50th Annual
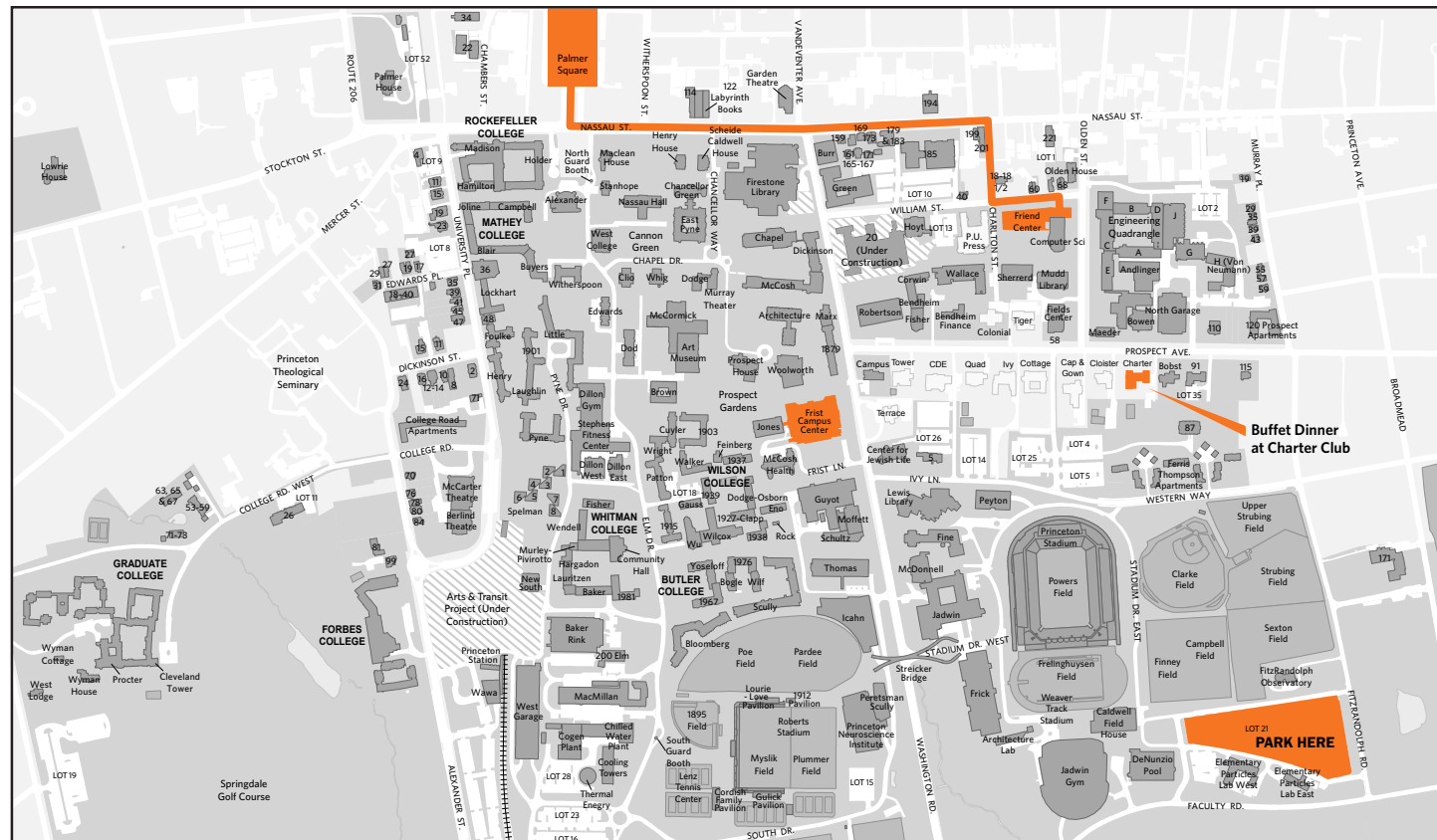# Conference on Information Sciences and Systems
2016

PRINCETON

50th
CiSS
PRINCETON UNIVERSITY

MARCH 16, 17, & 18 • 2016 • FRIEND CENTER • PRINCETON UNIVERSITY
Hosted by the Department of Electrical Engineering with technical co-sponsorship by IEEE

Restaurants

For dining options on campus including Frist Campus Center Food Court see link:
http://m.princeton.edu/dining/

Here is a listing of some restaurants within a short walk from Friend Center. (An asterisk* denotes those closest to Friend Center)

Alchemist & Barrister
28 Witherspoon Street
American: Bar

Agricola
11 Witherspoon Street
American

*Blue Point Grill
258 Nassau Street
Seafood, Dinner only

Café Vienna
200 Nassau Street
Sandwiches, coffee

D'Angelo Italian Market
35 Spring Street
Italian

*Despaña
235 Nassau Street
Spanish/Tapis

*EFES Mediterranean Grill
235B Nassau Street
Mediterranean

Halo Pub
9 Hulfish Street
Ice Cream & Coffee

*Hoagie Haven
242 Nassau Street
Deli: take out only

Princeton Pi
86 Nassau Street
Italian pizzeria

La Mezzaluna
25 Witherspoon Street
Italian

Massimo's
124 Nassau Street
Italian pizzeria

Mediterra
29 Hulfish Street
Mediterranean

*Mehek
164 Nassau Street
Indian

Nassau Street Seafood
256 N. Nassau Street
Seafood

Nassau Sushi
179 Nassau Street
Japanese and Korean

Olives
22 Witherspoon Street
Greek/Sandwiches

Panera Bread
136 Nassau Street
Sandwiches

Qdoba Mexican Grill
140 Nassau Street
Mexican

PJ's Pancake House
154 Nassau Street
Pancakes, Sandwiches

*Small World Coffee
254 Nassau Street
Coffeehouse

Starbucks
100 Nassau Street
Coffee

Taste of Mexico
180 Nassau Street
Mexican

Teresa's Caffé
23 Palmer Square
Italian

*Thai Village Place
235 Nassau St.
Thai

*Tiger Noodles
260 Nassau Street
Chinese

*Tomo Sushi
Nassau Street
Sushi

Triumph Brewery Company
138 Nassau Street
Local brewery: restaurant/bar

J.B. Winberie
1 Palmer Square
American

Witherspoon Grill
57 Witherspoon Street
Steakhouse

Yankee Doodle Tap Room
The Nassau Inn
10 Palmer Square
Contemporary American

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Plenary Speakers

Sergio Verdú, Princeton University   Wednesday, March 16, 11:45am

Claude Shannon

Commemorating Claude Shannon's centennial year, this biographical non-technical talk will give an account of the major milestones in the life of the father of the information age.

Sergio Verdú is the Eugene Higgins Professor of Electrical Engineering at Princeton University. A member of the Information Sciences and Systems group and the Program in Applied and Computational Mathematics, his research interests are in Information Theory, Data Compression and Transmission. Sergio Verdú is a member of the U. S. National Academy of Engineering and the U. S. National Academy of Sciences. He is the recipient of the Claude E. Shannon Award (the highest award in information theory), and the IEEE Richard W. Hamming Medal.

Steven H Low, California Institute of Technology   Thursday, March 17, 11:45am

Online Optimization of Power Networks

We are at the cusp of a historical transformation of our power systems into a more sustainable, dynamic, intelligent, and distributed form. There are hundreds of millions of distributed energy resources, such as solar panels, wind turbines, electric vehicles, smart buildings, smart appliances, storage devices, and power electronics, that may not only consume, but may also generate, sense, compute, communicate and actuate. We are interested in the optimization and control of a large network of these resources in a plug-and-play environment of the future. This requires solving power flow equations which is well-known to be hard. The grid, however, solves them in real-time exactly at scale, and we propose to exploit it explicitly to carry out part of our optimization algorithm. This approach not only improves scalability, but also naturally adapts to evolving network conditions. In this talk, we present two examples.

The first example presents an online algorithm to solve an optimal power flow problem at a slow timescale on a radial network where the controllable devices continuously interact with the network that implicitly computes a power flow solution given a control action. Collectively these devices and the network implement a gradient projection algorithm in real time. We prove that the proposed algorithm converges to a set of local optima and provide sufficient conditions under which it converges to a global optimum. We derive an upper bound on the suboptimality gap of any local optimum. This bound suggests that any local optimum is almost as good as any strictly feasible point.

In the second example, the online algorithm integrates primary frequency regulation, secondary frequency regulation, and congestion management at a fast timescale. The algorithm is distributed in that it requires communication only between neighboring buses. Collectively, the controllable devices and the swing dynamics of the network implement a primal-dual algorithm to rebalance power, restore nominal frequency and inter-area flows, and enforce line limits at a minimum control cost. We prove sufficient conditions under which the algorithm converges to a global optimum.
(Joint work with Changhong Zhao, Enrique Mallada, Lingwen Gan)

Steven H. Low is a Professor of the Department of Electrical Engineering and the Department of Computing & Mathematical Sciences at Caltech. Before that, he was with AT&T Bell Laboratories, Murray Hill, NJ, and the University of Melbourne, Australia. His interests are in communication networks and power networks. Research from his group is accelerating more than 1TB of Internet traffic every second. He is a Senior Editor of the IEEE Transactions on Control of Network Systems and the IEEE Transactions on Network Science & Engineering, is on the editorial boards of NOW Foundations and Trends in Networking, and in Electric Energy Systems, as well as Journal on Sustainable Energy, Grids and Networks. He received his B.S. from Cornell and PhD from Berkeley, both in EE, and is an IEEE Fellow.

Plenary Panel   Friday, March 18, 11:45am

ISS the Next 50 Years

As CISS celebrates its first 50 years, this Plenary Panel will discuss the opportunities and challenges of research in information science and systems in the next five decades.

Panelists: **Emmanuel Abbe**
            Paul Cuff
            Prateek Mittal

Moderator: **Peter Ramadge**

Wednesday, March 16

INVITED SESSION

WA-01
Optimization of Social and Energy Networks
Room F006

Organizer: Mung Chiang

9:00 – 9:20am
Store or Sell? A Threshold Price Policy for Revenue Maximization in Windfarms with On-site Storage
  Zamiyad Dar, Rensselaer Polytechnic Institute
  Koushik Kar, Rensselaer Polytechnic Institute
  Joe H. Chow, Rensselaer Polytechnic Institute

9:20 – 9:40am
Optimal Detection of Influential Spreaders in Online Social Networks
  Chee Wei Tan, City University of Hong Kong, Hong Kong

9:40 – 10:00am
Optimal Operation of Battery Energy Storage Systems for Primary Frequency Control
  Ying Jun (Angela) Zhang, The Chinese University of Hong Kong, Hong Kong
  Changhong Zhao, California Institute of Technology
  Wanrong Tang, The Chinese University of Hong Kong, Hong Kong
  Steven Low, California Institute of Technology

10:00 – 10:30am
BREAK

10:30 – 10:50am
Second Chance Works Out Better: Saving More for Data Center Operator in Open Energy Market
  Peijian Wang, The Chinese University of Hong Kong, Hong Kong
  Ying Zhang, The Chinese University of Hong Kong, Hong Kong
  Lei Deng, The Chinese University of Hong Kong, Hong Kong
  Minghua Chen, The Chinese University of Hong Kong, Hong Kong
  Xue Liu, McGill University, Canada

INVITED SESSION

WA-02
Cybersecurity and Privacy in Distributed and Cyber-physical Systems
Room F004

Organizer: Lalitha Sankar

9:00 – 9:20am
A Little Shared Secrecy and Feedback Go a Long Way in Network Error Correction
  Oliver Kosut, Arizona State University
  Peida Tian, Chinese University of Hong Kong, Hong Kong
  Mayank Bakshi, Chinese University of Hong Kong, Hong Kong
  Sidharth Jaggi, Chinese University of Hong Kong, Hong Kong

9:20 – 9:40am
Privacy with Estimation Constraints
  Flavio du Pin Calmon, IBM

9:40 – 10:00am
Differential Privacy in Networked Data Collection
  Omid Javidbakht, Lehigh University
  Parv Venkitasubramaniam, Lehigh University

10:00 – 10:30am
BREAK

10:30-10:50am
Privacy-preserving Source Separation for Distributed Data using Independent Component Analysis
  Hafiz Imtiaz, Rutgers University
  Rogers F Silva, The University of New Mexico (UNM) & The Mind Research Network (MRN)
  Bradley Baker, New College of Florida
  Sergey Plis, The Mind Research Network (MRN)
  Anand D. Sarwate, Rutgers University
  Vince Calhoun, University of New Mexico

10:50 – 11:10am
Differentially Private Multi-party Computation
  Peter Kairouz, University of Illinois at Urbana-Champaign
  Sewoong Oh, University of Illinois at Urbana-Champaign
  Pramod Viswanath, University of Illinois at Urbana-Champaign

11:10 – 11:30am
Algorithmic Advances in Anonymous Communication over Networks
  Giulia Fanti, University of California, Berkeley
  Pramod Viswanath, University of Illinois at Urbana-Champaign

WA-3
Wireless Communications 1
Room F008

9:00 – 9:20am
Performance of Pattern Diversity in Reconfigurable Antenna Arrays
  George Sworo, Drexel University
  Kapil Dandekar, Drexel University
  Moshe Kam, New Jersey Institute of Technology

9:20 – 9:40am
Statistical Analysis of Measured Ground Penetrating Radar
  DataAnirudh Rangaswamy, Centerville High School
  Lorenzo Lo Monte, University of Dayton & Air Force Research Lab
  Michael Wicks, University of Dayton

9:40 – 10:00am
Doubly Opportunistic Beamforming for Downlink Multiuser, MIMO
  Junyoung Nam, Electronics and Telecommunications Research Institute (ETRI), Korea
  Young-Jo Ko, Electronics and Telecommunications Research Institute, Korea

10:00 – 10:30am
BREAK

10:30 – 10:50am
Energy-Efficient Power Control with Finite Discrete Inputs under Quality of Service Constraints
Gozde Ozcan, Syracuse University
M. Cenk Gursoy, Syracuse University

10:50 – 11:10am
Investigation of RLS Beamforming Algorithm In-terms of Energy Efficiency
Hailu Belay Kassa, AAU, Ethiopia
Tezera Chernet, Hawassa University, Ethiopia
Estifanos Yohannes Menta, Hawassa Institute of Technology (HIoT) Hawassa University, Ethiopia
Dereje H. Woldegebreal, Addis Ababa University, Addis Ababa Institute of Technology, Ethiopia
Yacob Astatke, Morgan State University
Farzad Moazzami, Morgan State University
Wondimu Zegeye, Morgan State University

■ **WA-04**
Networks 1
Room F108

9:00 – 9:20am
Battle of Opinions over Evolving Social Networks
Irem Koprulu, The Ohio State University
Yoora Kim, University of Ulsan, Korea
Ness B. Shroff, The Ohio State University

9:20 – 9:40am
Evolutionary Game Theoretic Analysis of Distributed Denial of Service Attacks in a Wireless Network
Ahmed Alabdel Abass, Rutgers University
Mohammad Hajimirsadeghi, WINLAB, Rutgers University
Narayan Mandayam, WINLAB, Rutgers University
Zoran Gajic, Rutgers University

9:40 – 10:00am
Optimal Energy Allocation and Storage Control for Distributed Estimation with Sensor Collaboration
Sijia Liu, Syracuse University
Yanzhi Wang, Syracuse University
Makan Fardad, Syracuse University
Pramod Varshney, Syracuse University

10:00 – 10:30am
BREAK

10:30 – 10:50am
Design and Performance Evaluation of an Energy Efficient Routing Protocol for Wireless Sensor Networks
Seifemichael Amsalu, North Carolina A&T State University
Wondimu Zegeye, Morgan State University
Dereje H. Woldegebreal, Addis Ababa University, Addis Ababa Institute of Technology, Ethiopia
Yacob Astatke, Morgan State University

10:50 – 11:10am
Towards Optimal PMU Placement against Data Integrity Attacks in Smart Grid
Qingyu Yang, Xi'an Jiaotong University, P.R. China
Rui Min, Xi'an Jiaotong University, P.R. China
Dou An, Xi'an Jiaotong University, P.R. China
Wei Yu, Towson University
Xinyu Yang, Xi'an Jiaotong University, P.R. China

■ **WA-05**
Signal Processing 1
Room F109

9:00 – 9:20am
Fidelity Loss in Distribution-Preserving Anonymization and Histogram Equalization
Lav R. Varshney, University of Illinois at Urbana-Champaign
Kush Varshney, IBM Thomas J. Watson Research Center

9:20 – 9:40am
One Sample Per Person Facial Recognition With Local Binary Patterns and Image Sub-Grids
Gordon Stein, Lawrence Technological University
Yuan Li, Lawrence Technological University
Yin Wang, Lawrence Technological University

10:00 – 10:30am
BREAK

10:30 – 10:50am
Signal Processing of Time Domain Load Signals of CNC Lathe Based on Improved Neighbor Block
Zhen Li, JiLin University, P.R. China
Fei Chen, JiLin University, P.R. China
Jialong He, JiLin University, P.R. China
Mingmin Zhu, JiLin University, P.R. China
Binbin Xu, JiLin University, P.R. China

10:50 – 11:10am
A Dynamic Time Warping Algorithm for Industrial Robot Motion Analysis
Benjamin Johnen, Ruhr-Universität Bochum, Germany
Bernd Kuhlenkötter, TU Dortmund University, Institute of Production Systems, Germany

■ **WA-06**
Information Theory & Communications 1
Room F009

9:00 – 9:20am
On the LLR criterion based Shortening Design for LDPC Code
Hui Wang, Southwest Jiaotong University, P.R. China
Qingchun Chen, Southwest Jiaotong University, P.R. China
Yong Zhang, Southwest Jiaotong University, P.R. China

9:20 – 9:40am
Triggering Wave-Like Convergence of Tail-biting Spatially Coupled LDPC Codes
Sebastian Cammerer, University of Stuttgart, Germany
Vahid Aref, Bell Laboratories, Nokia, Germany
Laurent Schmalen, Alcatel-Lucent, Bell Laboratories, Germany
Stephan ten Brink, University of Stuttgart, Germany

9:40 – 10:00am
Non-linear Satellite Channel Equalization Based on a Low Complexity Echo State Network
Marc Bauduin, Université Libre de Bruxelles, Belgium
Serge Massar, Université Libre de Bruxelles, Belgium
François Horlin, Université Libre de Bruxelles, Belgium

10:00 – 10:30am
BREAK

10:30 – 10:50am
Vector Gaussian Multi-Decoder Rate-Distortion: Trace Constraints
 Sinem Unal, Cornell University
 Aaron Wagner, Cornell University

10:50 – 11:10am
Channel Equalization Techniques for Non-volatile Memristor Memories
 Rawan Naous, KAUST, Saudi Arabia
 Mohammed Affan Zidan, KAUST, Saudi Arabia
 Ahmed Sultan, KAUST, Saudi Arabia
 Khaled N Salama, KAUST, Saudi Arabia

WP-01
Optimization of Wireless Networks
Room F006

Organizer: Mung Chiang

2:30 – 2:50pm
Inter-Network Dynamic Spectrum Allocation Via a Colonel Blotto Game
 Mohammad Hajimirsadeghi, WINLAB, Rutgers University
 Gokul Sridharan, WINLAB, Rutgers University
 Walid Saad, Virginia Tech
 Narayan Mandayam, WINLAB, Rutgers University

2:50 – 3:10pm
Tracking Mobile Users via Standard Routing Engines
 Matthew Andrews, Nokia Bell Labs
 Lisa Zhang, Nokia Bell Labs

3:10 – 3:30pm
Spatial-Temporal Routing for Supporting End-to-End Hard Deadlines in Multi-hop Networks
 Xin Liu, Arizona State University
 Lei Ying, Arizona State University

3:30 – 4:00pm
BREAK

4:00 – 4:20pm
Comparative Analysis of Initial Access Techniques in 5G mmWave Cellular Networks
 Marco Giordani, Universita' degli Studi di Padova, Italy
 Marco Mezzavilla, NYU Poly
 C. Nicolas Barati Nt., NYU Poly
 Sundeep Rangan, NYU Poly
 Michele Zorzi, Università degli Studi di Padova, Italy

4:20 – 4:40pm
Adaptive Scheduling with Reconfiguration Delay
 Tara Javidi, UC San Diego

4:40 – 5:00pm
Scheduling for Fresh Information in Wireless Networks
 Changee Joo, UNIST
 Atilla Eryilmaz, Ohio State University

WP-02
Optimization in the Information Sciences
Room F004

Organizer: Venkat Chandrasekaran

2:30 – 2:50pm
Optimization for Sequential Change-point Detection
 Yao Xie, Georgia Institute of Technology

2:50 – 3:10pm
Higher Order Analysis of Sparse Recovery Algorithms: Resolving the Limitations of Phase Transition
 Arian Maleki, Columbia University

3:10 – 3:30pm
From Seismography to Compressed Sensing and Back: A Brief History of Optimization-based Signal Processing
 Carlos Fernandez-Granda, New York University

3:30 – 4:00pm
BREAK

4:00 – 4:20pm
Localization from Paired Comparisons
 Mark Davenport, Georgia Institute of Technology

4:20 – 4:40pm
Low-rank Matrix Completion under Monotonic Transformation
 Laura Balzano, University of Michigan

4:40 – 5:00pm
The Computational Power of Relative Entropy
 Venkat Chandrasekaran, California Institute of Technology

■ **WP-03**
Wireless Communications 2
Room 008

2:30 – 2:50pm
Packet Success Probability Derivation in a Vehicular Ad Hoc Network for a Highway Scenario
 Ali Rakhshan, University of Massachusetts, Amherst
 Hossein Pishro-Nik, University of Massachusetts, Amherst

2:50 – 3:10pm
A New PTS Method for OFDM Signals Without Side Information Based on Constellation Reshaping
 Hongxiang Chu, Saitama University, Japan
 Tetsuya Shimamura, Saitama University, Japan

3:30 – 4:00pm
BREAK

4:00 – 4:20pm
User Association with Lighting Constraints in Visible Light Communication Systems
    Cong Shen, University of Science and Technology of China, P.R. China
    Shun Lou, University of Science and Technology of China, P.R. China
    Chen Gong, University of Science and Technology of China, P.R. China
    Zhengyuan Xu, University of Science and Technology of China, P.R. China

4:20 – 4:40pm
Design and Implementation of an Underlay Control Channel for NC-OFDM-Based Networks
    Ratnesh Kumbhkar, WINLAB, Rutgers University
    Gokul Sridharan, WINLAB, Rutgers University
    Narayan Mandayam, WINLAB, Rutgers University
    Ivan Seskar, WINLAB, Rutgers University
    Sastry Kompella, Naval Research Laboratory

■ WP-04
Networks 2
Room F108

2:30 – 2:50pm
Interdependency Analysis of Communications and Control in Networked Cyber Physical Systems: An Entropy Framework
    Husheng Li, University of Tennessee

2:50 – 3:10pm
Wi-Fi-LAA Coexistence: Design and Evaluation of Listen Before Talk for LAA
    Ananth Kini, InterDigital Communications
    Loïc Canonne-Velasquez, InterDigital Communications
    Mohsen Hosseinian, InterDigital Communications
    Marian Rudolf, InterDigital Communications
    Janet Stern-Berkowitz, InterDigital Communications

3:10 – 3:30pm
Nonlinear Structural Equation Models for Network Topology Inference
    Yanning Shen, University of Minnesota
    Brian Baingana, University of Minnesota
    Georgios B. Giannakis, University of Minnesota

3:30 – 4:00pm
BREAK

4:00 – 4:20pm
Decay of Correlation in Network Flow Problems
    Patrick Rebeschini, Yale University
    Sekhar Tatikonda, Yale University

4:20 – 4:40pm
Incentive Mechanisms for Privacy-Sensitive Electricity Consumers with Alternative Energy Sources
    Chong Huang, Arizona State University
    Lalitha Sankar, Arizona State University

■ WP-05
Security and Privacy
Room F109

2:30 – 2:50pm
Advanced Persistent Threats: Behind the Scenes
    Martin Ussath, Hasso Plattner Institute, University of Potsdam, Germany
    David Jaeger, Hasso Plattner Institute, University of Potsdam, Germany

    Feng Cheng, Hasso Plattner Institute, University of Potsdam, Germany
    Christoph Meinel, Hasso Plattner Institute, University of Potsdam, Germany

2:50 – 3:10pm
Privacy-Aware Stochastic Control with a "Snoopy" Adversary: A Game-Theoretic Approach
    Abhishek Gupta, Ohio State University

3:10 – 3:30pm
Sequential Aggregate Authentication Codes with Information Theoretic Security
    Shinichiro Tomita, Yokohama National University, Japan
    Yohei Watanabe, Yokohama National University, Japan
    Junji Shikata, Yokohama National University, Japan

3:30 – 4:00pm
BREAK

4:00 – 4:20pm
Cyber Fighter Associate: A Decision Support System for Cyber Agility
    Charles Huber, Pennsylvania State University
    Scott Brown, Army Research Lab
    Lisa Marvel, Army Research Laboratory
    Patrick McDaniel, Pennsylvania State University

4:20 – 4:40pm
Defining Perfect Location Privacy Using Anonymization
    Zarrin Montazeri, University of Massachusetts, Amherst
    Amir Houmansadr, University of Massachusetts Amherst
    Hossein Pishro-Nik, University of Massachusetts, Amherst

■ WP-06
Information Theory & Communications 2
Room F009

2:30 – 2:50pm
An Operational Measure of Information Leakage
    Ibrahim Issa, Cornell University
    Sudeep Kamath, Princeton University
    Aaron Wagner, Cornell University

3:10 – 3:30pm
Decentralized Simultaneous Energy and Information Transmission in Multiple Access Channels
    Selma Belhadj Amor, INRIA, France
    Samir M. Perlaza, INRIA, France

3:30 – 4:00pm
BREAK

4:00 – 4:20pm
Energy-Efficient Resource Allocation for SWIPT in Multiple Access Channels
    Tewodros Zewde, Syracuse University
    M. Cenk Gursoy, Syracuse University

Thursday, March 17

INVITED SESSION

TA-01
Optimization of Cloud and Fog Networks
Room F006

Organizer: Mung Chiang

9:00 – 9:20am
Performance Bound Analysis for Crowdsourced Mobile Video Streaming
Lin Gao, The Chinese University of Hong Kong, Hong Kong
Ming Tang, The Chinese University of Hong Kong, Hong Kong
Haitian Pang, Tsinghua University, P.R. China
Jianwei Huang, The Chinese University of Hong Kong, Hong Kong
Lifeng Sun, Tsinghua University, P.R. China

9:20 – 9:40am
Background Traffic Optimization for Meeting Deadlines in Data Center Storage
Tian Lan, George Washington University

9:40 – 10:00am
Efficient Load Balancing in Large-Scale Systems
Sem Borst, Eindhoven University of Technology, The Netherlands
Debankur Mukherjee, Eindhoven University of Technology, The Netherlands
Johan van Leeuwaarden, Eindhoven University of Technology, The Netherlands
Philip Whiting, Macquarie University, Australia

10:00 – 10:30am
BREAK

10:30 – 10:50am
Max-Min Fair Scheduling of Variable-Length Packet-Flows to Multiple Servers by Deficit Round-Robin
George Kesidis, Pennsylvania State University
Ioannis Lambadaris, Carleton University, Canada
Bhuvan Urgaonkar, Pennsylvania State University
Yiqiang Q. Zhao, Carleton University, Canada
Jalal Khamse-Ashari, Carleton University, Canada

TA-02
Machine Learning 1
Room F004

9:00 – 9:20am
Quality of Service Timeseries Forecasting for Web Services: A Machine Learning, Genetic Programming-Based Approach
Yang Syu, National Taipei University of Technology, Taiwan
Yong-Yi FanJiang, Fu Jen Catholic University, Taiwan
Jong Yih Kuo, National Taipei University of Technology, Taiwan
Ruei-Long Su, China University of Technology, Taiwan

9:20 – 9:40am
Cyclic Stochastic Optimization via Arbitrary Selection Procedures for Updating Parameters
Karla Hernandez, Johns Hopkins University

9:40 – 10:00am
Integration of Multiple Adaptive Algorithms for Parallel Decision Fusion
Weiqiang Dong, New Jersey Institute of Technology
Moshe Kam , New Jersey Institute of Technology

10:00 – 10:30am
BREAK

10:30 – 10:50am
State Estimation for Flag Hidden Markov Models with Imperfect Sensors
Kyle Doty, Washington State University
Sandip Roy, Washington State University
Thomas Fischer, Washington State University

10:50 – 11:10am
I/O HSMM: Learning Behavioral Dynamics of a Cognitive Wireless Network Node From Spectrum Sensing
Silvija Kokalj-Filipović, Naval Research Laboratory
Joel Goodman, Naval Research Laboratory
Crystal Bertoncini Acosta, Naval Research Laboratory
George Stantchev, Naval Research Laboratory

TA-03
Wireless Communications 3
Room F008

9:00 – 9:20am
Multiperiod Subscription Pricing for Cellular Wireless Entrants
George Kesidis, Pennsylvania State University
Saswati Sarkar, University of Pennsylvania
Serge Fdida, UPMC Sorbonne Universités, France
Ravi Dhar, Yale University
Xinyi Hu, Pennsylvania State University
Yuquan Shan, Pennsylvania State University

9:40 – 10:00am
Symbol Alphabet Modifier for PAPR Reduction in OFDM Communications
Yuewen Wang, New Jersey Institute of Technology
Ali Akansu, New Jersey Institute of Technology

10:00 – 10:30am
BREAK

10:30 – 10:50am
Beam Selection for Performance-Complexity Optimization in High-Dimensional MIMO Systems
John Hogan, University of Wisconsin-Madison
Akbar Sayeed, University of Wisconsin-Madison

■ TA-04
Networks 3
Room F108

9:00 – 9:20am
Measurement and Modelling of TCP Downstream Throughput Dependence on SNR in an IEEE802.11b WLAN System
Ikponmwosa Oghogho, Landmark University OmuAran & University of Benin, Nigeria
Frederick Edeko, University Of Benin, Nigeria
Joy Emagbetere, University of Benin, Nigeria

9:20 – 9:40am
Energy-Aware Optimization and Mechanism Design for Cellular Device-to-Device Local Area Networks
Mehdi Naderi Soorki, Isfahan University of Technology, Iran
Mohammad Yaghini, Isfahan University of Technology, Iran
Mohammad Hossein Manshaei, Isfahan University of Technology, Iran
Walid Saad, Virginia Tech
Hossein Saidi, Isfahan University of Technology, Iran

9:40 – 10:00am
Load Statistics and Required Spectrum in Multi-tier Heterogeneous Networks
Sanam Sadr, University of Toronto, Canada
Raviraj Adve, University of Toronto, Canada

10:00 – 10:30am
BREAK

10:50 – 11:10am
Cache Aided Wireless Networks: Tradeoffs between Storage and Latency
Avik Sengupta, Virginia Tech
Ravi Tandon, University of Arizona
Osvaldo Simeone, New Jersey Institute of Technology

■ TA-05
Signal Processing 2
Room F109

9:00 – 9:20am
Estimation Information Bounds Using the I-MMSE Formula and Gaussian Mixture Models
Bryan Paul, Arizona State University & General Dynamics Mission Systems
Daniel W. Bliss, Arizona State University

9:20 – 9:40am
Hard Decision Based Distributed Detection in Multi-Sensor System over Noise Correlated Sensing Channels
Hadi Kasasbeh, University of Mississippi
Lei Cao, University of Mississippi
Ramanarayanan Viswanathan, University of Mississippi

9:40 – 10:00am
A Probability Neural Network-Jensen-Shannon Divergence for a Fingerprint Based Localization
Osamah Abdullah, Western Michigan University

10:00 – 10:30am
BREAK

10:30 – 10:50am
Using Approximate Entropy as a Speech Quality Measure for a Speaker Recognition System
Richard Metzger, II, Pennsylvania State University
John F. Doherty, Pennsylvania State University
David Jenkins, Applied Research Laboratory

10:50 – 11:10am
Efficient Implementation of Enhanced Adaptive Simultaneous Perturbation Algorithms
Pushpendre Rastogi, Johns Hopkins University
Jingyi Zhu, Johns Hopkins University
James Spall, Applied Physics Laboratory

11:10 – 11:30am
An Adaptive Bacterial Foraging Algorithm For Color Image Enhancement
Om Verma, Delhi Technological University, India
Rishi Chopra, Delhi Technological University, India
Abhinav Gupta, Delhi Technological University, India

INVITED SESSION
TP-01
Optimization of Network Pricing
Room F006

Organizer: Mung Chiang

2:30 – 2:50pm
Migration to a Non-Neutral Internet: Economics Modeling and Analysis of Impact
Mohammad Hassan Lotfi, University of Pennsylvania
Saswati Sarkar, University of Pennsylvania
George Kesidis, Pennsylvania State University

2:50 – 3:10pm
Multi-Operator Service Optimization for Fixed Access Network Sharing (FANS)
Kenneth Kerpez, ASSIA, Inc.
Haleema Mehmood, Stanford University

3:10 – 3:30pm

Impact of Network Effect and Congestion Effect on Price Competition among Wireless Service Providers

    Junshan Zhang, Arizona State University
    Lei Yang, University of Nevada, Reno
    Mengyuan Zhang, Arizona State University
    Xiaowen Gong, Ohio State University

3:30 – 4:00pm

BREAK

4:00 – 4:20pm

The Impact of Investment on Small-Cell Resource Allocation

    Cheng Chen, Northwestern University
    Randall A Berry, Northwestern University
    Michael Honig, Northwestern University
    Vijay Subramanian, University of Michigan

INVITED SESSION

TP-02
Computational Neuroscience
Room F004

Organizer: Siamak Sorooshyari

2:30 – 2:50pm

Neuronal Encoding Models of Complex Receptive Fields: A Comparison of Nonparametric and Parametric Approaches

    Sridevi Sarma, Johns Hopkins University
    Rahul Agarwal, Johns Hopkins University
    Zhe Chen, New York University School of Medicine

2:50 – 3:10pm

A Machine Learning Approach to Predict Episodic Memory Formation

    Gabriel Kreiman, Harvard Medical School
    Gnel Pivazyan, Harvard Medical School
    Jedediah Singer, Harvard Medical School
    Matias Ison, Harvard Medical School
    Hanlin Tang, Harvard Medical School
    Melissa Romaine, Harvard Medical School
    Rosa Frias, Harvard Medical School
    Adrianna Boulin, Harvard Medical School
    James Carroll, Harvard Medical School
    Sarah Dowcett, Harvard Medical School
    Marlise Arlellano, Harvard Medical School
    Elizabeth Meller, Harvard Medical School
    Victoria Perron, Harvard Medical School

3:10 – 3:30pm

Non-parametric Change Point Detection for Spike Trains

    Thiago Mosqueiro, University of California San Diego
    Martin Strube-Bloss, University of Wuerzburg, Germany
    Rafael Tuma, University of São Paulo, Brazil
    Reynaldo Pinto, University of São Paulo, Brazil
    Brian H. Smith, Arizona State University
    Ramon Huerta, University of California San Diego

3:30 – 4:00pm

BREAK

4:00 – 4:20pm

Dynamic Estimation of Causal Influences in Sparsely-Interacting Neuronal Ensembles

    Alireza Sheikhattar, University of Maryland, College Park
    Behtash Babadi, University of Maryland, College Park

4:20 – 4:40pm

Computational Mapping of Brain Networks

    Alayar Kangarlu, Columbia University & New York State Psychiatric Institute

4:40 – 5:00pm

Winning Versus Losing During Gambling and Its Neural Correlates

    Pierre Sacré, Johns Hopkins University
    Matthew Kerr, Johns Hopkins University
    Sandya Subramanian, University of Cambridge, United Kingdom
    Kevin Kahn, Insight Data Science
    J. Gonzalez-Martinez, Cleveland Clinic
    J.T. Gale, Cleveland Clinic
    Sridevi Sarma, Johns Hopkins University

5:00 – 5:20pm

Controlling Information Flow and Energy Use Via Adaptive Synaptogenesis

    William Levy, University of Virginia
    Robert Baxter, Baxter Research
    Harang Ju, University of Virginia
    Costa Colbert, Informed Simplifications LLC

TP-03
Wireless Communications 4
Room F008

2:30 – 2:50pm

Portfolio Theory based Sensor Selection in Wireless Sensor Networks with Unreliable Observations

    Nianxia Cao, Syracuse University
    Swastik Brahma, Syracuse University
    Pramod Varshney, Syracuse University

2:50 – 3:10pm

Experimental Demonstration of a Distributed Antenna Array Pre-Synchronized for Retrodirective Transmission

    Benjamin Peiffer, University of Iowa
    Raghuraman Mudumbai, University of Iowa
    Anton Kruger, University of Iowa
    Amy Kumar, University of Iowa
    Soura Dasgupta, The University of Iowa

3:10 – 3:30pm

Matching Theory for Cognitive Spectrum Allocation in Wireless Networks

    Raghed El-Bardan, Syracuse University
    Walid Saad, Virginia Tech
    Swastik Brahma, Syracuse University
    Pramod Varshney, Syracuse University

3:30 – 4:00pm

BREAK

TP-04
Networks 4
Room F108

2:30 – 2:50pm
Joint Uplink/Downlink and Offloading Optimization for Mobile Cloud Computing with Limited Backhaul
    Ali N. Al-Shuwaili, New Jersey Institute of Technology
    Alireza Bagheri, New Jersey Institute of Technology
    Osvaldo Simeone, New Jersey Institute of Technology

2:50 – 3:10pm
Dynamic Node-disjoint Multipath Routing for Millimeter Wave Networks Using Directional Antennas
    Zhuo Chen, InterDigital Communications & WINLAB, Rutgers University
    Roy Yates, Rutgers University
    Dipankar Raychaudhuri, Rutgers University

3:10 – 3:30pm
Effect of Fading on Maximum Sum Rate of Aloha
    Yitong Li, City University of Hong Kong, Hong Kong
    Lin Dai, City University of Hong Kong, Hong Kong

3:30 – 4:00pm
BREAK

4:00 – 4:20pm
Ultra-Reliable Cloud Mobile Computing with Service Composition and Superposition Coding
    Seyyed Mohammadreza Azimi, New Jersey Institute of Technology
    Osvaldo Simeone, New Jersey Institute of Technology
    Onur Sahin, InterDigital, United Kingdom
    Petar Popovski, Aalborg University, Denmark

4:20 – 4:40pm
A Markov Chain Model for the Search Time for Max Degree Nodes in a Graph Using a Biased Random Walk
    Jonathan Stokes, Drexel University
    Steven Weber, Drexel University

TP-05
Signal Processing 3
Room F109

2:30 – 2:50pm
Caching Gaussians: Minimizing Total Correlation on the Gray-Wyner Network
    Giel Op 't Veld, École Polytechnique Fédérale de Lausanne, Switzerland
    Michael Gastpar, EPFL Switzerland & University of California, Berkeley

2:50 – 3:10pm
Computationally Efficient Toeplitz-Constrained Blind Equalization Based on Independence
    Zhengwei Wu, University of Pennsylvania
    Saleem A Kassam, University of Pennsylvania

3:10 – 3:30pm
Divergence and Bayes Error Based Soft Decision for Decentralized Signal Detection of Correlated Sensor Data
    Roopashree Rajanna, University of Mississippi
    Lei Cao, University of Mississippi
    Ramanarayanan Viswanathan, University of Mississippi

3:30 – 4:00pm
BREAK

4:00 – 4:20pm
Performance Analysis of Eigenportfolios for AR(1) Process
    Onur Yilmaz, New Jersey Institute of Technology
    Ali Akansu, New Jersey Institute of Technology

4:20 – 4:40pm
Kalman Filtering Based on Maximum Correntropy Criterion in Presence of Non-Gaussian Noise
    Reza Izanloo, Ferdowsi University of Mashhad, Iran
    Seyed Fakoorian, Cleveland State University
    Hadi Sadoghi Yazdi, Ferdowsi University of Mashhad, Iran
    D. Simon, Cleveland State University

4:40 – 5:00pm
Cramer-Rao Bound and Approximate Maximum Likelihood Estimation for Non-Coherent Direction of Arrival Problem
    Wei Jiang, New Jersey Institute of Technology
    Alexander M. Haimovich, New Jersey Institute of Technology

TP-06
Machine Learning 2
Room F009

2:30 – 2:50pm
Sufficient Conditions for Stable Recovery of Sparse Autoregressive Models
    Abbas Kazemipour, University of Maryland, College Park
    Behtash Babadi, University of Maryland, College Park
    Min Wu, University of Maryland, College Park

2:50 – 3:10pm
Adaptive Decision Fusion using Genetic Algorithm
    Ji Wang, Drexel University
    Moshe Kam, New Jersey Institute of Technology
    Sayandeep Acharya, Drexel University

3:10 – 3:30pm
Joint Machine Learning and Human Learning Design with Sequential Active Learning and Outlier Detection for Linear Regression Problems
    Xiaohua (Edward) Li, State University of New York at Binghamton
    Jian Zheng, State University of New York at Binghamton

3:30 – 4:00pm
BREAK

4:00 – 4:20pm
Two-Sided Change Detection under Unknown Initial State
    James Falt, Queen's University, Canada
    Steven D Blostein, Queen's University, Canada

Friday, March 18

INVITED SESSION
FA-01 Invited
Statistical Machine Learning and Optimization
Room F006

Organizer: Aurelie Lozano

9:00 – 9:20am
PDW Methods for Support Recovery in Nonconvex High-dimensional Problems
   Poh-Ling Loh, University of Pennsylvania

9:20 – 9:40am
Contextual MDPs: A New Model and Analysis for Reinforcement Learning with Rich Observations
   Akshay Krishnamurthy, Microsoft Research

9:40 – 10:00am
Confidence Intervals for the Mixing Time of a Reversible Markov Chain from a Single Sample Path
   Daniel Hsu, Columbia University

10:00 – 10:30am
BREAK

10:30 – 10:50am
Robust Trimmed Estimation: Statistical Analysis and Efficient Optimization
   Eunho Yang, IBM Research

10:50 – 11:10am
Real-time On-device Learning and Inference with Structured Transforms
   Vikas Sindhwani, Google Research

11:10 – 11:30am
Semiparametric Exponential Family Graphical Model
   Han Liu, Princeton University

INVITED SESSION
FA-02 Invited
Learning Theory and Information Theory
Room F004

Organizers: Sebastien Bubeck and Emmanuel Abbe

9:00 – 9:20am
Communication Lower Bounds for Statistical Estimation Problems via a Distributed Data Processing Inequality
   Tengyu Ma, Princeton University

9:20 – 9:40am
How to Classify from Sparse Data
   Elad Hazan, Princeton University

9:40 – 10:00am
A Reverse Entropy Power Inequality
   Tomasz Tkocz, Princeton University

10:00 – 10:30am
BREAK

10:30 – 10:50am
Optimal Species Extrapolation with Random Cutoff
   Yihong Wu, University of Illinois, Urbana-Champaign

10:50 – 11:10am
Spectral Bounds for Independent Cascade Model with Sensitive Edges
   Eun Jee Lee, Princeton University

11:10 – 11:30am
Persistence of Centrality in Random Growing Trees
   Varun Jog, University of Pennysylvania

INVITED SESSION
FA-03
Social Network Security
Room F008

Organizer: Prateek Mittal

9:00 – 9:20am
Securing the Perimeter at LinkedIn: Approaches to Registration and Login Defense
   David Freeman, LinkedIn

9:20 – 9:40am
Blackmarket-driven Interventions: Fighting Account Abuse at Google
   Kurt Thomas, Google

9:40 – 10:00am
SybilFuse: Combining Local Attributes with Global Structure to Perform Robust Sybil Detection
   Peng Gao, Princeton University

10:00 – 10:30am
BREAK

10:30 – 10:50am
Fighting Malware on Facebook
   Neha Chachra, Facebook

10:50 – 11:10am
Beyond Detecting Bots in Social Networks: A Path to Next-Generation Social Media Analytics
   Yalin Sagduyu, Intelligent Automation, Inc

11:10 - 11:30am
Automatically Analyzing Cybercriminal Markets
   Sadia Afroz, Berkeley University

FA-04
Networks 5
Room F108

9:00 – 9:20am
Prediction of Granular Time-Series Energy Consumption for Manufacturing Jobs from Analysis and Learning of Historical Data
   Chris Duerden, University of Central Lancashire, United Kingdom
   Lik-Kwan Shark, University of Central Lancashire, United Kingdom
   Geoff Hall, University of Central Lancashire, United Kingdom
   Joe Howe, University of Chester, United Kingdom

9:20 – 9:40am
Distributed Resource Allocation Using One-Way Communication with Applications to Power Networks
   Sindri Magnùsson, KTH, Sweden
   Chinwendu Enyioha, Harvard University
   Kathryn Heal, Harvard University
   Na Li, Harvard University
   Carlo Fischione, KTH, Sweden
   Vahid Tarokh, Harvard University

9:40 – 10:00am
A Generalized Nash Equilibrium Model of a Resource Stockpile with Independent Market Response Dynamics
   Justin Lloyd, Johns Hopkins University
   Gerard Meyer, Johns Hopkins University

10:00 – 10:30am
BREAK

10:30 – 10:50am
Efficiency Comparison between Proportional Fairness and Dominant Resource Fairness with Two Different Type Resources
   Youngmi Jin, KDDI R&D Laboratories, Japan
   Michiaki Hayashi, KDDI R&D Laboratories, Japan

FA-05
Estimation
Room F109

9:00 – 9:20am
Generalized Range Space Property for Group Sparsity of Linear Underdetermined Systems
   Ahmed Al Hilli, Rutgers University
   Laleh Najafizadeh, Rutgers University
   Athina Petropulu, Rutgers University

9:20 – 9:40am
Compressive Line Spectrum Estimation with Clustering and Interpolation
   Dian Mo, University of Massachusetts
   Marco F Duarte, University of Massachusetts

9:40 – 10:00am
On the Performance Overhead Tradeoff of Distributed Principal Component Analysis via Data Partitioning
   Ni An, Drexel University
   Steven Weber, Drexel University

10:00 – 10:30am
BREAK

10:30 – 10:50am
Detecting Community Structures in Hi-C Genomic Data
   Irineo Cabreros, Princeton University
   Emmanuel Abbe, Princeton University
   Aristotelis Tsirigos, New York University

10:50 – 11:10am
Efficient Subspace Clustering of Large-scale Data Streams with Misses
   Panagiotis A Traganitis, University of Minnesota
   Georgios B. Giannakis, University of Minnesota

11:10 – 11:30am
Improving the Recovery of Principal Components with Semi-Deterministic Random Projections
   Keegan Kang, Cornell University
   Giles Hooker, Cornell University

FA-06
Information Theory & Communications 3
Room F009

9:00 – 9:20am
Multilevel Diversity Coding with Regeneration: Separate Coding Achieves the MBR Point
   Shuo Shao, Texas A&M University
   Tie Liu, Texas A&M University
   Chao Tian, University of Tennessee, Knoxville

9:20 – 9:40am
Learning with Finite Memory for Machine Type Communication
   Taehyeun Park, Virginia Tech
   Walid Saad, Virginia Tech

9:40 – 10:00am
EXIT Chart Based IRA Code Design for TDMR
   Morteza Merhnoush, Washington State University
   Benjamin J Belzer, Washington State University
   Krishnamoorthy Sivakumar, Washington State University
   Roger Wood, HGST

10:00 – 10:30am
BREAK

10:30 – 10:50am
K Users Caching Two Files: An Improved Achievable Rate
   Saeid Sahraei, EPFL, Switzerland
   Michael Gastpar, EPFL Switzerland & University of California, Berkeley

10:50 – 11:10am
Strong Coordination over a Line when Actions are Markovian
   Badri N Vellambi, New Jersey Institute of Technology
   Joerg Kliewer, New Jersey Institute of Technology
   Matthieu Bloch, Georgia Institute of Technology & Georgia Tech Lorraine, France