2023 57th Asilomar Conference on Signals, Systems, and Computers

Pacific Grove, California, USA
29 October - 1 November 2023

Pages 1-577

IEEE Catalog Number: CFP23431-POD
ISBN: 979-8-3503-2575-1

Copyright © 2023 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP23431-POD
ISBN (Print-On-Demand):	979-8-3503-2575-1
ISBN (Online):	979-8-3503-2574-4
ISSN:	1058-6393

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

Table of Contents

Student Paper Contest xxix
Foreword xxx

Ma1a: Architecture for Security (Invited)
Ma1a.1: An Efficient Hardware Accelerator of High-Speed NTT for CRYSTALS-Kyber 1
Post-Quantum Cryptography
Zhuoyao Zhang, Yijun Cui, Nanjing University of Aeronautics and Astronautics, China; Ziying Ni, Queen's University Belfast, United Kingdom; Chenghua Wang, Weiqiang Liu, Nanjing University of Aeronautics and Astronautics, China
Ma1a.2: Homomorphic Evaluation Friendly Vision Transformer Design 7
Antian Wang, Yingjie Lao, Clemson University, United States
Ma1a.3: SCC5G: A PQC-based Architecture for Highly Secure Critical Communication over 11
Cellular Network in Zero-Trust Environment
Mohammed Gharib, Fatemeh Afghah, CLEMSON UNIVERSITY, United States
Ma1a.4: Efficient Hardware RNS Decomposition for Post-Quantum Signature Scheme 19
FALCON
Samuel Coulon, Pengzhou He, Tianyou Bao, Jiafeng Xie, Villanova University, United States

MA2a: Deep Learning for Medical Imaging (Invited)
MA2a.1: Accelerated Phase-Contrast Flow MRI with Low-Rank and Generative Subspace 27
Modeling
Hengfa Lu, Aiqi Sun, Jiachen Wang, Bo Zhao, The University of Texas at Austin, United States
MA2a.2: Fast Image Recovery using Plug-and-Play Multi-Scale Energy (MuSE) Framework 32
Jyothi Rikhab Chand, Mathews Jacob, University of Iowa, United States
MA2a.4: On Reference-based Image Quality Assessment in Medical Image Reconstruction: 36
Potential Pitfalls and Possible Solutions
Chin-Cheng Chan, Jiayang Wang, Tashfa Nadeem, Justin P. Haldar, University of Southern California, United States

MA3a: Optimization
MA3a.1: End-to-End Learning of Communication Systems with Novel Data-Efficient IIR 40
Channel Identification
Roya Khanzadeh, Stefan Angerbauer, Andreas Springer, Werner Haselmayr, Johannes Kepler University Linz, Austria
MA3a.2: Optimal SDNR Digital Predistortion via Direct Inversion 47
Luis Godoy, Andrés Villamil, Emil Matus, Gerhard Fettweis, Technische Universität Dresden, Germany
MA3a.3: Analog-digital Scheduling for Federated Learning: A Communication-Efficient 53
Approach
Muhammad Faraz Ul Abrar, Nicolò Michelusi, Arizona State University, United States
MA3a.4: Strategic Quantization over a Noisy Channel 59
Anju Anand, Emrah Akyol, STATE UNIVERSITY OF NEW YORK AT BINGHAMTON, United States

MA4a: Massive Random Access (Invited)
MA4a.1: Remote Monitoring of Markov Sources over Random Access Channels: False Alarm and 64
Detection Probability
Andrea Munari, German Aerospace Center (DLR), Germany; Giuseppe Cocco, Polytechnic University of Catalonia (UPC), Spain; Gianluigi Liva, German Aerospace Center (DLR), Germany
MA4a.2: An Advanced Tree Algorithm with Interference Cancellation in Uplink and Downlink 72
Quirin Vogel, Yash Deshpande, Technical University of Munich, Germany; Cedomir Stefanovic, Aalborg University, Denmark; Wolfgang Kellerer, Technical University of Munich, Germany

MA4a.4: Heterogeneous Radio Access with Multiple Latency Targets 80
Israel Leyva-Mayorga, Aalborg University, Denmark; Jose Manuel Gimenez-Guzman, Universitat Politècnica de València, Spain; Lorenzo Valentini, University of Bologna, Italy; Petar Popovski, Aalborg University, Denmark

MA5a: Age of Information (Invited)
MA5a.1: Optimizing Information Freshness over a Channel that Wears Out..... 85
George J. Stamatakis, Linköping University, Sweden; Osvaldo Simeone, King's College London, United Kingdom; Nikolaos Pappas, Linköping University, Sweden
MA5a.2: Moment Generating Function of the Age of Gossip in Networks..... 90
Mohamed A. Abd-Elmagid, Harpreet S. Dhillon, Virginia Tech, United States
MA5a.3: Minimizing the Age of Information Over an Erasure Channel for Random Packet 95
Arrivals With a Storage Option at the Transmitter
Subhankar Banerjee, Sennur Ulukus, Anthony Ephremides, University of Maryland, College Park, United States
MA5a.4: Importance-aware Sampling of a Two-State Markov Source for Real-time Tracking..... 101
Mehrdad Salimnejad, Linkoping University, Sweden; Marios Kountouris, EURECOM, France; Nikolaos Pappas, Linkoping University, Sweden

MA6a1: Full-duplex MIMO (Invited)
MA6a1.1: On Array Geometry and Self-Interference in Full-Duplex Massive MIMO 122
Communications
Robin Rajamäki, UC San diego, United States; Risto Wichman, AaltoUniversity, Finland
MA6a1.2: STEER+: Robust Beam Refinement for Full-Duplex Millimeter Wave 134
Communication Systems
Ian Roberts, University of California, Los Angeles, United States; Yu Zhang, Tawfik Osman, Ahmed Alkhateeb, Arizona State University, United States
MA6a1.3: Sub-Band Full-Duplex for 5G New Radio: Challenges, Solutions and Performance..... 167
Lorenza Giupponi, Ericsson, Spain; Gabor Fodor, Ericsson Research and KTH Royal Institute of Technology, Sweden; Abhishek Ambede, Ericsson Research, Sweden; Dennis Hui, Bo Göransson, Ericsson, United States; Jose Mairton Barros Da Silva Jr, Uppsala University, Sweden
MA6a1.4: RIS-Assisted Self-Interference Mitigation for IBFD..... 182
Sultangali Arzykulov, Nazarbayev University, Kazakhstan; Abdulkadir Celik, King Abdullah University of Science and Technology, Saudi Arabia; Galymzhan Nauryzbayev, Nazarbayev University, Kazakhstan; Ahmed Eltawil, King Abdullah University of Science and Technology, Saudi Arabia

MA6a2: Federated Learning over Wireless Edge Devices I (Invited)
MA6a2.1: On the Tradeoff Between Heterogeneity and Communication Complexity in Federated 115
Learning
Priyanka Sinha, Jacek Kibilda, Walid Saad, Virginia Tech, United States

MA6a3: Reconfigurable Intelligent Surfaces I (Invited)
MA6a3.1: Unleashing 3D Connectivity in Beyond 5G Networks with Reconfigurable 106
Intelligent Surfaces
Jiguang He, Aymen Fakhreddine, Technology Innovation Institute, United Arab Emirates; Arthur S. de Sena, Centre for Wireless Communications, FI-90014, University of Oulu, Finland; Yu Tian, Technology Innovation Institute, United Arab Emirates; Merouane Debbah, KU 6G Research Center, Khalifa University of Science and Technology, United Arab Emirates
MA6a3.2: Integrated Imaging and Communication with Reconfigurable Intelligent Surfaces..... 151
Hao Luo, Ahmed Alkhateeb, Arizona State University, United States

MA6a4: Reconfigurable Intelligent Surfaces II (Invited)
MA6a4.1: RIS in Indoor Environments: Benchmarking Against Ambient Propagation..... 127
Masoud Sadeghian, Andrea Pizzo, Angel Lozano, Univ. Pompeu Fabra, Spain

MA6a4.2: Optimization of RIS-aided SISO Systems Based on a Mutually Coupled Loaded Wire Dipole Model 145
Nemanja Stefan Perovic, Université Paris-Saclay, CNRS, CentraleSupélec, France; Le-Nam Tran, University College Dublin, Ireland; Marco Di Renzo, Université Paris-Saclay, CNRS, CentraleSupélec, France; Mark F. Flanagan, University College Dublin, Ireland
MA6a4.3: Parametric Near-Field Channel Estimation for Extremely Large Aperture Arrays 162
Alva Kosasih, KTH Royal Institute, Sweden; Özlem Tuğfe Demir, TOBB University of Economics and Technology, Turkey; Emil Björnson, KTH Royal Institute, Sweden
MA6a4.4: Control Aspects for using RIS in Latency-Constrained Mobile Edge Computing 174
Fabio Saggese, Victor Croisfelt, Aalborg University, Denmark; Francesca Costanzo, University of Rome "La Sapienza", Italy; Junya Shiraishi, Radosław Kotaba, Aalborg University, Denmark; Paolo Di Lorenzo, University of Rome "La Sapienza", Italy; Petar Popovski, Aalborg University, Denmark

MA6a5: Modulation and Coding
MA6a5.1: A New Affine Fractional Fourier Transform With Circular Convolution Property 111
Amir Raeisi Nafchi, Mona Esmaeili, Balu Santhanam, Ramiro Jordan, University of New Mexico, United States
MA6a5.2: Fractional Chirp-Slope-Shift-Keying for SDR-based Search and Rescue Applications 140
Daniel Gil Gaviria, Marcus Müller, Felix Artmann, Laurent Schmalen, Karlsruhe Institute of Technology (KIT), Germany
MA6a5.3: ML-Based Feedback-Free Adaptive MCS Selection for Massive Multi-User MIMO 157
Qing An, Mehdi Zafari, Graduate Student, United States; Chris Dick, Nvidia, United States; Santiago Segarra, Assistant Professor, United States; Ashutosh Sabharwal, Professor, United States; Rahman Doost-Mohammady, Assistant Research Professor, United States

MA6a6: Comm Systems: IoT, V2V, 5G
MA6a6.1: Integration of Index and Differential Modulation for Non-coherent Grant-free NOMA 192
Eiji Yoshimura, Takanori Hara, Kenichi Higuchi, Tokyo University of Science, Japan
MA6a6.2: Increasing LoRa Sensitivity and Reliability with an IoT Cloud RAN 197
Joachim Tapparel, Andreas Burg, École polytechnique fédérale de Lausanne, Switzerland
MA6a6.3: Cooperative Perception for Connected Autonomous Vehicles under Constrained V2V Networking 210
Ahmad Sarlak, Sayed Pedram Haeri Boroujeni, Hazim Alzorgan, Clemson University, United States; Rahul Amin, MIT Lincoln Laboratory, United States; Abolfazl Razi, Hossein Rajoli, Clemson University, United States
MA6a6.4: Vehicle Cameras Guide mmWave Beams: Approach and Real-World V2V Demonstration 225
Tawfik Osman, Gouranga Charan, Ahmed Alkhateeb, Arizona State University, United States
MA6a6.5: Outage Probability Calculation for Two-Ray Ground Reflection Scenarios with Frequency Diversity 237
Karl-Ludwig Besser, Princeton University, United States; Eduard A. Jorswieck, Technische Universität Braunschweig, Germany; Justin P. Coon, University of Oxford, United Kingdom
MA6a6.6: Scheduling URLLC and Punctured eMBB Users with Retransmissions and Rate Adaptation Techniques 243
Ahmed Ewaisha, Cihan Tepedelenlioglu, Arizona State University, United States
MA6a6.7: seq2seq-SC: End-to-End Semantic Communication Systems with Pre-Trained Language Model 260
Ju-Hyung Lee, Dong-Ho Lee, Eunsoo Sheen, Thomas Choi, Jay Pujara, University of Southern California, United States

MA6a7: Comm Systems: Optimization, Latency, and Security

MA6a7.1: Orbital Modulation for Shared Spectrum Optimization and Obfuscated Communications 188
Scott Velazquez, Linearity, LLC, United States; Brennan Eveland, Robert Shanafelt, TM Technologies, Inc., United States

MA6a7.2: A Time-Frequency Modulation and Coding Scheme for Communications in the Presence of LFM Chirp Radar 202
Hsin-Yung Lin, Mark R. Bell, Purdue University, United States

MA6a7.3: NOMA-Based Scheduling and Offloading for Energy Harvesting Devices using Reinforcement Learning 215
Ibrahim Djemai, Mireille Sarkiss, Télécom SudParis, Institut Polytechnique de Paris, France; Philippe Ciblat, Télécom Paris, Institut Polytechnique de Paris, France

MA6a7.4: Reliable Adaptive Recoding for Batched Network Coding with Burst-Noise Channels 220
Jie Wang, Georgia Institute of Technology, United States; Talha Bozkus, University of Southern California, United States; Yao Xie, Georgia Institute of Technology, United States; Urbashi Mitra, University of Southern California, United States

MA6a7.5: Random Orthogonalization for Private Wireless Federated Learning 233
Sadaf ul Zuhra, Mohamed Seif, Princeton University, United States; Karim Banawan, Alexandria University, Egypt; H. Vincent Poor, Princeton University, United States

MA6a7.6: Covert Communications under Environmental Uncertainty on a Continuous-Time Channel 248
Amna Gillani, University of Massachusetts Amherst, United States; Tamara Sobers, The MITRE Corporation, Bedford, MA, USA, United States; Don Towsley, Dennis Goeckel, University of Massachusetts Amherst, United States

MA6a7.7: Sampling-Based Linear Approximate Planning for Underwater Space-Time Fair Scheduling 253
Chen Peng, Urbashi Mitra, University of Southern California, United States

MA6a7.8: An Improved Dictionary Design for Multicarrier Underwater Transmission 265
Xiang Huang, Rong-Rong Chen, University of Utah, United States

MA6a7.9: Path-Based Frequency Offset Estimation for Acoustic OFDM Systems 270
Diego Cuji, Zhengnan Li, Milica Stojanovic, Northeastern University, United States

MA1b: Hyperdimensional Computing (invited)

MA1b.1: Classifying Functional Brain Graphs using Graph Hypervector Representation 275
Lulu Ge, University of Minnesota, United States; Ali Payani, Hugo Latapie, Cisco Systems, United States; Keshab K. Parhi, University of Minnesota, United States

MA1b.3: Technology/Algorithm Co-design for Robust Brain-inspired Hyperdimensional In-memory Computing 280
Paul R. Genssler, University of Stuttgart, Germany; Hussam Amrouch, Technical University of Munich, MERMI, University of Stuttgart, Germany

MA1b.4: Hyperdimensional Computing for Robust and Efficient Unsupervised Learning 281
Sanggeon Yun, Hamza Errahmouni Barkam, University of California, Irvine, United States; Paul Genssler, University of Stuttgart, Germany; Hugo Latapie, CISCO Systems, United States; Hussam Amrouch, Technical University of Munich, Germany; Mohsen Imani, University of California Irvine, United States

MA2b: Signal Processing for Prosthetics (Invited)

MA3b: Edge Computing and Learning (Invited)

MA3b.1: Mobility-assisted Federated Learning for Vehicular Edge Computing 289
Jieming Bian, Jie Xu, University of Miami, United States

MA4b: Massive MIMO

MA4b.1: Holographic Distributed Coherent Beamforming 294
Jacob Holtom, Andrew Herschfelt, Shammi Doly, Daniel Bliss, Arizona State University, United States
MA4b.2: BiSPARCs for Unsourced Random Access in Massive MIMO 299
Patrick Agostini, Zoran Utkovski, Slawomir Stanczak, Fraunhofer Heinrich Hertz Institute, Germany
MA4b.3: Robust Covariance-Based Activity Detection for Massive Access 304
Jianan Bai, Erik G. Larsson, Linköping University, Sweden
MA4b.4: Universal MIMO Jammer Mitigation via Secret Temporal Subspace Embeddings 309
Gian Marti, Christoph Studer, ETH Zurich, Switzerland

MA5b: Machine Learning over Graphs (Invited)

MA5b.1: Generative Few-shot Graph Classification: An Adaptive Perspective 317
Song Wang, Jundong Li, University of Virginia, United States
MA5b.2: Community Detection in High-Dimensional Graph Ensembles 322
Robert Malinas, Dogyoon Song, Alfred Hero, University of Michigan, United States
MA5b.3: Fairness-Aware Graph Filter Design 330
O. Deniz Kose, Yanning Shen, University of California Irvine, United States; Gonzalo Mateos, University of Rochester, United States
MA5b.4: Extending DSP to Graph Signal Processing: The Companion Approach 335
John Shi, Jose M. F. Moura, Carnegie Mellon University, United States

MA6b1: Simultaneous Tx-Rx (Invited)

MA6b1.1: Joint Self-Interference Cancellation and Data Estimation for OFDM Based Full-Duplex Communication Systems 345
Stefan Baumgartner, Carl Böck, Mario Huemer, Johannes Kepler University Linz, Austria; Alexios Balatsoukas-Stimming, Eindhoven University of Technology, Netherlands
MA6b1.2: Residual Neural Networks for Learning the Full-Duplex Self-Interference 370
Mohamed Elsayed, Ahmad A. Aziz El-Banna, Octavia A. Dobre, Faculty of Engineering and Applied Science, Memorial University, Canada; Wan Yi Shiu, Peiwei Wang, Huawei Canada Research Centre, Huawei Technologies Canada Company Ltd., Canada
MA6b1.3: Cascaded Models for Cancellation of Air-Induced Passive Intermodulation in MIMO Transceivers 398
Vesa Lampu, Lauri Anttila, Matias Turunen, Tampere University, Finland; Marko Fleischer, Jan Hellmann, Nokia Mobile Networks, Germany; Mikko Valkama, Tampere University, Finland
MA6b1.4: Enabling Integrated Sensing and Communication using In-Band Full-Duplex Systems 410
Hao-Lun Weng, Yung-Chih Chih, Chung-An Shen, National Taiwan University of Science and Technology, Taiwan; Mohammed Fouda, Rain Neuromorphics, United States; Ahmed Eltawil, KAUST, Saudi Arabia

MA6b2: Multiuser and Massive MIMO

MA6b2.1: DFT-Based Channel Estimation for Holographic MIMO 353
Antonio Alberto D'Amico, Giacomo Bacci, Luca Sanguinetti, University of Pisa, Italy
MA6b2.2: Enhanced Low-Complexity FDD System Feedback with Variable Bit Lengths via Generative Modeling 363
Nurettin Turan, Benedikt Fesl, Wolfgang Utschick, Technical University of Munich, Germany
MA6b2.3: Device Detection and Channel Estimation in MTC with Correlated Activity Pattern 393
Hamza Djelouat, Mikko Sillanpää, Markku Juntti, University of Oulu, Finland
MA6b2.4: PAPR Reduction Utilizing Difference in Singular Values Among Spatial Channels in Uplink Eigenmode Massive MIMO Transmission 415
Yuta Abekura, Kenichi Higuchi, Tokyo University of Science, Japan
MA6b2.5: The Impact of SAR-ADC Mismatch on Quantized Massive MU-MIMO Systems 420
Jérémy Guichemerre, Christoph Studer, ETH Zurich, Switzerland
MA6b2.6: Enhanced Data Detection for Massive MIMO with 1-Bit ADCs 427
Amin Radbord, Italo Atzeni, Antti Tölli, University of Oulu, Finland

MA6b2.7: A Fourier Analysis of Digital Beamforming with Severely Quantized mmWave Arrays.....433
Canan Cebeci, Upamanyu Madhow, University of California, Santa Barbara, United States
MA6b2.8: Reinforcement Learning-Based Weak Signal Detection from Compressed 438
Measurements in Massive MIMO Systems
Md Saidur Rahman Pavel, Yimin Zhang, Temple University, United States

MA6b3: Channel Estimation

MA6b3.1: Joint Channel Estimation and Symbol Detection for OTFS System using a 340
Two-Stage Algorithm
Rabah Ouchikh, Ecole Militaire polytechnique, Algeria; Abdeldjalil Aïssa-El-Bey, Thierry Chonavel, ECOLE NATIONALE SUPERIEURE MINES-TELECOM ATLANTIQUE BRETAGNE, France; Mustapha Djeddou, National Polytechnic School, Algeria
MA6b3.2: Low-Rank Structured MMSE Channel Estimation with Mixtures of Factor 375
Analyzers
Benedikt Fesl, Nurettin Turan, Wolfgang Utschick, Technical University of Munich, Germany
MA6b3.3: Max-min Hierarchical Codebooks for Millimeter-Wave Channel Sensing with 387
Bandit Algorithms
Parthasarathi Khirwadkar, Sina Shahsavari, Mehmet Can Hucumenoglu, Piya Pal, University of California San Diego, United States

MA6b4: Cell free Systems

MA6b4.1: LLR Refinement Strategies for Iterative Detection and Decoding Schemes in 358
Cell-Free Massive MIMO Networks
Tonny Ssettumba, Zhichao Shao, Lukas T. N. Landau, Pontifical Catholic University of Rio de Janeiro (PUC-Rio), Brazil; Michelle S. P. Facina, Fundação Centro de Pesquisa e Desenvolvimento em Telecomunicações, Brazil; Paulo Branco da Silva, Fundação Centro de Pesquisa e Desenvolvimento em Telecomunicações (CPQD), Brazil; Rodrigo C. de Lamare, Pontifical Catholic University of Rio de Janeiro (PUC-Rio), Brazil
MA6b4.2: Cell-free Joint Sensing and Communication MIMO: A Max-Min Fair Beamforming 381
Approach
Umut Demirhan, Ahmed Alkhateeb, Arizona State University, United States
MA6b4.3: Nonlinear Cluster-Based Precoders for Cell-Free MU-MIMO Systems.....405
André Robert Flores Manrique, Rodrigo Caiado de Lamare, Pontifical Catholic University of Rio de Janeiro, Brazil; Kumar Vijay Mishra, United States DEVCOM Army Research Laboratory, United States

MA6b5: MIMO Communications

MA6b5.1: Full-Duplex Adaptive Array.....443
Robert Shanafelt, TM Technologies, Inc., United States; Scott Velazquez, Linearity, LLC, United States
MA6b5.2: Robust Joint Transmit and Receive Beamformer Design for Dual-Function 452
Radar-Communication Systems
Runchen Liang, McMaster University, Canada; Cai Wen, Northwest University, China; Timothy Davidson, McMaster University, Canada
MA6b5.3: Doubly 1-Bit Quantized Massive MIMO.....465
Italo Atzeni, Antti Tölli, University of Oulu, Finland; Duy H. N. Nguyen, San Diego State University, United States; A. Lee Swindlehurst, University of California, Irvine, United States
MA6b5.4: Novel Sensing Methodology for Initial Alignment Using MmWave Phased Arrays.....475
Rohan Ramchandra Pote, Bhaskar D. Rao, University of California San Diego, United States
MA6b5.5: Fast Deep Unfolded Hybrid Beamforming in Multiuser Large MIMO Systems.....486
Nhan Thanh Nguyen, University of Oulu (UOULU), Finland; Ly Van Nguyen, University of California, Irvine, United States; Nir Shlezinger, Ben-Gurion University of the Negev, Beer-Sheva, Israel; A. Lee Swindlehurst, University of California, Irvine, Israel; Markku Juntti, University of Oulu, Finland, Israel
MA6b5.6: Over-the-Air Calibration via Two-Way Signaling for Millimeter Wave Systems.....491
Vasanthan Raghavan, Kobi Ravid, Ozge Koymen, Junyi Li, Qualcomm, United States

MA6b5.7: Low-complexity Linear Multicast Beamforming for Cache-aided MIMO Communications 509
Mohammad NaseriTehrani, mohammadjavad Salehi, Antti Tölli, Centre for Wireless Communications (CWC)- University of Oulu, Finland
MA6b5.8: Experimental Survey of Discrete Minimizers of the p-frame Energy....522
Dmitriy Bilyk, University of Minnesota, United States; Alexey Glazyrin, University of Texas Rio Grande Valley, United States; Ryan Matzke, Vanderbilt University, United States; Josiah Park, Texas A&M University, United States; Oleksandr Vlasiuk, Vanderbilt University, United States
MA6b5.9: Robust Class-Conditional Distribution Alignment for Partial Domain Adaptation....530
Sandipan Choudhuri, Arunabha Sen, Arizona State University, United States

MA6b6: Reflective Intelligent Surfaces (III)
MA6b6.2: Online Null Adaptation on a Digitally Controllable Reflectarray Receiver....447
Christian Chapman, Swaroop Appadwedula, Keith Forsythe, William Moulder, David Browne, Massachusetts Institute of Technology Lincoln Laboratory, United States
MA6b6.3: Design of a Single-User RIS-Aided MISO System Based on Statistical Channel Knowledge 460
Sadaf Syed, Dominik Semmler, Donia Ben Amor, Michael Joham, Wolfgang Utschick, Technical University of Munich, Germany
MA6b6.4: Efficient Design of Multi-group Multicast Beamforming via Reconfigurable Intelligent Surface 470
Mohammad Ebrahimi, Min Dong, Ontario Tech University, Canada
MA6b6.5: Amplitude-Based Sequential Optimization of Energy Harvesting With Reconfigurable Intelligent Surfaces 480
Morteza Tavana, KTH Royal Institute of Technology, Sweden; Meysam Masoudi, Ericsson, Sweden; Emil Björnson, KTH Royal Institute of Technology, Sweden
MA6b6.6: URLLC in IRS-Aided MIMO Systems: Finite Blocklength Analysis and Design....496
Xin Zhang, Shenghui Song, HKUST, Hong Kong SAR of China
MA6b6.7: Broad Beam Reflection for RIS-Assisted MIMO Systems with Planar Arrays....504
Parisa Ramezani, KTH Royal Institute of Technology, Sweden; Maksym Girnyk, Ericsson Networks, Sweden; Emil Björnson, KTH Royal Institute of Technology, Sweden
MA6b6.8: Capacity Gain from Multi-mode Reconfigurable Antennas as a Function of Degrees of Control in Clustered MIMO Channels 514
Siyu Liao, Taiyun Chi, Ashutosh Sabharwal, Rice university, United States

MP1b: Neuromorphic Computing (invited)
MP1b.1: Evaluating Neuron Models through Application-Hardware Co-Design....537
Catherine Schuman, Hritom Das, James Plank, Ahmedullah Aziz, Garrett Rose, University of Tennessee, United States
MP1b.4: Energy-efficient Hardware Design for Spiking Neural Networks....543
Abhishek Moitra, Ruokai Yin, Priyadarshini Panda, Yale University, United States

MP2b: Statistical Methods for Neural Analysis (Invited)

MP3b: Beamforming
MP3b.1: Direction-of-Arrival Estimation using Location Unaware Linear Array....545
Parth Mehta, Kumar Appaiah, Rajbabu Velmurugan, Indian Institute of Technology Bombay, India
MP3b.2: Robust Localization of Close-Range Radar Reflections....549
Andreas Jansson, Acconeer/Lund University, Sweden; Andreas Jakobsson, Lund University, Sweden
MP3b.3: Mode Estimation Using Sub-band Processing for LFM Reception....554
Bhargabi Chakrabarti, Kathleen E. Wage, George Mason University, United States

MP3b.4: Per-Antenna Power Constrained Cooperative Beamforming in Distributed Relay Networks 559
Adarsh Venkataramani, Owen Ma, Arindam Dutta, Jacob Holtom, Daniel Bliss, Arizona State University, United States

MP4b: Graph Signal Processing

MP4b.1: Convergence of Graph Neural Networks on Relatively Sparse Graphs 566
Zhiyang Wang, University of Pennsylvania, United States; Luana Ruiz, Johns Hopkins University, United States; Alejandro Ribeiro, University of Pennsylvania, United States

MP4b.2: A Simplified Framework for Contrastive Learning for Node Representations 573
Ilgee Hong, Huy Tran, Claire Donnat, The University of Chicago, United States

MP4b.3: Robust Graph Neural Network Based on Graph Denoising 578
Victor M. Tenorio, Samuel Rey, Antonio G. Marques, King Juan Carlos University, Spain

MP4b.4: Graph Classification via Simple Graph Based Features 583
Farida Abdelmoneum, John Shi, Jose M. F. Moura, Carnegie Mellon University, United States

MP4b.5: A Belief Propagation Approach for Direct Multipath-Based SLAM 588
Mingchao Liang, University of California, San Diego, United States; Erik Leitinger, Graz University of Technology, Austria; Florian Meyer, University of California, San Diego, United States

MP5b: Fast and Scalable Algorithms

MP5b.1: Conic Descent Redux for Memory-Efficient Optimization 594
Bingcong Li, Georgios Giannakis, University of Minnesota, Twin Cities, United States

MP5b.2: High Probability Guarantees for Submodular Maximization via Boosted Stochastic Greedy 602
Andrés Castillo, Ege Kaya, Abolfazl Hashemi, Purdue University, United States

MP5b.3: FedAvg for Minimizing Polyak-Lojasiewicz Objectives: The Interpolation Regime 607
Shruti Maralappanavar, IIT Dharwad, India; Prashant Khanduri, Wayne State University, United States; Bharath B. N., IIT Dharwad, India

MP5b.4: Stratified-NMF for Heterogeneous Data 614
James Chapman, Yotam Yaniv, Deanna Needell, University of California, Los Angeles, United States

MP6b1: Federated Learning over Wireless Edge Devices II (Invited)

MP6b1.1: Rethinking the Data Heterogeneity in Federated Learning 624
Jiayi Wang, University of Utah, United States; Shiqiang Wang, IBM T. J. Watson Research Center, United States; Rong-Rong Chen, Mingyue Ji, University of Utah, United States

MP6b1.4: Federated Learning for Massive MIMO Power Allocation 651
Yushu Yan, Xiangyu Chang, Basak Guler, Amit K. Roy-Chowdhury, Srikanth V. Krishnamurthy, University of California, Riverside, United States; Ananthram Swami, Army Research Laboratory, United States

MP6b2: Machine Learning for Communication Systems (Invited)

MP6b2.2: Offline Reinforcement Learning for Wireless Network Optimization with Mixture Datasets 629
Kun Yang, Cong Shen, Univeristy of Virginia, United States; Jing Yang, The Pennsylvania State University, United States; Shu-ping Yeh, Jerry Sydir, Intel Corporation, United States

MP6b2.3: Open RAN LSTM Traffic Prediction and Slice Management using Deep Reinforcement Learning 646
Fatemeh Lotfi, Fatemeh Afghah, Clemson University, United States

MP6b2.4: Time-Varying Noise Perturbation and Power Control for Differential-Privacy-Preserving Wireless Federated Learning 656
Dang Qua Nguyen, Taejoon Kim, University of Kansas, United States

MP6b3: Wireless Networks

MP6b3.1: Optimal Fairness Scheduling for Coded Caching in Multi-AP Multi-antenna WLAN 619
Kagan Akcay, Technische Universität Berlin, Germany; MohammadJavad Salehi, Antti Tölli, University Of Oulu, Finland; Giuseppe Caire, Technische Universität Berlin, Germany
MP6b3.2: Determinantal Learning for Drone Networks 634
Xiangliu Tu, Virginia Tech, United States; Chiranjib Saha, Qualcomm, United States; Harpreet S. Dhillon, Virginia Tech, United States
MP6b3.3: Data-Driven Classification of Low-Power Communication Signals by an Unauthenticated Agent using a Software-Defined Radio 639
Tarun Rao Keshabhoina, Virginia Tech, United States; Marcos Vasconcelos, Florida State University, United States
MP6b3.4: Performance of Mobile Cyber-Physical Agents with Discrete Trajectories for Sensing Spatio-Temporal Variables 661
Wasif Hussain, Abhishek Gupta, Kaushlendra Pandey, Indian Institute of Technology Kanpur, India; Harpreet Dhillon, Virginia Tech, United States

MP6b4: Network Optimization and Information Theory

MP6b4.1: Quantum Cross Subspace Alignment Codes via the N-sum Box Abstraction 670
Yuxiang Lu, Syed Jafar, University of California, Irvine, United States
MP6b4.2: Blind Interference Alignment for MapReduce: Jointly Exploiting Side-information and Reconfigurable Antennas 682
Yuxiang Lu, Syed Jafar, University of California, Irvine, United States
MP6b4.3: Semantic-aware Real-time Tracking of a Markov Source under Sampling and Transmission Costs 694
Abolfazl Zakeri, University of Oulu, Finland; Mohammad Moltafet, University of California Santa Cruz, United States; Marian Codreanu, Link¨oping University, Sweden
MP6b4.4: Rate-Distortion Function of the Stochastic Block Model 699
Martin Wachiye Wafula, Praneeth Kumar Vippathalla, Justin P Coon, Mihai-Alin Badiu, University of Oxford, United Kingdom
MP6b4.5: Wire Before You Walk 714
Tesfa Asmara, Pomona College, United States; Dhananjay Bhaskar, Ian Adelstein, Smita Krishnaswamy, Yale University, United States; Michael Perlmutter, Boise State University, United States

MP6b5: Network Algorithms

MP6b5.1: Noisy Communication of Information in Federated Learning: An Improved Convergence Analysis 666
Antesh Upadhyay, Abolfazl Hashemi, Purdue University, United States
MP6b5.2: Communication-Efficient Distribution-Free Inference Over Networks 675
Mehrdad Pournaderi, Yu Xiang, University of Utah, United States
MP6b5.3: Distributed Change Point Detection in Streaming Manifold-valued Signals over Graphs 689
Xiuheng Wang, Université Côte d'Azur, CNRS, OCA., France; Ricardo Augusto Borsoi, Universit´e de Lorraine, CNRS, CRAN., France; Cédric Richard, André Ferrari, Université Côte d'Azur, CNRS, OCA., France
MP6b5.4: Privacy-Preserving Clustered Peer-to-Peer Learning 704
Xue Zheng, Aylin Yener, The Ohio State University, United States
MP6b5.5: Peer-to-Peer Learning + Consensus with Non-IID Data 709
Srinivasa Pranav, José M.F. Moura, Carnegie Mellon University, United States
MP6b5.6: A Novel Scheme for Cache-aided Multiuser Private Information Retrieval with User-to-user Privacy 717
Xiang Zhang, University of Utah, United States; Kai Wan, Huazhong University of Science and Technology, China; Hua Sun, University of North Texas, United States; Mingyue Ji, University of Utah, United States; Giuseppe Caire, Technische Universit at Berlin, Germany

MP6b5.7: Reinforcement Learning Based Dynamic Power Control for UAV Mobility Management 724
Irshad Ahmad Meer, KTH Royal Institute of Technology, Sweden; Karl-Ludwig Besser, Princeton University, United States; Mustafa Ozger, KTH Royal Institute of Technology, Sweden; H. Vincent Poor, Princeton University, United States; Cicek Cavdar, KTH Royal Institute of Technology, Sweden
MP6b5.8: Exploring the Interplay of Interference and Queues in Unlicensed Spectrum Bands for UAV Networks 729
Masoud Ghazikor, University of Kansas, United States; Keenan Roach, Kenny Cheung, Universities Space Research Association, United States; Morteza Hashemi, University of Kansas, United States

TA1a: Machine Learning Accelerators (invited)
TA1a.1: Ergodic Approximate Deep Learning Accelerators 734
Tim van Lijssel, Alexios Balatsoukas-Stimming, Eindhoven University of Technology, Netherlands
TA1a.2: On the Design of Reconfigurable Edge Devices for RF Fingerprint Identification (RED-RFFI) for IoT Systems 739
Thomas Keller, Joseph R. Cavallaro, Rice University, United States
TA1a.3: Dynamically Reconfigurable Perception using Dataflow Parameterization of Channel Attention 747
Yujunrong Ma, University of Maryland, United States; Kshitij Nikhal, University of Nebraska-Lincoln, United States; Jani Boutellier, University of Vaasa, Finland; Benjamin Riggan, University of Nebraska-Lincoln, United States; Shuvra Bhattacharyya, University of Maryland, United States

TA2a: Holographic Approaches (Invited)
TA2a.1: Diffractive Optical Networks & Computational Imaging Without a Computer 755
Aydogan Ozcan, University of California, Los Angeles, United States

TA3a: Joint Communication and sensing (Invited)
TA3a.1: An IRS-Assisted Secure Dual-Function Radar-Communication System 757
Yi-Kai Li, Athina Petropulu, Rutgers University, United States
TA3a.2: Multi-cell Coordinated Joint Sensing and Communications 763
Nithin Babu, Christos Masouros, University College London, United Kingdom
TA3a.3: In-Band Full-Duplex Integrated Sensing and Communication Using OTFS Waveforms 768
Haifeng Luo, Abhijeet Bishnu, Tharmalingam Ratnarajah, The University of Edinburgh, United Kingdom
TA3a.4: Power control and Active RIS Design for Energy-Efficient Integrated Sensing and Communications 774
Mohamed Rihan, University of Cassino and Southern Latium/Menoufia University, Italy; Alessio Zappone, University of Cassino and Southern Latium, Italy; Stefano Buzzi, University of Cassino and Southern Latium and Politecnico di Milano, Italy; Emanuele Grossi, University of Cassino and Southern Latium, Italy

TA4a: Computational Imaging (Invited)
TA4a.2: Diffusion Models for Phase Retrieval in Computational Imaging 779
Shirin Shoushtari, Jiaming Liu, Ulugbek Kamilov, Washington University in St. Louis, United States
TA4a.4: Dynamic DH-MBIR for Phase-Error Estimation from Streaming Digital-Holography Data 784
Ali Sheikh, Purdue University, United States; Casey Pellizzari, United States Air Force Academy, United States; Sherman Kisner, High Performance Imaging LLC, United States; Gregery Buzzard, Charles Bouman, Purdue University, United States

TA6a1: Higher-order Network Interactions (Invited)

TA6a1.1: Combinatorial Complexes: Bridging the Gap Between Cell Complexes and Hypergraphs 799
Mustafa Hajij, University of San Francisco, United States; Ghada Zamzmi, University of South Florida, United States; Theodore Papamarkou, University of Manchester, United Kingdom; Aldo Guzmán-Sáenz, IBM Corporation, United States; Tolga Birdal, Imperial College London, United Kingdom; Michael T. Schaub, RWTH Aachen University, Germany
TA6a1.2: Gaussian Processes for Edge Flow Prediction with Active Learning 809
Sravanthi Gurugubelli, Sundeep Prabhakar Chepuri, Indian Institute of Science Bangalore, India
TA6a1.3: Probabilistic Topological Models over Simplicial Complexes 822
Stefania Sardellitti, Sergio Barbarossa, Sapienza University of Rome, Italy

TA6a2: Learning with Constraints (Invited)

TA6a2.1: Learning Non-myopic Power Allocation in Constrained Scenarios 804
Arindam Chowdhury, Rice University, United States; Santiago Paternain, Rensselaer Polytechnic Institute, United States; Gunjan Verma, Ananthram Swami, DEVCOM Army Research Laboratory, United States; Santiago Segarra, Rice University, United States
TA6a2.2: Learning Safety Critics via a Non-Contractive Binary Bellman Operator 814
Agustin Castellano, Johns Hopkins University, United States; Hancheng Min, University of Pennsylvania, United States; Juan Andrés Bazerque, University of Pittsburgh, United States; Enrique Mallada, Johns Hopkins University, United States

TA6a3: Modern Applications (Invited)

TA6a3.1: Improving Denoising Diffusion Probabilistic Models via Exploiting Shared Representations 789
Delaram Pirhayatifard, Mohammad Taha Toghani, Guha Balakrishnan, César A. Uribe, Rice University, United States

TA6a4: Compressive Sensing and Imaging

TA6a4.1: Partitioned Convolutional Dictionary Learning over Imbalanced Subspaces 794
Michael A. Culp, Naval Air Warfare Center Weapons Division, United States
TA6a4.3: Constrained Independent Vector Analysis with References: Algorithms and Performance Evaluation 827
Trung Vu, Francisco Laport, Hanlu Yang, Tulay Adali, University of Maryland, Baltimore County, United States
TA6a4.4: Stochastic Natural Thresholding Algorithms 832
Rachel Grotheer, Wofford College, United States; Shuang Li, University of California, Los Angeles, United States; Anna Ma, University of California, Irvine, United States; Deanna Needell, University of California, Los Angeles, United States; Jing Qin, University of Kentucky, United States
TA6a4.5: Solving Inverse Problems with Score-Based Generative Priors learned from Noisy Data 837
Asad Aali, Marius Arvinte, Sidharth Kumar, Jonathan Tamir, The University of Texas at Austin, United States

TA6a5: Supervised and Self-supervised Learning

TA6a5.1: Constrained Hierarchical Clustering via Graph Coarsening and Optimal Cuts 844
Eliabelle Mauduit, Andrea Simonetto, ENSTA Paris, France
TA6a5.2: Enhancing Neural Network Performance for Problems in the Physical Sciences: Applications to Electromagnetic Signal Source Localization 860
Maria Barger, Worcester Polytechnic Institute, United States; Evan Witz, Wisconsin Lutheran College, United States; Randy Paffenroth, Worcester Polytechnic Institute, United States
TA6a5.3: A Novel Cardiac Arrhythmia Classification Method Using Visibility Graphs and Graph Convolutional Network 866
Dorsa EPMoghaddam, Ananya Muguli, Behnaam Aazhang, Rice University, United States

TA6a5.4: Knowledge Distillation by Compressive Sampling 882
Shreyas Chaudhari, Jose Moura, Carnegie Mellon University, United States

TA6a6: Estimation and Inference

TA6a6.1: Power Grid Faults Classification via Low-Rank Tensor Modeling 849
Matthew Repasky, Yao Xie, Georgia Institute of Technology, United States; Yichen Zhang, University of Texas at Arlington, United States; Feng Qiu, Argonne National Laboratory, United States
TA6a6.2: Bias, Variance, and Threshold Level of the Least Squares Pitch Estimator with Windowed Data 854
Jonas Lindenberger, Silicon Austria Labs GmbH, Austria; Stefan Schuster, voestalpine Stahl GmbH, Austria; Oliver Lang, Johannes Kepler University, Austria; Alexander Haberl, voestalpine Stahl GmbH, Austria; Clemens Staudinger, K1-MET GmbH, Austria; Theresa Roland, voestalpine Metal Forming GmbH, Austria; Mario Huemer, Johannes Kepler University, Austria
TA6a6.3: Stochastic Geometry Analysis of Localizability in Vision-Based Geolocation Systems 871
Haozhou Hu, Harpreet S. Dhillon, R. Michael Buehrer, Virginia Tech, United States
TA6a6.4: Optimal Multi-Stream Quickest Detection with False Discovery Rate control 877
Topi Halme, Visa Koivunen, Aalto University, Finland
TA6a6.5: Intrinsic Slepian-Bangs Type Formula for Parameters on LGs with Unknown Measurement Noise Variance 887
Samy LABSIR, IPSA, France; Alexandre Renaux, University of Paris Saclay, France; Jordi Vilà-Valls, Eric Chaumette, ISAE-SUPAERO, France
TA6a6.6: Local Convergence of Gradient Descent-Ascent for Training Generative Adversarial Networks 892
Evan Becker, University of California Los Angeles, United States; Parthe Pandit, University of California San Diego, United States; Alyson Fletcher, University of California Los Angeles, United States; Sundeep Rangan, New York University, United States
TA6a6.7: Bethe Free Energy and Extrinsics in Approximate Message Passing 897
Zilu Zhao, Dirk Slock, EURECOM, France
TA6a6.8: Causal Structural Learning from Time Series: A Convex Optimization Approach 902
Song Wei, Yao Xie, Georgia Institute of Technology, United States
TA6a6.9: Deep Expectation-Consistent Approximation for Phase Retrieval 910
Saurav K. Shastri, Rizwan Ahmad, Philip Schniter, The Ohio State University, United States
TA6a6.10: Identifying Direct Causes using Intervened Target Variable 915
Kang Du, Yu Xiang, University of Utah, United States; Ilya Soloveychik, Hebrew University of Jerusalem, Israel
TA6a6.11: Streaming Low-Rank Matrix Data Assimilation and Change Identification 920
Henry Yuchi, Matthew Repasky, Terry Ma, Yao Xie, Georgia Institute of Technology, United States
TA6a6.13: Global One-Bit Phase Retrieval via Sample Abundance—Including an Application to STFT Measurements 925
Arian Eamaz, Farhang Yeganegi, Mojtaba Soltanalian, University of Illinois Chicago, United States
TA6a6.14: Error Probability Bounds for Invariant Causal Prediction via Multiple Access Channels 932
Austin Goddard, Yu Xiang, University of Utah, United States; Ilya Soloveychik, Hebrew University of Jerusalem, Israel

TA1b: Architectures for Machine Learning

TA1b.1: A Hardware-Oriented QAM Demodulation Method Driven by AW-SOM Machine Learning 937
Lorenzo Canese, Gian Carlo Cardarilli, Luca Di Nunzio, Rocco Fazzolari, Marco Re, Sergio Spanò, University of Rome, Italy

TA1b.2: Synaptic Turnover Promotes Efficient Learning in Bio-Realistic Spiking Neural Networks 942
Nikos Malakasis, Spyridon Chavlis, Panayiota Poirazi, Foundation for Research and Technology-Hellas (FORTH), Greece
TA1b.3: An Efficient Dot-Product Unit Based on Online Arithmetic for Variable Precision Applications 950
Saeid Gorgin, MohammadH. Golamrezaei, Jeong-A Lee, Chosun University, Republic of Korea; Miloˇs D. Ercegovac, University of California, Los Angeles, United States
TA1b.4: MSDF-SVM: Advantage of Most Significant Digit First Arithmetic for SVM Realization 955
Saeid Gorgin, Mohammadreza Najafi, Mohammad H. Golamrezaei, Jeong-A Lee, Chosun University, Republic of Korea; Miloˇs D. Ercegovac, University of California, Los Angeles, United States

TA2b: Bioinformatics
TA2b.1: Error Correction Codes for Testing Chemical/Biological Agents: Using Pooled Testing to Increase Test Reliability 960
Jirong Yi, University of Iowa, United States; Myung Cho, California State University, United States; Jingchao Gao, Xiaodong Wu, Weiyu Xu, Raghu Mudumbai, University of Iowa, United States
TA2b.2: Analysis of a Modified SEIRS Compartmental Model for COVID-19 965
Lavanya Shri S A, Clarkson University, United States; Bhavikkumar Patel, Arizona State University, United States; Mahesh Banavar, Clarkson University, United States; Mohil Malu, Cihan Tepedelenlioglu, Andreas Spanias, Arizona State University, United States; Stephanie Schuckers, Clarkson University, United States
TA2b.3: A Statistical Analysis of Duplication Errors in the Nanopore Sequencing Channel 970
Sarvin Motamen, Hao Lou, Farzad Farnoud, University of Virginia, United States
TA2b.4: Constrained Code for Data Storage in DNA via Nanopore Sequencing 975
Kallie Whritenour, Mete Civelek, Farzad Farnoud, University of Virginia, United States

TA3b: Cell-free Massive MIMO (Invited)
TA3b.1: Machine Learning-based Channel Prediction for Widely Distributed Massive MIMO with Real-World Data 982
David Löschenbrand, Markus Hofer, AIT Austrian Institute of Technology GmbH, Austria; Lukas Eller, Markus Rupp, TU Wien, Austria; Thomas Zemen, AIT Austrian Institute of Technology GmbH, Austria
TA3b.2: Joint Optimization of Switching Point and Power Control in Dynamic TDD Cell-Free Massive MIMO 988
Martin Andersson, Tung T. Vu, Linköping University, Sweden; Pål Frenger, Ericsson AB, Sweden; Erik G. Larsson, Linköping University, Sweden
TA3b.3: DRL-Based Joint AP Deployment and Network-Centric Cluster Formation for Maximizing Long-Term Energy Efficiency in Cell-free Massive MIMO 993
Ozan Alp Topal, Qinglong He, KTH Royal Institute of Technology, Sweden; Özlem Tuğfe Demir, TOBB University of Economics and Technology, Turkey; Meysam Masoudi, Ericsson, Sweden; Cicek Cavdar, KTH Royal Institute of Technology, Sweden
TA3b.4: Towards Practical Cell-Free 6G Network Deployments: An Open-Source End-to-End Ray Tracing Simulator 1000
William Tärneberg, Aleksei Fedorov, Lund University, Sweden; Gilles Callebaut, Liesbet Van der Perre, KU Leuven, Belgium; Emma Fitzgerald, Lund University, Sweden

TA4b: Implicit Neural Representations (Invited)

TA6b1: Algorithms for Adaptive Systems
TA6b1.2: Tensor Least Mean Fourth Algorithm 1006
Muhammad Moinuddin, King Abdulaziz University, Saudi Arabia; Azzedine Zerguine, King Fahd University of Petroleum & Minerals, Saudi Arabia

TA6b1.3: Low-Complexity and Model-Free Parameter Tracking Algorithms 1020
Daniel C. Vidal, Vítor H. Nascimento, University of São Paulo, Brazil
TA6b1.4: Advanced Results Verifying that Adaptive Fault Tolerance is Inherently Contained in 1030
Bio-Inspired Adaptive Optimization
William Jenkins, Pennsylvania State University, United States; Chandra Radhakrishnan, University of Illinois, United States
TA6b1.5: Teacher-Student Knowledge Distillation for Radar Perception on Embedded 1035
Accelerators
Steven Shaw, Kanishka Tyagi, Shan Zhang, Aptiv Technical Center, United States
TA6b1.6: On the Asymptotic Linear Convergence of Gradient Descent for Non-Symmetric 1049
Matrix Completion
Trung Vu, University of Maryland, Baltimore County, United States; Raviv Raich, Oregon State University, United States
TA6b1.7: Rayleigh-Ritz based updates of the Multilinear Singular Value Decomposition 1059
Vasileios Kalantzis, IBM Research, United States; Panagiotis Traganitis, Michigan State University, United States

TA6b2: Deep Learning
TA6b2.2: Radiation Anomaly Detection Using an Adversarial Autoencoder 1010
Charles Sayre, Eric Larson, Gabs DiLiegro, Joseph Camp, Southern Methodist University, United States; Bruce Gnade, University of Texas at Dallas, United States
TA6b2.3: A Generative Neighborhood-Based Deep Autoencoder with an Extended Loss Function 1015
for Robust Imbalanced Classification
Eirini Troullinou, Grigorios Tsagkatakis, University of Crete, Greece; Attila Losonczy, Columbia University, United States; Panayiota Poirazi, IMBB-FORTH, Greece; Panagiotis Tsakalides, University of Crete, Greece
TA6b2.4: Deep Learning-Based Pilotless Spatial Multiplexing....1025
Dani Korpi, Mikko Honkala, Janne M.J. Huttunen, Nokia Bell Labs, Finland
TA6b2.5: Adaptive LPD Radar Waveform Design with Generative Adversarial Neural 1039
Networks
Matthew Ziemann, DEVCOM Army Research Laboratory, United States; Christopher Metzler, University of Maryland, United States
TA6b2.6: DeepGRAND: Deep Graph Neural Diffusion 1044
Khang Nguyen, Hieu Nong, Khuong Nguyen, FSOFT AI Center, Viet Nam; Tan Nguyen, University of California, Los Angeles, United States; Vinh Nguyen, FSOFT AI Center, Viet Nam
TA6b2.7: A Novel Methodology for Accurate 12-Lead ECG Reconstruction 1054
Dorsa EPMoghaddam, Anton Banta, Rice University, United States; Allison Post, Mehdi Razavi, Texas Heart Institute, United States; Behnaam Aazhang, Rice University, United States
TA6b2.9: Solving Large-scale Spatial Problems with Convolutional Neural Networks....1064
Damian Owerko, Charilaos Kanatsoulis, Alejandro Ribeiro, University of Pennsylvania, United States
TA6b2.10: Trust, but Verify: Robust Image Segmentation using Deep Learning....1070
Fahim Ahmed Zaman, Xiaodong Wu, Weiyu Xu, Milan Sonka, Raghuraman Mudumbai, University of Iowa, United States
TA6b2.11: Complex-Valued Deep-Learning Model for 3D SAR Modeling and Image Generation....1075
Nithin Sugavanam, Emre Ertin, The Ohio State University, United States

TA6b3: Advances in Speech Processing I (Invited)
TA6b3.1: Fast Low-rank Filtered-x Least Mean Squares for Multichannel Active Noise 1085
Control
Jesper Brunnström, Martin Jälmby, Toon van Waterschoot, Marc Moonen, KU Leuven, Belgium
TA6b3.3: Adaptive Time Segmentation for Improved Signal Model Parameter Estimation for a 1106
Single-Source Scenario
Changheng Li, Richard Christian Hendriks, Delft University of Technology, Netherlands

TA6b4: Advances in Speech Processing II

TA6b4.1: Zero Shot Text to Speech Augmentation for Automatic Speech Recognition on Low-Resource Accented Speech Corpora 1080
Francesco Nespoli, Imperial College London / Nuance Communications UK, United Kingdom; Daniel Barreda, Nuance Communications Spain, Spain; Patrick Naylor, Imperial College London, United Kingdom

TA6b4.2: Transformer Ensemble for Synthesized Speech Detection 1100
Emily Bartusiak, Kratika Bhagtani, Amit Kumar Singh Yadav, Edward J. Delp, Purdue University, United States

TA6b4.3: Real-time Speech Enhancement and Separation with a Unified Deep Neural Network for Single/Dual Talker Scenarios 1117
Kashyap Patel, Anton Kovalyov, Issa Panahi, University of Texas at Dallas, United States

TA6b4.4: Binaural Speech Enhancement using Complex Convolutional Recurrent Networks 1130
Vikas Tokala, Eric Grinstein, Mike Brookes, Imperial College London, United Kingdom; Simon Doclo, University of Oldenburg, Germany; Jesper Jensen, Demant A/S, Denmark; Patrick A. Naylor, Imperial College London, United Kingdom

TA6b5: Computer Vision and Imaging

TA6b5.1: Iterative Graph-Based HDR Image Enhancement 1090
Zachary Lazri, University of Maryland, United States; Guan-Ming Su, Dolby Laboratories, United States

TA6b5.2: Personalized Food Image Classification: Benchmark Datasets and New Baseline 1095
Xinyue Pan, Jiangpeng He, Fengqing Zhu, Purdue University, United States

TA6b5.3: Interactive Motion Blur Framework for Immersive Mobile Viewing Experiences 1112
Dae Yeol Lee, Neeraj Gadgil, Guan-Ming Su, Dolby Laboratories, Inc., United States

TA6b5.4: Residual Encoding using Neural Field for Image Sequence Modeling 1123
Anustup Choudhury, Guan-Ming Su, Dolby Laboratories Inc., United States; Siddhant Gautam, Michigan State University, United States

TA6b5.5: FGSSAT : Unsupervised Fine-Grain Attribution of Unknown Speech Synthesizers Using Transformer Networks 1135
Kratika Bhagtani, Amit Kumar Singh Yadav, Ziyue Xiang, Purdue University, United States; Paolo Bestagini, Politecnico di Milano, Italy; Edward J. Delp, Purdue University, United States

TA6b5.6: Neural Segmentation Field in 3D Scene 1141
Tsung-Wei Huang, Dolby Laboratories, Inc., United States; Peihan Tu, University of Maryland, College Park, United States; Guan-Ming Su, Dolby Laboratories, Inc., United States

TA6b5.7: Partition Generation from Clustering using Key Point Detection 1146
Allen Rush, Sally Wood, Santa Clara University, United States

TP1a: Special Session on Adaptive Signal Processing and Machine Learning: A Tribute to Sam Stearns (Invited)

TP1a.1: Quantum Linear Prediction for System Identification and Spectral Estimation Applications 1151
Aradhita Sharma, Glen Uehara, Andreas Spanias, Arizona State University, United States

TP1a.3: An Adaptive and Interpretable Framework for Biomedical Image Analysis 1156
Samarth Singh, Scott Acton, Shayan Moosa, Natasha Sheybani, University of Virginia, United States

TP1a.4: A Review of Machine Learning Methods Applied to Video Analysis Systems 1161
Marios Pattichis, Venkatesh Jatla, University of New Mexico, United States; Alvaro E. Ulloa Cerna, Pontificia Universidad Catolica del Peru, Peru

TP2a: Bilevel Optimization (Invited)

TP3a: Generative Models (Invited)

TP4a: Co-design for Computational Sensing (Invited)

TP4a.2: Recent Advances in Computational Time-of-Flight Imaging....1166
Miguel Heredia Conde, Alvaro Lopez Paredes, Faisal Ahmed, University of Siegen, Germany; Peyman F. Shahandashti, Paula López, Universidade de Santiago de Compostela, Spain
TP4a.4: Array Design Based on the Worst-Case Cramér-Rao Bound to Account for Multiple Targets 1174
Costas Kokke, Delft University of Technology, Netherlands; Mario Coutino, TNO, Netherlands; Richard Heusdens, Netherlands Defence Academy, Netherlands; Geert Leus, TU Delft, Netherlands

TP6a1: Automotive Radar (Invited)

TP6a1.1: Deep Reinforcement Learning for Secure MEC Service in Vehicular Networks with Reconfigurable Intelligent Surfaces 1184
Haoyu Wang, University of California, Irvine, United States; Haowen Bai, Ying Ju, Xidian University, China; Lee Swindlehurst, University of California, Irvine, United States
TP6a1.2: 4D Automotive Radar Exploiting Sparse Array Optimization and Compressive Sensing....1189
Ruxin Zheng, Shunqiao Sun, The University of Alabama, United States; Wesley Kuo, Theagenis Abatzoglou, Matt Markel, Spartan Radar, United States
TP6a1.3: SAR on the Wheels: High-Resolution Synthetic Aperture Radar Sensing on Moving Vehicles 1204
Kun Qian, Xinyu Zhang, University of California San Diego, United States
TP6a1.4: Generalized Optimization of Sparse Antenna Arrays for High-Resolution Automotive Radar Imaging 1215
Lifan Xu, Shunqiao Sun, The University of Alabama, United States; Ryan Wu, Dongyin Ren, Jun Li, NXP Semiconductors, United States
TP6a1.5: High-Speed Moving Target Parameter Estimation for One-Bit MIMO PMCW Automotive Radar 1220
Jiaying Ren, Chao-Yi Wu, Jian Li, Tan F. Wong, University of Florida, United States
TP6a1.6: Ambiguity Function Shaping in FMCW Automotive Radar 1235
Zahra Esmaeilbeig, University of Illinois at Chicago, United States; Arindam Bose, KMB Telematics, United States; Mojtaba Soltanalian, University of Illinois at Chicago, United States

TP6a2: Array Processing Applications

TP6a2.1: Accurate Real-Time Estimation of 2-Dimensional Direction of Arrival using a 3-Microphone Array 1179
Anton Kovalyov, Kashyap Patel, Issa Panahi, The University of Texas at Dallas, United States
TP6a2.2: GPS-Denied Navigation Using SAR by Measuring Position Fitness Using Image Quality Measures 1194
Tucker Hathaway, Todd Moon, Jacob Gunther, Utah State University, United States
TP6a2.3: Extracting Doppler From WiFi Signals Reflected from Moving Targets for Target Tracking 1199
Todd Moon, James Hyland, Bridger Altice, Jacob Gunther, Utah State University, United States
TP6a2.4: ESPRIT for Time-Delay Estimation for Radar Employing Stretch Processing with a Linear FM Chirp 1210
Michael Zoltowski, Mark Bell, Steve Rausch, Purdue University, United States
TP6a2.5: Radar Clutter Cancellation using Multitaper Methods....1225
Stephen D. Howard, Defence Science and Technology Group, Australia; Douglas Cochran, Arizona State University, United States
TP6a2.6: Gridless Spectral Estimation from Multi-Snapshot Signed Measurements via Atomic-Norm Regularized Likelihood Method 1230
Jiaying Ren, Chao-Yi Wu, Jian Li, Tan F. Wong, University of Florida, United States

TP6a2.7: AWACS Radar Aircraft Trajectory Tracking via Networked Ground Receiver Stations 1240
Michel Kulhandjian, Rice University, United States; Hovannes Kulhandjian, California State University, Fresno, United States; Ashutosh Sabharwal, Rice University, United States
TP6a2.8: Characterizing Snowpack with 60 GHz FMCW Millimeter-Wave Radar Sensors 1245
Stijn Wielandt, Ivo Marković, Lonnie Chien, Diana Morales, Lawrence Berkeley National Laboratory, United States; Ryan Landon Crumley, Los Alamos National Laboratory, United States; Baptiste Dafflon, Reynold Cooper, Lawrence Berkeley National Laboratory, United States
TP6a2.9: Wideband Integrated Sensing and Communication on Synthetic Aperture Radar Platforms 1251
Peter Vouras, U.S. Department of Defense, United States

TP6a3: Source Localization and Separation
TP6a3.1: Multi-Signal Ambiguity in Direction-of-Arrival Estimation 1259
Benjamin Friedlander, University of California Santa Cruz, United States
TP6a3.2: Analytical Performance Assessment of 1-D ESPRIT in DFT Beamspace in Terms of Physical Parameters 1264
Damir Rakhimov, Martin Haardt, Ilmenau University of Technology, Germany
TP6a3.3: Joint Recursive Receiver and Emitter Geolocation using Time Difference of Arrival Measurements 1277
Liam Coulter, University of Minnesota, United States; David Geroski, Andrew Marcum, Raytheon BBN, United States
TP6a3.4: Cramér–Rao Bound for Convolutional Beamspace Method 1288
Po-Chih Chen, P. P. Vaidyanathan, California Institute of Technology, United States
TP6a3.5: Estimator of Signals in Gaussian Noise Using the Directional Curvature of the Signal Manifold 1298
Theagenis Abatzoglou, Independent Scientist, United States
TP6a3.6: Localization in Wideband SIMO Channels using Pulse Shape 1313
Rajeev Gangula, Northeastern University, United States; Omid Esrafilian, David Gesbert, EURECOM, France; Tommaso Melodia, Northeastern University, United States
TP6a3.7: The Neural-SRP Method for Positional Sound Source Localization 1318
Eric Grinstein, Imperial College London, United Kingdom; Toon van Waterschoot, KU Leuven, Belgium; Mike Brookes, Imperial College London, United Kingdom; Patrick A. Naylor, Imperial Colege London, United Kingdom
TP6a3.8: Direction of Arrival Estimation with Hybrid Digital Analog Arrays: Algorithms and Ziv-Zakai Lower Bound 1329
Miguel Rivas Costa, Carlos Mosquera Nartallo, Universidade de Vigo, Spain
TP6a3.9: On the Efficiency of Coarray-Based Direction of Arrival Estimation 1334
Pranav Kulkarni, P. P. Vaidyanathan, California Institute of Technology, United States
TP6a3.10: Multi-Channel Factor Analysis for Temporally and Spatially Correlated Time Series 1339
Gray Stanton, Haonan Wang, Colorado State University, United States; Dongliang Duan, University of Wyoming, United States; Louis Scharf, Colorado State University, United States
TP6a3.11: Identifiability in Multi-Channel Factor Analysis 1344
Gray Stanton, Colorado State University, United States; David Ramírez, Universidad Carlos III de Madrid, Spain; Ignacio Santamaria, Universidad de Cantabria, Spain; Louis Scharf, Haonan Wang, Colorado State University, United States
TP6a3.12: Impulse Response Interpolation Using Optimal Transport 1350
David Sundström, Lund University, Sweden; Filip Elvander, Aalto University, Finland; Andreas Jakobsson, Lund University, Sweden

TP6a4: Algorithms for Array Processing
TP6a4.1: Asymptotic Distribution of Channel Matrix-based GLRT for Cognitive Radar/Sonar 1255
Touseef Ali, Arizona State University, United States; Christ Richmond, Duke University, United States

TP6a4.2: Opportunistic Time-of-Flight Imaging Using MU-MIMO Downlink 1271
Kris Li, Rice University, United States; Kumar Vijay Mishra, United States Army Research Laboratory, United States; Ashutosh Sabharwal, Rice University, United States
TP6a4.3: Few-Shot Classification Using Tensor Completion 1283
Anastasia Aidini, Grigorios Tsagkatakis, University of Crete/Foundation for Research and Technology Hellas, Greece; Nicholas D. Sidiropoulos, University of Virginia, United States; Panagiotis Tsakalides, University of Crete/Foundation for Research and Technology Hellas, Greece
TP6a4.4: Hybrid Convolutional Beamspace Method for mmWave MIMO Channel Estimation 1293
Po-Chih Chen, P. P. Vaidyanathan, California Institute of Technology, United States
TP6a4.5: Pattern Coupled Sparse Bayesian Learning with Fixed Point Iterations for DOA and Amplitude Estimation 1303
Didem Dogan, Geert Leus, Delft University of Technology, Netherlands
TP6a4.6: Harnessing Holes for Spatial Smoothing with Applications in Automotive Radar 1308
Yinyan Bu, Robin Rajamaki, Pulak Sarangi, Piya Pal, University of California, San Diego, United States
TP6a4.7: Unambiguous DOA Estimation Using Multi-Frequency Rational Sparse Arrays 1324
Md Waqeeb Tahmeed Sayeed Chowdhury, Yimin Daniel Zhang, Temple University, United States

TP1b: Machine Learning Meets Monte Carlo (Invited)
TP1b.1: Learning Differentiable Particle Filter on the Fly 1355
Jiaxi Li, Xiongjie Chen, Yunpeng Li, University of Surrey, United Kingdom
TP1b.2: On the Impact of Sampling on Deep Sequential State Estimation 1362
Helena Calatrava, Northeastern University, United States; Ricardo Borsoi, University of Lorraine, CNRS, France; Tales Imbiriba, Pau Closas, Northeastern University, United States
TP1b.3: Fusion of Gaussian Processes Predictions with Monte Carlo Sampling 1367
Marzieh Ajirak, Daniel Waxman, Fernando Llorente, Petar Djuric, Stony Brook University, United States
TP1b.4: State and Dynamics Estimation with the Kalman-Langevin Filter 1372
Martin Sevilla, Nicolas Zilberstein, Rice University, United States; Benjamin Cox, Sara Perez-Vieites, Victor Elvira, University of Edinburgh, United Kingdom; Santiago Segarra, Rice University, United States

TP2b: Reinforcement Learning
TP2b.1: Predictive Estimation for Reinforcement Learning with Time-Varying Reward Functions 1377
Abolfazl Hashemi, Antesh Upadhyay, Purdue University, United States
TP2b.3: A Novel Ensemble Q-Learning Algorithm for Policy Optimization in Large-Scale Networks 1381
Talha Bozkus, Urbashi Mitra, University of Southern California, United States
TP2b.4: Reward Attack on Stochastic Bandits with Non-stationary Rewards 1387
Chenye Yang, Guanlin Liu, Lifeng Lai, University of California, Davis, United States
TP2b.5: Multi-Agent Recurrent Deterministic Policy Gradient with Inter-Agent Communication 1394
Joohyun Cho, Mingxi Liu, Yi Zhou, Rong-Rong Chen, University of Utah, United States

TP3b: Multi-channel Speech Processing (Invited)
TP3b.1: Spatial Diarization for Meeting Transcription with Ad-Hoc Acoustic Sensor Networks 1399
Tobias Gburrek, Joerg Schmalenstroeer, Reinhold Haeb-Umbach, Paderborn University, Germany
TP3b.2: Head Orientation Estimation with Distributed Microphones Using Speech Radiation Patterns 1404
Kaspar Müller, Cerence GmbH, Germany; Bilgesu Çakmak, Paul Didier, KU Leuven, Belgium; Simon Doclo, University of Oldenburg, Germany; Jan Østergaard, Aalborg University, Denmark; Tobias Wolff, Cerence GmbH, Germany

TP3b.3: Validation of Frequency Warping (Freping) as a New Tool for Feedback Control in Hearing Aids 1410
Alice Sokolova, University of California San Diego, United States; Varsha Rallapalli, Northwestern University, United States; Anusha Yellamsetty, San Jose State University, United States; Martin Hunt, Nadi LLC, United States; Baris Aksanli, San Diego State University, United States; Fredric Harris, Harinath Garudadri, University of California San Diego, United States
TP3b.4: Distant, Multichannel Speech Recognition Using Microphone Array Coding and Cloud-based Beamforming with a Self-attention Channel Combinator 1415
Dushyant Sharma, Microsoft, United States; Daniel Jones, Imperial College London, United Kingdom; Stanislav Kruchinin, Rong Gong, Nuance / Microsoft, Austria; Patrick Naylor, Imperial College, United Kingdom
TP3b.5: Adaptive Coding in Wireless Acoustic Sensor Networks for Distributed Blind System Identification 1420
Matthias Blochberger, KU Leuven, Belgium; Jan Østergaard, Aalborg University, Denmark; Randall Ali, University of Surrey, United Kingdom; Marc Moonen, KU Leuven, Belgium; Filip Elvander, Aalto University, Finland; Jesper Jensen, Aalborg University, Denmark; Toon van Waterschoot, KU Leuven, Belgium

TP4b: Advances in Aensing and Imaging (Invited)
TP4b.2: Thermal Image Calibration and Correction using Unpaired Cycle-Consistent Adversarial Networks 1425
Hossein Rajoli, Pouya Afshin, Fatemeh Afghah, Clemson University, United States
TP4b.5: Unlimited Sampling of FRI Signals with Dithered One-Bit Quantization 1430
Arian Eamaz, Farhang Yeganegi, University of Illinois Chicago, United States; Kumar Vijay Mishra, United States DEVCOM Army Research Laboratory, United States; Mojtaba Soltanalian, University of Illinois Chicago, United States

TP6b1: Single/multiphoton Optical Imaging (Invited)

TP6b2: Machine Learning Models for Biomedical Signal and Image Processing
TP6b2.1: MRI Reconstruction with Side Information using Diffusion Models 1436
Brett Levac, University of Texas, Austin, United States; Ajil Jalal, Kannan Ramchandran, University of California, Berkeley, United States; Jonathan Tamir, University of Texas, Austin, United States
TP6b2.2: Physics-driven Learned Deconvolution of Multi-spectral Cellular MRI with Radial Sampling 1453
Jiawen Chen, Eric Ahrens, Piya Pal, University of California San Diego, United States
TP6b2.3: Flexible Multisubject Multiset FMRI Data Analysis Using Robust Discriminative Dictionary Learning 1458
Rui Jin, Shuai Xu, Seung-Jun Kim, University of Maryland, Baltimore County, United States; Vince Calhoun, Tri-institutional Center for Translational Research in Neuroimaging & Data Science (TReNDS), United States
TP6b2.4: FlySeg: an Automated Volumetric Instance Segmentation Algorithm for Dense Cell Populations in Drosophila Melanogaster Nervous System 1474
Andrea Vaccari, Middlebury College, United States; Mark Dombrovski, University of California, Los Angeles, United States
TP6b2.5: Information-Theoretic Limits on the Performance of Auditory Attention Decoders 1479
Ruwanthi Abeysekara, University of Maryland, United States; Christopher Smalt, MIT Lincoln Laboratory, United States; I. M. Dushyanthi Karunathilake, Jonathan Simon, Behtash Babadi, University of Maryland, United States

TP6b3: Biomedical Signal and Image Processing

TP6b3.1: Regression-Assisted Independent Vector Analysis: A Solution to Large-Scale fMRI Data Analysis 1443
Hanlu Yang, Ben Gabrielson, University of Maryland Baltimore County, United States; Vince Calhoun, Georgia State University, Georgia Institute of Technology, and Emory University, United States; Tülay Adali, University of Maryland Baltimore County, United States

TP6b3.2: Reproducibility in Joint Blind Source Separation: Application to fMRI Analysis 1448
Francisco Laport, University of Maryland Baltimore County, CITIC Research Center University of A Coruña, United States; Trung Vu, Hanlu Yang, University of Maryland Baltimore County, United States; Vince Calhoun, Tri-Institutional Center for Translational Research in Neuroimaging and Data Science (TReNDS), Georgia State University, Georgia Institute of Technology, and Emory University, United States; Tülay Adali, University of Maryland Baltimore County, United States

TP6b3.3: Biophysics of Amplitude-Modulated Giga-hertz Electromagnetic Waves Stimulation 1463
Fatima Ahsan, Aravind C. Govindaraju, Robert M. Raphael, Taiyun Chi, Rice University, United States; Sameer A. Sheth, Wayne Goodman, Baylor College of Medicine, United States; Behnaam Aazhang, Rice University, United States

TP6b3.4: Generalizing and Mapping Actigraphy Based Sleep Detection Algorithms 1469
Christopher Felton, Kaylah Berndt, Michelle Grady, David Holmes, Clifton Haider, Mayo Clinic, United States

TP6b3.5: Deriving 3D Functional Brain Regions from Multi-Slice Functional Ultrasound Data using ICA and IVA 1484
Isabell Lehmann, Paderborn University, Germany; Tülay Adali, University of Maryland, Baltimore County, United States; Pieter Kruizinga, Erasmus MC, Netherlands; Borbála Hunyadi, TU Delft, Netherlands

TP6b3.6: Channel Reduction Approaches in Deep Learning for Brain-Computer Interfaces 1491
Soren Madsen, Justin Goh, Sally Wood, Santa Clara University, United States

TP6b3.7: Multilevel State-Space Models Enable High Precision Event Related Potential Analysis 1496
Proloy Das, Stanford University, United States; Mingjian He, Massachusetts Institute of Technology, United States; Patrick L. Purdon, Stanford University, United States

TP6b4: B5G/6G Wireless (Invited)

TP6b4.1: An Efficient Iterative Detection and Decoding Receiver for Polar-Coded Massive MIMO 1505
Tiancan Xia, Xiaohua Xie, Xiaosi Tan, Yongming Huang, Xiaohu You, Chuan Zhang, Southeast University, China

TP6b5: Architectures and Algorithms I

TP6b5.1: Detection of Unknown-Unknowns in Human-in-Loop Human-in-Plant Systems Using Physics Guided Process Models 1500
Aranyak Maity, Ayan Banerjee, Sandeep Gupta, Arizona State University, United States

TP6b5.2: A Vibrational Radar Backscatter Communication Experimental Testbed 1510
Jessica Centers, Jeffrey Krolik, Duke University, United States

TP6b5.3: Non-Subtractive Dither for Squared Error Linearization of Lloyd-Max Quantizers 1516
Morriel Kasher, Rutgers University, United States; Michael Tinston, Expedition Technology, Inc., United States; Predrag Spasojevic, Rutgers University, United States

TP6b5.4: Optimizing Dither Distributions for Noisy Quantization Systems 1524
Morriel Kasher, Rutgers University, United States; Michael Tinston, Expedition Technology, Inc., United States; Predrag Spasojevic, Rutgers University, United States

TP6b5.5: Multiplier Optimization via E-Graph Rewriting 1528
Andy Wanna, Imperial College London, United Kingdom; Samuel Coward, Imperial College London & Intel Corporation, United Kingdom; Theo Drane, Intel Corporation, United States; George Constantinides, Imperial College London, United Kingdom; Milos Ercegovac, University of California, Los Angeles, United States

TP6b5.6: Design Exploration of Magnitude Comparators for RISC-V System-on-Chip Architectures 1534
Alex Underwood, James Stine, Oklahoma State University, United States
TP6b5.7: Signed-Digit Addition Based on CNFETs and Ternary Logic 1539
Sébastien Roy, Université de Sherbrooke, Canada
TP6b5.8: Tunable Floating Point for High Quality Audio Systems: The Sound of Numbers 1547
Gian Carlo Cardarilli, Luca Di Nunzio, Rocco Fazzolari, Riccardo La Cesa, Univ. of Rome Tor Vergata, Italy; Alberto Nannarelli, Technical University of Denmark, Denmark; Marco Re, Univ. of Rome Tor Vergata, Italy
TP6b5.9: Hardware Implementation of RF Spectral Convergence System on DASH SoC 1552
Saquib Siddiqui, Arindam Dutta, Alex Chiriyath, Drake Silbernagel, Prithvi Hemanth, Owen Ma, Jacob Holtom, Nishita Luhana, Daniel Bliss, Arizona State University, United States
TP6b5.10: Design and Synthesis of RISC-V Bit Manipulation Extensions 1559
Kevin Kim, David Harris, Kip Macsai-Goren, Harvey Mudd College, United States
TP6b5.11: Using Evolutionary Computation to Optimize Task Performance of Unclocked, Recurrent Boolean Circuits in FPGAs 1564
Raphael Norman-Tenazas, David Kleinberg, Erik C. Johnson, Johns Hopkins University Applied Physics Laboratory, United States; Daniel P. Lathrop, Recurrent Computing, Inc., United States; Matthew J. Roos, Johns Hopkins University Applied Physics Laboratory, United States
TP6b5.12: Parallelization of the Shift and Add Reducer 1569
Ryan Swann, James Stine, Oklahoma State University, United States
TP6b5.13: Hardware-Optimal Digital FIR Filters: One ILP to Rule Them All and in Faithfulness Bind Them 1574
Anastasia Volkova, Inria, France; Rémi Garcia, Nantes Université, France; Florent de Dinechin, INSA Lyon, France; Martin Kumm, Fulda University of Applied Sciences, Germany
TP6b5.14: Unlocking the Potential of LDPC Decoders with PiM Acceleration 1579
Oscar Ferraz, Instituto de Telecomunicacoes, University of Coimbra, Portugal; Yann Falevoz, UPMEM, France; Vitor Silva, Gabriel Falcao, Instituto de Telecomunicacoes, University of Coimbra, Portugal

WA1a: Holographic MIMO (Invited)
WA1a.3: Electromagnetic-Based Signal Processing for Arbitrary Arrays 1584
Miguel Castellanos, Robert Heath, North Carolina State University, United States
WA1a.4: Physically Consistent Models for Intelligent Reflective Surface-assisted Communications under Mutual Coupling and Element Size Constraint 1589
Mohamed Akrout, Faouzi Bellili, Amine Mezghani, University of Manitoba, Canada; Josef A. Nossek, TUM, Germany

WA2a: Networked Optimization (Invited)
WA2a.1: Variance Reduced Stochastic Optimization over Directed Graphs with Row and Column Stochastic Weights 1595
Muhammad Ibrahim Qureshi, Tufts University, United States; Ran Xin, Soummya Kar, Carnegie Mellon University, United States; Usman Khan, Tufts University, United States
WA2a.2: Mode Connectivity in Federated Learning with Data Heterogeneity 1600
Tailin Zhou, Jun Zhang, The Hong Kong University of Science and Technology, China; Danny H.K. Tsang, The Hong Kong University of Science and Technology (Guangzhou) and The Hong Kong University of Science and Technology, China
WA2a.3: Distributed Stochastic Optimization with Gradient Tracking over Time-Varying Directed Networks 1605
Duong Thuy Anh Nguyen, Duong Tung Nguyen, Angelia Nedić, Arizona State University, United States

WA3a: mmWave Massive MIMO (Invited)
WA3a.1: A Hybrid Antenna-Metasurface Architecture for mmWave and THz Massive MIMO 1610
Zijian Shao, Ruiyi Shen, Princeton, United States; William Xia, NYU, United States; Yasaman Ghasempour, Kaushik Sengupta, Princeton, United States; Sundeep Rangan, NYU, United States

WA3a.2: High Dynamic Range mmWave Massive MU-MIMO with Householder Reflections.....1617
Victoria Palhares, Gian Marti, Oscar Castañeda, Christoph Studer, ETH Zurich, Switzerland
WA3a.3: Energy-Efficient Tri-Hybrid Precoding with Dynamic Metasurface Antennas.....1625
Miguel Castellanos, Joseph Carlson, Robert Heath, North Carolina State University, United States
WA3a.4: mmWave Massive MIMO Processing in Demanding Environments -- An Aircraft 1631
Cabin Deployment Study
Sijia Cheng, Lund University, Sweden; Ozan Alp Topal, Mustafa Ozger, Cicek Cavdar, KTH Royal Institute of Technology, Sweden; Liang Liu, Ove Edfors, Lund University, Sweden

WA4a: Channel Charting (Invited)
WA4a.1: Model-based Deep Learning for Beam Prediction based on a Channel Chart.....1636
Taha Yassine, IRT bcom, France; Baptiste Chatelier, INSA Rennes, Mitsubishi electric research center Europe, France; Vincent Corlay, Mitsubishi electric research center Europe, France; Matthieu Crussière, INSA Rennes, France; Stéphane Paquelet, IRT bcom, France; Olav Tirkkonen, Aalto University, Finland; Luc Le Magoarou, INSA Rennes, France
WA4a.2: Augmenting Channel Charting with Classical Wireless Source Localization 1641
Techniques
Florian Euchner, Phillip Stephan, Stephan ten Brink, University of Stuttgart, Germany
WA4a.3: Channel Charting for Streaming CSI Data.....1648
Sueda Taner, ETH Zurich, Switzerland; Maxime Guillaud, Inria, France; Olav Tirkkonen, Aalto University, Finland; Christoph Studer, ETH Zurich, Switzerland
WA4a.4: Learning Privacy-Preserving Channel Charts.....1654
Patrick Agostini, Zoran Utkovski, Igor Bjelakovic, Slawomir Stanczak, Fraunhofer Heinrich Hertz Institute, Germany

WA1b: MIMO for Integrated Sensing and Communication (Invited)
WA1b.1: Multi-Target Two-way Integrated Sensing and Communications with Full Duplex 1661
MIMO Radios
Muhammad Talha, Besma Smida, University of Illinois Chicago, United States; Atiqul Md. Islam, Qualcomm Technologies, Inc., United States; George Alexandropoulos, National and Kapodistrian University of Athens, Greece
WA1b.2: Terminal Position Tracking in LEO Satellite Communication Systems Exploiting 1668
Doppler and Multiantenna Measurements
Bibhor Kumar, Nuria Gonzalez-Prelcic, North Carolina State University, United States; Takayuki Shimizu, Akila Ganlath, Toyota Motor North America, United States
WA1b.3: Multi-Target Tracking for Full-Duplex Distributed Integrated Sensing and 1673
Communications
Sk Nayemuzzaman, The University of Texas, United States; Kumar Vijay Mishra, United States DEVCOM Army Research Laboratory, United States; Mohammad Saquib, The University of Texas, Dallas, United States

WA2b: Online Optimization and Dynamical Systems (Invited)

WA3b: Non-terrestrial Communications (Invited)
WA3b.1: CSI Measurements and Initial Results for Massive MIMO to UAV 1679
Communications
Zhuangzhuang Cui, Katholieke Universiteit Leuven, Belgium; Achiel Colpaert, Katholieke Universiteit Leuven & Interuniversity Microelectronics Centre (IMEC), Belgium; Sofie Pollin, Katholieke Universiteit Leuven, Belgium
WA3b.2: On the Energy Consumption of UAV Edge Computing in Non-Terrestrial Networks.....1684
Alessandro Traspadini, Marco Giordani, University of Padova, Italy; Giovanni Giambene, University of Siena, Italy; Tomaso De Cola, DLR - Institute of Communications and Navigation, Germany; Michele Zorzi, University of Padova, Italy

WA4b: Secure Aggregation (Invited)

WA4b.1: Detecting Active Attacks in Over-the-Air Computation using Dummy Samples 1691
David Nordlund, Zheng Chen, Erik G. Larsson, Linköping University, Sweden
WA4b.3: Private and Secure Over-the-Air Multi-Party Communication 1697
Jan Jonas Brune, Fraunhofer Heinrich-Hertz-Institute, Germany; Matthias Frey, University of Melbourne, Australia; Felix Klement, University of Passau, Germany; Igor Bjelakovic, Fraunhofer Heinrich-Hertz-Institute, Technische Universität Berlin, Germany; Stefan Katzenbeisser, University of Passau, Germany; Slawomir Stanczak, Fraunhofer Heinrich-Hertz-Institute, Technische Universität Berlin, Germany

2022: 2022 Papers

2022.1: An Iterative 2-D DOA Estimation Approach for L-shaped Nested Array.....1702
Feng Xu, Sergiy A. Vorobyov, Aalto University, Finland
2022.2: Channel Charting for Beam Management in Sub-THz Systems 1707
Patrick Agostini, Zoran Utkovski, Slawomir Stanczak, Fraunhofer Heinrich Hertz Institute, Germany
2022.3: WiFi Sensing for Outdoor Surveillance 1713
Junye Li, Aryan Sharma, Deepak Mishra, University of New South Wales, Australia; Joseph Davis, University of Sydney, Australia; Aruna Seneviratne, University of New South Wales, Australia
2022.4: Blind Doppler Estimation for Satellite with Interference Emiiter 1719
Yanwu Ding, Wichita State University, United States
2022.5: Novel Respiration-Free Heartbeat Detection Algorithm Using Millimeter Wave 1724
Radar
Yu Rong, Arizona State University, United States; Kumar Vijay Mishra, Army Research Lab, United States; Daniel W. Bliss, ASU, United States