Fifty-Fourth Asilomar Conference on Signals, Systems and Computers

November 1–5, 2020
Virtual Conference

Technical Co-sponsor

IEEE Signal Processing Society®

FIFTY-FOURTH ASILOMAR CONFERENCE ON SIGNALS, SYSTEMS AND COMPUTERS

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CONFERENCE COMMITTEE

*participating in his or her personal capacity

Welcome from the General Chairman

Prof. Joseph R. Cavallaro
Rice University

Welcome to the 54th Asilomar Conference on Signals, Systems, and Computers! This is a difficult year as we have by necessity gone from meeting at the beautiful Asilomar campgrounds to a new virtual format over four days. I am honored to serve as General Chair during this unusual year. Through the years, the Asilomar conference has been well known for excellent talks bringing together both senior researchers and the best and brightest young scholars. Many important research results in the area were first presented and discussed at Asilomar in the meeting rooms, in the lodge, and by the beach. The first time that I attended Asilomar was back in 1999 and every year since I make the trip to California in late October or early November.

We have an excellent technical program for you this year with contributions to both the invited and regular sessions. I would like to thank the Technical Program Chair Prof. Marco Duarte and his team of Technical Area Chairs: Ali Tajer, Mojtaba Soltanalian, Usman Khan, Chinmay Hegde, Marius Pesavento, Selin Aviyente, Liesbet Van der Perre, and Sean Ramprashad, for selecting great presentations and papers this year. They all did an outstanding job in building the program. This year the conference consists of 355 accepted papers, of which 164 were invited. Among these papers, 83 were submitted to the student paper contest, from which a list of 10 finalists were selected. These finalists will present their research via the virtual platform on Monday morning in an online discussion session chaired by Visa Koivunen to a committee of judges and to all attendees. The top three student papers will be awarded at the Tuesday morning plenary session.

I am truly pleased that this year's Sydney Parker Memorial Lecture plenary speaker on Tuesday morning will be Prof. Keshab Parhi of the University of Minnesota. Keshab is an authority on VLSI signal processing algorithms, architectures, and accelerators. His talk will present recent research in the application of signal processing and machine learning to image data related to neuroscience and brain disorders. For our second keynote lecture, we are pleased to have Prof. Katie Bouman of Caltech on Wednesday morning. Her talk will focus on the signal and image processing challenges in capturing the first image of a black hole using the Event Horizon Telescope distributed network. This talk is especially relevant as the 2020 Nobel Prize in Physics was awarded for research on the topic of black holes. I look forward to both talks on important and timely topics.

The role of General Chair for Asilomar is always an exciting adventure and this year provided new challenges. I hope that you will all enjoy the conference and find that the virtual format provides a good alternative this year when we could not meet in person.

Prof. Joseph R. Cavallaro
Rice University

Conference Steering Committee

2020 Asilomar Technical Program Committee

Technical Chairman
Prof. Marco Duarte
University of Massachusetts Amherst

2020 Asilomar Technical Program Committee Members

TRACK A: COMMUNICATIONS SYSTEMS
Prof. Ali Tajer
Rensselaer Polytechnic Institute, New York, USA
tajer@ecse.rpi.edu

TRACK B: MIMO COMMUNICATIONS AND SIGNAL PROCESSING
Prof. Mojtaba Soltanalian
University of Illinois, Chicago, USA
msol@uic.edu

TRACK C: NETWORKS
Prof. Usman Khan
Tufts University, Massachusetts, USA
khan@ece.tufts.edu

TRACK D: ADAPTIVE SYSTEMS, MACHINE LEARNING, DATA ANALYTICS
Prof. Chinmay Hegdeel
New York University, New York, USA
chinmay.h@nyu.edu

TRACK E: ARRAY PROCESSING AND MULTISENSOR SYSTEMS
Prof. Marius Pesavento
Technical University of Darmstadt, Hesse, Germany
pesavento@nt.tu-darmstadt.de

TRACK F: BIOMEDICAL SIGNAL AND IMAGE PROCESSING
Prof. Selin Aviyente
University of Minnesota, Minnesota, USA
aviyente@egr.msu.edu

TRACK G: ARCHITECTURES AND IMPLEMENTATION
Prof. Liesbet Van der Perre
Katholieke Universiteit te Leuven, Belgium
liesbet.vanderperre@kuleuven.be

TRACK H: SPEECH, IMAGE AND VIDEO PROCESSING
Dr. Sean Ramprashad
Apple
sramprashad.ieee@gmail.com

2020 Asilomar Conference Session Schedule

Monday Morning, November 2, 2020

8:00–9:30 AM Student Paper Competition

10:00–11:20 AM MORNING SESSIONS
MO1-1 Waveform Design
MO1-2 Machine Learning for Advanced Wireless Communications
MO1-3 Decentralized Learning and Optimization
MO1-4 Applications of Deep Learning I
MO1-5 Sparse Array Processing in MIMO Systems
MO1-6 Network-Level Analysis and Modeling of Neural Data
MO1-7 Architectures for Machine Learning
MO1-8 Signal and Image Processing for Visual Cultural Heritage

Monday Afternoon, November 2, 2020

1:00–2:20 PM AFTERNOON SESSIONS I
MO2-1 Modulation
MO2-2 Machine Learning for Communication Systems
MO2-3 Tensor Methods for Signal, Data, and Network Analytics
MO2-4 Applications of Deep Learning II
MO2-5 Robust Techniques for Effective Direction of Arrival Estimation
MO2-6 Signal Processing for Neural and Medical Imaging
MO2-7 Energy-Efficient solutions for neural networks and applications
MO2-8 Generative Modeling of Images and Video Challenges, Trends, and Applications

2:50–4:30 PM AFTERNOON SESSIONS II
MO3-1 Machine Learning for Wireless Resource Allocation
MO3-2 Milimeter Wave Architectures and Baseband Algorithms
MO3-3 Nonconvex Methods for High-Dimensional Estimation
MO3-4 Robustness and Efficiency in Machine Learning
MO3-5 Tensor-Based Array Signal Processing
MO3-6 Neuro-Rehabilitation and Assistive Technologies
MO3-7 Low-Resolution Sampling and Modulation
MO3-8 Reinforcement Learning and Bandits for Communication Systems

2020 Asilomar Conference Session Schedule
(continued)

Tuesday Morning, November 3, 2020

8:00–9:30 AM Conference Welcome and
Sydney Parker Memorial Lecture
Prof. Keshab K. Parhi
"Data-Drive Neuroscience, Neurology and Psychiatry: Feature Extraction, Brain Connectivity and Classification"

10:00–11:20 AM MORNING SESSIONS
TU1-1 Information Theory
TU1-2 Millimeter Wave and Beyond
TU1-3 Signals on Graphs: Filtering, Evolution, and Convergence
TU1-4 Generative Models in Computational Imaging
TU1-5 Beamforming
TU1-6 Signal Processing for Computational Genomics
TU1-7 Architectures and Arithmetic for Autonomous Sensor Modules
TU1-8 Computational Methods for Audio Processing and Enhancement

Tuesday Afternoon, November 3, 2020

1:00–2:20 PM AFTERNOON SESSIONS I
TU2-1 mm-Wave Communication
TU2-2 MIMO Communication Beyond 5G
TU2-3 Statistical Signal Processing Over Networks
TU2-4 Nonlinear Estimation
TU2-5 Radar
TU2-6 Algorithms, Learning, and Theory for Computational Imaging
TU2-7 Positioning Energy Constraint Devices
TU2-8 Neural Generative Systems for Speech Compression, Synthesis, and Enhancement

2:50–4:30 PM AFTERNOON SESSIONS II
TU3-1 Coding
TU3-2 Large Reconfigurable Intelligent Surfaces for Future Wireless Communications
TU3-3 Graph Signal Processing
TU3-4 Machine Learning in Communications
TU3-5 Robust Multi-Sensor Signal Processing: Challenges and Perspectives
TU3-6 Neuroengineering and Neural Signal Processing
TU3-7 Massive MIMO: Cell-Free and Beyond
TU3-8 Image and Video Processing and Modeling

2020 Asilomar Conference Session Schedule
(continued)

Wednesday Morning, November 4, 2020

8:00–9:30 AM Plenary: Prof. Katie Bouman
"Capturing the First Image of a Black Hole & Designing the Future of Black Hole Imaging"

10:00–11:20 AM MORNING SESSIONS
WE1-1 5G and Beyond I
WE1-2 Signal Processing for Simultaneous Transmit-Receive Systems
WE1-3 Decentralized Optimization
WE1-4 Sparsity for Nonlinear Inverse Problems
WE1-5 Learning-based Multichannel Signal Processing
WE1-6 Machine Learning for Physiological Signal Processing
WE1-7 Algorithm-Architecture Co-Design for Energy Efficient (Beyond) 5G Systems
WE1-8 Rate-Splitting and Robust Interference Management

1:00–2:20 PM AFTERNOON SESSIONS I
WE2-1 5G and Beyond II
WE2-2 Signal Processing Algorithms and Hardware for Massive MIMO
WE2-3 Wireless Networks I
WE2-4 Distributed Coding and Optimization
WE2-5 Parametric MIMO Channel Estimation
WE2-6 From Neural Networks to Neural Systems: Using AI to Decode the Brain in Health and Disease
WE2-7 Low Power and Wide Area: Implementations That Make It Happen
WE2-8 Advances in Visual Data Compression and Communication

2:50–4:30 PM AFTERNOON SESSIONS II
WE3-1 Spectrum
WE3-2 Massive MIMO Radar
WE3-3 Wireless Networks II
WE3-4 Theory of Machine Learning
WE3-5 DOA Estimation and Source Localization
WE3-6 In-Band Full Duplex Communications for Future Wireless Systems
WE3-7 Arithmetic, Algorithms, and Practicalities
WE3-8 Learning from Light: Where Computer Vision and Machine Learning Meets Optics and Imaging

2020 Asilomar Conference Session Schedule
(continued)

Thursday Morning, November 5, 2020

10:00–11:20 AM MORNING SESSIONS
TH1-1 Matrix Completion Methods for Wireless Systems
TH1-2 Optimization and Learning
TH1-3 Novel Control Algorithms for Smart Grid Applications
TH1-4 Bayesian Bounds for Stochastic Signal Recovery I
TH1-5 Sparsity-aware learning
TH1-6 Image Recovery in Computational Imaging Applications
TH1-7 Adaptive Methods I
TH1-8 Modeling and Coding of Speech, Audio, and Acoustics

1:00–2:20 PM AFTERNOON SESSIONS
TH2-1 Matrix Recovery
TH2-3 Deep Learning and Reinforcement Learning
TH2-4 Bayesian Bounds for Stochastic Signal Recovery II
TH2-5 Machine Learning Algorithms
TH2-6 Sequential Methods
TH2-7 Adaptive Methods II
TH2-8 Deep Learning Techniques for Detection and Classification in Images and Video

Student Paper Contest

Monday, November 2, 2020, 8:00–9:30 AM

Track A
Timely Updates in Distributed Computation Systems with Stragglers
Baturalp Buyukates, Sennur Ulukus

Deep Actor-Critic Learning for Distributed Power Control in Wireless Mobile Networks
Yasar Sinan Nasir, Dongning Guo

Track B
Physics-based Modeling of Large Intelligent Reflecting Surfaces for Scalable Optimization
Marzieh Najafi, Vahid Jamali, Robert Schober, Vincent H. Poor

Track C
Blind Estimation of Eigenvector Centrality from Graph Signals: Beyond Low-pass Filtering
T. Mitchell Roddenberry, Santiago Segarra

Track D
Third-order Cumulants Reconstruction from Compressive Measurements
Yanbo Wang, Zhi Tian

On Human Assisted Decision Making for Machines Using Correlated Observations
Nandan Sriranga, Baocheng Geng, Pramod Varshney

Track E
Bounds on Bearing, Symbol, and Channel Estimation Under Model Misspecification
Akshay Bondre, Touseef Ali, Christ Richmond

Track F
Optimizing Optical Compressed Sensing for Multispectral DNN-Based Image Segmentation
Yuqi Li, Yoram Bresler

Track G
LSTM Network-Assisted Belief Propagation Flip Polar Decoder
Yutai Sun, Yifei Shen, Wenqing Song, Zihao Gong, Zaichen Zhang, Xiaohu You, Chuan Zhang

Track H
A Lightweight Model for Deep Frame Prediction in Video Coding
Hyomin Choi, Ivan Bajic

2020 Asilomar Conference Session Schedule

Tuesday, November 3, 2020

Sydney Parker Memorial Lecture, 8:00–9:30 am

Data-Drive Neuroscience, Neurology and Psychiatry: Feature Extraction, Brain Connectivity and Classification

Prof. Keshab K. Parhi
University of Minnesota, USA

Abstract
Large amounts of imaging data from the brain are now available to better understand the brain and "reverse engineer" the brain. Signal processing and machine learning can unravel mysteries of the brain and can be used to diagnose various brain disorders. This talk will describe analysis of functional magnetic resonance imaging (fMRI) data collected from healthy subjects at the Center for Magnetic Resonance Research (CMRR) of the University of Minnesota (UMN) as part of the U.S. Human Connectome Project (HCP), analysis of electroencephalogram (EEG) for prediction and detection of seizures from publicly available datasets, analysis of magnetoencephalogram (MEG) data collected at the Minneapolis VA hospital from subjects with schizophrenia, and analysis of fMRI data collected at the UMN from adolescents with psychiatric disorders and healthy controls. One goal of the analysis is to extract appropriate features and design appropriate classifiers. Sub-graph entropy, a measure of static connectivity, is introduced to discover predictive subnetworks that are used to classify task vs. no-task or to discriminate two tasks from the task fMRI data collected from the healthy subjects from HCP. Tensor decomposition approach is used to extract dynamic brain connectivity and is used to predict gender and fluid intelligence of the healthy subjects from HCP. About 1% of world population suffer from epilepsy. Spectral-domain features, such as spectral powers in different bands and ratios of spectral power of two different bands extracted from EEG and intra-cranial EEG, are used to predict and detect seizures with high sensitivity and specificity. Band-power ratios of MEG during word processing task are used as features to identify subjects with schizophrenia. Resting-State fMRI data are used to design classifiers for identifying three types of psychiatric disorders among adolescents: borderline personality disorder (BPD), obsessive compulsive disorder (OCD) and major depressive disorder (MDD) using spectral-domain features and static brain connectivity. In summary, extracting appropriate biomarkers using spectral-temporal-spatial signal processing approaches and classifying states using machine learning approaches can assist clinicians in predicting and detecting various brain disorders and to understand more about the

healthy brain. These biomarkers can be tracked to design personalized therapy and effectiveness of therapy by closed-loop drug delivery or closed loop neuromodulation, i.e., brain stimulation either by invasive or non-invasive means using electrical or magnetic stimulation.

Biography

Keshab K. Parhi received the B.Tech. degree from the Indian Institute of Technology (IIT), Kharagpur, in 1982, the M.S.E.E. degree from the University of Pennsylvania, Philadelphia, in 1984, and the Ph.D. degree in EECS from the University of California, Berkeley, in 1988. He has been with the University of Minnesota, Minneapolis, since 1988, where he is currently Distinguished McKnight University Professor and Edgar F. Johnson Professor in the Department of Electrical and Computer Engineering. He has published over 650 papers, has authored the textbook VLSI Digital Signal Processing Systems (Wiley, 1999) and coedited the reference book Digital Signal Processing for Multimedia Systems (Marcel Dekker, 1999). Dr. Parhi is widely recognized for his work on high-level transformations of iterative data-flow computations and for his research on hardware accelerators for signal processing and networking systems. His current research addresses VLSI accelerators for signal processing and machine learning including deep learning, data-driven neuroscience, hardware security and molecular computing. Dr. Parhi is the recipient of numerous awards including the 2003 IEEE Kiyo Tomiyasu Technical Field Award, the 2017 Mac Van Valkenburg award, the 2012 Charles A. Desoer Technical Achievement award and the 1999 Golden Jubilee medal from the IEEE Circuits and Systems Society, and the 2004 F. E. Terman award from the American Society of Engineering Education. He served as the Editor-in-Chief of the IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS —PART I (2004-2005 term), as a distinguished lecturer for the IEEE Circuits and Systems society during 1996-1998 and 2019-2021, and was an elected member of the Board of Governors of the IEEE Circuits and Systems society from 2005 to 2007. He is a Fellow of IEEE (1996) and the AAAS (2017).

Wednesday, November 4, 2020

Keynote Address, 8:00–9:30 am

Capturing the First Image of a Black Hole & Designing the Future of Black Hole Imaging

Prof. Katie Bouman
California Institute of Technology, USA

Abstract
This talk will present the methods and procedures used to produce the first image of a black hole from the Event Horizon Telescope, as well as discuss future developments for black hole imaging. It had been theorized for decades that a black hole would leave a "shadow" on a background of hot gas. Taking a picture of this black hole shadow would help to address a number of important scientific questions, both on the nature of black holes and the validity of general relativity. Unfortunately, due to its small size, traditional imaging approaches require an Earth-sized radio telescope. In this talk, I discuss techniques the Event Horizon Telescope Collaboration has developed to photograph a black hole using the Event Horizon Telescope, a network of telescopes scattered across the globe. Imaging a black hole's structure with this computational telescope required us to reconstruct images from sparse measurements, heavily corrupted by atmospheric error. This talk will summarize how the data from the 2017 observations were calibrated and imaged, and explain some of the challenges that arise with a heterogeneous telescope array like the EHT. The talk will also discuss future developments, including how we are developing machine learning methods to help design future telescope arrays.

Biography
Katherine L. (Katie) Bouman is a Rosenberg Scholar and an assistant professor in the Computing and Mathematical Sciences and Electrical Engineering Department at the California Institute of Technology. Before joining Caltech, she was a postdoctoral fellow in the Harvard-Smithsonian Center for Astrophysics. She received her Ph.D. in the Computer Science and Artificial Intelligence Laboratory (CSAIL) at MIT in EECS. Before coming to MIT, she received her bachelor's degree in Electrical Engineering from the University of Michigan. The focus of her research is on using emerging computational methods to push the boundaries of interdisciplinary imaging.

Program of the 2020 Asilomar Conference on Signals, Systems, and Computers

Technical Program Chairman
Marco Duarte
University of Massachusetts Amherst

Session MO1-1 Waveform Design

Chair: *Lukas Landau, Pontificia Universidade Catolica do Rio de Janeiro*

MO1-1-1 Uncoded Binary Signaling through Modulo AWGN Channel — 10:00 AM
Gizem Tabak, Andrew Singer, University of Illinois at Urbana-Champaign, United States

MO1-1-2 A decision theoretic approach for waveform design in joint radar communications applications. — 10:20 AM
Shammi A Doly, Shankarachary Ragi, South Dakota School of Mines & Technology, United States; Alex Chiriyath, School of Electrical, Computer and Energy Engineering, Arizona State University, Tempe, AZ 85287, United States; Hans D. Mittelmann, Arizona State University, United States; Daniel W. Bliss, Mathematical and Statistical Sciences, Arizona State University, Tempe, AZ 85287, United States

MO1-1-3 Predistortion of OFDM Waveforms using Guard-band Subcarriers — 10:40 AM
Chance Tarver, Rice Unviersity, United States; Alexios Balatsoukas-Stimming, Eindhoven University of Technology, United States; Joseph Cavallaro, Rice University, United States

MO1-1-4 Continuous Phase Modulation With Faster-than-Nyquist Signaling for Channels With 1-bit Quantization and Oversampling at the Receiver — 11:00 AM
Rodrigo de Alencar, Lukas Landau, Pontifical Catholic University of Rio de Janeiro, Brazil

Session MO1-2 Machine Learning for Advanced Wireless Communications

Co-Chairs: *Cong Shen, University of Virginia; Mingyi Hong, University of Minnesota and Lingjia Liu, Virginia Tech*

MO1-2-1 Optimization Inspired Learning Network for Multiuser Beamforming — 10:00 AM
Minghe Zhu, Tsung-Hui Chang, The Chinese University of Hong Kong, Shenzhen, China; Mingyi Hong, University of Minnesota, United States

MO1-2-2 Learning with Knowledge of Structure: A Neural Network-Based Approach for MIMO-OFDM Detection — 10:20 AM
Zhou Zhou, Shashank Jere, Virginia Tech, United States; Lizhong Zheng, Massachusetts Institute of Technology, United States; Lingjia Liu, Virginia Tech, United States

MO1-2-3 Downlink Channel Feedback in FDD Massive MIMO Systems via Tensor Compression and Sampling — 10:40 AM
Mohamed Salah Ibrahim, University of Virginia, United States; Charilaos Kanatsoulis, University of Minnesota, United States; Nicholas D. Sidiropoulos, University of Virginia, United States

MO1-2-4 Thresholded Wirtinger Flow for Fast Millimeter Wave Beam Alignment 11:00 AM
Chao Gan, Jing Yang, The Pennsylvania State University, United States; Cong Shen, University of Virginia, United States

Session MO1-3 Decentralized Learning and Optimization

Chair: *Andrea Simonetto, IBM*

MO1-3-1 Learning-based Adaptive Quantization for Communication-efficient Distributed Optimization with ADMM 10:00 AM
Truong Nghiem, Northern Arizona University, United States; Aldo Duarte, Shuangqing Wei, Louisiana State University, United States

MO1-3-2 Privacy-Preserving Distributed Learning with Non-Smooth Objective Functions 10:20 AM
François Gauthier, Cristiano Gratton, Naveen Venkategowda, Stefan Werner, Norwegian University of Science and Technology, Norway

MO1-3-3 Distributed Prediction-Correction ADMM for Time-Varying Convex Optimization 10:40 AM
Nicola Bastianello, University of Padova, Italy; Andrea Simonetto, IBM Research Ireland, Ireland; Ruggero Carli, University of Padova, Italy

MO1-3-4 Conservative Multi-agent Online Kernel Learning in Heterogeneous Networks 11:00 AM
Hrusikesha Pradhan, Indian Institute of Technology Kanpur, India; Amrit Singh Bedi, Alec Koppel, US Army Research Laboratory, Adelphi, United States; Ketan Rajawat, Indian Institute of Technology Kanpur, India

Session MO1-4 Applications of Deep Learning I

Chair: *Chinmay Sahu, Clarkson U*

MO1-4-1 Spatiotemporal Convolutional LSTM for Radar Echo Extrapolation 10:00 AM
Shuxin Zhong, Xianxin Zeng, Qing Ling, Sun Yat-Sen University, China; Qiushi Wen, Weiguang Meng, Yerong Feng, Guangzhou Institute of Tropical and Marine Meteorology, China

MO1-4-2 A novel distance-based algorithm for multi-user classification in keystroke dynamics 10:20 AM
Chinmay Sahu, Mahesh Banavar, Stephanie Schuckers, Clarkson University, United States

MO1-4-3 FuSSI-Net: Fusion of Spatio-temporal Skeletons for Intention Prediction Network 10:40 AM
Francesco Piccoli, Rajarathnam Balakrishnan, Maria Jesus Perez, Moraldeepsingh Sachdeo, Carlos Nuñez, Matthew Tang, University of California, Berkeley, United States; Kajsa Andreasson, Kalle Bjurek, Ria Dass Raj, Ebba Davidsson, Colin Eriksson, Victor Hagman, Jonas Sjöberg, Chalmers University of Technology, Sweden; Ying Li, Volvo Cars Technology, United States; L. Srikar Muppirisetty, Volvo Cars Corporation, Sweden; Sohini Roychowdhury, Volvo Cars Technology, United States

MO1-4-4 Disentangling high energy chorus elements against structured background interference in the Van Allen radiation belts using braid manifolds 11:00 AM
Ananya Sen Gupta, Ryan McCarthy, Craig Kletzing, Kawther Rouabhi, Ivar Christopher, University of Iowa, United States

Session MO1-5 Sparse Array Processing in MIMO Systems

Co-Chairs: *Christopher Mecklenbrauker, TU Vienna and Peter Gerstoft, University of California San Diego*

MO1-5-1 Sequential sparse Bayesian learning for DOA 10:00 AM
YONGSUNG PARK, FLORIAN MEYER, PETER GERSTOFT, University of California, San Diego, United States

MO1-5-2 Sparse MIMO synthetic aperture sonar processing with distributed optimization 10:20 AM
Angeliki Xenaki, Yan Pailhas, Roberto Sabatini, Centre for Maritime Research and Experimentation, Italy

MO1-5-3 Robust Multibeam Interference Cancellation Using Atomic Norm Minimization 10:40 AM
Shuang Li, Daniel Gaydos, Payam Nayeri, Michael Wakin, Colorado School of Mines, United States

MO1-5-4 Sparse Approximation of an Outdoor-to-Indoor Massive MIMO Channel Measurement 11:00 AM
Herbert Groll, Daniel Schützenöfer, Stefan Pratschner, TU Wien, Austria; Peter Gerstoft, University of California San Diego, United States; Christoph F. Mecklenbräuker, TU Wien, Austria

Session MO1-6 Network-Level Analysis and Modeling of Neural Data

Chair: *Behtash Babadi, University of Maryland*

MO1-6-1 Inferring neural dynamics during burst-suppression using a neurophysiology-inspired switching state-space model 10:00 AM
Sourish Chakravarty, Gabriel Schamberg, Taylor Baum, Emery Brown, Massachusetts Institute of Technology, United States

MO1-6-2 The population map of changes in the spatiotemporal sensitivity of visual neurons across saccadic eye movements 10:20 AM
Manish Roy, Amir Akbarian, Behrad Noudoost, Neda Nategh, University of Utah, United States

MO1-6-3 Adaptive frequency-domain Granger causal inference from neuronal ensemble data 10:40 AM
Anuththara Rupasinghe, Shoutik Mukherjee, Behtash Babadi, University of Maryland, United States

MO1-6-4 Time-varying graph analysis comparing speech perception in healthy and aphasic brains 11:00 AM
Sudha Yellapantula, Colin Noe, Simon Fischer-Baum, Behnaam Aazhang, Rice University, United States

Session MO1-7 Architectures for Machine Learning

Chair: *Liesbet Van der Perre, KU Leuven*

MO1-7-1 Low-complexity Neural Network-based MIMO Detector using Permuted Diagonal Matrix 10:00 AM
Siyu Liao, Chunhua Deng, Yi Xie, Rutgers University, United States; Lingjia Liu, Virginia Tech, United States; Bo Yuan, Rutgers University, United States

MO1-7-2 FPGA Implementation of Q-RTS for Real-Time Swarm Intelligence systems 10:20 AM
Gian Carlo Cardarilli, Luca Di Nunzio, Rocco Fazzolari, Daniele Giardino, Marco Matta, University of Rome Tor Vergata, Italy; Alberto Nannarelli, Technical University of Denmark, Denmark; Marco Re, Sergio Spanò, University of Rome Tor Vergata, Italy

MO1-7-3 VLSI Hardware Architecture for Gaussian Process 10:40 AM
Chunhua Deng, Yongbin Gong, Feng Han, Siyu Liao, Jingang Yi, Bo Yuan, Rutgers University, China

MO1-7-4 A Neural Network Engine for Resource Constrained Embedded Systems 11:00 AM
Zuzana Jelčicová, Demant A/S; Technical University of Denmark (DTU), Denmark; Adrian Mardari, Oskar Andersson, Evangelia Kasapaki, Demant A/S, Denmark; Jens Sparsø, Technical University of Denmark (DTU), Denmark

Session MO1-8 Signal and Image Processing for Visual Cultural Heritage

Co-Chairs: *Paul Messier, Yale University and Andy Klein, Western Washington University*

MO1-8-1 Steerable Pyramid for Texture Classification of Photographic Paper 10:00 AM
Nicholas Rogers, Damon Crockett, Paul Messier, IPCH Lens Media Lab, United States

MO1-8-2 Multiscale anisotropic analysis for assessment of similarity between Arches papers in selected Matisse lithographs 10:20 AM
Patrice ABRY, Stephane ROUX, CNRS - ENS Lyon, France; Paul MESSIER, Institute for the Preservation of Cultural Heritage, Yale University, United States; Margaret HOLBEN, Stephane JAFFARD, Institute of Fine Arts, New York University, United States

MO1-8-3 Semi-Supervised Convolutional Triplet Neural Networks for Assessing Paper Texture Similarity 10:40 AM
Leah Lackey, Arick Grootveld, Andrew Klein, Western Washington University, United States

Session MO2-1 Modulation

Chair: *Giovanni Minelli, Naval Postgraduate School*

MO2-1-1 Spectral Correlation Based Detection of GFSK Modulated LEO Satellite Signals at Very Low SINR 1:00 PM
Jonas Hofmann, Andreas Knopp, Bundeswehr University Munich, Germany; Chad Spooner, NorthWest Research Associates, United States; Giovanni Minelli, James Newman, Naval Postgraduate School, United States

MO2-1-2 Optimizing Convolutional Neural Networks to Identify Distorted M-ary CPFSK Signals with RRC Pulse Shaped Instantaneous Frequency 1:20 PM
Ambaw Ambaw, George Washington University, United States; Mohammad Bari, T-Mobile, Headquarters, United States; Milos Doroslovacki, George Washington University, United States

MO2-1-3 OVER THE AIR PERFORMANCE OF DEEP LEARNING FOR MODULATION CLASSIFICATION ACROSS CHANNEL CONDITIONS 1:40 PM
Venkatesh Sathyanarayanan, Mark Wagner, Peter Gerstoft, UCSD, United States

MO2-1-4 Enhanced Automatic Modulation Classification using Deep Convolutional Latent Space Pooling 2:00 PM
Clayton Harper, Lauren Lyons, Mitchell Thornton, Eric Larson, Darwin Deason Institute, United States

Session MO2-2 Machine Learning for Communication Systems

Co-Chairs: *Harpreet Dhilon, Virginia Tech and Ahmed Alkhateeb, Arizona State University*

MO2-2-1 End-to-End Learning of Neuromorphic Wireless Systems for Low-Power Edge Artificial Intelligence 1:00 PM
Nicolas Skatchkovsky, Hyeryung Jang, Osvaldo Simeone, King's College London, United Kingdom

MO2-2-2 Vision Aided URLL Communications: Proactive Service Identification and Coexistence 1:20 PM
Muhammad Alrabeiah, Umut Demirhan, Andrew Hredzak, Ahmed Alkhateeb, Arizona State University, United States

MO2-2-3 Wideband Signal Localization with Spectral Segmentation 1:40 PM
Nathan West, Tamoghna Roy, Tim O'Shea, DeepSig Inc, United States

MO2-2-4 Learning on a Grassmann Manifold: CSI Quantization for Massive MIMO Systems 2:00 PM
Keerthana Bhogi, Chiranjib Saha, Harpreet S. Dhillon, Virginia Tech, United States

Session MO2-3 Tensor Methods for Signal, Data, and Network Analytics

Co-Chairs: *Xiao Fu, Oregon State University; Panos Markopoulos, Rochester Institute of Technology and Ahmed Zamzam, NREL*

MO2-3-1 Algorithms for nonnegative tensor factorization 1:00 PM
Michiel Vandecappelle, Stijn Hendrikx, Lieven De Lathauwer, KU Leuven, Belgium

MO2-3-2 C^3APTION: Constraint Coupled CP And PARAFAC2 Tensor Decomposition 1:20 PM
Ekta Gujral, University of California, Riverside, United States; Georgios Theocharous, Adobe Inc, United States; Evangelos E. Papalexakis, University of California, Riverside, United States

MO2-3-3 Multi-Area Model-Free State Estimation via Distributed Tensor Decomposition 1:40 PM
Yajing Liu, Ahmed S. Zamzam, Andrey Bernstein, National Renewable Energy Laboratory, United States

MO2-3-4 Supervised Learning via Ensemble Tensor Completion 2:00 PM
Nikos Kargas, University of Minnesota, United States; Nicholas D. Sidiropoulos, University of Virginia, United States

Session MO2-4 Applications of Deep Learning II

Chair: *Scott Acton, University of Virginia*

MO2-4-1 A Deep Learning-Aided Approach to Portfolio Design for Financial Index Tracking 1:00 PM
Zepeng Zhang, Ziping Zhao, Shanghaitech University, China

MO2-4-2 UPR: A Model-Driven Architecture for Deep Phase Retrieval 1:20 PM
Naveed Naimipour, Shahin Khobahi, Mojtaba Soltanalian, University of Illinois at Chicago, United States

MO2-4-3 Complexity Analysis and u-net Based Segmentation of Meningeal Lymphatic Vessels 1:40 PM
Nazia Tabassum, Michael Ferguson, Jasmin Herz, Scott Acton, University of Virginia, United States

MO2-4-4 Detecting Adversarial Images via Texture Analysis 2:00 PM
Weiheng Chai, Senem Velipasalar, Syracuse University, United States

Session MO2-5 Robust Techniques for Effective Direction of Arrival Estimation

Co-Chairs: *Wei Liu, University of Sheffield and Piya Pal, University of California San Diego*

MO2-5-1 A Fast Group Sparsity Based Phase Retrieval Algorithm for Non-Coherent DOA Estimation 1:00 PM
Zhengyu Wan, Wei Liu, University of Sheffield, United Kingdom

MO2-5-2 Non-Redundant Sparse Array with Flexible Aperture 1:20 PM
Ammar Ahmed, Yimin D. Zhang, Temple University, United States

MO2-5-3 Co-Array Based DoA Estimation Under Angle-Independent Nonidealities 1:40 PM
Robin Rajamäki, Visa Koivunen, Aalto University, Finland

MO2-5-4 Robust DOA and Subspace Estimation for Hybrid Channel Sensing 2:00 PM
Pulak Sarangi, Sina Shahsavari, Piya Pal, University of California, San Diego, United States

Session MO2-6 Signal Processing for Neural and Medical Imaging

Chair: *Milos Doroslovacki, George Washington University*

MO2-6-1 Graph Laplacian-based Tumor Segmentation and Denoising in Brain Magnetic Resonance Imaging 1:00 PM
Adnan Hanif, Milos Doroslovacki, The George Washington University, United States

MO2-6-2 Joint Estimation of Hemodynamic Response and Stimulus Function in Functional Ultrasound Using Convolutive Mixtures 1:20 PM
Aybüke Erol, Delft University of Technology, Netherlands; Simon Van Eyndhoven, Katholieke Universiteit Leuven, Belgium; Sebastiaan Koekkoek, Pieter Kruizinga, Erasmus Medical Center, Netherlands; Borbala Hunyadi, Delft University of Technology, Netherlands

MO2-6-3 Hieroglyph: Hierarchical Glia Graph Skeletonization and Matching 1:40 PM
Tiffany Ly, Tamal Batabyal, Jeremy Thompson, Tajie Harris, Daniel Weller, Scott Acton, University of Virginia, United States

MO2-6-4 VBET: VESSELNESS AND BLOB ENHANCEMENT TECHNIQUE FOR 2D AND 3D MICROSCOPY IMAGES OF MICROGLIA 2:00 PM
Tanjin Taher Toma, Kanchan Bisht, Ukpong Eyo, Daniel Weller, University of Virginia, United States

Session MO2-7 Energy-Efficient solutions for neural networks and applications

Co-Chairs: *Youngjoo Lee, POSTECH and Yanxiang Huang, NVIDIA*

MO2-7-1 Hierarchical Approximate Memory for Deep Neural Network Applications 1:00 PM
Minho Ha, Pohang University of Science and Technology, Republic of Korea; Seokha Hwang, Samsung Electronics, Republic of Korea; Jeonghun Kim, Youngjoo Lee, Sunggu Lee, Pohang University of Science and Technology, Republic of Korea

MO2-7-2 Deep Learning Based MIMO Channel Prediction: An Initial Proof of Concept Prototype 1:20 PM
Jayden Booth, Ahmed Ewaisha, Andreas Spanias, Ahmed Alkhateeb, Arizona State University, United States

MO2-7-3 An Energy-Efficient Deep Neural Network Accelerator Design 1:40 PM
Jooeun Jung, Kyuho Lee, UNIST, Republic of Korea

MO2-7-4 A REVIEW OF ON-DEVICE FULLY NEURAL END-TO-END AUTOMATIC SPEECH RECOGNITION ALGORITHMS 2:00 PM
Chanwoo Kim, Kwangyoun Kim, Dhananjaya Gowda, Jiyeon Kim, Changwoo Han, Dongsoo Lee, Samsung Research, Republic of Korea

Session MO2-8 Generative Modeling of Images and Video: Challenges, Trends, and Applications

Co-Chairs: *Rushil Anirudh, Lawrence Livermore National Lab and Jayaraman Thiagarajan, Lawrence Livermore National Lab*

MO2-8-1 Solving Linear PDEs with Generative Models 1:00 PM
Ameya Joshi, New York University, United States; Biswajit Khara, Soumik Sarkar, Baskar Ganapathysubramanian, Iowa State University, United States; Chinmay Hegde, New York University, United States

MO2-8-2 Explaining Deep Neural Networks using Disentangled Generative Models 1:20 PM
Prasanna Sattigeri, IBM Research, United States; Jayaraman Thiagarajan, LLNL, United States

MO2-8-3 Partial Domain Adaptation Using Selective Representation Learning For Class-Weight Computation 1:40 PM
Sandipan Choudhuri, Riti Paul, Arunabha Sen, Baoxin Li, Hemanth Venkateswara, Arizona State University, United States

MO2-8-4 Generative Models with Low-Rank Tensor Factorization 2:00 PM
Rakib Hyder, M. Salman Asif, University of California, Riverside, United States

Session MO3-1 Machine Learning for Wireless Resource Allocation

Co-Chairs: *Alejandro Ribeiro, University of Pennsylvania and Mark Eisen, Intel*

MO3-1-1 Deep Learning for Scalable Wireless Resource Allocation: Which Model to Use? 2:50 PM
Yifei Shen, The Hong Kong University of Science and Technology, Hong Kong SAR of China; Jun Zhang, The Hong Kong Polytechnic University, Hong Kong SAR of China; Shenghui Song, B. Khaled Letaief, The Hong Kong University of Science and Technology, Hong Kong SAR of China

MO3-1-2 Importance- and Channel-Aware Scheduling in Cellular Federated Edge Learning 3:10 PM
Jinke Ren, Yinghui He, Zhejiang University, China; Dingzhu Wen, The University of Hong Kong, China; Guanding Yu, Zhejiang University, China; Kaibin Huang, The University of Hong Kong, China; Dongning Guo, Northwestern University, United States

MO3-1-3 Decentralized Wireless Resource Allocation with Graph Neural Networks 3:30 PM
Zhiyang Wang, University of Pennsylvania, United States; Mark Eisen, Intel Corporation, United States; Alejandro Ribeiro, University of Pennsylvania, United States

MO3-1-4 A Combinatorial Bandit Approach to UAV-aided Edge Computing 3:50 PM
Bochun Wu, Fudan University, China; Tianyi Chen, Rensselaer Polytechnic Institute, United States; Xin Wang, Fudan University, China

Session MO3-2 Milimeter Wave Architectures and Baseband Algorithms

Chair: *Christoph Studer, ETH Zurich*

MO3-2-1 Millimeter-Wave Massive MIMO Testbed with Hybrid Beamforming 2:50 PM
MinKeun Chung, Liang Liu, Andreas Johansson, Martin Nilsson, Lund University, Sweden; Olof Zander, Zhinong Ying, Sony Research Center, Sweden; Fredrik Tufvesson, Ove Edfors, Lund University, Sweden

MO3-2-2 Frequency Synchronization for Low Resolution Millimeter-Wave 3:10 PM
Ryan Dreifuerst, Robert Heath, University of Texas at Austin, United States; Mandar Kulkarni, Jianzhong (Charlie) Zhang, Samsung Research America, United States

MO3-2-3 Distributed Massive MIMO Through 1-bit Sigma-Delta Radio Over Fiber 3:30 PM
Lise Aabel, Ericsson, Sweden; Ibrahim Can Sezgin, Sven Jacobsson, Giuseppe Durisi, Christian Fager, Chalmers, Sweden

MO3-2-4 Power Efficient Multi-Carrier Baseband Processing for 5G and 6G Wireless 3:50 PM
Panagiotis Skrimponis, NYU Tandon School of Engineering, United States; Seyed Hadi Mirfarshbafan, Christoph Studer, Cornell Tech, United States; Sundeep Rangan, NYU Tandon School of Engineering, United States

Session MO3-3 Nonconvex Methods for High-Dimensional Estimation

Co-Chairs: *Yue Lu, Harvard University and Ran Xin, Carnegie Mellon University*

MO3-3-1 Decentralized stochastic algorithms for non-convex finite-sum minimization 2:50 PM
Ran Xin, Soummya Kar, CMU, United States; Usman Khan, Tufts, United States

MO3-3-2 Analysis of the Optimization Landscapes for Overcomplete Representation Learning 3:10 PM
Qing Qu, New York University, Center for Data Science, United States; Yuexiang Zhai, UC Berkeley, United States; Xiao Li, CUHK, China; Yuqian Zhang, Rutgers, United States; Zhihui Zhu, University of Denver, United States

MO3-3-3 A Sharp Asymptotic Analysis of Learning with Random Orthogonal Features 3:30 PM
Oussama Dhifallah, Yue M. Lu, Harvard University, United States

Session MO3-4 Robustness and Efficiency in Machine Learning

Chair: *Paul Rodriguez, PUCP*

MO3-4-1 Least squares estimation in In-memory Architectures 2:50 PM
Chandrasekhar Radhakrishnan, Sujan Gonugondla, University of Illinois, Urbana-Champaign, United States

MO3-4-2 Memory-Rate Tradeoff for Caching with Uncoded Placement under Nonuniform File Popularity 3:10 PM
Yong Deng, Min Dong, Ontario Tech University, Canada

MO3-4-3 Robustifying FISTA via the infinity norm of its smooth component's gradient 3:30 PM
Paul Rodriguez, PUCP, Peru

MO3-4-4 Unsupervised Mode Extraction and Group Velocity Estimation for Ultrasonic Guided Waves Propagating in Dispersive Material 3:50 PM
Javaid Ikram, Intel Corporation, United States; Aditi Chattopadhyay, Antonia Papandreou-Suppappola, Arizona State University, United States

Session MO3-5 Tensor-Based Array Signal Processing

Chair: *Martin Haardt, TU Ilmenau*

MO3-5-1 Nonnegative CPD of fiber-wise sampled tensors 2:50 PM
Stijn Hendrikx, KU Leuven, Belgium; Mikael Sorensen, University of Virginia, United States; Lieven De Lathauwer, KU Leuven, Belgium

MO3-5-2 Low-Complexity Massive MIMO Tensor Precoding 3:10 PM
Lucas Nogueira Ribeiro, TU Ilmenau, Germany; Stefan Schwarz, TU Wien, Austria; André Lima Férrer de Almeida, Federal University of Ceará, Brazil; Martin Haardt, TU Ilmenau, Germany

MO3-5-3 Recovering Joint PMF from Pairwise Marginals 3:30 PM
Shahana Ibrahim, Xiao Fu, Oregon State University, United States

MO3-5-4 Learning Polynomial Neural Network via Low Rank Tensor Recovery 3:50 PM
Mehmet Can Hucumenoglu, Piya Pal, University of California, San Diego, United States

Session MO3-6 Neuro-Rehabilitation and Assistive Technologies

Chair: *Arash Mohammadi, Concordia University*

MO3-6-1 Adaptive approaches for chronic selective electroneurographic recordings 2:50 PM
Stephen Sammut, University of Toronto, Canada; José Zariffa, Toronto Rehabilitation Institute - University Health Network, Canada

MO3-6-2 Hybrid Deep Neural Networks for Sparse Surface EMG-Based Hand Gesture Recognition 3:10 PM
Elahe Rahimian, Soheil Zabihi, Amir Asif, Arash Mohammadi, Concordia University, Canada

MO3-6-3 Decoding neural activity to anticipate eye movements 3:30 PM
Neda Nategh, University of Utah, United States

MO3-6-4 Wearable Multichannel Multimodal Dynamomyography for Motion Intention Detection 3:50 PM
S. Atashzar, New York University, United States

Session MO3-7 Low-Resolution Sampling and Modulation

Chair: *Rodrigo C. de Lamare, Pontifical Catholic University of Rio de Janeiro*

MO3-7-1 Spatial Sigma-Delta Massive MIMO: Improved Channel Estimation and Achievable Rates 2:50 PM
Shilpa Rao, Hessam Pirzadeh, University of California, Irvine, United States; Gonzalo Seco-Granados, Universitat Autonoma de Barcelona, Spain; A. Lee Swindlehurst, University of California, Irvine, United States

MO3-7-2 Comparator Network Aided Detection for MIMO Receivers with 1-Bit Quantization 3:10 PM
Ana Beatriz L. B. Fernandes, Zhichao Shao, Lukas T. N. Landau, Rodrigo C. de Lamare, Pontifical Catholic University of Rio de Janeiro, Brazil

MO3-7-3 Hardware-Friendly Two-Stage Spatial Equalization for All-Digital mmWave Massive MU-MIMO 3:30 PM
Oscar Castañeda, Cornell Tech, United States; Sven Jacobsson, Ericsson Research, Sweden; Giuseppe Durisi, Chalmers University of Technology, Sweden; Tom Goldstein, University of Maryland, College Park, United States; Christoph Studer, Cornell Tech, United States

MO3-7-4 Learning a Low-Complexity Channel Estimator for One-Bit Quantization 3:50 PM
Benedikt Fesl, Michael Koller, Nurettin Turan, Wolfgang Utschick, Technische Universität München, Germany

Session MO3-8 Reinforcement Learning and Bandits for Communication Systems

Chair: *Tianyi Chen, Rensslaer Polytechnic Institute*

MO3-8-1 Deep Actor-Critic Learning for Distributed Power Control in Wireless Mobile Networks 2:50 PM
Yasar Sinan Nasir, Dongning Guo, Northwestern University, United States

MO3-8-2 Adaptive MIMO Antenna Selection via Deep Learning and Submodular Optimization 3:10 PM
Cong Shen, University of Virginia, United States; Donghao Li, University of Science and Technology of China, China; Jing Yang, Pennsylvania State University, United States

MO3-8-3 Cooperative perception in Vehicular Networks using Multi-Agent Reinforcement Learning 3:30 PM
Mohamed K. Abdel-Aziz, Sumudu Samarakoon, University of Oulu, Finland; Cristina Perfecto, University of the Basque Country, Spain; Mehdi Bennis, University of Oulu, Finland

MO3-8-4 Network Performance Adaptation in Wireless Control with Reinforcement Learning 3:50 PM
Mark Eisen, Arjun KG, Amit S. Baxi, Dave Cavalcanti, Intel Corporation, United States

Session TU1-1 Information Theory

Chair: *Ali Tajer, Rensslaer Polytechnic Institute*

TU1-1-1 Timely Updates in Distributed Computation Systems with Stragglers 10:00 AM
Baturalp Buyukates, Sennur Ulukus, University of Maryland, United States

TU1-1-2 Maximizing Information Freshness in Caching Systems with Limited Cache Storage Capacity 10:20 AM
Melih Bastopcu, Sennur Ulukus, University of Maryland, United States

TU1-1-3 Nonasymptotic bounds via causal coding on scalar-valued Gauss-Markov sources with MSE Distortion and causal side information 10:40 AM
Photios Stavrou, Mikael Skoglund, KTH Royal Institute of Technology, Sweden

TU1-1-4 Increasing the Raw Key Rate in Energy-Time Entanglement Based Quantum Key Distribution 11:00 AM
Esmaeil Karimi, Texas A&M University, United States; Emina Soljanin, Rutgers University, United States; Philip Whiting, Macquarie University, Australia

Session TU1-2 Millimeter Wave and Beyond

Chair: *Ahmed Alkhateeb, Arizona State University*

TU1-2-1 Impact of Hand Blockage on Form-Factor Millimeter Wave User Equipment Design 10:00 AM
Vasanthan Raghavan, Ali Tassoudji, Yu-Chin Ou, Ozge Koymen, Junyi Li, Qualcomm, United States

TU1-2-2 Energy-Efficient Analog Beamforming with Short Packets in Millimeter-Wave MIMO Systems 10:20 AM
Jordi Borras, Francesc Molina, Technical University of Catalonia, Spain; Roberto Lopez-Valcarce, atlanTTic Research Center, University of Vigo, Spain; Josep Sala-Alvarez, Technical University of Catalonia, Spain

TU1-2-3 Reinforcement Learning for Beam Pattern Design in Millimeter Wave and Massive MIMO Systems 10:40 AM
Yu Zhang, Muhammad Alrabeiah, Ahmed Alkhateeb, Arizona State University, United States

TU1-2-4 Antenna Selection for Upper Millimeter Wave and THz Bands 11:00 AM
Vasanthan Raghavan, Tao Luo, Ozge Koymen, Junyi Li, Qualcomm, United States

Session TU1-3 Signals on Graphs: Filtering, Evolution, and Convergence

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

TU1-3-1 Finite-time in-network computation of linear transforms 10:00 AM
Soummya Kar, Carnegie Mellon University, United States; Markus Püschel, ETH Zürich, Switzerland; José Moura, Carnegie Mellon University, United States

TU1-3-2 Node-Asynchronous Implementation of Filter Banks on Graphs 10:20 AM
Oguzhan Teke, P. P. Vaidyanathan, California Institute of Technology, United States

TU1-3-3 Blind Estimation of Eigenvector Centrality from Graph Signals: Beyond Low-pass Filtering 10:40 AM
T. Mitchell Roddenberry, Santiago Segarra, Rice University, United States

TU1-3-4 Graph-aided Online Learning with Expert Advice 11:00 AM
Pouya M. Ghari, Yanning Shen, University of California, Irvine, United States

Session TU1-4 Generative Models in Computational Imaging

Chair: *Salman Asif, University of California Riverside*

TU1-4-1 Improving the Robustness of DNN-Based Image Reconstruction using a Generative Model for Adversarial Attacks 10:00 AM
Ankit Raj, Yoram Bresler, University of Illinois at Urbana-Champaign, United States

TU1-4-2 Deep S3PR: Simultaneous Source Separation and Phase Retrieval Using Deep Generative Models 10:20 AM
Christopher Metzler, Gordon Wetzstein, Stanford University, United States

TU1-4-3 Image reconstruction for MRI using deep CNN priors trained without ground truth 10:40 AM
Weijie Gan, Cihat Eldeniz, Jiaming Liu, Shihao Chen, Hongyu An, Ulugbek Kamilov, Washington University in St. Louis, United States

TU1-4-4 Solving Phase Retrieval with a Learned Reference 11:00 AM
Rakib Hyder, Zikui Cai, M. Salman Asif, University of California, Riverside, United States

Session TU1-5 Beamforming

Chair: *Kathleen E. Wage, George Mason University*

TU1-5-1 Joint Precoding and Scheduling Optimization in Downlink Multicell Satellite Communications 10:00 AM
Yimin Zhang, Temple University, United States; Khanh Pham, Air Force Research Laboratory, United States

TU1-5-2 A Nonlinear Relay Scheme Resilient to Interference with Unknown CSI 10:20 AM
Rui Wang, Yi Jiang, Fudan University, China

TU1-5-3 Random Matrix Theory Analysis of the Dominant Mode Rejection Beamformer White Noise Gain with Overestimated Rank 10:40 AM
Christopher Hulbert, Kathleen Wage, George Mason University, United States

TU1-5-4 ITERATIVE MMSE SPACE-TIME ZERO-CROSSING PRECODING FOR CHANNELS WITH 1-BIT QUANTIZATION AND OVERSAMPLING 11:00 AM
Diana M. V. Melo, Lukas T. N. Landau, Pontifical Catholic University of Rio de Janeiro, Brazil; Lucas N. Ribeiro, Martin Haardt, Ilmenau University of Technology, Germany

Session TU1-6 Signal Processing for Computational Genomics

Chair: *Gail Rosen, Drexel University*

TU1-6-1 Network-Based RNA Structural Alignment Through Optimal Local Neighborhood Matching 10:00 AM
Hyun-Myung Woo, Byung-Jun Yoon, Texas A&M University, United States

TU1-6-2 Visualizing and Annotating Protein Sequences using Deep Neural Network 10:20 AM
Zhengqiao Zhao, Gail Rosen, Drexel University, United States

TU1-6-3 Novel structural variant genome detection through negative binomial optimization 10:40 AM
Mario Banuelos, California State University, Fresno, United States; Suzanne Sindi, Roummel Marcia, University of California, Merced, United States

TU1-6-4 Spatiotemporal Tracking of SARS-CoV-2 Variants using informative subtype markers and association graphs 11:00 AM
Ananya Sen Gupta, University of Iowa, United States; Gail Rosen, Drexel University, United States

Session TU1-7 Architectures and Arithmetic for Autonomous Sensor Modules

Chair: *Stijn Wielandt, Lawrence Berkeley National Laboratory,*

TU1-7-1 Autonomous Low Power Wide Area Networks for Environmental Monitoring of Remote Field Sites 10:00 AM
Stijn Wielandt, Baptiste Dafflon, Lawrence Berkeley National Laboratory, United States

TU1-7-2 On Reducing Signal Activities in Arithmetic Operations: A Left-to-Right Approach 10:20 AM
Milos Ercegovac, Cmptr Sci, United States

TU1-7-3 An Architecture for Improving Variable Radix Real and Complex Division Using Recurrence Division 10:40 AM
Brett Mathis, James Stine, Oklahoma State University, United States; Miloš Ercegovac, University of California, Los Angeles, United States; Jean-Michel Muller, CNRS-Laboratoire LIP, France

TU1-7-4 Adaptive Systems Benefiting Adaptive Humans 11:00 AM
Ali Moin, Jan Rabaey, University of California, Berkeley, United States

Session TU1-8 Computational Methods for Audio Processing and Enhancement

Co-Chairs: *Gerald Schuller, TU Ilmenau and Stylianos Ioannis Mimilakis, Fraunhofer IDMT*

TU1-8-1 Learning to separate sounds from weakly labeled scenes 10:00 AM
Fatemeh Pishdadian, Northwestern University, United States; Gordon Wichern, Jonathan Le Roux, Mitsubishi Electric Research Laboratories (MERL), United States

TU1-8-2 Probabilistic Optimization for Source Separation 10:20 AM
Gerald Schuller, Oleg Golokolenko, Ilmenau University of Technology, Germany

TU1-8-3 Multi-resolution Common Fate Transform: a bio-inspired audio representation 10:40 AM
Fatemeh Pishdadian, Bryan Pardo, Northwestern University, United States

Session TU2-1 mm-Wave Communication

Chair: *Mingyue Ji, University of Utah*

TU2-1-1 A Stochastic Optimization Framework for Distributed Beam Scheduling in 5G mm-Wave Networks over non-cooperative Operators 1:00 PM
Xiang Zhang, Shamik Sarkar, University of Utah, United States; Arupjyoti Bhuyan, Idaho National Laboratory, United States; Sneha Kasera, Mingyue Ji, University of Utah, United States

TU2-1-2 Enabling Uncoordinated Spectrum Sharing in Millimeter Wave Networks Using Carrier Sensing 1:20 PM
Shamik Sarkar, Xiang Zhang, University of Utah, United States; Arupjyoti Bhuyan, Idaho National Labs, United States; Mingyue Ji, Sneha Kasera, University of Utah, United States

TU2-1-3 Multi-user Beam Alignment for Millimeter Wave Systems in Multi-path Environments 1:40 PM
Mohammad A. (Amir) Khojastepour, NEC Laboratories America, Inc., United States; Shahram Shahsavari, University of Waterloo, United States; Abbas Khalili, Elza Erkip, New York University, United States

TU2-1-4 Reducing Hardware Requirements and Computational Effort for Automotive OFDM Radar Systems 2:00 PM
Oliver Lang, Johannes Kepler University Linz, Austria; Alexander Onic, LeddarTech Inc., Austria; Christian Schmid, Infineon Technologies Austria AG, Austria; Reinhard Feger, Mario Huemer, Johannes Kepler University Linz, Austria

Session TU2-2 MIMO Communication Beyond 5G

Co-Chairs: *Emil Björnson, Linköping University and Luca Sanguinetti, University of Pisa*

TU2-2-1 Parallel Interference Cancellation for Cell-Free C-RANs 1:00 PM
Reza Mosayebi, Mohammad Mojahedian, Angel Lozano, Univ. Pompeu Fabra, Spain

TU2-2-2 Physics-based Modeling of Large Intelligent Reflecting Surfaces for Scalable Optimization 1:20 PM
Marzieh Najafi, Vahid Jamali, Robert Schober, Friedrich-Alexander University Erlangen-Nuremberg, Germany; H. Vincent Poor, Princeton University, United States

TU2-2-3 Near- and Far-Field Communications with Large Intelligent Surfaces 1:40 PM
Andrea De Jesus Torres, Luca Sanguinetti, University of Pisa, Italy; Emil Björnson, Linköping University, Sweden

TU2-2-4 The Impact of Terminal Mobility on the Performance of a Panel-Based Large Intelligent Surfaces 2:00 PM
Andreia Pereira, University of Coimbra (Instituto de Telecomunicações), Portugal; Fredrik Rusek, Lund University, Sweden; Marco Gomes, University of Coimbra (Instituto de Telecomunicações), Portugal; Rui Dinis, FCT-UNL (Instituto de Telecomunicações), Portugal

Session TU2-3 Statistical Signal Processing Over Networks

Chair: *Arash Mohammadi, Concordia University*

TU2-3-1 Learning from Networks of Distributions 1:00 PM
Antonios Valkanas, Florence Regol, Mark Coates, McGill University, Canada

TU2-3-2 Distributed Hybrid Kalman Temporal Differences for Reinforcement Learning 1:20 PM
Mohammad Salimibeni, Parvin Malekzadeh, Concordia University, Canada; Konstantinos N. Plataniotis, University of Toronto, Canada; Arash Mohammadi, Concordia University, Canada

TU2-3-3 Asymptotic Performance In Heterogeneous Human-machine Inference Networks 1:40 PM
Chen Quan, Baocheng Geng, Pramod Varshney, Syracuse University, United States

Session TU2-4 Nonlinear Estimation

Chair: *Jitendra Tugnait, Auburn University*

TU2-4-1 Consistency of Sparse-Group Lasso Graphical Model Selection for Time Series 1:00 PM
Jitendra Tugnait, Auburn University, United States

TU2-4-2 A Novel Framework for Deep Learning from Pairwise Constraints 1:20 PM
Wubin Sheng, John Lipor, Portland State University, United States

TU2-4-3 Estimating Vector Fields from Noisy Time Series 1:40 PM
Harish S. Bhat, Majerle Reeves, University of California, Merced, United States; Ramin Raziperchikolaei, Rakuten, United States

TU2-4-4 Non-linear Manifold Clustering based on Congruence Index 2:00 PM
Mahlagha Sedghi, George Atia, Michael Georgiopoulos, UCF, United States

Session TU2-5 Radar

Chair: *Jun Liu, University of Science and Technology of China*

TU2-5-1 A Cramer-Rao Bound Analysis for mmWave PMCW MIMO Radar with Quantized Observations 1:00 PM
Chao-Yi Wu, Jian Li, Tan F. Wong, University of Florida, United States

TU2-5-2 Moving Target Detection using Distributed MIMO Radar in Non-Homogeneous Clutter with Limited Training Data 1:20 PM
Jared Smith, Arnab Shaw, Wright State University, United States

TU2-5-3 Sparsity-Based High-Resolution Analysis of Mixed-Mode Over-The-Horizon Radar Signals 1:40 PM
Ammar Ahmed, Temple University, United States

TU2-5-4 Estimating Absolute Humidity Using Propagation Delay Measurements over CMLs: Challenges, Opportunities and Error Analysis 2:00 PM
Gal Leibovitz, Hagit Messer, Tel-Aviv University, Israel

Session TU2-6 Algorithms, Learning, and Theory for Computational Imaging

Co-Chairs: *Saiprasad Ravishankar, Michigan State University and Michael McCann, Michigan State University*

TU2-6-1 End-to-end learning for computational microscopy 1:00 PM
Laura Waller, University of California, Berkeley, United States

TU2-6-2 Ultra-Sparse View Reconstruction for Flash X-Ray Imaging using Consensus Equilibrium 1:20 PM
Maliha Hossain, Shane Paulson, Purdue University, United States; Hangjie Liao, Lam Research, United States; Weinong Chen, Charles Bouman, Purdue University, United States

TU2-6-3 Optimizing Optical Compressed Sensing for Multispectral DNN-Based Image Segmentation 1:40 PM
Yuqi Li, Yoram Bresler, University of Illinois at Urbana-Champaign, United States

TU2-6-4 Combining physics-based optimization with deep learning for computational medical imaging reconstruction 2:00 PM
Jonathan Tamir, The University of Texas at Austin, United States

Session TU2-7 Positioning Energy Constraint Devices

Co-Chairs: *Klaus Witrisal, TU Graz and Erik Leitinger, TU Graz*

TU2-7-1 ToF-based Indoor Positioning for Low-power IoT Nodes 1:00 PM
Daniel Neunteufel, TU Wien, Austria; Andreas Fuchs, Graz University of Technology, Austria; Holger Arthaber, TU Wien, Austria

TU2-7-2 High-accuracy positioning of battery-less hybrid Gen2 UHF-UWB tags 1:20 PM
Davide Fabbri, Nicolò Decarli, Anna Guerra, Aldo Romani, Davide Dardari, University of Bologna, Italy

TU2-7-3 RSS-Based Localization of Low-Power IoT Devices Exploting AoA and Range Information 1:40 PM
Xuhong Li, Lund University, Sweden; Erik Leitinger, Graz University of Technology, Austria; Fredrik Tufvesson, Lund University, Sweden

TU2-7-4 Energy-Neutral Devices: Can Hybrid RF-Acoustic Signals Point Them Out? 2:00 PM
Bert Cox, Chesney Buyle, Liesbet Van der Perre, Lieven De Strycker, KU Leuven, Belgium

Session TU2-8 Neural Generative Systems for Speech Compression, Synthesis, and Enhancement

Chair: *Jan Skoglund, Google*

TU2-8-1 A Study on Conditional Features for a Flow-based Neural Vocoder 1:00 PM
Hyungseob Lim, Suhyeon Oh, Kyungguen Byun, Hong-Goo Kang, Yonsei University, Republic of Korea

TU2-8-2 Handling Background Noise in Neural Speech Generation 1:20 PM
Tom Denton, Alejandro Luebs, Michael Chinen, Felicia S. C. Lim, Andrew Storus, Yero Yeh, W. Bastiaan Kleijn, Jan Skoglund, Google, United States

TU2-8-3 WaveNetEQ — Packet Loss Concealment with WaveRNN 1:40 PM
Florian Stimberg, DeepMind, United Kingdom; Alex Narest, Alessio Bazzica, Lennart Kolmodin, Pablo Barrera González, Olga Sharonova, Henrik Lundin, Google, Sweden; Thomas C. Walters, DeepMind, Sweden

Session TU3-1 Coding

Chair: *David Love, Purdue University*

TU3-1-1 A Novel Systematic Representation of Reed-Muller Codes 2:50 PM
Vinayak Suresh, David Love, Purdue University, United States

TU3-1-2 Iterative Detection and Decoding of Finite-Length Polar Codes in Gaussian Multiple Access Channels 3:10 PM
Moustafa Ebada, Sebastian Cammerer, Ahmed Elkelesh, Marvin Geiselhart, Stephan ten Brink, Stuttgart University, Germany

TU3-1-3 A Learning-Based Approach to Address Complexity-Reliability Tradeoff in OS Decoders 3:30 PM
Baptiste Cavarec, Hasan Basri Celebi, Mats Bengtsson, Mikael Skoglund, KTH, Royal Institute of Technology, Sweden

TU3-1-4 Joint Source-Channel Rate-Distortion Optimization for Wireless Video Transmission 3:50 PM
Rana Hegazy, University of California San Diego, United States; Qing Song, Dolby labs, United States; Arash Vosoughi, LG Electronics Mobile Research Lab, United States; Pamela Cosman, Laurence Milstein, University of California San Diego, United States

TU3-1-5 Comparison of Integrated and Independent RF/FSO Transceivers on a Fading Optical Channel 4:10 PM
Jonathan Nguyen, Ethan Liang, Linfang Wang, Richard Wesel, UCLA, United States; Todd Drullinger, Todd Chauvin, SA Photonics, United States

Session TU3-2 Large Reconfigurable Intelligent Surfaces for Future Wireless Communications

Co-Chairs: *Kumar Vijay Mishra, United States Army Research Laboratory; Björn Ottersen, University of Luxembourg and M. R. Bhavani Shankar, University of Luxembourg*

TU3-2-1 Holographic MIMO Communications Under Spatially-Stationary Scattering 2:50 PM
Andrea Pizzo, Thomas L. Marzetta, New York University, United States; Luca Sanguinetti, University of Pisa, Italy

TU3-2-2 Large Intelligent Reflecting Surface Aided Terahertz Communications 3:10 PM
Kumar Vijay Mishra, United States Army Research Laboratory, United States; M. R. Bhavani Shankar, Björn Ottersten, SnT, University of Luxembourg, Luxembourg

TU3-2-3 Deep Learning-based Phase Reconfiguration for Intelligent Reflecting Surfaces 3:30 PM
Özgecan Özdogan, Emil Björnson, Linköping University, Sweden

TU3-2-4 Polarization-Space Modulation in Reconfigurable Intelligent Surfaces 3:50 PM
John Hodge, Virginia Tech, United States; Kumar Vijay Mishra, Quang M. Nguyen, U.S. CCDC Army Research Lab, United States; Amir Zaghloul, U.S. CCDC Army Research Lab and Virginia Tech, United States

TU3-2-5 Secure Transmission in IRS-Assisted MIMO Systems with Active Eavesdroppers 4:10 PM
Ali Bereyhi, Saba Asaad, Ralf R. Müller, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany; Rafael F. Schaefer, Technische Universität Berlin, Germany; H. Vincent Poor, Princeton University, United States

Session TU3-3 Graph Signal Processing

Chair: *Elvin Isufi, TU Delft*

TU3-3-1 Unveiling Anomalous Edges and Nominal Connectivity of Attributed Networks 2:50 PM
Konstantinos D. Polyzos, Costas Mavromatis, Vassilis N. Ioannidis, Georgios B. Giannakis, University of Minnesota, United States

TU3-3-2 Clustering in Partially Labeled Stochastic Block Models via Total Variation Minimization 3:10 PM
Alexander Jung, Aalto University, Finland

TU3-3-3 RATIONAL CHEBYSHEV GRAPH FILTERS 3:30 PM
Oxana Rimleanscaia, University of Perugia, Italy; Elvin Isufi, Delft University of Technology, Netherlands

TU3-3-4 Learning Undirected Graphs in Financial Markets 3:50 PM
José Vinícius de Miranda Cardoso, Daniel Palomar, The Hong Kong University of Science and Technology, Hong Kong SAR of China

TU3-3-5 Evaluating Effectiveness of Graph Structures 4:10 PM
Lavender Yao Jiang, John Shi, Mark Cheung, Oren Wright, José M. F. Moura, Carnegie Mellon University, United States

Session TU3-4 Machine Learning in Communications

Chair: *Emrah Akyol, Binghamton University*

TU3-4-1 Strategic Remote Estimation 2:50 PM
Griffin Rule, NYU, United States; Emrah Akyol, Binghamton University, United States

TU3-4-2 Kernel Recursive Least Squares Algorithm for Self-Interference Cancellation in Mobile Communication Transceivers 3:10 PM
Christina Auer, Thomas Paireder, Oliver Lang, Mario Huemer, Johannes Kepler University Linz, Austria

TU3-4-3 How to Make 5G Communications "Invisible": Adversarial Machine Learning for Wireless Privacy 3:30 PM
Brian Kim, University of Maryland, United States; Yalin E. Sagduyu, Kemal Davaslioglu, Tugba Erpek, Intelligent Automation, Inc., United States; Sennur Ulukus, University of Maryland, United States

TU3-4-4 DNN-based Sum-Rate Maximization of Multicell MISO Networks 3:50 PM
Youjin Kim, Jonggyu Jang, Hyun Jong Yang, Ulsan National Institute of Science and Technology, Republic of Korea

TU3-4-5 Unsupervised Training Dataset Curation for Deep-Neural-Net RF Signal Classification 4:10 PM
George Sklivanitis, Konstantinos Tountas, Florida Atlantic University, United States; Ngwe Thawdar, Michael J. Medley, Air Force Research Laboratory, United States; Dimitris A. Pados, Florida Atlantic University, United States

Session TU3-5 Robust Multi-Sensor Signal Processing: Challenges and Perspectives

Co-Chairs: *Mohammed Nabil El Korso, University Paris Nanterre and Eric Chaumette, ISAE-Supaero Tolouse*

TU3-5-1 Robust Registration of Multi-modal Medical Images Using Huber's Criterion 2:50 PM
Nora Ouzir, Esa Ollila, Sergiy Vorobyov, Aalto University, Finland

TU3-5-2 A Mismatched Bound for Stochastic DOA Estimation 3:10 PM
Gerald LaMountain, Pau Closas, Northeastern University, United States

TU3-5-3 Linearly Constrained EKF for Non Linear Estimation Applied to Three-Wheeled Vehicles 3:30 PM
Emir Hrustic, Rayen Rayen Ben Abdallah, Damien Vivet, Eric Chaumette, Isae Supaero, France

TU3-5-4 Moving Target Detection for Distributed MIMO Radar under Clutter Model Mismatch 3:50 PM
Aboulnasr Hassanien, Wright State University, United States; Braham Himed, AFRL/RYMD, United States

TU3-5-5 Bounds on Bearing, Symbol, and Channel Estimation Under Model Misspecification 4:10 PM
Akshay Bondre, Touseef Ali, Christ Richmond, Arizona State University, United States

Session TU3-6 Neuroengineering and Neural Signal Processing

Chair: *Laleh Najafizadeh, Rutgers University*

TU3-6-1 On the Spatio-Temporo-Rhythmic Mapping of the Task-Associated Brain Functional Networks 2:50 PM
Ali Haddad, Laleh Najafizadeh, Rutgers University, United States

TU3-6-2 Exact Characterization of Phase Locking in a Linear Recurrent Spiking Neural Network 3:10 PM
Fatemeh Koohestanmahalian, Neil E. Cotter, University of Utah, United States

TU3-6-3 Machine Learning Enabled Adaptive Wireless Power Transmission System for Neuroscience Study 3:30 PM
Hyun-Myung Woo, Woo Seok Kim, Sungcheol Hong, Texas A&M University, United States; Vivekanand Jeevakumar, Clay M. Smithhart, Theodore J. Price, University of Texas at Dallas, United States; Byung-Jun Yoon, Sung Il Park, Texas A&M University, United States

TU3-6-4 Non-invasive Deep Brain Stimulation using Electromagnetic Waves 3:50 PM
Fatima Ahsan, Taiyun Chi, Rice University, United States; Raymond Cho, Sameer Anil Sheth, Wayne Goodman, Baylor College of Medicine, United States; Behnaam Aazhang, Rice University, United States

TU3-6-5 An end-to-end spike-based image compression architecture 4:10 PM
Effrosyni Doutsi, Foundation for Research and Technology - Hellas, Greece; Marc Antonini, Université Côte d'Azur, France; Panagiotis Tsakalides, Foundation for Research and Technology - Hellas, University of Crete, Greece

Session TU3-7 Massive MIMO: Cell-Free and Beyond

Co-Chairs: *Hien Quoc Ngo, Queen's University Belfast and Le-Nam Tran, University College Dublin*

TU3-7-1 Cell-free Massive MIMO with multi-antenna access points and user terminals 2:50 PM
Alister Burr, Shammi Islam, Junbo Zhao, University of York, United Kingdom; Manijeh Bashar, University of Surrey, United Kingdom

TU3-7-2 User Association in Scalable Cell-Free Massive MIMO Systems 3:10 PM
Carmen D'Andrea, University of Cassino and Southern Latium, Italy; Erik G. Larsson, University of Linköping, Sweden

TU3-7-3 Design of Pilots and Power Control in the Cell-Free Massive MIMO Uplink 3:30 PM
Trang C. Mai, Hien Quoc Ngo, Queen's University Belfast, United Kingdom; Le-Nam Tran, University College Dublin, Ireland

TU3-7-4 Reconfigurable Intelligent Surface Assisted Underlay Spectrum Sharing 3:50 PM
Dulaj Gunasinghe, Dhanushka Kudathanthirige, Gayan Aruma Baduge, Southern Illinios University, United States

TU3-7-5 Co-Located vs Distributed vs Semi-Distributed MIMO: Measurement-Based Evaluation 4:10 PM
Thomas Choi, Peng Luo, Akshay Ramesh, Andreas Molisch, University of Southern California, United States

Session TU3-8 Image and Video Processing and Modeling

Chair: *Sean Ramprashad, Apple Inc.*

TU3-8-1 Accurate Tensor Decomposition with Simultaneous Rank Approximation for Surveillance Videos 2:50 PM
Ramin Goudarzi Karim, Stillman College, United States; Guimu Guo, Da Yan, Carmeliza Navasca, University of Alabama at Birmingham, United States

TU3-8-2 TARA: Tracking with Aspect Ratio Adaptability 3:10 PM
Haoyi Ma, Scott Acton, Zongli Lin, University of Virginia, United States

TU3-8-3 Superresolution-Enabled Video CODEC 3:30 PM
James Glenn-Anderson, Mathematical Systems Theory Research Institute, United States

TU3-8-4 How the Discrete Hirschman Transform Inherits its Eigenstructure from the DFT 3:50 PM
Rajesh Thomas, Victor DeBrunner, Linda DeBrunner, Florida State University, United States

TU3-8-5 On-Chip Optical and Analog Processing in 180nm CMOS for Holography 4:10 PM
Mel White, Cornell University, United States; Vivek Boominathan, Ashok Veeraraghavan, Rice University, United States; Alyosha Molnar, Cornell University, United States

Session WE1-1 5G and Beyond I

Chair: *Ahmed Emad Ewaisha, Arizona State University*

WE1-1-1 Wide-Band Active Analog Self-Interference Cancellation for 5G and Beyond Full-Duplex Systems 10:00 AM
Haifeng Luo, The University of Edinburgh, United Kingdom; Mark Holm, Huawei Technologies {Sweden} Co., Ltd., Sweden; Tharmalingam Ratnarajah, The University of Edinburgh, United Kingdom

WE1-1-2 Offloading Hard-Deadline Constrained Traffic in Multi-Flow Interference-Aware Cellular Systems 10:20 AM
Ahmed Ewaisha, Cihan Tepedelenlioglu, Arizona State University, United States

WE1-1-3 Scheduling Cooperative IoT Devices in High-Dense Cellular Systems with QoS Guarantees 10:40 AM
Ahmed Ewaisha, Arizona State University, United States

WE1-1-4 On the Set of Joint Rayleigh Fading Distributions Achieving Positive Zero-Outage Capacities 11:00 AM
Karl-Ludwig Besser, Pin-Hsun Lin, Eduard A. Jorswieck, Technische Universität Braunschweig, Germany

Session WE1-2 Signal Processing for Simultaneous Transmit-Receive Systems

Chair: *Mario Huemer, Johannes Kepler University Linz*

WE1-2-1 Improving Digital Interference Cancellation in LTE-A/5G-Transceivers by Statistical Modeling 10:00 AM
Christian Motz, Thomas Paireder, Mario Huemer, Johannes Kepler University, Austria

WE1-2-2 Beamforming and Waveform Optimization for OFDM-based Joint Communications and Sensing at mm-Waves 10:20 AM
Carlos Baquero Barneto, Sahan Damith Liyanaarachchi, Taneli Riihonen, Mikko Heino, Lauri Anttila, Mikko Valkama, Tampere University, Finland

WE1-2-3 Full Duplex Self Cancellation Techniques Using Independent Component Analysis 10:40 AM
Hsi-Hung Lu, National Taiwan University of Science and Technology, Taiwan; Mohammed Fouda, University of California, Irvine, United States; Chung-An Shen, National Taiwan University of Science and Technology, Taiwan; Ahmed Eltawil, King Abdullah University of Science and Technology, Saudi Arabia

WE1-2-4 Non-linear Self-Interference Cancellation Using Tensor Completion 11:00 AM
Freek Jochems, Alexios Balatsoukas-Stimming, Eindhoven University of Technology, Netherlands

Session WE1-3 Decentralized Optimization

Chair: *Anit Kumar Sahu, Bosch Center for AI*

WE1-3-1 FedPD: A Federated Learning Framework with Optimal Rates and Adaptivity to Non-IID Data 10:00 AM
Xinwei Zhang, Mingyi Hong, Sairaj Dhople, University of Minnesota, United States; Wotao Yin, UCLA, United States; Yang Liu, Webank, United States

WE1-3-2 Push-sum, geometric average of Gaussians, and mixing tanks 10:20 AM
Cesar Uribe, MIT, United States

WE1-3-3 Exploring the error-runtime tradeoff for Decentralized Stochastic Gradient Descent 10:40 AM
Jianyu Wang, Carnegie Mellon University, United States; Anit Kumar Sahu, Bosch Center for Artificial Intelligence, United States; Gauri Joshi, Soummya Kar, Carnegie Mellon University, United States

WE1-3-4 SECOND-ORDER GUARANTEES IN FEDERATED LEARNING 11:00 AM
Stefan Vlaski, Elsa Rizk, Ali Sayed, EPFL, Switzerland

Session WE1-4 Sparsity for Nonlinear Inverse Problems

Chair: *Kiryung Lee, Ohio State University*

WE1-4-1 Accelerating Ill-Conditioned Low-Rank Matrix Estimation via Scaled Gradient Descent 10:00 AM
Tian Tong, Carnegie Mellon University, United States; Cong Ma, Princeton University, United States; Yuejie Chi, Carnegie Mellon University, United States

WE1-4-2 Tensor-norm-based convex program and performance guarantee for subspace-constrained blind deconvolution 10:20 AM
Rakshith Sharma Srinivasa, Georgia Institute of Technology, United States; Kiryung Lee, Ohio State University, United States; Justin Romberg, Georgia Institute of Technology, United States

WE1-4-3 Fast Compressive PCA and Low-Rank Matrix Recovery 10:40 AM
Seyedehsara Nayer, Praneeth Narayanamurthy, Namrata Vaswani, Iowa State University, United States

WE1-4-4 Geometry and Algorithms for Differentiable Games 11:00 AM
Shuang Li, Qiuwei Li, Gongguo Tang, Michael Wakin, Colorado School of Mines, United States

Session WE1-5 Learning-based Multichannel Signal Processing

Chair: *Florian Meyer, UC San Diego*

WE1-5-1 Quantized Higher-Order Tensor Recovery by Exploring Low-Dimensional Structures 10:00 AM
Ren Wang, Meng Wang, Rensselaer Polytechnic Institute, United States; Jinjun Xiong, IBM Thomas J. Watson Research Center, United States

WE1-5-2 Convolutional Beamspace and Sparse Signal Recovery for Linear Arrays 10:20 AM
Po-Chih Chen, P. P. Vaidyanathan, Caltech, United States

WE1-5-3 Data Fusion for Multipath-Based SLAM 10:40 AM
Erik Leitinger, TU Graz, Austria; Florian Meyer, University of California San Diego, United States

WE1-5-4 L1-Norm RESCAL Decomposition 11:00 AM
Yorgos Tsitsikas, University of California, Riverside, United States; Dimitris G. Chachlakis, Rochester Institute of Technology, United States; Evangelos E. Papalexakis, University of California, Riverside, United States; Panos P. Markopoulos, Rochester Institute of Technology, United States

Session WE1-6 Machine Learning for Physiological Signal Processing

Chair: *Fatemeh Afghah, Northern Arizona University*

WE1-6-1 Photoplethysmography-Based Blood Pressure Estimation Using Deep Learning 10:00 AM
Weinan Wang, Li Zhu, Rutgers University, United States; Fatemeh Marefat, Pedram Mohseni, Kevin Kilgore, Case Western Reserve University, United States; Laleh Najafizadeh, Rutgers University, United States

WE1-6-2 A Graph-Constrained Changepoint Learning Approach for Automatic QRS-Complex Detection 10:20 AM
Atiyeh Fotoohinasab, Toby Hocking, Fatemeh Afghah, Northern Arizona University, United States

WE1-6-3 Respiration and Cardiac Activity Sensing Using 3-D Cameras 10:40 AM
Yu Rong, Sharanya Srinivas, Huiwen Chu, Hanguang Yu, Kailing Liu, Daniel Bliss, Arizona State University, United States

WE1-6-4 An Uncertainty Estimation Framework for Risk Assessment in Deep Learning-based AFib Classification 11:00 AM
James Belen, Sajad Mousavi, Alireza Shamsoshoara, Fatemeh Afghah, Northern Arizona University, United States

Session WE1-7 Algorithm-Architecture Co-Design for Energy Efficient (Beyond) 5G Systems

Chair: *Liang Liu, Lund University*

WE1-7-1 Energy-Efficient Precoding Architecture for Multi-User MIMO Systems 10:00 AM
Seungsik Moon, Deokhwan Hwan, Namyoon Lee, Youngjoo Lee, Pohang University of Science and Technology, Republic of Korea

WE1-7-2 On the Implementation Complexity of Digital Full-Duplex Self-Interference Cancellation 10:20 AM
Andreas Toftegaard Kristensen, École polytechnique fédérale de Lausanne, Switzerland; Alexios Balatsoukas-Stimming, Eindhoven University of Technology, Netherlands; Andreas Burg, École polytechnique fédérale de Lausanne, Switzerland

WE1-7-3 Handling PA nonlinearity in massive MIMO: What are the tradeoffs between system capacity and power consumption 10:40 AM
Sidra Muneer, Liang Liu, Ove Edfors, Henrik Sjöland, Lund University, Sweden; Liesbet Van der Perre, KU Leuven, Belgium

WE1-7-4 LSTM Network-Assisted Belief Propagation Flip Polar Decoder 11:00 AM
Yutai Sun, Yifei Shen, Southeast University, China; Wenqing Song, Nanjing University, China; Zihao Gong, Zaichen Zhang, Xiaohu You, Chuan Zhang, Southeast University, China

Session WE1-8 Rate-Splitting and Robust Interference Management

Chair: *Bruno Clerckx, Imperial College London*

WE1-8-1 Interference Mitigation for Cooperative MIMO Channels with Asymmetric Feedback 10:00 AM
Lorenzo Miretti, David Gesbert, EURECOM, France

WE1-8-2 Dirty Paper Coded Rate-Splitting for Non-orthogonal Unicast and Multicast Transmission with Partial CSIT 10:20 AM
Yijie Mao, Bruno Clerckx, Imperial College London, United Kingdom

WE1-8-3 Coordinated Rate Splitting Multiple Access for Multi-Cell Downlink Networks 10:40 AM
Nohgyeom Ha, Wonjae Shin, Pusan National University, Republic of Korea; Mojtaba Vaezi, Villanova University, United States; H. Vincent Poor, Princeton University, United States

Session WE2-1 5G and Beyond II

Chair: *Navid Reyhanian, University of Minnesota*

WE2-1-1 Statistical Slice Selection in Multi-Tenant Networks with Maximum Isolation of Reserved Resources 1:00 PM
Navid Reyhanian, University of Minnesota, Twin Cities, United States; Behrouz Maham, Nazarbayev University, Kazakhstan

WE2-1-2 RadioWeaves for Extreme Spatial Multiplexing in Indoor Environments 1:20 PM
Unnikrishnan Kunnath Ganesan, Emil Björnson, Erik G. Larsson, Linköping University, Sweden

WE2-1-3 NR V2X: Technologies, Performance, and Standardization 1:40 PM
Jie Chen, Jun Tan, Nokia, United States

WE2-1-4 Source Voltage Optimization for Near-Field Wireless Powered Communication using Coil Array 2:00 PM
Tomohiro Arakawa, James Krogmeier, David Love, Purdue University, United States

Session WE2-2 Signal Processing Algorithms and Hardware for Massive MIMO

Chair: *Steffen Paul, University of Bremen*

WE2-2-1 Reciprocity Aided CSI Feedback for Massive MIMO 1:00 PM
Ema Becirovic, Emil Björnson, Erik G. Larsson, Linköping University, Sweden

WE2-2-2 Reinforcement Learning based Per-antenna Discrete Power Control for Massive MIMO Systems 1:20 PM
Navneet Garg, Tharmalingam Ratnarajah, The University of Edinburgh, United Kingdom

WE2-2-3 A Novel Approach for Combining Local Estimates for Fully Decentralized Feedforward Massive MIMO Equalization: The Multistep Fusion 1:40 PM
Pascal Seidel, Ludwig Karsthof, Steffen Paul, University of Bremen, Germany

WE2-2-4 Hardware Architecture of a Decentralized Massive MIMO Equalizer based on Gauss-Seidel Detection 2:00 PM
Ludwig Karsthof, Pascal Seidel, Raik Milautzki, Universität Bremen, Germany; Jochen Rust, DSI Aerospace Technologie GmbH, Germany; Steffen Paul, Universität Bremen, Germany

Session WE2-3 Wireless Networks I

Chair: *Tharmalingam Ratnarajah, Univ of Edinburgh*

WE2-3-1 Scaling Laws of Dense Multi-Antenna Cellular Networks 1:00 PM
Ahmad AlAmmouri, Jeffrey Andrews, Francois Baccelli, The University of Texas at Austin, United States

WE2-3-2 Decentralized Coded Caching For Interference Networks 1:20 PM
Navneet Garg, Tharmalingam Ratnarajah, The University of Edinburgh, United Kingdom

WE2-3-3 6DOF Virtual Reality Dataset and Performance Evaluation of Millimeter Wave vs. Free-Space-Optical Indoor Communications Systems for Lifelike Mobile VR Streaming 1:40 PM
Jacob Chakareski, Mahmudur Khan, New Jersey Institute of Technology, United States; Tanguy Ropitault, Steve Blandino, National Institute of Standards, United States

WE2-3-4 Rate Allocation in Massive Multiple Access Combining Successive Decoding with Error Control 2:00 PM
Francesc Molina, Josep Sala-Álvarez, Universitat Politècnica de Catalunya, Spain

Session WE2-4 Distributed Coding and Optimization

Chair: *Gauri Joshi, Carnegie Mellon University*

WE2-4-1 Robust class parallelism - Error Resilient Parallel Inference with Low Communication Cost 1:00 PM
Yaoqing Yang, Jichan Chung, Guanhua Wang, Vipul Gupta, Adarsh Karnati, Kenan Jiang, Ion Stoica, Joseph Gonzalez, Kannan Ramchandran, UC Berkeley, United States

WE2-4-2 vqSGD: Vector Quantized Stochastic Gradient Descent 1:20 PM
Venkata Gandikota, University of Massachusetts Amherst, United States; Daniel Kane, University of California San Diego, United States; Raj Kumar Maity, Arya Mazumdar, University of Massachusetts Amherst, United States

WE2-4-3 Adaptive Client Selection in Federated Learning 1:40 PM
Yae Jee Cho, Gauri Joshi, Carnegie Mellon University, United States

WE2-4-4 Attack of the Tails: Yes, You Really Can Backdoor Federated Learning 2:00 PM
Hongyi Wang, Kartik Sreenivasan, Harit Vishwakarma, University of Wisconsin-Madison, United States; Jy-yong Sohn, KAIST, Republic of Korea; Shashank Rajput, Saurabh Agarwal, Kangwook Lee, Dimitris Papailiopoulos, University of Wisconsin-Madison, United States

Session WE2-5 Parametric MIMO Channel Estimation

Chair: *Fredrik Tufvesson, Lund University*

WE2-5-1 Analysis of multipath channel delay estimation using subspace fitting 1:00 PM
Tarik Kazaz, Jac Romme, Gerard Janssen, Alle-Jan van der Veen, Delft University of Technology, Netherlands

WE2-5-2 Two-Layer J-Best Selection / Maximal-Ratio Combining in Rayleigh Fading 1:20 PM
Sebastien Roy, Université de Sherbrooke, Canada

WE2-5-3 Detection and Tracking of Multipath Channel Parameters Using Belief Propagation 1:40 PM
Xuhong Li, Lund University, Sweden; Erik Leitinger, Graz University of Technology, Austria; Fredrik Tufvesson, Lund University, Sweden

WE2-5-4 Detection and Estimation of a Spectral Line in MIMO Systems 2:00 PM
Erik Leitinger, Stefan Grebien, Graz University of Technology, Austria; Bernard Fleury, Aalborg University, Denmark; Klaus Witrisal, Graz University of Technology, Austria

Session WE2-6 From Neural Networks to Neural Systems: Using AI to Decode the Brain in Health and Disease

Chair: *Archana Venkataraman, Johns Hopkins University*

WE2-6-1 An End-to-End Multimodal Imaging-Genetics Framework for Biomarker Identification and Disease Classification 1:00 PM
Sayan Ghosal, Johns Hopkins University, United States; Qiang Chen, Lieber Institute for Brain Development, United States; Giulio Pergola, University of Bari Aldo Moro, Italy; Daniel Weinberger, Venkata Mattay, Lieber Institute for Brain Development, United States; Archana Venkataraman, Johns Hopkins University, United States

WE2-6-2 Advancing Neuroscientific Discovery via Bias-Resilient Neural Networks 1:20 PM
Kilian Pohl, Qingyu Zhao, Ehsan Adeli, Stanford University, United States

WE2-6-3 Artificial Intelligence System for Expert-Level Neuroimaging Diagnoses with Quantitative and Probabilistic Descriptions of Disease 1:40 PM
Andreas Rauschecker, Jeffrey Rudie, University of California, San Francisco, United States; Long Xie, Jiancong Wang, Michael Tran Duong, R Nick Bryan, Ilya Nasrallah, Suyash Mohan, James Gee, University of Pennsylvania, United States

WE2-6-4 Unbiased atlas construction for neonatal cortical surfaces via unsupervised learning 2:00 PM
Jieyu Cheng, Martinos Center, United States; Adrian Dalca, Massachusetts Institute of Technology, United States; Lilla Zollei, Martinos Center, United States

Session WE2-7 Low Power and Wide Area: Implementations That Make It Happen

Chair: *Lieven De Strycker, KU Leuven*

WE2-7-1 Internet of Bouys: An Internet of Things implementation at sea 1:00 PM
Michiel Sandra, KU Leuven, Belgium; Sara Gunnarsson, Anders J Johansson, Lund University, Sweden

WE2-7-2 Massive MIMO goes Sub-GHz: Implementation and Experimental Exploration for LPWANs 1:20 PM
Gilles Callebaut, KU Leuven, Belgium; Sara Gunnarsson, Lund University and KU Leuven, Sweden; Fredrik Tufvesson, Lund University, Sweden; Andrea P. Guevara, Sofie Pollin, Liesbet Van der Perre, KU Leuven, Belgium; Anders J. Johansson, Lund University, Sweden

WE2-7-3 Multi-User Receivers for LoRa LPWAN 1:40 PM
Orion Afisiadis, École polytechnique fédérale de Lausanne (EPFL), Switzerland; Mathieu Xhonneux, UCLouvain, Belgium; Joachim Tapparel, Sitian Li, École polytechnique fédérale de Lausanne (EPFL), Switzerland; Alexios Balatsoukas-Stimming, Eindhoven University of Technology (TU/e), Netherlands; Andreas Burg, École polytechnique fédérale de Lausanne (EPFL), Switzerland

WE2-7-4 An Architecture for Grant-Free Random Access Massive Machine Type Communication Using Coordinate Descent 2:00 PM
Mikael Henriksson, Oscar Gustafsson, Unnikrishnan Kunnath Ganesan, Erik G. Larsson, Linköping University, Sweden

Session WE2-8 Advances in Visual Data Compression and Communication

Co-Chairs: *Maggie (Fengqing) Zhu, Purdue University and Amy Reibman, Purdue University*

WE2-8-1 Activation Map Saliency Guided Filtering for Efficient Image Compression for Vision Tasks 1:00 PM
Yixin Mei, Fan Li, Xi'an Jiaotong University, China; Li Li, Zhu Li, University of Missouri-Kansas City, United States

WE2-8-2 A LIGHTWEIGHT MODEL FOR DEEP FRAME PREDICTION IN VIDEO CODING 1:20 PM
Hyomin Choi, Ivan Bajic, Simon Fraser University, Canada

WE2-8-3 Transform Domain Temporal Prediction and Geodesic Motion Compensation in Spherical Video Coding 1:40 PM
Kruthika Koratti Sivakumar, Bharath Vishwanath, Kenneth Rose, University of California Santa Barbara, United States

WE2-8-4 IN-CAMERA RAW COMPRESSION: A NEW PARADIGM FROM IMAGE ACQUISITION TO DISPLAY 2:00 PM
Zhihao Li, Haojie Liu, Nanjing University, China; Lin Yang, Gyrfalcon Technology Inc., United States; Zhan Ma, Nanjing University, China

Session WE3-1 Spectrum

Chair: *Shahin Shahrampour, Texas A&M University*

WE3-1-1 Asynchronous Successive Interference Cancellation for 5G Receiver Operateing in Shared Spectrum with Different Radio System 2:50 PM
Issei Kanno, Ryochi Kataoka, KDDI Research Inc., Japan; Toshinori Suzuki, KDDI Research Inc. / Tohoku Gakuin University, Japan; Hiroyasu Ishikawa, KDDI Research Inc. / Nihon University, Japan; Kosuke Yamazaki, Yoji Kishi, KDDI Research Inc., Japan

WE3-1-3 Cell Association via Boundary Detection: A Scalable Approach Based on Data-Driven Random Features 3:30 PM
Yinsong Wang, Texas A&M University, United States; Hessam Mahdavifar, University of Michigan, United States; Kamran Entesari, Shahin Shahrampour, Texas A&M University, United States

WE3-1-4 A Tensor-Based Approach to Massive Random Access 3:50 PM
Alexis Decurninge, Ingmar Land, Maxime Guillaud, Huawei Technologies France, France

WE3-1-5 Energy- vs Spectral-Efficiency for Energy-Harvesting Hybrid RF/VLC Networks 4:10 PM
Yavuz Yapici, Ismail Guvenc, North Carolina State University, United States

Session WE3-2 Massive MIMO Radar

Co-Chairs: *Kumar Vijay Mishra, United States Army Research Laboratory and Pawan Setlur, Riverside Research*

WE3-2-1 Limits of Transmit Beamforming for Massive MIMO Radar 2:50 PM
Arindam Bose, Ahsan Ghauri, Mojtaba Soltanalian, University of Illinois at Chicago, United States

WE3-2-2 Joint Transmit Beamforming for Massive MIMO Radar-Communications 3:10 PM
Kumar Vijay Mishra, United States Army Research Laboratory, United States; Bhavani Shankar, Björn Ottersten, SnT, University of Luxembourg, Luxembourg

WE3-2-3 Constrained Maximum Likelihood Channel Estimation for Massive MIMO Radar 3:30 PM
Bosung Kang, University of Dayton, United States; Sandeep Gogineni, Information Systems Laboratories, Inc., United States; Muralidhar Rangaswamy, Air Force Research Laboratory, United States; Joseph Guerci, Information Systems Laboratories, Inc., United States

WE3-2-4 Multi-Frequency Sparse Array-Based Massive MIMO Radar for Autonomous Driving 3:50 PM
Shunqiao Sun, University of Alabama, United States; Yimin Zhang, Temple University, United States

WE3-2-5 Multifunctionality in radar: A massive MIMO radar paradigm 4:10 PM
Pawan Setlur, Adam Rose, Philip Chorman, Riverside Research, United States

Session WE3-3 Wireless Networks II

Chair: *Harpreet Dhillon, Virginia Tech*

WE3-3-1 An Energy-Efficient Event-Based MIMO Communication Scheme for UAV Formation Control 2:50 PM
Yasemin Karacora, Aydin Sezgin, Ruhr University Bochum, Germany

WE3-3-2 Stochastic Geometry for Sensing Environmental Processes with a known Spatio-Temporal Profile 3:10 PM
Abhishek Gupta, Kaushledra Pandey, Indian Institute of Technology Kanpur, India; Harpreet S. Dhillon, Virginia Tech, United States

WE3-3-3 Optimal Scheduling of Multiple Spatio-temporally Dependent Observations using Age-of-Information 3:30 PM
Victor Wattin Håkansson, Naveen K. D. Venkategowda, Stefan Werner, Norwegian University of Science and Technology, Norway

WE3-3-4 Rate Coverage of a Cellular Network with Users distributed as Poisson Cluster Process 3:50 PM
Chiranjib Saha, Praful Mankar, Harpreet S. Dhillon, Virginia Tech, United States

WE3-3-5 Model-Assisted Deep Reinforcement Learning for Dynamic Wireless Scheduling 4:10 PM
Arjun Anand, Ravikumar Balakrishnan, V. Srinivasa Somayazulu, Rath Vannithamby, Intel Labs, United States

Session WE3-4 Theory of Machine Learning

Chair: *Shahin Shahrampour, Texas A&M University*

WE3-4-1 Learning Kolmogorov Models for Binary Random Variables — 2:50 PM
Hadi Ghauch, Telecom Paris, France; Hossein Shokri Ghadikolaei, Mikael Skoglund, Carlo Fischione, Royal Institute for Technology, KTH, Sweden

WE3-4-2 Successive Information Bottleneck and Applications in Deep Learning — 3:10 PM
Yassine Yousfi, Emrah Akyol, Binghamton University-SUNY, United States

WE3-4-3 Separating the Effects of Batch Normalization on CNN Training Speed and Stability Using Classical Adaptive Filter Theory — 3:30 PM
Elaina Chai, Mert Pilanci, Boris Murmann, Stanford University, United States

WE3-4-4 Global Convergence of Newton Method for Empirical Risk Minimization in Reproducing Kernel Hilbert Space — 3:50 PM
Ting-Jui Chang, Shahin Shahrampour, Texas A&M University, United States

WE3-4-5 Knowing When to Stop: Joint Heterogeneous Feature Selection and Classification — 4:10 PM
Imara Nazar, Daphney-Stavroula Zois, Charalampos Chelmis, University at Albany, SUNY, United States

Session WE3-5 DOA Estimation and Source Localization

Chair: *Tirza Routtenberg, Ben-Gurion University of the Negev*

WE3-5-1 QR decomposition and Parallel Factor-based Model for Two-Dimensional Direction of Arrival Angle Estimation — 2:50 PM
Nizar Tayem, Texas A & M University, United States

WE3-5-2 Colored Noise in DOA Estimation from Seismic Data: an Empirical Study — 3:10 PM
Neta Zimerman, Jonathan D. Rosenblatt, Tirza Routtenberg, Ben-Gurion University of the Negev, Israel

WE3-5-3 On the Mutual Coupling Matrix in Array Signal Processing — 3:30 PM
Benjamin Friedlander, University of California, Santa Cruz, United States

WE3-5-4 3-D MUSIC Spectrum Reconstruction for Joint Azimuth-Elevation-Frequency Band Estimation — 3:50 PM
Hasbi Nur Prasetyo Wisudawan, Universitas Gadjah Mada and Universitas Islam Indonesia, Indonesia; Dyonisius Dony Arianananda, Risanuri Hidayat, Universitas Gadjah Mada, Indonesia

WE3-5-5 On the Cramer-Rao Bound for Sparse Linear Arrays — 4:10 PM
Benjamin Friedlander, University of California, Santa Cruz, United States

Session WE3-6 In-Band Full Duplex Communications for Future Wireless Systems

Chair: *Besma Smida, University of Illinois Chicago*

WE3-6-1 In-Band, Full-Duplex Self-Interference Mitigation Using Sparse Tap-Delay Models with Quantized and Power Constrained Weights 2:50 PM
Andrew Herschfelt, Alex Chiriyath, Arizona State University, United States; Alyosha Christopher Molnar, Cornell University, United States; David G. Landon, L3Harris, United States; Daniel W. Bliss, Arizona State University, United States

WE3-6-2 Performance Comparison of Frequency-Domain and Time-Domain RF Self-Interference Cancellation in Full-Duplex Wireless Systems 3:10 PM
Aditya Gaonkar, Aravind Nagulu, Sasank Garikapati, Harish Krishnaswamy, Columbia University, United States

WE3-6-3 Adaptive Cancellation of Nonlinear Self-Interference in Wireless Full-Duplex: Cascaded Spline-Interpolated Methods 3:30 PM
Pablo Pascual Campo, Lauri Anttila, Tampere University, Finland; Dani Korpi, Nokia Bell Labs, Finland; Mikko Valkama, Tampere University, Finland

WE3-6-4 On the Performance of Power Splitting-Based SWIPT in Self-Energy Recycling Full-Duplex Relaying Networks 3:50 PM
Isabella Wanderley Gomes da Silva, Federal University of São Carlos, Brazil; Diana Pamela Moya Osorio, University of Oulu, Finland; Edgar Eduardo Benitez Olivo, São Paulo State University, Brazil; Onel Luis Alcaraz López, Hirley Alves, Matti Latva-aho, University of Oulu, Finland

WE3-6-5 Simultaneous Data Communication and Channel Estimation in Multiuser Full Duplex MIMO Systems 4:10 PM
Md Atiqul Islam, University of Illinois at Chicago, United States; George C. Alexandropoulos, National and Kapodistrian University of Athens, Greece; Besma Smida, University of Illinois at Chicago, United States

Session WE3-7 Arithmetic, Algorithms, and Practicalities

Chair: *James Stine, Oklahoma State University*

WE3-7-1 Towards the Basic Linear Algebra Unit 2:50 PM
Nicolas BRUNIE, Kalray, France

WE3-7-2 How the Sampling Rate Impacts Wordlength Selection for FIR Filter Implementations 3:10 PM
Victor DeBrunner, Linda S. DeBrunner, Florida State University, United States

WE3-7-3 HARDWARE IMPLEMENTATION OF FIXED-POINT DECODER FOR LOW-DENSITY LATTICE CODES 3:30 PM
Rachna Srivastava, Vincent C Gaudet, Patrick Mitran, University of Waterloo, Canada

WE3-7-4 Phase Unwrapping with Multiple Wavelengths on the Flat Torus 3:50 PM
Arrigo Benedetti, Microsoft Corp., United States

Session WE3-8 Learning from Light: Where Computer Vision and Machine Learning Meets Optics and Imaging

Chair: *Ashok Veeraraghavan, Rice University*

WE3-8-1 Computational Imaging with Partially-known Physical Priors 2:50 PM
Achuta Kadambi, University of California, Los Angeles, United States

WE3-8-2 Boosting the Performance of Plug-and-Play Priors via Denoiser Scaling 3:10 PM
Xiaojian Xu, Jiaming Liu, Yu Sun, Washington University in St. Louis, United States; Brendt Wohlberg, Los Alamos National Laboratory, United States; Ulugbek Kamilov, Washington University in St. Louis, United States

WE3-8-3 Deep Optics: Learning Cameras and Optical Computing Systems 3:30 PM
Gordon Wetzstein, Hayato Ikoma, Christopher Metzler, Yifan Peng, Stanford University, United States

WE3-8-4 Role of Deep Learning in Infrared and Hyperspectral Compressive Imaging 3:50 PM
Yibo Xu, Anthony Giljum, Weidi Liu, Jianbo Chen, Kevin Kelly, Rice University, United States

WE3-8-5 Low-budget 3D scanning and material estimation using PyTorch3D 4:10 PM
Oliver Cossairt, Chia-Kai Yeh, Florian Willomitzer, Marc Walton, Aggelos Katsaggelos, Northwestern University, United States

Session TH1-1 Matrix Completion Methods for Wireless Systems

Chair: *Giuseppe Abreu, Jacobs University*

TH1-1-1 Joint Localization and Channel Estimation for UAV-Assisted Millimeter Wave Communications 8:00 AM
George Alexandropoulos, National and Kapodistrian University of Athens, Greece; Evangelos Vlachos, Athena Research Center, Greece; Besma Smida, University of Illinois at Chicago, United States

TH1-1-2 Autoencoder Matrix Completion Based Indoor Localization 8:20 AM
Iness Ahriz, Michel Terré, Wafa Njima, Le CNAM Paris, France

TH1-1-3 Discrete-Aware Matrix Completion via Proximal Gradient 8:40 AM
Hiroki Iimori, Giuseppe Thadeu Freitas de Abreu, Jacobs University Bremen, Germany; Omid Taghizadeh, Technische Universität Berlin, Germany; Koji Ishibashi, The University of Electro-Communications, Japan

TH1-1-4 Tensor Completion based Prediction in Wireless Edge Caching 9:00 AM
Navneet Garg, Tharmalingam Ratnarajah, The University of Edinburgh, United Kingdom

Session TH1-2 Optimization and Learning

Chair: *Amine Mezghani, University of Manitoba*

TH1-2-1 K-SVD based Periodicity Dictionary Learning 8:00 AM
Pranav Kulkarni, P. P. Vaidyanathan, Caltech, United States

TH1-2-2 Capacity based optimization of wideband MISO systems in the presence of mutual coupling 8:20 AM
Sandy Saab, University of Texas at Austin, United States; Amine Mezghani, University of Manitoba, Canada; Robert W. Heath Jr., University of Texas at Austin, United States

TH1-2-3 Situation-Aware Channel Covariance Prediction for Deep Learning Aided Massive MIMO Systems 8:40 AM
Abdelrahman Taha, Ahmed Alkhateeb, Arizona State University, United States

TH1-2-4 Robust Transceiver Design for Full-Duplex Decode-and-Forward Relay-Assisted MIMO Systems 9:00 AM
Hossein Esmaeili, Ali Kariminezhad, Aydin Sezgin, Ruhr-university bochum, Germany

Session TH1-3 Novel Control Algorithms for Smart Grid Applications

Chair: *Irfhan Khan, Texas A&M University at Galveston*

TH1-3-1 Investigation of Power Quality Issues in Cold – Ironed (Shore Connected) Grid Connected Electric Ships 8:00 AM
Syed Rahman, Irfan Khan, Texas A&M University, United States

TH1-3-2 Cascaded Solid State Transformer Structure to Power Fast EV Charging Stations from Medium Voltage Transmission Lines 8:20 AM
Syed Rahman, Texas A&M University, United States; Ahmed Imteaj, Florida International University, United States; Irfan Khan, Texas A&M University, United States; M.Hadi Amini, Florida International University, United States

TH1-3-3 Precise Energy Consumption Forecasting via Variational Sequential Model Using Atmospheric Numerical Outputs 8:40 AM
Yihe Zhang, Xu Yuan, University of Louisiana at Lafayette, United States

TH1-3-4 Optimal Zoning of Storage and Distributed Solar Photovoltaic Systems for Minimizing Generation Uncertainty 9:00 AM
Sara Eftekharnejad, Syracuse University, United States; Ahad Esmaeilian, Avangrid, United States; Sagnik Basumallik, Rui Ma, Syracuse University, United States

Session TH1-4 Bayesian Bounds for Stochastic Signal Recovery I

Co-Chairs: *Alex Dytso, Princeton University; Michael Fauss, Princeton University and Vincent Poor, Princeton University*

TH1-4-1 Bayesian Cramer-Rao Bound for Estimation After Model Selection 8:00 AM
Nadav Harel, Tirza Routtenberg, Ben Gurion University of the Negev, Israel

TH1-4-2 Hybrid Cramér-Rao Inequality via Information Geometry 8:20 AM
Kumar Vijay Mishra, M. Ashok Kumar, United States Army Research Laboratory, United States

TH1-4-3 A Bayesian lower bound for parameters with bounded support priors 8:40 AM
Raksha Ramakrishna, Anna Scaglione, Arizona State University, United States

TH1-4-4 Bayesian Fisher Information Shannon Information and ROC Analysis for Classification Tasks 9:00 AM
Eric Clarkson, University of Arizona, United States

Session TH1-5 Sparsity-aware learning

Chair: *Vaishali Amin, Temple University*

TH1-5-1 Improved Time-Frequency Representation of Multi-Component FM Signals with Compressed Observations 8:00 AM
Vaishali S. Amin, Yimin D. Zhang, Temple University, United States; Braham Himed, Air Force Research Laboratory, United States

TH1-5-2 Posterior Variance Predictions in Sparse Bayesian Learning under Approximate Inference Techniques 8:20 AM
Christo Kurisummoottil Thomas, Dirk Slock, Eurecom, France

TH1-5-3 Third-order Cumulants Reconstruction from Compressive Measurements 8:40 AM
Yanbo Wang, Zhi Tian, George Mason University, United States

TH1-5-4 Improved Block-Sparse Recovery Bound Using Cumulative Block Coherence 9:00 AM
Pouria Saidi, George Atia, Azadeh Vosoughi, University of Central Florida, United States

Session TH1-6 Image Recovery in Computational Imaging Applications

Chair: *Il Yong Chun, University of Hawaii*

TH1-6-1 Model-based Reconstruction for Single Particle Cryo-Electron Microscopy 8:00 AM
Singanallur Venkatakrishnan, Oak Ridge National Lab, United States; Puneet Juneja, Emory University, United States; Hugh O'Neill, Oak Ridge National Lab, United States

TH1-6-2 A statistical framework for model-based inverse problems in ultrasound elastography 8:20 AM
Narges Mohammadi, Marvin M. Doyley, Mujdat Cetin, University of Rochester, United States

TH1-6-3 Autotuning Plug-and-Play Algorithms for MRI 8:40 AM
Saurav Shastri, Rizwan Ahmad, Philip Schniter, Ohio State, United States

TH1-6-4 Momentum-Net for Low-Dose CT Image Reconstruction 9:00 AM
Siqi Ye, Yong Long, Shanghai Jiao Tong University, China; Il Yong Chun, University of Hawai'i at Manoa, United States

Session TH1-7 Adaptive Methods I

Chair: *Azzedine Zerguine, KFUPM*

TH1-7-1 Decentralized Multitask Recursive Least Squares with Local Linear Constraints 8:00 AM
Xuanyu Cao, Tamer Basar, University of Illinois at Urbana-Champaign, United States

TH1-7-2 Adaptive Blind Equalization in Impulsive Noise 8:20 AM
Shafayat Abrar, Habib University, Pakistan; Azzedine Zerguine, KFUPM, Saudi Arabia; Karim Abed-Meraim, PRISME Lab, France

TH1-7-3 A q-Noise Constrained Least Mean Square Algorithm 8:40 AM
Muhammad Omer Bin Saeed, Air University, Pakistan; Azzedine Zerguine, KFUPM, Saudi Arabia

TH1-7-4 Collision Avoidance by Utilizing Dynamic Road Friction Information 9:00 AM
Jonas Herzfeld, Sanjiv Thottathodhi, Mats Jonasson, Chalmers University of Technology, Sweden; L. Srikar Muppirisetty, Volvo Cars Corporation, Sweden; Sohini Roychowdhury, Volvo Cars Technology, United States; Jonas Sjöberg, Chalmers University of Technology, Sweden

Session TH1-8 Modeling and Coding of Speech, Audio, and Acoustics

Chair: *Sean Ramprashad, Apple Inc.*

TH1-8-1 Output Recursively Adaptive (ORA) Tree Coding of Speech with VAD/CNG 8:00 AM
Hoontaek Oh, Jerry Gibson, University of California, Santa Barbara, United States

TH1-8-2 Sparse Framework for Reproduction of NFC-HOA 8:20 AM
GYANAJYOTI ROUTRAY, RAJESH HEGDE, Indian Institute of Technology (IIT) Kanpur, India

TH1-8-3 Generating Personal Sound Zones using Directional Loudspeakers 8:40 AM
Ajay Dagar, Rajesh Hegde, Indian Institute of Technology Kanpur, India

TH1-8-4 Modeling Ornaments in Carnatic Music Signals via Wavelets 9:00 AM
Zitha Sasindran, Shayan Garani, Indian Institute of Science, India

Session TH2-1 Matrix Recovery

Chair: *Shuang Li, Colorado School of Mines*

TH2-1-1 An Adaptation for Iterative Structured Matrix Completion 10:00 AM
Lara Kassab, Henry Adams, Colorado State University, United States; Deanna Needell, University of California, Los Angeles, United States

TH2-1-2 Nuclear Norm Based Spectrum Estimation for Molecular Dynamic Simulations 10:20 AM
Shuang Li, Colorado School of Mines, United States; Stephen Becker, University of Colorado, Boulder, United States; Michael Wakin, Colorado School of Mines, United States

TH2-1-3 LOW-COST ADAPTIVE MAXIMUM ENTROPY COVARIANCE MATRIX RECONSTRUCTION FOR ROBUST BEAMFORMING 10:40 AM
Saeed Mohammadzadeh, Vitor H. Nascimento, University of São Paulo, Brazil; Rodrigo C. de Lamare, CETUC/PUC-Rio, Brazil; Osman Kukrer, Eastern Mediterranean University, Turkey

Session TH2-3 Deep Learning and Reinforcement Learning

Chair: *Thomas Goldstein, University of Maryland*

TH2-3-1 Generative Priors and Computational-Statistical Gaps 10:00 AM
Jorio Cocola, Paul Hand, Northeastern University, United States; Vladislav Voroninski, Helm.ai, United States

TH2-3-2 Meta-learning made easy: fast adaptation and transfer learning through structured feature representations. 10:20 AM
Tom Goldstein, Micah Goldblum, Steven Reich, Renkun Ni, Valeriia Cherepanova, University of Maryland, United States

TH2-3-3 A Dual Approach to Graph CNNs 10:40 AM
John Shi, Mark Cheung, Wendy Summer, Jose Moura, Carnegie Mellon University, United States

Session TH2-4 Bayesian Bounds for Stochastic Signal Recovery II

Co-Chairs: *Alex Dytso, Princeton University; Michael Fauss, Princeton University and Vincent Poor, Princeton University*

TH2-4-1 On Misspecified Parameter Bounds with Application to Sparse Bayesian Learning 10:00 AM
Christ Richmond, Abdulhakim Alhowaish, Arizona State University, United States

TH2-4-2 MMSE Bounds Under Kullback-Leibler Divergence Constraints on the Joint Input-Output Distribution 10:20 AM
Michael Fauss, Alex Dytso, H. Vincent Poor, Princeton University, United States

TH2-4-3 Estimating oceanographic properties from ambient noise 10:40 AM
John Gebbie, Metron, Inc., United States

Session TH2-5 Machine Learning Algorithms

Chair: *Yongjune Kim, DGIST*

TH2-5-1 On Parametric Model Mismatch in Nonlinear EKF Approximations 10:00 AM
Homeyra Khaledian, Universitat Politècnica de Catalunya (UPC), Spain; Jordi Vilà-Valls, Eric Chaumette, ISAE-SUPAERO/University of Toulouse, France; Xavier Prats, Universitat Politècnica de Catalunya (UPC), Spain

TH2-5-2 Distributed Boosting Classifiers over Noisy Channels 10:20 AM
Yongjune Kim, Western Digital Research, United States; Yuval Cassuto, Technion – Israel Institute of Technology, Israel; Lav Varshney, University of Illinois at Urbana-Champaign, United States

TH2-5-3 A finite rate of innovation approach for the estimation of a stream of decaying exponentials 10:40 AM
Benjamin Bejar, Swiss Data Science Center, Switzerland; Gavin Mischler, Johns Hopkins University, United States

TH2-5-4 On Human Assisted Decision Making for Machines Using Correlated Observations 11:00 AM
Nandan Sriranga, Baocheng Geng, Pramod Varshney, Syracuse University, United States

Session TH2-6 Sequential Methods

Chair: *Bahman Moraffah, ASU*

TH2-6-1 Sequential Estimation of Network Cascades 10:00 AM
Anirudh Sridhar, H. Vincent Poor, Princeton University, United States

TH2-6-2 Maneuvering Target Tracking using the Autoencoder Interacting Multiple Model Filter 10:20 AM
Kirty Vedula, Matthew L Weiss, Randy C Paffenroth, Worcester Polytechnic Institute, United States; Joshua R. Uzarski, U.S. Army CCDC-SC, United States; D. Richard Brown III, Worcester Polytechnic Institute, United States

TH2-6-3 METRIC-Bayes: Measurements Estimation for Tracking in High Clutter using Bayesian Nonparametrics 10:40 AM
Bahman Moraffah, Christ Richmond, Raha Moraffah, Antonia Papandreou-Suppappola, Arizona State University, United States

TH2-6-4 Transfer Learning with Nonparametric Bayesian Modeling for Object Tracking Under Varying Conditions 11:00 AM
Omar Alotaibi, Antonia Papandreou-Suppappola, Arizona State University, United States

Session TH2-7 Adaptive Methods II

Chair: *Azzedine Zerguine, KFUPM*

TH2-7-1 Graph Diffusion Kernel LMS using Random Fourier Features 10:00 AM
Vitor R. M. Elias, Federal University of Rio de Janeiro, Brazil; Vinay C. Gogineni, Norwegian University of Science and Technology, Norway; Wallace A. Martins, University of Luxembourg, Luxembourg; Stefan Werner, Norwegian University of Science and Technology, Norway

TH2-7-2 Energy-Efficient Distributed Recursive Least Squares Learning with Coarsely Quantized Signals 10:20 AM
Alireza Danaee, Rodrigo C. de Lamare, Pontifical Catholic University of Rio de Janeiro, Brazil; Vitor H. Nascimento, University of São Paulo, Brazil

TH2-7-3 Diffusion PSO-LMS Adaptation over Networks 10:40 AM
Sameer Arastu, Naveed Iqbal, Muhammad Bin Saeed, Azzedine Zerguine, KFUPM, Saudi Arabia

Session TH2-8 Deep Learning Techniques for Detection and Classification in Images and Video

Chair: *Maggie (Fengqing) Zhu, Purdue University*

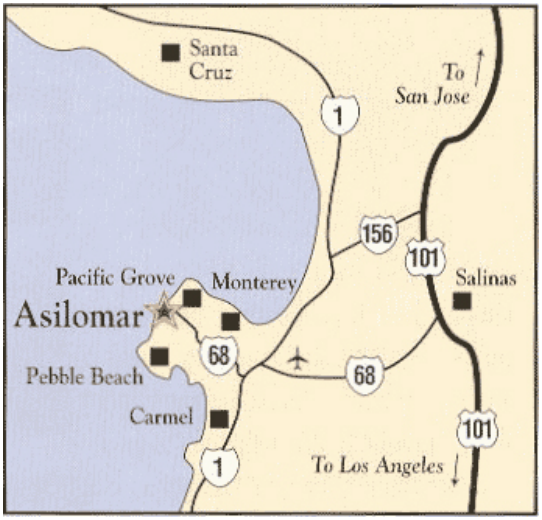
TH2-8-1 Quadric-based Traffic Sign Landmarks Initialization for Object-oriented EKF-SLAM 10:00 AM
Emir HRUSTIC, Damien VIVET, ISAE-SUPAERO, France

TH2-8-2 Pedestrian Detection from Thermal Images Incorporating Saliency Features 10:20 AM
Fatih Altay, Senem Velipasalar, Syracuse University, United States

TH2-8-3 Multi-Class Micro-CT Image Segmentation Using Sparse Regularized Deep Networks 10:40 AM
Amirsaeed Yazdani, Yung-Chen Sun, Nicholas B. Stephens, Timothy Ryan, Vishal Monga, Pennsylvania State University, United States

TH2-8-4 Hierarchical Grow Network for Point Cloud Segmentation 11:00 AM
Jiajing Chen, Burak Kakillioglu, Senem Velipasalar, Syracuse University, United States

Author List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