

IEEE **GlobalSIP**

2018 IEEE Global Conference on Signal and Information Processing

November 26–29, 2018
Anaheim, California, USA

Program Guide



SCHEDULE AT A GLANCE

Mon - Nov. 26	Adventure	Castle	Magic Kingdom Ballroom 1	Magic Kingdom Ballroom 4
15:00-17:00	WS-1: Deep Learning on Signals			Adventure
Tue - Nov. 27	Adventure	Castle	Magic Kingdom Ballroom 1	Magic Kingdom Ballroom 4
08:15-08:30	Opening Remarks			Magic Kingdom Ballroom 2&3
08:30-09:30	PLEN-1: Vincent Poor "Security in the Internet of Things: Information Theoretic Insights"			Magic Kingdom Ballroom 2&3
09:40-10:40		DL-GSP.1: Georgios Giannakis "Online Scalable Learning Adaptive to Unknown Dynamics and Graphs"	DL-BIO.1: Dario Farina	DL-IVC.1: Robert Heath "Signal Processing for Automated Driving"
11:00-12:30	GS-L.1: Image restoration and reconstruction	GSP-L.1: Graph Signal Processing I	BIO-L.1: Signal Processing for Rehabilitation & Assistive Systems	IVCL.1: Advanced PHY Techniques for Intelligent Vehicular Communications
12:30-14:00	Lunch			
14:00-15:30	GS-L.2: Image and video enhancement	GSP-L.2: Graph Signal Processing II	BIO-L.2: Signal Processing for Wearable Health Technologies	IVCL.2: Applications in Internet of Intelligent Vehicles
15:50 - 17:20	GS-L.3: Machine Learning for Signal Processing	DL-GSP.2: Michael Rabbat "Learning graphs from data"	BIO-L.3: Neural Signal Processing and BCI Systems	
17:00 - 18:00				
18:00 - 22:00	Welcome Reception			Magic Kingdom Lawn
Wed - Nov. 28	Adventure	Castle	Magic Kingdom Ballroom 1	Magic Kingdom Ballroom 4
08:30-09:40	PLEN-2: Anna Scaglione: "Grid Graph Signal Processing"			Magic Kingdom Ballroom 2&3
09:40-10:30	DL-GCN.1: Chih-Lin I "5G's Green Journey and More"	DL-TM.1: Nikos Sidiropoulos "Tensors and Probability: An Intriguing Union"		
11:00-12:30	GCN-L.1: Energy Harvesting	TM-L.1: Theory/Algorithms I	BIO-L.4: Bio-signal Processing & Machine Learning for MCPS	SML-L.1: Optimization and Control in Smart Grids
12:30-14:00	Lunch			
12:30-14:30	Young Professionals Event: Engineering Career Speed Dating			The Disneyland Hotel
14:00-15:30	GCN-L.2: Energy Efficiency in Massive MIMO	TM-L.2: Theory/Algorithms II	BIO-L.5: Biomedical Image Processing I	SML-L.2: Resilience and Security of Power Grids
16:00-17:30	GCN-L.3: Signal and Information Processing for Energy Efficiency	TM-L.3: Theory/Algorithms/Applications	BIO-L.6: Biomedical Image Processing II	GS-L.4: Localization in Wireless Networks
18:00 - 19:30	Evening Reception			Magic Kingdom Ballroom 2&3
Thu - Nov. 29	Adventure	Castle	Magic Kingdom Ballroom 1	Magic Kingdom Ballroom 4
08:30-09:40	PLEN-3: Zhongfeng Wang: "VLSI Optimizations for Deep Neural Networks"			Magic Kingdom Ballroom 2&3
09:40-10:40		DL-AML.1: Nicholas Carlini "Making and Measuring Progress in Adversarial Machine Learning"	DL-MMW.1: Monisha Ghosh	DL-SML.1: Gil Zussman "Power Grid State Recovery following a Joint Cyber and Physical Attack"
11:00-12:30	GS-L.5: Image-based quality assessment and performance analysis			SML-L.3: Learning in Energy Systems
12:30-14:00	Lunch			
12:30-14:00	Ethics for Authors and Volunteers Workshop			Mark Twain & Terrace
12:30-14:00	GlobalSIP to GlobalSIP			Amazon
14:00-15:30	GS-L.6: Signal Processing Theory and Methods I	AML-L.1: Adversarial Machine Learning I	MMW-L.1: Millimeter Wave Communications I	
15:50 - 17:20	GS-L.7: Compressive Sensing and Sparsity Theory		MMW-L.2: Millimeter Wave Communications II MMW-PAN: mmWave from Research to Practice	

SCHEDULE AT A GLANCE

Mon - Nov. 26	Monorail	Safari
15:00-17:00		
Tue - Nov. 27	Monorail	Safari
08:15-08:30		
08:30-09:30		
09:40-10:40	DL-WNS.1: Brian Sadler "Cryptographic Side-Channel Signaling and Authentication via Fingerprint Embedding"	DL-5GS.1: Muriel Medard "Network coding in satellites"
11:00-12:30	WNS-L.1: Wireless Network Security I	5GS-L.1: 5G Technologies
12:30-14:00		
14:00-15:30	WNS-L.2: Wireless Network Security II	5GS-L.2: 5G Satellite Communications
15:50 - 17:20	WNS-L.3: Wireless Network Security III - Invited Talks	
17:00 - 18:00		5GS-PAN: 5G SatCom and Cross-Fertilization with 5G PHY Technologies
18:00 - 22:00		
Wed - Nov. 28	Monorail	Safari
08:30-09:40		
09:40-10:30	DL-DLN.1: Lin Xiao "Randomized Primal-Dual Algorithms for Asynchronous Distributed Optimization"	DL-MHI.1: Andrea Bertozzi "Hyperspectral Image Classification Using Graph Clustering Methods"
11:00-12:30	DLN-L.1: Distributed Learning & Optimization: Algorithms	DL-MHI.2: Dragan Maric "Deciphering the complexity of brain system biology via whole brain multispectral imaging"
12:30-14:00		
12:30-14:30		
14:00-15:30	DLN-L.2: Distributed Learning & Optimization: Applications I	MHI-L.1: Multispectral and Hyperspectral Imaging and Analysis I
16:00-17:30	DLN-L.3: Distributed Learning & Optimization: Applications II	MHI-L.2: Multispectral and Hyperspectral Imaging and Analysis II
18:00 - 19:30		
Thu - Nov. 29	Monorail	Safari
08:30-09:40		
09:40-10:40	DL-DLW.1: Yiyu Shi "Scaling of Deep Neural Networks for Edge Inference in Internet-of-Many-Things"	DL-RA.1: Steve Ellingson "Signal Processing Methods for Mitigation of Radio Frequency Interference in the Era of Real-Time Astronomy"
11:00-12:30	DLW-L.1: Design and Implementation of Deep Learning for Wireless Communications	RA-L.1: Instrumentation and RFI Mitigation
12:30-14:00		
12:30-14:00		
12:30-14:00		
14:00-15:30	DLW-L.2: Deep-Learning-Based Signal Processing for Wireless Communications	RA-L.2: Signal Detection
15:50 - 17:20	DLW-L.3: Deep-Learning-Based Network Optimization for Wireless Communications	RA-L.3: Estimation, Mitigation and Performance

Poster Sessions
Sleeping Beauty Pavilion
Tue - Nov. 27
11:00 - 12:30
GS-P.1: Massive MIMO
14:00 - 15:30
GS-P.2: Wireless Communications
15:50 - 16:50
5GS-P.1: 5G Satellite Networks
17:00 - 18:00
GSP-P.1: Graph Signal Processing III
Wed - Nov. 28
11:00 - 12:30
GS-P.3: Speech and Audio Signal Processing
14:00 - 15:30
GS-P.4: Radar/Sonar/DOA Estimation
15:50 - 17:20
GS-P.5: Signal Processing Theory and Methods II
Thu - Nov. 29
11:00 - 12:30
GS-P.6: Compressed Sensing, Sparsity Analysis and Applications
14:00 - 15:30
GS-P.7: Image and video processing for applications
SMP-P.1: Monitoring, Control and Markets in Energy Systems
15:50 - 17:20
AML-P.1: Adversarial Machine Learning II
GS-P.8: Neural networks for image and video processing

- Plenary Talk
- Distinguished Lecture
- Lecture Session
- Panel
- Poster Session
- Event
- Break

Welcome to GlobalSIP 2018 at Disneyland, the happiest place on earth! While the park offers an escape into fantasy and dream worlds, we hope that the conference provides you with an “escape” into some of the interesting and exciting new directions in signal processing. Some of the ideas and techniques presented here would certainly have been considered a dream or a fantasy a few years ago, and we’re confident that the talks and papers that make up the conference will be an important part of the foundation for realizing future technological capabilities that might seem only fanciful now.

This year’s GlobalSIP technical program reflects the growing presence of data-driven “machine learning” techniques in signal processing, in applications from biomedicine to energy infrastructure to wireless communications. Of course, we have been doing “machine learning” in our community already for decades; we just referred to it by a different name, “adaptive” signal processing. But what we’re experiencing now is more than just a rebranding of old ideas; clearly the scale and complexity of the problems being solved are well beyond traditional approaches, and these new techniques are being used to solve problems that were the things of science fiction not too many years ago. Appropriately, it was Walt Disney himself who once said “It’s kind of fun to do the impossible!”

It is indeed a fun and exciting time to be involved in signal processing research, doing what some might have thought (and still think) is impossible.

We have done our best to make this year’s conference a rewarding and stimulating experience; we hope the various talks and presentations provoke new ideas and insights that will guide your future endeavors. A great deal of thanks is due to the organizers of each of the symposia, who spent many hours encouraging submissions, forming their technical committees, assigning reviews, reviewing papers, organizing sessions, finding distinguished speakers, etc. These symposia are the heart of GlobalSIP, and make it unique among our society’s meetings. We gratefully acknowledge all of the hard work involved by the symposia organizers (and their timely responses to our many requests) that have made the conference a success. Many of you were also reviewers for the conference, and we sincerely appreciate the critical part you played in ensuring the quality of our meeting. To all who are authors or presenters, we look forward to hearing about your ideas, and thank you for sharing them with us!

Please enjoy the conference!

Dinei Florencio
Amy Reibman
Lee Swindlehurst
GlobalSIP 2018 Technical Program Chairs

CONFERENCE ORGANIZING COMMITTEE

General Chairs

Shuguang Cui
University of California, Davis

Hamid Jafarkhani
University of California, Irvine

Technical Chairs

Amy Reibman
Purdue University

Lee Swindlehurst
University of California, Irvine

Dinei Florencio
Microsoft Corporation

Finance Chair (Treasurer)

Yindi Jing
University of Alberta

Local Arrangement Chair

Ahmed Eltawil
University of California, Irvine

Publications Chair

Yuejie Chi
Ohio State University

Publicity Chairs

Zhi Quan
Shenzen University

Jonathan Manton
University of Melbourne

Sergios Theodoridis
University of Athens

GENERAL SYMPOSIUM

General Chairs

Shuguang Cui, University of California, Davis
Hamid Jafarkhani, University of California, Irvine

Technical Program Chairs

Dinei Florencio, Microsoft Corporation
Amy Reibman, Purdue University
Lee Swindlehurst, University of California Irvine

ADVANCED BIO-SIGNAL PROCESSING AND MACHINE LEARNING FOR MEDICAL CYBER-PHYSICAL SYSTEMS

General Chairs

Arash Mohammadi, Concordia University, Canada
S. Farokh Atashzar, CSTAR and Western University, Canada

Technical Program Chairs

Konstantinos N. Plataniotis, University of Toronto
Rajni V. Patel, CSTAR and Western University, Canada
Mahdi Tavakoli, University of Alberta
Mahya Shahbazi, CSTAR and Western University, Canada

DESIGN, IMPLEMENTATION AND OPTIMIZATION OF DEEP LEARNING FOR WIRELESS COMMUNICATIONS

General Chairs

Chuan Zhang, Southeast University
Yeong-Luh Ueng, National Tsing Hua University, Taiwan

Technical Program Chairs

Yair Be'ery, Tel Aviv University
Christoph Studer, Cornell University
Warren J. Gross, McGill University

DISTRIBUTED LEARNING AND OPTIMIZATION OVER NETWORKS

General Chair

Zhi-Quan Luo, University of Minnesota, The Chinese University of Hong Kong, Shenzhen

Technical Program Chairs

Necdet Serhat Aybat, Pennsylvania State University
Mingyi Hong, University of Minnesota
Qing Ling, Sun Yat-Sen University

GRAPH SIGNAL PROCESSING

General Chair

Gonzalo Mateos, University of Rochester

Technical Program Chairs

Santiago Segarra, Massachusetts Institute of Technology
Sundeep Chepuri, Delft University of Technology

GREEN COMMUNICATIONS AND NETWORKING

General Chairs

Ender Ayanoglu, University of California Irvine
Victor C. M. Leung, University of British Columbia

Technical Program Chairs

Zhi Ding, University of California Davis
F. Richard Yu, Carleton University

INFORMATION PROCESSING, LEARNING AND OPTIMIZATION FOR SMART ENERGY INFRASTRUCTURES

General Chair

Deepa Kundur, University of Toronto
Yue Zhao, Stony Brook University

Technical Program Chairs

Yue Zhao, Stony Brook University
Hao Zhu, University of Texas
Emiliano Dall'Anese, University of Colorado Boulder

MULTISPECTRAL AND HYPERSPECTRAL IMAGING AND ANALYSIS

General and Technical Program Chairs

Saurabh Prasad, University of Houston
Badrinath Roysam, University of Houston
Paul Gader, University of Florida

5G SATELLITE NETWORKS: SIGNAL PROCESSING APPLICATIONS AND CHALLENGES

General Chairs

Ana Pérez-Neira (CTTC/UPC)
Giovanni Giambene (Univ. Siena)
Prashant Pillai (University of Wolverhampton, UK)
Raed Shubair (UAE Ministry of Education & MIT)
Elisabeth de Carvalho (Aalborg University)

SIGNAL DETECTION FOR SETI AND RFI MITIGATION IN RADIO ASTRONOMY

General Chairs

Gregory Hellbourg, University of California Berkeley
Ian Morrison, Swinburne University
Richard Prestage, Green Bank Observatory

Technical Program Chairs

Nicolo Antoniette, SETI Permanent Committee
Amit Mishra, University of Cape Town
Gelu Nita, New Jersey Institute of Technology
Subramaniam Sadasivan, Independent Consultant

SIGNAL PROCESSING FOR ADVERSARIAL MACHINE LEARNING

General Chairs

Pin-Yu Chen, IBM Research AI
Sijia Liu, IBM Research AI
Bo Li, University of Illinois

Technical Program Chairs

Jinfeng Yi, JD.com
Cho-Jui Hsieh, University of California Davis

SIGNAL PROCESSING FOR INTELLIGENT VEHICULAR COMMUNICATIONS

General and Technical Program Chairs

Xiang Cheng, Peking University
Rongqing Zhang, Colorado State University
Mounir Ghogho, International University of Rabat
Ender Ayanoglu, University of California Irvine
Liuqing Yang, Colorado State University

SIGNAL PROCESSING FOR MILLIMETER-WAVE COMMUNICATIONS

General and Technical Program Chairs

Hani Mehrpouyan, Boise State University
David Matolak, University of South Carolina
Ismail Guvenc, North Carolina State University

SIGNAL PROCESSING FOR WIRELESS NETWORK SECURITY

General and Technical Program Chairs

Yingbo Hua, University of California, Riverside
Zygmunt Haas, Cornell University and University of Texas at Dallas
Mounir Ghogho, University of Leeds
Ananthram Swami, Army Research Lab

TENSOR METHODS FOR SIGNAL PROCESSING AND MACHINE LEARNING

General Chairs

Panos P. Markopoulos, Rochester Institute of Technology
Evangelos E. Papalexakis, University of California Riverside

Technical Program Chairs

Fauzia Ahmad, Temple University
Andre L. F. de Almeida, Federal University of Cesara, Brazil
Xiao Fu, Oregon State University
Dimitris A. Pados, Florida Atlantic University

REVIEWERS

Elias Aboutanios, University of New South Wales
Mohammadreza Abtahi, University of Rhode Island
Parnian Afshar, Concordia University
Fauzia Ahmad, Temple University
Mojtaba Ahmadi Almasi, Boise State University
Jens Ahrens, Chalmers University of Technology
Robin Alais, MINES ParisTech
Atm Alam, University of Surrey
Panos Alevizos, Technical University of Crete
Mohamed ALHajri, Massachusetts Institute of Technology
Mahnoosh Alizadeh, University of California Santa Barbara
Amir Amini, Concordia University
roohollah Amiri, 1989
Dimitris Ampeliotis, University of Patras
Fernanda Andalo, University of Campinas (Unicamp)
Chethan Kumar Anjinappa, North Carolina State University
Nicolo Antoniette, SETI permanent committee
Fabrizio Argenti, University of Florence
Camille Artur, University of Houston
S. Farokh Atashzar, University of Western Ontario, Canada
Tom Bäckström, Aalto University
Dragana Bajic, University of Novi Sad
Alexios Balatsoukas-Stimming, École polytechnique fédérale de Lausanne (EPFL)
Alexndru-Sabin Bana, Aalborg University
Kevin Bandura, West Virginia University
Stefania Bartoletti, University of Ferrara Department of Engineering
Juan Andres Bazerque, Universidad de la Republica
Yair Be'ery, Tel Aviv University
Baltasar Beferull Lozano, University of Agder
Kostas Berberidis, University of Patras
SEBASTIAN BERISHA, UNIVERSITY OF HOUSTON
Andrey Bernstein, National Renewable Energy Laboratory
Alexander Bertrand, KU Leuven
Yuanguo Bi, NEU
Akhilan Boopathy, Massachusetts Institute of Technology
Pierre Borgnat, ENS Lyon
Rémy Boyer, university of Lille
Dragos Burileanu, University Politehnica of Bucharest
Marcelo Caetano, INESC TEC
Yiqian Cai, Nanjing University
Shan Cao, Shanghai University
Luis Castedo, University of A Coruña
Marius Caus, CTTC
Renato L. G. Cavalcante, Fraunhofer Heinrich Hertz Institute
Stefania Cecchi, Università Politecnica delle Marche
Dimitris Chachlakis, Rochester Institute of Technology
Tsung-Hui Chang, The Chinese University of Hong Kong, Shenzhen
Giannis Chantas, Information Technologies Institute
Huang Chao-Tsung, National Tsing Hua University
Chen Chen, Argonne National Laboratory
Chen Chen, Argonne National Laboratory
Chen Chen, Xidian University
Hongge Chen, MIT
Jianjun Chen, Changsha University of Science & Technology
Jiayu Chen, Wuhan University
Jie Chen, Oulu University, Finland
Kang-Cheng Chen, Yuan Ze University
Lijun Chen, University of Colorado at Boulder
Pin-Yu Chen, IBM Research AI
Qinyu Chen, Nanjing University
Tianyi Chen, University of Minnesota
Xu Chen, SYSU
Sundeepr Prabhakar Chepuri, TU Delft
Bertrand Chupeau, Technicolor
Claudio Cicconetti, IIT-CNR
Silviu Ciochina, University 'Politehnica' of Bucharest
Ali C. Cirik, Ofinno Technologies
Mihai Ciuc, University Politehnica Bucharest
Domenico Ciunozzo, University of Naples Federico II and NM2 s.r.l.
Mark Coates, Mc Gill University
Joao Paulo C. L. da Costa, University of Brasilia
Mauro Dalla Mura, GIPSA-lab, Grenoble Institute of Technology
Emiliano Dall'Anese, University of Colorado
Debadatta Dash, University of Texas at Dallas
Andre de Almeida, Federal University of Ceara
Matthieu De Mari, Singapore University of Technology and Design
Ricardo de Queiroz, University of Brasilia
Deepjyoti Deka, Los Alamos National Laboratory
Jean Pierre Delmas, Telecom SudParis
Xiangyun Deng, Nanjing University
Mohamed Deriche, King Fahd University of Petroleum & Minerals
Paolo Di Lorenzo, Sapienza University of Rome
Zhi Ding, UC Davis
Kutluyil Dogançay, University of South Australia
Aleksandar Dogandžic, Iowa State University
Xiaowen Dong, Oxford
Florian Dorfler, ETH (Swiss Federal Inst. of Tech. Zurich)
Dongliang Duan, University of Wyoming
Harishchandra Dubey, University of Texas Dallas
Bogdan Dumitrescu, University Politehnica of Bucharest
Benjamin Edwards, IBM Research
Ceyhun Eksin, Texas A&M University
Ahmed Elzanaty, University of Bologna
Chongzhou Fang, Southeast University
Luoyang Fang, Colorado State University
Chen Feng, The University of British Columbia
Tiago Fernandes Tavares, University of Campinas
Marcelo Fiori, Universidad de la República
Dinei Florencio, Microsoft Research

Dariush Fooladivanda, UCSD
 Pascal Frossard, EPFL
 Xiang Fu, Apple Inc.
 Xiao Fu, Oregon State University
 Fernando Gama, University of Pennsylvania
 Sharon Gannot, Bar-Ilan University
 Shijian Gao, CSU
 Javier Garcia-Frias, University of Delaware
 Nikolaos Gatsis, The University of Texas at San Antonio
 Vincent Gaudet, University of Waterloo
 Munir Georges, Intel
 Harris Georgiou, University of Athens (NKUA/UoA)
 Daniele Giacobello, Sonos
 Giovanni Giambene, University of Siena
 Georgios Giannakis, University of Minnesota
 Christopher Gilliam, RMIT University
 Benjamin Girault, University of Southern California
 Daniel Giusto, University of Cagliari
 Alberto Gonzalez, Universitat Politècnica de Valencia
 Christos Grecos, Central Washington University
 Kristjan Greenewald, IBM Research
 Vincent Gripon, IMT-Atlantique
 Ke Guan, Beijing Jiaotong University
 GUAN GUI, Nanjing University of Posts and
 Telecommunications
 Ekta Gujral, University of California, Riverside
 Mert Gurbuzbalaban, Rutgers University
 Ismail Guvenc, North Carolina State University
 Walid Hachem, CNRS / LIGM - Université Paris Est Marne-la-
 Vallée
 ADI HAJJ-AHMAD, GE Digital
 Zhenjun Han, University of Chinese Academy of Sciences
 Zhu Han, University of Houston
 Jarvis Haupt, University of Minnesota
 Chen He, Northwest University, Xi'an, China
 Ji He, University of Washington
 Qian He, University of Electronic Science and Technology of
 China (UESTC)
 Ruisi He, Beijing Jiaotong University
 Gregory Hellbourg, University of California
 Gustavo Hernandez-Abrego, Google
 Paul Honeine, LITIS Lab, Université de Rouen
 Mingyi Hong, 1984
 Yiguang Hong, Institute of Systems Science, Chinese Academy
 of Sciences
 Nozhan Hosseini, University of South Carolina
 Cho-Jui Hsieh, UC Davis
 Shaoming Hu, Carleton University
 Yuan-Hao Huang, National Tsing Hua University
 Alexandros Iosifidis, Tampere University of Technology
 Dusan Jakovetic, University of Novi Sad
 Hosseinali Jamal, University of South Carolina
 Huizhu Jia, Peking University
 Jiejun Jin, Southeast University
 Mikael Johansson, Royal Institute of Technology (KTH)
 Eduard Jorswieck, Technische Universität Dresden
 George Kafentzis, University of Crete
 Bhavya Kailkhura, Lawrence Livermore National Laboratory
 Andre Kaup, University of Erlangen-Nuremberg
 Wei Ke, Carnegie Mellon University
 Vassilis Kekatos, Virginia Tech
 John Kerekes, RIT
 Yassin Khalifa, University of Pittsburgh
 Mahfuza Khatun, Boise State University
 Wahab Khawaja, North Carolina State University
 Vahid Khorasani Ghassab, Concordia University
 Dong In Kim, Sungkyunkwan University
 Lisimachos Kondi, University of Ioannina
 Alec Koppel, U.S. Army Research Laboratory
 Constantine Kotropoulos, University of Thessaloniki
 Margarita Kotti, Imperial College London
 Shoichi Koyama, The University of Tokyo
 Animesh Kumar, Indian Institute of Technology Bombay
 Anurag Kumar, Carnegie Mellon University
 Sandipan Kundu, CRUISE Automation
 Deepa Kundur, University of Toronto
 Fabrice Labeau, McGill University
 Lifeng Lai, University of California, Davis
 Lutz Lamp, University of British Columbia
 Guanghui Lan, Georgia Institute of Technology
 Jung-San Lee, Feng Chia University
 Ang Li, University College London
 Bo Li, University of Illinois
 wenting li, Rensselaer Polytechnic Institute
 Xingyu Li, University of Toronto
 Zechao Li, Nanjing University of Science and Technology
 Yong Liao, Chongqing University
 Bin Lin, DLMU
 Qihang Lin, University of Iowa
 Xue Lin, Northeastern Univ.
 Qing Ling, Sun Yat-Sen University
 Dong Liu, Univ Sci Tech China
 Fan Liu, University College London
 Jinwen Liu, university of south carolina
 Mengting Liu, Beijing University of Posts and
 Telecommunications
 Sijia Liu, IBM Research
 Sijia Liu, IBM Research
 Wei Liu, University of Sheffield
 Xiaozhen Liu, Nanjing University
 Roberto López-Valcarce, Universidad de Vigo
 Andreas Loukas, Ecole Polytechnique Federal Lausanne
 Steven Low, California Institute of Technology
 Yue Lu, Harvard University
 David Luengo, Universidad Politécnica de Madrid (UPM)
 Shiqian Ma, UC Davis
 Ali Makhdomi, Duke University
 Dmitry Malioutov, DE Shaw Group
 Fotios Mandanas, Aristotle University of Thessaloniki
 Kunal Mankodiya, University of Rhode Island

Panos P. Markopoulos, ROCHESTER INSTITUTE OF TECHNOLOGY

Dejan Markovic, Politecnico di Milano

Antonio G. Marques, King Juan Carlos University

Cesar Marquez Chin, Toronto Rehabilitation Institute - UHN

Gonzalo Mateos, University of Rochester

David Matolak, University of South Carolina

Vincenzo Matta, University of Salerno

Gerald Matz, Vienna University of Technology

Thomas Maugey, INRIA

David Mayerich, University of Houston

Hani Mehrpouyan, Boise State University

Shervin Mehryar, Massachusetts Institute of Technology

Vineetha Menon, University of Alabama in Huntsville

Hagit Messer, Tel-Aviv University

Benjamin Miller, MIT Lincoln Laboratory

mahsa mirgholami, Concordia University

Amit Mishra, University of Cape Town

Kumar Vijay Mishra, The University of Iowa

Paul D. Mitchell, University of York

Babak Moatamed, University of California Los Angeles

Arash Mohammadi, Concordia University

Mohammadali Mohammadi, Shahrekord University

Aryan Mokhtari, Massachusetts Institute of Technology

Daniel Molzahn, Argonne National Laboratory

Ian Morrison, Curtin University

Joao Mota, Heriot Watt University

Silvia Muceli, Imperial College London

Amitav Mukherjee, Verizon

Sourav Kumar Mukhopadhyay, Ryerson University

Bhavani Shankar Mysore, University of Luxembourg

Farnoosh Naderkhani, Georgia Tech University

Ambarish Natsu, Australian Government

Maria-Irina Nicolae, IBM

Gelu Nita, New Jersey Institute of Technology

Alex Oleshevsky, Boston University

Ozgur Ozdemir, North Carolina State University

Athanasios D. Panagopoulos, National Technical University of Athens

Evangelos E. Papalexakis, University of California Riverside

Fabio Pasqualetti, University of California, Riverside

Shreyas Srikanth Payal, Qualcomm Tech.

Ana Pérez-Neira, Universitat Politècnica de Catalunya (UPC/CTTC)

Anh Huy Phan, SKOLKOVO Institute of Science and Technology

Prashant Pillai, University of Wolverhampton

Hessam Pirzadeh, University of California, Irvine

Aaditya Prakash, Brandeis University

Saurabh Prasad, UH

Ashley Prater-Bennette, Air Force Research Lab

Victor Preciado, University of Pennsylvania

Richard Prestage, West Virginia University

Emanuele Principi, Università Politecnica delle Marche

Sanjay Purushotham, University of Southern California

Xiaoqi Qin, BUPT

Michael G. Rabbat, McGill University

Vasanthan Raghavan, Qualcomm Flarion Technologies, Inc.,

Elaheh Rahimian, Concordia University

David Ramirez, Universidad Carlos III de Madrid

Luis Miguel Ramos López, Researcher, University of Agder

Phillip Regalia, National Science Foundation

Shaolei Ren, University of California Riverside

Yuqing Ren, Southeast University

Yuzhuo Ren, University of Southern California

Behnaz Rezaei, Northeastern University

Alejandro Ribeiro, University of Pennsylvania

Cédric Richard, Université Côte d'Azur

Florian Roemer, Fraunhofer Institute for Nondestructive Testing IZFP

Florian Römer, Fraunhofer Institute for Nondestructive Testing IZFP

Daniel Romero, University of Agder

Yue Rong, Curtin University

Tirza Routtenberg, Ben-Gurion University of the Negev

Macey Ruble, North Carolina State University

Nadisanka Rupasinghe, North Carolina State University

Corneliu Rusu, Technical University of Cluj-Napoca

Walid Saad, Virginia Tech

Subramaniam Sadasivan, Independent Consultant

Brian M. Sadler, Army Research Laboratory

Fatemeh Saki, Qualcomm Inc.

Hojjat Salehinejad, University of Toronto

Shamim Samadi, North Carolina State University

Arun Saranath, University of Massachusetts, Amherst

Andreas Savakis, Rochester Institute of Technology

Ioannis Schizas, University of Texas at Arlington

Santiago Segarra, Massachusetts Institute of Technology

Abd-krim Seghouane, The University of Melbourne

Ervin Sejdic, University of Pittsburgh

Musbah Shaat, CTTC

Mahya Shahbazi, University of Western Ontario

Mohamad Shahbazi, Sharif University of Technology

Shahin Shahrampour, Harvard University

Atefeh Shahroudjeh, Concordia University

Soroosh Shahtalebi, Concordia University

Hangguan Shan, Zhejiang University

Fei Shen, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences

Ziyuan Shen, Southeast University

Wei Shi, Arizona State University

Raed Shubair, Massachusetts Institute of Technology (MIT)

David Shuman, Macalester College

Oswaldo Simeone, KCL

Andrea Simonetto, IBM Research Ireland

Dirk Slock, EURECOM

Mojtaba Soltanalian, University of Illinois at Chicago

Wenqing Song, Nanjing University

Yuhang Song, University of Southern California

Petros Spachos, University of Guelph

Pirathayini Srikantha, Western University
 Christoph Studer, Cornell University
 Xin Sui, Tableau Software
 Jiande Sun, Shandong Normal University
 Ying Sun, Purdue University
 Himal A. Suraweera, University of Peradeniya
 Ali Tajer, Rensselaer Polytechnic Institute
 Toru Takahashi, Osaka Sangyo University
 Mai Tanaka, University of Calgary
 Yuichi Tanaka, Tokyo University of Agriculture and Technology
 Xiaojun Tang, Apple Inc.
 Ivan Tashev, Microsoft Corporation
 Nikolaos Thomos, University of Essex
 Paishun Ting, University of Michigan, Ann Arbor
 Stefano Tomasin, University of Padova
 Nicolas Tremblay, CNRS
 Chun-Chen Tu, University of Michigan
 Stefano Tubaro, Politecnico di Milano
 Maria Tzelepi, Aristotle University of Thessaloniki
 Yeong-Luh Ueng, National Tsing Hua University
 Miguel Ángel Vázquez, Centre Tecnològic de les
 Telecomunicacions de Catalunya
 Santiago Velasco-Forero, MINES ParisTech, PSL Research
 University, CMM-Center of Mathematical Morphology
 Vladan Velisavljevic, University of Bedfordshire
 Krishna Kumar Venkatasubramanian, Worcester Polytechnic
 Institute
 Francesco Verde, University of Napoli Federico II
 Luisa Verdoliva, Università Federico II di Napoli
 Sergiy A. Vorobyov, Aalto University
 Hoi-To Wai, Arizona State University
 Michael Wand, The Swiss AI Lab IDSIA
 Baoji Wang, Peking University
 Dexin Wang, Colorado State University
 Huizheng Wang, Southeast University
 Meng Wang, Rensselaer Polytechnic Institute
 Wenwu Wang, University of Surrey
 Randall Wayth, Curtin University
 Ermin Wei, Northwestern University
 Jin Wei, University of Akron
 Tsui-Wei Weng, MIT
 Peter Willett, University of Connecticut
 Chris Winstead, Utah State University
 Yu Xiang, University of Utah
 Chaowei Xiao, U of Michigan
 Yuanzhang Xiao, University of Hawaii at Manoa
 Tianpei Xie, Amazon.com, Inc
 Guixian Xu, Aalborg University
 Mengyu Xu, University of Central Florida
 Yunhao Xu, Southeast University
 Mehrdad Yaghoobi, University of Edinburgh
 Nan Yang, Australian National University
 Ruizhe Yang, Beijing University of Technology
 Yufeng Yang, Southeast University
 Yavuz Yapici, North Carolina State University
 Wotao Yin, UCLA
 Anlan Yu, Southeast University
 F. Richard Yu, Carleton University
 Wei Yu, University of Toronto
 Chau Yuen, Singapore University of Technology and Design
 Syed A.R. Zaidi, University of Leeds
 Alina Zare, University of Florida
 Baosen Zhang, University of Washington
 Chuan Zhang, Southeast University
 Di Zhang, Zhengzhou University
 Huan Zhang, University of California Davis
 June Zhang, University of Hawaii
 Rongqing Zhang, Colorado State University
 Shunqing Zhang, Shanghai University
 Tao Zhang, Starkey Hearing Technologies
 Wenfeng Zhang, Ocean University of China
 Wenyi Zhang, University of Science and Technology of China
 Yu Zhang, Stanford University
 Yu Zhang, University of California, Santa Cruz
 Zhicai Zhang, Carleton University
 H. Vicky Zhao, Tsinghua University
 Qibin Zhao, RIKEN
 Yue Zhao, Stony Brook University
 Gan Zheng, Loughborough University
 Caijun Zhong, Zhejiang University
 Haibo Zhou, Nanjing University
 Sheng Zhou, Tsinghua University
 Xiong Zhou, Amazon
 Yi Zhou, Henan University
 Hao Zhu, The University of Texas at Austin
 Lijun Zhu, Georgia Institute of Technology
 Minghui Zhu, Pennsylvania State University
 Zuqing Zhu, University of Science and Technology of China
 Yuchen Zhuang, Southeast University
 David Ziung, University of Toronto
 Saman Zonouz, Rutgers University

Monday, November 26, 15:00-17:00, Adventure Room

Cost: Free

Machine/Deep Learning is a powerful technique for solving complex modeling problems across a broad range of industries. The benefits of deep learning are being realized in applications everywhere, including predictive maintenance, health monitoring, financial portfolio forecasting, and advanced driver assistance etc.

However, Identifying and extracting the relevant features for developing predictive models on sensor data is not a trivial task. Traditional techniques of Identifying the right features and building a model may involve significant domain expertise and is also time consuming. In many applications, lack of having a decent amount of training data also puts a constraint on developing invariant models for signal classification. Moreover, there is an increasing need for developing smart sensor signal processing algorithms which can be either deployed on edge nodes / embedded devices or on the cloud depending on the application.

Join us to learn more about how latest capabilities in MATLAB enable to you to perform Deep learning on signals quickly and with great ease. We will showcase some latest techniques in Deep Learning that let you build models for classification automatically. We will explore a couple of workflows for signal classification using techniques that capture deep insights from signals. You don't need to have any background in signal processing to use these techniques.

MATLAB based Topics/Examples Include:

- Deep Learning Techniques applied towards Music Genre Classification - Example
- Explore Transfer learning workflows to develop predictive models on sensor data using sharp time-frequency representations - Example
- Explore easy to use signal pre-processing techniques to increase signal quality
- Explore latest datatypes such as tall arrays to work with data that does not fit in memory alleviating the need for writing special code to work with large sensor data,
- Leverage high-performance computing resources, such as multicore computers, GPUs, computer clusters to scale up the performance

Sponsored by:



PLEN-1: SECURITY IN THE INTERNET OF THINGS: INFORMATION THEORETIC INSIGHTS

Tuesday, 27 November, 08:30 - 09:30, Magic Kingdom Ballroom 2&3

H. Vincent Poor, Princeton University

The emerging Internet of Things (IoT) has several salient characteristics that differentiate it from existing wireless networking architectures. These include the deployment of very large numbers of (possibly) low-complexity terminals; the need for low-latency, short-packet communications (e.g., to support automation); light or no infrastructure; and primary applications of data gathering, inference and control. These characteristics shape the issue of security in the IoT, and an important aspect of this issue is the need for new fundamental insights about security that address these characteristics. This talk will discuss recent research advances along these lines. In particular, results that examine security in source coding, data transmission and inference within the above setting will be described. This is an evolving field, and several open problems will also be discussed.



H. Vincent Poor is the Michael Henry Strater University Professor of Electrical Engineering at Princeton University. From 1977, and until joining the Princeton faculty in 1990, he was on the faculty of the University of Illinois. During 2006 - 2016, he served as Dean of Princeton's School of Engineering and Applied Science. He has also held visiting positions at several other universities, including most recently at Berkeley and Cambridge. Dr. Poor's research interests are in signal processing and information theory, and their applications in wireless networks, energy systems and related fields. He is a member of the National Academy of Engineering and the National Academy of Sciences, and is a foreign member of the Chinese Academy of Sciences, the Royal Society, and other national and international academies. He received the Society Award of the IEEE Signal Processing Society in 2011, and the IEEE Alexander Graham Bell Medal in 2017.

PLEN-2: GRID GRAPH SIGNAL PROCESSING

Wednesday, 28 November, 08:30 - 09:30, Magic Kingdom Ballroom 2&3

Anna Scaglione, Arizona State University

Power systems sensors data analysis relies on Kirchhoff and Ohm's laws to model the sensor field. Interestingly, these basic laws we learn as undergraduates, induce a structure in the current and voltage measurement data that finds parallels in classical RADAR sensor array processing



as well as the emerging field of Graph Signal Processing. Also, given the predictable sparse harmonic content of the power-line carrier, the grid is an ideal realm to apply sub-Nyquist sampling. This talk will go from basic models to the abstraction of the problem formulation that makes these connections apparent, with the goal of establishing a taxonomy of Grid-Graph Signal Processing problem and highlighting some of the opportunities that exist for advancing how these critical systems are monitored.

Anna Scaglione (M.Sc.'95, Ph.D. '99) is currently a professor in electrical and computer engineering at Arizona State University. She was Professor of Electrical Engineering previously at the University of California at Davis (2008-2014), and at Cornell University, (2001-2008). Prior to joining the engineering faculty at Cornell, Scaglione was an assistant professor at the University of New Mexico (2000-2001). Dr. Scaglione's expertise is in the broad area of statistical signal processing for communication, electric power systems and information networks. Her current research focuses on studying and enabling decentralized learning and signal processing in networks of sensors. Dr. Scaglione was elected an IEEE fellow in 2011, honored by both the Signal Processing and the Communication Societies. She was editor in chief in (2012-2013) of the IEEE Signal Processing Letters, and served as associate editor for the IEEE Transactions on Wireless Communications from 2002 to 2005. From 2008 to 2011, she served on the editorial board of the IEEE Transactions on Signal Processing from 2008, where she was area editor in 2010-11. She is currently Senior Editor for the IEEE Transactions on Control of Networked Systems.

She was general chair of the SPAWC 2005 workshop and on the Signal Processing for Communication Committee from 2004 to 2009. She has been an IEEE SmartGridComm conference steering committee member from 2010 to 2015, and was on board of governors of the IEEE Signal Processing Society during 2011-2014. Dr. Scaglione received the 2000 IEEE Signal Processing Transactions Best Paper Award and the 2013, IEEE Donald G. Fink Prize Paper Award for the best review paper in that year in the IEEE publications. Her research with her students was also honored with the 2013 IEEE Signal Processing Society Young Author Best Paper Award (Lin Li), and three conference best paper awards: the Eilersick Best Paper Award (MILCOM 2005) and the student best paper award at Smartgridcomm 2014 and the student best paper award at ICASSP 2017. She was also a recipient of the NSF CAREER grant (2002).

PLEN-3: VLSI OPTIMIZATIONS FOR DEEP NEURAL NETWORKS

Thursday, 29 November, 08:30 - 09:30, Magic Kingdom Ballroom 2&3

Zhongfeng Wang, Nanjing University

In this talk, I will first give a brief introduction about basics of VLSI optimization for signal processing systems as well as basics of deep learning. Then I will discuss a few new methods about model compression for deep neural networks. Thereafter, I will focus on efficient VLSI design for deep convolutional neural network and recurrent neural network.



Zhongfeng Wang received both BS and MS degrees from Tsinghua University. He obtained the Ph.D. degree from the University of Minnesota, Minneapolis, in 2000. He is currently a Distinguished Professor at Nanjing University, China. Previously he worked for Broadcom Corporation, California,

from 2007 to 2016 as an Associate Technical Director. Before that, he has worked for Oregon State University and National Semiconductor Corporation. Dr. Wang is a world-recognized expert on Low-Power High-Speed VLSI Design for Signal Processing Systems. He has published over one 170 technical papers with two best paper awards received in the IEEE Circuits and Systems (CAS) society. He has edited one book "VLSI" and filed over forty U.S. patent applications and disclosures. In the current record, he was the first person in the research society having five papers ranked among top 20 most downloaded manuscripts in IEEE Trans. on VLSI Systems. In the past, he has served as Associate Editor for IEEE Trans. on CAS-I, CAS-II, and VLSI Systems for multiple terms. In 2013, he served in the Best Paper Award selection committee for the IEEE CAS society. Meanwhile, he has contributed significantly to the industrial standards. So far, his technical proposals have been adopted by more than fifteen international networking standards. In 2015, He was elevated to the Fellow of IEEE for contributions to VLSI design and implementation of FEC coding. His current research interests are in the area of Low Power/High Speed VLSI Design for Digital Communications and Deep Learning.

REGISTRATION HOURS

The GlobalSIP 2018 Registration Desk is located Magic Kingdom Ballroom East Foyer in The Disneyland Hotel. Hours of operation are:

Monday, November 26 14:00 - 18:00
Tuesday, November 27 07:30 - 17:30
Wednesday, November 28 .. 08:00 - 17:30
Thursday, November 29 08:00 - 17:30

VENUE

The Disneyland Hotel

Address: 1150 West Magic Way
Anaheim, CA 92802
Phone: (714) 778-6600
Website: disneyland.disney.go.com

INTERNET ACCESS

Free WiFi Internet access is available to all attendees in the session & meeting rooms. Connect to network "**DLR Convention WIFI**". A splash page will appear. To log on, click on "**Connect to AT&T**".

SOCIAL EVENTS

WELCOME RECEPTION

Tuesday, 27 November 18:00–22:00, Magic Kingdom Lawn

The Organizing committee would like to welcome you to Anaheim and GlobalSIP 2018. Please join us Tuesday for drinks and hors d'oeuvres on the Magic Kingdom Lawn.

YOUNG PROFESSIONALS EVENT: ENGINEERING CAREER SPEED DATING

Wednesday, 28 November, 12:30–14:30, The Disneyland Hotel

At this event students and young professionals will move among tables every 15 minutes. At each table there will be an engineer who will give a brief overview of about 5 minutes on their career path, their current position, educational background and skills necessary for this field. The remaining minutes will be spent fielding questions from students and young professionals. A bell will signal students and young professionals to move to another table and the process will begin again for a total of 6 presentations with each group having approximately 5 - 8 students.

The goal is to give an opportunity for students and young professionals to ask questions that will help them better understand the variety of opportunities available in signal processing related fields.

EVENING RECEPTION

Wednesday, 28 November 18:00–19:30, Magic Kingdom Ballroom 2&3

OTHER EVENTS

ETHICS FOR AUTHORS AND VOLUNTEERS WORKSHOP

Thursday, 29 November, 12:30–14:00, Mark Twain & Terrace

The Author Ethics workshop will provide a comprehensive review of author ethics and best practices that covers the proper preparation of a manuscript, application for funding and grants, avoiding bibliometric and citation manipulation, submission and the peer review process, and offers suggestions towards the best ethical practices to ensure successful publication.

GLOBALSIP TO GLOBALSIP MEETING

Thursday, 29 November, 12:30–14:00, Amazon

GLOBALSIP 2018 SUPPORTERS

GlobalSIP 2018 thanks Mathworks for their support of the conference!



GLOBALSIP 2018 TECHNICAL PROGRAM

Distinguished Lecturer – Brian M. Sadler, Army Research Laboratory**CRYPTOGRAPHIC SIDE-CHANNEL SIGNALING AND AUTHENTICATION VIA FINGERPRINT EMBEDDING****Abstract**

We describe a general framework for designing and embedding a fingerprint at the physical layer of a wireless network to achieve authentication with enhanced security and stealth. Fingerprint embedding is a key-aided process of superimposing a low-power tag to the primary message waveform for the purpose of authenticating the transmission. The tag is uniquely created from the message and key, and successful authentication is achieved when the correct tag is detected by the receiver. This enables control over performance trade-offs by design, and low-power fingerprints enhance security by making the authentication tags much less accessible to an adversary (Eve). Privacy analysis shows how Eve can be forced into difficult detection regimes, and secrecy analysis demonstrates that Eve's uncertainty about the secret key is not readily reduced by an increase in her computational ability. In addition, the fingerprint embedding framework easily generalizes to create an authenticated communications side-channel for minimal cost. Side-channel information is conveyed to the receiver through the transmitter's choice of tag from a secret codebook generated by the primary message and a shared secret key set. A linear coding scheme is introduced which enables tradeoffs among the performance goals of authentication, side-channel rate, secrecy, and privacy. Practical designs are readily achieved, and software-defined radio experiments validate the theory and demonstrate how the use of a set of secret keys for fingerprint embedding can, at minimal cost, allow secret and private side-channel communications, while simultaneously providing authentication with enhanced security.

**Biography**

Brian M. Sadler is the Army Senior Scientist for Intelligent Systems at the Army Research Laboratory (ARL) in Adelphi, MD, is a Fellow of ARL, a Fellow of the IEEE, and an IEEE Signal Processing Society Distinguished Lecturer for 2017-2018. He has been an associate or guest editor for a variety of journals including the IEEE Transactions on Signal Processing, EURASIP Signal Processing, IEEE SP Letters, IEEE SP Magazine, the International Journal of Robotics Research, and Autonomous Robots. He received Best Paper Awards from the IEEE Signal Processing Society in 2006 and 2010, several ARL and Army R&D awards, and a 2008 Outstanding Invention of the Year Award from the University of Maryland. His research interests include information science, wireless networked and autonomous systems, human-machine teaming, sensing, and mixed-signal integrated circuit architectures, and he has more than 400 publications in these areas.

Distinguished Lecturer – Muriel Médard, Massachusetts Institute of Technology (MIT)**NETWORK CODING IN SATELLITES****Biography**

Muriel Médard is the Cecil H. Green Professor in the Electrical Engineering and Computer Science (EECS) Department at MIT and leads the Network Coding and Reliable Communications Group at the Research Laboratory for Electronics at MIT. She has cofounded three companies to commercialize network coding, CodeOn, Steinwurf and Chocolate Cloud. She has served as editor for many publications of the Institute of Electrical and Electronics Engineers (IEEE), of which she was elected Fellow, and she has served as Editor in Chief of the IEEE Journal on Selected Areas in Communications. She was President of the IEEE Information Theory Society in 2012, and served on its board of governors for eleven years. She has served as technical program committee co-chair of many of the major conferences in information theory, communications and networking. She received the 2009 IEEE Communication Society and Information Theory Society Joint Paper Award, the 2009 William R. Bennett Prize in the Field of Communications Networking, the 2002 IEEE Leon K. Kirchmayer Prize Paper Award and several conference paper awards. She was co-winner of the MIT 2004 Harold E. Edgerton Faculty Achievement Award, received the 2013 EECS Graduate Student Association Mentor Award and served as Housemaster for seven years. In 2007 she was named a Gilbreth Lecturer by the U.S. National Academy of Engineering. She received the 2016 IEEE Vehicular Technology James Evans Avant Garde Award, the 2017 Aaron Wyner Distinguished Service Award from the IEEE Information Theory Society and the 2017 IEEE Communications Society Edwin Howard Armstrong Achievement Award.



Distinguished Lecturer – Dario Farina, Imperial College London



Distinguished Lecturer – Georgios Giannakis, University of Minnesota

ONLINE SCALABLE LEARNING ADAPTIVE TO UNKNOWN DYNAMICS AND GRAPHS

Abstract

Kernel based methods exhibit well-documented performance in various nonlinear learning tasks. Most of them rely on a preselected kernel, whose prudent choice presumes task-specific prior information. Especially when the latter is not available, multi-kernel learning has gained popularity thanks to its flexibility in choosing kernels from a prescribed kernel dictionary. Leveraging the random feature approximation, this talk will introduce first for static setups a scalable multi-kernel learning approach (termed Raker) to obtain the sought nonlinear learning function ‘on the fly,’ bypassing the ‘curse of dimensionality’ associated with kernel methods. We will also present an adaptive multi-kernel learning scheme (termed AdaRaker) that relies on weighted combinations of advices from hierarchical ensembles of experts to boost performance in dynamic environments. The weights account not only for each kernel’s contribution to the learning process, but also for the unknown dynamics. Performance is analyzed in terms of both static and dynamic regrets. AdaRaker is uniquely capable of tracking nonlinear learning functions in environments with unknown dynamics, with analytic performance guarantees. The approach is further tailored for online graph-adaptive learning with scalability and privacy. Tests with synthetic and real datasets will showcase the effectiveness of the novel algorithms.



Biography

Georgios B. Giannakis (Fellow’97) received his Diploma in Electrical Engr. from the Ntl. Tech. Univ. of Athens, Greece, 1981. From 1982 to 1986 he was with the Univ. of Southern California (USC), where he received his MSc. in Electrical Engineering, 1983, MSc. in Mathematics, 1986, and Ph.D. in Electrical Engr., 1986. He was with the U. of Virginia from 1987 to 1998, and since 1999 he has been a professor with the U. of Minnesota, where he holds a Chair in Wireless Communications, a University of Minnesota McKnight Presidential Chair in ECE, and serves as director of the Digital Technology Center. His general interests span the areas of communications, networking and statistical signal processing – subjects on which he has published more than 430 journal papers, 720 conference papers, 25 book chapters, two edited books and two research monographs (h-index 133). Current research focuses on data science and network science with applications to social, brain, and power networks with renewables. He is the (co-) inventor of 32 patents issued, and the (co-) recipient of 9 best journal paper awards from the IEEE Signal Processing (SP) and Communications Societies. He also received Technical Achievement Awards from the SP Society

(2000), from EURASIP (2005), and the inaugural IEEE Fourier Tech. Field Award (2015). He is a Fellow of EURASIP, and has served the IEEE in various posts including that of a Distinguished Lecturer.

Tuesday, November 27

09:40 - 10:40

DL Session

DL-IVC.1

Magic Kingdom Ballroom 4

Distinguished Lecturer – Robert Heath Jr., University of Texas at Austin

SIGNAL PROCESSING FOR AUTOMATED DRIVING

Abstract

Signal processing is playing an important role in automated driving. The reason is that automated driving exploits multiple sensing modalities including millimeter wave radar, computer vision, ultrasonic radar, not to mention wireless communication and satellite navigation. While each area is separately acknowledged as an application of signal processing, their combined use in vehicular systems is still not well understood.

The objective of this tutorial is to provide an overview of signal processing opportunities for vehicular systems from a signal processing perspective.



Biography

Robert W. Heath Jr. received the Ph.D. in EE from Stanford University. He is a Cullen Trust for Higher Education Endowed Professor in the Department of Electrical and Computer Engineering at The University of Texas at Austin and a Member of the Wireless Networking and Communications Group. He is also the President and CEO of MIMO Wireless Inc and Chief Innovation Officer at Kuma Signals LLC. Prof. Heath is a recipient of the 2012 Signal Processing Magazine Best Paper award, a 2013 Signal Processing Society best paper award, the 2014 EURASIP Journal on Advances in Signal Processing best paper award, and the 2014 Journal of Communications and Networks best paper award, the 2016 IEEE Communications Society Fred W. Ellersick Prize, the 2016 IEEE Communications Society and Information Theory Society Joint Paper Award, 2017 IEEE Marconi Prize Paper Award, and the 2017 EURASIP Technical Achievement Award. He authored "Introduction to Wireless Digital Communication" (Prentice Hall in 2017) and "Digital Wireless Communication: Physical Layer Exploration Lab Using the NI USRP" (National Technology and Science Press in 2012). He co-authored "Millimeter Wave Wireless Communications" (Prentice Hall in 2014). He is a licensed Amateur Radio Operator, a registered Professional Engineer in Texas, a Fellow of the National Academy of Inventors, and a Fellow of the IEEE.

5G Technologies

Session Chair: Elisabeth de Carvalho, Aalborg University

- 5GS-L.1.1** 11:00 **WIDEBAND MASSIVE MIMO CHANNEL ESTIMATION VIA SEQUENTIAL ATOMIC NORM MINIMIZATION**
Stelios Stefanatos, Freie University Berlin, Germany; Mahdi Barzegar Khalilsarai, Technical University of Berlin, Germany; Gerhard Wunder, Freie University Berlin, Germany
- 5GS-L.1.2** 11:18 **DOWNLINK SPECTRAL EFFICIENCY OF CELL-FREE MASSIVE MIMO WITH FULL-PILOT ZERO-FORCING**
Giovanni Interdonato, Ericsson AB, Sweden; Marcus Karlsson, Emil Björnson, Erik G. Larsson, Linköping University, Sweden
- 5GS-L.1.3** 11:36 **SPATIAL CHANNEL COVARIANCE ESTIMATION FOR THE HYBRID ARCHITECTURE AT A BASE STATION: A TENSOR-DECOMPOSITION-BASED APPROACH**
Sungwoo Park, Anum Ali, Nuria González-Prelcic, Robert Heath, The University of Texas at Austin, United States
- 5GS-L.1.4** 11:54 **WIRELESS CHIP TO CHIP COMMUNICATION LINK BUDGET ENHANCEMENT USING HARD/SOFT SURFACES**
Yazan Al-Alem, Ahmed A. Kishk, Concordia University, Canada; Raed Shubair, Massachusetts Institute of Technology, United States
- 5GS-L.1.5** 12:12 **ON OPTIMAL SENSING AND CAPACITY TRADE-OFF IN COGNITIVE RADIO SYSTEMS WITH DIRECTIONAL ANTENNAS**
Hassan Yazdani, Azadeh Vosoughi, University of Central Florida, United States

Signal Processing for Rehabilitation & Assistive Systems

Session Co-Chairs: Arash Mohammadi, Concordia University; Farokh Atashzar, University of Western Ontario

- BIO-L.1.1** 11:00 **ADAPTIVE CSP FOR USER INDEPENDENCE IN MI-BCI PARADIGM FOR UPPER LIMB STROKE REHABILITATION**
Ana P. Costa, Jakob S. Møller, Technical University of Denmark, Denmark; Helle K. Iversen, Glostrup Hospital, Denmark; Sadasivan Puthusserypady, Technical University of Denmark, Denmark
- BIO-L.1.2** 11:18 **ELECTROPHYSIOLOGICAL SIGNAL PROCESSING FOR INTRAOPERATIVE LOCALIZATION OF SUBTHALAMIC NUCLEUS DURING DEEP BRAIN STIMULATION SURGERY**
Mahsa Khasravi, Seyed Farokh Atashzar, Greydon Gilmore, Mandar S. Jog, Rajni V. Patel, University of Western Ontario, Canada
- BIO-L.1.3** 11:36 **HUMAN ACTIVITY CLASSIFICATION INCORPORATING EGOCENTRIC VIDEO AND INERTIAL MEASUREMENT UNIT DATA**
Yantao Lu, Senem Velipasalar, Syracuse University, United States
- BIO-L.1.4** 11:54 **THE ROLE OF ACCELEROMETER AND GYROSCOPE SENSORS IN IDENTIFICATION OF MILD COGNITIVE IMPAIRMENT**
Migyeong Gwak, Ellen Woo, Majid Sarrafzadeh, University of California, Los Angeles, United States
- BIO-L.1.5** 12:12 **CNN-BASED ACTION RECOGNITION USING ADAPTIVE MULTISCALE DEPTH MOTION MAPS AND STABLE JOINT DISTANCE MAPS**
Junyou He, Hailun Xia, Chunyan Feng, Yunfei Chu, Beijing University of Posts and Telecommunications, China

Image restoration and reconstruction

- GS-L.1.1** 11:00 **DEEP BACK PROJECTION FOR SPARSE-VIEW CT RECONSTRUCTION**
Dong Hye Ye, Gregory Buzzard, Max Ruby, Charles Bouman, Purdue University, United States
- GS-L.1.2** 11:18 **DEEP NEURAL NETWORKS FOR NON-LINEAR MODEL-BASED ULTRASOUND RECONSTRUCTION**
Hani Almansouri, Purdue University, United States; Singanallur Venkatakrishnan, Oak Ridge National Lab, United States; Gregory Buzzard, Charles Bouman, Purdue University, United States; Hector Santos-Villalobos, Oak Ridge National Lab, United States
- GS-L.1.3** 11:36 **LINEARIZED ADMM AND FAST NONLOCAL DENOISING FOR EFFICIENT PLUG-AND-PLAY RESTORATION**
Unni V.S., Sanjay Ghosh, Kunal Chaudhury, Indian Institute of Science, India
- GS-L.1.4** 11:54 **BLIND IMAGE RESTORATION OF BLURRED IMAGES USING FAILING DETECTION PROCESS**
Takahiro Nagata, Satoshi Motohashi, Tomio Goto, Nagoya Institute of Technology, Japan

Graph Signal Processing I

Session Chair: Santiago Segarra

- GSP-L.1.1** 11:00 **ANALYSIS VS SYNTHESIS - AN INVESTIGATION OF (CO)SPARSE SIGNAL MODELS ON GRAPHS**
Madeleine Kotzagiannidis, Mike E. Davies, University of Edinburgh, United Kingdom
- GSP-L.1.2** 11:18 **SINGLE INDEX LATENT VARIABLE MODELS FOR NETWORK TOPOLOGY INFERENCE**
Jonathan Mei, Jose' M.F. Moura, Carnegie Mellon University, United States
- GSP-L.1.3** 11:36 **GENERALIZED GRAPH SIGNAL PROCESSING**
Feng Ji, Wee Peng Tay, Nanyang Technological University, Singapore
- GSP-L.1.4** 11:54 **SAMPLING AND RECONSTRUCTION OF SIGNALS ON PRODUCT GRAPHS**
Guillermo Ortiz-Jiménez, Mario Coutino, Sundeep Prabhakar Chepuri, Geert Leus, Delft University of Technology, Netherlands
- GSP-L.1.5** 12:12 **MODELING SIGNALS OVER DIRECTED GRAPHS THROUGH FILTERING**
Harry Sevi, CEA\ENS de Lyon, France; Gabriel Rilling, CEA, France; Pierre Borgnat, ENS de Lyon, France

Advanced PHY Techniques for Intelligent Vehicular Communications

Session Chair: Dongliang Duan, University of Wyoming

- IVC-L.1.1** **OBSTRUCTED VEHICLE-TO-VEHICLE CHANNEL MODELING FOR INTELLIGENT VEHICULAR COMMUNICATIONS**
11:00
Ke Guan, Bo Ai, Danping He, Beijing Jiaotong University, China; David W. Matolak, University of South Carolina, United States; Qi Wang, China Academy of Information and Communications Technology, China; Zhangdui Zhong, Beijing Jiaotong University, China; Thomas Kuerner, Technische Universitaet Braunschweig, Germany
- IVC-L.1.2** **TIME-SEQUENCE CHANNEL INFERENCE FOR BEAM ALIGNMENT IN VEHICULAR NETWORKS**
11:18
Sheng Chen, Zhiyuan Jiang, Sheng Zhou, Zhisheng Niu, Tsinghua University, China
- IVC-L.1.3** **PILOT INSERTION WITH INDEX MODULATION FOR OFDM-BASED VEHICULAR COMMUNICATIONS**
11:36
Qiang Li, Miaowen Wen, South China University of Technology, China; Yuekai Zhang, HUAWEI Technologies Company Limited, China; Jun Li, Guangzhou University, China; Fangjiong Chen, Fei Ji, South China University of Technology, China
- IVC-L.1.4** **IMPACTS OF CHANNEL IMPAIRMENTS AND IMPERFECTIONS ON OFDM SYSTEM PERFORMANCES**
11:54
Sharif Matin, Intel Inc., United States; Laurence B. Milstein, University of California, San Diego, United States
- IVC-L.1.5** **BEM-BASED UKF CHANNEL ESTIMATION FOR 5G-ENABLED V2V CHANNEL**
12:12
Xuanfan Shen, Yong Liao, Center of Communication and TT&C, Chongqing University, China; Xuewu Dai, Faculty of Engineering and Environment, Northumbria University, China

Wireless Network Security I

Session Chair: P.-C. Ching, Chinese University of Hong Kong

- WNS-L.1.1** **RELAY-AIDED SECURE BROADCASTING FOR VLC**
11:00
Ahmed Arafa, Princeton University, United States; Erdal Panayirci, Kadir Has University, Turkey; H. Vincent Poor, Princeton University, United States
- WNS-L.1.2** **A NEW LOOK AT SECRECY CAPACITY OF MIMOME USING ARTIFICIAL NOISE FROM ALICE AND BOB WITHOUT KNOWLEDGE OF EVE'S CSI**
11:18
Reza Sohrabi, Yingbo Hua, University of California, Riverside, United States
- WNS-L.1.3** **ROBUST SECRECY DESIGN FOR MIMO SWIPT WITH ARTIFICIAL NOISE AND FULL-DUPLEX RECEIVER JAMMING**
11:36
Yao Ge, Pak-Chung Ching, The Chinese University of Hong Kong, China
- WNS-L.1.4** **TO COMMUNICATE OR TO SCAN: PROSPECT THEORY EXTENSION OF A STOCHASTIC GAME**
11:54
Andrey Garnae, Wade Trappe, WINLAB, Rutgers University, United States; Athina Petropulu, Rutgers University, United States
- WNS-L.1.5** **JOINT PARTIAL-TIME PARTIAL-BAND JAMMING OF A MULTICARRIER DS-CDMA SYSTEM IN A FADING ENVIRONMENT**
12:12
Kanke Wu, Pamela C. Cosman, Laurence B. Milstein, University of California, San Diego, United States

Massive MIMO

- GS-P.1.1 COMPRESSIVE MASSIVE RANDOM ACCESS FOR MASSIVE MACHINE-TYPE COMMUNICATIONS (MMTC)**
Malong Ke, Zhen Gao, Beijing Institute of Technology, China; Yongpeng Wu, Shanghai Jiao Tong University, China; Xiangming Meng, Huawei Technologies Co.Ltd, China
- GS-P.1.2 DOWNLINK CHANNEL SPATIAL COVARIANCE ESTIMATION IN REALISTIC FDD MASSIVE MIMO SYSTEMS**
Lorenzo Miretti, EURECOM, France; Renato Luis Garrido Cavalcante, Slawomir Stanczak, Fraunhofer Heinrich Hertz Institute, and Technical University of Berlin, Germany
- GS-P.1.3 HOW TO EXPLOIT MOBILITY TO MITIGATE PILOT CONTAMINATION?**
Xiaoyu Zhang, Xuanfeng Li, Yong Zhou, ShanghaiTech University, China; Hua Qian, Shanghai Advanced Research Institute, CAS, China; Xiliang Luo, ShanghaiTech University, China
- GS-P.1.4 CHANNEL COVARIANCE IDENTIFICATION IN FDD MASSIVE MIMO SYSTEMS**
José Pablo González-Coma, Pedro Suárez-Casal, Paula María Castro, Luis Castedo, University of A Coruña, Spain; Michael Joham, Technische Universität München, Germany
- GS-P.1.5 INTERFERENCE STATISTICS APPROXIMATIONS FOR DATA RATE ANALYSIS IN UPLINK MASSIVE MTC**
Sergi Liesegang, Olga Muñoz, Antonio Pascual-Iserte, Universitat Politècnica de Catalunya, Spain
- GS-P.1.6 A LOW COMPLEXITY MASSIVE MIMO DETECTION SCHEME USING ANGULAR-DOMAIN PROCESSING**
Mojtaba Mahdavi, Ove Edfors, Viktor Öwall, Liang Liu, Lund University, Sweden

5G Satellite Communications

Session Chair: Ana Perez-Neira, CTTC/UPC

- 5GS-L.2.1 ASSESSMENT OF 5G NR PHYSICAL LAYER FOR FUTURE SATELLITE NETWORKS**
14:00
Nicolas Cassiau, Luc Maret, Jean-Baptiste Doré, Valentin Savin, Dimitri Kténas, CEA-Leti, MINATEC Campus, France
- 5GS-L.2.2 CONCEPT AND EVALUATION OF MOBILE CELL CONNECTIVITY OVER A SATELLITE BACKHAUL FOR FUTURE 5G NETWORKS**
14:18
Florian Völk, Robert T. Schwarz, Bundeswehr University Munich, Germany; Mario Lorenz, Fraunhofer Institute for Integrated Circuits, Germany; Andreas Knopp, Bundeswehr University Munich, Germany; Markus Landmann, Fraunhofer Institute for Integrated Circuits, Germany
- 5GS-L.2.3 SPECTRAL CLUSTERING FOR BEAM-FREE SATELLITE COMMUNICATIONS**
14:36
Miguel Ángel Vázquez, Ana Isabel Pérez-Neira, Centre Tecnològic de les Telecomunicacions de Catalunya, Spain
- 5GS-L.2.4 SYMBOL-ASYNCHRONOUS TRANSMISSION IN MULTIBEAM SATELLITE USER DOWN-LINK: RATE REGIONS FOR NOVEL SUPERPOSITION CODING SCHEMES**
14:54
Nele Noels, Marc Moeneclaey, Ghent University (UGent), Belgium; Tomás Ramírez, Carlos Mosquera, University of Vigo, Spain; Màrius Caus, Adriano Pastore, Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Spain
- 5GS-L.2.5 TURBO-FSK: A 5G NB-IOT EVOLUTION FOR LEO SATELLITE NETWORKS**
15:12
Jean-Baptiste Doré, Vincent Berg, Commissariat à l'énergie atomique et aux énergies alternatives (CEA), France

Tuesday, November 27 14:00 - 15:30
Lecture Session BIO-L.2 Magic Kingdom Ballroom 1

Signal Processing for Wearable Health Technologies

Session Chair: Arash Mohammadi, Concordia University

BIO-L.2.1 14:00 **CONTACT SURFACE AREA: A NOVEL SIGNAL FOR HEART RATE ESTIMATION IN SMARTPHONE VIDEOS**
Sara Fridovich-Keil, Peter Ramadge, Princeton University, United States

BIO-L.2.2 14:18 **NON-INTRUSIVE AND NON-CONTACT SLEEP MONITORING WITH SEISMOMETER**
Fangyu Li, Jose Clemente, WenZhan Song, University of Georgia, United States

BIO-L.2.3 14:36 **A SMARTPHONE-BASED WELLNESS ASSESSMENT USING MOBILE SENSORS**
Katherine McLeod, Liudmyla Girchenko, Peter Spenler, Petros Spachos, University of Guelph, Canada

BIO-L.2.4 14:54 **LOW-COMPLEXITY COMPRESSED ANALYSIS IN EIGENSPACE WITH LIMITED LABELED DATA FOR REAL-TIME ELECTROCARDIOGRAPHY TELEMONITORING**
Kai-Chieh Hsu, Bo-Hong Cho, Ching-Yao Chou, An-Yeu (Andy) Wu, National Taiwan University, Taiwan

Tuesday, November 27 14:00 - 15:30
Lecture Session GS-L.2 Adventure

Image and video enhancement

GS-L.2.1 14:00 **NOISE-AIDED EDGE-PRESERVING IMAGE DENOISING USING NON-LOCAL MEANS WITH STOCHASTIC RESONANCE**
Deepak Dhillon, Rajlaxmi Chouhan, Indian Institute of Technology Jodhpur, India

GS-L.2.2 14:18 **COLOR BILATERAL FILTERING USING STRATIFIED FOURIER SAMPLING**
Sanjay Ghosh, Kunal Chaudhury, Indian Institute of Science, India

GS-L.2.3 14:36 **SINGLE IMAGE SUPER-RESOLUTION USING A NON-LOCAL 3D CONVOLUTIONAL NEURAL NETWORK**
Zhuang Xiong, Xidian University, China; Xiaoming Tao, Tsinghua University, China; Nan Zhao, Xidian University, China; Baihong Lin, Tsinghua University, China

GS-L.2.4 14:54 **SINGLE IMAGE SUPER-RESOLUTION WITH LIMITED NUMBER OF FILTERS**
Yusuke Nakahara, Takuro Yamaguchi, Masaaki Ikehara, Keio University, Japan

GS-L.2.5 15:12 **VIDEO SUPER-RESOLUTION VIA DYNAMIC LOCAL FILTER NETWORK**
Yang Zhou, University of Ottawa, Canada; Xiaohong Liu, McMaster University, Canada; Lei Chen, Jiying Zhao, University of Ottawa, Canada

Graph Signal Processing II

Session Chair: Sundeep Chopuri

- GSP-L.2.1 CNN ARCHITECTURES FOR GRAPH DATA**
14:00 *Fernando Gama, University of Pennsylvania, United States; Antonio Marques, King Juan Carlos University, Spain; Geert Leus, Delft University of Technology, Netherlands; Alejandro Ribeiro, University of Pennsylvania, United States*
- GSP-L.2.2 WEIGHTED MULTI-PROJECTION: 3D POINT CLOUD DENOISING WITH TANGENT PLANES**
14:18 *Chaojing Duan, Carnegie Mellon University, United States; Siheng Chen, Uber Advanced Technology Group, United States; Jelena Kovačević, New York University, United States*
- GSP-L.2.3 RUMOUR SOURCE DETECTION IN SOCIAL NETWORKS USING PARTIAL OBSERVATIONS**
14:36 *Roxana Alexandru, Pier Luigi Dragotti, Imperial College London, United Kingdom*
- GSP-L.2.4 FLOW SMOOTHING AND DENOISING: GRAPH SIGNAL PROCESSING IN THE EDGE-SPACE**
14:54 *Michael Schaub, Santiago Segarra, Massachusetts Institute of Technology, United States*
- GSP-L.2.5 GRAPH-BASED REGULARIZATION FOR REGRESSION PROBLEMS WITH HIGHLY-CORRELATED DESIGNS**
15:12 *Yuan Li, Benjamin Mark, Garvesh Raskutti, University of Wisconsin-Madison, United States; Rebecca Willett, University of Chicago, United States*

Applications in Internet of Intelligent Vehicles

Session Chair: Jian Wang, Tsinghua University

- IVC-L.2.1 A PROTOTYPE PERFORMANCE ANALYSIS FOR V2V COMMUNICATIONS USING USRP-BASED SOFTWARE DEFINED RADIO PLATFORM**
14:00 *Fei Peng, Shunqing Zhang, Shan Cao, Shugong Xu, Shanghai University, China*
- IVC-L.2.2 OPTIMAL MULTI-SENSOR MULTI-VEHICLE (MSMV) LOCALIZATION AND MOBILITY TRACKING**
14:18 *Pengtao Yang, Peking University, China; Dongliang Duan, University of Wyoming, United States; Chen Chen, Xiang Cheng, Peking University, China; Liuqing Yang, Colorado State University, United States*
- IVC-L.2.3 A DEEP REINFORCEMENT LEARNING APPROACH TO FLOCKING AND NAVIGATION OF UAVS IN LARGE-SCALE COMPLEX ENVIRONMENTS**
14:36 *Chao Wang, Jian Wang, Xudong Zhang, Tsinghua university, China*
- IVC-L.2.4 THE GREEDY DIRICHLET PROCESS FILTER - AN ONLINE CLUSTERING MULTI-TARGET TRACKER**
14:54 *Benjamin Naujoks, Patrick Burger, Hans-Joachim Wuensche, University of the Bundeswehr München, Germany*
- IVC-L.2.5 QUICKEST FREEWAY ACCIDENT DETECTION UNDER UNKNOWN POST-ACCIDENT CONDITIONS**
15:12 *Yasitha Warahena Liyanage, Daphney-Stavroula Zois, Charalampos Chelmis, University at Albany, SUNY, United States*

Wireless Network Security II

Session Chair: Naveen Venkatesgowda, Norwegian University of Science and Technology

- WNS-L.2.1** 14:00 **PRIVACY-PRESERVING DISTRIBUTED PRECODER DESIGN FOR DECENTRALIZED ESTIMATION**
Naveen K. D. Venkatesgowda, Stefan Werner, Norwegian University of Science and Technology, Norway
- WNS-L.2.2** 14:18 **PRESERVING PARAMETER PRIVACY IN SENSOR NETWORKS**
Chong Xiao Wang, Yang Song, Wee Peng Tay, Nanyang Technological University, Singapore
- WNS-L.2.3** 14:36 **INFERENCE RESISTANT POLICY DESIGN FOR MARKOV DECISION PROCESSES**
Omid Javidbakht, Parv Venkatasubramaniam, Lehigh University, United States
- WNS-L.2.4** 14:54 **SEQUENTIAL GAME NETWORK (SEGANE) WITH APPLICATION TO ONLINE DATA SANITIZATION**
Zahir Alsulaimawi, Jinsub Kim, Thanh Nguyen, Oregon State University, United States

Wireless Communications

- GS-P.2.1** **CONSTELLATION DESIGN FOR LED-BASED FULL-DUPLEX VLC**
Bingqi Zhang, Chen Gong, Shangbin Li, Zhengyuan Xu, University of Science and Technology of China, China
- GS-P.2.2** **OPPORTUNISTIC SCHEDULING IN UNDERLAY COGNITIVE RADIO BASED SYSTEMS: USER SELECTION PROBABILITY ANALYSIS**
Neeraj Varshney, Syracuse University, United States; Prabhat K. Sharma, VNIT, India; Mohamed-Slim Alouini, King Abdullah University of Science and Technology, Saudi Arabia
- GS-P.2.3** **TRANSMISSION DESIGN FOR A JOINT MIMO RADAR AND MU-MIMO DOWNLINK COMMUNICATION SYSTEM**
Jiawei Liu, Mohammad Saquib, The University of Texas at Dallas, United States
- GS-P.2.4** **FULL-DUPLEX TRANSMISSION OPTIMIZATION FOR BI-DIRECTIONAL MIMO LINKS WITH QOS GUARANTEES**
Hiroki Iimori, Ritsumeikan University, Japan; Giuseppe Abreu, Jacobs University Bremen, Germany; George C Alexandropoulos, Huawei Technologies France SASU, France
- GS-P.2.5** **A NOVEL APPROACH TO JOINT USER SELECTION AND PRECODING FOR MULTIUSER MISO DOWNLINK CHANNELS**
Ashok Bandi, Bhavani Shankar Mysore R, Sina Maleki, Symeon Chatzinotas, Bjorn Ottersten, University of Luxembourg, Luxembourg
- GS-P.2.6** **A LOW-COMPLEXITY LS TURBO CHANNEL ESTIMATION TECHNIQUE FOR MU-MIMO SYSTEMS**
Yasuhiro Takano, Kobe University, Japan; Hsuan-Jung Su, National Taiwan University, Taiwan

Distinguished Lecturer – Michael Rabbat, Facebook Research**LEARNING GRAPHS FROM DATA****Abstract**

The construction of a meaningful graph topology plays a crucial role in the effective representation, processing, analysis and visualization of structured data. When a natural choice of the graph is not readily available from the datasets, it is desirable to infer or learn a graph topology from the data. I will discuss approaches to the problem of graph learning, emphasizing those that adopt a graph signal processing perspective.

**Biography**

Michael Rabbat earned the B.Sc. from the University of Illinois, Urbana-Champaign, in 2001, the M.Sc. from Rice University, Houston, TX, in 2003, and the Ph.D. from the University of Wisconsin, Madison, in 2006, all in electrical engineering. He is currently a Research Scientist with Facebook AI Research. From 2007 - 2018 he was a professor in the Department of Electrical and Computer Engineering at McGill University. He serves as an Associate Editor for IEEE Transactions on Signal and Information Processing over Networks, as an elected member of the IEEE SPS Big Data SIG, and as a member of the IEEE SPS Data Science Initiative steering committee. He previously served as Associate Editor for IEEE Transactions on Control of Networked Systems, and as Senior Area Editor for IEEE Signal Processing Letters. His research interests include distributed algorithms for optimization and inference, and graph signal processing.

Wireless Network Security III - Invited Talks

Session Chairs: Ananthram Swami, Army Research Labs and Yingbo Hua, University of California, Riverside

WNS-L.3.1 SAMPLING AND THE AGE OF INFORMATION

15:50

*Sastry Kompella; Naval Research Laboratory***WNS-L.3.2 INTERACTIVE WIRELESS NETWORK SECURITY**

16:20

*Suhas Diggavi; University of California Los Angeles***WNS-L.3.3 SECURITY ISSUES IN SPECTRUM SHARING BETWEEN RADAR AND COMMUNICATION SYSTEMS**

16:50

*Athina Petropulu; Rutgers University***WNS-L.3.4 ANTI-EAVESDROPPING CHANNEL ESTIMATION FOR WIRELESS SECURITY**

17:20

Yingbo Hua; University of California Riverside

Neural Signal Processing and BCI Systems

Session Chair: Farokh Atashzar, University of Western Ontario

BIO-L.3.1
15:50 **CHARACTERIZING UNOBSERVED FACTORS DRIVING LOCAL FIELD POTENTIAL DYNAMICS UNDERLYING A TIME-VARYING SPIKE GENERATION**

Kaiser Niknam, Amir Akbarian, Behrad Noudoost, Neda Nategh, University of Utah, United States

BIO-L.3.2
16:08 **A GENERALIZABLE MODEL FOR SEIZURE PREDICTION BASED ON DEEP LEARNING USING CNN-LSTM ARCHITECTURE**

Mohamad Shahbazi, Hamid Aghajan, Sharif University of Technology, Iran

BIO-L.3.3
16:26 **A COMPARATIVE STUDY OF FEATURES AND CLASSIFIERS IN SINGLE-CHANNEL EEG-BASED MOTOR IMAGERY BCI**

Suguru Kanoga, Atsunori Kanemura, Hideki Asoh, National Institute of Advanced Industrial Science and Technology (AIST), Japan

BIO-L.3.4
16:44 **IMPROVING THE PERFORMANCE OF MOTOR IMAGERY EEG-BASED BCIS VIA AN ADAPTIVE EPOCH TRIMMING MECHANISM**

Golnar Kalantar, Mahsa Mirgholami, Amir Asif, Arash Mohammadi, Concordia University, Canada

BIO-L.3.5
17:02 **POLARITY INVARIANT TRANSFORMATION FOR EEG MICROSTATES ANALYSIS**

Obada Al Zoubi, Ahmad Mayeli, The University of Oklahoma, United States; Vadim Zotev, Hazem Refai, Martin Paulus, Jerzy Bodurka, Laureate Institute for Brain Research, United States

Machine Learning for Signal Processing

GS-L.3.1
15:50 **AFFINE LBG FOR CODEBOOK TRAINING OF UNIVARIATE LINEAR REPRESENTATION**

Tiannan Dong, Jianji Wang, Meng Yang, Yi Kai, Nanning Zheng, Xi'an Jiaotong University, China

GS-L.3.2
16:08 **BAYESIAN QUICKEST CHANGE POINT DETECTION WITH MULTIPLE CANDIDATES OF POST-CHANGE MODELS**

Samrat Nath, Jingxian Wu, University of Arkansas, United States

GS-L.3.3
16:26 **PHASELESS SUBSPACE TRACKING**

Seyedehsara Nayer, Namrata Vaswani, Iowa State University, United States

GS-L.3.4
16:44 **ON THE BEHAVIOR OF THE EXPECTATION-MAXIMIZATION ALGORITHM FOR MIXTURE MODELS**

Babak Barazandeh, Meisam Razaviyayn, University of Southern California, United States

GS-L.3.5
17:02 **LARGE SCALE RANDOMIZED LEARNING GUIDED BY PHYSICAL LAWS WITH APPLICATIONS IN FULL WAVEFORM INVERSION**

Rui Xie, Fangyu Li, Zengyan Wang, WenZhan Song, University of Georgia, United States

5G Satellite Networks

Session Chair: Raed Shubair, UAE Ministry of Education & MIT

- 5GS-P.1.1 JOINT ENERGY AND RATE ALLOCATION FOR SUCCESSIVE INTERFERENCE CANCELLATION IN THE FINITE BLOCKLENGTH REGIME**
Francesc Molina, Josep Sala-Alvarez, Javier Villares, Francesc Rey, Technical University of Catalonia, Spain
- 5GS-P.1.2 ACTIVE SENSING FOR MARKOV CHAIN TRACKING**
Arpan Chattopadhyay, Urbashi Mitra, University of Southern California, United States
- 5GS-P.1.3 MACHINE LEARNING FOR RELIABLE MMWAVE SYSTEMS: BLOCKAGE PREDICTION AND PROACTIVE HANDOFF**
Ahmed Alkhateeb, Arizona State University, United States; Iz Beltagy, Allen Institute for Artificial Intelligence, United States; Sam Alex, Facebook, United States
- 5GS-P.1.4 A MACHINE LEARNING APPROACH FOR THE CLASSIFICATION OF INDOOR ENVIRONMENTS USING RF SIGNATURES**
Mohamed I. AlHajri, Massachusetts Institute of Technology, United States; Nazar T. Ali, Khalifa University, United Arab Emirates; Raed Shubair, Massachusetts Institute of Technology, United States
- 5GS-P.1.5 IMPLEMENTATION OF A HDL-CODER BASED TELECOMMAND RECEIVER APPLICATION FOR MICROSATELLITE COMMUNICATION**
Jan Budroweit, Ferdinand Stehle, German Aerospace Center, Germany; Christopher Willuweit, Dirk Wübben, University of Bremen, Germany
- 5GS-P.1.6 LEO SOFTWARE DEFINED NETWORKING BASED ON ONBOARD CONTROLLER**
Hefei Hu, Shanshan Zhang, Bihua Tang, Beijing University of Posts and Telecommunications, China
- 5GS-P.1.7 BANDWIDTH AND ROUND-TRIP TIME DETECTION BASED CONGESTION CONTROL FOR MULTIPATH TCP OVER HIGHLY LOSSY SATELLITE NETWORKS**
Hefei Hu, Heng Li, Yuanan Liu, Beijing University of Posts and Telecommunications, China
- 5GS-P.1.8 PHYSICAL LAYER ABSTRACTION FOR PERFORMANCE EVALUATION OF LEO SATELLITE SYSTEMS FOR IOT USING TIME-FREQUENCY ALOHA SCHEME**
Sylvain Cluzel, T&SA Laboratory, France; Mathieu Dervin, Thales Alenia Space, France; José Radzik, ISAE-SUPAERO, France; Sonia Cazalens, INSA-LAAS/CNRS, France; Cédric Baudoin, Thales Alenia Space, France; Daniela Dragomirescu, INSA-LAAS/CNRS, France
- 5GS-P.1.9 DEPLOYING JOINT BEAM HOPPING AND PRECODING IN MULTIBEAM SATELLITE NETWORKS WITH TIME VARIANT TRAFFIC**
Vahid Joroughi, University of Luxembourg, Luxembourg; Eva Lagunas, Stefano Andrenacci, Nicola Maturo, Symeon Chatzinotas, The University of Luxembourg, Luxembourg; Joel Grotz, SES S.A., Luxembourg; Bjorn Ottersten, The University of Luxembourg, Luxembourg

5G SatCom and Cross-Fertilization with 5G PHY Technologies

Moderator: Ana I. Pérez-Neira

Ana I. Pérez-Neira (SM'02) is full professor at UPC (Technical University of Catalonia) in the Signal Theory and Communication department. Her research topic is signal processing for communications and currently she is working in multi-antenna and multicarrier signal processing, both, for satellite communications and wireless systems. She has been in the board of directors of ETSETB (Telecom Barcelona) from 2000-03 and Vicerector for Research at UPC (2010-13). She created UPC Doctoral School (2011). Currently, she is Scientific Coordinator at CTTC (Centre Tecnològic de Telecomunicacions de Catalunya), where she is fellow researcher. From 2008-2016 she has been member of EURASIP BoD (European Signal Processing Association), from 2010-2016 member of IEEE SPTM (Signal Processing Theory and Methods) and at 2016 she has been elected SPS Regional Director-at-Large for 2 years. She is the coordinator of the European project SANSA and of the Network of Excellence on satellite communications, financed by the European Space Agency: SatnEXIV. She has been the leader of 20 projects and has participated in over 50 (10 for European Space Agency). She is author of 50 journal papers (20 related with Satcom) and more than 200 conference papers (20 invited). She is co-author of 4 books and 5 patents (one on satcom). She has been guest editor in 5 special issues and associate editor of the IEEE Transactions on Signal Processing and EURASIP Advances in Signal Processing. Currently she is editor of Eurasip Signal Processing. She has been the general chairman of IWCLD'09, EUSIP'11, EW'14, IWSCS'14 and ASMS/SPSC'16. She is IEEE Director-at-large for Region 8 of the Signal Processing Society. She is recipient for the 2018 EURASIP Society Award. She is the general chair of IEEE ICASSP'20.



Panelists

Guy Levitas

Guy Levitas is a modem group manager at Gilat Satellite Networks Ltd. He got his Electronics & Computer engineering degree (B.Sc) from Ben Gurion University of the Negev at Beer Sheva, Israel, specialized at communication and signal processing (2001). At the past 12 years (from 2006) he served as communication engineer and a group manager with responsibility for the Gilat modems physical layer. Before that (2000-2006) he worked at Intel DSPC as a FW engineer for 3G cellular product.



Paul Febvre

Paul Febvre is CTO of the Satellite Applications Catapult, a UK research and technology organisation, supporting businesses in accelerating the adoption of satellite services for novel applications, and assisting researchers in advancing the technologies that will deliver future satellite capabilities. Previously Paul was System Design Authority for the L-band digital services at Inmarsat for 19 years, developing the first mobile packet data services, the first 2.5G and 3G satellite networks. Paul spent the first part of his career developing his skills as a satellite system engineer at BT Research Labs.



positions as a satellite engineer, project manager and program manager, among others in the German central development and procurement agency for military communications equipment and technology. His current research interests focus on satellite network integration, digital signal processing for HTS, signal parameter estimation and radio waveform design. Andreas is a Senior Member IEEE, and a member of AFCEA and the German engineers association VDE.

Channasandra Ravishankar

Channasandra Ravishankar received his PhD degree in Electrical Engineering from Purdue University, USA, after graduating from Indian Institute of Technology in Bombay, India. He is currently Vice President of Engineering at Hughes Network Systems, Maryland, USA where he leads system engineering activities in the Mobile Satellite division. He played a key role in the system design of mobile satellite systems such as THURAYA, MEXSAT, Next Generation Globalstar, TerreStar and Echostar Mobile Systems and is currently involved in development of OneWeb LEO satellite system. He led the development of the ETSI standardized GMR-1 3G MSS air interface that provides voice and data services based on satellite optimized all-IP 3GPP architecture. He also led the design of Ground Based Beam Former (GBBF) design for TerreStar and Echostar Mobile satellite systems. His primary interests are in the system design of 4G/5G GEO/MEO/LEO mobile satellite systems, design of hybrid terrestrial/satellite systems and development of satellite air interface specifications. His other interests include design, analysis and performance evaluation efficient MAC protocols in long delay and error-prone links and design of advanced scheduling algorithms for differentiated QoS. Prior to joining Hughes, he worked at Comsat Laboratories, Maryland, USA.



Andreas Knopp

Andreas Knopp received the B.Eng. ('99), the M.Sc. ('02) and Ph.D. ('08) degrees (with distinction) in radio communications from the Bundeswehr University Munich. He is now the chair holder of Signal Processing and a Full Professor with the Department of Electrical Engineering and Information Technology. In parallel he is the director of the Munich Center for Space Communications, one of Germany's largest over-the-air test ranges for satellite communications research. Prior to taking up the faculty position in 2014, Andreas has gained expertise as a practitioner in satellite communications. He held several



Graph Signal Processing III

Session Chair: Sundeep Chopuri

- GSP-P.1.1 PREDICTING POWER OUTAGES USING GRAPH NEURAL NETWORKS**
Damian Owerko, Fernando Gama, Alejandro Ribeiro, University of Pennsylvania, United States
- GSP-P.1.2 IDENTIFYING RUMOR SOURCES USING DOMINANT EIGENVALUE OF NONBACKTRACKING MATRIX**
Jiachun Pan, Wenyi Zhang, University of Science and Technology of China, China
- GSP-P.1.3 GRAPH VARIOGRAM: A NOVEL TOOL TO MEASURE SPATIAL STATIONARITY**
Alexander Serrano, Benjamin Girault, Antonio Ortega, University of Southern California, United States
- GSP-P.1.4 ENHANCING GEOMETRIC DEEP LEARNING VIA GRAPH FILTER DECONVOLUTION**
Jingkang Yang, Queen Mary University of London, United Kingdom; Santiago Segarra, Massachusetts Institute of Technology, United States
- GSP-P.1.5 GRAPH-PROJECTED SIGNAL PROCESSING**
Nicolas Grelier, Carlos Rosar Kos Lassance, Elsa Dupraz, Vincent Gripon, IMT Atlantique, France
- GSP-P.1.6 SAMPLING THEORY FOR GRAPH SIGNALS ON PRODUCT GRAPHS**
Rohan Varma, Carnegie Mellon University, United States; Jelena Kovačević, New York University, United States
- GSP-P.1.7 DYNAMIC NETWORK IDENTIFICATION FROM NON-STATIONARY VECTOR AUTOREGRESSIVE TIME SERIES**
Luis Miguel Lopez-Ramos, Daniel Romero, Bakht Zaman, Baltasar Beferull-Lozano, University of Agder, Norway
- GSP-P.1.8 A NOVEL SCHEME FOR SUPPORT IDENTIFICATION AND ITERATIVE SAMPLING OF BANDLIMITED GRAPH SIGNALS**
Abolfazl Hashemi, University of Texas at Austin, United States; Rasoul Shafipour, University of Rochester, United States; Haris Vikalo, University of Texas at Austin, United States; Gonzalo Mateos, University of Rochester, United States
- GSP-P.1.9 ENERGY COMPACTION FILTERS ON GRAPHS**
Oguzhan Teke, P. P. Vaidyanathan, California Institute of Technology, United States
- GSP-P.1.10 DECENTRALIZED SUBSPACE PROJECTION IN LARGE NETWORKS**
Siavash Mollaebrahim, Cesar Asensio-Marco, Daniel Romero, Baltasar Beferull-Lozano, University of Agder, Norway
- GSP-P.1.11 SEMI-SUPERVISED CLUSTERING BASED ON SIGNED TOTAL VARIATION**
Peter Berger, Thomas Dittrich, Gerald Matz, Technische Universität Wien, Austria
- GSP-P.1.12 GRAPH-BASED RECOMMENDATION SYSTEM**
Kaige Yang, Laura Toni, University College London, United Kingdom

Distinguished Lecturer – Lin Xiao, Microsoft Research

RANDOMIZED PRIMAL-DUAL ALGORITHMS FOR ASYNCHRONOUS DISTRIBUTED OPTIMIZATION

Abstract

Machine learning with big data often involves large optimization models. For distributed optimization over a cluster of machines, frequent communication and synchronization of all model parameters (optimization variables) can be very costly. A promising solution is to use parameter servers to store different subsets of the model parameters, and update them asynchronously at different machines using local datasets. In this talk, we focus on distributed optimization of large linear models with convex loss functions, and propose a family of randomized primal-dual block coordinate algorithms that are especially suitable for asynchronous distributed implementation with parameter servers. In particular, we work with the saddle-point formulation of such problems which allows simultaneous data and model partitioning, and exploit its structure by doubly stochastic coordinate optimization with variance reduction (DSCOVER). Compared with other first-order distributed algorithms, we show that DSCOVER may require less amount of overall computation and communication, and less or no synchronization. We discuss the implementation details of the DSCOVER algorithms, and present numerical experiments on an industrial distributed computing system. This is joint work with Adam Wei Yu, Qihang Lin and Weizhu Chen.



Biography

Dr. Lin Xiao is a principal researcher at Microsoft Research, located in Redmond, Washington. He obtained his PhD in Aeronautics and Astronautics from Stanford University in 2004, and spent two years as a postdoctoral fellow at California Institute of Technology before joining Microsoft. His current research interests include large-scale optimization, machine learning, randomized algorithm, and parallel and distributed computing.

Distinguished Lecturer – Chih-Lin I, China Mobile**5G's GREEN JOURNEY AND MORE****Abstract**

Deploying and operating the world's largest mobile network with efficiency in mind has been an ongoing pursuit of China Mobile through each and every generation. This talk will give an overview of its Green Action program that has led to the greenest 4G network from the first day of its deployment, and the world's first multi-radio access technology, multi-vendor plug-and-play energy saving solution. In addition, it will highlight China Mobile's 5G R&D themes (Green & Soft) that led to an end-to-end Soft 5G architecture and how this has been reflected in the 5G NR specifications. The journey began with multiple initiatives to "Rethink the Fundamentals." Now, a pursuit of "Open & Smart" themes of future wireless communication systems will be discussed. "Open" embraces open architecture, open interface, white-box hardware, and open source, while "Smart" refers to embedded intelligence in the radio access with wireless big data and machine learning. Preliminary exploration of artificial intelligence and its associated reference architecture will be introduced. The progression from "Green & Soft" to "Open & Smart" is expected to bring forth the necessary transformation of our ecosystem.



Network Operator Council Founding Member of ETSI NFV, a Steering Board Member and Vice Chair of WWRF, a Steering Committee member and the Publication Chair of IEEE 5G Initiative, a member of IEEE ComSoc SDB, SPC, and CSCN-SC, and a Scientific Advisory Board Member of Singapore NRF. Her current research interests center around "From Green & Soft to Open & Smart."

Biography

Chih-Lin I received her Ph.D. degree in electrical engineering from Stanford University. She has been working at multiple world-class companies and research institutes leading the R&D, including AT&T Bell Labs, Director of ITRI Taiwan, and VPGD of ASTRI Hong Kong. She received the IEEE Transactions on Communications Stephen O. Rice Best Paper Award, the IEEE Communications Magazine Fred W. Ellersick Prize Best Paper Award, is a winner of the CCCP National 1000 Talent Program, and has won the 2015 Industrial Innovation Award of IEEE Communication Society for Leadership and Innovation in Next-Generation Cellular Wireless Networks. In 2011, she joined China Mobile as its Chief Scientist of wireless technologies, established the Green Communications Research Center, and launched the 5G Key Technologies R&D. She is spearheading major initiatives including 5G, C-RAN, high energy efficiency system architectures, technologies and devices, green energy, and wireless big data for network embedded intelligence. She has led the launch of Wireless AI Alliance (WAIA) and O-RAN (Open RAN) Alliance. She was an Area Editor of IEEE/ACM Trans. NET, an elected Board Member of IEEE ComSoc, Chair of the ComSoc Meetings and Conferences Board, and Founding Chair of the IEEE WCNC Steering Committee. She was a Professor at NCTU, an Adjunct Professor at NTU, and an Adjunct Professor at BUPT. She is the Chair of WAIA Executive Committee, the Chair of O-RAN TSC, an Executive Board Member of GreenTouch, a

Distinguished Lecturer – Andrea Bertozzi, University of California, Los Angeles

HYPERSPECTRAL IMAGE CLASSIFICATION USING GRAPH CLUSTERING METHODS

Abstract

Hyperspectral imagery is a challenging modality due to the dimension of the pixels which can range from hundreds to over a thousand frequencies depending on the sensor. Most methods in the literature reduce the dimension of the data using a method such as principal component analysis, however this procedure can lose information. More recently methods have been developed to address classification of large datasets in high dimensions. In this talk I review a family of efficient graph-based classification methods for hyperspectral imagery. Using the full dimensionality of the data, we consider a similarity graph based on pairwise comparisons of pixels. Rather than constructing the full graph, which is computationally prohibitive, I review two methods for approximating it - one that involves a low rank approximation of the graph Laplacian and another method that involves nearest neighbor sampling of pixels. The graph itself is segmented using a pseudospectral algorithm for graph clustering that requires information about the eigenfunctions of the graph Laplacian but does not require computation of the full graph. With at most a few hundred eigenfunctions, we can implement the clustering methods designed to solve variational problems for a graph-cut-based semi-supervised or unsupervised classification. We implement OpenMP directive-based parallelism in our algorithms and show performance improvement and strong, almost ideal, scaling behavior. The methods can handle very large datasets including a video sequence with over a million pixels, and the problem of segmenting a data set into a pre-determined number of classes or unknown number of classes.



Biography

Andrea Bertozzi is an applied mathematician with expertise in nonlinear partial differential equations and fluid dynamics. She also works in the areas of geometric methods for image processing, crime modeling and analysis, and swarming/cooperative dynamics. Bertozzi completed all her degrees in Mathematics at Princeton. She was an L. E. Dickson Instructor and NSF Postdoctoral Fellow at the University of Chicago from 1991-1995. She was the Maria Geoppert-Mayer Distinguished Scholar at Argonne National Laboratory from 1995-6. She was on the faculty at Duke University from 1995-2004 first as Associate Professor of Mathematics and then as Professor of Mathematics and Physics. She has served as the Director of the Center for Nonlinear and Complex Systems while at Duke. Bertozzi moved to UCLA in 2003 as a Professor of Mathematics. Since 2005 she has served as Director of Applied Mathematics, overseeing

the graduate and undergraduate research training programs at UCLA. In 2012 she was appointed the Betsy Wood Knapp Chair for Innovation and Creativity. Bertozzi's honors include the Sloan Research Fellowship in 1995, the Presidential Early Career Award for Scientists and Engineers in 1996, and SIAM's Kovalevsky Prize in 2009. She was elected to the American Academy of Arts and Sciences in 2010 and to the Fellows of the Society of Industrial and Applied Mathematics (SIAM) in 2010. She became a Fellow of the American Mathematical Society in 2013 and a Fellow of the American Physical Society in 2016. She won a SIAM outstanding paper prize in 2014 with Arjuna Flenner, for her work on geometric graph-based algorithms for machine learning. Bertozzi is a Thomson-Reuters/Clarivate Analytics 'highly cited' Researcher in mathematics for both 2015 and 2016, one of about 100 worldwide in her field. She was awarded a Simons Math + X Investigator Award in 2017, joint with UCLA's California NanoSystems Institute (CNSI). Bertozzi was appointed Professor of Mechanical and Aerospace Engineering at UCLA in 2018, in addition to her primary position in the Mathematics Department. In May 2018 Bertozzi was elected to the US National Academy of Sciences. Bertozzi has served on the editorial boards of fourteen journals: SIAM Review, SIAM J. Math. Anal., SIAM's Multiscale Modeling and Simulation, Interfaces and Free Boundaries, Applied Mathematics Research Express (Oxford Press), Applied Mathematics Letters, Mathematical Models and Methods in the Applied Sciences (M3AS), Communications in Mathematical Sciences, Nonlinearity, and Advances in Differential Equations, Journal of Nonlinear Science, Journal of Statistical Physics, Nonlinear Analysis Real World Applications; and the J. of the American Mathematical Society. She served as Chair of the Science Board of the NSF Institute for Computational and Experimental Research in Mathematics at Brown University from 2010-2014 and previously on the board of the Banff International Research Station. She served on the Science Advisory Committee of the Mathematical Sciences Research Institute at Berkeley from 2012-2016. To date she has graduated 35 PhD students and has mentored over 40 postdoctoral scholars.

Distinguished Lecturer – Nikos Sidiropoulos, University of Virginia**TENSORS AND PROBABILITY: AN INTRIGUING UNION****Abstract**

We reveal an interesting link between tensors and multivariate statistics. The rank of a multivariate probability tensor can be interpreted as a nonlinear measure of statistical dependence of the associated random variables. Rank equals one when the random variables are independent, and complete statistical dependence corresponds to full rank; but we show that rank as low as two can already model strong statistical dependence. In practice we usually work with random variables that are neither independent nor fully dependent – partial dependence is typical, and can be modeled using a low-rank multivariate probability tensor. Directly estimating such a tensor from sample averages is impossible even for as few as ten random variables taking ten values each – yielding a billion unknowns; but we often have enough data to estimate lower-order marginalized distributions. We prove that it is possible to identify the higher-order joint probabilities from lower order ones, provided that the higher-order probability tensor has low-enough rank, i.e., the random variables are only partially dependent. We also provide a computational identification algorithm that is shown to work well on both simulated and real data. The insights and results have numerous applications in estimation, hypothesis testing, completion, machine learning, and system identification. Low-rank tensor modeling thus provides a ‘universal’ non-parametric (model-free) alternative to probabilistic graphical models.

**Biography**

Nikos Sidiropoulos received the Diploma in Electrical Engineering from the Aristotelian University of Thessaloniki, Greece, and M.S. and Ph.D. degrees in Electrical Engineering from the University of Maryland–College Park, in 1988, 1990 and 1992, respectively. He served as Assistant Professor at the University of Virginia (1997-1999); Associate Professor at the University of Minnesota–Minneapolis (2000-2002); Professor at the Technical University of Crete, Chania–Crete, Greece (2002-2011); and Professor at the University of Minnesota–Minneapolis (2011-), where he holds an ADC Chair in Digital Technology (2015-). His research interests are in signal processing, communications, optimization, tensor decomposition, and factor analysis. His current research focuses primarily on signal and tensor analytics and optimization-based algorithms, with applications in machine learning and communications. He received the NSF/CAREER award in 1998, and the IEEE Signal Processing Society (SPS) Best Paper Award in 2001, 2007, and 2011. He served as IEEE SPS Distinguished Lecturer (2008-2009), and as Chair of the IEEE Signal Processing for Communications and Networking Technical Committee (2007-2008), and was recently elected

Vice President - Membership of the IEEE Signal Processing Society. He received the 2010 IEEE Signal Processing Society Meritorious Service Award, and the 2013 Distinguished Alumni Award from the University of Maryland, Dept. of ECE. He is a Fellow of IEEE (2009) and a Fellow of EURASIP (2014).

Distinguished Lecturer – Dragan Maric, National Institutes of Health**DECIPHERING THE COMPLEXITY OF BRAIN SYSTEM BIOLOGY VIA WHOLE BRAIN MULTISPECTRAL IMAGING****Abstract**

Stroke is a leading cause of death in the United States and even when survivable it can lead to complex and widespread debilitating changes in the brain, with marked deterioration of quality of life and potentially long recovery times required to restore lost functions. While extensive stroke



research conducted thus far has aimed to better characterize the complex processes mediating brain tissue damage and recovery after stroke, our full understanding of these processes and designing comprehensive drug treatments to elicit most beneficial clinical outcomes are still in their nascent stages. To further advance this field of research, we used a comprehensive systems cell biology biomarker screening approach by combining large-scale multiplexed fluorescence immunohistology in a rat brain model of focal ischemic injury with whole brain slide scanning using a customized multispectral imaging platform. We processed serial 10-micron thick whole brain coronal sections collected from male Sprague Dawley rats at 72 hours following focal brain ischemia induced by using a standard stroke model involving middle cerebral artery occlusion (MCAO). Sections were repeatedly probed and sequentially imaged using a panel of up to 50 fluorescent biomarkers relevant to cellular and molecular processes mediating neuroinflammation, neuroplasticity, neurogenesis, gliogenesis and angiogenesis in response to MCAO. Unique combinations of these biomarkers enabled a comprehensive identification and quantitation of all relevant cell types (neurons, astrocytes, oligodendrocytes, endothelial cells, microglia, immune cells, etc.) and their changing functional states (reactive, resting, apoptotic, proliferative, etc.) in the brain after injury. The results show dynamic and highly complex spatiotemporal changes in brain tissue remodeling and recovery after ischemic injury eliciting distinct cellular/molecular and specific niche responses that develop both proximally and distally to the site of injury. This work demonstrates the crucial need and a workable solution to apply comprehensive multiplex fluorescence biomarker screening and multispectral imaging to resolve complex systems biology of brain in response to stroke associated injury. The practical computational solutions pertaining to processing very large image datasets and multi-parametric computational image analysis of these datasets are currently in development. This work is supported by Intramural Research Program, National Institutes of Neurological Disorders and Stroke, National Institutes of Health.

Biography

Dr. Dragan Maric received B.S. degrees in biochemistry and microbiology in 1981 from University of Maryland, USA, and a M.S. in immunology in 1985 and a Ph.D. in neuroimmunology in 1989 from University of Belgrade, Yugoslavia. Dr. Maric completed his postdoctoral training in developmental neurobiology at the National Institutes of Neurological Disorders and Stroke (NINDS), National Institutes of Health (NIH) in Bethesda, Maryland, USA from 1991-1993, and in mucosal immunology at McMaster University, Hamilton, Canada from 1993-1994. After returning to NINDS in 1994, Dr. Maric worked in the Laboratory of Neurophysiology first as a visiting scientist from 1994-2000 and then as a staff scientist from 2000-2010 focusing his research primarily in the field of developmental neurobiology. He became Manager of the NINDS Flow and Imaging Cytometry Core Facility in 2001 with the primary mission to support basic, translational and clinical intramural research at NINDS and other institutes across NIH. Dr. Maric's continued interests include researching the seminal properties of neural stem cells and their differentiating progeny during embryonic, postnatal and adult CNS development and adapting new methodologies to more effectively study the complex processes in brain systems biology under physiological and pathophysiological conditions.

Bio-signal Processing & Machine Learning for MCPS

- BIO-L.4.1** 11:00 **OVERT SPEECH RETRIEVAL FROM NEUROMAGNETIC SIGNALS USING WAVELETS AND ARTIFICIAL NEURAL NETWORKS**
Debadatta Dash, University of Texas at Dallas, United States; Paul Ferrari, University of Texas at Austin, United States; Saleem Malik, Cook Children's Hospital, United States; Jun Wang, University of Texas at Dallas, United States
- BIO-L.4.2** 11:18 **HOW MANY FMRI SCANS ARE NECESSARY AND SUFFICIENT FOR RESTING BRAIN CONNECTIVITY ANALYSIS?**
Debadatta Dash, University of Texas at Dallas, United States; Anil Kumar Sao, Indian Institute of Technology Mandi, India; Jun Wang, University of Texas at Dallas, United States; Bharat Biswal, New Jersey Institute of Technology, United States
- BIO-L.4.3** 11:36 **STATIONPLOT: A NEW NON-STATIONARITY QUANTIFICATION TOOL FOR DETECTION OF EPILEPTIC SEIZURES**
Sawon Pratiher, Indian Institute of Technology Kharagpur, India; Subhankar Chatteraj, Techno India University, West Bengal, India; Rajdeep Mukherjee, Manipal University Jaipur, India
- BIO-L.4.4** 11:54 **BAYESIAN FEATURE SELECTION WITH DATA INTEGRATION**
Ali Foroughi Pour, Lori A. Dalton, The Ohio State University, United States
- BIO-L.4.5** 12:12 **A CONTEXT-INTEGRATING SIGNAL CLASSIFICATION MODEL FOR RESOLVING AMBIGUOUS STIMULI**
Rajesh Amerineni, Lalit Gupta, Southern Illinois University, United States; Resh Gupta, Vanderbilt University, United States

Distributed Learning & Optimization: Algorithms

Session Chair: Fangyu Li, University of Georgia

- DLN-L.1.1** 11:00 **NON-ASYMPTOTIC RATES FOR COMMUNICATION EFFICIENT DISTRIBUTED ZEROth ORDER STRONGLY CONVEX OPTIMIZATION**
Anit Kumar Sahu, Carnegie Mellon University, United States; Dusan Jakovetic, Dragana Bajovic, University of Novi Sad, Serbia; Soumya Kar, Carnegie Mellon University, United States
- DLN-L.1.2** 11:18 **FAST ASYNCHRONOUS DECENTRALIZED OPTIMIZATION: ALLOWING MULTIPLE MASTERS**
Meng Ma, Jineng Ren, Georgios B. Giannakis, Jarvis Haupt, University of Minnesota, United States
- DLN-L.1.3** 11:36 **PROVABLY COMMUNICATION-EFFICIENT ASYNCHRONOUS DISTRIBUTED INFERENCE FOR CONVEX AND NONCONVEX PROBLEMS**
Jineng Ren, Jarvis Haupt, University of Minnesota Twin Cities, United States
- DLN-L.1.4** 11:54 **EXACT NONPARAMETRIC DECENTRALIZED ONLINE OPTIMIZATION**
Hrusiksha Pradhan, Amrit Singh Bedi, Indian Institute of Technology Kanpur, India; Alec Koppel, U.S. Army Research Laboratory, India; Ketan Rajawat, Indian Institute of Technology Kanpur, India

Energy Harvesting

Session Chair: Azadeh Vosoughi, University of Central Florida

GCN-L.1.1 **ROBUST ENERGY-EFFICIENT POWER ALLOCATION STRATEGY FOR ENERGY HARVESTING-AIDED HETEROGENEOUS CELLULAR NETWORKS**

11:00

Yongjun Xu, Xiaolei Yu, Yao Peng, Guoquan Li, Qianbin Chen, Chongqing Key Lab of Mobile Communication Technology, Chongqing University of Post and Telecommunication, China

GCN-L.1.2 **OUTAGE PROBABILITY FOR TWO-WAY RELAY NETWORKS WITH STOCHASTIC ENERGY HARVESTING SOURCE NODES**

11:18

Wei Li, Chang'an University, China; Meng-Lin Ku, National Central University, Taiwan; Yan Chen, University of Electronic Science and Technology, China; Zhonghua Liang, Chang'an University, China

GCN-L.1.3 **OPTIMAL LOCAL THRESHOLDS FOR DISTRIBUTED DETECTION IN ENERGY HARVESTING WIRELESS SENSOR NETWORKS**

11:36

Ghazaleh Ardeshiri, Hassan Yazdani, Azadeh Vosoughi, University of Central Florida, United States

GCN-L.1.4 **EXACT PERFORMANCE OF NOMA WITH FULL-DUPLEX ENERGY HARVESTING RELAYING IN NAKAGAMI-M FREQUENCY-SELECTIVE FADING CHANNEL**

11:54

Szu-Liang Wang, Chih-Yu Wang, Academia Sinica, Taiwan; Wei-Ho Chung, National Tsing Hua University, Taiwan

Optimization and Control in Smart Grids

Session Chair: Emiliano Dall'anese, University of Colorado Boulder

SMI-L.1.1 **LARGE-SCALE ADAPTIVE ELECTRIC VEHICLE CHARGING**

11:00

Zachary Lee, Daniel Chang, California Institute of Technology, United States; Cheng Jin, George Lee, PowerFlex Systems, United States; Rand Lee, California Institute of Technology, United States; Ted Lee, PowerFlex Systems, United States; Steven Low, California Institute of Technology, United States

SMI-L.1.2 **COMPARISON OF VARIOUS TRILINEAR MONOMIAL ENVELOPES FOR CONVEX RELAXATIONS OF OPTIMAL POWER FLOW PROBLEMS**

11:18

Mohammad Rasoul Narimani, Missouri University of Science and Technology, United States; Daniel Kenneth Molzahn, Argonne National Laboratory, United States; Harsha Nagarajan, Los Alamos National Laboratory, United States; Marisa L. Crow, Missouri University of Science and Technology, United States

SMI-L.1.3 **FAST NONCONVEX SDP SOLVER FOR LARGE-SCALE POWER SYSTEM STATE ESTIMATION**

11:36

Yu Lan, Xi'an Jiaotong University, China; Hao Zhu, The University of Texas at Austin, United States; Xiaohong Guan, Xi'an Jiaotong University, China

SMI-L.1.4 **KERNEL-BASED LEARNING FOR SMART INVERTER CONTROL**

11:54

Aditie Garg, Mana Jalali, Vassilis Kekatos, Nikolaos Gatsis, Virginia Tech, United States

SMI-L.1.5 **A FIXED-POINT ITERATION FOR STEADY-STATE ANALYSIS OF WATER DISTRIBUTION NETWORKS**

12:12

Mohammadhafez Bazrafshan, Nikolaos Gatsis, Marcio Giacomoni, Ahmad Taha, The University of Texas at San Antonio, United States

Theory/Algorithms I

- TM-L.1.1** 11:00 **IMPUTATION OF COUPLED TENSORS AND GRAPHS**
Vassilis N. Ioannidis, Ahmed S. Zamzam, Georgios B. Giannakis, University of Minnesota, United States; Nicholas D. Sidiropoulos, University of Virginia, United States
- TM-L.1.2** 11:18 **NONLINEAR DIMENSIONALITY REDUCTION VIA POLYNOMIAL PRINCIPAL COMPONENT ANALYSIS**
Abbas Kazemipour, Shaul Druckmann, Stanford University, United States
- TM-L.1.3** 11:36 **SPARSE DISCRIMINATIVE TENSOR DICTIONARY LEARNING FOR OBJECT CLASSIFICATION**
Seyyid Emre Sofuoglu, Selin Aviyente, Michigan State University, United States
- TM-L.1.4** 11:54 **SIMPLIFIED ALGORITHMS FOR CANONICAL POLYADIC DECOMPOSITION FOR OVER-COMPLETE EVEN ORDER TENSORS (ONGOING WORK)**
Ali Koochakzadeh, Piya Pal, University of California, San Diego, United States

Speech and Audio Signal Processing

- GS-P.3.1** **ADAPTIVE DIFFERENTIAL MICROPHONE ARRAY WITH DISTORTIONLESS RESPONSE AT ARBITRARY DIRECTIONS FOR HEARING AID APPLICATIONS**
Hala As'ad, Martin Bouchard, University of Ottawa, Canada; Homayoun Kamkar-Parsi, Sivantos Group, Germany
- GS-P.3.2** **SINGLE CHANNEL JOINT SPEECH DEREVERBERATION AND DENOISING USING DEEP PRIORS**
Aditya Raikar, Sourya Basu, Rajesh M. Hegde, IIT Kanpur, India
- GS-P.3.3** **A SUPERVISED MULTI-CHANNEL SPEECH ENHANCEMENT ALGORITHM BASED ON BAYESIAN NMF MODEL**
Hanwook Chung, McGill University, Canada; Eric Plourde, Sherbrooke University, Canada; Benoit Champagne, McGill University, Canada
- GS-P.3.4** **SINGLE-ENDED PACKET LOSS RATE ESTIMATION OF TRANSMITTED SPEECH SIGNALS**
Gabriel Mittag, Sebastian Möller, Technische Universität Berlin, Germany
- GS-P.3.5** **MULTIPLICATIVE UPDATES AND JOINT DIAGONALIZATION BASED ACCELERATION FOR UNDER-DETERMINED BSS USING A FULL-RANK SPATIAL COVARIANCE MODEL**
Nobutaka Ito, Tomohiro Nakatani, NTT Corporation, Japan

Biomedical Image Processing I

- BIO-L.5.1** **AN UNCONSTRAINED ELLIPSE FITTING TECHNIQUE AND APPLICATION TO OPTIC CUP SEGMENTATION**
14:00
Harsha Sridhar, Spectrum Lab, Indian Institute of Science, India; J. R. Harish Kumar, Indian Institute of Science and Manipal Institute of Technology, India; Subramanya Jois S.P., Chandra Sekhar Seelamantula, Spectrum Lab, Indian Institute of Science, India
- BIO-L.5.2** **UNSUPERVISED SEMANTIC SEGMENTATION OF KIDNEYS USING RADIAL TRANSFORM SAMPLING ON LIMITED IMAGES**
14:18
Hojjat Salehinejad, University of Toronto, Canada; Sumeya Naqvi, Errol Colak, Joseph Barfett, St. Michael's Hospital, Canada; Shahrokh Valaee, University of Toronto, Canada
- BIO-L.5.3** **A FULLY AUTOMATED SPINAL CORD SEGMENTATION**
14:36
Subramanya Jois S.P., Harsha Sridhar, Indian Institute of Science, India; J.R. Harish Kumar, Manipal Institute of Technology, India
- BIO-L.5.4** **LEARNED MIXED MATERIAL MODELS FOR EFFICIENT CLUSTERING BASED DUAL-ENERGY CT IMAGE DECOMPOSITION**
14:54
Zhipeng Li, Shanghai Jiao Tong University, China; Saiprasad Ravishankar, University of Michigan, United States; Yong Long, Shanghai Jiao Tong University, China; Jeff Fessler, University of Michigan, United States
- BIO-L.5.5** **UNVEILING VESTIGES OF MAN-MADE MODIFICATIONS ON MOLECULAR-BIOLOGICAL EXPERIMENT IMAGES**
15:12
Hao-Chiang Shao, Fu Jen Catholic University, Taiwan

Distributed Learning & Optimization: Applications I

Session Chair: Mingyi Hong, University of Minnesota

- DLN-L.2.1** **AN ENERGY-EFFICIENT DISTRIBUTED AVERAGE CONSENSUS SCHEME VIA INFREQUENT COMMUNICATION**
14:00
Ping Xu, Zhi Tian, Yue Wang, George Mason University, United States
- DLN-L.2.2** **ON THE CAPACITY OF SECURE DISTRIBUTED FAST FOURIER TRANSFORM**
14:18
Wei-Ting Chang, Ravi Tandon, University of Arizona, United States
- DLN-L.2.3** **ENERGY-AWARE SENSOR SCHEDULING IN DISTRIBUTED GAUSSIAN DETECTION**
14:36
Hongbin Zhu, ShanghaiTech University, China; Kai Kang, Shanghai Advanced Research Institute, CAS, China; Xiliang Luo, ShanghaiTech University, China; Hua Qian, Shanghai Advanced Research Institute, CAS, China
- DLN-L.2.4** **DELAYED WEIGHT UPDATE FOR FASTER CONVERGENCE IN DATA-PARALLEL DEEP LEARNING**
14:54
Tetsuya Youkawa, Haruki Mori, Yuki Miyauchi, Kazuki Yamada, Shintaro Izumi, Masahiko Yoshimoto, Hiroshi Kawaguchi, Kobe University, Japan
- DLN-L.2.5** **CONSENSUS OPTIMIZATION FOR DISTRIBUTED REGISTRATION**
15:12
Rajat Sanyal, KPMG Advisory Services Private Limited, India; Kunal Chaudhury, Indian Institute of Science, India

Energy Efficiency in Massive MIMO

Session Chair: M. Cenk Gursoy, Syracuse University

GCN-L.2.1 A POWER EFFICIENT PILOT DESIGN FOR MULTI-CELL MASSIVE MIMO SYSTEMS

14:00

Tuan Anh Le, Middlesex University, United Kingdom; Trinh Van Chien, Linköping University, Sweden; Mohammad Reza Nakhai, King's College London, United Kingdom

GCN-L.2.2 CELL-FREE MASSIVE MIMO SYSTEMS WITH MULTI-ANTENNA USERS

14:18

Cong-Trang Mai, Quoc-Hien Ngo, Quang-Trung Duong, Queen's University Belfast, United Kingdom

GCN-L.2.3 MULTIUSER ONE-BIT MASSIVE MIMO PRECODING UNDER MPSK SIGNALING

14:36

Mingjie Shao, Qiang Li, Yatao Liu, Wing-Kin Ma, The Chinese University of Hong Kong, China

GCN-L.2.4 ENERGY-EFFICIENT JOINT ANTENNA AND USER SELECTION IN SINGLE-CELL MASSIVE MIMO SYSTEMS

14:54

Mangqing Guo, M. Cenk Gursoy, Syracuse University, United States

Multispectral and Hyperspectral Imaging and Analysis I

Session Co-Chairs: John Kerekes, Rochester Institute of Technology; Saurabh Prasad, University of Houston

MHI-L.1.1 APPLICATION OF ACTIVE DEEP LEARNING FOR PROFILING CELLULAR ALTERATIONS FROM MULTISPECTRAL BRAIN TISSUE IMAGES

14:00

Aditi Singh, Hien Nguyen, Badrinath Roysam, University of Houston, United States

MHI-L.1.2 SIAMESE NETWORK WITH MULTI-LEVEL FEATURES FOR PATCH-BASED CHANGE DETECTION IN SATELLITE IMAGERY

14:18

Faiz Ur Rahman, Bhavan Kumar Vasu, Jared Van Cor, John Kerekes, Andreas Savakis, Rochester Institute of Technology, United States

MHI-L.1.3 ANOMALY DETECTION WITH HIGH RESOLUTION HYPERSPECTRAL OBSERVATIONS

14:36

Cécile Chenot, Mehrdad Yaghoobi, Mike E. Davies, University of Edinburgh, United Kingdom; Yoann Altmann, Heriot-Watt University, United Kingdom

MHI-L.1.4 GRAPH CONVOLUTIONAL NEURAL NETWORKS FOR HYPERSPECTRAL DATA CLASSIFICATION

14:54

Farideh Foroozandeh Shahraki, Saurabh Prasad, University of Houston, United States

MHI-L.1.5 ADVERSARIAL LEARNING FOR DOMAIN ADAPTED LARGE SCALE MAPPING

15:12

Lexie Yang, Dalton Lunga, Nikhil Makkar, Nkosinathi Ndlovu, Oak Ridge National Laboratory, United States; Xueqing Deng, University of California, Merced, United States

Resilience and Security of Power Grids

Session Chair: Hao Zhu, University of Texas at Austin

- SMI-L.2.1**
14:00 **ROLE OF LOCAL GEOMETRY IN ROBUSTNESS OF POWER GRID NETWORKS**
Umar Islambekov, Asim Dey, Yulia Gel, University of Texas at Dallas, United States; H. Vincent Poor, Princeton University, United States
- SMI-L.2.2**
14:18 **DETECTION OF FALSE DATA INJECTION ATTACKS IN POWER SYSTEMS WITH GRAPH FOURIER TRANSFORM**
Elisabeth Drayer, Tirza Routtenberg, Ben-Gurion University of the Negev, Israel
- SMI-L.2.3**
14:36 **MODERNIZING DISTRIBUTION SYSTEM RESTORATION TO ACHIEVE RESILIENCY AGAINST EXTREME WEATHER EVENTS**
Chen Chen, Bo Chen, Argonne National Laboratory, United States
- SMI-L.2.4**
14:54 **NON-LINEAR STATE ESTIMATION IN POWER SYSTEMS UNDER MODEL UNCERTAINTY**
Saurabh Sihag, Ali Tajer, Rensselaer Polytechnic Institute, United States
- SMI-L.2.5**
15:12 **SPARSE ERROR CORRECTION FOR PMU DATA UNDER GPS SPOOFING ATTACKS**
Shashini De Silva, Travis Hagan, Jinsub Kim, Eduardo Cotilla-Sanchez, Oregon State University, United States

Theory/Algorithms II

- TM-L.2.1**
14:00 **ON IDENTIFIABILITY OF NONNEGATIVE MATRIX FACTORIZATION**
Xiao Fu, Oregon State University, United States; Kejun Huang, University of Minnesota, United States; Nicholas D. Sidiropoulos, University of Virginia, United States
- TM-L.2.2**
14:18 **LARGE-SCALE AUTOREGRESSIVE SYSTEM IDENTIFICATION USING KRONECKER PRODUCT EQUATIONS**
Martijn Boussé, KU Leuven, Belgium; Lieven De Lathauwer, KU Leuven Kulak, Belgium
- TM-L.2.3**
14:36 **L1-NORM HIGHER-ORDER SINGULAR-VALUE DECOMPOSITION**
Panos Markopoulos, Dimitris Chachlakis, Rochester Institute of Technology, United States; Ashley Prater-Bennette, Air Force Research Laboratory, United States
- TM-L.2.4**
14:54 **THE EXACT SOLUTION TO RANK-1 L1-NORM TUCKER2 DECOMPOSITION**
Panos Markopoulos, Dimitris Chachlakis, Rochester Institute of Technology, United States; Evangelos Papalexakis, University of California, Riverside, United States

Radar/Sonar/DOA Estimation

- GS-P.4.1 SUB-BANDS BEAM-SPACE ADAPTIVE BEAMFORMER FOR PORT-STARBOARD REJECTION IN TRIPLET SONAR ARRAYS**
Pietro Stinco, Alessandra Tesei, Alain Maguer, NATO Centre for Maritime Research and Experimentation, Italy; Fabrizio Ferraioli, Valerio Latini, Luca Pesa, Leonardo S.p.a., Italy
- GS-P.4.2 DETECTION OF INCUMBENT RADAR IN THE 3.5 GHZ CBRS BAND**
Raied Caromi, Michael Souryal, Wen-Bin Yang, National Institute of Standards and Technology, United States
- GS-P.4.3 A HYBRID NEURAL NETWORK FRAMEWORK AND APPLICATION TO RADAR AUTOMATIC TARGET RECOGNITION**
Zhe Zhang, Xiang Chen, Zhi Tian, George Mason University, United States
- GS-P.4.4 COMPRESSED SENSING BASED JOINT DOA AND POLARIZATION ANGLE ESTIMATION FOR SPARSE ARRAYS WITH DUAL-POLARIZED ANTENNAS**
Batu Chalise, New York Institute of Technology, United States; Yimin Zhang, Temple University, United States; Braham Himed, Air Force Research Laboratory, United States
- GS-P.4.5 FAST PHASE-DIFFERENCE-BASED DOA ESTIMATION USING RANDOM FERNS**
Hui Chen, Tarig Ballal, Tareq Al-Naffouri, King Abdullah University of Science and Technology, Saudi Arabia
- GS-P.4.6 GENERATION OF CORRELATED PSK WAVEFORMS USING COMPLEX GAUSSIAN RANDOM VARIABLES**
Seifallah Jardak, King Abdullah University of Science and Technology, Saudi Arabia; Sajid Ahmed, Information Technology University, Pakistan; Mohamed-Slim Alouini, King Abdullah University of Science and Technology, Saudi Arabia

Biomedical Image Processing II

- BIO-L.6.1 CYLINDRICAL TRANSFORM: 3D SEMANTIC SEGMENTATION OF KIDNEYS WITH LIMITED ANNOTATED IMAGES**
15:50
Hojjat Salehinejad, University of Toronto, Canada; Sumeya Naqvi, Errol Colak, Joseph Barfett, St. Michael's Hospital, Canada; Shahrokh Valaee, University of Toronto, Canada
- BIO-L.6.2 DATA-DRIVEN TIGHT FRAME FOR CRYO-EM IMAGE DENOISING AND CONFORMATIONAL CLASSIFICATION**
16:08
Yin Xian, Hanlin Gu, Wei Wang, Xuhui Huang, Yuan Yao, Yang Wang, Jian-Feng Cai, Hong Kong University of Science and Technology, China
- BIO-L.6.3 IMPROVED EXPLAINABILITY OF CAPSULE NETWORKS: RELEVANCE PATH BY AGREEMENT**
16:26
Atefeh Shahrudnejad, Parnian Afshar, Concordia University, Canada; Konstantinos N. Plataniotis, University of Toronto, Canada; Arash Mohammadi, Concordia University, Canada

Distributed Learning & Optimization: Applications II

Session Chair: Xiliang Luo, Shanghai Tech University

- DLN-L.3.1** **OPPORTUNISTIC SPECTRUM ACCESS VIA GOOD ARM IDENTIFICATION**
15:50
Zhiyang Wang, Ziyu Ying, Cong Shen, University of Science and Technology of China, China
- DLN-L.3.2** **AN ONLINE LEARNING APPROACH TO WIRELESS COMPUTATION OFFLOADING**
16:08
Hongbin Zhu, ShanghaiTech University, China; Haifeng Wang, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China; Xiliang Luo, ShanghaiTech University, China; Hua Qian, Shanghai Advanced Research Institute, CAS, China
- DLN-L.3.3** **ONLINE OPTIMAL TASK OFFLOADING WITH ONE-BIT FEEDBACK**
16:26
Shangshu Zhao, Zhaowei Zhu, Fuqian Yang, Xiliang Luo, ShanghaiTech University, China
- DLN-L.3.4** **OPTIMAL TASK OFFLOADING IN FOG-ENABLED NETWORKS VIA INDEX POLICIES**
16:44
Fuqian Yang, Zhaowei Zhu, Shangshu Zhao, Yang Yang, Xiliang Luo, ShanghaiTech University, China
- DLN-L.3.5** **OPTIMAL DATA TASK DISTRIBUTION FOR BALANCING ENERGY CONSUMPTION ON COOPERATIVE FOG NETWORKS**
17:02
Jose Clemente, Fangyu Li, WenZhan Song, University of Georgia, United States

Signal and Information Processing for Energy Efficiency

Session Chair: Chung-An Shen, National Taiwan University of Science and Technology

- GCN-L.3.1** **ELITE GRADIENT DESCENT OPTIMIZATION OF ANTENNA PARAMETERS CONSTRAINED BY RADIO COVERAGE IN GREEN CELLULAR NETWORKS**
15:50
Yaxi Liu, Wei Huangfu, Haijun Zhang, Keping Long, Beijing Engineering and Technology Research Center for Convergence Networks and Ubiquitous Services, University of Science and Technology Beijing(USTB), China
- GCN-L.3.2** **A LARGE-SCALE EXTENSION OF SPARSE-CODE MULTIPLE-ACCESS SYSTEM**
16:08
Chao Yang, Shusen Jing, Xiao Liang, Zaichen Zhang, Xiaohu You, Chuan Zhang, Southeast University, China
- GCN-L.3.3** **A REAL-TIME AND MEMORY-SAVING LINK RECOVERY MECHANISM FOR GREEN SOFTWARE-DEFINED NETWORKING**
16:26
Chia-Wei Huang, Chung-An Shen, Tai-Lin Chin, Shan-Hsiang Shen, National Taiwan University of Science and Technology, Taiwan
- GCN-L.3.4** **THE HARDWARE AND SOFTWARE CO-DESIGN OF A STACKABLE OPENFLOW SWITCH FOR SOFTWARE DEFINED NETWORKING**
16:44
Chun-Wei Wu, Chung-An Shen, National Taiwan University of Science and Technology, Taiwan

Localization in Wireless Networks

GS-L.4.1 15:50 HYBRID WIRELESS LOCALIZATION VIA COMPLEX-DOMAIN ISOMETRIC EMBEDDING

Giuseppe Abreu, Alireza Ghods, Jacobs University Bremen, Germany

GS-L.4.2 16:08 TURBO MRC-SMDS: LOW-COMPLEXITY COOPERATIVE LOCALIZATION FROM HYBRID INFORMATION

Giuseppe Abreu, Alireza Ghods, Jacobs University Bremen, Germany

GS-L.4.3 16:26 OPTIMAL ASYNCHRONOUS MULTI-SENSOR REGISTRATION IN 3 DIMENSIONS

Shunan Jiang, The Chinese University of Hong Kong, China; Wenqiang Pu, Xidian University, China; Zhi-Quan Luo, The Chinese University of Hong Kong, China

GS-L.4.4 16:44 TOWARD TRACKING MULTIPLE BUILDING OCCUPANTS BY FOOTSTEP VIBRATIONS

Jeffrey Paston, Virginia Tech, United States

Multispectral and Hyperspectral Imaging and Analysis II

Session Co-Chairs: Saurabh Prasad, University of Houston; Badrinath Roysam, University of Houston

MHI-L.2.1 15:50 DIGITAL STAINING OF HIGH-RESOLUTION FTIR SPECTROSCOPIC IMAGES

Mahsa Lotfollahi, Davar Daeinejad, Sebastian Berisha, David Mayerich, University of Houston, United States

MHI-L.2.2 16:08 TENSOR COMPRESSIVE HYPERSPECTRAL IMAGING BASED ON TOTAL VARIATION NORM MINIMIZATION

Xinyue Zhang, Xudong Zhang, Tsinghua University, China

MHI-L.2.3 16:26 PERSISTENT HYPERSPECTRAL OBSERVATIONS OF THE URBAN LIGHTSCAPE

Julien Baur, Gregory Dobler, Federica Bianco, Mohit Sharma, Andreas Karpf, New York University, United States

MHI-L.2.4 16:44 DISPARITY MAP ESTIMATION FROM CROSS-MODAL STEREO

Thapanapong Rukkanchanunt, Tokyo Institute of Technology, Japan; Takashi Shibata, NEC Corporation, Japan; Masayuki Tanaka, Tokyo Institute of Technology, The National Institute of Advanced Industrial Science and Technology, Japan; Masatoshi Okutomi, Tokyo Institute of Technology, Japan

MHI-L.2.5 17:02 ENDMEMBER DICTIONARY BASED HYPERSPECTRAL IMAGE UNMIXING

Zhengzhi Gu, Suyu Wang, Fengqing Zhu, Beijing University of Technology, China

Theory/Algorithms/Applications

- TM-L.3.1** 15:50 **SEQUENTIAL CLOSED-FORM SEMIBLIND RECEIVER FOR SPACE-TIME CODED MULTIHOP RELAYING SYSTEMS**
Walter Freitas Jr., Wireless Telecom Research Group, Brazil; Gérard Favier, I3S Laboratory, University of Nice Sophia Antipolis, CNRS, Sophia Antipolis, France; André de Almeida, Wireless Telecom Research Group, Brazil
- TM-L.3.2** 16:08 **TENSOR ENSEMBLE LEARNING FOR MULTIDIMENSIONAL DATA**
Ilija Kisil, Ahmad Moniri, Danilo Mandic, Imperial College London, United Kingdom
- TM-L.3.3** 16:26 **SPARSE TENSOR RECOVERY VIA N-MODE FISTA WITH SUPPORT AUGMENTATION**
Ashley Prater-Bennette, Air Force Research Laboratory, United States; Lixin Shen, Syracuse University, United States
- TM-L.3.4** 16:44 **TENSORMAP: LIDAR-BASED TOPOLOGICAL MAPPING AND LOCALIZATION VIA TENSOR DECOMPOSITIONS**
Sirisha Rambhatla, University of Minnesota Twin Cities, United States; Nicholas D. Sidiropoulos, University of Virginia, United States; Jarvis Haupt, University of Minnesota Twin Cities, United States

Signal Processing Theory and Methods II

- GS-P.5.1** **PREDICTION-BASED SIMILARITY IDENTIFICATION FOR AUTOREGRESSIVE PROCESSES**
Hanwei Wu, Qiwen Wang, Markus Flierl, KTH Royal Institute of Technology, Sweden
- GS-P.5.2** **RECONFIGURABLE NEWTON STRUCTURE FOR SAMPLE RATE CONVERSION**
Ali Zeineddine, TDF, France; Stéphane Paquelet, Matthieu Kanj, b<>com, France; Christophe Moy, Université de Rennes 1, France; Amor Nafkha, CentraleSupélec, France; Pierre-Yves Jezequel, TDF, France
- GS-P.5.3** **MULTI-LAYERED CEPSTRUM FOR INSTANTANEOUS FREQUENCY ESTIMATION**
Chin-Yun Yu, National Chiao-Tung University, Taiwan; Li Su, Academia Sinica, Taiwan
- GS-P.5.4** **USING LINEAR PREDICTION TO MITIGATE END EFFECTS IN EMPIRICAL MODE DECOMPOSITION**
Steven Sandoval, Matthew Bredin, Phillip De Leon, New Mexico State University, United States
- GS-P.5.5** **THE FINITE SAMPLE PERFORMANCE OF DYNAMIC MODE DECOMPOSITION**
Arvind Prasad, Raj Rao Nadakuditi, University of Michigan, United States
- GS-P.5.6** **A MEASUREMENT-EFFICIENT LOW-RANK MATRIX RECOVERY APPROACH**
Yanbo Wang, Zhi Tian, Yue Wang, George Mason University, United States
- GS-P.5.7** **RANDOMIZED METHOD FOR ESTIMATING THE VON NEUMANN ENTROPY OF LARGE-SCALE DENSITY MATRICES**
Hayoung Choi, Xuming Song, Yuanming Shi, ShanghaiTech University, China
- GS-P.5.8** **LARGE-SCALE ALGORITHM DESIGN FOR PARALLEL FFT-BASED SIMULATIONS ON GPU**
Anuva Kulkarni, Franz Franchetti, Jelena Kovačević, Carnegie Mellon University, United States
- GS-P.5.9** **FACE AGING AS IMAGE-TO-IMAGE TRANSLATION USING SHARED-LATENT SPACE GENERATIVE ADVERSARIAL NETWORKS**
Evangelia Pantraki, Constantine Kotropoulos, Aristotle University of Thessaloniki, Greece
- GS-P.5.10** **LO-NORM FEATURE LMS ALGORITHMS**
Hamed Yazdanpanah, José Apolinário Jr., Military Institute of Engineering (IME), Brazil; Paulo Diniz, Markus Lima, Federal University of Rio de Janeiro (UFRJ), Brazil

Distinguished Lecturer – Nicholas Carlini, Google Brain**MAKING AND MEASURING PROGRESS IN ADVERSARIAL MACHINE LEARNING****Abstract**

The field of adversarial machine learning, despite seeing a similar amount of work as other areas, has had significantly less visible progress. One of the key driving factors behind the leaps of progress in most areas of deep learning has been the abundance of useful metrics and benchmarks.

Unfortunately, measuring progress in adversarial situations is exceptionally difficult due in part to the impossibility of designing fixed benchmarks. In this talk, I examine how we are, and discuss how I think we should be, measuring progress in the field of adversarial machine learning. I evaluate our current benchmark tasks and explore the ways in which we have, and have not, succeeded at them. I conclude with lessons for designing good metrics we can draw from other fields.

**Biography**

Nicholas Carlini is a research scientist at Google Brain, where he studies the security and privacy of machine learning. He has won multiple best paper awards (including one at IEEE S&P and another at ICML), and his work has been widely covered by articles in the New York Times, Science Magazine, and the Communications of the ACM. He received his Ph.D. in computer security from the University of California, Berkeley, in 2018.

Distinguished Lecturer – Yiyu Shi, University of Notre Dame**SCALING OF DEEP NEURAL NETWORKS FOR EDGE INFERENCE IN INTERNET-OF-MANY-THINGS****Abstract**

Deep neural networks have demonstrated amazing potential across a wide range of applications, from autonomous cars to precision medicine. A clear trend in deep neural networks is the exponential growth of network size and the associated increases in computational complexity and memory consumption. On the other hand, when neural networks are being deployed in a network with many things, in order to reduce communication cost and to provide enhanced security/reliability, the inference is usually done on the edge with limited area and power budget. In this talk we analyze recent data and show that there are increasing gaps between the computational complexity and energy efficiency required by data scientists and the hardware capacity made available by hardware architects. We will then discuss various architecture and algorithm innovations that could help to bridge the gaps, with a special focus on network quantization and its theoretical implications and bounds. Finally, we will theoretically demonstrate the universal approximability of quantized neural networks, and the loss of expressive power induced by quantization, a missing piece in the literature.

**Biography**

Dr. Yiyu Shi is currently an associate professor in the Department of Computer Science and Engineering at the University of Notre Dame, and the director of the Sustainable Computing Lab (SCL). He received his B.S. degree (with honor) in Electronic Engineering from Tsinghua University, Beijing, China in 2005, the M.S and Ph.D. degree in Electrical Engineering from the University of California, Los Angeles in 2007 and 2009 respectively. His current research interests include hardware intelligence and three-dimensional integration. In recognition of his research, many of his papers have been nominated for the Best Paper Awards in top conferences. He was also the recipient of IBM Invention Achievement Award, Japan Society for the Promotion of Science (JSPS) Faculty Invitation Fellowship, Humboldt Research Fellowship, IEEE St. Louis Section Outstanding Educator Award, Academy of Science (St. Louis) Innovation Award, Missouri S&T Faculty Excellence Award, NSF CAREER Award, IEEE Region 5 Outstanding Individual Achievement Award, and the Air Force Summer Faculty Fellowship. He has served on the technical program committee of many international conferences including DAC, ICCAD, DATE, ISPD, ASPDAC and ICCD. He is an executive committee member of ACM SIGDA, a member of IEEE CEDA Publicity Committee, deputy editor-in-chief of IEEE VLSI CAS Newsletter, and an associate editor of IEEE TCAD,

Distinguished Lecturer – Monisha Ghosh, University of Chicago

Biography

Dr. Monisha Ghosh joined NSF as a rotating Program Director in September 2017, in the Computer and Network System (CNS) division within the Directorate of Computer & Information Science and Engineering (CISE). She manages wireless networking research within the Networking Technologies and Systems (NeTS) program. Dr. Ghosh is also a Research Professor at the University of Chicago, with a joint appointment at the Argonne National Laboratories, where she conducts research on wireless technologies for the IoT, 5G cellular, next generation Wi-Fi systems, coexistence, and machine learning for predictive oncology. Prior to joining the University of Chicago in September 2015, she worked at Interdigital, Philips Research and Bell Laboratories, on various wireless systems such as the HDTV broadcast standard, cable standardization and on cognitive radio for the TV White Spaces. She has been an active contributor to many industry standards and was recognized with a Certificate of Appreciation for her outstanding contributions to IEEE 802.22. She is a Fellow of the IEEE. She received her Ph.D. in Electrical Engineering from the University of Southern California in 1991, and her B. Tech from the Indian Institute of Technology, Kharagpur (India) in 1986.



Distinguished Lecturer – Steve Ellingson, Virginia Tech**SIGNAL PROCESSING METHODS FOR MITIGATION OF RADIO FREQUENCY INTERFERENCE IN THE ERA OF REAL-TIME ASTRONOMY****Abstract**

Modern signal processing methods for mitigation of radio frequency interference (RFI) in radio astronomy are enabled by off-line processing of data recorded with high time/frequency resolution. The radio astronomy community is now making its first tentative steps toward an era of real-time data reduction in which RFI mitigation is nominally performed on-the-fly in the limited interval during which data with high time-frequency resolution are available. This presentation provides a brief overview of RFI mitigation methods in the context of this “post-observation” versus “on-the-fly” dichotomy. Also considered is how emerging technologies such as heterogenous computing, machine learning, and dynamic spectrum access might play a role in modern RFI mitigation systems.

**Biography**

Steve Ellingson is an Associate Professor at Virginia Tech in Blacksburg, Virginia in the United States. He received PhD and MS degrees in Electrical Engineering from the Ohio State University and a BS in Electrical & Computer Engineering from Clarkson University. He was affiliated with the US Army, Booz-Allen & Hamilton, Raytheon, and the Ohio State University ElectroScience Laboratory before joining the faculty of Virginia Tech, where his work includes the development of meter- and cm-wavelength instruments and observing techniques. Ellingson is the author of *Radio Systems Engineering* (Cambridge University Press, 2016) and the open textbook *Electromagnetics Volume 1* (VT Publishing, 2018).

Distinguished Lecturer – Gil Zussman, Columbia University**POWER GRID STATE RECOVERY FOLLOWING A JOINT CYBER AND PHYSICAL ATTACK****Abstract**

We focus on joint cyber and physical attacks on power grids and present methods to retrieve the grid state information following such attacks. We consider models where an adversary attacks an area by (i) physically disconnecting some of the power lines, and (ii) blocking/modifying the measurements from monitoring devices within the area to mask the line failures. We use tools from linear algebra and graph theory, and leverage the properties of the power flow equations to develop methods for state recovery. Namely, using information observed outside of the attacked area, these methods recover information about the disconnected lines and the state inside the attacked area. We identify sufficient conditions on the area structure and constraints on the attack characteristics such that these methods can correctly recover the state. We consider the DC and AC power flow models, measurement noise, and false data injection attacks, and present corresponding analytical and numerical results.



Based on joint work with Saleh Soltan (Princeton) and Mihalis Yannakakis (Columbia)

Biography

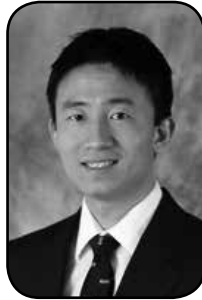
Gil Zussman received the Ph.D. degree in Electrical Engineering from the Technion in 2004. Between 2004 and 2007 he was a Postdoctoral Associate at MIT. Since 2007 he has been with Columbia University where he is now an Associate Professor of Electrical Engineering and Computer Science, and member of the Data Science Institute. Between 2014 and 2016 he was a Visiting Scientist in the School of Computer Science in Tel Aviv University. His research interests are in the area of networking, and in particular in the areas of wireless, mobile, and resilient networks. Gil received the Knesset (Israeli Parliament) award for distinguished students, two Marie Curie fellowships, the Fulbright Fellowship, the DTRA Young Investigator Award, and the NSF CAREER Award. He was the PI of a team that won the 1st place in the 2009 Vodafone Americas Foundation Wireless Innovation Project competition and is currently the Columbia PI of the NSF PAWR COSMOS testbed. He is a co-recipient of seven best paper awards, including the ACM SIGMETRICS/IFIP Performance'06 Best Paper Award, the 2011 IEEE Communications Society Award for Advances in Communication, and the ACM CoNEXT'16 Best Paper Award.

Distinguished Lecturer – Mingyi Hong, University of Minnesota

RECENT ADVANCES OF ZERO-ORDER OPTIMIZATION WITH APPLICATIONS IN ADVERSARIAL ML

Abstract

Zeroth-order optimization methods have been popular for applications where the gradient and Hessian information of the problem of interest is either too expensive to compute, or computing such information reveals sensitive information about the underlying model. In these cases, one has to assume that the only knowledge about the problem of interest is by querying a “black box”, which returns the functional value of the underlying problem. Common applications of these methods include simulation-based optimization, online auction, web advertising, adversary machine learning, etc. In this talk, we first review recent algorithmic advances in zeroth-order optimization, including centralized and distributed zeroth-order methods. Second, we will review a recent application of these methods on designing adversary examples for machine learning models. In particular, we will show that how zero-order type optimization methods can be properly modified to build powerful black-box adversarial attacks for existing machine learning models. We will provide a comprehensive convergence analysis on different types of zeroth-order methods, and illustrate their connections and empirical performance of generating black-box adversarial examples in robust ML.



Biography

Mingyi Hong received his Ph.D. degree from University of Virginia in 2011. He is currently an Assistant Professor in the Department of Electrical and Computer Engineering, University of Minnesota. From 2014-2017 he has been an Assistant Professor with the Department of Industrial and Manufacturing Systems Engineering, Iowa State University. He is serving on the IEEE Signal Processing for Communications and Networking (SPCOM), and Machine Learning for Signal Processing (MLSP) Technical Committees. His research interests are primarily in optimization theory and applications in signal processing and machine learning.

Distinguished Lecturer – Andreas Molisch, University of Southern California

MODULATION AND MULTIPLE ACCESS FOR NEXT-GENERATION WIRELESS SYSTEMS

Abstract

While the recently approved “phase 1” of 5G is using OFDM as modulation format, just like in LTE, research into future systems such as 5G-phase 2 and beyond continues. In this talk we will first summarize the key requirements for next-generation wireless systems especially as related to millimeter-wave systems, but also IoT, V2X, and tactile internet. We will then discuss “ab initio” modulation design for those applications and in particular the tradeoff between adaptation and whitening, based on fundamental time-frequency representation methods. This will lead to a new class of modulation formats that perform time-frequency spreading, recently proposed under the name OTFS. Comparisons of these approaches to OFDM, both from a theoretical point of view, and through simulations, will wrap up the presentation.



Biography

Andreas F. Molisch is the Solomon Golomb – Andrew and Erna Viterbi Chair Professor at the University of Southern California. He previously was at TU Vienna, AT&T (Bell) Labs, Lund University, and Mitsubishi Electric Research Labs. His research interest is wireless communications, with emphasis on wireless propagation channels, multi-antenna systems, ultrawideband signaling and localization, novel modulation methods, and caching for wireless content distribution. He is the author of four books, 19 book chapters, more than 220 journal papers, 300 conference papers, as well as 80 patents. He is a Fellow of the National Academy of Inventors, IEEE, AAAS, and IET, as well as Member of the Austrian Academy of Sciences and recipient of numerous awards.

Thursday, November 29 11:00 - 12:30
Lecture Session DLW-L.1 Monorail

Design and Implementation of Deep Learning for Wireless Communications

Session Chair: Yuan-Hao Huang, National Tsing Hua University

DLW-L.1.1 POLAR FEATURE BASED DEEP ARCHITECTURES FOR AUTOMATIC MODULATION CLASSIFICATION CONSIDERING CHANNEL FADING

11:00

Chieh-Fang Teng, Ching-Chun Liao, Chun-Hsiang Chen, An-Yeu (Andy) Wu, National Taiwan University, Taiwan

DLW-L.1.2 LOW-COMPLEXITY MESSAGE PASSING MIMO DETECTION ALGORITHM WITH DEEP NEURAL NETWORK

11:18

Xiaosi Tan, Zhiwei Zhong, Zaichen Zhang, Xiaohu You, Chuan Zhang, Southeast University, China

DLW-L.1.3 USING DEEP CROSS MODAL HASHING AND ERROR CORRECTING CODES FOR IMPROVING THE EFFICIENCY OF ATTRIBUTE GUIDED FACIAL IMAGE RETRIEVAL

11:36

Veeru Talreja, Fariborz Taherkhani, Matthew Valenti, Nasser Nasrabadi, West Virginia University, United States

DLW-L.1.4 NEURAL LATTICE DECODERS

11:54

Vincent Corlay, Mitsubishi Electric R&D Centre Europe, France; Joseph J. Boutros, Texas A&M University, Qatar; Philippe Ciblat, Telecom ParisTech, France; Loic Brunel, Mitsubishi Electric R&D Centre Europe, France

DLW-L.1.5 DEEP LEARNING BASED POWER CONTROL FOR QUALITY-DRIVEN WIRELESS VIDEO TRANSMISSIONS

12:12

Chuang Ye, M. Cenk Gursoy, Senem Velipasalar, Syracuse University, United States

Thursday, November 29 11:00 - 12:30
Lecture Session GS-L.5 Adventure

Image-based quality assessment and performance analysis

GS-L.5.1 HDR IMAGE QUALITY ASSESSMENT USING MACHINE-LEARNING BASED COMBINATION OF QUALITY METRICS

11:00

Anustup Choudhury, Scott Daly, Dolby Laboratories Inc., United States

GS-L.5.2 PERFORMANCE EVALUATION OF OBJECTIVE QUALITY METRICS ON HLG-BASED HDR IMAGE CODING

11:18

Yasuko Sugito, NHK, Japan; Marcelo Bertalmio, Universitat Pompeu Fabra, Spain

GS-L.5.3 A PERFORMANCE ANALYSIS ON THE OPTIMAL NUMBER OF MEASUREMENTS FOR CODED COMPRESSIVE IMAGING

11:36

Oğuzhan Fatih Kar, Alper Güngör, Serhat Ilbey, Can Barış Top, H. Emre Güven, ASELSAN Research Center, Turkey

GS-L.5.4 WHAT MATTERS THE MOST? OPTIMAL QUICK CLASSIFICATION OF URBAN ISSUE REPORTS BY IMPORTANCE

11:54

Yasitha Liyanage, Mengfan Yao, Christopher Yong, Daphney-Stavroula Zois, Charalampos Chelmis, University at Albany, SUNY, United States

Instrumentation and RFI Mitigation

Session Chair: Richard Prestage, West Virginia University

- RA-L.1.1** **ON SIGNAL ESTIMATION, DETECTION AND INTERFERENCE MITIGATION IN LIGO**
11:00
Akhila Raman, University of California, Berkeley, United States
- RA-L.1.2** **RFI MITIGATION ON FAST FEED CABIN**
11:18
Haiyan Zhang, Rui Yao, Hao Hu, Shijie Huang, National Astronomical Observatories of CAS, China
- RA-L.1.3** **DATABASE OF SMOS RFI SOURCES IN THE 1400-1427MHZ PASSIVE BAND**
11:36
Ekhi Uranga, Álvaro Llorente, Antonio de la Fuente, ESA, Spain

Learning in Energy Systems

Session Chair: Yue Zhao, Stony Brook University

- SMI-L.3.1** **REAL-TIME POWER SYSTEM STATE ESTIMATION VIA DEEP UNROLLED NEURAL NETWORKS**
11:00
Liang Zhang, Gang Wang, Georgios B. Giannakis, University of Minnesota, United States
- SMI-L.3.2** **COINCIDENT PEAK PREDICTION USING A FEED-FORWARD NEURAL NETWORK**
11:18
Chase Dowling, Daniel Kirschen, Baosen Zhang, University of Washington, United States
- SMI-L.3.3** **LEARNING TO DYNAMICALLY PRICE ELECTRICITY DEMAND BASED ON MULTI-ARMED BANDITS**
11:36
Ahmadreza Moradipari, Cody Silva, Mahnoosh Alizadeh, University of California, Santa Barbara, United States
- SMI-L.3.4** **JOINT CHANCE CONSTRAINTS REDUCTION THROUGH LEARNING IN ACTIVE DISTRIBUTION NETWORKS**
11:54
Kyri Baker, University of Colorado Boulder, United States; Andrey Bernstein, National Renewable Energy Laboratory, United States
- SMI-L.3.5** **REAL-TIME POWER OUTAGE DETECTION SYSTEM USING SOCIAL SENSING AND NEURAL NETWORKS**
12:12
Sifat Shahriar Khan, Jin Wei, The University of Akron, United States

Compressed Sensing, Sparsity Analysis and Applications

- GS-P.6.1** **COMPRESSING UNSTRUCTURED MESH DATA USING SPLINE FITS, COMPRESSED SENSING, AND REGRESSION METHODS**
Chandrika Kamath, Ya Ju Fan, Lawrence Livermore National Laboratory, United States
- GS-P.6.2** **DESIGNING CONSTRAINED PROJECTIONS FOR COMPRESSED SENSING: MEAN ERRORS AND ANOMALIES WITH COHERENCE**
Dhruv Shah, Indian Institute of Technology Bombay, India; Alankar Kotwal, Carnegie Mellon University, United States; Ajit Rajwade, Indian Institute of Technology Bombay, India
- GS-P.6.3** **SIGNAL RECOVERY IN PERTURBED FOURIER COMPRESSED SENSING**
Himanshu Pandotra, Eeshan Malhotra, Ajit Rajwade, IIT Bombay, India; Karthik S. Gurumoorthy, ICTS-TIFR, India
- GS-P.6.4** **SPARSE AND LOW-RANK OPTIMIZATION FOR PLIABLE INDEX CODING**
Tao Jiang, Yuanming Shi, ShanghaiTech University, China
- GS-P.6.5** **GENERALIZED APPROXIMATE MESSAGE PASSING FOR UNLIMITED SAMPLING OF SPARSE SIGNALS**
Osman Musa, Technische Universität Wien, Austria; Peter Jung, Technische Universität Berlin, Germany; Norbert Goertz, Technische Universität Wien, Austria
- GS-P.6.6** **VECTOR APPROXIMATE MESSAGE PASSING FOR QUANTIZED COMPRESSED SENSING**
Daniel Franz, Volker Kuehn, University of Rostock, Germany
- GS-P.6.7** **A NOVEL GREEDY ALGORITHM FOR JOINT SPARSE RECOVERY THROUGH INFORMATION TRANSFER**
Nam Yul Yu, Gwangju Institute of Science and Technology (GIST), Korea (South)
- GS-P.6.8** **SOURCE SEPARATION IN THE PRESENCE OF SIDE INFORMATION: NECESSARY AND SUFFICIENT CONDITIONS FOR RELIABLE DE-MIXING**
Zahra Sabetsarvestani, University College London, United Kingdom; Francesco Renna, Instituto de Telecomunicações and Faculdade de Ciências da Universidade do Porto, Portugal; Franz Kiraly, Miguel Rodrigues, University College London, United Kingdom
- GS-P.6.9** **PHASE RETRIEVAL FOR SIGNALS IN UNION OF SUBSPACES**
Salman Asif, University of California, Riverside, United States; Chinmay Hegde, Iowa State University, United States

Adversarial Machine Learning I

Session Co-Chairs: Sijia Liu, IBM; Pin-Yu Chen, IBM Research AI

- AML-L.1.1** **DIFFERENTIALLY PRIVATE SPARSE INVERSE COVARIANCE ESTIMATION**
14:00
Di Wang, Mengdi Huai, Jinhui Xu, State University of New York at Buffalo, United States
- AML-L.1.2** **DEFENDING DNN ADVERSARIAL ATTACKS WITH PRUNING AND LOGITS AUGMENTATION**
14:18
Siyue Wang, Northeastern University, United States; Xiao Wang, Boston University, United States; Shaokai Ye, Syracuse University, United States; Pu Zhao, Xue Lin, Northeastern University, United States
- AML-L.1.3** **ON THE UTILITY OF CONDITIONAL GENERATION BASED MUTUAL INFORMATION FOR CHARACTERIZING ADVERSARIAL SUBSPACES**
14:36
Chia-Yi Hsu, Pei-Hsuan Lu, National Chung Hsing University, Taiwan; Pin-Yu Chen, IBM Research AI, United States; Chia-Mu Yu, National Chung Hsing University, Taiwan
- AML-L.1.4** **BACKDOOR ATTACKS ON NEURAL NETWORK OPERATIONS**
14:54
Joseph Clements, Yingjie Lao, Clemson University, United States
- AML-L.1.5** **ON EXTENSIONS OF CLEVER: A NEURAL NETWORK ROBUSTNESS EVALUATION ALGORITHM**
15:12
Tsui-Wei Weng, Massachusetts Institute of Technology, United States; Huan Zhang, University of California, Davis, United States; Pin-Yu Chen, Aurelie Lozano, IBM Research AI, United States; Cho-Jui Hsieh, University of California, Davis, United States; Luca Daniel, Massachusetts Institute of Technology, United States

Deep-Learning-Based Signal Processing for Wireless Communications

Session Chair: Zhongfeng Wang, Nanjing University

DLW-L.2.1
14:00 **REINFORCEMENT LEARNING WITH BUDGET-CONSTRAINED NONPARAMETRIC FUNCTION APPROXIMATION FOR OPPORTUNISTIC SPECTRUM ACCESS**

Theodoros Tsiligkaridis, David Romero, MIT Lincoln Laboratory, United States

DLW-L.2.2
14:18 **A MODEL-DRIVEN DEEP LEARNING NETWORK FOR MIMO DETECTION**

Hengtao He, Southeast University, China; Chao-Kai Wen, National Sun Yat-sen University, Taiwan; Shi Jin, Southeast University, China; Geoffrey Ye Li, Georgia Institute of Technology, United States

DLW-L.2.3
14:36 **SET-THEORETIC LEARNING FOR DETECTION IN CELL-LESS C-RAN SYSTEMS**

Daniyal Amir Awan, Technical University of Berlin, Germany; Renato L.G. Cavalcante, Zoran Utkovski, Slawomir Stanczak, Fraunhofer Heinrich Hertz Institute, Germany

DLW-L.2.4
14:54 **CNN BASED RICIAN K FACTOR ESTIMATION FOR NON-STATIONARY INDUSTRIAL FADING CHANNEL**

Guobao Lu, Qilong Zhang, University of Chinese Academy of Sciences, China; Xin Zhang, National University of Defense Technology, China; Fei Shen, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China; Fei Qin, University of Chinese Academy of Sciences, China

DLW-L.2.5
15:12 **ACTOR-CRITIC DEEP REINFORCEMENT LEARNING FOR DYNAMIC MULTICHANNEL ACCESS**

Chen Zhong, Ziyang Lu, M. Cenk Gursoy, Senem Velipasalar, Syracuse University, United States

Signal Processing Theory and Methods I

GS-L.6.1
14:00 **FIRST-ORDER OPTIMAL SEQUENTIAL SUBSPACE CHANGE-POINT DETECTION**

Liyan Xie, Georgia Institute of Technology, United States; George V. Moustakides, Rutgers University, United States; Yao Xie, Georgia Institute of Technology, United States

GS-L.6.2
14:18 **DOMINANT COMPONENT TRACKING FOR EMPIRICAL MODE DECOMPOSITION USING A HIDDEN MARKOV MODEL**

Steven Sandoval, Matthew Bredin, Phillip De Leon, New Mexico State University, United States

GS-L.6.3
14:36 **DESIGN OF UNIMODULAR SEQUENCE SETS WITH GOOD CORRELATION AND COMPLEMENTARY CORRELATION PROPERTIES**

Israel Alejandro Arriaga-Trejo, CONACYT - Autonomous University of Zacatecas, Mexico; Arindam Bose, University of Illinois at Chicago, United States; Aldo Gustavo Orozco-Lugo, CINVESTAV - National Polytechnic Institute, Mexico; Mojtaba Soltanalian, University of Illinois at Chicago, United States

GS-L.6.4
14:54 **CYCLOSTATIONARY STATISTICAL MODELS AND ALGORITHMS FOR ANOMALY DETECTION USING MULTI-MODAL DATA**

Taposh Banerjee, Harvard University, United States; Gene Whipps, Army Research Lab, United States; Prudhvi Gurram, Army Research Lab and Booz Allen Hamilton, United States; Vahid Tarokh, Duke University, United States

Millimeter Wave Communications I

MMW-L.1.1 ORBITAL ANGULAR MOMENTUM-BASED TWO-DIMENSIONAL SUPER-RESOLUTION TARGETS IMAGING

14:00

Rui Chen, Wen-Xuan Long, Xidian University, China; Yue Gao, Queen Mary University of London, United Kingdom; Jiandong Li, Xidian University, China

MMW-L.1.2 HYBRID BEAMFORMING FOR SINGLE CARRIER MMWAVE MIMO SYSTEMS

14:18

Tian Lin, Jiaqi Cong, Yu Zhu, Fudan University, China

MMW-L.1.3 PERTURBED COMPRESSED SENSING BASED SINGLE SNAPSHOT DOA ESTIMATION

14:36

Himanshu Pandotra, Rajbabu Velmurugan, IIT Bombay, India; Karthik S. Gurumoorthy, ICTS-TIFR, India; Ajit Rajwade, IIT Bombay, India

MMW-L.1.4 GRADIENT-BASED SOLUTION OF MAXIMUM LIKELIHOOD ANGLE ESTIMATION FOR VIRTUAL ARRAY MEASUREMENTS

14:54

Peter Vouras, Alec Weiss, National Institute of Standards and Technology, United States; Maria Becker, Hastings College, United States; Ben Jamroz, Jeanne Quimby, Dylan Williams, Kate Remley, National Institute of Standards and Technology, United States

MMW-L.1.5 DELAY-LINE PRECODER BASED ANALOG-DIGITAL MIMO SYSTEMS WITH MMSE EQUALIZER

15:12

Wai Ming Chan, City University of Hong Kong, China; Wing Shan Tam, Chi Wah Kok, Canaan Semiconductor Limited, China; Hing Cheung So, City University of Hong Kong, China

Signal Detection

Session Chair: Gelu Nita, New Jersey Institute of Technology

RA-L.2.1 POWER-BASED CONTINUOUS WAVE RFI DETECTOR FOR RF OPERATING SYSTEMS

14:00

Tilahun Getu, École de Technologie Supérieure (ÉTS), Canada; Wessam Ajib, Université du Québec à Montréal (UQAM), Canada; René Jr. Landry, École de Technologie Supérieure (ÉTS), Canada

RA-L.2.2 STATISTICAL DETECTION AND CLASSIFICATION OF TRANSIENT SIGNALS IN LOW-BIT SAMPLING TIME-DOMAIN SIGNALS

14:18

Gelu Nita, New Jersey Institute of Technology, United States; Aard Keimpema, Zsolt Paragi, Joint institute for VLBI ERIC, Netherlands

RA-L.2.3 EFFICIENT RFI DETECTION IN RADIO ASTRONOMY BASED ON COMPRESSIVE STATISTICAL SENSING

14:36

Gonzalo Cucho-Padin, University of Illinois at Urbana-Champaign, United States; Yue Wang, George Mason University, United States; Lara Waldrop, University of Illinois at Urbana-Champaign, United States; Zhi Tian, George Mason University, United States; Farzad Kamalabadi, University of Illinois at Urbana-Champaign, United States

RA-L.2.4 SELF-SUPERVISED ANOMALY DETECTION FOR NARROWBAND SETI

14:54

Yunfan Zhang, Ki Hyun Won, Seung Woo Son, Andrew Siemion, Steve Croft, University of California, Berkeley, United States

Image and video processing for applications

- GS-P.7.1 A PERCEPTUALLY-INSPIRED 2D VIDEO STABILITY ESTIMATOR**
Biao Ma, Amy R. Reibman, Purdue University, United States
- GS-P.7.2 JOINT IMAGE SEGMENTATION AND CLASSIFICATION WITH APPLICATION TO CLUTTERED CORAL IMAGES**
Ying Ma, University of Florida, United States; Bing Ouyang, Stephanie Farrington, Florida Atlantic University, United States; Shujian Yu, University of Florida, United States; John Reed, Florida Atlantic University, United States; Jose Principe, University of Florida, United States
- GS-P.7.3 COARSE-TO-FINE SEGMENTATION REFINEMENT AND MISSING SHAPE RECOVERY FOR HALIBUT FISH**
Gaoang Wang, Jenq-Neng Hwang, University of Washington, United States; Yiling Xu, Shanghai Jiao Tong University, China; Farron Wallace, Craig Rose, National Oceanic and Atmospheric Administration, United States
- GS-P.7.4 GAN-NL: UNSUPERVISED REPRESENTATION LEARNING FOR REMOTE SENSING IMAGE CLASSIFICATION**
Yiping Duan, Xiaoming Tao, Tsinghua University, China; Mai Xu, Beihang University, China; Chaoyi Han, Jianhua Lu, Tsinghua University, China
- GS-P.7.5 FAST IMAGE MATCHING BASED ON FOURIER-MELLIN PHASE CORRELATION FOR TAG-LESS IDENTIFICATION OF MASS-PRODUCED PARTS**
Rui Ishiyama, Toru Takahashi, Kengo Makino, Yuta Kudo, NEC Corporation, Japan
- GS-P.7.6 OBJECT CLASSIFICATION FROM 3D VOLUMETRIC DATA WITH 3D CAPSULE NETWORKS**
Burak Kakillioglu, Ayesha Ahmad, Senem Velipasalar, Syracuse University, United States
- GS-P.7.7 PATCH-AWARE AVERAGING FILTER FOR SCALING IN POINT CLOUD COMPRESSION**
Keming Cao, University of California, San Diego, United States; Yi Xu, OwlII Inc., China; Pamela C. Cosman, University of California, San Diego, United States

Monitoring, Control and Markets in Energy Systems

Session Chair: Yue Zhao, Stony Brook University

- SMI-P.1.8 ONE-CLASS CLASSIFIER BASED FAULT DETECTION IN DISTRIBUTION SYSTEMS WITH DISTRIBUTED ENERGY RESOURCES**
Zhidi Lin, Xiamen University, China; Dongliang Duan, University of Wyoming, United States; Qi Yang, Xiamen University, China; Xiang Cheng, Peking University, China; Liuqing Yang, Colorado State University, United States; Shuguang Cui, The Chinese University of Hong Kong, China
- SMI-P.1.9 DISTRIBUTED ASSIMILATION OF GRID CONDITIONS AND LOAD INTEGRATION VIA SOCIAL LEARNING**
Jingyuan Liu, Pirathayini Srikantha, Western University, Canada
- SMI-P.1.10 CYBER ATTACKS ON SMART ENERGY GRIDS USING GENERATIVE ADVERSARIAL NETWORKS**
Saeed Ahmadian, Heidar Malki, Zhu Han, University of Houston, United States
- SMI-P.1.11 ENHANCED INDOOR NAVIGATION SYSTEM WITH BEACONS AND KALMAN FILTERS**
Andrew Mackey, Petros Spachos, University of Guelph, Canada; Konstantinos N. Plataniotis, University of Toronto, Canada
- SMI-P.1.12 DYNAMIC PRICE DISCRIMINATION IN DEMAND RESPONSE MARKET: A BILEVEL GAME THEORETICAL MODEL**
Ding Xiang, Ermin Wei, Northwestern University, United States
- SMI-P.1.13 A SIMPLE MARKET MECHANISM FOR RENEWABLE POWER PRODUCERS ACHIEVES ASYMPTOTIC SOCIAL EFFICIENCY**
Hossein Khazaei, Yue Zhao, Stony Brook University, United States

Deep-Learning-Based Network Optimization for Wireless Communications

Session Chair: Yingjie Lao, Clemson University

- DLW-L.3.1**
15:50 **DATA-DRIVEN PREDICTION OF CELLULAR NETWORKS COVERAGE: AN INTERPRETABLE MACHINE-LEARNING MODEL**
Amir Ghasemi, Communications Research Centre Canada, Canada
- DLW-L.3.2**
16:08 **JOINT CONTENT POPULARITY PREDICTION AND CONTENT DELIVERY POLICY FOR CACHE-ENABLED D2D NETWORKS: A DEEP REINFORCEMENT LEARNING APPROACH**
Jiaying Yin, Lixin Li, Yang Xu, Wei Liang, Huisheng Zhang, Northwestern Polytechnical University, China; Zhu Han, University of Houston, United States
- DLW-L.3.3**
16:26 **SCALABLE NETWORK ADAPTATION FOR CLOUD-RANS: AN IMITATION LEARNING APPROACH**
Yifei Shen, The Hong Kong University of Science and Technology, China; Yuanming Shi, ShanghaiTech University, China; Jun Zhang, Khaled B. Letaief, The Hong Kong University of Science and Technology, China
- DLW-L.3.4**
16:44 **DEEP JOINT DEMOSAICING AND SUPER RESOLUTION ON HIGH RESOLUTION BAYER SENSOR DATA**
Junkang Zhang, Cheolhong An, Truong Nguyen, University of California, San Diego, United States
- DLW-L.3.5**
17:02 **THREE-DIMENSIONAL CONVOLUTIONAL NEURAL NETWORK BASED TRAFFIC CLASSIFICATION FOR WIRELESS COMMUNICATIONS**
Jing Ran, Yexin Chen, Shulan Li, Beijing University of Posts and Telecommunications, China

Compressive Sensing and Sparsity Theory

- GS-L.7.1**
15:50 **SKETCHING DISCRETE VALUED SPARSE MATRICES**
Lakshmi Narasimhan Theagarajan, Indian Institute of Technology, India
- GS-L.7.2**
16:08 **JOINT SPARSE RECOVERY: DOES DIVERSIFYING SENSING MATRICES HELP?**
Sharmin Kibria, Jinsub Kim, Oregon State University, United States
- GS-L.7.3**
16:26 **POISSON LOW-RANK MATRIX RECOVERY USING THE ANSCOMBE TRANSFORM**
Pakshal Bohra, Ajit Rajwade, IIT Bombay, India
- GS-L.7.4**
16:44 **A NONCONVEX ALGORITHM FOR SIMULTANEOUSLY SPARSE AND LOW-RANK MATRIX RECONSTRUCTION**
Wei Chen, Beijing Jiaotong University, China
- GS-L.7.5**
17:02 **PERFORMANCE BOUNDS FOR TRACTABLE POISSON DENOISERS WITH PRINCIPLED PARAMETER TUNING**
Chinmay Talegaonkar, Ajit Rajwade, Indian Institute of Technology Bombay, India

Millimeter Wave Communications II

MMW-L.2.1 FAST OPTIMIZATION ALGORITHM ON COMPLEX OBLIQUE MANIFOLD FOR HYBRID PRECODING IN MILLIMETER WAVE MIMO SYSTEMS

15:50

Hiroyuki Kasai, The University of Electro Communications, Japan

MMW-L.2.2 JOINT ENERGY AND SINR COVERAGE IN ENERGY HARVESTING MMWAVE CELLULAR NETWORKS WITH USER-CENTRIC BASE STATION DEPLOYMENTS

16:04

Xueyuan Wang, M. Cenk Gursoy, Syracuse University, United States

MMW-L.2.3 60-GHZ MILLIMETER-WAVE PATHLOSS MEASUREMENTS IN BOISE AIRPORT

16:18

Mahfuza Khatun, Hani Mehrpouyan, Boise State University, United States; David W. Matolak, University of South Carolina, United States

MMW-L.2.4 ROBUST MULTI-USER ANALOG BEAMFORMING IN MMWAVE MIMO SYSTEMS

16:33

Lisi Jiang, Hamid Jafarkhani, Center for Pervasive Communications and Computing, United States

Estimation, Mitigation and Performance

Session Chair: Steve Ellingson, Virginia Tech

RA-L.3.1 OPTIMAL EIGENVALUE DECOMPOSITION BASED FREQUENCY ESTIMATION ALGORITHM FOR COMPLEX SINUSOIDAL SIGNALS

15:50

Muhammad Zubair, Sajid Ahmed, Information Technology University, Pakistan; Seifallah Jardak, Mohamed-Slim Alouini, King Abdullah University of Science and Technology, Saudi Arabia

RA-L.3.2 BLIND CO-CHANNEL SOURCE SEPARATION IN SPARSE INTERFEROMETRIC ARRAYS

16:08

Ben Johnson, Douglas Schuyler, Lockheed Martin Corp, United States

RA-L.3.3 SIGNAL SIMULATOR FOR RFI MITIGATION ALGORITHMS TESTING

16:26

Janusz Kulpa, William Barott, Embry-Riddle Aeronautical University, United States

RA-L.3.4 SPATIAL FOURIER TRANSFORM FOR DETECTION AND ANALYSIS OF PERIODIC ASTROPHYSICAL PULSES

16:44

Marwan Alkhaweldi, Natalia A. Schmid, West Virginia University, United States

Adversarial Machine Learning II

Session Co-Chairs: Sijia Liu, IBM; Pin-Yu Chen, IBM Research AI

- AML-P.1.1 MULTI-VIEW FRAME RECONSTRUCTION WITH CONDITIONAL GAN**
Tahmida Mahmud, Mohammad Billah, Amit Roy-Chowdhury, University of California, Riverside, United States
- AML-P.1.2 REINFORCED ADVERSARIAL ATTACKS ON DEEP NEURAL NETWORKS USING ADM**
Pu Zhao, Kaidi Xu, Northeastern University, United States; Tianyun Zhang, Makan Fardad, Syracuse University, United States; Yanzhi Wang, Xue Lin, Northeastern University, United States
- AML-P.1.3 IS ORDERED WEIGHTED L1 REGULARIZED REGRESSION ROBUST TO ADVERSARIAL PERTURBATION? A CASE STUDY ON OSCAR**
Pin-Yu Chen, Bhanukiran Vinzamuri, Sijia Liu, IBM Research AI, United States
- AML-P.1.4 ZERO-ORDER STOCHASTIC PROJECTED GRADIENT DESCENT FOR NONCONVEX OPTIMIZATION**
Sijia Liu, IBM Research, United States; Xingguo Li, University of Minnesota, United States; Pin-Yu Chen, IBM Research, United States; Jarvis Haupt, University of Minnesota, United States; Lisa Amini, IBM Research, United States
- AML-P.1.5 ON THE TRADEOFF BETWEEN MODE COLLAPSE AND SAMPLE QUALITY IN GENERATIVE ADVERSARIAL NETWORKS**
Sudarshan Adiga, Mohamed Adel Attia, Wei-Ting Chang, Ravi Tandon, University of Arizona, United States
- AML-P.1.6 RANDOM ENSEMBLE OF LOCALLY OPTIMUM DETECTORS FOR DETECTION OF ADVERSARIAL EXAMPLES**
Amish Goel, Pierre Moulin, University of Illinois at Urbana-Champaign, United States

Neural networks for image and video processing

- GS-P.8.7 CLASSIFICATION OF SEVERELY OCCLUDED IMAGE SEQUENCES VIA CONVOLUTIONAL RECURRENT NEURAL NETWORKS**
Jian Zheng, Yifan Wang, Xiaonan Zhang, Xiaohua Li, Binghamton University, United States
- GS-P.8.8 RECONSTRUCTION-FREE DEEP CONVOLUTIONAL NEURAL NETWORKS FOR PARTIALLY OBSERVED IMAGES**
Arun Nair, Luoluo Liu, Akshay Rangamani, Peter Chin, Muyinatu A Lediju Bell, Trac Tran, Johns Hopkins University, United States
- GS-P.8.9 INTERACTIVE OBJECT SEGMENTATION WITH NOISY BINARY INPUTS**
Gregory Canal, Sivabalan Manivasagam, Georgia Institute of Technology, United States; Shaoheng Liang, Tsinghua University, China; Christopher Rozell, Georgia Institute of Technology, United States
- GS-P.8.10 PERSON RE-IDENTIFICATION BY REFINED ATTRIBUTE PREDICTION AND WEIGHTED MULTI-PART CONSTRAINTS**
Xiao Hu, Beijing University of Posts and Telecommunications, China; Xiaoqiang Guo, Academy of Broadcasting Science, China; Zhuqing Jiang, Beijing University of Posts and Telecommunications, China; Yun Zhou, Academy of Broadcasting Science, China; Zixuan Yang, Beijing University of Posts and Telecommunications, China
- GS-P.8.11 REGION-PARTITION BASED BILINEAR FUSION NETWORK FOR PERSON RE-IDENTIFICATION**
Xiao Hu, Beijing University of Posts and Telecommunications, China; Xiaoqiang Guo, Academy of Broadcasting Science, China; Zhuqing Jiang, Beijing University of Posts and Telecommunications, China; Yun Zhou, Academy of Broadcasting Science, China; Zixuan Yang, Beijing University of Posts and Telecommunications, China

mmWave from Research to Practice

Moderator: Monisha Ghosh

Dr. Monisha Ghosh joined NSF as a rotating Program Director in September 2017, in the Computer and Network System (CNS) division within the Directorate of Computer & Information Science and Engineering (CISE). She manages wireless networking research within the Networking Technologies and Systems (NeTS) program. Dr. Ghosh is also a Research Professor at the University of Chicago, with a joint appointment at the Argonne National Laboratories, where she conducts research on wireless technologies for the IoT, 5G cellular, next generation Wi-Fi systems, coexistence, and machine learning for predictive oncology. Prior to joining the University of Chicago in September 2015, she worked at Interdigital, Philips Research and Bell Laboratories, on various wireless systems such as the HDTV broadcast standard, cable standardization and on cognitive radio for the TV White Spaces. She has been an active contributor to many industry standards and was recognized with a Certificate of Appreciation for her outstanding contributions to IEEE 802.22. She is a Fellow of the IEEE.



She received her Ph.D. in Electrical Engineering from the University of Southern California in 1991, and her B. Tech from the Indian Institute of Technology, Kharagpur (India) in 1986.

Panelists**Andy Molisch**

Andreas F. Molisch is the Solomon Golomb - Andrew and Erna Viterbi Chair Professor at the University of Southern California. He previously was at TU Vienna, AT&T (Bell) Labs, Lund University, and Mitsubishi Electric Research Labs. His research interest is wireless communications, with emphasis on wireless propagation channels, multi-antenna systems, ultrawideband signaling and localization, novel modulation methods, and caching for wireless content distribution. He is the author of four books, 19 book chapters, more than 220 journal papers, 300 conference papers, as well as 80 patents. He is a Fellow of the National Academy of Inventors, IEEE, AAAS, and IET, as well as Member of the Austrian Academy of Sciences and recipient of numerous awards.

**Ian Wong**

Dr. Ian C. Wong is Senior Manager of the Advanced Wireless Research group at National Instruments where he leads the company's 3GPP and 802.11 wireless standards strategy and platforms for wireless system design, simulation, prototyping, and implementation. From 2007-2009, he was



a systems research and standards engineer with Freescale Semiconductor where he represented Freescale in the 3GPP LTE standardization efforts. He is a senior member of the IEEE, the Director of Industry Communities for IEEE Communications Society 2016-present, and was the Industry Program Chair for IEEE Globecom 2014 in Austin. His current research interests include 5G wireless systems design and prototyping, and design automation tools for rapid algorithm development.

Dr. Wong is the co-author of the Springer book "Resource Allocation for Multiuser Multicarrier Wireless Systems," has over 10 patents, over 25 peer-reviewed journal and conference papers, and over 40 standards contributions. He was awarded the Texas Telecommunications Engineering Consortium Fellowship in 2003-2004, and the Wireless Networking and Communications Group student leadership award in 2007.

He received the MS and PhD degrees in electrical engineering from the University of Texas at Austin in 2004 and 2007, respectively, and a BS degree in electronics and communications engineering (magna cum laude) from the University of the Philippines in 2000.

Hamid Jafarkhani

Hamid Jafarkhani is a Chancellor's Prof and the Conexant-Broadcom Endowed Chair at the Department of EECS, UC, Irvine. Among his awards are the IEEE Marconi Prize Paper Award in Wireless Communications, the IEEE Communications Society Award for Advances in Communication, and the IEEE Eric E. Sumner Award. He is listed as a highly cited researcher in isihighlycited and one of the top 10 most-cited researchers in the field of "computer science" during 1997-2007. He is a fellow of IEEE and AAAS.

**Hani Mehrpouyan**

Hani Mehrpouyan is an Assistant Professor at Boise State University. His main areas of research are mmWave communications, application of machine learning to resource management in wireless networks, and generally speaking signal processing for communications. He is the recipient of the best paper award at IEEE ICC 2018. He received his PhD from Queen's University, Canada, in 2011.



AUTHOR INDEX

A

Abreu, Giuseppe	26, 44	Ballal, Tarig	42
Adiga, Sudarshan	58	Bandi, Ashok	26
Afshar, Parnian	42	Banerjee, Taposh	53
Aghajan, Hamid	28	Barazandeh, Babak	28
Ahmad, Ayesha	55	Barfett, Joseph	39, 42
Ahmadian, Saeed	55	Barott, William	57
Ahmed, Sajid	42, 57	Barzegar Khalilsarai, Mahdi	20
Ai, Bo	22	Basu, Sourya	38
Ajib, Wessam	54	Baudoin, Cédric	29
Akbarian, Amir	28	Baur, Julien	44
Al-Alem, Yazan	20	Bazrafshan, Mohammadhafez	37
Alexandropoulos, George C	26	Becker, Maria	54
Alexandru, Roxana	25	Bedi, Amrit Singh	36
Alex, Sam	29	Beferull-Lozano, Baltasar	31
AlHajri, Mohamed I.	29	Beltagy, Iz	29
Ali, Anum	20	Berger, Peter	31
Ali, Nazar T.	29	Berg, Vincent	23
Alizadeh, Mahnoosh	51	Berisha, Sebastian	44
Alkhateeb, Ahmed	29	Bernstein, Andrey	51
Alkhweldi, Marwan	57	Bertalmío, Marcelo	50
Almansouri, Hani	21	Bianco, Federica	44
Al-Naffouri, Tareq	42	Billah, Mohammad	58
Alouini, Mohamed-Slim	26, 42, 57	Biswal, Bharat	36
Alsulaimawi, Zahir	26	Björnson, Emil	20
Altmann, Yoann	40	Bodurka, Jerzy	28
Al Zoubi, Obada	28	Bohra, Pakshal	56
Amerineni, Rajesh	36	Borgnat, Pierre	21
Amini, Lisa	58	Bose, Arindam	53
An, Cheolhong	56	Bouchard, Martin	38
Andrenacci, Stefano	29	Bouman, Charles	21
Apolinário Jr., José	45	Boussé, Martijn	41
Arafa, Ahmed	22	Boutros, Joseph J.	50
Ardeshiri, Ghazaleh	37	Bredin, Matthew	45, 53
Arriaga-Trejo, Israel Alejandro	53	Brunel, Loic	50
As'ad, Hala	38	Budroweit, Jan	29
Asensio-Marco, Cesar	31	Burger, Patrick	25
Asif, Amir	28	Buzzard, Gregery	21
Asif, Salman	52		
Asoh, Hideki	28		
Atashzar, Farokh (Ses. Chair)	20, 28		
Atashzar, Seyed Farokh	20		
Attia, Mohamed Adel	58		
Aviyente, Selin	38		
Awan, Daniyal Amir	53		

B

Bajovic, Dragana	36
Baker, Kyri	51

C

Cai, Jian-Feng	42
Canal, Gregory	58
Cao, Keming	55
Cao, Shan	25
Caromi, Raied	42
Cassiau, Nicolas	23
Castedo, Luis	23
Castro, Paula María	23
Caus, Màrius	23
Cavalcante, Renato L.G.	53

Cavalcante, Renato Luis Garrido	23	Corlay, Vincent	50
Cazalens, Sonia	29	Cosman, Pamela C.	22, 55
Chachlakis, Dimitris	41	Costa, Ana P.	20
Chalise, Batu	42	Cotilla-Sanchez, Eduardo	41
Champagne, Benoit	38	Coutino, Mario	21
Chang, Daniel	37	Croft, Steve	54
Chang, Wei-Ting	39, 58	Crow, Mariesa L.	37
Chan, Wai Ming	54	Cucho-Padin, Gonzalo	54
Chattopadhyay, Arpan	29	Cui, Shuguang	55
Chattoraj, Subhankar	36		
Chatzinotas, Symeon	26, 29	D	
Chaudhury, Kunal	21, 24, 39	Daeinejad, Davar	44
Chelms, Charalampos	25, 50	Dai, Xuewu	22
Chen, Bo	41	Dall'anese, Emiliano (Ses. Chair)	37
Chen, Chen	25, 41	Dalton, Lori A.	36
Chen, Chun-Hsiang	50	Daly, Scott	50
Chen, Fangjiong	22	Daniel, Luca	52
Cheng, Xiang	25, 55	Dash, Debadatta	36
Chen, Hui	42	Davies, Mike E.	21, 40
Chen, Lei	24	de Almeida, André	45
Chenot, Cécile	40	de Carvalho, Elisabeth (Ses. Chair)	20
Chen, Pin-Yu	52, 58	de la Fuente, Antonio	51
Chen, Pin-Yu (Ses. Chair)	52, 58	De Lathauwer, Lieven	41
Chen, Qianbin	37	De Leon, Phillip	45, 53
Chen, Rui	54	Deng, Xueqing	40
Chen, Sheng	22	Dervin, Mathieu	29
Chen, Siheng	25	De Silva, Shashini	41
Chen, Wei	56	Dey, Asim	41
Chen, Xiang	42	Dhillon, Deepak	24
Chen, Yan	37	Diniz, Paulo	45
Chen, Yexin	56	Dittrich, Thomas	31
Chepuri, Sundeep (Ses. Chair)	25, 31	Dobler, Gregory	44
Chepuri, Sundeep Prabhakar	21	Dong, Tiannan	28
Chien, Trinh Van	40	Doré, Jean-Baptiste	23
Ching, Pak-Chung	22	Dowling, Chase	51
Ching, P.-C. (Ses. Chair)	22	Dragomirescu, Daniela	29
Chin, Peter	58	Dragotti, Pier Luigi	25
Chin, Tai-Lin	43	Drayer, Elisabeth	41
Cho, Bo-Hong	24	Druckmann, Shaul	38
Choi, Hayoung	45	Duan, Chaojing	25
Chou, Ching-Yao	24	Duan, Dongliang	25, 55
Choudhury, Anustup	50	Duan, Dongliang (Ses. Chair)	22
Chouhan, Rajlaxmi	24	Duan, Yiping	55
Chung, Hanwook	38	Duong, Quang-Trung	40
Chung, Wei-Ho	37	Dupraz, Elsa	31
Chu, Yunfei	20	D. Venkategowda, Naveen K.	26
Ciblat, Philippe	50		
Clemente, Jose	24, 43	E	
Clements, Joseph	52	Edfors, Ove	23
Cluzel, Sylvain	29	Ellingson, Steve (Ses. Chair)	57
Colak, Errol	39, 42		
Cong, Jiaqi	54		

F	
Fan, Ya Ju	52
Fardad, Makan	58
Farrington, Stephanie	55
Favier, Gérard	45
Feng, Chunyan	20
Ferraioli, Fabrizio	42
Ferrari, Paul	36
Fessler, Jeff	39
Flierl, Markus	45
Foroozandeh Shahraki, Farideh	40
Foroughi Pour, Ali	36
Franchetti, Franz	45
Franz, Daniel	52
Freitas Jr., Walter	45
Fridovich-Keil, Sara	24
Fu, Xiao	41
G	
Gama, Fernando	25, 31
Gao, Yue	54
Gao, Zhen	23
Garg, Aditie	37
Garnaev, Andrey	22
Gatsis, Nikolaos	37
Gel, Yulia	41
Getu, Tilahun	54
Ge, Yao	22
Ghasemi, Amir	56
Ghods, Alireza	44
Ghosh, Sanjay	21, 24
Giacomoni, Marcio	37
Giannakis, Georgios B.	36, 38, 51
Gilmore, Greydon	20
Girault, Benjamin	31
Girchenko, Liudmyla	24
Goel, Amish	58
Goertz, Norbert	52
Gong, Chen	26
González-Coma, José Pablo	23
González-Prelcic, Nuria	20
Goto, Tomio	21
Grelier, Nicolas	31
Gripon, Vincent	31
Grotz, Joel	29
Guan, Ke	22
Guan, Xiaohong	37
Gu, Hanlin	42
Güngör, Alper	50
Guo, Mangqing	40
Guo, Xiaoqiang	58
Gupta, Lalit	36
Gupta, Resh	36
Gurram, Prudhvi	53
Gursoy, M. Cenk	40, 50, 53, 57
Gursoy, M. Cenk (Ses. Chair)	40
Gurumoorthy, Karthik S.	52, 54
Güven, H. Emre	50
Gu, Zhengzhi	44
Gwak, Migyeong	20
H	
Hagan, Travis	41
Han, Chaoyi	55
Han, Zhu	55, 56
Harish Kumar, J. R.	39
Hashemi, Abolfazl	31
Haupt, Jarvis	36, 45, 58
Heath, Robert	20
He, Danping	22
Hegde, Chinmay	52
Hegde, Rajesh M.	38
He, Hengtao	53
He, Junyou	20
Himed, Braham	42
Hong, Mingyi (Ses. Chair)	39
Hsieh, Cho-Jui	52
Hsu, Chia-Yi	52
Hsu, Kai-Chieh	24
Huai, Mengdi	52
Huang, Chia-Wei	43
Huangfu, Wei	43
Huang, Kejun	41
Huang, Shijie	51
Huang, Xuhui	42
Huang, Yuan-Hao (Ses. Chair)	50
Hua, Yingbo	22
Hu, Hao	51
Hu, Hefei	29
Hu, Xiao	58
Hwang, Jenq-Neng	55
Hyun Won, Ki	54
I	
Iimori, Hiroki	26
Ikehara, Masaaki	24
Ilbey, Serhat	50
Interdonato, Giovanni	20
Ioannidis, Vassilis N.	38
Ishiyama, Rui	55
Islambekov, Umar	41
Ito, Nobutaka	38
Iversen, Helle K.	20
Izumi, Shintaro	39

J

Jafarkhani, Hamid	57
Jakovetic, Dusan	36
Jalali, Mana	37
Jamroz, Ben	54
Jardak, Seifallah	42, 57
Javidbakht, Omid	26
Jezequel, Pierre-Yves	45
Jiang, Lisi	57
Jiang, Shunan	44
Jiang, Tao	52
Jiang, Zhiyuan	22
Jiang, Zhuqing	58
Ji, Fei	22
Ji, Feng	21
Jin, Cheng	37
Jing, Shusen	43
Jin, Shi	53
Jog, Mandar S.	20
Joham, Michael	23
Johnson, Ben	57
Jois S.P., Subramanya	39
Joroughi, Vahid	29
Jung, Peter	52

K

Kai, Yi	28
Kakillioglu, Burak	55
Kalantar, Golnar	28
Kamalabadi, Farzad	54
Kamath, Chandrika	52
Kamkar-Parsi, Homayoun	38
Kanemura, Atsunori	28
Kang, Kai	39
Kanj, Matthieu	45
Kanoga, Suguru	28
Karlsson, Marcus	20
Kar, Oğuzhan Fatih	50
Karpf, Andreas	44
Kar, Soumya	36
Kasai, Hiroyuki	57
Kawaguchi, Hiroshi	39
Kazemipour, Abbas	38
Keimpema, Aard	54
Kekatos, Vassilis	37
Ke, Malong	23
Kerekes, John	40
Kerekes, John (Ses. Chair)	40
Khan, Sifat Shahriar	51
Khatun, Mahfuza	57
Khazaei, Hossein	55
Khosravi, Mahsa	20

Kibria, Sharmin	56
Kim, Jinsub	26, 41, 56
Kiraly, Franz	52
Kirschen, Daniel	51
Kishk, Ahmed A.	20
Kisil, Ilia	45
Knopp, Andreas	23
Kok, Chi Wah	54
Koochakzadeh, Ali	38
Koppel, Alec	36
Kotropoulos, Constantine	45
Kotwal, Alankar	52
Kotzagiannidis, Madeleine	21
Kovačević, Jelena	25, 31, 45
Kténas, Dimitri	23
Kudo, Yuta	55
Kuehn, Volker	52
Kuerner, Thomas	22
Kulkarni, Anuva	45
Kulpa, Janusz	57
Kumar, J.R. Harish	39
Ku, Meng-Lin	37

L

Lagunas, Eva	29
Landmann, Markus	23
Landry, René Jr.	54
Lan, Yu	37
Lao, Yingjie	52
Lao, Yingjie (Ses. Chair)	56
Larsson, Erik G.	20
Latini, Valerio	42
Lediju Bell, Muyinatu A	58
Lee, George	37
Lee, Rand	37
Lee, Ted	37
Lee, Zachary	37
Letaief, Khaled B.	56
Le, Tuan Anh	40
Leus, Geert	21, 25
Liang, Shaoheng	58
Liang, Wei	56
Liang, Xiao	43
Liang, Zhonghua	37
Liao, Ching-Chun	50
Liao, Yong	22
Liesegang, Sergi	23
Li, Fangyu	24, 28, 43
Li, Fangyu (Ses. Chair)	36
Li, Geoffrey Ye	53
Li, Guoquan	37
Li, Heng	29

Li, Jiandong	54	Mahdavi, Mojtaba	23
Li, Jun	22	Mahmud, Tahmida	58
Li, Lixin	56	Mai, Cong-Trang	40
Lima, Markus	45	Makino, Kengo	55
Lin, Baihong	24	Makkar, Nikhil	40
Lin, Tian	54	Maleki, Sina	26
Lin, Xue	52, 58	Malhotra, Eeshan	52
Lin, Zhidi	55	Malik, Saleem	36
Li, Qiang	22, 40	Malki, Heidar	55
Li, Shangbin	26	Ma, Meng	36
Li, Shulan	56	Mandic, Danilo	45
Liu, Jiawei	26	Manivasagam, Sivabalan	58
Liu, Jingyuan	55	Maret, Luc	23
Liu, Liang	23	Mark, Benjamin	25
Liu, Luoluo	58	Markopoulos, Panos	41
Liu, Sijia	58	Marques, Antonio	25
Liu, Sijia (Ses. Chair)	52, 58	Mateos, Gonzalo	31
Liu, Xiaohong	24	Matin, Sharif	22
Liu, Yatao	40	Matolak, David W.	22, 57
Liu, Yaxi	43	Maturo, Nicola	29
Liu, Yuanan	29	Matz, Gerald	31
Li, Wei	37	Ma, Wing-Kin	40
Li, Xiaohua	58	Mayeli, Ahmad	28
Li, Xingguo	58	Mayerich, David	44
Li, Xuanfeng	23	Ma, Ying	55
Liyanage, Yasitha	50	McLeod, Katherine	24
Liyanage, Yasitha Warahena	25	Mehrpouyan, Hani	57
Li, Yuan	25	Mei, Jonathan	21
Li, Zhipeng	39	Meng, Xiangming	23
Llorente, Álvaro	51	Milstein, Laurence B.	22
Long, Keping	43	Miretti, Lorenzo	23
Long, Wen-Xuan	54	Mirgholami, Mahsa	28
Long, Yong	39	Mitra, Urbashi	29
Lopez-Ramos, Luis Miguel	31	Mittag, Gabriel	38
Lorenz, Mario	23	Miyauchi, Yuki	39
Lotfollahi, Mahsa	44	Moeneclae, Marc	23
Low, Steven	37	Mohammadi, Arash	28, 42
Lozano, Aurelie	52	Mohammadi, Arash (Ses. Chair)	20, 24
Lu, Guobao	53	Molina, Francesc	29
Lu, Jianhua	55	Mollaebrahim, Siavash	31
Lunga, Dalton	40	Møller, Jakob S.	20
Luo, Xiliang	23, 39, 43	Möller, Sebastian	38
Luo, Xiliang (Ses. Chair)	43	Molzahn, Daniel Kenneth	37
Luo, Zhi-Quan	44	Moniri, Ahmad	45
Lu, Pei-Hsuan	52	Moradipari, Ahmadreza	51
Lu, Yantao	20	Mori, Haruki	39
Lu, Ziyang	53	Mosquera, Carlos	23
M		Motohashi, Satoshi	21
Ma, Biao	55	Moulin, Pierre	58
Mackey, Andrew	55	Moura, Jose' M.F.	21
Maguer, Alain	42	Moustakides, George V.	53
		Moy, Christophe	45

Mukherjee, Rajdeep	36	Park, Sungwoo	20
Muñoz, Olga	23	Pascual-Iserte, Antonio	23
Musa, Osman	52	Pastore, Adriano	23
Mysore R, Bhavani Shankar	26	Patel, Rajni V.	20
N		Paulus, Martin	28
Nadakuditi, Raj Rao	45	Peng, Fei	25
Nafkha, Amor	45	Peng, Yao	37
Nagarajan, Harsha	37	Perez-Neira, Ana (Ses. Chair)	23
Nagata, Takahiro	21	Pérez-Neira, Ana Isabel	23
Nair, Arun	58	Pesa, Luca	42
Nakahara, Yusuke	24	Petropulu, Athina	22
Nakatani, Tomohiro	38	Plataniotis, Konstantinos N.	42, 55
Nakhai, Mohammad Reza	40	Plourde, Eric	38
Naqvi, Sumeya	39, 42	Poor, H. Vincent	22, 41
Narimani, Mohammad Rasoul	37	Poston, Jeffrey	44
Nasrabadi, Nasser	50	Pradhan, Hrusikesha	36
Nategh, Neda	28	Prasadan, Arvind	45
Nath, Samrat	28	Prasad, Saurabh	40
Naujoks, Benjamin	25	Prasad, Saurabh (Ses. Chair)	40, 44
Nayer, Seyedehsara	28	Prater-Bennette, Ashley	41, 45
Ndlovu, Nkosinathi	40	Pratihar, Sawon	36
Ngo, Quoc-Hien	40	Prestage, Richard (Ses. Chair)	51
Nguyen, Hien	40	Principe, Jose	55
Nguyen, Thinh	26	Puthusserypady, Sadasivan	20
Nguyen, Truong	56	Pu, Wenqiang	44
Niknam, Kaiser	28	Q	
Nita, Gelu	54	Qian, Hua	23, 39, 43
Nita, Gelu (Ses. Chair)	54	Qin, Fei	53
Niu, Zhisheng	22	Quimby, Jeanne	54
Noels, Nele	23	R	
Noudoost, Behrad	28	Radzik, José	29
O		Rahman, Faiz Ur	40
Okutomi, Masatoshi	44	Raikar, Aditya	38
Orozco-Lugo, Aldo Gustavo	53	Rajawat, Ketan	36
Ortega, Antonio	31	Rajwade, Ajit	52, 54, 56
Ortiz-Jiménez, Guillermo	21	Ramadge, Peter	24
Ottersten, Bjorn	26, 29	Raman, Akhila	51
Ouyang, Bing	55	Rambhatla, Sirisha	45
Öwall, Viktor	23	Ramírez, Tomás	23
Owerko, Damian	31	Rangamani, Akshay	58
P		Ran, Jing	56
Pal, Piya	38	Raskutti, Garvesh	25
Panayirci, Erdal	22	Ravishankar, Saiprasad	39
Pandotra, Himanshu	52, 54	Razaviyayn, Meisam	28
Pan, Jiachun	31	Reed, John	55
Pantraki, Evangelia	45	Refai, Hazem	28
Papalexakis, Evangelos	41	Reibman, Amy R.	55
Paquelet, Stéphane	45	Remley, Kate	54
Paragi, Zsolt	54	Ren, Jineng	36
		Renna, Francesco	52

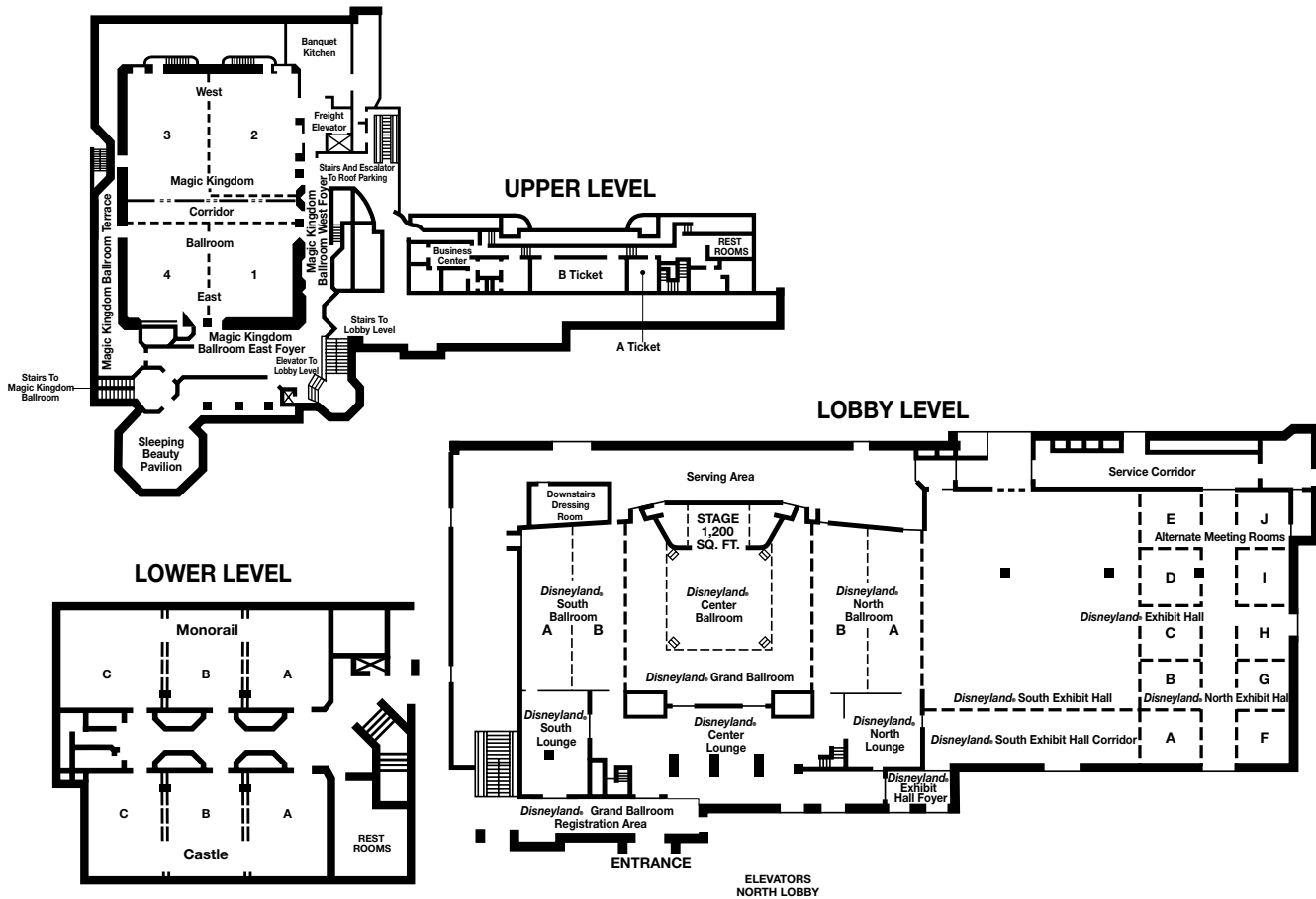
Rey, Francisc	29	Shen, Xuanfan	22
Ribeiro, Alejandro	25, 31	Shen, Yifei	56
Rilling, Gabriel	21	Shibata, Takashi	44
Rodrigues, Miguel	52	Shi, Yuanming	45, 52, 56
Romero, Daniel	31	Shubair, Raed	20, 29
Romero, David	53	Shubair, Raed (Ses. Chair)	29
Rosar Kos Lassance, Carlos	31	Sidiropoulos, Nicholas D.	38, 41, 45
Rose, Craig	55	Siemion, Andrew	54
Routtenberg, Tirza	41	Sihag, Saurabh	41
Roy-Chowdhury, Amit	58	Silva, Cody	51
Roysam, Badrinath	40	Singh, Aditi	40
Roysam, Badrinath (Ses. Chair)	44	Sofuoglu, Seyyid Emre	38
Rozell, Christopher	58	So, Hing Cheung	54
Ruby, Max	21	Sohrabi, Reza	22
Rukkanchanunt, Thapanapong	44	Soltanalian, Mojtaba	53
S			
Sabetsarvestani, Zahra	52	Song, WenZhan	24, 28, 43
Sahu, Anit Kumar	36	Song, Xuming	45
Sala-Alvarez, Josep	29	Song, Yang	26
Salehinejad, Hojjat	39, 42	Son, Seung Woo	54
Sandoval, Steven	45, 53	Souryal, Michael	42
Santos-Villalobos, Hector	21	Spachos, Petros	24, 55
Sanyal, Rajat	39	Spenler, Peter	24
Sao, Anil Kumar	36	Sridhar, Harsha	39
Saqib, Mohammad	26	Srikantha, Pirathayini	55
Sarrafzadeh, Majid	20	Stanczak, Slawomir	23, 53
Savakis, Andreas	40	Stefanatos, Stelios	20
Savin, Valentin	23	Stehle, Ferdinand	29
Schaub, Michael	25	Stinco, Pietro	42
Schmid, Natalia A.	57	Suárez-Casal, Pedro	23
Schuyler, Douglas	57	Sugito, Yasuko	50
Schwarz, Robert T.	23	Su, Hsuan-Jung	26
Seelamantula, Chandra Sekhar	39	Su, Li	45
Segarra, Santiago	25, 31	T	
Segarra, Santiago (Ses. Chair)	21	Taha, Ahmad	37
Serrano, Alexander	31	Taherkhani, Fariborz	50
Sevi, Harry	21	Tajer, Ali	41
Shafipour, Rasoul	31	Takahashi, Toru	55
Shahbazi, Mohamad	28	Takano, Yasuhiro	26
Shah, Dhruv	52	Talegaonkar, Chinmay	56
Shahroudnejad, Atefeh	42	Talreja, Veeru	50
Shao, Hao-Chiang	39	Tam, Wing Shan	54
Shao, Mingjie	40	Tanaka, Masayuki	44
Sharma, Mohit	44	Tandon, Ravi	39, 58
Sharma, Prabhat K.	26	Tang, Bihua	29
Shen, Chung-An	43	Tan, Xiaosi	50
Shen, Chung-An (Ses. Chair)	43	Tao, Xiaoming	24, 55
Shen, Cong	43	Tarokh, Vahid	53
Shen, Fei	53	Tay, Wee Peng	21, 26
Shen, Lixin	45	Teke, Oguzhan	31
Shen, Shan-Hsiang	43	Teng, Chieh-Fang	50
		Tesei, Alessandra	42

Theagarajan, Lakshmi Narasimhan	56	Wang, Siyue	52
Tian, Zhi	39, 42, 45, 54	Wang, Suyu	44
Toni, Laura	31	Wang, Szu-Liang	37
Top, Can Barış	50	Wang, Wei	42
Tran, Trac	58	Wang, Xiao	52
Trappe, Wade	22	Wang, Xueyuan	57
Tsiligkaridis, Theodoros	53	Wang, Yanbo	45
U		Wang, Yang	42
Uranga, Ekhi	51	Wang, Yanzhi	58
Utkovski, Zoran	53	Wang, Yifan	58
V		Wang, Yue	39, 45, 54
Vaidyanathan, P. P.	31	Wang, Zengyan	28
Valaee, Shahrokh	39, 42	Wang, Zhiyang	43
Valenti, Matthew	50	Wang, Zhongfeng (Ses. Chair)	53
Van Cor, Jared	40	Wei, Ermin	55
Varma, Rohan	31	Wei, Jin	51
Varshney, Neeraj	26	Weiss, Alec	54
Vasu, Bhavan Kumar	40	Wen, Chao-Kai	53
Vaswani, Namrata	28	Weng, Tsui-Wei	52
Vázquez, Miguel Ángel	23	Wen, Miaowen	22
Velipasalar, Senem	20, 50, 53, 55	Werner, Stefan	26
Velmurugan, Rajbabu	54	Whipps, Gene	53
Venkatakrishnan, Singanallur	21	Willett, Rebecca	25
Venkategowda, Naveen (Ses. Chair)	26	Williams, Dylan	54
Venkitasubramaniam, Parv	26	Willuweit, Christopher	29
Vikalo, Haris	31	Woo, Ellen	20
Villares, Javier	29	Wu, An-Yeu (Andy)	24, 50
Vinzamuri, Bhanukiran	58	Wübben, Dirk	29
Völk, Florian	23	Wu, Chun-Wei	43
Vosoughi, Azadeh	20, 37	Wuentsche, Hans-Joachim	25
Vosoughi, Azadeh (Ses. Chair)	37	Wu, Hanwei	45
Vouras, Peter	54	Wu, Jingxian	28
V.S., Unni	21	Wu, Kanke	22
W		Wunder, Gerhard	20
Waldrop, Lara	54	Wu, Yongpeng	23
Wallace, Farron	55	X	
Wang, Chao	25	Xia, Hailun	20
Wang, Chih-Yu	37	Xiang, Ding	55
Wang, Chong Xiao	26	Xian, Yin	42
Wang, Di	52	Xie, Liyan	53
Wang, Gang	51	Xie, Rui	28
Wang, Gaoang	55	Xie, Yao	53
Wang, Haifeng	43	Xiong, Zhuang	24
Wang, Jian	25	Xu, Jinhui	52
Wang, Jian (Ses. Chair)	25	Xu, Kaidi	58
Wang, Jianji	28	Xu, Mai	55
Wang, Jun	36	Xu, Ping	39
Wang, Qi	22	Xu, Shugong	25
Wang, Qiwen	45	Xu, Yang	56
		Xu, Yi	55
		Xu, Yiling	55

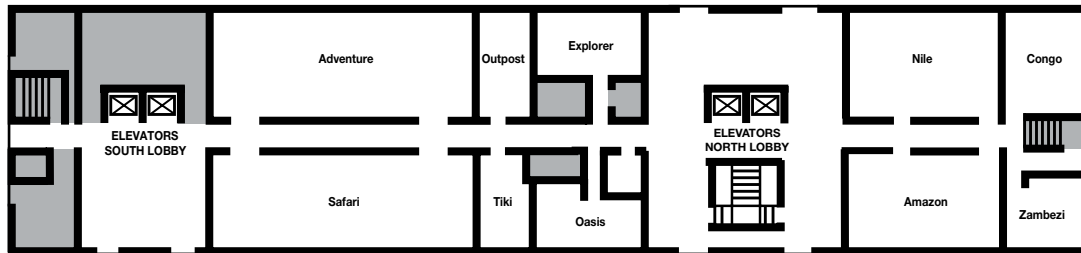
Xu, Yongjun	37	Zhang, Liang	51
Xu, Zhengyuan	26	Zhang, Qilong	53
Y			
Yaghoobi, Mehrdad	40	Zhang, Shanshan	29
Yamada, Kazuki	39	Zhang, Shunqing	25
Yamaguchi, Takuro	24	Zhang, Tianyun	58
Yang, Chao	43	Zhang, Wenyi	31
Yang, Fuqian	43	Zhang, Xiaonan	58
Yang, Jingkang	31	Zhang, Xiaoyu	23
Yang, Kaige	31	Zhang, Xin	53
Yang, Lexie	40	Zhang, Xinyue	44
Yang, Liuqing	25, 55	Zhang, Xudong	25, 44
Yang, Meng	28	Zhang, Yimin	42
Yang, Pengtao	25	Zhang, Yuekai	22
Yang, Qi	55	Zhang, Yunfan	54
Yang, Wen-Bin	42	Zhang, Zaichen	43, 50
Yang, Yang	43	Zhang, Zhe	42
Yang, Zixuan	58	Zhao, Jiying	24
Yao, Mengfan	50	Zhao, Nan	24
Yao, Rui	51	Zhao, Pu	52, 58
Yao, Yuan	42	Zhao, Shangshu	43
Yazdani, Hassan	20, 37	Zhao, Yue	55
Yazdanpanah, Hamed	45	Zhao, Yue (Ses. Chair)	51, 55
Ye, Chuang	50	Zheng, Jian	58
Ye, Dong Hye	21	Zheng, Nanning	28
Ye, Shaokai	52	Zhong, Chen	53
Ying, Ziyu	43	Zhong, Zhangdui	22
Yin, Jiaying	56	Zhong, Zhiwei	50
Yong, Christopher	50	Zhou, Sheng	22
Yoshimoto, Masahiko	39	Zhou, Yang	24
Youkawa, Tetsuya	39	Zhou, Yong	23
You, Xiaohu	43, 50	Zhou, Yun	58
Yu, Chia-Mu	52	Zhu, Fengqing	44
Yu, Chin-Yun	45	Zhu, Hao	37
Yu, Nam Yul	52	Zhu, Hao (Ses. Chair)	41
Yu, Shujian	55	Zhu, Hongbin	39, 43
Yu, Xiaolei	37	Zhu, Yu	54
Z			
Zaman, Bakht	31	Zhu, Zhaowei	43
Zamzam, Ahmed S.	38	Zois, Daphney-Stavroula	25, 50
Zeineddine, Ali	45	Zotev, Vadim	28
Zhang, Baosen	51	Zubair, Muhammad	57
Zhang, Bingqi	26		
Zhang, Chuan	43, 50		
Zhang, Haijun	43		
Zhang, Haiyan	51		
Zhang, Huan	52		
Zhang, Huisheng	56		
Zhang, Jun	56		
Zhang, Junkang	56		

THE DISNEYLAND HOTEL FLOORPLAN

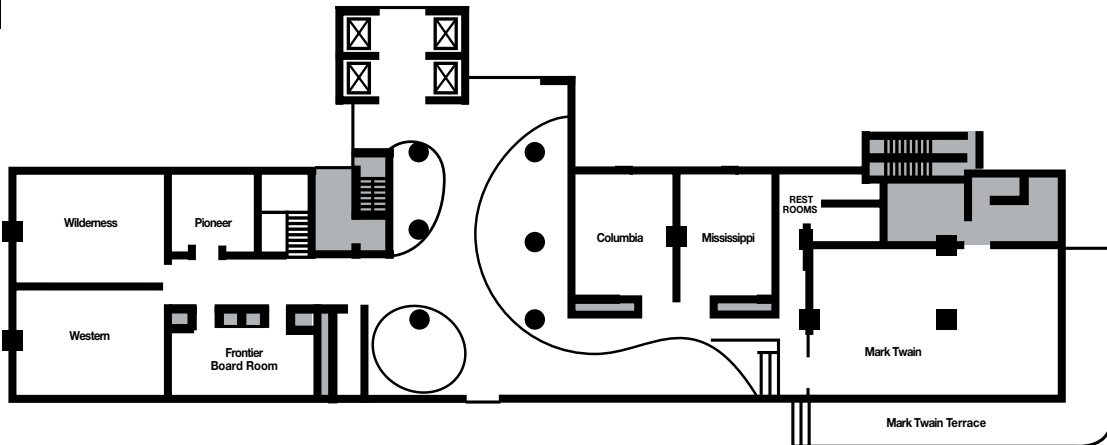
FANTASY TOWER



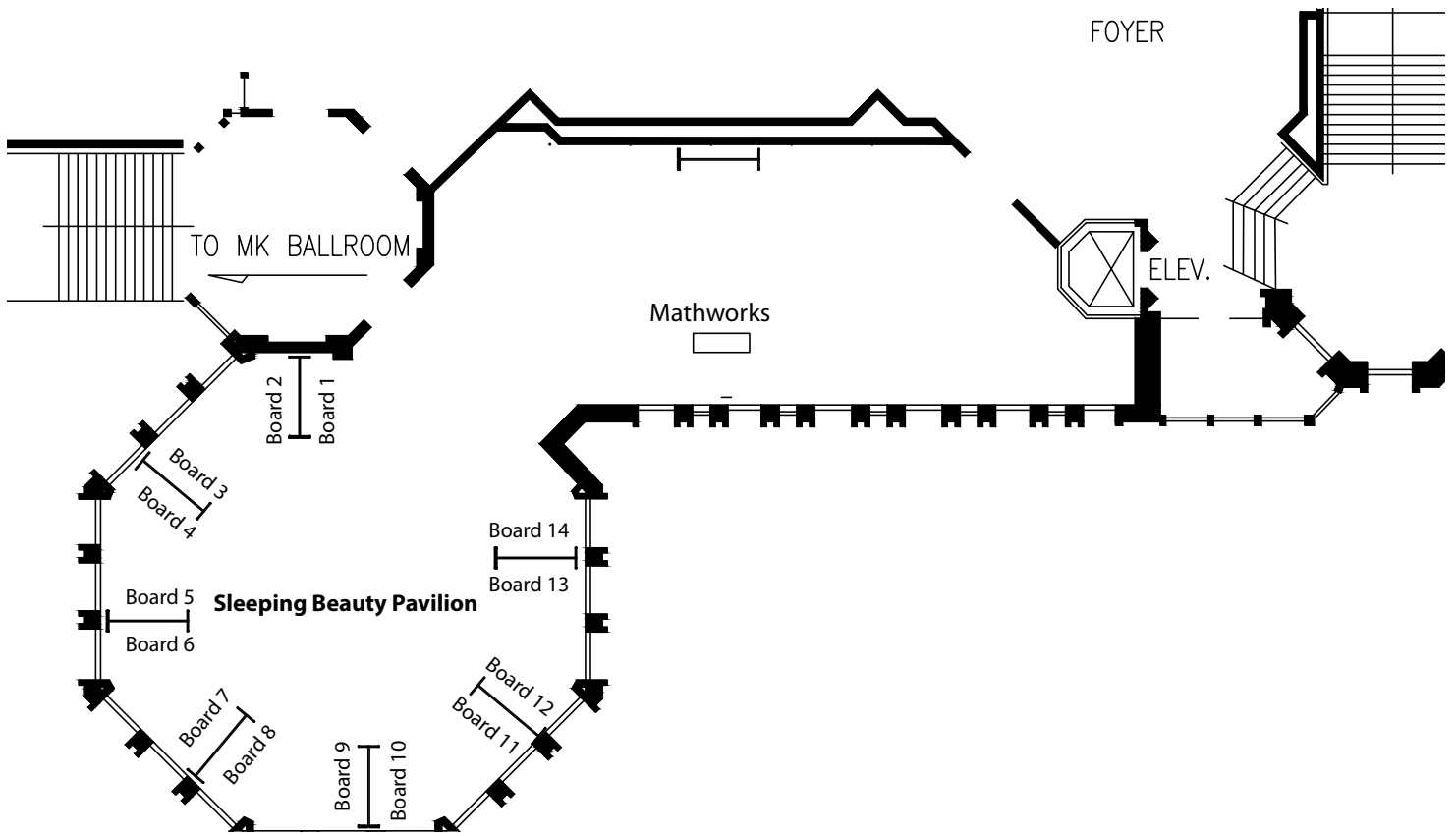
ADVENTURE TOWER



FRONTIER TOWER



POSTER DETAIL: SLEEPING BEAUTY PAVILION



SYMPOSIA GUIDE

GS	General Symposium
BIO	Advanced Bio-Signal Processing and Machine Learning for Medical Cyber-Physical Systems
DLW	Design, Implementation and Optimization of Deep Learning for Wireless Communications
DLN	Distributed Learning and Optimization over Networks
GSP	Graph Signal Processing
GCN	Green Communications and Networking
SMI	Information Processing, Learning and Optimization for Smart Energy Infrastructures
MHI	Multispectral and Hyperspectral Imaging and Analysis
5GS	5G Satellite Networks: Signal Processing Applications and Challenges
RA	Signal Detection for SETI and RFI Mitigation in Radio Astronomy
AML	Signal Processing for Adversarial Machine Learning
IVC	Signal Processing for Intelligent Vehicular Communications
MMW	Signal Processing for Millimeter-Wave Communications
WNS	Signal Processing for Wireless Network Security
TM	Tensor Methods for Signal Processing and Machine Learning