

**FIFTIETH  
ASILOMAR CONFERENCE ON  
SIGNALS, SYSTEMS AND  
COMPUTERS**



**50<sup>th</sup>**  
**ANNIVERSARY**

**November 6–9, 2016**  
Asilomar Hotel and  
Conference Grounds

**Technical Co-sponsor**

*IEEE*  
*Signal Processing Society*  <sup>®</sup>

# FIFTIETH ASILOMAR CONFERENCE ON SIGNALS, SYSTEMS AND COMPUTERS

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# Welcome from the General Chairman

Prof. Phil Schniter  
The Ohio State University, USA

Welcome to the 50th Asilomar Conference on Signals, Systems, and Computers! I am honored to serve as the general chair for this special "50th anniversary" edition of the Conference. I first attended in 1997 and have returned almost every year since then. What keeps me coming back are the high-quality technical program, the relaxed and friendly atmosphere, and the natural beauty of Asilomar State Park.

This year, we come together to celebrate the remarkable impact that Asilomar has made, over the last 50 years, on the fields of signal processing, communications, circuits, and control. As we know, these fields are key to many of the core technologies that we use in our day-to-day lives.

For 50 years now, Asilomar has brought together top researchers from academia, industry, and government laboratories to advance the frontier of knowledge. As our lives become ever more enriched by technology, the importance of Asilomar will only grow in the years to come.

I am very excited by this year's technical program, which was brilliantly crafted by the Technical Program Chair, Gerald Matz, and his team: Jeff Andrews, Andreas Burg, Romain Couillet, Joakim Jaldén, Marco Lops, Antonia Papandreou-Suppapola, Marios Pattichis, Alejandro Ribeiro, and Wei Yu.

This year's program consists of 392 accepted papers, of which 208 were invited. Among these papers, 81 were submitted to the student paper contest, from which a list of 7 finalists were selected. On Sunday afternoon before the Welcome Reception, these finalists will present their work before a panel of judges organized by Scott Acton. We encourage everyone to attend this special session. The top 3 finishers will be announced before Tuesday's plenary lecture.

This year we are honored to have two plenary talks. The first plenary will be given on Sunday evening by Dr. John Treichler of Raytheon, Inc. John, who has been attending Asilomar since 1978, is famous for many contributions to signal processing and communications. I am very much looking forward to his lecture on "Fifty years of the Asilomar conference and its role in the flowering of DSP technology."

The second plenary will be given on Tuesday morning by Prof. Thomas Strohmer of the University of California at Davis. Thomas is an eminent researcher on the mathematics of signal processing, where he has made many lasting contributions. I am very excited about his lecture, entitled "You can have it all: Rapid, robust, and reliable solution of bilinear problems in signal processing."

I am thrilled and honored to serve as the General Chair of the 50th Asilomar Conference. I hope that you all enjoy the conference this year and discover everything that it has to offer.

Phil Schniter, Columbus, OH, June 2016.

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Vienna University of Technology

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Centrale Supélec, France

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Antonia Papandreou-Suppapola  
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### **TRACK G: ARCHITECTURE AND IMPLEMENTATION**

Andreas Burg  
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### **TRACK H: SPEECH IMAGE AND VIDEO PROCESSING**

Marios Pattichis  
University of New Mexico, USA

### **VICE TRACK CHAIR**

Wei Yu  
University of Toronto, Canada

# 2016 Asilomar Conference Session Schedule

## Sunday Afternoon, November 6, 2016

- 3:00–7:00 PM Registration — Merrill Hall  
3:00–5:15 PM Student Paper Contest — Heather Hall  
5:30–6:30 PM 50th Anniversary Address, John Treichler —Nautilus Hall  
6:30–9:00 PM Welcoming Reception — Merrill Hall

## Monday Morning, November 7, 2016

- 7:30–9:00 AM Breakfast – Crocker Dining Hall  
8:00 AM–6:00 PM Registration  
9:45–10:15 AM Coffee Social

### 8:15–11:55 AM MORNING SESSIONS

- MA1 Towards 5G (Invited)  
MA2a Spectrum Sharing Between Communication and Radar Systems (Invited)  
MA2b Hybrid Analog/Digital Precoding (Invited)  
MA3a Topology of Networks (Invited)  
MA3b Smart Grid (Invited)  
MA4a High Dimensional Inference, Random Matrices, and Applications (Invited)  
MA4b Information Theory and Statistical Learning (Invited)  
MA5a Sequential Signal Processing (Invited)  
MA5b Multisensor Systems and Statistical Inference (Invited)  
MA6 Signals and Systems in Visual Cultural Heritage (Invited)  
MA7a Computer Arithmetic I  
MA7b Neural Signal Processing  
MA8a1 Efficient Hardware Implementation (Poster)  
MA8a2 Error Correction and Network Coding (Poster)  
MA8a3 Massive MIMO (Poster)  
MA8a4 Neural Imaging (Poster)  
MA8b1 Design Methodologies for Signal Processing Systems (Poster)  
MA8b2 Sparse Methods and Compressive Sensing (Poster)  
MA8b3 Speech and Image Analysis (Poster)

- 12:00–1:00 PM Lunch – Crocker Dining Hall

## Monday Afternoon, November 7, 2016

### 1:30–5:10 PM AFTERNOON SESSIONS

- MP1a Algorithm and Hardware Aspects for 5G Wireless Systems (Invited)  
MP1b Wireless Networks (Invited)  
MP2a Interference Limited Next Generation Satellite Communications (SatnexIV) (Invited)  
MP2b Signal Processing for Low-Resolution Sampling (Invited)  
MP3a Communication and Coding for Distributed Computing (Invited)  
MP3b Distributed Optimization (Invited)  
MP4a Sparse Sampling for Data Analytics (Invited)  
MP4b High-dimensional Inference (Invited)  
MP5a Recent Advances in Nonstationary Signal Processing (Invited)  
MP5b Recent Advances in Covariance Matrix Estimation for Array Processing (Invited)  
MP6a Emerging Models and Methods in Image and Video Processing (Invited)  
MP6b Speech Signal Processing and Health Applications (Invited)  
MP7a Advances in Neuronal Modeling (Invited)  
MP7b Advances in Neural Array Processing (Invited)  
MP8a1 Beamforming and Array-based Estimation I (Poster)  
MP8a2 Communication Networks (Poster)  
MP8a3 Estimation and Learning Theory for Communications (Poster)  
MP8a4 Model Selection, Source Separation and Classification (Poster)  
MP8b1 Beamforming and Array-based Estimation II (Poster)  
MP8b2 Communication Theory (Poster)  
MP8b3 Implementations of DSP Kernels (Poster)

# 2016 Asilomar Conference Session Schedule (continued)

## Monday Evening, November 7, 2016

6:30–9:30 PM            50th Anniversary Conference Banquet at the Monterey Bay Aquarium. Buses leave Asilomar grounds at 5:40 pm and 6:00 pm. See registration materials for details and fees.

## Tuesday Morning, November 8, 2016

7:30–9:00 AM            Breakfast — Crocker Dining Hall

8:00 AM–5:00 PM        Registration

8:15–9:45 AM            TA1a — Conference Welcome and Plenary Session — Chapel

10:15–11:55 AM        MORNING SESSIONS

TA1b    Biological Communications (Invited)

TA2b    Recent Advances in Massive MIMO (Invited)

TA3b    Distributed Signal Processing

TA4b    Sketching and Optimizing for Big Data (Invited)

TA5b    Hardware Aspects for Compressive Sensing and Analog-to-Information Conversion (Invited)

TA6b    Phase Retrieval for Imaging: Theory and Methods (Invited)

TA7b    Biological Neural Systems (Invited)

TA8b1   Array Processing and Wireless Communications (Poster)

TA8b2   Communication System Theory (Poster)

TA8b3   MIMO and Multistatic Radars (Poster)

12:00–1:00 PM           Lunch – Crocker Dining Hall

## Tuesday Afternoon, November 8, 2016

1:30–5:35 PM            AFTERNOON SESSIONS

TP1a    Millimeter Wave Cellular Systems (Invited)

TP1b    5G Cellular Theory

TP2a    Implementation of Decoders for Polar Codes (Invited)

TP2b    Beamforming and Linear Processing

TP3a    Multiagent Systems and Game Theory (Invited)

TP3b    Graph Signal Processing (Invited)

TP4a    Bilinear Inverse Problems (Invited)

TP4b    Five Puzzles and Euclid's Bag of Tricks (Invited)

TP5a    Detection over Very Large Datasets (Invited)

TP5b    Source Localization and Sparse Array Design

TP6a    Big Data Analytics for Image and Video Processing (Invited)

TP6b    Optimization and Adaptive Methods

TP7a    Signal Processing for Dynamic Functional Brain Network Analysis (Invited)

TP7b    Implementation of Full-Duplex Radio Transceivers (Invited)

TP8a1   Network Data Analysis (Poster)

TP8a2   Relaying and Full Duplex Communications (Poster)

TP8a3   Subspaces, Covariances and Tensors (Poster)

TP8b1   Computer Arithmetic II (Poster)

TP8b2   Image and Video Sensor Processing and Communications (Poster)

TP8b3   Processing of Physiological Signals (Poster)

**Tuesday Evening    Open Evening — Enjoy the Monterey Peninsula**

# 2016 Asilomar Conference Session Schedule (continued)

## Wednesday Morning, November 9, 2016

7:30–9:00 AM Breakfast — Crocker Dining Hall

8:00 AM–12:00 PM Registration — Copyright forms must be turned in before the registration closes at 12:00 noon.

8:15 AM–11:30 PM MORNING SESSIONS

WA1a Approximate Computing and Fault Tolerance (Invited)

WA1b Communication System Development

WA2a Physical Layer Security (Invited)

WA2b Massive MIMO in the Field

WA3a Cognitive Networking (Invited)

WA3b Signal Processing with Lattices (Invited)

WA4a Decentralized Optimization and Learning (Invited)

WA4b Modelling and Inference with Graphs

WA5 Tensor Signal Processing (Invited)

WA6a Emerging Sensing Technologies for Assisted Living (Invited)

WA6b Image and Video Quality Assessment

WA7 Cognitive Radar (Invited)

12:00–1:00 PM Lunch — This meal is not included in the registration.



# Student Paper Contest

Heather - Sunday, November 6, 2016, 3:00–5:15 PM

## Track A

*“On the Impact of Blockage on the Throughput of Multi-tier Millimeter-Wave Networks”*

**Shuqiao Jia**, David Ramirez, Rice University, United States; Lei Huang, Yi Wang, Huawei Technologies Co. Ltd., China; Behnaam Aazhang, Rice University, United States

*“Fundamental Limits of Secure Device-to-Device Coded Caching”*

**Ahmed A. Zewail**, Aylin Yener, Pennsylvania State University, United States

## Track B

*“Robust Precoding Design for Massive MISO Downlink”*

**Mostafa Medra**, Timothy Davidson, McMaster University, Canada

## Track C

*“A Distributed Range-based Algorithm for Localization in Mobile Networks”*

**Sam Safavi**, Usman Khan, Tufts University, United States

## Track D

*“Parallel Asynchronous Lock-free Algorithms for Nonconvex Big-Data Optimization”*

**Loris Cannelli**, Gesualdo Scutari, Purdue University, United States; Francisco Facchinei, University of Rome, La Sapienza, Italy; Vyacheslav Kungurtsev, Czech Technical University in Prague, Czech Republic

## Track E

*“Two-Dimensional Sparse Arrays with Hole-Free Coarray and Reduced Mutual Coupling”*

**Chun-Lin Liu**, Palghat Vaidyanathan, California Institute of Technology, United States

## Track G

*“Memristor Based Adder Circuit Design”*

**Nagaraja Revanna**, Earl Swartzlander, University of Texas at Austin, United States

# 2016 Asilomar Conference Session Schedule

Coffee breaks will be at 9:55 AM and 3:10 PM. (except Tuesday morning when refreshments will be served outside the Chapel from 9:45–10:15 AM)

**Sunday, November 6, 2016**

**PLENARY SESSION 5:30–6:30 PM**

50<sup>th</sup> Anniversary Asilomar Distinguished Lecture

**Fifty years of the Asilomar conference, and its role in the  
flowering of DSP technology**

**John Treichler**

Raytheon Applied Signal Technology, USA

## **Abstract**

When this conference was first held at Asilomar in 1967, computers were rare beasts, control systems were mostly analog, digital signals processing was mostly theory, and Silicon Valley hadn't even been named yet [That happened in 1971]. This talk chronicles the incredible evolution of those technologies over the past 50 years and highlights many of the points where the research and practice brought together at this annual conference proved highly influential in the progress of the tightly related fields of communications, control, estimation, coding, and signal processing algorithm design. Little did the founders of this conference understand the impact that it, and the technology it helped develop, would have on the world.

## **Biography**

John Treichler received his BA and MEE degrees from Rice University, Houston, TX in 1970 and his PhDEE from Stanford in 1977. He served as a line officer aboard destroyers in the US Navy from 1970 to 1974. In 1977 he joined ARGO Systems in Sunnyvale, CA and then helped found Applied Signal Technology, Inc. in 1984 after serving for a year as an Associate Professor of Electrical Engineering at Cornell University. Applied Signal Technology, now a mission area within the Space and Airborne Systems (SAS) business unit of Raytheon, Inc, designs and builds advanced signal processing equipment used by the United States government and its allies for foreign intelligence collection. For three years he was the president

of the Raytheon Applied Signal Technology business unit and continues as the unit's Chief Technical Officer. He was elected a Fellow in the Institute of Electrical and Electronics Engineers (IEEE) in 1991. He was awarded the IEEE Signal Processing Society's Technical Achievement Award in 2000 and its first Industrial Leader Award in 2016. He recently completed a three-year tour as the IEEE Signal Processing Society's Vice President for Membership and Awards and is on the board of directors of the IEEE Foundation. In 2016 he was elected a member of the National Academy of Engineering.

**Tuesday, November 8, 2016**

**CONFERENCE WELCOME AND PLENARY  
SESSION 8:15–9:45 AM**

1. Welcome from the General Chair

**Prof. Philip Schniter**  
The Ohio State University, USA

2. Session TA1a      Distinguished Lecture for the 2016  
Asilomar Conference

**You can have it all: Rapid, robust, and reliable solution of  
bilinear problems in signal processing**

**Thomas Strohmer**  
University of California, Davis, USA

**Abstract**

I will first describe how I once failed to catch a murderer (dubbed the “graveyard murderer” by the media), because I failed in solving a blind deconvolution problem. Here, blind deconvolution refers to the following problem: Assume we are given a function  $y$  which arises as the convolution of two unknown functions  $g$  and  $h$ . When and how is it possible to recover  $g$  and  $h$  from the knowledge of  $y$ ? Blind deconvolution pervades many areas of science and technology, including astronomy, medical imaging, optics, and communications engineering. Blind deconvolution is obviously ill-posed and even under additional assumptions this is a very difficult non-convex problem full of undesirable local minima. I will present the first numerically efficient blind deconvolution algorithm that comes with rigorous convergence guarantees. We will also

consider more general bilinear problems, such as the case where we are given a mixture of blind deconvolution problems. Here we need to correctly blindly deconvolve and separate (demix) multiple functions at the same time from just a single measured function. I will describe a powerful convex framework for the solution of this problem and discuss its importance for the future Internet-of-Things.

### **Biography**

Thomas Strohmer is Professor of Mathematics at the University of California, Davis. His research interests are in applied harmonic analysis, numerical analysis, signal- and image processing, high-dimensional data analysis, and mathematics of information. He got his M.S. and Ph.D. in Mathematics in 1991 and 1994 respectively from the University of Vienna, Austria. He spent one year as Erwin-Schrodinger fellow at the Department of Statistics at Stanford University in 1997 before joining the University of California, Davis in 1998. His recent awards include the 2013 IEEE Signal Processing Society Best Paper Award and the 2014 SIAM Outstanding Paper Prize. Dr. Strohmer is on the editorial board of several journals. He also serves as consultant to industry in the areas of telecommunications, bioengineering, and signal- and image processing.

**Program of the  
2016 Asilomar Conference on  
Signals, Systems, and Computers**

**Technical Program Chairman  
Prof. Gerald Matz  
Vienna University of Technology**

## Session MA1 Towards 5G (invited)

Co-Chairs: *Angel Lozano, UPF, Barcelona and Maxime Guillaud, Huawei Research, Paris*

- MA1-1 A Novel Alternative to Cloud-RAN for Throughput Densification: Coded Pilots and Fast User-Packet Scheduling at Remote Radio Heads 8:15 AM  
*Ozgun Y. Bursalioglu, Chenwei Wang, Haralabos Papadopoulos, DOCOMO Innovations Inc, United States; Giuseppe Caire, Technische Universität Berlin, Germany*
- MA1-2 Integer-Forcing Analog-To-Digital Conversion for Massive MIMO Systems 8:40 AM  
*Luis G. Ordóñez, Iñaki Estella, Maxime Guillaud, Huawei Technologies, France*
- MA1-3 Analytical Handle for ZF Reception in Distributed Massive MIMO 9:05 AM  
*Rajitha Senanayake, University of Melbourne, Australia; Angel Lozano, Universitat Pompeu Fabra, Spain; Peter Smith, Victoria University of Wellington, New Zealand; Jamie Evans, University of Melbourne, Australia*
- MA1-4 The Impact of Beamforming and Coordination on Spectrum Pooling in MmWave Cellular Networks 9:30 AM  
*Hossein Shokri, KTH Royal Institute of Technology, Sweden; Federico Boccardi, Ofcom, United Kingdom; Elza Erkip, New York University, United States; Carlo Fischione, KTH Royal Institute of Technology, Sweden; Gabor Fodor, Ericsson, Sweden; Marios Kountouris, Huawei Technologies Co. Ltd., France; Petar Popovski, Aalborg University, Denmark; Michele Zorzi, University of Padova, Italy*
- BREAK 9:55 AM
- MA1-5 Limited Feedback Based Double-Sided Full-Dimension MIMO for Mobile Backhauling 10:15 AM  
*Stefan Schwarz, Markus Rupp, Technische Universität Wien, Austria*
- MA1-6 Downlink Massive MIMO Capacity Bound with Blind Gain Estimation at the Terminal 10:40 AM  
*Hien Quoc Ngo, Erik G. Larsson, Linköping University, Sweden*
- MA1-7 Overloaded MU-MISO Transmission with Imperfect CSIT 11:05 AM  
*Enrico Piovano, Hamdi Joudeh, Bruno Clerckx, Imperial College London, United Kingdom*
- MA1-8 Enforcing Coordination in Network MIMO with Unequal CSIT 11:30 AM  
*Paul de Kerret, Antonio Bazco, David Gesbert, EURECOM, France*

## **Session MA2a    Spectrum Sharing Between Communication and Radar Systems (invited)**

Chair: *Athina Petropulu, Rutgers University*

- MA2a-1    Bargaining over Fair Performing Dual Radar    8:15 AM  
and Communication Task  
*Andrey Garnaev, Wade Trappe, Rutgers University,  
WINLAB, United States; Athina Petropulu, Rutgers  
University, United States*
- MA2a-2    Spectrum Sharing Between MIMO-MC    8:40 AM  
Radars and Communication Systems  
*Bo Li, Athina Petropulu, Rutgers University, United States*
- MA2a-3    Spectrum Sharing with Radars: Impact of    9:05 AM  
Radars on Wi-Fi  
*Hossein-Ali Safavi-Naeini, Sumit Roy, University of  
Washington, United States*
- MA2a-4    Spectrum Maps for Cognition and    9:30 AM  
Co-Existence of Communication and Radar  
Systems  
*Maarit Melvasalo, Visa Koivunen, Jarmo Lunden, Aalto  
University, Finland*

## **Session MA2b    Hybrid Analog/Digital Precoding (invited)**

Co-Chairs: *Mats Bengtsson, KTH Royal Institute of Technology; Hadi  
Ghauch, KTH Royal Institute of Technology and Taejoon Kim, City  
University of Hong Kong*

- MA2b-1    Alternating Minimization for Hybrid    10:15 AM  
Precoding in Multiuser OFDM mmWave Systems  
*Xianghao Yu, Jun Zhang, Hong Kong University of  
Science and Technology, Hong Kong SAR of China;  
Khaled B. Letaief, Hong Kong University of Science  
and Technology, Hong Kong and Hamad bin Khalifa  
University, Qatar*
- MA2b-2    Subspace Estimation and Hybrid Precoding    10:40 AM  
for Wideband Millimeter-Wave MIMO System  
*Wai Ming Chan, Taejoon Kim, City University of Hong  
Kong, Hong Kong SAR of China; Hadi Ghauch, Mats  
Bengtsson, KTH Royal Institute of Technology, Sweden*
- MA2b-3    Multiuser Hybrid Precoding for Frequency    11:05 AM  
Selective Millimeter Wave Systems  
*Nuria Gonzalez-Prelcic, University of Vigo, Spain; Robert  
W. Heath, University of Texas at Austin, United States*
- MA2b-4    Hybrid Precoding for Millimeter Wave    11:30 AM  
Systems with a Constraint on User Electromagnetic  
Radiation Exposure  
*David Love, Miguel Castellanos, Purdue University,  
United States; Bertrand Hochwald, University of Notre  
Dame, United States*

## Session MA3a Topology of Networks (invited)

Co-Chairs: *Harish Chintakunta, Florida Polytechnic University and Hamid Krim, North Carolina State University*

- MA3a-1 Influence of Topology in Information Flow in Social Networks 8:15 AM  
*Harish Chintakunta, Athanasios Gentimis, Florida Polytechnic University, United States*
- MA3a-2 Persistent Homology Lower Bounds on Distances in the Space of Networks 8:40 AM  
*Weiyu Huang, Alejandro Ribeiro, University of Pennsylvania, United States*
- MA3a-3 Node Dominance: Discovering Hypernym-Hyponym Relations for Building Taxonomies 9:05 AM  
*Hui Guan, North Carolina State University, United States; Harish Chintakunta, Florida Polytechnic University, United States; Hamid Krim, North Carolina State University, United States*
- MA3a-4 Persistent Homology of Directed Networks 9:30 AM  
*Samir Chowdhury, Facundo Memoli, The Ohio State University, United States*

## Session MA3b Smart Grid (invited)

Chair: *Hao Zhu, University of Illinois at Urbana Champaign*

- MA3b-1 A Learning Based Method for Real Time Prediction of Cascading Failures 10:15 AM  
*Yue Zhao, Stony Brook University, United States; Jianshu Chen, Microsoft Research, United States*
- MA3b-2 On the Solution of the Three-Phase Load Flow in Distribution Networks 10:40 AM  
*Mohammadhafez Bazrafshan, Nikolaos Gatsis, University of Texas at San Antonio, Iran*
- MA3b-3 A Compressive Sensing Framework for the Analysis of Solar Photo-Voltaic Power 11:05 AM  
*Raksha Ramakrishna, Anna Scaglione, Bitu Analui, Arizona State University, United States*
- MA3b-4 Power Network Topology Control for Mitigating the Effects of Geomagnetically Induced Currents 11:30 AM  
*Cecilia Klauber, Hao Zhu, University of Illinois, United States*

## Session MA4a High Dimensional Inference, Random Matrices, and Applications (invited)

Chair: *Matthew McKay, Hong Kong University of Science and Technology*

- MA4a-1 Free Component Analysis 8:15 AM  
*Hao Wu, Raj Rao Nadakuditi, University of Michigan, United States*



- MA4a-2 Random Matrix Improved Subspace Clustering 8:40 AM  
*Romain Couillet, CentraleSupélec, France; Abba Kammoun, King Abdullah University of Science and Technology, France*
- MA4a-3 Inference of Principal Components of Noisy Correlation Matrices with Prior Information: from Statistical Physics to Applications to Proteins 9:05 AM  
*Remi Monasson, CNRS & Ecole Normale Supérieure, France*
- MA4a-4 A Tailored Sparse PCA Method for Finding Vaccine Targets Against Hepatitis C 9:30 AM  
*Ahmed Abdul Quadeer, David Morales-Jimenez, Matthew McKay, Hong Kong University of Science and Technology, Hong Kong SAR of China*

## Session MA4b Information Theory and Statistical Learning (invited)

Chair: *Pablo Piantanida, CentraleSupélec*

- MA4b-1 Information-Theoretic Analysis of Stability and Bias of Learning Algorithms 10:15 AM  
*Maxim Raginsky, University of Illinois at Urbana-Champaign, United States*
- MA4b-2 Estimation from Pairwise Comparisons: Statistical and Computational Aspects 10:40 AM  
*Nihar Shah, University of California, Berkeley, United States; Sivaraman Balakrishnan, Carnegie Mellon University, United States; Martin Wainwright, University of California, Berkeley, United States*
- MA4b-3 Beyond Maximum Likelihood: Boosting the Chow-Liu Algorithm for Large Alphabets 11:05 AM  
*Jiantao Jiao, Yanjun Han, Tsachy Weissman, Stanford University, United States*
- MA4b-4 Adaptive Sequential Learning 11:30 AM  
*Craig Wilson, Google, Inc., United States; Venugopal Veeravalli, University of Illinois at Urbana-Champaign, United States*

## Session MA5a Sequential Signal Processing (invited)

Co-Chairs: *Venugopal Veeravalli, University of Illinois at Urbana-Champaign and George Moustakides, University of Patras*

- MA5a-1 On Parallel Sequential Change Detection Controlling False Discovery Rate 8:15 AM  
*Jie Chen, Wenyi Zhang, H. Vincent Poor, University of Science and Technology of China, China*
- MA5a-2 Distributed Quickest Detection with Optional Observations at the Fusion Center 8:40 AM  
*Bo Jiang, Lifeng Lai, Worcester Polytechnic Institute, United States*

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|--------|---|---------|
| MA5a-3 | How to Quickly Detect a Change While Sleeping (almost) All the Time<br><i>Venkat Chandar, D.E. Shaw, United States; Aslan Tchamkerten, Télécom Paristech, France</i>                      | 9:05 AM |
| MA5a-4 | Dynamic Change-Point Detection using Correlation Networks<br><i>Shanshan Cao, Yao Xie, Georgia Institute of Technology, United States; Yuxin Chen, Stanford University, United States</i> | 9:30 AM |

## **Session MA5b    Multisensor Systems and Statistical Inference (invited)**

Chair: *Visa Koivunen, Aalto University*

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|--------|---|----------|
| MA5b-1 | How to Capture a Stopping Time: the Independent Case<br><i>George Moustakides, University of Patras, Greece</i>   | 10:15 AM |
| MA5b-2 | Wideband Capon Beamforming with Pre-Steering<br><i>Richard Kozick, Bucknell University, United States; Christian Coviello, University of Oxford, United Kingdom</i>   | 10:40 AM |
| MA5b-3 | Sparsity-Promoting Bootstrap Method for Large-Scale Data<br><i>Visa Koivunen, Emad Mozafari, Aalto University, Finland</i>  | 11:05 AM |
| MA5b-4 | New Contributions to Estimation Theory with Applications in Wave Energy, IEEE 1588, Cybersecurity, MIMO Radar and the Internet of Things<br><i>Qian He, University of Electronic Science and Technology, China; Jiangfan Zhang, Anand Guruswamy, Basel Alnajjab, Rick S. Blum, Lehigh University, United States</i> | 11:30 AM |

## **Session MA6    Signals and Systems in Visual Cultural Heritage (invited)**

Co-Chairs: *Andy Klein, Western Washington University and Rick Johnson, Cornell University*

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|-------|---|---------|
| MA6-1 | Automated Classification of Pen Strokes in Van Gogh's Drawings<br><i>Rosaleena Mohanty, University of Wisconsin-Madison, United States; William Sethares, University of Wisconsin-Madison and Rijksmuseum, United States; Teio Meedendorp, Louis van Tilborgh, Van Gogh Museum, Netherlands</i> | 8:15 AM |
| MA6-2 | Non-Negative Dictionary Learning for Paper Watermark Similarity<br><i>David Picard, Thomas Henn, ETIS ENSEA/Université de Cergy-Pontoise/CNRS, France; Georg Dietz, papierstruktur.de, France</i>   | 8:40 AM |

- MA6-3 Automated Chain Line Marking and Pattern Matching in Radiographs of Rembrandt's Prints 9:05 AM  
*Xuelie Xi, Cornell University, United States; Devin Conathan, University of Wisconsin, United States; Amanda House, Cornell University, United States; William Sethares, University of Wisconsin-Madison and Rijksmuseum, United States; C. Richard Johnson, Jr., Cornell University, United States*
- MA6-4 Deep Learning Classification of Photographic Paper Based on Clustering by Domain Experts 9:30 AM  
*Andrea Frost, Western Washington University, United States; Sally Wood, Santa Clara University, United States; Paul Messier, Yale University, United States; David Palzer, Andrew G. Klein, Western Washington University, United States*
- BREAK 9:55 AM
- MA6-5 Applying Measures of Texture Similarity to Wove Paper 10:15 AM  
*Patrice Abry, CNRS / ENS Lyon, France; Andrew G. Klein, Western Washington University, United States; Paul Messier, Yale University, United States; Margaret H. Ellis, Morgan Library & Museum, United States; William A. Sethares, University of Wisconsin, United States; David Picard, ENSEA, France; Yuanhao Zhai, David L. Neuhoff, University of Michigan, United States; Stephane Roux, ENS Lyon, France; Stephane Jaffard, Université Paris-Est - Créteil Val-de-Marne, France; Herwig Wendt, CNRS / University of Toulouse, France; C. Richard Johnson, Jr., Cornell University, United States*
- MA6-6 Multispectral Imaging at the Interface of Cultural Heritage Research and Undergraduate Education 10:40 AM  
*Erich Uffelmann, Mallory Stephenson, Washington and Lee University, United States; John Delaney, Kathryn Dooley, National Gallery of Art (Washington, DC), United States*
- MA6-7 Spatial-Spectral Representation for X-Ray Fluorescence Image Super-Resolution 11:05 AM  
*Qiqin Dai, Northwestern University, United States; Emeline Pouyet, Northwestern University / Art Institute of Chicago Center for Scientific Studies in the Arts, United States; Oliver Cossairt, Marc Walton, Aggelos Katsaggelos, Northwestern University, United States*
- MA6-8 Automatic Registration and Mosaicking of Color, Infrared, and X-Radiograph Images of Old Master Paintings Along with Automated Thread Counting 11:30 AM  
*Damon Conover, John Delaney, National Gallery of Art; George Washington University, United States; Murray Loew, George Washington University, United States*

## Session MA7a Computer Arithmetic I

Chair: *Earl Swartzlander, University of Texas at Austin*

- MA7a-1 A Theoretical Analysis of Square versus Rectangular Component Multipliers in Recursive Multiplication 8:15 AM  
*Behrooz Parhami, University of California, Santa Barbara, United States*
- MA7a-2 Memristor Based Adder Circuit Design 8:40 AM  
*Nagaraja Revanna, Earl Swartzlander, University of Texas at Austin, United States*
- MA7a-3 Synthesis of Correlated Bit Streams for Stochastic Computing 9:05 AM  
*Megha Parhi, Yin Liu, Marc D. Riedel, Keshab K. Parhi, University of Minnesota, United States*

## Session MA7b Neural Signal Processing

Chair: *P.P. Vaidyanathan, California Institute of Technology*

- MA7b-1 Efficiency of Estimators in Fluorescence Microscopy 10:15 AM  
*Amir Tahmasbi, Texas A&M University, United States; E. Sally Ward, Texas A&M Health Science Center, United States; Raimund Ober, Texas A&M University, United States*
- MA7b-2 Detection of Protein Repeats using the Ramanujan Filter Bank 10:40 AM  
*Srikanth V. Tenneti, Vaidyanathan P.P., California Institute of Technology, United States*
- MA7b-3 On Inferring Functional Connectivity with Directed Information in Neuronal Networks 11:05 AM  
*Zhiting Cai, Rice University, United States; Curtis Neveu, John Byrne, University of Texas Health Science Center at Houston, United States; Behnaam Aazhang, Rice University, United States*
- MA7b-4 Seizure Prediction using Long-Term Fragmented Intracranial Canine and Human EEG Recordings 11:30 AM  
*Zisheng Zhang, Keshab Parhi, University of Minnesota, United States*

## Session MA8a1 Efficient Hardware Implementation

Chair: *Harald Enzinger, Graz University of Technology*

8:15 AM–9:55 AM

- MA8a1-1 Cost-Performance Tradeoffs in Unreliable Computation Architectures  
*Mehmet Donmez, Maxim Raginsky, Andrew Singer, Lav Varshney, University of Illinois at Urbana Champaign, United States*
- MA8a1-2 Baseband Volterra Filters with Even-Order Terms: Theoretical Foundation and Practical Implications  
*Harald Enzinger, Karl Freiberger, Gernot Kubin, Graz University of Technology, Austria; Christian Vogel, FH Joanneum - University of Applied Sciences, Austria*

- MA8a1-3 Fast Time-Domain Volterra Filtering  
*Harald Enzinger, Karl Freiberger, Gernot Kubin, Graz University of Technology, Austria; Christian Vogel, FH Joanneum - University of Applied Sciences, Austria*
- MA8a1-4 Hardware Implementation of a Series of Transform Matrices Based on Discrete Hirschman Transform  
*Peng Xi, Victor Debrunner, Florida State University, United States*

## **Session MA8a2 Error Correction and Network Coding**

Chair: *Jeff Andrews, UT Austin*

8:15 AM–9:55 AM

- MA8a2-1 On the Catastrophic Puncturing Patterns for Finite-Length Polar Codes  
*Song-Nam Hong, Ajou University, ; Dennis Hui, Ivana Maric, Ericsson Research, United States*
- MA8a2-2 On Error Correction for Asynchronous Communication  
*Chen Yi, Joerg Kliewer, New Jersey Institute of Technology, United States*
- MA8a2-3 Linear Superposition Coding for the Asymmetric Gaussian MAC with Quantized Feedback  
*Stefan Farthofer, Gerald Matz, Vienna University of Technology, Austria*
- MA8a2-4 Physical-Layer Network Coded QAM with Trellis Shaping for the Two-Way Relay Channel  
*Daniela Donati, Mark Flanagan, University College Dublin, Ireland*
- MA8a2-5 Construction of Minimal Sets for Capacity- Approaching Variable-Length Constrained Sequence Codes  
*Congzhe Cao, Ivan Fair, University of Alberta, Canada*

## **Session MA8a3 Massive MIMO**

Chair: *Timothy Davidson, McMaster University*

8:15 AM–9:55 AM

- MA8a3-1 Massive MIMO via Cooperative Users  
*Sha Hu, Fredrik Rusek, Ove Edfors, Lund University, Sweden*
- MA8a3-2 Robust Precoding Design for Massive MISO Downlink  
*Mostafa Medra, Timothy Davidson, McMaster University, Canada*
- MA8a3-3 Analysis and Evaluation of a Practical Downlink Multiuser MIMO Scheduler over LTE Advanced Massive MIMO Systems  
*Rob Arnott, NEC Telecom Modus, United States; Kengo Oketani, NEC Corporation, United States; Narayan Prasad, Sampath Rangarajan, NEC Laboratories America, United States; Patricia Wells, NEC Telecom Modus, United States*

- MA8a3-4 Grassmannian Training for Massive MIMO Cellular Networks  
*Yonghee Han, Jungwoo Lee, Seoul National University, Republic of Korea*
- MA8a3-5 Power Allocation for Downlink Path-Based Precoding in Multiuser FDD Massive MIMO Systems Without CSI Feedback  
*Chin-Wei Hsu, Ming-Fu Tang, Borching Su, National Taiwan University, Taiwan*
- MA8a3-6 Performance of Cell-Free Massive MIMO Systems with MMSE and PCP Receivers  
*Elina Nayebi, University of California, San Diego, United States; Alexei Ashikhmin, Thomas L. Marzetta, Bell Laboratories, United States; Bhaskar D. Rao, University of California, San Diego, United States*
- MA8a3-7 A Path Selection Algorithm for Sparse Massive MIMO Channels  
*Maliheh Soleimani, Mahmood Mazrouei-Sebdani, Witold A. Krzymien, University of Alberta, Canada; Jordan Melzer, TELUS Communications, Canada*

## **Session MA8a4 Neural Imaging**

Chair: *Konstantinos Slavakis, University of Buffalo*

8:15 AM–9:55 AM

- MA8a4-1 Detection of Diabetic Peripheral Neuropathy using Spatial-Temporal Analysis in Infrared Videos  
*Peter Soliz, Carla Agurto, Ana Edwards, Zyden Jarry, VisionQuest Biomedical LLC, United States; Janet Simon, Foot & Ankle Associates of New Mexico, United States; Mark Burge, University of New Mexico Health Sciences Center, United States*
- MA8a4-2 Clustering Brain-Network-Connectivity States using Kernel Partial Correlations  
*Konstantinos Slavakis, Shiva Salsabilian, David Wack, Sarah Muldoon, Henry Baidoo-Williams, University at Buffalo, United States; Jean Vettel, US Army Research Laboratory, United States; Matt Cieslak, Scott Grafton, University of California, Santa Barbara, United States*
- MA8a4-3 Automated Selection of Uniform Regions for CT Image Quality Detection  
*Maitham Naeemi, University of Washington - Bothell, United States; Adam Alessio, University of Washington, United States; Sohini Roychowdhury, University of Washington - Bothell, United States*
- MA8a4-4 Big Data Spark Solution for Functional Magnetic Resonance Imaging  
*Saman Sarraf, Rotman Research Institute at Baycrest, University of Toronto, United States; Mehdi Ostadhashem, Rogers, United States*

## Session MA8b1 Design Methodologies for Signal Processing Systems

Chair: *Endri Bezati, EPFL*

10:15 AM–11:55 AM

- MA8b1-1 A New Open-Source SIMDVector libm Fully Implemented with High-Level Scalar C  
*Christoph Lauter, Sorbonne Universités, UPMC Univ Paris 6, UMR 7606, LIP6, France*
- MA8b1-2 Fast Digital Design Space Exploration with High-Level Synthesis: A Case Study with Approximate Conjugate Gradient Pursuit  
*Benjamin Knoop, Karthik Vinod, Sebastian Schmale, Dagmar Peters-Drolshagen, Steffen Paul, University of Bremen, Germany*
- MA8b1-3 High-Level System Synthesis and optimization of Dataflow Programs for MPSoCs  
*Endri Bezati, Simone Casale Brunet, Marco Mattavelli, École polytechnique fédérale de Lausanne, Switzerland; Jorn Janneck, Lund University, Sweden*
- MA8b1-4 Analyzing Streaming Application Performance on Processor Arrays  
*Jorn Janneck, Lund University, Sweden*
- MA8b1-5 Trace-Based Manycore Partitioning of Stream-Processing Applications  
*Jorn Janneck, Lund University, Sweden; Michalska Malgorzata, Simone Casale-Brunet, Endri Bezati, Marco Mattavelli, École polytechnique fédérale de Lausanne, Switzerland*

## Session MA8b2 Sparse Methods and Compressive Sensing

Chair: *Todd Moon, Utah State University*

10:15 AM–11:55 AM

- MA8b2-1 Time-Recursive Multi-Pitch Estimation using Group Sparse Recursive Least Squares  
*Filip Elvander, Johan Sward, Andreas Jakobsson, Lund University, Sweden*
- MA8b2-2 Quantized Low-Rank Matrix Recovery with Erroneous Measurements: Application to Data Privacy in Power Grids  
*Meng Wang, Rensselaer Polytechnic Institute, United States*
- MA8b2-3 Bayesian Method for Image Recovery from Block Compressive Sensing  
*Uditha Wijewardhana, Marian Codreanu, Matti Latva-aho, University of Oulu, Finland*
- MA8b2-4 Stable Compressive Low Rank Toeplitz Covariance Estimation Without Regularization  
*Heng Qiao, Piya Pal, University of Maryland, United States*

- MA8b2-5 Sparse Bayesian Learning Boosted by Partial Erroneous Support Knowledge  
*Mohammad Shekaramiz, Todd K. Moon, Jacob H. Gunther, Utah State University, United States*
- MA8b2-6 Hyperparameter-Free Sparse Linear Regression of Grouped Variables  
*Ted Kronvall, Stefan Ingi Adalbjörnsson, Santhosh Nadig, Andreas Jakobsson, Lund University, Sweden*
- MA8b2-7 One-Bit Compressive Sampling with Time-Varying Thresholds: Maximum Likelihood and the Cramer-Rao Bound  
*Christopher Gianelli, Luzhou Xu, Jian Li, University of Florida, United States; Petre Stoica, Uppsala University, Sweden*

### **Session MA8b3 Speech and Image Analysis**

Chair: *Marios Pattichis, University of New Mexico*

10:15 AM–11:55 AM

- MA8b3-1 A Joint EMD and Teager-Kaiser Energy Approach Towards Normal and Nasal Speech Analysis  
*Chris De La Cruz, Balu Santhanam, University of New Mexico, United States*
- MA8b3-2 Iris Recognition using Cross-Spectral Comparison  
*Jennifer Webb, Delores Etter, Vianka Barboza, Elena Sharp Sharp, Southern Methodist University, United States*
- MA8b3-3 Efficient Facial Recognition using Vector Quantization of 2D DWT Features  
*Ahmed Aldhahab, Taif Al Obaidi, Wasfy B. Mikhael, University of Central Florida, United States*
- MA8b3-4 An Efficient DCT template-based Object Detection Method using Phase Correlation  
*Markus Hörhan, Horst Eidenberger, Vienna University of Technology, Austria*
- MA8b3-5 Transfer of Multimodal Emotion Features in Deep Belief Networks  
*Hiranmayi Ranganathan, Shayok Chakraborty, Panchanathan Sethuraman, Arizona State University, United States*
- MA8b3-6 Direct Classification from Compressively Sensed Images via Deep Boltzmann Machine  
*Henry Braun, Pavan Turaga, Cihan Tepedelenlioglu, Andreas Spanias, Arizona State University, United States*

### **Session MP1a Algorithm and Hardware Aspects for 5G Wireless Systems (invited)**

Chair: *Christoph Studer, Cornell University*

- MP1a-1 Many-Antenna MU-MIMO Channel Measurements 1:30 PM  
*Clayton Shepard, Abeer Javed, Ryan Guerra, Jian Ding, Lin Zhong, Rice University, United States*



- MP1a-2 Decentralized Data Detection for Massive MU-MIMO on a GPU Cluster 1:55 PM  
*Kaipeng Li, Rice University, United States; Rishi Sharan, Cornell University, United States; Yujun Chen, Joseph Cavallaro, Rice University, United States; Christoph Studer, Cornell University, United States*
- MP1a-3 An Energy Efficiency Perspective on Massive MIMO Quantization 2:20 PM  
*Muris Sarajlic, Liang Liu, Ove Edfors, Lund University, Sweden*
- MP1a-4 Limited Feedback in Multi-User MIMO System with Low Resolution ADCs 2:45 PM  
*Jianhua Mo, Robert Heath, University of Texas at Austin, United States*

### **Session MP1b Wireless Networks (invited)**

Chair: *Andrea Goldsmith, Stanford University*

- MP1b-1 From Niche to Renaissance: Why 5G will be the last G 3:30 PM  
*Mischa Dohler, Kings College London, United Kingdom; Ali Hossaini, Cinema Arts Network, United Kingdom; Prokar Dasgupta, NHS, United Kingdom; Peter Marshall, Ericsson, United Kingdom; Toktam Mahmoodi, Maria Lema, Kings College London, United Kingdom*
- MP1b-2 CEAL: Research Challenges in Fog Networking 3:55 PM  
*Mung Chiang, Princeton University, United States*
- MP1b-3 The Beam Alignment Problem in mmWave Wireless Networks 4:20 PM  
*Saeid Haghighatshoar, Giuseppe Caire, Technische Universität Berlin, Germany*
- MP1b-4 Staying Alive - Network Coding for Data Persistence in Volatile Networks 4:45 PM  
*Vitaly Abdrashitov, Muriel Medard, Massachusetts Institute of Technology, United States*

### **Session MP2a Interference Limited Next Generation Satellite Communications (SatnexIV) (invited)**

Chair: *Ana Perez-Neira, Universitat Politecnica de Catalunya - Centre Tecnologic de Telecomunicacions de Catalunya*

- MP2a-1 User Selection for Multibeam Satellite Systems: A Stochastic Geometry Perspective. 1:30 PM  
*Mathini Sellathurai, Heriot Watt University, United Kingdom; Satyanarayana Vuppala, Tharm Ratnarajah, University of Edinburgh, United Kingdom*
- MP2a-2 Efficient Satellite Systems Based on Interference Management and Exploitation 1:55 PM  
*Alessandro Ugolini, University of Parma, Italy; Amina Piemontese, Chalmers University of Technology, Sweden; Alessandro Vanelli-Coralli, University of Bologna, Italy; Giulio Colavolpe, University of Parma, Italy*

- MP2a-3 Noma and Interference Limited Satellite Communications 2:20 PM  
*Ana Perez-Neira, Universitat Politecnica de Catalunya, Spain; Marius Caus, Miguel Angel Vazquez, Centre Tecnologic de Telecomunicacions de Catalunya, Spain*
- MP2a-4 Optimized Link Adaptation for DVB-S2x Precoded Waveforms Based on SNIR Estimation 2:45 PM  
*Stefano Andrenacci, Danilo Spano, University of Luxembourg, Luxembourg; Dimitrios Christopoulos, Newtec, Belgium; Symeon Chatzinotas, University of Luxembourg, Luxembourg; Jens Krause, SES, Luxembourg; Björn Ottersten, University of Luxembourg, Luxembourg*

## **Session MP2b Signal Processing for Low-Resolution Sampling (invited)**

Chair: *Robert Heath, University of Texas at Austin*

- MP2b-1 Spatial Coding Based on Minimum BER in 1-Bit Massive MIMO Systems 3:30 PM  
*Hela Jedda, Technische Universität München, Germany; Amine Mezghani, University of California, Irvine, United States; Jawad Munir, Fabian Steiner, Josef A. Nossek, Technische Universität München, Germany*
- MP2b-2 Analysis of One-Bit Quantized ZF Precoding for Downlink Multiuser Massive MIMO 3:55 PM  
*Amodh Kant Saxena, University of California, Irvine, United States; Inbar Fijalkow, ETIS / ENSEA - University Cergy-Pontoise - CNRS, France; Amine Mezghani, Lee Swindlehurst, University of California, Irvine, France*
- MP2b-3 Quantized Channel Estimation and Data Detection in Massive MU-MIMO-OFDM Systems 4:20 PM  
*Christoph Studer, Cornell University, Sweden; Giuseppe Durisi, Chalmers University, Sweden*
- MP2b-4 Channel Estimation in Mixed Hybrid-Low Resolution MIMO Architectures for Millimeter Wave Communication 4:45 PM  
*Nuria Gonzalez-Prelcic, Universidade de Vigo, Spain; Cristian Rusu, University of Vigo, Spain; R Heath, University of Texas at Austin, United States*

## **Session MP3a Communication and Coding for Distributed Computing (invited)**

Chair: *Salman Avestimehr, University of Southern California*

- MP3a-1 Coded Distributed Computing: Fundamental Limits and Practical Challenges 1:30 PM  
*Songze Li, Qian Yu, University of Southern California, United States; Mohammad-Ali Maddah-Ali, Bell Labs, Alcatel-Lucent, United States; Salman Avestimehr, University of Southern California, United States*
- MP3a-2 Trade-Offs Between Asynchrony, Concurrency and Storage Cost in Consistent Distributed Storage Systems. 1:55 PM  
*Viveck Cadambe, Pennsylvania State University, United States*

- MP3a-3 Codes Can Speed Up Large-Scale Distributed Computing 2:20 PM  
*Kangwook Lee, Maximilian Lam, Ramtin Pedarsani, Dimitris Papailiopoulos, Kannan Ramchandran, University of California, Berkeley, United States*
- MP3a-4 Avoiding Coordination in Parallel Machine Learning 2:45 PM  
*Dimitris Papailiopoulos, University of California, Berkeley, United States*

### **Session MP3b Distributed Optimization (invited)**

Chair: *Qing Ling, University of Science and Technology China*

- MP3b-1 Distributed Proximal Gradient Methods for Constrained Consensus Optimization 3:30 PM  
*Necdet Serhat Aybat, Erfan Yazdandoost, Pennsylvania State University, United States*
- MP3b-2 ESOM: Exact Second-Order Method for Consensus Optimization 3:55 PM  
*Aryan Mokhtari, University of Pennsylvania, United States; Wei Shi, University of Illinois at Urbana-Champaign, United States; Qing Ling, University of Science and Technology of China, China*
- MP3b-3 Distributed Nonconvex Multiagent Optimization over Time-Varying Networks 4:20 PM  
*Ying Sun, Hong Kong University of Science and Technology, Hong Kong SAR of China; Gesualdo Scutari, Purdue University, United States; Daniel Palomar, Hong Kong University of Science and Technology, United States*
- MP3b-4 Space-Time Scheduling for Green Data Center Networks 4:45 PM  
*Tianyi Chen, University of Minnesota, United States; Antonio Marques, Rey Juan Carlos University, Spain; Georgios Giannakis, University of Minnesota, United States*

### **Session MP4a Sparse Sampling for Data Analytics (invited)**

Chair: *Geert Leus, Delft University of Technology*

- MP4a-1 Solving Inverse Source Problems for Linear PDEs using Sparse Sensor Measurements 1:30 PM  
*John Murray-Bruce, Pier Luigi Dragotti, Imperial College London, United Kingdom*
- MP4a-2 Rethinking Sketching as Sampling: Linear Transforms of Graph Signals 1:55 PM  
*Fernando Gama, University of Pennsylvania, United States; Antonio Garcia Marques, King Juan Carlos University, Spain; Gonzalo Mateos, University of Rochester, United States; Alejandro Ribeiro, University of Pennsylvania, United States*
- MP4a-3 Distributed Adaptive Learning of Signals Defined over Graphs 2:20 PM  
*Paolo Di Lorenzo, Paolo Banelli, University of Perugia, Italy; Sergio Barbarossa, Stefania Sardellitti, Sapienza University of Rome, Italy*

MP4a-4      Subsampling for Graph Signal Detection      2:45 PM  
*Sundeep Prabhakar Chepuri, Geert Leus, Delft University  
of Technology, Netherlands*

**Session MP4b      High-dimensional Inference  
(invited)**

Chair: *Galen Reeves, Duke University*

MP4b-1      Dynamics of Stochastic Gradient Method for      3:30 PM  
Online Estimation  
*Chuang Wang, Yue Lu, Harvard University, United States*

MP4b-2      Fast and Robust Learning for Mixture of      3:55 PM  
Sparse Linear Models Using Codes  
*Dong Yin, Ramtin Pedarsani, University of California,  
Berkeley, United States; Yudong Chen, Cornell University,  
United States; Kannan Ramchandran, University of  
California, Berkeley, United States*

MP4b-3      A Conditional Central Limit Theorem for      4:20 PM  
Random Projections  
*Galen Reeves, Duke University, United States*

MP4b-4      Tensor Decompositions and Sparse      4:45 PM  
Log-Linear Models  
*James Johndrow, Stanford University, United States;  
Anirban Bhattacharya, Texas A&M University, United  
States; David Dunson, Duke University, United States*

**Session MP5a      Recent Advances in Nonstationary  
Signal Processing (invited)**

Chair: *Antonio Napolitano, Università di Napoli*

MP5a-1      Algorithms for Analysis of Signals with      1:30 PM  
Time-Warped Cyclostationarity  
*Antonio Napolitano, University of Napoli, Italy; William  
Gardner, University of California, Davis, United States*

MP5a-2      The Sound of Silence: Recovering Signals      1:55 PM  
from Time-Frequency Zeros  
*Patrick Flandrin, CNRS & ENS de Lyon, France*

MP5a-3      Nonstationary Signal Design for Coexisting      2:20 PM  
Radar and Communications Systems  
*John Kota, Antonia Papandreou-Suppappola, Arizona  
State University, United States; Garry Jacyna, MITRE  
Corporation, United States*

MP5a-4      Benefits of Noncircular Statistics for      2:45 PM  
Nonstationary Signals  
*Scott Wisdom, Les Atlas, James Pitton, Greg Okopal,  
University of Washington, United States*

## **Session MP5b    Recent Advances in Covariance Matrix Estimation for Array Processing (invited)**

Chair: *Frederic Pascal, Supelec*

- MP5b-1    Bounds for Estimating the Parameters of Low-Rank Compound-Gaussian Clutter and White Gaussian Noise    3:30 PM  
*Olivier Besson, ISAE-Supaéro, France*
- MP5b-2    Robust Rank Constrained Kronecker Covariance Matrix Estimation    3:55 PM  
*Arnaud Breloy, LEME, France; Ying Sun, Hong Kong University of Science and Technology, Hong Kong SAR of China; Guillaume Ginolhac, LISTIC, France; Daniel Palomar, Hong Kong University of Science and Technology, Hong Kong SAR of China*
- MP5b-3    Quaternion Structured Non-Paranormal Distributions    4:20 PM  
*Yonatan Woodbridge, Hebrew University of Jerusalem, Israel; Gal Elidan, Hebrew University of Jerusalem and Google Inc., Israel; Ami Wiesel, Hebrew University of Jerusalem, Israel*
- MP5b-4    New Properties for the Tyler's Covariance Matrix Estimator    4:45 PM  
*Gordana Draskovic, Frederic Pascal, CentraleSupelec, France*

## **Session MP6a    Emerging Models and Methods in Image and Video Processing (invited)**

Chair: *Balasubramaniam Santhanam, University of New Mexico*

- MP6a-1    Sampled Efficient Full-Reference Image Quality Assessment Models    1:30 PM  
*Christos Bampis, Todd Goodall, Alan Bovik, University of Texas at Austin, United States*
- MP6a-2    Feature Extraction and Image Recognition from Superpixels on an Automata Architecture    1:55 PM  
*Tiffany Ly, Rituparna Sarkar, Scott Acton, Kevin Skadron, University of Virginia, United States*
- MP6a-3    Distributed Video Analysis for the Advancing Out of School Learning in Mathematics and Engineering Project    2:20 PM  
*Cody Eilar, Venkatesh Jatla, Marios Pattichis, Carlos LopezLeiva, Sylvia Celedon-Pattichis, University of New Mexico, United States*
- MP6a-4    Fingerprint Feature Extraction and Classification using Multirate Frequency Transformations and Wideband AM-FM Energy Demodulation    2:45 PM  
*Wenjing Liu, Balu Santhanam, University of New Mexico, United States*



## **Session MP7b Advances in Neural Array Processing (invited)**

Chair: *Jun (Jason) Zhang, University of Denver*

- MP7b-1 Analysis of Signals Recorded from Human Cerebral Cortex using Micro-Scale Electrode Arrays During Articulate Movements and Epileptiform Activity 3:30 PM  
*Kevin O'Neill, Denise Oswald, Arizona State University, United States; Kari Ashmont, David Adelson, Phoenix Children's Hospital, United States; Bradley Greger, Arizona State University, United States*
- MP7b-2 Decoding Human Intent using a Wearable System and Multi-Modal Sensor Data 3:55 PM  
*Md Muztoba, Cemil Geyik, Umit Y. Ogras, Daniel W. Bliss, Arizona State University, United States*
- MP7b-3 Suppression of Neurostimulation Artifacts and Adaptive Clustering of Parkinson's Patients Behavioral Tasks using EEG 4:20 PM  
*Alexander Maurer, Arizona State University, United States; Sara Hanrahan, Joshua Nedrud, Adam Hebb, Colorado Neurological Institute, United States; Antonia Papandreou-Suppappola, Arizona State University, United States*
- MP7b-4 Causality Analysis in Parkinson's Disease Patients during Behavior Tasks 4:45 PM  
*Abdulaziz Almalaq, Jun Zhang, University of Denver, United States; Sara Hanrahan, Adam Hebb, Joshua Nedrud, Colorado Neurological Institute, United States*

## **Session MP8a1 Beamforming and Array-based Estimation I**

Chair: *Rick Blum, Lehigh University*

1:30 PM–3:10 PM

- MP8a1-1 Multipath Mitigation Techniques for Nonlinear Adaptive Beamforming  
*Peter Vouras, Naval Research Laboratory, United States*
- MP8a1-2 Array Self Calibration using Multiple Data Sets  
*Benjamin Friedlander, University of California, Santa Cruz, United States*
- MP8a1-3 Convex-Optimization based Geometric Beamforming for FD-MIMO Arrays  
*Stefan Schwarz, Technische Universität Wien, Austria; Tal Philosoof, General Motors, Israel; Markus Rupp, Technische Universität Wien, Austria*
- MP8a1-4 Reduced-Complexity Direction-of-Arrival Estimation for Large-Aperture Antenna Arrays Employing Spatial Ambiguities  
*Chung-Cheng Ho, Scott C. Douglas, Southern Methodist University, United States*

- MP8a1-5 Constraint Pursuit Estimator for Covariance-Based Array Processing  
*Yassine Zniyed, L2S lab., France; Remy Boyer, University of Paris-Sud - L2S lab., France; Mohammed Nabil El Korso, University of Paris X - LEME, France; Sylvie Marcos, CNRS - L2S lab., France*
- MP8a1-6 On Spatial Security Outage Probability Derivation of Exposure Region Based Beamforming with Randomly Located Eavesdroppers  
*Yuanrui Zhang, Youngwook Ko, Roger Woods, Queen's University Belfast, United Kingdom; Alan Marshall, University of Liverpool, United Kingdom; Joe Cavallaro, Kaipeng Li, Rice University, United States*
- MP8a1-7 A User Cooperative Beamforming Approach to PAPR Reduction in MIMO-OFDM Uplink  
*Antti Arvola, Antti Tölli, University of Oulu, Finland; David Gesbert, EURECOM, France*

## Session MP8a2 Communication Networks

Chair: *Chester Sungchung Park, Konkuk University*

1:30 PM–3:10 PM

- MP8a2-1 Partial Interference Cancellation in Ultra-Dense Cellular Networks: Performance Analysis and Optimization  
*Italo Azeni, Marios Kountouris, Huawei Technologies, France*
- MP8a2-2 Leader Selection in Cooperative Network Based on MDL Subspace Algorithm for Cognitive Radio  
*Sander Ulp, Tõnu Trump, Tallinn University of Technology, Estonia*
- MP8a2-3 Optimal De-Anonymization in Random Graphs with Community Structure  
*Efe Onaran, Siddharth Garg, Elza Erkip, New York University, United States*
- MP8a2-4 Joint Optimization of Communication Scheduling and Online Power Allocation in Remote Estimation  
*Xiaobin Gao, Emrah Akyol, Tamer Basar, University of Illinois, Urbana-Champaign, United States*
- MP8a2-5 Layered Caching for Heterogeneous Storage  
*Avik Sengupta, Virginia Tech, United States; Ravi Tandon, University of Arizona, United States; T. Charles Clancy, Virginia Tech, United States*
- MP8a2-6 Energy-Efficient Random Sleep Protocol based on Distributed Coding for Sensor-to-Vehicle Communications  
*Yuki Goto, Shun Ogata, Koji Ishibashi, University of Electro-Communications, Japan*
- MP8a2-7 Long-Term Power Allocation for Multi-Channel Device-to-Device Communication Based on Limited Feedback Information  
*Ruhallah AliHemmati, Ben Liang, University of Toronto, Canada; Min Dong, University of Ontario Institute of Technology, Canada; Gary Boudreau, S. Hossein Seyedmehdi, Ericsson Canada, Canada*



MP8a2-8 Decentralized Coded Caching with Distinct Cache Capacities  
*Mohammad Mohammadi Amiri, Qianqian Yang, Deniz Gunduz, Imperial College London, United Kingdom*

### **Session MP8a3 Estimation and Learning Theory for Communications**

Chair: *Mario Huemer, Johannes Kepler Universität Linz*

1:30 PM–3:10 PM

- MP8a3-1 On the Log-Likelihood Ratio Evaluation of CWCU Linear and Widely Linear MMSE Data Estimators  
*Oliver Lang, Mario Huemer, Johannes Kepler University, Austria; Christian Hofbauer, Linz Center of Mechatronics GmbH, Austria*
- MP8a3-2 Improved SNR-based Estimation of the Attainable Net-Data-Rates in Vectoring VDSL2  
*Driton Statovci, Martin Wolkerstorfer, Sanda Drakulic, Technische Universität Wien, Austria*
- MP8a3-3 Effects of Channel Environment on Timing Advance for Mobile Device Positioning in Long-Term Evolution Networks  
*Allison Hunt, Alex DeGabriele, John Roth, Justin A. Blanco, T. Owens Walker III, Jeremy Martin, United States Naval Academy, United States*
- MP8a3-4 Benchmarking of Learning Architectures for Digital Predistortion  
*Thomas Magesacher, Lund University, Sweden; Peter Singerl, Infineon Technologies AG, Austria*
- MP8a3-5 Supervised Machine Learning for Signals Having RRC Shaped Pulses  
*Mohammad Bari, George Washington University, United States; Hussain Taher, University of Engineering & Technology Peshawar, Pakistan; Syed Saad Sherazi, University of Engineering & Technology Bannu, Pakistan; Milos Doroslovacki, George Washington University, United States*
- MP8a3-6 Nonstationary Jammers Suppression Based on Parametric Sparse Reconstruction  
*Ben Wang, Harbin Engineering University, China; Yimin Zhang, Temple University, United States; Wei Wang, Harbin Engineering University, China*
- MP8a3-7 Radio Transformer Networks: Attention Models for Learning to Synchronize in Wireless Systems  
*Timothy J O'Shea, Latha Pemula, Dhruv Batra, T. Charles Clancy, Virginia Tech, United States*

## **Session MP8a4 Model Selection, Source Separation and Classification**

Chair: *Peter Schreier, Universität Paderborn*

1:30 PM–3:10 PM

- MP8a4-1 Cross-Validation Techniques for Determining the Number of Correlated Components Between Two Data Sets When the Number of Samples Is Very Small  
*Christian Lameiro, Peter J. Schreier, Universität Paderborn, Germany*
- MP8a4-2 Model Selection for High-Dimensional Data  
*Arash Owrang, Magnus Jansson, KTH Royal Institute of Technology, Sweden*
- MP8a4-3 Bootstrap-Based Detection of the Number of Signals Correlated Across Multiple Data Sets  
*Tanuj Hasija, Universität Paderborn, Germany; Yang Song, Nanyang Technological University, Singapore; Peter Schreier, Universität Paderborn, Germany; David Ramirez, University Carlos III of Madrid, Spain*
- MP8a4-4 Demixing Sparse Signals from Nonlinear Observations  
*Mohammadreza Soltani, Chinmay Hegde, Iowa State University, United States*
- MP8a4-5 Dictionary Driven Vehicle Classification  
*Jeff Druce, Stefano Gonella, Jarvis Haupt, University of Minnesota, United States*
- MP8a4-6 Obfuscating Poisson & Gaussian Data Using a Rotation in the Complex Plane  
*Ruaridh Macdonald, Muriel Medard, Massachusetts Institute of Technology, United States*
- MP8a4-7 Multiscale Tensor Decomposition  
*Alp Ozdemir, Mark A. Iwen, Selin Aviyente, Michigan State University, United States*

## **Session MP8b1 Beamforming and Array-based Estimation II**

Chair: *Benjamin Friedlander, Jack Baskin School of Engineering*

3:30 PM–5:10 PM

- MP8b1-1 The Advanced TOA Trilateration Algorithms with Performance Analysis  
*Sajina Pradhan, Seokjoo Shin, Goo-Rak Kwon, Jae-young Pyun, Suk-seung Hwang, Chosun University, Nepal*
- MP8b1-2 Design and Implementation of a Three-layer Cognitive Radar Architecture  
*Stefan Brueggenwirth, Fraunhofer FHR, Germany*
- MP8b1-3 Real-Time Underdetermined Source Separation for Low-Latency Speech Enhancement  
*Ryan Corey, Andrew Singer, University of Illinois at Urbana-Champaign, United States*
- MP8b1-4 On the Resolution of Diversely Polarized Arrays  
*Benjamin Friedlander, University of California, Santa Cruz, United States*

- MP8b1-5 Super-resolution Direction-of-Arrival Estimation Using a Coprime Sensor Array With the Min Processor  
*Yang Liu, John R. Buck, University of Massachusetts Dartmouth, United States*
- MP8b1-6 Dynamic Formulation of Co-prime Array for DOA Estimation  
*Xiaomeng Wang, Xin Wang, Stony Brook University, United States*
- MP8b1-7 Alternating Optimization Low-Rank Expansion Algorithm to Estimate a Linear Combination of Separable Filters to Approximate 2D Filter Banks  
*Paul Rodriguez, Pontifical Catholic University of Peru, Peru*

## **Session MP8b2 Communication Theory**

Chair: *James A. Ritcey, University of Washington*

3:30 PM–5:10 PM

- MP8b2-1 Fundamental BER Performance Trade-off in Cooperative Cognitive Radio Systems with Random Number of Secondary Users  
*Ruo Chen Zeng, Cihan Tepedelenlioglu, Arizona State University, United States*
- MP8b2-2 Performance of OFDM Systems with Adaptive DFT-Precoding  
*Yusaku Yamashita, Hideki Ochiai, Yokohama National University, Japan*
- MP8b2-3 Physical Layer Security Analysis for Cooperative Communications with Full-Duplex Relaying under Nakagami-m Fading Model  
*Yohannes Jote Tolossa, Abreu Giuseppe, Jacobs University Bremen, Germany*
- MP8b2-4 On Zero-Forcing Equalization for Short-Filtered Multicarrier Faster-than-Nyquist Signaling  
*Albert Abelló, Damien Roque, ISAE-Supaéro, France; Cyrille Siclet, Alexandre Marquet, GIPSA-lab, France*
- MP8b2-5 Secret Communication on Z-Channel with Cooperative Receivers  
*Abdallah M.Fayed, Tamer Khattab, Qatar University, Qatar; Lifeng Lai, Worcester Polytechnic Institute, United States*
- MP8b2-6 Joint Precoding and Transmit Antenna Selection for Spatial Modulation  
*Michael Carosino, James Ritcey, University of Washington, United States*

## Session MP8b3 Implementations of DSP Kernels

Chair: *Alexios Balatsoukas-Stimming, EPFL*

3:30 PM–5:10 PM

- MP8b3-1 Hardware Architecture for Positive Definite Matrix Inversion Based on LDL Decomposition and Back-Substitution  
*Carl Ingemarsson, Oscar Gustafsson, Linköping University, Sweden*
- MP8b3-2 A Scalable Architecture for Massive MIMO Base Stations Using Distributed Processing  
*Erik Bertilsson, Oscar Gustafsson, Erik G. Larsson, Linköping University, Sweden*
- MP8b3-3 Interpolated FIR Based Practically Perfect Reconstruction Filter Bank  
*Jorge Cadena, A.A. (Louis) Beex, Virginia Tech, United States*
- MP8b3-4 Design of a Multi-Core Hardware Architecture for Consensus-based MIMO Detection Algorithms  
*Konstantin Tscherkaschin, Benjamin Knoop, Jochen Rust, Steffen Paul, University of Bremen, Germany*
- MP8b3-5 Dynamically-Loaded Hardware Libraries (HLL) Technology for Audio Applications  
*Andrea Lomuscio, Angelo Esposito, Gian Carlo Cardarilli, Leonardo Di Carlo, University of Rome Tor Vergata, Italy; Alberto Nannarelli, Technical University of Denmark, Denmark; Marco Re, University of Rome Tor Vergata, Italy*

## Session TA1b Biological Communications (invited)

Co-Chairs: *Ubli Mitra, University of Southern California and Nicolo Michelusi, Purdue University*

- TA1b-1 Model and Analysis of Population Density Estimation via Quorum Sensing 10:15 AM  
*Nicolo Michelusi, Purdue University, United States; Urbashi Mitra, University of Southern California, United States*
- TA1b-2 A Fundamental Approach to Communication using Individual Molecules 10:40 AM  
*Christopher Rose, Brown University, United States*
- TA1b-3 Multicellular Information Relays 11:05 AM  
*Ilya Nemenman, Emory University, United States; Andrew Mugler, Purdue University, United States; Andre Levchenko, Yale University, United States; Tyler Smith, Emory University, United States; Sean Fancher, Purdue University, United States*

## **Session TA2b      Recent Advances in Massive MIMO (invited)**

Chair: *Erik G. Larsson, Linköping University*

- TA2b-1      Dual-regularized Precoding: A Robust      10:15 AM  
Approach for D2D-Enabled Massive MIMO  
*Junting Chen, Haifan Yin, Laura Cottatellucci, David  
Gesbert, EURECOM, France*
- TA2b-2      FD-MIMO versus Massive MIMO      10:40 AM  
Performance: What do the Data Say?  
*Jose Flordelis, Fredrik Rusek, Fredrik Tufvesson, Ove  
Edfors, Lund University, Sweden; Erik G. Larsson,  
Linköping University, Sweden*
- TA2b-3      Base Station Cooperation in Massive MIMO      11:05 AM  
Systems: Large System Analysis  
*Luca Sanguinetti, University of Pisa, Italy; Emil Bjornson,  
Linköping University, Sweden; Merouane Debbah,  
CentraleSupélec, France*
- TA2b-4      Pilot Decontamination Through Compressive      11:30 AM  
Wideband Channel Estimation  
*Saeid Haghighatshoar, Giuseppe Caire, Technische  
Universität Berlin, Germany*

## **Session TA3b      Distributed Signal Processing**

Chair: *Qing Ling, University of Science and Technology of China*

- TA3b-1      Doubly Partial-Diffusion LMS over Adaptive      10:15 AM  
Networks  
*Ibrahim El Khalil Harrane, Rémi Flamary, Cédric  
Richard, University Nice Sophia Antipolis, France*
- TA3b-2      Decentralized Consensus Optimization with      10:40 AM  
Asynchrony and Delay  
*Tianyu Wu, Kun Yuan, University of California, Los  
Angeles, United States; Qing Ling, University of Science  
and Technology of China, China; Wotao Yin, Ali H. Sayed,  
University of California, Los Angeles, United States*
- TA3b-3      Thermodynamic Limit of Interacting Particle      11:05 AM  
Systems over Dynamical Networks  
*Augusto Santos, Soumya Kar, José M. F. Moura,  
Carnegie Mellon University, United States; João Xavier,  
University of Lisbon, Portugal*
- TA3b-4      Distributed Dictionary Learning      11:30 AM  
*Amir Daneshmand, Gesualdo Scutari, Purdue University,  
United States; Francisco Facchinei, University of Rome,  
Italy*

## **Session TA4b      Sketching and Optimizing for Big Data (invited)**

Co-Chairs: *Georgios Giannakis, University of Minnesota and Gonzalo Mateos, University of Rochester*

- TA4b-1      Parallel Asynchronous Lock-free Algorithms      10:15 AM  
for Nonconvex Big-Data Optimization  
*Loris Cannelli, Gesualdo Scutari, Purdue University, United States; Francisco Facchinei, University of Rome, La Sapienza, Italy; Vyacheslav Kungurtsev, Czech Technical University in Prague, Czech Republic*
- TA4b-2      Sketching for Numerical Linear Algebra and      10:40 AM  
Recent Developments  
*David P. Woodruff, IBM Almaden Research Center, United States*
- TA4b-3      Large Scale Subspace Clustering Algorithms      11:05 AM  
*Chong You, Claire Donnat, Daniel Robinson, Rene Vidal, Johns Hopkins University, United States*
- TA4b-4      Randomized Approaches to Large-Scale      11:30 AM  
Subspace Clustering  
*Panagiotis Traganitis, Georgios Giannakis, University of Minnesota, United States*

## **Session TA5b      Hardware Aspects for Compressive Sensing and Analog-to-Information Conversion (invited)**

Chair: *Christoph Studer, Cornell University*

- TA5b-1      Exploiting System Configurability Towards      10:15 AM  
Dynamic Accuracy-Performance Trade-Offs in AIC  
and CS Front-ends  
*Laura Isabel Galindez Olascoaga, Steven Lauwereins, Komail Badami, Juan-Carlos Pena, KU Leuven, Belgium; Rajesh Venkata, Marian Verhelst, KU Leuven and IMEC, Belgium*
- TA5b-2      Band-Pass Compressive Sampling As an      10:40 AM  
Enabling Technology for Rapid Wideband RF  
Spectrum Sensing  
*Rabia Tugce Yazicigil, Tanbir Haque, John Wright, Peter R. Kinget, Columbia University, United States*
- TA5b-3      Adaptive Compressive Sensing for      11:05 AM  
Radio-Frequency Receivers  
*Michael Pelissier, CEA, LETI, MINATEC Campus & Cornell University, France; Christoph Studer, Cornell University, United States*
- TA5b-4      Compressed Sampling for Astrophysical      11:30 AM  
Signal Processing  
*Patrick Loumeau, Yosra Gargouri, Hervé Petit, Telecom ParisTech Institut Mines-Telcom, France; Baptiste Ceccconi, Observatoire de Paris, France; Patricia Desgreys, Telecom ParisTech Institut Mines-Telcom, France*

## **Session TA6b Phase Retrieval for Imaging: Theory and Methods (invited)**

Chair: *Daniel Weller, University of Virginia*

- TA6b-1 Nonconvex Phase Retrieval: From Theory to Physical Implementation 10:15 AM  
*Mahdi Soltanolkotabi, University of Southern California, United States*
- TA6b-2 Robust PhaseLift for Phase Retrieval under Corruptions 10:40 AM  
*Paul Hand, Rice University, United States; Thang Huynh, New York University, United States*
- TA6b-3 Solving Random Quadratic Systems of Equations Is Nearly As Easy As Solving Linear Systems 11:05 AM  
*Yixin Chen, Emmanuel Candes, Stanford University, United States*
- TA6b-4 Robust Phase Retrieval with Sparsity under Nonnegativity Constraints 11:30 AM  
*Daniel Weller, University of Virginia, United States*

## **Session TA7b Biological Neural Systems (invited)**

Chair: *Francisco Solis, Arizona State University*

- TA7b-1 A Pulse-Gated, Predictive Neural Circuit 10:15 AM  
*Yuxiu Shao, Peking University, China; Andrew Sornborger, University of California, Davis, United States; Louis Tao, Peking University, China*
- TA7b-2 A Multitaper, Causal Decomposition for Stochastic, Multivariate Time Series: Application to High-Frequency Calcium Imaging Data 10:40 AM  
*Andrew Sornborger, University of California, Davis, United States; James D Lauderdale, University of Georgia, United States*
- TA7b-3 The Neural Basis for Sleep Regulation - Data Assimilation from Animal to Model 11:05 AM  
*Fatemeh Bahari, Camila Tulyaganova, Myles Billard, Kevin Alloway, Bruce Gluckman, Pennsylvania State University, United States*
- TA7b-4 Neuronal Network Models for Sensory Discrimination 11:30 AM  
*Mohammad Samavat, Genevieve Toutain, Sharon Crook, Arizona State University, United States*

## **Session TA8b1 Array Processing and Wireless Communications**

Chair: *Xavier Leturc, Telecom ParisTech*

10:15 AM–11:55 AM

- TA8b1-1 An Exact Bayesian Detector for Multistatic Passive Radar  
*Stephen D. Howard, Songsri Sirianunpiboon, DST Group Australia, Australia; Douglas Cochran, Arizona State University, United States*

- TA8b1-2 Compressive Direction-of-Arrival Estimation Off The Grid  
*Shermin Hamzehei, Marco Duarte, University of Massachusetts, United States*
- TA8b1-3 Bandpass Signal Design for Passive Time Delay Estimation  
*Jeffrey Nanzer, Matthew Sharp, Johns Hopkins Applied Physics Laboratory, United States; Donald Brown, Worcester Polytechnic Institute, United States*
- TA8b1-4 Estimation of the Ricean K-Factor from Noisy Complex Channel Coefficients  
*Xavier Leturc, Thales Communications and Security, France; Philippe Ciblat, Télécom Paristech, France; Christophe Le Martret, Thales Communications and Security, France*
- TA8b1-5 A Novel Non-Linear Equalizer Structure for Single Carrier Wideband Communication  
*fredric harris, Xiaofei Chen, San Diego State University, United States; Elettra Venosa, SpaceMicro, United States*

## **Session TA8b2 Communication System Theory**

Chair: *Lara Dolecek, UCLA*

10:15 AM–11:55 AM

- TA8b2-1 From Dedicated Redundant Subcarriers to Distributed Redundancy in UW-OFDM  
*Christian Hofbauer, Linz Center of Mechatronics, Austria; Carl Böck, Mario Huemer, Johannes Kepler University, Austria*
- TA8b2-2 Coordinated Medium Access in Wireless Industrial D2D Networks: Fast Handshake Procedures Based on Stable Matching Variants  
*Bernd Holfeld, Thomas Wirth, Fraunhofer Heinrich Hertz Institute, Germany*
- TA8b2-3 Delay-Optimal Scheduling and Power Control for Instantaneous-Interference-Limited CRs  
*Ahmed Ewaisha, Cihan Tepedelenligolu, Arizona State University, United States*
- TA8b2-4 Non-Orthogonal Multiple Access with Sub-Constellation Alignment  
*Sanjeewa Herath, Afshin Haghighat, InterDigital Communications, Inc., Canada*
- TA8b2-5 On the Capacity of Diffusion-Based Molecular Timing Channels with Diversity  
*Nariman Farsad, Yonathan Murin, Milind Rao, Andrea Goldsmith, Stanford University, United States*
- TA8b2-6 On Global Channel State Estimation and Dissemination in Ring Networks  
*Shahab Farazi, Donald Brown, Worcester Polytechnic Institute, United States; Andrew Klein, Western Washington University, United States*



- TA8b2-7 Spatially-Coupled LDPC Codes Optimized for 1-D Magnetic Recording Channels  
*Homa Esfahanizadeh, Ahmed Hareedy, Lara Dolecek, University of California, Los Angeles, United States*

## **Session TA8b3 MIMO and Multistatic Radars**

Chair: *Braham Himed, Air Force Research Laboratory*

10:15 AM–11:55 AM

- TA8b3-1 Analyzing and Improving MIMO Radar Detection Performance in the Presence of Cybersecurity Attacks  
*Hao Chen, Boise State University, United States; Braham Himed, Air Force Research Laboratory, United States*
- TA8b3-2 Direct Tracking of Multiple Targets in MIMO Radar  
*Phuoc Vu, Alexander Haimovich, New Jersey Institute of Technology, United States; Braham Himed, Air Force Research Lab (AFRL/RMD), United States*
- TA8b3-3 Super-Resolution in Position and Velocity Estimation for Short-Range mmWave Radar  
*Anant Gupta, Upamanyu Madhow, University of California, Santa Barbara, United States; Amin Arbabian, Stanford University, United States*
- TA8b3-4 High Resolution Geolocation with a Multi-Static Radar  
*Benjamin Friedlander, University of California, Santa Cruz, United States*
- TA8b3-5 Using WCP-OFDM Signals with Time-Frequency Localized Pulses for Radar Sensing  
*Damien Roque, Stephanie Bidon, University of Toulouse, ISAE-SUPAERO, France*
- TA8b3-6 Canonical Correlations for Target Detection in a Passive Radar Network  
*Yuan Wang, Washington State University, United States; Louis Scharf, Colorado State University, United States; Ignacio Santamaria, University of Cantabria, Spain; Haonan Wang, Colorado State University, United States*
- TA8b3-7 Compressive Radar Sensing via One-Bit Sampling with Time-Varying Thresholds  
*Jian Li, University of Florida, United States; Mohammad Mahdi Naghsh, Sayed Jala Zahabi, Mahmoud Modarres-Hashemi, Isfahan University of Technology, Iran*

## **Session TP1a Millimeter Wave Cellular Systems (invited)**

Co-Chairs: *Robert Heath, University of Texas at Austin and Nuria Gonzalez Prelcic, University of Vigo*

- TP1a-1 mmWave Overlaid 5G Heterogeneous Cellular Networks - From Central Resource Management to Distributed Edge Cloud  
*Kei Sakaguchi, Tokyo Institute of Technology / Fraunhofer HHI, Germany; Gia Khanh Tran, Tokyo Institute of Technology, Japan; Thomas Haustein, Fraunhofer Heinrich Hertz Institute, Germany* 1:30 PM

- TP1a-2 On the Design and Performance of Initial Access in mmWave Cellular Networks 1:55 PM  
*Yingzhe Li, Jeffrey Andrews, Francois Baccelli, University of Texas at Austin, United States; Thomas Novlan, Charlie Zhang, Samsung Research America, United States*
- TP1a-3 On the Feasibility of Interference Alignment in Ultra Dense Millimeter Wave Cellular Networks 2:20 PM  
*Jian Song, Thanh Tu Lam, Marco Di Renzo, Paris-Saclay University / CNRS, France*
- TP1a-4 Performance Characteristics of 5G mmWave Wireless To-the-Home 2:45 PM  
*Frederick Vook, Eugene Visotsky, Timothy Thomas, Amitava Ghosh, Nokia Bell Labs, United States*

## Session TP1b 5G Cellular Theory

Chair: *Robert Heath, University of Texas at Austin*

- TP1b-1 5G New Radio and Ultra Low Latency Applications: A PHY Implementation Perspective 3:30 PM  
*Thomas Wirth, Bernd Holfeld, Matthias Mehlhose, Jens Pilz, Dennis Wieruch, Fraunhofer Heinrich Hertz Institute, Germany*
- TP1b-2 Fundamental Limits of Secure Device-to-Device Coded Caching 3:55 PM  
*Ahmed A. Zewail, Aylin Yener, Pennsylvania State University, United States*
- TP1b-3 On the Impact of Blockage on the Throughput of Multi-tier Millimeter-Wave Networks 4:20 PM  
*Shuqiao Jia, David Ramirez, Rice University, United States; Lei Huang, Yi Wang, Huawei Technologies Co. Ltd., China; Behnaam Aazhang, Rice University, United States*
- TP1b-4 Spatial Channel Covariance Estimation for mmWave Hybrid MIMO Architecture 4:45 PM  
*Sungwoo Park, Robert Heath, University of Texas at Austin, United States*
- TP1b-5 Joint User Association and Resource Allocation in Small Cells with Limited Backhaul Capacity 5:10 PM  
*Jong Gyu Jang, Woojin Park, Hyun Jong Yang, Ulsan National Institute of Science and Technology, Republic of Korea; Hye Gyung Jwa, Electronics and Telecommunications Research Institute, Republic of Korea*

## Session TP2a Implementation of Decoders for Polar Codes (invited)

Co-Chairs: *Alexios Balatsoukas-Stimming, EPFL and Pascal Giard, McGill University & EPFL*

- TP2a-1 Low Complexity SC Stack Polar Decoder Based on Segmented CRC Scheme 1:30 PM  
*Yi Zhao, Chuan Zhang, Southeast University, China; Shunqing Zhang, Intel Labs, China; Xiaohu You, Southeast University, China*

- TP2a-2 Low Memory Complexity Successive Cancellation Decoder for Very Long Polar Codes 1:55 PM  
*Bertrand Le Gal, Camille Leroux, Christophe Jego, University of Bordeaux, France*
- TP2a-3 A Multi-Gbps Unrolled Hardware List Decoder 2:20 PM  
*Pascal Giard, McGill University, Canada; Alexios Balatsoukas-Stimming, Thomas Christoph Müller, Andreas Burg, École polytechnique fédérale de Lausanne, Switzerland; Claude Thibeault, École de technologie supérieure, Canada; Warren J. Gross, McGill University, Canada*
- TP2a-4 Error Patterns in Belief Propagation Decoding of Polar Codes and Their Mitigation Methods 2:45 PM  
*Shuanghong Sun, Sung-Gun Cho, Zhengya Zhang, University of Michigan, United States*

## **Session TP2b Beamforming and Linear Processing**

Chair: *Mojtaba Soltanalian, University of Illinois at Chicago*

- TP2b-1 Max-Min Transmit Beamforming via Iterative Regularization 3:30 PM  
*Ahmad Gharanjik, University of Luxembourg / KTH Royal Institute of Technology, Luxembourg; Bhavani Shankar, University of Luxembourg, Luxembourg; Mojtaba Soltanalian, University of Illinois at Chicago, United States Virgin Islands; Björn Ottersten, University of Luxembourg / KTH Royal Institute of Technology, Luxembourg*
- TP2b-2 Two-Stage Downlink Beamforming in MISO Multicell Networks with Limited Backhaul Signaling 3:55 PM  
*Youjin Kim, Hyun Jong Yang, Ulsan National Institute of Science and Technology, Republic of Korea*
- TP2b-3 A Class of Scalable Feedback Algorithms for Beam and Null-forming from Distributed Arrays 4:20 PM  
*Sairam Goguri, Ben Peiffer, Raghu Mudumbai, Soura Dasgupta, University of Iowa, United States*
- TP2b-4 Dirty Paper Coding versus Beamforming in Multi-user MIMO under OFDM 4:45 PM  
*Ajay Mohanan, Arjun Nadh, Andrew Thangaraj, Radha Krishna Ganti, Indian Institute of Technology, Madras, India*
- TP2b-5 Linear Detection Schemes for MIMO UW-OFDM 5:10 PM  
*Sher Ali Cheema, Jianshu Zhang, Ilmenau University of Technology, Germany; Mario Huemer, Johannes Kepler University, Austria; Martin Haardt, Ilmenau University of Technology, Germany*

## Session TP3a Multiagent Systems and Game Theory (invited)

Chair: *Ceyhun Eksin, Georgia Tech*

- TP3a-1 Strategic Communication in Multi-Agent Systems 1:30 PM  
*Emrah Akyol, Cedric Langbort, Tamer Basar, University of Illinois at Urbana Champaign, United States*
- TP3a-2 A Decentralized Algorithm with Signaling for Learning Nash Equilibria in Bilinear Graphical Games 1:55 PM  
*Ceyhun Eksin, Georgia Institute of Technology, United States; Jeff S. Shama, King Abdullah University of Science and Technology, Saudi Arabia*
- TP3a-3 Computationally Efficient Learning in Large-Scale Games: Sampled Fictitious Play Revisited 2:20 PM  
*Brian Swenson, Soumya Kar, Carnegie Mellon University, United States; Joao Xavier, Instituto Superior Tecnico, Portugal*
- TP3a-4 Equivalence Between Dynamic Games and its Effect on Equilibrium Characterization 2:45 PM  
*Dhruva Kartik, Ashutosh Nayyar, University of Southern California, United States*

## Session TP3b Graph Signal Processing (invited)

Co-Chairs: *Mike Rabbat, McGill University and Antonio Ortega, University of Southern California*

- TP3b-1 Network Topology Identification from Imperfect Spectral Templates 3:30 PM  
*Santiago Segarra, University of Pennsylvania, United States; Antonio Marques, King Juan Carlos University, Spain; Gonzalo Mateos, University of Rochester, United States; Alejandro Ribeiro, University of Pennsylvania, United States*
- TP3b-2 Models that Generate Approximately Band-limited Graph Signals 3:55 PM  
*Takeshi Musgrave, Michael Rabbat, McGill University, Canada*
- TP3b-3 Representations for Localized Signals on Graphs 4:20 PM  
*Rohan Varma, Siheng Chen, Jelena Kovacevic, Carnegie Mellon University, United States*
- TP3b-4 Graph Learning with Laplacian Constraints: Modeling Attractive Gaussian Markov Random Fields 4:45 PM  
*Hilmi Enes Egilmez, Eduardo Pavez, Antonio Ortega, University of Southern California, United States*
- TP3b-5 Discrete Uncertainty Principles on Graphs 5:10 PM  
*Oguzhan Teke, Palghat Vaidyanathan, California Institute of Technology, United States*

## Session TP4a Bilinear Inverse Problems (invited)

Chair: *Yuejie Chi, The Ohio State University*

- TP4a-1 Simultaneous Blind Deconvolution and Blind Demixing via Convex Programming 1:30 PM  
*Shuyang Ling, Thomas Strohmer, University of California, Davis, United States*
- TP4a-2 Ambiguities of Convolutions with Application to Phase Retrieval Problems 1:55 PM  
*Philipp Walk, California Institute of Technology, United States; Peter Jung, Technische Universität Berlin, Germany; Goetz E. Pfander, Philipps-University Marburg, Germany*
- TP4a-3 Blind Deconvolution with Sparsity: Optimal Identifiability Conditions and Efficient Recovery 2:20 PM  
*Yanjun Li, University of Illinois at Urbana-Champaign, United States; Kiryung Lee, Georgia Institute of Technology, United States; Yoram Bresler, University of Illinois at Urbana-Champaign, United States*
- TP4a-4 Time-Varying Narrowband Channel Estimation: Exploiting Low-Rank and Sparsity Structures in Delay-Doppler Domain via Bilinear Representation 2:45 PM  
*Sajjad Beygi, Urbashi Mitra, University of Southern California, United States*

## Session TP4b Five Puzzles and Euclid's Bag of Tricks (invited)

Co-Chairs: *Ivan Dokmanic, Ecole Polytechnique Fédérale de Lausanne and Martin Vetterli, Ecole Polytechnique Fédérale de Lausanne*

- TP4b-1 Recovering Spatial Organization of Genomes from Hi-C Contact Maps: High-Dimensional Statistical Estimation and Optimization with Euclidean Distance Matrices 3:30 PM  
*Aleksandr Aravkin, University of Washington, United States; Stephen Becker, University of Colorado at Boulder, United States; Dmitriy Drusvyatskiy, University of Washington, United States; Aurelie Lozano, IBM T.J. Watson Research Center, United States*
- TP4b-2 Graph Rigidity, Unassigned Distance Geometry and the Nanostructure Problem 3:55 PM  
*Phillip Duxbury, Michigan State University, United States; Simon Billinge, Columbia University, United States*
- TP4b-3 Biologically Inspired Unsupervised Algorithms for Streaming Data Analysis 4:20 PM  
*Dmitri Chklovskii, Simons Center for Data Analysis, United States*
- TP4b-4 Look, no beacons! Optimal all-in-one EchoSLAM 4:45 PM  
*Miranda Krekovic, Ivan Dokmanic, Martin Vetterli, École polytechnique fédérale de Lausanne, Switzerland*

TP4b-5 Eternity II Insoluble: Damn You, Monckton 5:10 PM  
*Jon Dattorro, Systems Optimization Laboratory, United States*

## **Session TP5a Detection over Very Large Datasets (invited)**

Co-Chairs: *Vincent H. Poor, Princeton University and Yingbin Liang, Syracuse University*

TP5a-1 Detection of Sparse Mixtures: the Finite Alphabet Case 1:30 PM

*Jonathan Ligo, University of Illinois at Urbana-Champaign, United States; George Moustakides, University of Patras, Greece; Venugopal Veeravalli, University of Illinois at Urbana-Champaign, United States*

TP5a-2 Quickest Hub Discovery in Correlation Graphs 1:55 PM

*Taposh Banerjee, Massachusetts Institute of Technology, United States; Alfred Hero, University of Michigan, Ann Arbor, United States*

TP5a-3 Quickest Combined Anomaly Detection and Estimation in Networked Data 2:20 PM

*Javad Heydari, Ali Tajer, Rensselaer Polytechnic Institute, United States*

TP5a-4 Nonparametric Composite Outlier Detection 2:45 PM

*Weiguang Wang, Yingbin Liang, Syracuse University, United States; H. Vincent Poor, Princeton University, United States*

## **Session TP5b Source Localization and Sparse Array Design**

Chair: *Marco Lops, University of Cassino*

TP5b-1 An Ideal-Theoretic Criterion for Localization of an Unknown Number of Sources 3:30 PM

*Matthew W. Morency, Delft University of Technology, Netherlands; Sergiy A. Vorobyov, Aalto University, Finland; Geert Leus, Delft University of Technology, Netherlands*

TP5b-2 Exact Localization of Correlated Sources using 2D Harmonics Retrieval 3:55 PM

*Ali Koochakzadeh, Piya Pal, University of Maryland, College Park, United States*

TP5b-3 Two-Dimensional Sparse Arrays with Hole-Free Coarray and Reduced Mutual Coupling 4:20 PM

*Chun-Lin Liu, Palghat Vaidyanathan, California Institute of Technology, United States*

TP5b-4 Multiple Source Detection Performance of Linear Sparse Arrays 4:45 PM

*Yu Rong, Daniel Bliss, Arizona State University, United States*

- TP5b-5      Gridless Super-Resolution Direction Finding      5:10 PM  
 for Strictly Non-Circular Sources Based on Atomic  
 Norm Minimization  
*Jens Steinwandt, Florian Roemer, Ilmenau University  
 of Technology, Germany; Christian Steffens, Technische  
 Universität Darmstadt, Germany; Martin Haardt, Ilmenau  
 University of Technology, Germany; Marius Pesavento,  
 Technische Universität Darmstadt, Germany*

## **Session TP6a      Big Data Analytics for Image and Video Processing (invited)**

Chair: *Marios Pattichis, University of New Mexico*

- TP6a-1      Food Image Analysis: the Big Data Problem      1:30 PM  
 You Can Eat!  
*Yu Wang, Chang Liu, Shaobo Fang, Fengqing Zhu,  
 Purdue University, United States; Deborah Kerr, Curtin  
 University, Australia; Carol Boushey, University of  
 Hawaii, United States; Edward Delp, Purdue University,  
 United States*
- TP6a-2      Automated Monitoring by Behavior      1:55 PM  
 Classification of Healthcare Providers using Big  
 Data Analysis  
*Nasrin Sadeghzadehyazdi, Laura Barnes, Scott Acton,  
 University of Virginia, United States*
- TP6a-3      Building a Living Atlas of the Earth in the      2:20 PM  
 Cloud  
*Daniela I. Moody, Steven P. Brumby, Michael S. Warren,  
 Samuel W. Skillman, Ryan Keisler, Rick Chartrand, Tim  
 Kelton, Mark Mathis, Descartes Labs, United States*
- TP6a-4      A Review of Big Data Technologies and      2:45 PM  
 Challenges in Image and Video Analytics in  
 Healthcare  
*Andreas Panayides, University of New Mexico, United  
 States; Constantinos Pattichis, University of Cyprus,  
 Cyprus; Marios Pattichis, University of New Mexico,  
 United States*

## **Session TP6b      Optimization and Adaptive Methods**

Chair: *Philip Schniter, Ohio State University*

- TP6b-1      A New Formulation of Generalized      3:30 PM  
 Approximate Message Passing  
*Subrata Sarkar, Philip Schniter, The Ohio State University,  
 United States; Alyson Fletcher, University of California,  
 Los Angeles, United States; Sundeep Rangan, New York  
 University, United States*
- TP6b-2      Mean-Reverting Portfolio Design via      3:55 PM  
 Majorization-Minimization Method  
*Ziping Zhao, Daniel P. Palomar, Hong Kong University of  
 Science and Technology, Hong Kong SAR of China*

- TP6b-3 Online Kernel Dictionary Learning on a Budget 4:20 PM  
*Jeon Lee, University of Texas Southwestern Medical Center, United States; Seung-Jun Kim, University of Maryland, Baltimore County, United States*
- TP6b-4 A New Strategy for Effective Learning in Adaptive Importance Sampling 4:45 PM  
*Monica Bugallo, Stony Brook University, United States; Victor Elvira, Universidad Carlos III de Madrid, Spain; Luca Martino, Universidad de Valencia, Spain*
- TP6b-5 A Bayesian Framework for Robust Kalman Filtering Under Uncertain Noise Statistics 5:10 PM  
*Roozbeh Dehghannasiri, Texas A&M University, United States; Mohammad Shahrokh Esfahani, Stanford School of Medicine, United States; Edward Dougherty, Texas A&M University, United States*

**Session TP7a Signal Processing for Dynamic Functional Brain Network Analysis (invited)**

Chair: *Seline Aviyente, Michigan State University*

- TP7a-1 Connectivity Dynamics from Wakefulness to Sleep 1:30 PM  
*Eswar Damaraju, Robyn Miller, Devon Hjelm, Vince Calhoun, Mind Research Network, United States*
- TP7a-2 An EEG and fTCD based BCI for Control 1:55 PM  
*Matthew Sybeldon, Aya Khalaf, Ervin Sejdic, Murat Akcakaya, University of Pittsburgh, United States*
- TP7a-3 Source-Informed Segmentation: Towards Capturing the Dynamics of Brain Functional Networks Through Eeg 2:20 PM  
*Ali Haddad, Laleh Najafzadeh, Rutgers University, United States*
- TP7a-4 Functional Connectivity Metrics for Wavelet Clustering of rs-fMRI Data 2:45 PM  
*Alessio Medda, Georgia Tech Research Institute, United States; Jacob Billings, Emory University, United States; Shella Keilholz, Georgia Institute of Technology and Emory University, United States*

**Session TP7b Implementation of Full-Duplex Radio Transceivers (invited)**

Co-Chairs: *Joseph Cavallaro, Rice University and Ashutosh Sabharwal, Rice University*

- TP7b-1 Advanced Architectures for Self-Interference Cancellation in Full-Duplex Radios: Algorithms and Measurements 3:30 PM  
*Dani Korpi, Mona Aghababaeetafreschi, Mauno Piiilä, Lauri Anttila, Mikko Valkama, Tampere University of Technology, Finland*



- TP7b-2 Self-Interference Cancellation for Full-Duplex Wireless Communications 3:55 PM  
*Tho Le-Ngoc, Robert Morawski, Ahmed Masmoudi, McGill University, Canada*
- TP7b-3 Real Time Adaptive RF and Digital Self-Interference Cancellation for Full-Duplex Transceivers 4:20 PM  
*Visa Tapio, Markku Juntti, Aarno Pärssinen, Kari Rikkinen, University of Oulu, Finland*
- TP7b-4 Full-Duplex in a Hand-held Device - From Fundamental Physics to Complex Integrated Circuits, Systems and Networks: An Overview of the Columbia FlexICoN project 4:45 PM  
*Harish Krishnaswamy, Gil Zussman, Jin Zhou, Jelena Marasevic, Tolga Dinc, Negar Reiskarimian, Tingjun Chen, Columbia University, United States*
- TP7b-5 Integrating Full-duplex Capabilities in Heterogeneous Spectrum Sharing 5:10 PM  
*Wessam Afifi, Marwan Krunz, Mohammed Hirzallah, University of Arizona, United States*

## Session TP8a1 Network Data Analysis

Chair: *Usman Khan, Tufts University*

1:30 PM–3:10 PM

- TP8a1-1 A New Approach to Distributed Hypothesis Testing  
*Gil Katz, Pablo Piantanida, Merouane Debbah, CentraleSupélec, France*
- TP8a1-2 Worst-case Robust Attacks by Limited Adversaries Against Electricity Markets  
*Mengheng Xue, Ali Tajer, Rensselaer Polytechnic Institute, United States*
- TP8a1-3 Efficient and Cooperative Smart Grid Failure Control with Low Communication Overhead  
*Jose Cordova-Garcia, Xin Wang, Stony Brook University, United States*
- TP8a1-4 A Distributed Range-Based Algorithm for Localization in Mobile Networks  
*Sam Safavi, Usman Khan, Tufts University, United States*
- TP8a1-5 Random Matrix Improved Community Detection in Heterogeneous Networks  
*Hafiz Tiomoko Ali, Romain Couillet, CentraleSupélec, University of Paris-Saclay, France*
- TP8a1-6 Distributed Learning over Multitask Networks with Linearly Related Tasks  
*Roula Nassif, Cédric Richard, André Ferrari, University of Nice-Sophia-Antipolis, France; Ali H. Sayed, University of California, Los Angeles, United States*
- TP8a1-7 Distributed Linear Prediction of a Single Source  
*Kevin Wagner, Naval Research Laboratory, United States; Milos Doroslovacki, George Washington University, United States*

TP8a1-8 A Latent Variable Clustering Method for Wireless Sensor Networks  
*Vladislav Vasilev, Georgi Iliev, Vladimir Poulkov, Technical University of Sofia, Bulgaria; Alben Mihovska, Aalborg University, Denmark*

## **Session TP8a2 Relaying and Full Duplex Communications**

Chair: *Min Dong, University of Ontario Institute of Technology*

1:30 PM–3:10 PM

- TP8a2-1 Robust Message Recovery for Non-Cooperative Compute-And-Forward Relaying  
*Miruna Raceala-Motoc, Jan Schreck, Peter Jung, Slawomir Stanczak, Fraunhofer Heinrich Hertz Institute, Germany*
- TP8a2-2 Performance Analysis for Multi-Source Multi-Relay Transmission over  $\kappa$ - $\mu$  Fading Channels  
*Shen Qian, Japan Advanced Institute of Science and Technology, Japan; Jiguang He, Markku Juntti, University of Oulu, Finland; Tad Matsumoto, Japan Advanced Institute of Science and Technology, Japan*
- TP8a2-3 Randomized Space-Time Codes with Imperfect Channel Estimation  
*Behrouz Shayesteh, Birsen Sirkeci, San Jose State University, United States*
- TP8a2-4 Joint Relay Beamforming and Receiver Processing for Multi-way Multi-antenna Relaying  
*Wen Li, Min Dong, University of Ontario Institute of Technology, Canada*
- TP8a2-5 Spatial Half-duplex: Precoder Design and Experimental Evaluation  
*Niranjan M Gowda, Ashutosh Sabharwal, Rice University, United States*
- TP8a2-6 Degrees of Freedom of Spatial Self-Interference Suppression for In-Band Full-Duplex with Inter-node Interference  
*Yujun Chen, Ashutosh Sabharwal, Rice University, United States*
- TP8a2-7 On the Achievability of Interference Alignment for Full-Duplex Cellular Networks with Multiple Antennas  
*Wonjae Shin, Seoul National University, Republic of Korea; Jong-Bu Lim, Samsung Electronics, Republic of Korea; Hyun-Ho Choi, Hankyong National University, Republic of Korea; Jungwoo Lee, Seoul National University, Republic of Korea*

## Session TP8a3 Subspaces, Covariances and Tensors

Chair: *Louis Scharf, Colorado State University*

1:30 PM–3:10 PM

- TP8a3-1 Covariance Estimation in Terms of Stokes Parameters with Application to Vector Sensor Imaging  
*Ryan Volz, Mary Knapp, Frank Lind, Frank Robey, Massachusetts Institute of Technology, United States*
- TP8a3-2 Principal Subspace Estimation for Low-rank Toeplitz Covariance Matrices with Binary Sensing  
*Haoyu Fu, Yuejie Chi, The Ohio State University, United States*
- TP8a3-3 Complexity and Search Space Reduction in Cyclic-by-Row PEVD Algorithms  
*Fraser Coutts, Jamie Corr, Keith Thompson, Stephan Weiss, University of Strathclyde, United Kingdom; Ian Proudler, Loughborough University, United Kingdom; John McWhirter, Cardiff University, United Kingdom*
- TP8a3-4 Investigation of a Polynomial Matrix Generalised EVD for Multi-Channel Wiener Filtering  
*Jamie Corr, Jennifer Pestana, Stephan Weiss, University of Strathclyde, United Kingdom; Soydan Redif, European University of Lefke, Cyprus; Marc Moonen, KU Leuven, Belgium*
- TP8a3-5 Maximum Likelihood Identification of an Information Matrix Under Constraints in a Corresponding Graphical Model  
*Randy Paffenroth, Nan Li, Worcester Polytechnic Institute, United States; Louis Scharf, Colorado State University, United States; Myung Hee Lee, Weill Cornell Medical College, United States*

## Session TP8b1 Computer Arithmetic II

Chair: *Pascal Giard, EPFL*

3:30 PM–5:35 PM

- TP8b1-1 Optimized Memristor-Based Ripple Carry Adders  
*Lauren Guckert, Earl Swartzlander, Jr., University of Texas at Austin, United States*
- TP8b1-2 Computing Subtraction and Polynomial Computation using Unipolar Stochastic Logic  
*Yin Liu, Keshab Parhi, University of Minnesota, Twin Cities, United States*
- TP8b1-3 Precise Digital Implementations of Hyperbolic Tanh and Sigmoid Function  
*Shaghayegh Gomar, Mitra Mirhassani, Majid Ahmadi, University of Windsor, Canada*
- TP8b1-4 Optimized Multipartite Table Methods for Elementary Functions Computation  
*James Stine, Masoud Sadeghian, Oklahoma State University, United States*

- TP8b1-5 Radix-4 Energy Efficient Carry-Free Truncated Multiplier  
*Wen Yan, Beijing Institute of Technology, China; Milos Ercegovac, University of California, Los Angeles, United States*

## **Session TP8b2 Image and Video Sensor Processing and Communications**

Chair: *Sally Wood, Santa Clara University*

3:30 PM–5:35 PM

- TP8b2-1 Focal Plane Processing for HOG Detection with Bayer Pattern Sensors  
*Allen Rush, Sally Wood, Santa Clara University, United States*
- TP8b2-2 Performance of Maximum Likelihood Temperature/Emissivity Separation of Hyperspectral Images with Correlated Gaussian Downwelling Radiance  
*David Neal, Todd Moon, Jacob Gunther, Utah State University, United States; Gus Williams, Brigham Young University, United States*
- TP8b2-3 Spatially Scalable Video Broadcasting in Multiple Antenna Systems  
*Arash Vosoughi, LG Electronics, United States; Seok-Ho Chang, Dankook University, Republic of Korea; Sang-Hyo Kim, Sungkyunkwan University, Republic of Korea; Pamela Cosman, Laurence Milstein, University of California, San Diego, United States*

## **Session TP8b3 Processing of Physiological Signals**

Chair: *Antonia Papandreou-Suppappola, Arizona State University*

3:30 PM–5:35 PM

- TP8b3-1 Modeling the P300-based Brain-computer Interface as a Channel with Memory  
*Vaishakhi Mayya, Boyla Mainsah, Galen Reeves, Duke University, United States*
- TP8b3-2 The Addition of Adaptive Comb Filtering to Sequential Adaptive Processing for Fetal Electrocardiograms (ECGs)  
*Yuqing Dong, Jacob Kovarskiy, William Jenkins, Pennsylvania State University, United States*
- TP8b3-3 Fast Respiratory Rate Estimation from PPG Signal Using Sparse Signal Reconstruction Based on Orthogonal Matching Pursuit  
*Xiaorong Zhang, San Francisco State University, United States; Quan Ding, The Home Depot Techshed, United States*
- TP8b3-4 Modeling of Oxygen Saturation and Respiration for Sleep Apnea Detection  
*Sandeep Gutta, Qi Cheng, Oklahoma State University, United States*

- TP8b3-5 Do Retinal Ganglion Cells Project Natural Scenes to Their Principal Subspace?  
*Reza Abbasi-Asl, University of California, Berkeley, United States; Cengiz Pehlevan, Simons Foundation, United States; Bin Yu, University of California, Berkeley, United States; Dmitri B. Chklovskii, Simons Foundation, United States*
- TP8b3-6 Surface charge method for the forward EEG problem  
*Francisco J. Solis, Antonia Papandreou-Suppappola, Arizona State University, United States*

## **Session WA1a Approximate Computing and Fault Tolerance (invited)**

Co-Chairs: *Andrew Singer, University of Illinois at Urbana Champaign and Pulkit Grover, Carnegie Mellon University*

- WA1a-1 Approximate and Error-Tolerant Computing: 8:15 AM  
 From Shannon-Theory to Circuits  
*Pulkit Grover, Carnegie Mellon University, United States; Andrew Singer, University of Illinois at Urbana Champaign, United States*
- WA1a-2 Energy Efficiency Limits in Approximate 8:40 AM  
 Computing: A Fundamental Physical Perspective  
*Neal Anderson, University of Massachusetts Amherst, United States*
- WA1a-3 Flash Memories in High Radiation 9:05 AM  
 Environments: LDPC Decoder Study  
*Frederic Sala, Clayton Schoeny, Shahroze Kabir, University of California, Los Angeles, United States; Dariush Divsalar, NASA Jet Propulsion Laboratory, United States; Lara Dolecek, University of California, Los Angeles, United States*
- WA1a-4 Analog Processing to Enable Scalable 9:30 AM  
 High-Throughput mm-Wave Wireless Fiber Systems  
*Mahmoud Sawaby, Stanford University, United States; Babak Mamandipour, Upamanyu Madhow, University of California, Santa Barbara, United States; Amin Arbabian, Stanford University, United States*

## **Session WA1b Communication System Development**

Chair: *Raghuraman Mudumbai, University of Iowa*

- WA1b-1 Maximizing Wireless Power Transfer using 10:15 AM  
 Distributed Beamforming  
*Sairam Goguri, University of Iowa, United States; Dennis Ogbe, Purdue University, United States; Raghuraman Mudumbai, University of Iowa, United States; David Love, Purdue University, United States; Soura Dasgupta, University of Iowa, United States; Patrick Bidigare, BBN Technologies, United States*

- WA1b-2 Digitally Enhanced Inter-modulation Distortion Compensation in Wideband Spectrum Sensing 10:40 AM  
*Han Yan, Danijela Cabric, University of California, Los Angeles, United States*
- WA1b-3 Hybrid Analog-Digital Transceiver Designs for Cognitive Radio Millimeter Wave Systems 11:05 AM  
*Christos G. Tsinos, Sina Maleki, Symeon Chatzinotas, Bjorn Ottersten, University of Luxembourg, Luxembourg*

## **Session WA2a Physical Layer Security (invited)**

Co-Chairs: *Rafael Schaefer, TU Berlin and Mario Goldenbaum, Princeton University*

- WA2a-1 Keyless Authentication over Noisy Channel 8:15 AM  
*Wenwen Tu, Lifeng Lai, Worcester Polytechnic Institute, United States*
- WA2a-2 Secure Computation of Linear Functions over Linear Discrete Multiple-Access Wiretap Channels 8:40 AM  
*Mario Goldenbaum, Princeton University, United States; Holger Boche, Technical University of Munich, Germany; H. Vincent Poor, Princeton University, United States*
- WA2a-3 Physical Layer Based Authentication Without Phase Detection 9:05 AM  
*Sarah Rumpel, Anne Wolf, Eduard A. Jorswieck, Technische Universität Dresden, Germany*
- WA2a-4 Private Authentication with Controllable Measurement 9:30 AM  
*Kittipong Kittichokechai, Rafael F. Schaefer, Giuseppe Caire, Technische Universität Berlin, Germany*

## **Session WA2b Massive MIMO in the Field**

Chair: *Lars Thiele, Fraunhofer Heinrich Hertz Institute*

- WA2b-1 Massive MIMO Proof-of-Concept: Emulations and Hardware-in-the-Loop Field Trials at 3.5 GHz 10:15 AM  
*Thomas Wirth, Lars Thiele, Martin Kurras, Matthias Mehlhose, Thomas Haustein, Fraunhofer Heinrich Hertz Institute, Germany*
- WA2b-2 Directional Propagation Measurements and Modeling in an Urban Environment at 3.7 GHz 10:40 AM  
*Leszek Raschkowski, Stephan Jaeckel, Fabian Undi, Lars Thiele, Wilhelm Keusgen, Fraunhofer Heinrich Hertz Institute, Germany; Boonsarn Pitakdumrongkija, Masayuki Ariyoshi, NEC Corporation, Japan*
- WA2b-3 Massive MIMO Properties based on Measured Channels: Channel Hardening, User Decorrelation and Channel Sparsity 11:05 AM  
*Alex Oliveras Martinez, Elisabeth De Carvalho, Jesper Ødum Nielsen, Aalborg University, Denmark*

## Session WA3a Cognitive Networking (invited)

Chair: *Tara Javidi, University of California, San Diego*

- WA3a-1 On the Equivalence Between Information Acquisition-Utilization and Generalized Tracking 8:15 AM  
*Tara Javidi, University of California, San Diego, United States*
- WA3a-2 Correlation-Aware Sensing in Active and Passive Modes for Source Localization 8:40 AM  
*Ali Koochakzadeh, Heng Qiao, Pia Pal, University of Maryland, College Park, United States*
- WA3a-3 Approximate K-Means++ in Sublinear Time 9:05 AM  
*Hamed Hassani, ETH, Switzerland*
- WA3a-4 A POMDP Approach for Active Collision Detection via Networked Sensors 9:30 AM  
*Daphney-Stavroula Zois, University of Illinois, Urbana Champaign, United States*

## Session WA3b Signal Processing with Lattices (invited)

Chair: *Vaughan Clarkson, University of Queensland*

- WA3b-1 Convolutional Lattices 10:15 AM  
*Joseph Boutros, Nicola Di Pietro, Texas A&M University at Qatar, Qatar; Fanny Jardel, Télécom Paristech, France*
- WA3b-2 Typical Sumsets of Lattice Points 10:40 AM  
*Jingge Zhu, Michael Gastpar, École polytechnique fédérale de Lausanne, Switzerland*
- WA3b-3 Lattice Parameter Estimation from Sparse, Noisy Measurements 11:05 AM  
*Vaughan Clarkson, University of Queensland, Australia; Robby McKilliam, Myriota Pty Ltd, Australia; Barry Quinn, Macquarie University, Australia*

## Session WA4a Decentralized Optimization and Learning (invited)

Co-Chairs: *Cédric Richard, Université de Nice Sophia-Antipolis and Pascal Bianchi, Telecom ParisTech*

- WA4a-1 Doubly Stochastic Algorithms for Large-Scale Optimization 8:15 AM  
*Alec Koppel, Aryan Mokhtari, Alejandro Ribeiro, University of Pennsylvania, United States*
- WA4a-2 On Hypothesis Testing in Networks 8:40 AM  
*Angelia Nedich, Alexander Olshevsky, Cesar Uribe, University of Illinois, United States*
- WA4a-3 Expander Graph and Communication-Efficient Decentralized Optimization 9:05 AM  
*Yat-Tin Chow, University of California, Los Angeles, United States; Wei Shi, University of Illinois at Urbana Champaign, United States; W Yin, University of California, Los Angeles, United States*

WA4a-4 An Empirical Comparison of Multi-Agent Optimization Methods for Distributed Learning 9:30 AM  
*Mahmoud Assran, Michael Rabbat, McGill University, Canada*

## Session WA4b Modelling and Inference with Graphs

Chair: *Georgios Giannakis, University of Minnesota*

WA4b-1 Semi-parametric Reconstruction of Signals over Graphs 10:15 AM  
*Vassilis N. Ioannidis, Daniel Romero, Georgios B. Giannakis, University of Minnesota, United States*

WA4b-2 Hierarchical Representations of Network Data with Optimal Distortion Bounds 10:40 AM  
*Zane Smith, Samir Chowdhury, Facundo Memoli, The Ohio State University, United States*

WA4b-3 Efficient Graph Signal Recovery over Big Networks 11:05 AM  
*Gabor Hannak, Peter Berger, Gerald Matz, Vienna University of Technology, Austria; Alexander Jung, Aalto University, Finland*

## Session WA5 Tensor Signal Processing (invited)

Chair: *Nicholas D. Sidiropoulos, University of Minnesota*

WA5-1 First-Order Perturbation Analysis of Low-Rank Tensor Approximations Based on the Truncated HOSVD 8:15 AM  
*Emilio Rafael Balda, Sher Ali Cheema, Jens Steinwandt, Martin Haardt, Ilmenau University of Technology, Germany; Amir Weiss, Arie Yeredor, Tel-Aviv University, Israel*

WA5-2 Extension of the Semi-Algebraic Framework for Approximate CP Decompositions via Simultaneous Matrix Diagonalization to the Efficient Calculation of Coupled CP Decompositions 8:40 AM  
*Kristina Naskovska, Martin Haardt, Ilmenau University of Technology, Germany*

WA5-3 Tensorlab 3.0 – Numerical Optimization Strategies for Large-Scale (Constrained, Coupled) Matrix/Tensor Factorization 9:05 AM  
*Nico Vervliet, Otto Debals, Lieven De Lathauwer, KU Leuven, Belgium*

WA5-4 Inferring Directed Network Topologies via Tensor Factorization 9:30 AM  
*Yanning Shen, Brian Baingana, Georgios Giannakis, University of Minnesota, United States*

BREAK 9:55 AM

WA5-5 Robust PCA via Tensor Outlier Pursuit 10:15 AM  
*Jineng Ren, Xingguo Li, University of Minnesota, United States; Jarvis Haupt, University of Minnesota, Twin Cities, United States*



- WA5-6      Tensor Completion via Group-Sparse      10:40 AM  
 Regularization  
*Bo Yang, Gang Wang, Nikos Sidiropoulos, University of  
 Minnesota, United States*
- WA5-7      Coupled Graph Tensor Factorization      11:05 AM  
*Ahmed S. Zamzam, Vassilis Ioannidis, Nikos D.  
 Sidiropoulos, University of Minnesota, United States*

## **Session WA6a      Emerging Sensing Technologies for Assisted Living (invited)**

Co-Chairs: *Yimin D. Zhang, Temple University and Fauzia Ahmad,  
 Villanova University*

- WA6a-1      Continuous-Wave Sensors for Non-contact      8:15 AM  
 Physiological Monitoring and Human-Aware  
 Localization  
*Changzhi Li, Texas Tech University, United States*
- WA6a-2      Training-Free Sleep Behavior Monitoring      8:40 AM  
 using Smartphones  
*Rui Wang, Dartmouth College, United States; Saeed  
 Abdullah, Cornell University, United States; Fazlay Rabbi,  
 Xiao Zeng, Mi Zhang, Michigan State University, United  
 States*
- WA6a-3      Breathing Detection Based on the Topological      9:05 AM  
 Features of IR Sensor and Accelerometer Signals  
*Fatih Erden, Atilim University, Turkey; Ahmet Enis Cetin,  
 Bilkent University, Turkey*
- WA6a-4      Wideband Radar Based Fall Motion Detection      9:30 AM  
 for a Generic Elderly  
*Baris Erol, Moeness Amin, Fauzia Ahmad, Villanova  
 University, United States; Yimin Zhang, Temple University,  
 United States*

## **Session WA6b      Image and Video Quality Assessment**

Chair: *Balasubramaniam Santhanam, University of New Mexico*

- WA6b-1      No-Reference Image Quality Assessment for      10:15 AM  
 High Dynamic Range Images  
*Debarati Kundu, Deepti Ghadiyaram, Alan Bovik, Brian  
 Evans, University of Texas at Austin, United States*
- WA6b-2      A Multi-Stage Temporal Pooling Mechanism      10:40 AM  
 for Video Quality Assessment  
*Venkata Phani Kumar M, Sudipta Mahapatra, Indian  
 Institute of Technology, Kharagpur, India*
- WA6b-3      Sparsity Based Stereoscopic Image Quality      11:05 AM  
 Assessment  
*Sameeulla Khan, Sumohana Channappayya, Indian  
 Institute of Technology, Hyderabad, India*

## Session WA7 Cognitive Radar (invited)

Co-Chairs: *Hugh Griffiths, University College London and Muralidhar Rangaswamy, Air Force Research Laboratory*

- WA7-1 Semi-Cognitive Angle Estimation for Adaptive Array Radars 8:15 AM  
*Michal Meller, PIT-RADWAR S.A., Poland*
- WA7-2 Challenge Problems in Cognitive Radar 8:40 AM  
*Hugh Griffiths, University College London, United Kingdom; Alex Charlish, Fraunhofer Institute for Communication, Information Processing and Ergonomics (FKIE), Germany; Nathan Goodman, University of Oklahoma, United States*
- WA7-3 Joint Design of Waveform and Receive Filter for MIMO Radar using Parametric Programming 9:05 AM  
*Bosung Kang, Omar Aldayel, Vishal Monga, Pennsylvania State University, United States; Muralidhar Rangaswamy, Air Force Research Laboratory, United States*
- WA7-4 Experimental Validation of Cognitive Radar Anticipation using Stochastic Control 9:30 AM  
*Colin Horne, Matthew Ritchie, Hugh Griffiths, University College London, United Kingdom; Folker Hoffmann, Alex Charlish, Fraunhofer Institute for Communication, Information Processing and Ergonomics (FKIE), Germany*
- BREAK 9:55 AM
- WA7-5 Learning Radar for Airborne Maritime Surveillance Applications 10:15 AM  
*Myriam Nouvel, Stéphane Kemkemia, THALES Airborne Systems, France*
- WA7-6 Cognitive Radar Testbed Development 10:40 AM  
*Roland Oechslin, armasuisse, Science and Technology, Switzerland; Graeme Smith, The Ohio State University, United States; Uwe Aulenbacher, Klaus Rech, Sebastian Hinrichsen, Ingenieurbüro für Sensorik und Signalverarbeitung, Germany; Kristine Bell, Metron, Inc., United States; Peter Wellig, armasuisse, Science and Technology, Switzerland*
- WA7-7 Big Data Capon Beamforming: Random Matrix Theory Perspectives 11:05 AM  
*Pawan Setlur, AFRL/WSRI, United States; Muralidhar Rangaswamy, Air Force Research Laboratory, United States*



## Author List

NAME	SESSION	NAME	SESSION
A. Zewail, Ahmed .....	TP1b-2	B. Chklovskii, Dmitri.....	TP8b3-5
Aazhang, Behnaam.....	MA7b-3	B. Letaief, Khaled .....	MA2b-1
Aazhang, Behnaam.....	TP1b-3	Babadi, Behtash .....	MP7a-4
Abbasi-Asl, Reza .....	TP8b3-5	Baccelli, Francois .....	TP1a-2
Abdrashitov, Vitaly .....	MP1b-4	Badami, Komail .....	TA5b-1
Abdullah, Saeed .....	WA6a-2	Bahari, Fatemeh .....	TA7b-3
Abelló, Albert .....	MP8b2-4	Baidoo-Williams, Henry .....	MA8a4-2
Abry, Patrice .....	MA6-5	Baingana, Brian.....	WA5-4
Acton, Scott .....	MP6a-2	Balakrishnan, Sivaraman.....	MA4b-2
Acton, Scott .....	TP6a-2	Balatsoukas-Stimming, Alexios	TP2a-3
Adalbjörnsson, Stefan Ingi.....	MA8b2-6	Balda, Emilio Rafael .....	WA5-1
Adelson, David .....	MP7b-1	Bampis, Christos.....	MP6a-1
Afifi, Wessam.....	TP7b-5	Banelli, Paolo .....	MP4a-3
Aghababaeetafreshi, Mona.....	TP7b-1	Banerjee, Taposh.....	TP5a-2
Agurto, Carla.....	MA8a4-1	Barbarossa, Sergio.....	MP4a-3
Ahmad, Fauzia.....	WA6a-4	Barboza, Vianka .....	MA8b3-2
Ahmadi, Majid .....	TP8b1-3	Bari, Mohammad .....	MP8a3-5
Akcakaya, Murat.....	TP7a-2	Barnes, Laura.....	TP6a-2
Akyol, Emrah.....	MP8a2-4	Basar, Tamer .....	MP8a2-4
Akyol, Emrah.....	TP3a-1	Basar, Tamer .....	TP3a-1
Al Obaidi, Taif .....	MA8b3-3	Batra, Dhruv .....	MP8a3-7
Aldayel, Omar.....	WA7-3	Bazco, Antonio .....	MA1-8
Aldhahab, Ahmed.....	MA8b3-3	Bazrafshan, Mohammadhafez	MA3b-2
Alessio, Adam .....	MA8a4-3	Becker, Stephen .....	TP4b-1
AliHemmati, Ruhallah.....	MP8a2-7	Beex, A.A. (Louis) .....	MP8b3-3
Alloway, Kevin.....	TA7b-3	Bell, Kristine.....	WA7-6
Almalaq, Abdulaziz .....	MP7b-4	Bengtsson, Mats .....	MA2b-2
Alnajjab, Basel.....	MA5b-4	Berger, Peter .....	WA4b-3
Amin, Moeness .....	WA6a-4	Berisha, Visar.....	MP6b-1
Analui, Bitu.....	MA3b-3	Bertilsson, Erik.....	MP8b3-2
Anderson, Alexander .....	MP7a-2	Besson, Olivier .....	MP5b-1
Anderson, Neal.....	WA1a-2	Beygi, Sajjad .....	TP4a-4
Andrenacci, Stefano .....	MP2a-4	Bezati, Endri .....	MA8b1-3
Andrews, Jeffrey .....	TP1a-2	Bezati, Endri .....	MA8b1-5
Anttila, Lauri.....	TP7b-1	Bezerra Mota, Natália .....	MP6b-3
Aravkin, Aleksandr .....	TP4b-1	Bhattacharya, Anirban.....	MP4b-4
Arbabian, Amin .....	TA8b3-3	Bidigare, Patrick.....	WA1b-1
Arbabian, Amin .....	WA1a-4	Bidon, Stephanie.....	TA8b3-5
Ariyoshi, Masayuki.....	WA2b-2	Billard, Myles .....	TA7b-3
Arnott, Rob .....	MA8a3-3	Billinge, Simon.....	TP4b-2
Arvola, Antti .....	MP8a1-7	Billings, Jacob.....	TP7a-4
Asgari, Meysam .....	MP6b-4	Bjornson, Emil .....	TA2b-3
Ashikhmin, Alexei.....	MA8a3-6	Blanco, Justin A. ....	MP8a3-3
Ashmont, Kari .....	MP7b-1	Bliss, Daniel .....	TP5b-4
Assran, Mahmoud.....	WA4a-4	Bliss, Daniel W. ....	MP7b-2
Atlas, Les .....	MP5a-4	Blum, Rick S. ....	MA5b-4
Atzeni, Italo .....	MP8a2-1	Boccardi, Federico .....	MA1-4
Aulenbacher, Uwe .....	WA7-6	Boche, Holger .....	WA2a-2
Avestimehr, Salman .....	MP3a-1	Böck, Carl.....	TA8b2-1
Aviyente, Selin.....	MP8a4-7	Bone, Daniel.....	MP6b-2
Aybat, Necdet Serhat.....	MP3b-1	Boudreau, Gary .....	MP8a2-7

<b>NAME</b>	<b>SESSION</b>	<b>NAME</b>	<b>SESSION</b>
Boushey, Carol	TP6a-1	Chatzinotas, Symeon	WA1b-3
Boutros, Joseph	WA3b-1	Cheema, Sher Ali	TP2b-5
Bovik, Alan	MP6a-1	Cheema, Sher Ali	WA5-1
Bovik, Alan	WA6b-1	Chen, Hao	TA8b3-1
Boyer, Remy	MP8a1-5	Chen, Jianshu	MA3b-1
Braun, Henry	MA8b3-6	Chen, Jie	MA5a-1
Breloy, Arnaud	MP5b-2	Chen, Junting	TA2b-1
Bresler, Yoram	TP4a-3	Chen, Siheng	TP3b-3
Brown, Donald	TA8b1-3	Chen, Tianyi	MP3b-4
Brown, Donald	TA8b2-6	Chen, Tingjun	TP7b-4
Brueggenwirth, Stefan	MP8b1-2	Chen, Xiaofei	TA8b1-5
Brumby, Steven P.	TP6a-3	Chen, Yudong	MP4b-2
Buck, John R.	MP8b1-5	Chen, Yujun	MP1a-2
Bugallo, Monica	TP6b-4	Chen, Yujun	TP8a2-6
Burg, Andreas	TP2a-3	Chen, Yuxin	MA5a-4
Burge, Mark	MA8a4-1	Chen, Yuxin	TA6b-3
Bursalioglu, Ozgun Y.	MA1-1	Cheng, Qi	TP8b3-4
Byrne, John	MA7b-3	Chepuri, Sundeep Prabhakar	MP4a-4
Cabric, Danijela	WA1b-2	Chi, Yuejie	TP8a3-2
Cadambe, Viveck	MP3a-2	Chiang, Mung	MP1b-2
Cadena, Jorge	MP8b3-3	Chintakunta, Harish	MA3a-1
Cai, Zhiting	MA7b-3	Chintakunta, Harish	MA3a-3
Caire, Giuseppe	MA1-1	Chklovskii, Dmitri	TP4b-3
Caire, Giuseppe	MP1b-3	Cho, Sung-Gun	TP2a-4
Caire, Giuseppe	TA2b-4	Choi, Hyun-Ho	TP8a2-7
Caire, Giuseppe	WA2a-4	Chow, Yat-Tin	WA4a-3
Calhoun, Vince	TP7a-1	Chowdhury, Samir	MA3a-4
Can, Dogan	MP6b-2	Chowdhury, Samir	WA4b-2
Candes, Emmanuel	TA6b-3	Christopoulos, Dimitrios	MP2a-4
Cannelli, Loris	TA4b-1	Ciblat, Philippe	TA8b1-4
Cao, Congzhe	MA8a2-5	Cieslak, Matt	MA8a4-2
Cao, Shanshan	MA5a-4	Clancy, T. Charles	MP8a2-5
Cardarilli, Gian Carlo	MP8b3-5	Clancy, T. Charles	MP8a3-7
Carosino, Michael	MP8b2-6	Clarkson, Vaughan	WA3b-3
Carrillo, Facundo	MP6b-3	Clerckx, Bruno	MA1-7
Casale Brunet, Simone	MA8b1-3	Cochran, Douglas	TA8b1-1
Casale-Brunet, Simone	MA8b1-5	Codreanu, Marian	MA8b2-3
Castellanos, Miguel	MA2b-4	Colavolpe, Giulio	MP2a-2
Gaus, Marius	MP2a-3	Conathan, Devin	MA6-3
Cavallaro, Joe	MP8a1-6	Conover, Damon	MA6-8
Cavallaro, Joseph	MP1a-2	Copelli, Mauro	MP6b-3
Cecconi, Baptiste	TA5b-4	Cordova-Garcia, Jose	TP8a1-3
Celedon-Pattichis, Sylvia	MP6a-3	Corey, Ryan	MP8b1-3
Cetin, Ahmet Enis	WA6a-3	Corr, Jamie	TP8a3-3
Chakraborty, Shayok	MA8b3-5	Corr, Jamie	TP8a3-4
Chan, Wai Ming	MA2b-2	Cosman, Pamela	TP8b2-3
Chandar, Venkat	MA5a-3	Cossairt, Oliver	MA6-7
Chang, Seok-Ho	TP8b2-3	Cottatellucci, Laura	TA2b-1
Channappayya, Sumohana	WA6b-3	Couillet, Romain	MA4a-2
Charlish, Alex	WA7-2	Couillet, Romain	TP8a1-5
Charlish, Alex	WA7-4	Coutts, Fraser	TP8a3-3
Chartrand, Rick	TP6a-3	Coviello, Christian	MA5b-2
Chaspari, Theodora	MP6b-2	Crook, Sharon	TA7b-4
Chatzinotas, Symeon	MP2a-4	Dai, Qiqin	MA6-7

<b>NAME</b>	<b>SESSION</b>	<b>NAME</b>	<b>SESSION</b>
Damaraju, Eswar .....	TP7a-1	Duxbury, Phillip.....	TP4b-2
Daneshmand, Amir .....	TA3b-4	Edfors, Ove .....	MA8a3-1
Dasgupta, Prokar .....	MP1b-1	Edfors, Ove .....	MP1a-3
Dasgupta, Soura .....	TP2b-3	Edfors, Ove .....	TA2b-2
Dasgupta, Soura .....	WA1b-1	Edwards, Ana.....	MA8a4-1
Dattorro, Jon.....	TP4b-5	Egilmez, Hilmi Enes.....	TP3b-4
Davidson, Timothy .....	MA8a3-2	Eidenberger, Horst .....	MA8b3-4
De Carvalho, Elisabeth .....	WA2b-3	Eilar, Cody .....	MP6a-3
de Kerret, Paul .....	MA1-8	Eksin, Ceyhun .....	TP3a-2
De La Cruz, Chris .....	MA8b3-1	El Khalil Harrane, Ibrahim .....	TA3b-1
De Lathauwer, Lieven .....	WA5-3	El Korso, Mohammed Nabil ..	MP8a1-5
Debals, Otto .....	WA5-3	Elidan, Gal .....	MP5b-3
Debbah, Merouane.....	TA2b-3	Ellis, Margaret H. ....	MA6-5
Debbah, Merouane.....	TP8a1-1	Elvander, Filip.....	MA8b2-1
Debrunner, Victor .....	MA8a1-4	Elvira, Victor.....	TP6b-4
DeGabriele, Alex.....	MP8a3-3	Enzinger, Harald .....	MA8a1-2
Dehghannasiri, Roozbeh .....	TP6b-5	Enzinger, Harald .....	MA8a1-3
Delaney, John.....	MA6-6	Ercegovac, Milos.....	TP8b1-5
Delaney, John.....	MA6-8	Erden, Fatih.....	WA6a-3
Delp, Edward.....	TP6a-1	Erkip, Elza .....	MA1-4
Desgreys, Patricia .....	TA5b-4	Erkip, Elza .....	MP8a2-3
Di Carlo, Leonardo .....	MP8b3-5	Erol, Baris .....	WA6a-4
Di Lorenzo, Paolo.....	MP4a-3	Esfahanizadeh, Homa.....	TA8b2-7
Di Pietro, Nicola .....	WA3b-1	Esposito, Angelo .....	MP8b3-5
Di Renzo, Marco.....	TP1a-3	Estella, Iñaki.....	MA1-2
Dietz, Georg .....	MA6-2	Etter, Delores.....	MA8b3-2
Dinc, Tolga .....	TP7b-4	Evans, Brian .....	WA6b-1
Ding, Jian.....	MP1a-1	Evans, Jamie.....	MA1-3
Ding, Quan .....	TP8b3-3	Ewaisha, Ahmed.....	TA8b2-3
Divsalar, Dariush .....	WA1a-3	Facchinei, Francisco .....	TA3b-4
Dodge, Hiroko .....	MP6b-4	Facchinei, Francisco .....	TA4b-1
Dohler, Mischa .....	MP1b-1	Fair, Ivan .....	MA8a2-5
Dokmanic, Ivan .....	TP4b-4	Fancher, Sean.....	TA1b-3
Dolecek, Lara .....	TA8b2-7	Fang, Shaobo .....	TP6a-1
Dolecek, Lara .....	WA1a-3	Farazi, Shahab.....	TA8b2-6
Donati, Daniela.....	MA8a2-4	Farsad, Nariman.....	TA8b2-5
Dong, Min .....	MP8a2-7	Farthofer, Stefan.....	MA8a2-3
Dong, Min .....	TP8a2-4	Fernandez Slezak, Diego .....	MP6b-3
Dong, Yuqing .....	TP8b3-2	Ferrari, André .....	TP8a1-6
Donmez, Mehmet.....	MA8a1-1	Fijalkow, Inbar.....	MP2b-2
Donnat, Claire .....	TA4b-3	Fischione, Carlo .....	MA1-4
Dooley, Kathryn.....	MA6-6	Flamary, Rémi .....	TA3b-1
Doroslovacki, Milos .....	MP8a3-5	Flanagan, Mark.....	MA8a2-4
Doroslovacki, Milos .....	TP8a1-7	Flandrin, Patrick.....	MP5a-2
Dougherty, Edward.....	TP6b-5	Fletcher, Alyson .....	TP6b-1
Douglas, Scott C. ....	MP8a1-4	Flordelis, Jose.....	TA2b-2
Dragotti, Pier Luigi.....	MP4a-1	Fodor, Gabor .....	MA1-4
Drakulic, Sanda.....	MP8a3-2	Freiberger, Karl.....	MA8a1-2
Draskovic, Gordana.....	MP5b-4	Freiberger, Karl.....	MA8a1-3
Druce, Jeff .....	MP8a4-5	Friedlander, Benjamin.....	MP8a1-2
Drusvyatskiy, Dmitriy .....	TP4b-1	Friedlander, Benjamin.....	MP8b1-4
Duarte, Marco .....	TA8b1-2	Friedlander, Benjamin.....	TA8b3-4
Dunson, David .....	MP4b-4	Fritz, Jonathan .....	MP7a-4
Durisi, Giuseppe.....	MP2b-3	Frost, Andrea .....	MA6-4

<b>NAME</b>	<b>SESSION</b>	<b>NAME</b>	<b>SESSION</b>
Fu, Haoyu	TP8a3-2	Guerra, Ryan	MP1a-1
G. Tsinos, Christos	WA1b-3	Guillaud, Maxime	MA1-2
Galindez Olascoaga, Laura Isabel	TA5b-1	Gunduz, Deniz	MP8a2-8
Gama, Fernando	MP4a-2	Gunnarsdottir, Kristin M.	MP7a-3
Gamaldo, Charlene E.	MP7a-3	Gunther, Jacob	TP8b2-2
Ganti, Radha Krishna	TP2b-4	Gunther, Jacob H.	MA8b2-5
Gao, Xiaobin	MP8a2-4	Gupta, Anant	TA8b3-3
García Marques, Antonio	MP4a-2	Guruswamy, Anand	MA5b-4
Gardner, William	MP5a-1	Gustafsson, Oscar	MP8b3-1
Garg, Siddharth	MP8a2-3	Gustafsson, Oscar	MP8b3-2
Gargouri, Yosra	TA5b-4	Gutta, Sandeep	TP8b3-4
Garnaev, Andrey	MA2a-1	Haardt, Martin	TP2b-5
Gastpar, Michael	WA3b-2	Haardt, Martin	TP5b-5
Gatsis, Nikolaos	MA3b-2	Haardt, Martin	WA5-1
Gentimis, Athanasios	MA3a-1	Haardt, Martin	WA5-2
Gesbert, David	MA1-8	Haddad, Ali	TP7a-3
Gesbert, David	MP8a1-7	Haghighat, Afshin	TA8b2-4
Gesbert, David	TA2b-1	Haghighatshoar, Saeid	MP1b-3
Geyik, Cemil	MP7b-2	Haghighatshoar, Saeid	TA2b-4
Ghadiyaram, Deepti	WA6b-1	Haimovich, Alexander	TA8b3-2
Gharanjik, Ahmad	TP2b-1	Hamzehei, Shermin	TA8b1-2
Ghauch, Hadi	MA2b-2	Han, Yanjun	MA4b-3
Ghosh, Amitava	TP1a-4	Han, Yonghee	MA8a3-4
Gianelli, Christopher	MA8b2-7	Hand, Paul	TA6b-2
Giannakis, Georgios	MP3b-4	Hannak, Gabor	WA4b-3
Giannakis, Georgios	TA4b-4	Hanrahan, Sara	MP7b-3
Giannakis, Georgios	WA5-4	Hanrahan, Sara	MP7b-4
Giannakis, Georgios B.	WA4b-1	Haque, Tanbir	TA5b-2
Giard, Pascal	TP2a-3	Hareedy, Ahmed	TA8b2-7
Gibson, James	MP6b-2	harris, fredric	TA8b1-5
Ginolhac, Guillaume	MP5b-2	Hasija, Tanuj	MP8a4-3
Giuseppe, Abreu	MP8b2-3	Hassani, Hamed	WA3a-3
Gluckman, Bruce	TA7b-3	Haupt, Jarvis	MP8a4-5
Goguri, Sairam	TP2b-3	Haupt, Jarvis	WA5-5
Goguri, Sairam	WA1b-1	Haustein, Thomas	TP1a-1
Goldenbaum, Mario	WA2a-2	Haustein, Thomas	WA2b-1
Goldsmith, Andrea	MP7a-1	He, Jiguang	TP8a2-2
Goldsmith, Andrea	TA8b2-5	He, Qian	MA5b-4
Gomar, Shaghayegh	TP8b1-3	Heath, R	MP2b-4
Gonella, Stefano	MP8a4-5	Heath, Robert	MP1a-4
Gonzalez-Prelcic, Nuria	MA2b-3	Heath, Robert	TP1b-4
Gonzalez-Prelcic, Nuria	MP2b-4	Heath, Robert W.	MA2b-3
Goodall, Todd	MP6a-1	Hebb, Adam	MP7b-3
Goodman, Nathan	WA7-2	Hebb, Adam	MP7b-4
Goto, Yuki	MP8a2-6	Hegde, Chinmay	MP8a4-4
Grafton, Scott	MA8a4-2	Henn, Thomas	MA6-2
Greger, Bradley	MP7b-1	Herath, Sanjeewa	TA8b2-4
Griffiths, Hugh	WA7-2	Hero, Alfred	TP5a-2
Griffiths, Hugh	WA7-4	Heydari, Javad	TP5a-3
Gross, Warren J.	TP2a-3	Himed, Braham	TA8b3-1
Grover, Pulkit	WA1a-1	Himed, Braham	TA8b3-2
Guan, Hui	MA3a-3	Hinrichsen, Sebastian	WA7-6
Guckert, Lauren	TP8b1-1	Hirzallah, Mohammed	TP7b-5
		Hjelm, Devon	TP7a-1

<b>NAME</b>	<b>SESSION</b>	<b>NAME</b>	<b>SESSION</b>
Ho, Chung-Cheng.....	MP8a1-4	Johnson, Jr., C. Richard.....	MA6-5
Hochwald, Bertrand .....	MA2b-4	Jorswieck, Eduard A. ....	WA2a-3
Hofbauer, Christian .....	MP8a3-1	Joudeh, Hamdi.....	MA1-7
Hofbauer, Christian .....	TA8b2-1	Jung, Alexander .....	WA4b-3
Hoffmann, Folker .....	WA7-4	Jung, Peter.....	TP4a-2
Holfeld, Bernd .....	TA8b2-2	Jung, Peter.....	TP8a2-1
Holfeld, Bernd .....	TP1b-1	Juntti, Markku.....	TP7b-3
Hong, Song-Nam .....	MA8a2-1	Juntti, Markku.....	TP8a2-2
Hörhan, Markus .....	MA8b3-4	Jwa, Hye Gyung .....	TP1b-5
Horne, Colin .....	WA7-4	Kabir, Shahroze.....	WA1a-3
Hossaini, Ali .....	MP1b-1	Kammoun, Abla .....	MA4a-2
House, Amanda.....	MA6-3	Kang, Bosung.....	WA7-3
Howard, Stephen D. ....	TA8b1-1	Kar, Soumya.....	TA3b-3
Hsu, Chin-Wei .....	MA8a3-5	Kar, Soumya.....	TP3a-3
Hu, Sha .....	MA8a3-1	Kartik, Dhruva .....	TP3a-4
Huang, Lei.....	TP1b-3	Katsaggelos, Aggelos.....	MA6-7
Huang, Weiyu.....	MA3a-2	Katz, Gil.....	TP8a1-1
Huemer, Mario .....	MP8a3-1	Kaye, Jeffrey .....	MP6b-4
Huemer, Mario .....	TA8b2-1	Keilholz, Shella.....	TP7a-4
Huemer, Mario .....	TP2b-5	Keisler, Ryan .....	TP6a-3
Hui, Dennis .....	MA8a2-1	Kelton, Tim.....	TP6a-3
Hunt, Allison .....	MP8a3-3	Kemkemian, Stéphane .....	WA7-5
Huynh, Thang.....	TA6b-2	Kerr, Deborah.....	TP6a-1
Hwang, Suk-seung.....	MP8b1-1	Keusgen, Wilhelm .....	WA2b-2
Iliev, Georgi.....	TP8a1-8	Khalaf, Aya .....	TP7a-2
Ingemarsson, Carl.....	MP8b3-1	Khan, Sameeulla .....	WA6b-3
Ioannidis, Vassilis .....	WA5-7	Khan, Usman .....	TP8a1-4
Ioannidis, Vassilis N.....	WA4b-1	Khattab, Tamer .....	MP8b2-5
Ishibashi, Koji .....	MP8a2-6	Kim, Jeremy.....	MP7a-1
Iwen, Mark A.....	MP8a4-7	Kim, Sang-Hyo.....	TP8b2-3
Jacyna, Garry .....	MP5a-3	Kim, Seung-Jun .....	TP6b-3
Jaeckel, Stephan .....	WA2b-2	Kim, Taejoon .....	MA2b-2
Jaffard, Stephane .....	MA6-5	Kim, Youjin.....	TP2b-2
Jakobsson, Andreas.....	MA8b2-1	Kinget, Peter R.....	TA5b-2
Jakobsson, Andreas.....	MA8b2-6	Kittichokechai, Kittipong .....	WA2a-4
Jang, Jong Gyu .....	TP1b-5	Klauber, Cecilia.....	MA3b-4
Janneck, Jorn.....	MA8b1-3	Klein, Andrew.....	TA8b2-6
Janneck, Jorn.....	MA8b1-4	Klein, Andrew G. ....	MA6-4
Janneck, Jorn.....	MA8b1-5	Klein, Andrew G. ....	MA6-5
Jansson, Magnus .....	MP8a4-2	Kliewer, Joerg .....	MA8a2-2
Jardel, Fanny.....	WA3b-1	Knapp, Mary .....	TP8a3-1
Jarry, Zyden .....	MA8a4-1	Knoop, Benjamin.....	MA8b1-2
Jatla, Venkatesh .....	MP6a-3	Knoop, Benjamin.....	MP8b3-4
Javed, Abeer .....	MP1a-1	Ko, Youngwook .....	MP8a1-6
Javidi, Tara.....	WA3a-1	Koivunen, Visa .....	MA2a-4
Jedda, Hela .....	MP2b-1	Koivunen, Visa .....	MA5b-3
Jego, Christophe.....	TP2a-2	Koochakzadeh, Ali.....	TP5b-2
Jenkins, William.....	TP8b3-2	Koochakzadeh, Ali.....	WA3a-2
Jia, Shuqiao .....	TP1b-3	Koppel, Alec.....	WA4a-1
Jiang, Bo .....	MA5a-2	Korpi, Dani .....	TP7b-1
Jiao, Jiantao.....	MA4b-3	Kota, John.....	MP5a-3
Jiao, Yishan.....	MP6b-1	Kountouris, Marios .....	MA1-4
Johndrow, James.....	MP4b-4	Kountouris, Marios .....	MP8a2-1
Johnson, Jr., C. Richard.....	MA6-3	Kovacevic, Jelena.....	TP3b-3



<b>NAME</b>	<b>SESSION</b>	<b>NAME</b>	<b>SESSION</b>
Kovarskiy, Jacob	TP8b3-2	Li, Yanjun	TP4a-3
Kozick, Richard	MA5b-2	Li, Yingzhe	TP1a-2
Krause, Jens	MP2a-4	Liang, Ben	MP8a2-7
Krekovic, Miranda	TP4b-4	Liang, Yingbin	TP5a-4
Krim, Hamid	MA3a-3	Ligo, Jonathan	TP5a-1
Krishnaswamy, Harish	TP7b-4	Lim, Jong-Bu	TP8a2-7
Kronvall, Ted	MA8b2-6	Lind, Frank	TP8a3-1
Krunz, Marwan	TP7b-5	Ling, Qing	MP3b-2
Krzymien, Witold A.	MA8a3-7	Ling, Qing	TA3b-2
Kubin, Gernot	MA8a1-2	Ling, Shuyang	TP4a-1
Kubin, Gernot	MA8a1-3	Liss, Julie	MP6b-1
Kundu, Debarati	WA6b-1	Liu, Chang	TP6a-1
Kungurtsev, Vyacheslav	TA4b-1	Liu, Chun-Lin	TP5b-3
Kurras, Martin	WA2b-1	Liu, Liang	MP1a-3
Kwon, Goo-Rak	MP8b1-1	Liu, Wenjing	MP6a-4
Lai, Lifeng	MA5a-2	Liu, Yang	MP8b1-5
Lai, Lifeng	MP8b2-5	Liu, Yin	MA7a-3
Lai, Lifeng	WA2a-1	Liu, Yin	TP8b1-2
Lam, Maximilian	MP3a-3	Loew, Murray	MA6-8
Lameiro, Christian	MP8a4-1	Lomuscio, Andrea	MP8b3-5
Lang, Oliver	MP8a3-1	LopezLeiva, Carlos	MP6a-3
Langbort, Cedric	TP3a-1	Loumeau, Patrick	TA5b-4
Larsson, Erik G.	MA1-6	Love, David	MA2b-4
Larsson, Erik G.	MP8b3-2	Love, David	WA1b-1
Larsson, Erik G.	TA2b-2	Lozano, Angel	MA1-3
Latva-aho, Matti	MA8b2-3	Lozano, Aurelie	TP4b-1
Lauderdale, James D.	TA7b-2	Lu, Yue	MP4b-1
Lauter, Christoph	MA8b1-1	Lunden, Jarmo	MA2a-4
Lauwereins, Steven	TA5b-1	Ly, Tiffany	MP6a-2
Le Gal, Bertrand	TP2a-2	M, Venkata Phani Kumar	WA6b-2
Le Martret, Christophe	TA8b1-4	M Gowda, Niranjan	TP8a2-5
Lee, Jeon	TP6b-3	M.Fayed, Abdallah	MP8b2-5
Lee, Jungwoo	MA8a3-4	Macdonald, Ruaridh	MP8a4-6
Lee, Jungwoo	TP8a2-7	Maddah-Ali, Mohammad-Ali	MP3a-1
Lee, Kangwook	MP3a-3	Madhow, Upamanyu	TA8b3-3
Lee, Kiryung	TP4a-3	Madhow, Upamanyu	WA1a-4
Lee, Myung Hee	TP8a3-5	Magesacher, Thomas	MP8a3-4
Lema, Maria	MP1b-1	Mahapatra, Sudipta	WA6b-2
Le-Ngoc, Tho	TP7b-2	Mahmoodi, Toktam	MP1b-1
Leroux, Camille	TP2a-2	Mainsah, Boyla	TP8b3-1
Leturc, Xavier	TA8b1-4	Maleki, Sina	WA1b-3
Leus, Geert	MP4a-4	Malgorzata, Michalska	MA8b1-5
Leus, Geert	TP5b-1	Mamandipour, Babak	WA1a-4
Levchenko, Andre	TA1b-3	Marasevic, Jelena	TP7b-4
Li, Bo	MA2a-2	Marcos, Sylvie	MP8a1-5
Li, Changzhi	WA6a-1	Maric, Ivana	MA8a2-1
Li, Jian	MA8b2-7	Marques, Antonio	MP3b-4
Li, Jian	TA8b3-7	Marques, Antonio	TP3b-1
Li, Kaipeng	MP1a-2	Marquet, Alexandre	MP8b2-4
Li, Kaipeng	MP8a1-6	Marshall, Alan	MP8a1-6
Li, Nan	TP8a3-5	Marshall, Peter	MP1b-1
Li, Songze	MP3a-1	Martin, Jeremy	MP8a3-3
Li, Wen	TP8a2-4	Martino, Luca	TP6b-4
Li, Xingguo	WA5-5	Marzetta, Thomas L.	MA8a3-6

<b>NAME</b>	<b>SESSION</b>	<b>NAME</b>	<b>SESSION</b>
Masmoudi, Ahmed	TP7b-2	Moon, Todd K.	MA8b2-5
Mateos, Gonzalo	MP4a-2	Moonen, Marc	TP8a3-4
Mateos, Gonzalo	TP3b-1	Morales-Jimenez, David	MA4a-4
Mathis, Mark	TP6a-3	Morawski, Robert	TP7b-2
Matsumoto, Tad	TP8a2-2	Morency, Matthew W.	TP5b-1
Mattavelli, Marco	MA8b1-3	Morin, Yonathan	MP7a-1
Mattavelli, Marco	MA8b1-5	Moura, José M. F.	TA3b-3
Matz, Gerald	MA8a2-3	Moustakides, George	MA5b-1
Matz, Gerald	WA4b-3	Moustakides, George	TP5a-1
Maurer, Alexander	MP7b-3	Mozafari, Emad	MA5b-3
Mayya, Vaishakhi	TP8b3-1	Mudumbai, Raghu	TP2b-3
Mazrouei-Sebdani, Mahmood	MA8a3-7	Mudumbai, Raghuraman	WA1b-1
McKay, Matthew	MA4a-4	Mugler, Andrew	TA1b-3
McKilliam, Robby	WA3b-3	Muldoon, Sarah	MA8a4-2
McWhirter, John	TP8a3-3	Müller, Thomas Christoph	TP2a-3
Medard, Muriel	MP1b-4	Munir, Jawad	MP2b-1
Medard, Muriel	MP8a4-6	Murin, Yonathan	TA8b2-5
Medda, Alessio	TP7a-4	Murray-Bruce, John	MP4a-1
Medra, Mostafa	MA8a3-2	Musgrave, Takeshi	TP3b-2
Meedendorp, Teio	MA6-1	Muztoba, Md	MP7b-2
Mehlhose, Matthias	TP1b-1	Nadakuditi, Raj Rao	MA4a-1
Mehlhose, Matthias	WA2b-1	Nadh, Arjun	TP2b-4
Meller, Michal	WA7-1	Nadig, Santhosh	MA8b2-6
Melvasalo, Maarit	MA2a-4	Naeemi, Maitham	MA8a4-3
Melzer, Jordan	MA8a3-7	Naghsh, Mohammad Mahdi	TA8b3-7
Memoli, Facundo	MA3a-4	Najafizadeh, Laleh	TP7a-3
Memoli, Facundo	WA4b-2	Nannarelli, Alberto	MP8b3-5
Messier, Paul	MA6-4	Nanzer, Jeffrey	TA8b1-3
Messier, Paul	MA6-5	Napolitano, Antonio	MP5a-1
Mezghani, Amine	MP2b-1	Narayanan, Shrikanth	MP6b-2
Mezghani, Amine	MP2b-2	Naskovska, Kristina	WA5-2
Michelusi, Nicolo	TA1b-1	Nassif, Roula	TP8a1-6
Mihovska, Albena	TP8a1-8	Nayebi, Elina	MA8a3-6
Mikhael, Wasfy B.	MA8b3-3	Nayyar, Ashutosh	TP3a-4
Miller, Robyn	TP7a-1	Neal, David	TP8b2-2
Milstein, Laurence	TP8b2-3	Nedich, Angelia	WA4a-2
Miran, Sina	MP7a-4	Nedrud, Joshua	MP7b-3
Mirhassani, Mitra	TP8b1-3	Nedrud, Joshua	MP7b-4
Mitra, Urbashi	TA1b-1	Nemenman, Ilya	TA1b-3
Mitra, Urbashi	TP4a-4	Neuhoff, David L.	MA6-5
Mo, Jianhua	MP1a-4	Neveu, Curtis	MA7b-3
Modarres-Hashemi, Mahmoud	TA8b3-7	Ngo, Hien Quoc	MA1-6
Mohammadi Amiri, Mohammad	MP8a2-8	Nossek, Josef A.	MP2b-1
Mohanani, Ajay	TP2b-4	Nouvel, Myriam	WA7-5
Mohanty, Rosaleena	MA6-1	Novlan, Thomas	TP1a-2
Mokhtari, Aryan	MP3b-2	Ober, Raimund	MA7b-1
Mokhtari, Aryan	WA4a-1	Ochiai, Hideki	MP8b2-2
Monasson, Remi	MA4a-3	Ødum Nielsen, Jesper	WA2b-3
Monga, Vishal	WA7-3	Oechslin, Roland	WA7-6
Moody, Daniela I.	TP6a-3	Ogata, Shun	MP8a2-6
Moon, Todd	TP8b2-2	Ogbe, Dennis	WA1b-1
		Ogras, Umit Y.	MP7b-2
		Oketani, Kengo	MA8a3-3
		Okopal, Greg	MP5a-4

<b>NAME</b>	<b>SESSION</b>	<b>NAME</b>	<b>SESSION</b>
Oliveras Martinez, Alex.....	WA2b-3	Pemula, Latha .....	MP8a3-7
Olshausen, Bruno.....	MP7a-2	Pena, Juan-Carlos .....	TA5b-1
Olshesky, Alexander .....	WA4a-2	Perez-Neira, Ana .....	MP2a-3
Onaran, Efe .....	MP8a2-3	Pesavento, Marius .....	TP5b-5
O'Neill, Kevin.....	MP7b-1	Pestana, Jennifer .....	TP8a3-4
Ordóñez, Luis G. ....	MA1-2	Peters-Drolshagen, Dagmar ..	MA8b1-2
Ortega, Antonio .....	TP3b-4	Petit, Hervé .....	TA5b-4
O'Shea, Timothy J.....	MP8a3-7	Petropulu, Athina .....	MA2a-1
Ostadhashem, Mehdi .....	MA8a4-4	Petropulu, Athina .....	MA2a-2
Oswalt, Denise .....	MP7b-1	Pfander, Goetz E.....	TP4a-2
Ottersten, Bjorn.....	WA1b-3	Philosof, Tal .....	MP8a1-3
Ottersten, Björn.....	MP2a-4	Piantanida, Pablo .....	TP8a1-1
Ottersten, Björn.....	TP2b-1	Picard, David.....	MA6-2
Owring, Arash .....	MP8a4-2	Picard, David.....	MA6-5
Ozdemir, Alp.....	MP8a4-7	Piemontese, Amina .....	MP2a-2
P.P., Vaidyanathan .....	MA7b-2	Piililä, Mauno .....	TP7b-1
Paffenroth, Randy .....	TP8a3-5	Pilz, Jens.....	TP1b-1
Pal, Pia.....	WA3a-2	Piovano, Enrico .....	MA1-7
Pal, Piya.....	MA8b2-4	Pitakdumrongkija, Boonsarn..	WA2b-2
Pal, Piya.....	TP5b-2	Pitton, James .....	MP5a-4
Palomar, Daniel .....	MP3b-3	Poor, H. Vincent .....	MA5a-1
Palomar, Daniel .....	MP5b-2	Poor, H. Vincent .....	TP5a-4
Palomar, Daniel P. ....	TP6b-2	Poor, H. Vincent .....	WA2a-2
Palzer, David .....	MA6-4	Popovski, Petar .....	MA1-4
Panayides, Andreas.....	TP6a-4	Poulkov, Vladimir .....	TP8a1-8
Papadopoulos, Haralabos .....	MA1-1	Pouyet, Emeline .....	MA6-7
Papailiopoulos, Dimitris .....	MP3a-3	Pradhan, Sajina .....	MP8b1-1
Papailiopoulos, Dimitris .....	MP3a-4	Prasad, Narayan.....	MA8a3-3
Papandreou-Suppappola, Antonia.....	MP5a-3	Proudler, Ian .....	TP8a3-3
Papandreou-Suppappola, Antonia.....	MP7b-3	Pyun, Jae-young .....	MP8b1-1
Papandreou-Suppappola, Antonia.....	TP8b3-6	Qian, Shen .....	TP8a2-2
Parhami, Behrooz.....	MA7a-1	Qiao, Heng .....	MA8b2-4
Parhi, Keshab.....	MA7b-4	Qiao, Heng .....	WA3a-2
Parhi, Keshab.....	TP8b1-2	Quadeer, Ahmed Abdul.....	MA4a-4
Parhi, Keshab K.....	MA7a-3	Quinn, Barry.....	WA3b-3
Parhi, Megha.....	MA7a-3	Rabbat, Michael .....	TP3b-2
Park, Sungwoo.....	TP1b-4	Rabbat, Michael .....	WA4a-4
Park, Woojin .....	TP1b-5	Rabbi, Fazlay.....	WA6a-2
Pärssinen, Aarno.....	TP7b-3	Raceala-Motoc, Miruna.....	TP8a2-1
Pascal, Frederic.....	MP5b-4	Raginsky, Maxim.....	MA4b-1
Pattichis, Constantinos .....	TP6a-4	Raginsky, Maxim.....	MA8a1-1
Pattichis, Marios .....	MP6a-3	Ramakrishna, Raksha .....	MA3b-3
Pattichis, Marios .....	TP6a-4	Ramchandran, Kannan.....	MP3a-3
Paul, Steffen.....	MA8b1-2	Ramchandran, Kannan.....	MP4b-2
Paul, Steffen.....	MP8b3-4	Ramirez, David.....	TP1b-3
Pavez, Eduardo .....	TP3b-4	Ramírez, David.....	MP8a4-3
Pedarsani, Ramtin.....	MP3a-3	Rangan, Sundeep.....	TP6b-1
Pedarsani, Ramtin.....	MP4b-2	Ranganathan, Hiranmayi.....	MA8b3-5
Pehlevan, Cengiz .....	TP8b3-5	Rangarajan, Sampath.....	MA8a3-3
Peiffer, Ben.....	TP2b-3	Rangaswamy, Muralidhar.....	WA7-3
Pelissier, Michael .....	TA5b-3	Rangaswamy, Muralidhar.....	WA7-7
		Rao, Bhaskar D. ....	MA8a3-6
		Rao, Milind.....	TA8b2-5
		Raschkowski, Leszek .....	WA2b-2

<b>NAME</b>	<b>SESSION</b>	<b>NAME</b>	<b>SESSION</b>
Ratnam, Kavitha.....	MP7a-2	Sanguinetti, Luca .....	TA2b-3
Ratnarajah, Tharm .....	MP2a-1	Santamaria, Ignacio .....	TA8b3-6
Re, Marco .....	MP8b3-5	Santhanam, Balu .....	MA8b3-1
Rech, Klaus .....	WA7-6	Santhanam, Balu .....	MP6a-4
Redif, Soydan.....	TP8a3-4	Santos, Augusto.....	TA3b-3
Reeves, Galen .....	MP4b-3	Sarajlić, Muris.....	MP1a-3
Reeves, Galen .....	TP8b3-1	Sardellitti, Stefania .....	MP4a-3
Reiskarimian, Negar.....	TP7b-4	Sarkar, Rituparna .....	MP6a-2
Ren, Jineng.....	WA5-5	Sarkar, Subrata .....	TP6b-1
Revanna, Nagaraja .....	MA7a-2	Sarma, Sridevi V.....	MP7a-3
Ribeiro, Alejandro .....	MA3a-2	Sarraf, Saman .....	MA8a4-4
Ribeiro, Alejandro .....	MP4a-2	Sawaby, Mahmoud.....	WA1a-4
Ribeiro, Alejandro .....	TP3b-1	Saxena, Amodh Kant.....	MP2b-2
Ribeiro, Alejandro .....	WA4a-1	Sayed, Ali H.....	TA3b-2
Ribeiro, Sidarta .....	MP6b-3	Sayed, Ali H.....	TP8a1-6
Richard, Cédric .....	TA3b-1	Scaglione, Anna .....	MA3b-3
Richard, Cédric .....	TP8a1-6	Schaefer, Rafael F.....	WA2a-4
Riedel, Marc D. ....	MA7a-3	Scharf, Louis.....	TA8b3-6
Rikkinen, Kari.....	TP7b-3	Scharf, Louis.....	TP8a3-5
Ritcey, James.....	MP8b2-6	Schmale, Sebastian.....	MA8b1-2
Ritchie, Matthew .....	WA7-4	Schniter, Philip.....	TP6b-1
Robey, Frank .....	TP8a3-1	Schoeny, Clayton .....	WA1a-3
Robinson, Daniel.....	TA4b-3	Schreck, Jan .....	TP8a2-1
Rodriguez, Paul.....	MP8b1-7	Schreier, Peter.....	MP8a4-3
Roemer, Florian.....	TP5b-5	Schreier, Peter J.....	MP8a4-1
Romero, Daniel .....	WA4b-1	Schwarz, Stefan .....	MA1-5
Rong, Yu .....	TP5b-4	Schwarz, Stefan .....	MP8a1-3
Roorda, Austin .....	MP7a-2	Scutari, Gesualdo.....	MP3b-3
Roque, Damien .....	MP8b2-4	Scutari, Gesualdo.....	TA3b-4
Roque, Damien .....	TA8b3-5	Scutari, Gesualdo.....	TA4b-1
Rose, Christopher .....	TA1b-2	Segarra, Santiago.....	TP3b-1
Roth, John .....	MP8a3-3	Sejdic, Ervin .....	TP7a-2
Roux, Stephane.....	MA6-5	Sellathurai, Mathini .....	MP2a-1
Roy, Sumit .....	MA2a-3	Senanayake, Rajitha .....	MA1-3
Roychowdhury, Sohini.....	MA8a4-3	Sengupta, Avik .....	MP8a2-5
Rumpel, Sarah .....	WA2a-3	Sethares, William .....	MA6-1
Rupp, Markus .....	MA1-5	Sethares, William .....	MA6-3
Rupp, Markus .....	MP8a1-3	Sethares, William A.....	MA6-5
Rusek, Fredrik.....	MA8a3-1	Sethuraman, Panchanathan ..	MA8b3-5
Rusek, Fredrik.....	TA2b-2	Setlur, Pawan .....	WA7-7
Rush, Allen.....	TP8b2-1	Seyedmehdi, S. Hossein .....	MP8a2-7
Rust, Jochen .....	MP8b3-4	Shah, Nihar .....	MA4b-2
Rusu, Cristian .....	MP2b-4	Shahrokh Esfahani, Mohammad .....	TP6b-5
Sabharwal, Ashutosh .....	TP8a2-5	Shama, Jeff S.....	TP3a-2
Sabharwal, Ashutosh .....	TP8a2-6	Shamma, Shihab.....	MP7a-4
Sadeghian, Masoud .....	TP8b1-4	Shankar, Bhavani.....	TP2b-1
Sadeghzadehyazdi, Nasrin .....	TP6a-2	Shao, Yuxiu .....	TA7b-1
Safavi, Sam .....	TP8a1-4	Sharan, Rishi .....	MP1a-2
Safavi-Naeini, Hossein-Ali .....	MA2a-3	Sharp, Elena Sharp .....	MA8b3-2
Sakaguchi, Kei .....	TP1a-1	Sharp, Matthew.....	TA8b1-3
Sala, Frederic .....	WA1a-3	Shayesteh, Behrouz .....	TP8a2-3
Salas, Rachel M.E. ....	MP7a-3	Sheikhattar, Alireza.....	MP7a-4
Salsabilian, Shiva .....	MA8a4-2	Shekaramiz, Mohammad .....	MA8b2-5
Samavat, Mohammad .....	TA7b-4		

<b>NAME</b>	<b>SESSION</b>	<b>NAME</b>	<b>SESSION</b>
Shen, Yanning	WA5-4	Sward, Johan	MA8b2-1
Shepard, Clayton	MP1a-1	Swartzlander, Earl	MA7a-2
Sherazi, Syed Saad	MP8a3-5	Swartzlander, Jr., Earl	TP8b1-1
Shi, Wei	MP3b-2	Swenson, Brian	TP3a-3
Shi, Wei	WA4a-3	Swindlehurst, Lee	MP2b-2
Shin, Seokjoo	MP8b1-1	Sybeldon, Matthew	TP7a-2
Shin, Wonjae	TP8a2-7	Taher, Hussain	MP8a3-5
Shokri, Hossein	MA1-4	Tahmasbi, Amir	MA7b-1
Siclet, Cyrille	MP8b2-4	Tajer, Ali	TP5a-3
Sidiropoulos, Nikos	WA5-6	Tajer, Ali	TP8a1-2
Sidiropoulos, Nikos D.	WA5-7	Tandon, Ravi	MP8a2-5
Simon, Janet	MA8a4-1	Tang, Ming-Fu	MA8a3-5
Singer, Andrew	MA8a1-1	Tao, Louis	TA7b-1
Singer, Andrew	MP8b1-3	Tapio, Visa	TP7b-3
Singer, Andrew	WA1a-1	Tchamkerten, Aslan	MA5a-3
Singerl, Peter	MP8a3-4	Teke, Oguzhan	TP3b-5
Sirianunpiboon, Songsri	TA8b1-1	Tenneti, Srikanth V.	MA7b-2
Sirkeci, Birsen	TP8a2-3	Tepedelenligolu, Cihan	TA8b2-3
Skadron, Kevin	MP6a-2	Tepedelenlioglu, Cihan	MA8b3-6
Skillman, Samuel W.	TP6a-3	Tepedelenlioglu, Cihan	MP8b2-1
Slavakis, Konstantinos	MA8a4-2	Thangaraj, Andrew	TP2b-4
Smith, Graeme	WA7-6	Thibeault, Claude	TP2a-3
Smith, Peter	MA1-3	Thiele, Lars	WA2b-1
Smith, Tyler	TA1b-3	Thiele, Lars	WA2b-2
Smith, Zane	WA4b-2	Thomas, Timothy	TP1a-4
Soleimani, Maliheh	MA8a3-7	Thompson, Keith	TP8a3-3
Solis, Francisco J.	TP8b3-6	Tiomoko Ali, Hafiz	TP8a1-5
Soliz, Peter	MA8a4-1	Tölli, Antti	MP8a1-7
Soltanalian, Mojtaba	TP2b-1	Tolossa, Yohannes Jote	MP8b2-3
Soltani, Mohammadreza	MP8a4-4	Toutain, Genevieve	TA7b-4
Soltanolkotabi, Mahdi	TA6b-1	Traganitis, Panagiotis	TA4b-4
Song, Jian	TP1a-3	Tran, Gia Khanh	TP1a-1
Song, Yang	MP8a4-3	Trappe, Wade	MA2a-1
Sornborger, Andrew	TA7b-1	Trump, Tõnu	MP8a2-2
Sornborger, Andrew	TA7b-2	Tscherkaschin, Konstantin	MP8b3-4
Spanias, Andreas	MA8b3-6	Tu, Ming	MP6b-1
Spano, Danilo	MP2a-4	Tu, Wenwen	WA2a-1
Stanczak, Slawomir	TP8a2-1	Tu Lam, Thanh	TP1a-3
Statovci, Driton	MP8a3-2	Tufvesson, Fredrik	TA2b-2
Steffens, Christian	TP5b-5	Tulyaganova, Camila	TA7b-3
Steiner, Fabian	MP2b-1	Turaga, Pavan	MA8b3-6
Steinwandt, Jens	TP5b-5	Uffelman, Erich	MA6-6
Steinwandt, Jens	WA5-1	Ugolini, Alessandro	MP2a-2
Stephenson, Mallory	MA6-6	Ulp, Sander	MP8a2-2
Stine, James	TP8b1-4	Undi, Fabian	WA2b-2
Stoica, Petre	MA8b2-7	Uribe, Cesar	WA4a-2
Strohmer, Thomas	TP4a-1	Vaidyanathan, Palghat	TP3b-5
Studer, Christoph	MP1a-2	Vaidyanathan, Palghat	TP5b-3
Studer, Christoph	MP2b-3	Valkama, Mikko	TP7b-1
Studer, Christoph	TA5b-3	van Tilborgh, Louis	MA6-1
Su, Borching	MA8a3-5	Vanelli-Coralli, Alessandro	MP2a-2
Sun, Shuanghong	TP2a-4	Varma, Rohan	TP3b-3
Sun, Ying	MP3b-3	Varshney, Lav	MA8a1-1
Sun, Ying	MP5b-2	Vasilev, Vladislav	TP8a1-8

<b>NAME</b>	<b>SESSION</b>	<b>NAME</b>	<b>SESSION</b>
Vazquez, Miguel Angel	MP2a-3	Wiesel, Ami	MP5b-3
Veeravalli, Venugopal	MA4b-4	Wijewardhana, Uditha	MA8b2-3
Veeravalli, Venugopal	TP5a-1	Williams, Gus	TP8b2-2
Venkata, Rajesh	TA5b-1	Wilson, Craig	MA4b-4
Venosa, Elettra	TA8b1-5	Wirth, Thomas	TA8b2-2
Verhelst, Marian	TA5b-1	Wirth, Thomas	TP1b-1
Vervliet, Nico	WA5-3	Wirth, Thomas	WA2b-1
Vettel, Jean	MA8a4-2	Wisdom, Scott	MP5a-4
Vetterli, Martin	TP4b-4	Wolf, Anne	WA2a-3
Vidal, Rene	TA4b-3	Wolkerstorfer, Martin	MP8a3-2
Vinod, Karthik	MA8b1-2	Wood, Sally	MA6-4
Visotsky, Eugene	TP1a-4	Wood, Sally	TP8b2-1
Vogel, Christian	MA8a1-2	Woodbridge, Yonatan	MP5b-3
Vogel, Christian	MA8a1-3	Woodruff, David P.	TA4b-2
Volz, Ryan	TP8a3-1	Woods, Roger	MP8a1-6
Vook, Frederick	TP1a-4	Wright, John	TA5b-2
Vorobyov, Sergiy A.	TP5b-1	Wu, Hao	MA4a-1
Vosoughi, Arash	TP8b2-3	Wu, Tianyu	TA3b-2
Vouras, Peter	MP8a1-1	Xavier, Joao	TP3a-3
Vu, Phuoc	TA8b3-2	Xavier, João	TA3b-3
Vuppala, Satyanarayana	MP2a-1	Xi, Peng	MA8a1-4
Wack, David	MA8a4-2	Xi, Xuelie	MA6-3
Wagner, Kevin	TP8a1-7	Xie, Yao	MA5a-4
Wainwright, Martin	MA4b-2	Xu, Luzhou	MA8b2-7
Walk, Philipp	TP4a-2	Xue, Mengheng	TP8a1-2
Walker III, T. Owens	MP8a3-3	Yamashita, Yusaku	MP8b2-2
Walton, Marc	MA6-7	Yan, Han	WA1b-2
Wang, Ben	MP8a3-6	Yan, Wen	TP8b1-5
Wang, Chenwei	MA1-1	Yang, Bo	WA5-6
Wang, Chuang	MP4b-1	Yang, Hyun Jong	TP1b-5
Wang, Gang	WA5-6	Yang, Hyun Jong	TP2b-2
Wang, Haonan	TA8b3-6	Yang, Qianqian	MP8a2-8
Wang, Meng	MA8b2-2	Yazdandoost, Erfan	MP3b-1
Wang, Rui	WA6a-2	Yazicigil, Rabia Tugce	TA5b-2
Wang, Wei	MP8a3-6	Yener, Aylin	TP1b-2
Wang, Weiguang	TP5a-4	Yeredor, Arie	WA5-1
Wang, Xiaomeng	MP8b1-6	Yi, Chen	MA8a2-2
Wang, Xin	MP8b1-6	Yin, Dong	MP4b-2
Wang, Xin	TP8a1-3	Yin, Haifan	TA2b-1
Wang, Yi	TP1b-3	Yin, W	WA4a-3
Wang, Yu	TP6a-1	Yin, Wotao	TA3b-2
Wang, Yuan	TA8b3-6	You, Chong	TA4b-3
Ward, E. Sally	MA7b-1	You, Xiaohu	TP2a-1
Warren, Michael S.	TP6a-3	Yu, Bin	TP8b3-5
Webb, Jennifer	MA8b3-2	Yu, Qian	MP3a-1
Weiss, Amir	WA5-1	Yu, Xianghao	MA2b-1
Weiss, Stephan	TP8a3-3	Yuan, Kun	TA3b-2
Weiss, Stephan	TP8a3-4	Zahabi, Sayed Jala	TA8b3-7
Weissman, Tsachy	MA4b-3	Zamzam, Ahmed S.	WA5-7
Weller, Daniel	TA6b-4	Zeng, Ruochen	MP8b2-1
Wellig, Peter	WA7-6	Zeng, Xiao	WA6a-2
Wells, Patricia	MA8a3-3	Zhai, Yuanhao	MA6-5
Wendt, Herwig	MA6-5	Zhang, Charlie	TP1a-2
Wieruch, Dennis	TP1b-1	Zhang, Chuan	TP2a-1

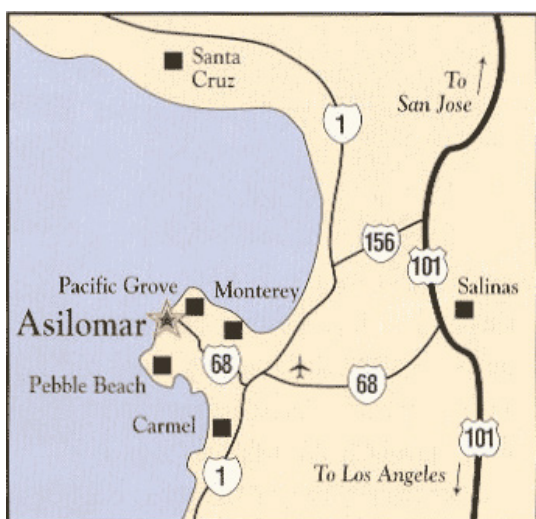
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Zhang, Jiangfan .....	MA5b-4		
Zhang, Jianshu.....	TP2b-5		
Zhang, Jun .....	MA2b-1		
Zhang, Jun .....	MP7b-4		
Zhang, Mi.....	WA6a-2		
Zhang, Shunqing.....	TP2a-1		
Zhang, Wenyi .....	MA5a-1		
Zhang, Xiaorong.....	TP8b3-3		
Zhang, Yimin.....	MP8a3-6		
Zhang, Yimin.....	WA6a-4		
Zhang, Yuanrui.....	MP8a1-6		
Zhang, Zhengya .....	TP2a-4		
Zhang, Zisheng .....	MA7b-4		
Zhao, Yi.....	TP2a-1		
Zhao, Yue .....	MA3b-1		
Zhao, Ziping .....	TP6b-2		
Zhong, Lin.....	MP1a-1		
Zhou, Jin .....	TP7b-4		
Zhu, Fengqing .....	TP6a-1		
Zhu, Hao .....	MA3b-4		
Zhu, Jingge .....	WA3b-2		
Zniyed, Yassine .....	MP8a1-5		
Zois, Daphney-Stavroula.....	WA3a-4		
Zorzi, Michele .....	MA1-4		
Zussman, Gil.....	TP7b-4		

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