with Time- and Frequency-Selective Fading** 1:30 pm  
W. Xiao and Michael Honig, Northwestern University
- TP2-2 Turbo Multiuser Detection for M-ary Orthogonal Modulation via Gibbs Sampling** 1:55 pm  
Xiaodong Wang, Texas A&M University
- TP2-3 Optimum Noncoherent Multiuser Detection for Multi-Antenna Diversity Communications Over Rayleigh Fading Channels** 2:20 pm  
Mahesh K. Varanasi, University of Colorado-Boulder
- TP2-4 A Subspace Approach for Blind Multiuser Detection Based on Second-order Nonstationarity** 2:45 pm  
Ruifeng Zhang and Michail Tsatsanis, Stevens Institute of Technology
- BREAK** 3:10 pm
- TP2-5 Constrained MMSE Detection for Noncoherent Nonlinear Multiuser Communications** 3:30 pm  
Rajnish Sinha, Aylın Yener, and Roy D. Yates, Rutgers University
- TP2-6 A Family of Linear-Complexity Likelihood-Ascent-Search Detectors for CDMA Multiuser Detection** 3:55 pm  
Yi Sun, The City College of City University of New York
- TP2-7 On Robust Multiuser Detection** 4:20 pm  
Haris Vikalo and Thomas Kailath, Stanford University
- TP2-8 Iterative Coded Multiuser Detection with a Verdu Soft Demodulator** 4:45 pm  
A. Robert Golshan and Keith M. Chugg, University of Southern California

## Session TP3 — Higher-Order Statistics and Signal Classification

Session Chair: Chad Spooner, Mission Research Corporation

- TP3-1 Automatic Radio-Frequency Environment Analysis** 1:30 pm  
Chad M. Spooner, William A. Brown, and Grace K. Yeung,  
Mission Research Corporation
- TP3-2 Blind Source Separation and Signal Classification** 1:55 pm  
Ananthram Swami, Army Research Lab
- TP3-3 The Blind Deconvolution of the Multi-Channel Based on the Higher Order Statistics** 2:20 pm  
Janghoon Yang and Chrysostomos L. Nikias, University of Southern California
- TP3-4 Normalized, HOS-Based, Blind Speech Separation Algorithms** 2:45 pm  
Phillip De Leon, New Mexico State University, Chengyang Li,  
University of Washington
- BREAK** 3:10 pm
- TP3-5 Blind Deconvolution Algorithms for MIMO-FIR Channels Driven by White but Fourth-Order Colored Signals** 3:30 pm  
Mitsuru Kawamoto and Yujiro Inouye, Shimane University,  
Ruey-Wen Liu, University of Notre Dame
- TP3-6 A Combination of Statistical and Structural Approaches in Blind Equalization Algorithms** 3:55 pm  
Monica Corlay, Pierre Duhamel, and Maurice Charbit, Enst/Tsi
- TP3-7 Blind Channel Identification Using Evolutionary Programming** 4:20 pm  
Charulatha Kalluri, Sathyanarayan S. RAO, and Nelatury Sudarshan RAO,  
Villanova University
- TP3-8 Open Set Classification Using Tolerance Intervals** 4:45 pm  
Edward C. Real and Andrew H. Baumann, Sanders, A Lockheed Martin Company

## Session TP4 — Signal Processing in Wireless Networks

Session Chair: Lang Tong

- TP4-1 Diversity and Code Combining for CDMA Packet Radio Networks** 1:30 pm  
Rajat Prakash, Venugopal V. Veeravalli, and Vinayak Tripathi, University of Illinois
- TP4-2 Multicarrier Random Access Racket Radio** 1:55 pm  
Nikos Sidiropoulos and G. Dimic, University of Minnesota
- TP4-3 A Dynamic Multiaccessing Protocol for Random Access Channels with Multipacket Reception** 2:20 pm  
Q. Zhao and Lang Tong, Cornell University
- TP4-4 Networking Issues in Large Microsensor Nets** 2:45 pm  
Ananthram Swami, Army Research Lab
- BREAK** 3:10 pm
- TP4-5 A New Resource Allocation Scheme for VBR Video Sources** 3:30 pm  
Krishnamurthy Nagarajan and G. Tong Zhou, Georgia Institute of Technology
- TP4-6 Supporting Integrated Services in Wireless Networks with Space-Time Block-Coded Transmissions** 3:55 pm  
A. Stamoulis and Georgios B. Giannakis, University of Minnesota
- TP4-7 A Fast Square-Root Implementation for BLAST** 4:20 pm  
Babak Hassibi, Lucent Bell Labs
- TP4-8 Mobile Adhoc Network Routing Protocol Analysis and its Application to a Programmable Modular Communications System** 4:45 pm  
Kevin M. Shea, Robert Ives, and Murali Tummala, Naval Postgraduate School
- TP4-9 The Capacity of Three Dimensional Ad Hoc Networks** 5:10 pm  
Stavros Toumpis and Andrea Goldsmith, Stanford University

## **Session TP5 — Signal Processing Techniques for Multiuser/Multirate Communications**

Session Chair: Naofal Al-Dhahir

- TP5-1 Blind Channel Estimation for Precoded Variable Bit-Rate Multiuser Systems** 1:30 pm  
Zhengyuan Xu, University of California-Riverside
- TP5-2 CDMA Multiuser Detection Based on State Space Estimation Techniques** 1:55 pm  
Sriram Mudulodu, Haris Vikalo, and Thomas Kailath, Stanford University
- TP5-3 A SINR Maximizing RAKE Receiver for DS-CDMA Downlinks** 2:20 pm  
Massimiliano Lenardi, Abdelkader Medles, and Dirk T.M. Slock, Eurecom Institute
- TP5-4 Multistage Nonlinear Blind Interference Cancellation for DS-CDMA Systems** 2:45 pm  
Dragan Samardzija, Narayan Mandayam, and Ivan Seskar, Rutgers University
- BREAK** 3:10 pm
- TP5-5 Influence of Periodic Correlation Properties of Sequences on the Sum Capacity of CDMA Systems** 3:30 pm  
Slawomir Stanczak and Holger Boche, Heinrich-Hertz-Institut
- TP5-6 Improved Constrained Optimization Method for CDMA Systems** 3:55 pm  
Zhengyuan Xu, University of California-Riverside
- TP5-7 Parallel Digital Architectures for High-Speed Adaptive DSSS Receivers** 4:20 pm  
Stephan Bemer and Phillip De Leon, New Mexico State University
- TP5-8 On the Design of Optimal Orthogonal Finite Order Transmitter and Receiver Filters Over Noisy Channels** 4:45 pm  
Jamal Tuqan, IBM Thomas J. Watson Research Center
- TP5-9 Phase Predistortion for a CDMA2000 System** 5:10 pm  
Giridhar D. Mandyam, Nokia Research Center

## Session TP6 — Computer Arithmetic, Part II

Session Chair: Earl Swartzlander, University of Texas at Dallas

- TP6-1 Computer Arithmetic for Processing of Media Signals** 1:30 pm  
Vojin Oklobdzija, University of California-Davis
- TP6-2 Improving the Recursive Multiplier** 1:55 pm  
John Kim, Motorola, Inc., Earl E. Swartzlander, Jr., University of Texas-Austin
- TP6-3 Parallel Square and Cube Computation** 2:20 pm  
Albert A. Liddicoat and Michael J. Flynn, Stanford University
- TP6-4 Left-to-Right Carry-Free Scheme for Computing  $AB+CD$**  2:45 pm  
Milos D. Ercegovac, University of California-Los Angeles
- BREAK** 3:10 pm
- TP6-5 The IEEE Rounding for Multiplier with Redundant Operands** 3:30 pm  
M. Ian Ferguson and Milos D. Ercegovac, University of California-Los Angeles
- TP6-6 Modular Multiplication in the Residue Number System with Application to Massively Parallel Public-Key Cryptography Systems** 3:55 pm  
William L. Freking and Keshab K. Parhi, University of Minnesota
- TP6-7 Variable-Correction Truncated Floating Point Multipliers** 4:20 pm  
Michael Schulte and Kent E. Wires, Lehigh University, James E. Stine, Illinois Institute of Technology
- TP6-8 Optimal-Depth Circuits for Prefix Computation and Addition** 4:45 pm  
Chi-Hsiang Yeh, Queen's University, Behrooz Parhami, University of California-Santa Barbara

## Session TP7 — Video Coding and Transmission

Session Chair: Aggelos Katsaggelos

- TP7-1 Optimal Scheduling for Streaming of Scalable Media** **1:30 pm**  
Zhourong Miao and Antonio Ortega, University of Southern California
- TP7-2 Rate-Distortion Optimizations for Region and Object-based Video Coding** **1:55 pm**  
Yan Yang, Aware Inc., Sheila S. Hemami, Cornell University
- TP7-3 Pre- and Post-Processing Algorithms for Compressed Video Enhancement** **2:20 pm**  
C. Andrew Segall and Aggelos K. Katsaggelos, Northwestern University
- TP7-4 Optimal Estimation for Error Concealment in Scalable Video Coding** **2:45 pm**  
Rui Zhang, Shankar L. Regunathan, and Kenneth Rose, University of California-Santa Barbara
- BREAK** **3:10 pm**
- TP7-5 Projection-Based Block Matching Motion Estimation** **3:30 pm**  
Chengjie Tu, Trac D. Tran, and Jerry L. Prince, the Johns Hopkins University, Pankaj Topiwala, Fastvdo Llc
- TP7-6 Frame Interpolation for Video Frame Rate Up Conversion** **3:55 pm**  
Hezerul Abdul Karim, Multimedia University, Kyeong H. Yang, Bell Labs, Lucent Technologies, Rosli Besar, Multimedia University, M.U. Siddiqi, Multimedia University
- TP7-7 Robust Image Communication Using Bandwidth Reducing and Expanding Mappings** **4:20 pm**  
Helge Coward and Tor A. Ramstad, Norwegian University of Science and Technology
- TP7-8 Error-Robust Video Coding with Channel-Optimized Trellis-Coded Quantization** **4:45 pm**  
Zhen Liu, Arizona State University, Glen P. Abousleman, Motorola SSG, Lina J. Karam, Arizona State University

**Session TP8a — Blind Source and Signal  
(Poster Session) Separation**  
3:30 - 5:00

Session Chair: Matt Bromberg

- TP8a-1 Code Gated Beamforming: A Blind Adaptive Antenna Array Algorithm for the Wideband CDMA**  
Yash M. Vasavada, Hughes Networks Systems, Thomas E. Biedka,  
Virginia Polytechnic Institute, Jeffrey H. Reed, Virginia Polytechnic Institute
- TP8a-2 A New Approach to Array Denoising**  
Karim G. Oweiss and David J. Anderson, University of Michigan
- TP8a-3 Signal Design for a Random Array with Unknown Sensor Positions**  
Peter S. Wyckoff and Randy K. Young, The Pennsylvania State University
- TP8a-4 Data-Aided Nonlinear Filter for Narrowband Interference Rejection in DS-SS Systems: Closed-Form Analytical Results**  
Yehezkel Bar-Ness and Kunjie Wang, New Jersey Institute of Technology
- TP8a-5 Multichannel Blind Deconvolution of Arbitrary Signals: Adaptive Algorithms and Stability Analyses**  
Xiaoan Sun and Scott C. Douglas, Southern Methodist University
- TP8a-6 Successive Interference Cancellation Receiver with Neural Network Compensation in the CDMA Systems**  
Ming-Huang Yang and Jiann-Liang Chen, National Dong Hwa University,  
PO-Yuen Cheng, Symmetry Communications Systems
- TP8a-7 Performance Enhancement of a Wavelet Based Multicarrier DS-CDMA System Through Adaptive Interference Cancellation**  
A.S. Madhukumar and Francois Chin, Centre for Wireless Communications,  
AB Premkumar, Nanyang Technological University
- TP8a-8 ICA for Blind Signal Detection in CDMA Communications**  
Xiaohong Gong and Anthony Kuh, University of Hawaii

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- TP8a-9 Turbo Multiuser Detection for Coded DS-CDMA Systems: A Gibbs Sampling Approach**  
Vincent Buchoux, Olivier Cappe, and Eric Moulines, Enst/Tsi
- TP8a-10 Semi-Blind Downlink Inter-Cell Interference Cancellation for FDD DS-CDMA Systems**  
Hafedh Trigui, Telecom Modus Ltd., Dirk T.M. Slock, Eurecom Institute
- TP8a-11 A Joint Adaptive MMSE Down-Link Receiver**  
Daniel Garcia-Alis, University of Strathclyde, Stephan Weiss, University of Southampton, Robert W. Stewart, University of Strathclyde
- TP8a-12 Designing Orthonormal Subspace Tracking Algorithms**  
Scott C. Douglas and Xiaolan Sun, Southern Methodist University



**Session TP8b — Algorithms for Audio  
(Poster Session) Coding and Speech  
3:30 - 5:00 Processing**

Session Chair: Keith Teague, Oklahoma State University

**TP8b-1 A C++ Research and Development Environment  
for Speech and Audio Processing Applications**

Ali Erdem Ertan and Thomas P. Barnwell, Georgia Institute of Technology

**TP8b-2 Algorithm Compatible Improvements for  
FS-1016 CELP**

Walter Andrews, Department of Defense, Keith A. Teague,  
Oklahoma State University

**TP8b-3 Method for Accurately Identifying and Re-  
constructing the Unvoiced Component in  
Speech**

W. Bastiaan Kleijn, A. Jefremov, and M. Murthi, Royal Institute of Technology

**TP8b-4 Spectral Entropy-Based Wideband Speech  
Coding**

Mark G. Kokes and Jerry D. Gibson, Southern Methodist University

**TP8b-5 Nonuniform Oversampled Filter Banks for  
Audio Signal Processing**

Zoran Cvetkovic and James Johnston, AT&T Shannon Laboratory

**TP8b-6 PDF Optimized Parametric Vector Quan-  
tization with Application to Speech Coding**

Anand D. Subramaniam and Bhaskar D. Rao, University of California-San Diego

**TP8b-7 Identification System of Music Notes through  
the use of DST-rot Adaptive Filter**

Antonio C.P. Veiga, Universidade Federal de Uberlandia, Yuzo Iano, Universidade  
Estadual de Campinas, Luciano V. Lima, Keiji Iamanaka, and Carlos A.L. Da Silva,  
Universidade Federal de Uberlandia

**TP8b-8 Maximum Entropy Classification Applied to  
Speech**

Maya Gupta, Michael P. Friedlander, and Robert M. Gray, Stanford University

**TP8b-9 Scaling of Audio Signals Using Frequency  
Domain Techniques**

K.P. Padhi and S.S. Abeysekera, Nanyang Technological University, J. Absar, St  
Microelectronics Asia Pacific PTE. Ltd., S. George, St Microelectronics Asia Pacific  
PTE. Ltd.

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**TP8b-10 Spectral Domain MMSE Estimators for System Modeling Non-Uniform Subband Adaptive Filters**

Jacob D. Griesbach, Michael Lightner, and Delores M. Etter,  
University of Colorado Boulder

**TP8b-11 Speech Analysis for Hearing Impaired Using Chirped Wavelets**

Adele B. Doser, University of Texas-Dallas

**TP8b-12 Speech Recognition Using Integra-Normalizer and Neuro-Fuzzy Method**

Sung-Soo Kim, Woosuk University, Dae-Jong Lee, Keun-Chang Kwak,  
and Jeong-Woong RYU, Chungbuk National University

**TP8b-13 Speech Spectrum Modeling - Applied to Spectrum Coding and Prediction**

Jonas Lindblom and Jonas Samuelsson, Chalmers University of Tehcnology

**TP8b-14 An Adaptive Multi-rate Speech Codec for Cellular Mobile Telephony**

K.R. Pankaj, Voice Over IP, Joy Kuri, Indian Institute of Science

**TP8b-15 Algebraic Separation Applied to Concurrent Vowel Separation and ECG Signal Separation**

Balasubramaniam Santhanam, University of New Mexico

**TP8b-16 Maximum Likelihood Noise HMM Estimation in Model-Based Robust Speech Recognition**

Martin Graciarena, Universidad de Buenos Aires

## Session WA1 — Automatic Target Recognition

Session Chair: Randolph Moses

- WA1-1 Signature Manifold Representation and Matching** 8:30 am  
Mike Bryant, Air FORCE Research Laboratory, Fred Garder, Sright State University
- WA1-2 Analytical and Experimental Performance—Complexity Tradeoffs in Automatic Target Recognition** 8:55 am  
Joseph A. O’Sullivan, Michael D. Devore, and Natalia Schmid, Washington University
- WA1-3 Expected Recognition Performance for SAR ATR Using Local Point Scatterers** 9:20 am  
Dave Doria, Raytheon
- WA1-4 Wavelet-Based Compression of High Range Resolution Radar Data for Moving Targets** 9:45 am  
Michael Clark, Chad M. Spooner, Todd McWhorter, and Sheeyun Park, Mission Research Corporation
- BREAK** 10:10 am
- WA1-5 Reduced-Rank Automatic Target Detection and Recognition** 10:30 am  
Piyapong Thanyasrisung, Irving S. Reed, and Xiaoli Yu, University of Southern California
- WA1-6 Optimization of Single Transmit Pulse Shape to Maximize Detection and Identification of Ground Mobile Targets** 10:55 am  
David A. Garren, Michael K. Osborn, Anne C. Odom, and J. Scott Goldstein, Science Applications INTERNATIONAL Corp., S. Unnikrishna Pillai, Polytechnic University, Joseph R. Guerci, Defense Advanced Research Projects Agency
- WA1-7 Comparison of Selected Features for Target Discrimination in SAR Imagery** 11:20 am  
Tristrom Cooke, CSSIP, Nick Redding, DSTO, Jim Schroeder, University of South Australia, Jingxin Zhang, CSSIP
- WA1-8 Optimized Automatic-Target-Recognition Algorithm on Scalable Myrinet/Field Programmable Array Nodes** 11:45 am  
Young CHO, University of Texas-Austin

## **Session WA2 — Blind and Nonblind Techniques for MIMO Channel Estimation**

Session Chair: Yingbo Hua

- WA2-1 Linear Space-Time Precoding for Multipath-Transparent Diversity Gains with Transmit-Antennas** **8:30 am**  
Georgios B. Giannakis, Yan Xin, and Zhengdao Wang, University of Minnesota
- WA2-2 Application of Blind MIMO Identification Methods to Blind Detection of Asynchronous DS-CDMA Signals in Multipath Channels** **8:55 am**  
Jitendra K. Tugnait, Auburn University
- WA2-3 Polynomial Ambiguity Resistant Precoders (PARP) for MIMO Channels: Necessity and Sufficiency for the Blind Identifiability and PARP Characterization and Construction** **9:20 am**  
Xiang-Gen Xia, University of Delaware, Weifeng Su and Hui Liu, University of Washington
- WA2-4 Combining Blind Equalization with Finite Alphabet Properties** **9:45 am**  
Alle-Jan Van Der Veen and Ant'onio Trindade, Delft University of Technology
- BREAK** **10:10 am**
- WA2-5 FIR Multichannel Identification Using Weighted Cumulant Matrix** **10:30 am**  
Jing Liang and Zhi Ding, University of Iowa
- WA2-6 Blind Identification of FIR MIMO Channels with Colored Input** **10:55 am**  
Yingbo Hua and Yong Xiang, The University of Melbourne
- WA2-7 A Randomised Algorithm for Improving Source and Channel Estimates by Exploiting the Finite Alphabet Property** **11:20 am**  
Jonathan H. Manton and Yingbo Hua, The University of Melbourne
- WA2-8 An Online Calibration Algorithm for the CDMA-Based Adaptive Antenna Array** **11:45 am**  
Chong Hyun Lee, Soohong Kim, and Joohwan Chun, Korea Advanced Institute of Science & Technology, Jong Heun Lee, SK-Telecom

## Session WA3 — SmartAirlinks

Session Chair: Andrea Goldsmith

- WA3-1 Space-Time Transmit Strategies and Channel Feedback Generation for Wireless Fading Channels** **8:30 am**  
Upamanyu Madhow, University of California-Santa Barbara, Eugene Visotsky, University of Illinois
- WA3-2 Spreading in Block Fading Channels** **8:55 am**  
Muriel Medard, MIT, D. Tse, University of California-Berkeley
- WA3-3 Capacity and Adaptive Modulation for Wideband Fading Channels** **9:20 am**  
SEONG-Taek Chung and Andrea Goldsmith, Stanford University
- WA3-4 Downlink Transmit Beamforming with Selective Feedback** **9:45 am**  
Shirish Nagaraj and Yih-Fang Huang, University of Notre Dame
- BREAK** **10:10 am**
- WA3-5 Performance Evaluation of a High-Speed Data Transmission System with Molulo-Type Preequalization** **10:30 am**  
Daqing Gu and Jay Bao, Mitsubishi Electric ITA
- WA3-6 An Antenna Solution for MIMO Channels: The Multimode Antenna** **10:55 am**  
Thomas Svantesson, Chalmers University of Technology
- WA3-7 Design of Spreading Sequences for SMPT-based CDMA Systems** **11:20 am**  
Slawomir Stanczak, Heinrich-Hertz-Institut, Frank Fitzek, Technical University Berlin, Holger Boche, Heinrich-Hertz-Institut, Adam Wolisz, Technical University Berlin
- WA3-8 A Multi-User Precoding Scheme Achieving Crosstalk Cancellation with Application to DSL Systems** **11:45 am**  
George Ginis and John M. Cioffi, Stanford University

## Session WA4 — Digital Filters

Session Chair: Claude Lindquist

- WA4-1 Nomographs for MFMBO Filters (Maximally Flat Magnitude Beyond the Origin) 8:30 am**  
Claude S. Lindquist, University of Miami, Celestino A. Corral, Motorola, Inc.
- WA4-2 Direct Digital Frequency Synthesizer Architecture Based on Chebyshev Approximation 8:55 am**  
Kalle Palomaki and Jarkko Niittylahti, Tampere University of Technology
- WA4-3 Design of IIR Digital Filters in the Complex Domain by Transforming the Desired Response 9:20 am**  
Tatsuya Matsunaga, Masahiro Yoshida, and Masaaki Ikehara, Keio University
- WA4-4 Adaptive Phase Equalizer for Minimum Phase SAW Filters 9:45 am**  
V. Hedge, S. Pai, and W. Kenneth Jenkins, Penn State University, T. Willborn, Qualcomm, Inc.
- BREAK 10:10 am**
- WA4-5 Canonic Signed Digit FIR Filter Design 10:30 am**  
Yassin M. Hasan and Lina J. Karam, Arizona State University, Matt Falkinburg, Art Helwig, and Matt Ronning, Motorola Ground Systems Div.
- WA4-6 Probabilistic Design of Long Round-off Error Free Fixed-Point Polynomial FIR Predictors and Predictive FIR Differentiators 10:55 am**  
Vassil S. Dimitrov and Jarmo M.S. Tanskanen, Helsinki University of Technology
- WA4-7 The Design of Peak Constrained Least Squares FIR Filters with Finite Precision Coefficients 11:20 am**  
Trevor W. Fox and Laurence E. Turner, University of Calgary

## **Session WA5 — DSP Programming and Implementation Techniques**

Session Chair: Stephen Wilson

- WA5-1 VLIW vs. Superscalar Implementation of a Baseline H.263 Video Encoder** **8:30 am**  
Serene Banerjee, Hamid R. Sheikh, Lizy K. John, Brian L. Evans, and Alan C. Bovik, The University of Texas at Austin
- WA5-2 Optimization of Vertical and Horizontal Beamforming Kernels on the PowerPC G4 Processor with AltiVec Technology** **8:55 am**  
Young Cho, University of Texas-Austin
- WA5-3 A Programmable Data-Path for MPEG-4 and Natural Hybrid Video Coding** **9:20 am**  
Aamir Farooqui, Synopsys Inc., Vojin Oklobdzija, University of California-Davis
- WA5-4 High Data Rtes Digital Communication System Design Compilers for VLIW DSPs** **9:45 am**  
Shoab Khan, National University of Sciences & Technologies, Maliq M. SAQIB, Aaman Sultana, and Sherjil Ahmed, Communications Enabling Technologies
- BREAK** **10:10 am**
- WA5-5 Impact of Architecture Extensions for Media Signal Processing on Data-Path Organization** **10:30 am**  
Aamir Farooqui, Synopsys Inc., Vojin Oklobdzija, University of California-Davis
- WA5-6 Optimal Time-Shared Design of Digital Signal Processing Architectures** **10:55 am**  
M. Sohail Sadiq, National University of Sciences & Technologies, Sheikh M. Farhan and Sherjil Ahmed, Communications Enabling Technologies
- WA5-7 An Evaluation of Compiler-Processor Interaction for DSP Applications** **11:20 am**  
Allan Frederikson and Rasmus Christiansen, Aalborg University, Jeff Bier, Berkeley Design Technology, Inc. Peter Koch, Aalborg University
- WA5-8 BURAQ: A DSP Development Framework** **11:45 am**  
Muddassar Farooq, and Shoab Khan, National University of Sciences & Technologies, Maliha Riaz, Wamiq Ali, and Sherjil Ahmed, Communications Enabling Technologies

## Session WA6 — Design for Low Power

Session Chair: David Martinez

- WA6-1 High-Performance Low-Power Polyphase Channelizer Chip-Set** **8:30 am**  
William S. Song, Michael M. Vai, Huy T. Nguyen, and Albert H. Horst, MIT
- WA6-2 Power Aware Systems** **8:55 am**  
Manish Bhardwaj and Anantha Chandrakasan, MIT
- WA6-3 Adaptive Error-Cancellation for Low-Power Digital Filtering** **9:20 am**  
Lei Wang, and Naresh Shanbhag, University of Illinois at Urbana-Champaign
- WA6-4 A New Low-Power Binary Adder** **9:45 am**  
Yuke Wang, the University of Texas-Dallas, Keshab K. Parhi, University of Minnesota
- BREAK** **10:10 am**
- WA6-5 Effect of Wire Delay on the Design of Prefix Adders in Deep-Submicron Technology** **10:30 am**  
Zhijun Huang and Milos D. Ercegovac, University of California-Los Angeles
- WA6-6 Optimal Digital Design of Signal Processing Subsystems Using Hybrid Architectures** **10:55 am**  
Shoab Khan, National University of Sciences & Technologies, Sherjil Ahmed, Communications Enabling Technologies



## Session WA7— Signal/Image Enhancement

Session Chair: Til Aach

- WA7-1 Matched Subspace Detectors for Discrimination Targets From Trees in SAR Imagery** **8:30 am**  
Anshul Sharma and Randolph L. Moses, The Ohio State University
- WA7-2 Parametric Modeling of Blurred Images for Image Restoration** **8:55 am**  
Prashan Premaratne and C.C. KO, The National University of Singapore
- WA7-3 An Adaptive Algorithm for Image Resolution Enhancement** **9:20 am**  
Simant Dube and Li Hong, Stmicroelectronics, Inc.
- WA7-4 An Algorithm for Fingerprint Image Postprocessing** **9:45 am**  
Marius Tico and Pauli Kuosmanen, Tampere University of Technology
- BREAK** **10:10 am**
- WA7-5 Two-Channel Noise Reduction with Pitch-Adaptive Post-Processing** **10:30 am**  
Fahmi Cheikh-Rouhou and Jan Tilp, Darmstadt University of Technology
- WA7-6 Manifold Reconstruction from Unorganized Points** **10:55 am**  
Daniel Freedman, Harvard University
- WA7-7 Data Fusion Using Multiple Models** **11:20 am**  
D.D. Sworder, University of California-San Diego, J.E. Boyd, Cubic Defense Systems, R.J. Elliott, University of Alberta, R. Gary Hutchins, Naval Postgraduate School

**Session WA8a — Adaptive Techniques for  
(Poster Session) Equalization and  
8:30 - 10:00 Beamforming**

Session Chair: Alan Lindsey, University of Southern California

**WA8a-1 A Blind Adaptive Equalizer for Sparse Channels**

Yuanwei Jin, University of California-Davis, Benjamin Friedlander,  
University of California-Santa Cruz

**WA8a-2 Stable Simplified Gradient Algorithms for Total  
Least Square Adaptive Filtering**

Bruce E. Dunne, Tellabs Research Center, Geoffrey A. Williamson,  
Illinois Institute of Technology

**WA8a-3 A Fractionally Spaced DFE with Subband  
Decorrelation**

Stephan Weiss, University of Southampton, Markus Rupp, Bell-Labs, Lucent  
Technologies, Hafizal Mohamad, and Lajos Hanzo, University of Southampton

**WA8a-4 Convex Optimization Algorithms for Blind  
Channel Equalization**

Mung Chiang, David Julian, Daniel O'Neill, and Arak Sutivong, Stanford University

**WA8a-5 The Adaptive Matching Pursuit Algorithm for  
Estimation and Equalization of Sparse Time-  
Varying Channels**

S.F. Cotter and Bhaskar D. RAO, University of California-San Diego

**WA8a-6 Blind Equalization for 256-QAM CATV  
Networks**

Juergen Bogenfeld, Wolfgang Sauer-Greff, and Werner Rupprecht,  
University of Kaiserslautern, Eckard Bogenfeld, T-Nova German Telekom

**WA8a-7 Selection of Time-Varying Volterra Model  
Using Multiple Hypothesis Testing**

Matthew Green and Abdelhak M. Zoubir, Curtin University of Technology

**WA8a-8 A Fast Newton Second-order Volterra Filter**

Junghsi Lee and Chia-Yi Lu, Yuan-Ze University

**WA8a-9 Turbo-Equalization for Bit-Interleaved Coded  
Modulations**

P. Magniez, Enst/Tsi, B. Muquet, Motorola Paris, Pierre Duhamel, Enst/Tsi,  
M. De Courville, Motorola Paris

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**WA8a-10 Adaptive Variable Rate Data Transmission  
Over Fading Channel with Adaptive Feedback  
Equalization**

R.E. Goot and E. Dolev, Holon ACADEMIC Institute of Technology

**WA8a-11 Adaptive Per-Survivor Processing**

Zhenyu Zhu, Lucent Technologies Microelectronics, Hamid Sadjadpour,  
AT&T Research

**WA8a-12 BER of Frequency Adaptive Radiotelecomm-  
unication System with Sounding Signals**

R.E. Goot and V.E. Levit, Holon Academic Institute of Technology

**WA8a-13 Blind Equalization of OFDM Signals on  
HF-Channels**

Walter Akmouche, Celar/Tcom/TR,  
Stephanie Gruffaz and ANDRE Quinquis, Ensieta

**WA8a-14 An Alias-Free Subband Adaptive Equalizer for  
OFDM System**

Tomohide Miyagi and Hiroshi Ochi, Kyushu Institute of Technology

**WA8a-15 Turbo-Equalization for Multicarrier  
Transmissions**

B. Muquet, Motorola Paris, P. Magniez and Pierre Duhamel, Enst/TSI,  
M. De Courville, Motorola Paris, Georgios B. Giannakis,  
University of Minnesota

**WA8a-16 On the Impact of Channel Estimation for  
Diversity Reception in Mobile OFDM Systems**

Andreas A. Hutter, Technische Universitat Munchen, Elisabeth de Carvalho  
and John M. Cioffi, Stanford University

## **Session WA8b — Data Security and Watermarks**

(Poster Session)

10:30 - 12:00

Session Chair: Min-You Wu

### **WA8b-1A Blind Watermarking Algorithm with Semantic Meaningful Watermarks**

Chun-Hsiang Huang, JA-Ling Wu, and Ding-Yun Chen,  
National Taiwan University

### **WA8b-2 Technical Challenges Associated with Protecting On-Line Images**

Gregory L. Heileman and Carlos E. Pizano, University of New Mexico

### **WA8b-3 A Secure Method for Quality Layered Encryption of MP3 Audio**

Niels Thorwirth and Petar Horvatic, Fraunhofer Crcg, Inc., Rudiger Weis,  
Universitat Mannheim, Jian Zhao, Fraunhofer Crcg, Inc.

### **WA8b-4 Optimum Attack on Digital Watermarks and its Defense**

Johathan K. Su and Joachim J. Eggers, University of Erlangen-Nuremberg,  
Berni Girod, Stanford University

### **WA8b-5 Illustration of the Duality Between Channel Coding and Rate Distortion with Side Information**

Johathan K. Su and Joachim J. Eggers, University of Erlangen-Nuremberg

### **WA8b-6 Covert Communications Through Spread-Spectrum Watermarking**

Arak Sutivong, Stanford University

### **WA8b-7 Robust Image Watermark with Wavelet Packet Transform and Spread Spectrum Techniques**

Yu-Pin Wang, National Dong Hwa University, PO-Yuen Cheng,  
Symmetry Communications Systems

### **WA8b-8 Detection of Security Attacks on Routers in Mobile ATM Networks**

Sirisha R. Medidi and Edward A. Ashcroft, Arizona State University

### **WA8b-9 Periodic Signaling Scheme in Oblivious Data Hiding**

Litao Gang, Ali N. Akansu, and Mahalingam Ramkumar,  
New Jersey Institute of Technology

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**WA8b-10 Adaptive Image Database Using Wavelets**

Shantanu Chakrabarty, Milutin Stanacevic, and Trac D. Tran,  
The Johns Hopkins University

**WA8b-11 An Energy Spreading Transform Approach to  
Efficient Image Retrieval**

Waranan Saengow and Budit Thipakorn, King Mongkut's University of Technology  
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HONG, SEUNG HONG	TA8b-14	KARLSSON, PETER	TA3-1
HONIG, MICHAEL	TP2-1	KASAPI, ATHOS	MP2b-2
HORST, ALBERT H.	WA6-1	KATSAGGELOS, AGGELOS	TP7-3
HORVATIC, PETAR	WA8b-3	KAUP, ANDRE	MA3b-3
HU, CHIA-CHANG	MP8b-9	KAWADA, MASAHIRO	MA8b-13
HUA, YINGBO	TA2-7	KAWAMOTO, MITSURU	TP3-5
HUA, YINGBO	WA2-6	KELLER, CATHERINE M.	MP8b-10
HUA, YINGBO	WA2-7	KERHERVE, ERIC	MA7b-2
HUANG, CHUN-HSIANG	WA8b-1	KERR, ADAM	MP2b-2
HUANG, S.	MP5-4	KHAN, SHOAB	WA5-4
HUANG, YIH-FANG	WA3-4	KHAN, SHOAB	WA5-8
HUANG, ZHIJUN	MP4-9	KHAN, SHOAB	WA6-6
HUANG, ZHIJUN	WA6-5	KIM, JOHN	TP6-2
HUGHES, BRIAN	TA2-3	KIM, JUNG-SU	TA8a-11
HUTCHINS, R. GARY	WA7-7	KIM, SOOHONG	WA2-8
HUTTER, ANDREAS A.	WA8a-16	KIM, SUNG-SOO	TA5-3
IAMANAKA, KEIJI	TP8b-7	KIM, SUNG-SOO	TP8b-12
IANO, YUZO	TP8b-7	KIM, THEODORE J.	MA1b-2
IKEHARA, MASAAKI	MA8b-13	KIVANC, DIDEM	MA7b-3
IKEHARA, MASAAKI	WA4-3	KIVANC, DIDEM	MP1b-1
IKRAM, MUHAMMAD Z.	TA5-6	KIVANC, DIDEM	MP1b-5
ILTIS, RONALD	MP1b-4	KLEIJN, W. BASTIAAN	TP8b-3
INOMATA, KENJI	TP1-8	KLIEWER, JORG	TA8b-4
INOUE, YUJIRO	TP3-5	KO, C.C.	WA7-2
ISKANDER, D.R.	MP3-8	KOCA, MUTLU	MP8a-11

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KOCA, MUTLU	MP8a-12	LINDSKOG, ERIK	MP8a-15
KOCH, PETER	WA5-7	LIU, HUI	MA7b-3
KOKES, MARK G.	TP8b-4	LIU, HUI	MP1b-1
KOUPATSIARIS, D. A.	MP6b-2	LIU, HUI	MP1b-5
KOUTEAS, S. D.	TA5-4	LIU, HUI	WA2-3
KRAUT, SHAWN	MP5-6	LIU, J.	MA6b-1
KRIM, HAMID	MP7-2	LIU, RUEY-WEN	TP3-5
KROLIK, JEFFREY	MP5-6	LIU, ZHEN	TP7-8
KROSCHER, KRISTIAN	MA8b-16	LIVINGSTON, FRANK	MP6a-2
KUH, ANTHONY	TP8a-8	LLORIS, ANTONIO	MP4-6
KUOSMANEN, PAULI	WA7-4	LLORIS, ANTONIO	MP4-7
KURI, JOY	TP8b-14	LU, CHIA-YI	WA8a-8
KURUOGLU, ERCAN E.	MP1a-2	LUK, WAYNE	MP4-4
KWAK, KEUN-CHANG	TA5-3	LUNDBERG, MAGNUS	MP8a-7
KWAK, KEUN-CHANG	TP8b-12	MADHOW, UPAMANYU	WA3-1
LAI, KUEI-CHIANG	MP3-9	MADHUKUMAR, A.S.	TA6-6
LAI, KUEI-CHIANG	TA8a-4	MADHUKUMAR, A.S.	TP8a-7
LARSSON, ERIK G.	MA8b-15	MAGLI, ENRICO	TA8b-7
LEAHY, RICHARD M.	MP3-3	MAGNIEZ, P.	WA8a-15
LEBEDEV, NIKOLAI	MP8a-3	MAGNIEZ, P.	WA8a-9
LEE, CHONG HYUN	WA2-8	MAGOTRA, NEERAJ	MP1a-1
LEE, DAE-JONG	TP8b-12	MAGOTRA, NEERAJ	MP6a-2
LEE, JIM P.Y.	MP8b-7	MAILAENDER, L.	MA4b-3
LEE, JONG HEUN	WA2-8	MAMUYA, N.D.	TA7-3
LEE, JUNGHSI	WA8a-8	MANDAYAM, NARAYAN	TP5-4
LEE, NIGEL	TA1-6	MANDYAM, GIRIDHAR D.	MA5b-1
LENARDI, MASSIMILIANO	TP5-3	MANDYAM, GIRIDHAR D.	MA5b-2
LEONG, WEN FENG	MP4-5	MANDYAM, GIRIDHAR D.	TP5-9
LEVIT, V.E.	WA8a-12	MANTIS, SPIROS	MP8b-12
LEVY, BERNARD C.	MP8a-11	MANTON, JONATHAN H.	TA2-7
LEVY, BERNARD C.	MP8a-12	MANTON, JONATHAN H.	WA2-7
LI, CHENGYANG	TA4-8	MAO, JIAN	MP8b-5
LI, CHENGYANG	TP3-4	MARPLE, JR., S. L.	MA1b-3
LI, HANG	MP2b-4	MARTIN, CAROL C.	TA3-2
LI, HONGBIN	TA2-8	MARTIN, CRISTOFF	TA8a-2
LI, JIAN	MA8b-15	MARTIN, ROSS D.	MA8b-9
LI, JIAN	TA2-8	MATSUNAGA, TATSUYA	WA4-3
LI, LAURA	MA8b-9	MATSUOKA, KATSUJI	TP1-8
LI, XIN	TA7-8	McDONALD, KEITH F.	TA1-2
LI, YOUMING	MP8b-11	MCILHENNY, ROBERT	MP4-9
LIANG, JIE	MA8b-12	McWHORTER, TODD	TP1-4
LIANG, JING	WA2-5	McWHORTER, TODD	WA1-4
LIANG, XUEBIN	TA2-6	MEDARD, MURIEL	WA3-2
LIDDICOAT, ALBERT A.	TP6-3	MEDIDI, SIRISHA R.	WA8b-8
LIGHTNER, MICHAEL	TP8b-10	MEDLES, ABDELKADER	TP5-3
LIMA, LUCIANO V.	TP8b-7	MELVIN, WILLIAM L.	TP1-7
LINDBLOM, JONAS	TP8b-13	MENHAJ, M.B.	MA8b-8
LINDQUIST, CLAUDE S.	MP3-7	MENSER, BERND	MA3b-1
LINDQUIST, CLAUDE S.	MP6b-5	MERMELSTEIN, PAUL	MP1b-3
LINDQUIST, CLAUDE S.	WA4-1	MIAO, ZHOURONG	TP7-1
LINDSEY, ALAN	TA8a-13	MICHELS, J.H.	TP1-5

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MILLER, ERIC	MP3-6	OH, JUNJIN	TA5-3
MILLER, W.C.	TA6-3	OKAMOTO, GARRET	MP8a-1
MITRA, SANJIT	TA8b-11	OKAZAKI, KATSUJI	TP1-8
MITRA, SANJIT	TA8b-12	OKLOBDZIJA, VOJIN	TP6-1
MITRA, SANJIT	TA8b-5	OKLOBDZIJA, VOJIN	WA5-3
MITRA, URBASHI	TA8a-5	OKLOBDZIJA, VOJIN	WA5-5
MIYAGI, TOMOHIDE	WA8a-14	OLMO, GABRIELLA	MP8b-6
MOHAMAD, HAFIZAL	WA8a-3	OLMO, GABRIELLA	TA8b-7
MONTALBANO, GIUSEPPE	MP8a-5	OMONDI, AMOS R.	MA6b-4
MORRELL, DARRYL	TP1-2	ONGGOSANUSI, EKO N.	MA5b-3
MOSES, RANDOLPH L.	WA7-1	ORTEGA, ANTONIO	TP7-1
MOSHER, JOHN C.	MP3-3	OSBORN, MICHAEL K.	WA1-6
MOULINES, ERIC	MP8b-4	OSHER, STANLEY	MP7-5
MOULINES, ERIC	TA5-8	OTTERSTEN, BJORN	TA3-1
MOULINES, ERIC	TP8a-9	OTTERSTEN, BJORN	TA8a-2
MUDULODU, SRIRAM	TA3-8	OWECHKO, Y.	TA1-1
MUDULODU, SRIRAM	TP5-2	OWEISS, KARIM G.	TP8a-2
MUHAMMAD, KHURRAM	MP6a-3	PADHI, K.P.	TP8b-9
MULLER, JEAN-MICHEL	TA6-4	PAI, S.	WA4-4
MUNSON, JR., DAVID C.	MA1b-1	PALOMAKI, KALLE	WA4-2
MUQUET, B.	TA8a-8	PANKAJ, K.R.	TP8b-14
MUQUET, B.	WA8a-15	PAPADIAS, CONSTANTINOS	TA3-6
MUQUET, B.	WA8a-9	PAPANDREOU-SUPPAPPOLA,	
MURTHI, M.	TP8b-3	ANTONIA	MP6b-4
MUSCEDERE, R.	TA6-3	PARHAMI, BEHROOZ	MA4b-4
NABAR, ROHIT U.	MP8a-14	PARHAMI, BEHROOZ	TA6-7
NAGARAJ, SHIRISH	WA3-4	PARHAMI, BEHROOZ	TA6-8
NAGARAJAN, K.	TP4-5	PARHAMI, BEHROOZ	TP6-8
NANNARELLI, ALBERTO	TA6-5	PARHI, KESHAB K.	MP8a-13
NEHORAI, ARYE	MP3-4	PARHI, KESHAB K.	TA8b-3
NEHORAI, ARYE	TA8a-3	PARHI, KESHAB K.	TP6-6
NEHORAI, ARYE	TA8a-9	PARHI, KESHAB K.	WA6-4
NELANDER, ANDERS	TP1-9	PARK, SHEEYUN	WA1-4
NELSON, KARL E.	MP4-5	PATTICHIS, MARIOS S.	TA7-2
NEUGEBAUER, SHAWN P.	TA5-1	PAULRAJ, AROGYASWAMI	MP8a-14
NGIA, LESTER S.H.	TA5-2	PAULRAJ, AROGYASWAMI	TA2-1
NGUYEN, HUY T.	WA6-1	PAULRAJ, AROGYASWAMI	TA3-4
NI, JIAN-JUN	TA4-3	PAULRAJ, AROGYASWAMI.	TA3-5
NIITTYLAHTI, JARKKO	WA4-2	PAULRAJ, AROGYASWAMI	TA3-8
NIKIAS, CHRYSOSTOMOS L.	TP3-3	PAULRAJ, AROGYASWAMI	TA8a-1
NODA, SHINSAKU	TP1-8	PAULRAJ, AROGYASWAMI	MP8a-2
NOLAN, ALISSA	MP2b-2	PEREIRA, FERNANDO	MA3b-2
NORDEN, FREDRIK	MA8b-10	PERONA, P.	MP4-1
NUNES, PAULO	MA3b-2	PEROOR, SEBASTIAN K.	TA8a-1
NUNEZ, J.A.	MA8b-4	PERROS-MEILHAC, LISA	MP8b-4
O'BOYLE, JOHN	MP8a-1	PERROS-MEILHAC, LISA	TA5-8
O'DROMA, MAIRTIN	MP8b-5	PERRY, RICHARD	TA8a-14
O'NEILL, DANIEL	WA8a-4	PESAVENTO, MARIUS	MA2b-4
O'SULLIVAN, JOSEPH A.	WA1-2	PETROPOULOS, HELEN	TA7-2
OCHI, HIROSHI	WA8a-14	PHILLIPS, B.J.	MA6b-3
ODOM, ANNE C.	WA1-6	PILLAI, S. UNNIKRISHNA	WA1-6

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PIZANO, CARLOS E.	WA8b-2	ROSE, KENNETH	TP7-4
PRAKASH, RAJAT	TP4-1	ROUSEFF, DANIEL	TA1-8
PREMARATNE, PRASHAN	WA7-2	ROY, SUMIT	TA4-8
PREMKUMAR, AB	TP8a-7	RUPP, MARKUS	MA4b-3
PRINCE, JERRY L.	MP7-3	RUPP, MARKUS	MP4-8
PRINCE, JERRY L.	TP7-5	RUPP, MARKUS	WA8a-3
PULSONE, NICHOLAS	TA1-6	RUPPRECHT, WERNER	WA8a-6
QIAN, HAOLI	TA4-6	RYU, JEONG-WOONG	TA5-3
QU, GONGYUAN	TA7-6	RYU, JEONG-WOONG	TP8b-12
QU, GONGYUAN	TA7-7	SABHARWAL, ASHUTOSH	TA8a-5
QUINQUIS, ANDRE	MA7b-2	SADIQ, M. SOHAIL	WA5-6
QUINQUIS, ANDRE	WA8a-13	SADJADPOUR, HAMID	WA8a-11
RAGHOTHAMAN, BALAJI	MA5b-2	SAENGOW, WARANAN	WA8b-11
RAGHUNATHAN, B.	TA7-4	SAMARDZIJA, DRAGAN	TP5-4
RAMIREZ, JAVIER	MP4-6	SAMPATH, HEMANTH	MP8a-2
RAMIREZ, JAVIER	MP4-7	SAMPATH, HEMANTH	TA3-5
RAMKUMAR, MAHALINGAM	WA8b-9	SAMUELSSON, JONAS	TP8b-13
RAMSTAD, TOR A.	TP7-7	SANDHU, SUMEET	MP8a-14
RANGASWAMY, MURALIDHAR	TP1-5	SANDOR-LEAHY, S.	MA8b-7
RANHEIM, ANDERS	MP8a-4	SANTHANAM, B.	TP8b-15
RANKEN, D.M.	MP3-1	SAQIB, MALIQ M.	WA5-4
RAO, BHASKAR D.	MP8a-4	SAUER-GREFF, W.	WA8a-6
RAO, BHASKAR D.	TA8a-12	SAVADATTI, SANMATI	MP6a-2
RAO, BHASKAR D.	TP8b-6	SAYEED, AKBAR M.	MA5b-3
RAO, BHASKAR D.	WA8a-5	SAYEED, AKBAR M.	MP8a-8
RAO, NELATURY S.	TA8a-15	SAYEED, AKBAR M.	TA4-5
RAO, NELATURY S.	TA8a-16	SAYEED, AKBAR M.	TA8a-7
RAO, NELATURY S.	TP3-7	SCHARF, LOUIS	MP5-1
RAO, SATHYANARAYAN S.	TA8a-15	SCHARF, LOUIS	TP1-3
RAO, SATHYANARAYAN S.	TA8a-16	SCHMID, NATALIA	WA1-2
RAO, SATHYANARAYAN S.	TP3-7	SCHMIDT, D.M.	MP3-1
RAY, NILANJAN	MP7-8	SCHROEDER, JIM	WA1-7
RE, MARCO	TA6-5	SCHULTE, MICHAEL	TP6-7
REAL, EDWARD C.	TP3-8	SEBASTIAN, PEROOR K.	MP8a-2
REDDING, NICK	WA1-7	SEGALL, C. ANDREW	TP7-3
REED, IRVING S.	MP5-4	SER, WEE	TA8a-3
REED, IRVING S.	WA1-5	SESKAR, IVAN	TP5-4
REED, JEFFREY H.	MP4-2	SETHIAN, JAMES	MP7-6
REED, JEFFREY H.	TA5-7	SHANBHAG, NARESH	WA6-3
REED, JEFFREY H.	TP8a-1	SHARMA, ANSHUL	WA7-1
REGUNATHAN, SHANKAR L.	TP7-4	SHEA, KEVIN M.	TP4-8
REIAL, ANDRES	TA2-5	SHEIKH, HAMID R.	WA5-1
RIAZ, MALIHA	WA5-8	SHEN, PEGGY	MP3-7
RICE, GARREY W.	TA4-7	SHEN, PEGGY	TA8a-9
RICKS, DAVID	TA1-4	SHEPHERD, R.J.	MA2b-2
RITCEY, JAMES A.	MP8a-16	SHIN, BONG-SIK	TA8a-11
ROBERTS, RANDY S.	MA8b-5	SHYNK, JOHN J.	MP3-9
ROBINSON, S.E.	MP3-2	SHYNK, JOHN J.	TA8a-4
ROGER, ANNE-FLORE	MP2b-2	SIDDIQI, M.U.	TP7-6
ROHWER, J.A.	MP1a-1	SIDIROPOULOS, NIKOS	TP4-2
RONNING, MATT	WA4-5		

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SIEGEL, PAUL H.	MP8a-4	TAN, KAH-HOWE	MP4-5
SINHA, RAJNISH	TP2-5	TANG, PING TAK PETER	TA6-2
SLAUGHTERBECK, AMY	MP8a-1	TANGSUKSON, T.	TA7-3
SLOCK, DIRK T.M.	MP8a-5	TANSKANEN, JARNO M.S.	WA4-6
SLOCK, DIRK T.M.	TP5-3	TEAGUE, KEITH A.	TP8b-2
SLOCK, DIRK T.M.	TP8a-10	TELLADO, JOSE	TA8a-1
SMITH, KEVIN S.	TA5-4	THANYASRISUNG, P.	WA1-5
SNG, Y.H.	MP8b-11	THERRIEN, CHARLES W.	MP6b-2
SODERSTRAND, MICHAEL A.	MP4-5	THERRIEN, CHARLES W.	TA5-4
SOLLENBERGER, NELSON R.	TA3-2	THIPAKORN, BUNDIT	WA8b-11
SONG, WILLIAM S.	WA6-1	THORWIRTH, NIELS	WA8b-3
SONG, YUYING	MP6b-5	TIAN, ZHI	MP8a-6
SOO, HOOI MIIN	MP4-5	TICO, MARIUS	WA7-4
SPOONER, CHAD M.	TP3-1	TILP, JAN	WA7-5
SPOONER, CHAD M.	WA1-4	TONG, LANG	TP4-3
SRIKANTESWARA, S.	MP4-2	TOPIWALA, PANKAJ	TP7-5
STAMOULIS, A.	TP4-6	TOUMPIS, STAVROS	TP4-9
STANACEVIC, MILUTIN	WA8b-10	TRAN, TRAC D.	MA8b-12
STANCZAK, SLAWOMIR	TP5-5	TRAN, TRAC D.	TP7-5
STANCZAK, SLAWOMIR	WA3-7	TRAN, TRAC D.	WA8b-10
STASZEWSKI, ROBERT B.	MP6a-3	TRANter, WILLIAM H.	TA5-7
STEARNS, SAM D.	MP1a-1	TRIGUI, HAFEDH	TP8a-10
STEIN, DAVID	MA8b-3	TRINDADE, ANT'ONIO	WA2-4
STEWART, ROBERT W.	TA4-7	TRIPATHI, VINAYAK	TP4-1
STEWART, ROBERT W.	TP8a-11	TSAI, ANDY	MP7-1
STEWART, STEVE	MA8b-3	TSATSANIS, MICHAIL	TP2-4
STINE, JAMES E.	TP6-7	TSE, D.	TA2-2
STOCKER, ALAN D.	MA8b-1	TSE, D.	WA3-2
STOICA, PETRE	MA8b-15	TSENG, BEN-DAU	MA8b-11
STOICA, PETRE	TA3-5	TU, CHENGJIE	TP7-5
STRIDH, RICKARD	TA3-1	TUGNAIT, JITENDRA K.	WA2-2
SU, JOHATHAN K.	WA8b-4	TUMMALA, MURALI	MP2a-1
SU, JOHATHAN K.	WA8b-5	TUMMALA, MURALI	TP4-8
SU, WEIFENG	WA2-3	TUQAN, JAMAL	TP5-8
SUBRAMANIAM, ANAND D.	TP8b-6	TURELI, UFUK	MP1b-1
SULLIVAN, JAMES L.	MP6b-1	TURELI, UFUK	MP1b-5
SULTANA, AAMAN	WA5-4	TURNER, LAURENCE E.	WA4-7
SUN, XIAOAN	TP8a-12	TURNER, R.H.	MP4-3
SUN, XIAOAN	TP8a-5	USEVITCH, BRYAN	MA7b-1
SUN, YI	TP2-6	VAI, MICHAEL M.	WA6-1
SUTIVONG, ARAK	WA8a-4	VAN DER VEEN, ALLE-JAN	WA2-4
SUTIVONG, ARAK	WA8b-6	van RENSBURG, C.	MP2b-3
SVANTESSON, THOMAS	MP8b-3	VAN TREES, HARRY L.	MP8a-6
SVANTESSON, THOMAS	WA3-6	VAN VEEN, BARRY D.	MA5b-3
SWAMI, ANANTHRAM	TP3-2	VANDENBERGHE, LIEVEN	MA8b-14
SWAMI, ANANTHRAM	TP4-4	VARANASI, MAHESH K.	TP2-3
SWARTZLANDER, JR., EARL	MP6a-1	VASAVADA, YASH M.	TP8a-1
SWARTZLANDER, JR., EARL	TP6-2	VEERAVALLI, VENUGOPAL V.	TP4-1
SWINDLEHURST, A. LEE	TA3-7	VEIGA, ANTONIO C.P.	TP8b-7
SWORDER, D.D.	WA7-7	VERDE, FRANCESCO	TA8a-10
TALEB, ANISSE	TA5-5	VESE, LUMINITA A.	MP7-4

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VIKALO, HARIS	TP2-7	XU, ZHENGYUAN	TP5-6
VIKALO, HARIS	TP5-2	YAN, MING	TA8a-12
VISOTSKY, EUGENE	WA3-1	YANG, JANGHOON	TP3-3
VOGEL, JULIA	MA8b-16	YANG, KYEONG H.	TP7-6
VRBA, J.	MP3-2	YANG, MING-HUANG	TP8a-6
WALKE, RICHARD	MA4b-1	YANG, YAN	TP7-2
WALSTER, BILL	TA6-1	YAO, MINGHUA	TA7-1
WANG, KUN	MP8a-10	YAP, T.B.	TA7-3
WANG, KUNJIE	TP8a-4	YATES, ROY D.	TP2-5
WANG, LEI	WA6-3	YEH, CHI-HSIANG	TA6-8
WANG, XIAODONG	TP2-2	YEH, CHI-HSIANG	TP6-8
WANG, YU-PIN	WA8b-7	YENER, AYLIN	TP2-5
WANG, YUKE	WA6-4	YEUNG, GRACE K.	TP3-1
WANG, ZHENGDAO	WA2-1	YEZZI, JR., ANTHONY	MP7-1
WANG, ZHONGFENG	MP8a-13	YEZZI, JR., ANTHONY	MP7-3
WATANABE, MASAHIRO	TP1-8	YOSHIDA, MASAHIRO	WA4-3
WEIS, RUDIGER	WA8b-3	YOUNG, RANDY K.	TP8a-3
WEISS, STEPHAN	TA4-7	YU, SUNGWOOK	MP6a-1
WEISS, STEPHAN	TP8a-11	YU, TIAN-HU	TA8b-11
WEISS, STEPHAN	WA8a-3	YU, TIAN-HU	TA8b-12
WHIPPLE, GARY H.	MP8b-10	YU, TIAN-HU	TA8b-5
WICHMAN, RISTO	MA5b-4	YU, XIAOLI	MP8b-9
WICKS, MICHAEL C.	TP1-7	YU, XIAOLI	WA1-5
WILBORN, T.	WA4-4	ZATMAN, MICHAEL	MA2b-3
WILLIAMSON, GEOFFREY A.	WA8a-2	ZERGUINE, AZZEDINE	MP2a-2
WILLSKY, ALAN	MP7-1	ZERGUINE, AZZEDINE	MP2a-3
WILSON, STEPHEN G.	TA2-5	ZERUBIA, JOSIANE	MP1a-2
WINTENBY, JOHANNES	TP1-1	ZHANG, HONGBING	MP6b-3
WINTER, EDWIN M.	MA8b-2	ZHANG, J.	TA8a-9
WINTER, EDWIN M.	MA8b-6	ZHANG, JINGXIN	WA1-7
WINTERS, JACK H.	TA3-2	ZHANG, NING	MA4b-2
WIRES, KENT E.	TP6-7	ZHANG, RUI	TP7-4
WITZGALL, J.	MP5-4	ZHANG, RUIFENG	TP2-4
WOLISZ, ADAM	WA3-7	ZHANG, YIMIN	TA8a-13
WONG, KEVIN	MP4-9	ZHAO, JIAN	WA8b-3
WOOD, C.C.	MP3-1	ZHAO, LIANG	TA8a-13
WOOD, SALLY L.	TA7-6	ZHAO, MINYI	TA8b-1
WOOD, SALLY L.	TA7-7	ZHAO, Q.	TP4-3
WOODS, ROGER	MP4-3	ZHONG, SHI	TA8b-9
WU, JA-LING	WA8b-1	ZHOU, G. TONG	TA5-6
WU, JEFFREY	MA7b-4	ZHOU, G. TONG	TP4-5
WYCKOFF, PETER S.	TP8a-3	ZHOU, S.	TA8a-8
XIA, XIANG-GEN	TA2-6	ZHOU, YIFENG	MP8b-7
XIA, XIANG-GEN	TA7-5	ZHU, JIE	TA8a-3
XIA, XIANG-GEN	WA2-3	ZHU, ZHENYU	WA8a-11
XIANG, YONG	WA2-6	ZOLTOWSKI, MICHAEL	MP5-4
XIAO, SHU	MA1b-1	ZOLTOWSKI, MICHAEL	TA4-2
XIAO, W.	TP2-1	ZOLTOWSKI, MICHAEL	TA8a-6
XIN, YAN	WA2-1	ZOUBIR, ABDELHAK M.	TA8b-15
XU, CHENYANG	MP7-3	ZOUBIR, ABDELHAK M.	WA8a-7
XU, GUANGHAN	MP2b-4	ZUCKER, STEVEN W.	MP7-7
XU, ZHENGYUAN	TP5-1		

**Notes...**

