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# Monday, December 14

## Monday, December 14, 08:30 - 09:30

### PLENARY-1: From Pixels to Information - Recent Advances in Visual Search

Bernd Girod
Room: England

Abstract: With intelligent processing, cameras have great potential to link the real world and the virtual world. We review advances and opportunities for algorithms and applications that retrieve information from large databases using images as queries. For rate-constrained applications, remarkable improvements have been achieved over the course the MPEG-CDVS (Compact Descriptors for Visual Search) standardization. Beyond CDVS lie applications that query video databases with images, while others continually match video frames against image databases. Exploiting the temporal coherence of video for either case can yield large additional gains. We will look at implementations for example applications ranging from text recognition to augmented reality to understand the challenges of building databases for rapid search and scalability, as well as the tradeoffs between processing on a mobile device

and in the cloud. Bio: Bernd Girod is the Robert L. and Audrey S. Hancock Professor of Electrical Engineering at Stanford University, California. Until 1999, he was a Professor in the Electrical Engineering Department of the University of Erlangen-Nuremberg. His research interests are in the area of image, video, and multimedia systems. He has published over 600 conference and journal papers and 6 books, receiving the EURASIP Signal Processing Best Paper Award in 2002, the IEEE Multimedia Communication Best Paper Award in 2007, the EURASIP Image Communication Best Paper Award in 2008, the EURASIP Signal Processing Most Cited Paper Award in 2008, as well as the EURASIP Technical Achievement Award in 2004 and the Technical Achievement Award of the IEEE Signal Processing Society in 2011. As an entrepreneur, Professor Girod has worked with numerous startup ventures, among them Polycom, Vivo Software, 8x8, and RealNetworks. He received an Engineering Doctorate from University of Hannover, Germany, and an M.S. Degree from Georgia Institute of Technology. Prof. Girod is a Fellow of the IEEE, a EURASIP Fellow, a member of the German National Academy of Sciences (Leopoldina), and a member of the United States National Academy of Engineering. He currently serves Stanford's School of Engineering as Senior Associate Dean at Large.

## Monday, December 14, 10:00 - 11:00

**MaMM-K: Keynote Talk**

Chang Wen Chen
Room: Diamond
Chair: Yu Sun (University of Central Arkansas, USA)

**MaMI-K: Keynote Talk**

Wireless Networks that can See
Dennis Prather
Room: Emerald

By offering enhanced frequency re-use, "small cells" have been proposed to address the need for increased capacity in future wireless networks. However, while a more-dense cellular topology is indeed attractive, their deployment is challenging due to the need for additional real estate, permits, and access to back-haul. As an alternative, dense sectoring is being proposed, wherein RF beam forming is used to "sectorize" the Tx/Rx capabilities of a base station into smaller angular regions, which also allows for enhanced frequency re-use. However, dense sectoring is challenged by co-channel and adjacent-channel interference (CCI and ACI), which inevitably arises due to nonlinear operations that result in signal intermixing and intermodulation as the Rx aperture receives all sectors simultaneously. In short, present beam-forming Rx arrays do not adequately discriminate between the multitude of spatial and spectral signals that are simultaneously received at a base station.To address these challenges, we present a Tx/Rx array that first "images" the spatial and spectral signals and subsequently "detects" them, thereby eliminating intermixing and intermodulation and thereby allows for full spatial/spectral discrimination and hence full frequency re-use in each sector. By analogy, visible imaging systems inherently perform such spatial/spectral discrimination by first performing a spatial mapping of the scene with a lens and then subsequently performing a spectral analysis of the signal to determine color. As an example consider a Christmas tree with multi-colored lights. From a signal detection perspective, each light is first spatially mapped, or imaged, onto the retina, which effectively renders a spatially orthogonal signal

plane, i.e., each point of origin in the source plane is focused to a separate and distinct point in the image plane that does not overlap with any adjacent points. Subsequently, the inherently non-linear process of detection is performed to determine the spectral nature of the imaged point, however, because each point is spatially separated from every other point, i.e., non-overlapping, signal intermixing does not take place due to the orthogonal nature of the imaging process and the inherent isolation it provides.In the context of wireless networks, the various colors represent frequency re-use and the various spatial locations correspond to the sectors within a wireless cell. In this talk, we present such an imaging/ receiver system that operates in the wireless spectrum. In so doing, it provides inherent CCI and ACI suppression over many spatial sectors and thereby enables ultra dense frequency reuse. Moreover, this approach allows for massive MIMO capability as all spatial sectors are imaged simultaneously with latencies limited only by the propagation delay of the wireless signals themselves. This talk will also present an efficient and high capacity Tx system that complements the "imaging-receiver" in terms of spatial/spectral signal exploitation.

**MaGS-L: Deconvolution and Kalman Filtering**

Room: Ireland A
Chair: Xiao-Ping (Steven) Zhang (Ryerson University, Canada)

**10:00 State Switching in US Equity Index Returns based on SETAR Model with Kalman Filter Tracking 1**

Timothy Little and Xiao-Ping (Steven) Zhang (Ryerson University, Canada); Fang Wang (Wilfrid Laurier University, Canada)

**MaSB-K: Keynote Talk**

Data Rich Smart Infrastructure Systems
Lucio Soibelman
Room: Ireland B
Chair: Mario Berges (Carnegie Mellon University, USA)

Infrastructure systems, broadly defined to include buildings and other facilities, transportation infrastructure, telecommunication networks, the power grid and environmental systems will require more and more that engineers provide a continuous state awareness, assessment and proactive decision making for the complete life-cycle of the systems and processes they create. Such continuous state awareness and proactive decision making will allow these systems to be more efficiently and effectively managed in both normal and abnormal conditions. Advanced Infrastructure Systems is defined here to refer to innovative systems, components, devices and processes that improve the performance and/or reduce the life-cycle cost of a broad range of physical infrastructure systems.There are many technological developments and research projects that already support, or begin to support this vision. Civil Engineers, not just electrical and computer engineers and computer scientists, can and should be involved in delivering this overall vision. At this talk professor Soibelman will introduce his vision and work developed within his research group that focus on the application and exploration of emerging Information and Communication Technologies (ICT), to a broadly defined set of infrastructure systems and associated processes, such as planning, design, construction, facility/infrastructure management, and environmental monitoring, so as to improve their sustainability, efficiency, maintainability, durability, and overall performance of these systems.

**MaSD-K: An Information-Theoretic View of Cache-Aided Communication, Compression, and Computation Systems**

Prof. Michèle Wigger
Room: Scotland C
Chair: Mohammad Asad Rehman Chaudhry (Soptimizer, Canada)

Abstract: ——————Pre-storing data in caches (memories) close to the end users during periods of low network congestion or good connectivity, is one of the most promising ways to increase rates and to decrease latency and energy consumption in future communication and compression systems. Before such systems can be put in place, important questions however have to be addressed: How much and which information should be pre-stored in the caches? How should this information be pre-stored? How should one communicate or compress in the presence of pre-stored data? What are the benefits in rates, latency, and energy efficiency that can be attained through caching?In this talk we will present recent information-theoretic results addressing theses questions. Specifically, we will explain and analyze simple algorithms, and provide intuition on how to derive information-theoretic upper bounds on the optimal performance. We shall also present the new concept of joint cache-channel coding (like our recent piggyback coding) as a way to improve communication in cache-aided networks, and we will illustrate the roles of the Wyner and the Gacs-Korner common informations in cache-aided compression systems. A particular focus of the talk will be on energy savings offered by caching.The talk is based on joint work with Bernhard Geiger and Roy Timo from TU Munich, and with Shirin Saeedi Bidokhti from Stanford University.Bio:———Michèle Wigger (S'05-M'09-SM'14) received the M.Sc. degree in electrical engineering (with distinction) and the Ph.D. degree in electrical engineering both from ETH Zurich in 2003 and 2008, respectively. In 2009, she was a Postdoctoral Researcher at the ITA Center at the University of California, San Diego, USA. Since December 2009, she has been an Assistant Professor and a Associate Professor at Telecom ParisTech, in Paris, France. She has been an associate editor of the IEEE Communication Letters since December 2012. Her main research interests are in multi-terminal information theory, in particular in distributed source coding, and capacities of networks with states, feedback, user cooperation, or caching.

## Monday, December 14, 11:00 - 12:20

**MbMM-L: Multimedia Applications**

Room: Diamond
Chair: Marios Pattichis (University of New Mexico, USA)

**MbMI-L: Massive MIMO I**

Room: Emerald
Chairs: Jinho Choi (Gwangju Institute of Science and Technology (GIST), Korea), Francisco A. Monteiro (Instituto de Telecomunicações & ISCTE - University Institute of Lisbon, Portugal)

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## Monday, December 14, 12:20 - 14:00

**Lunch**

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## Monday, December 14, 14:00 - 15:20

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Todd Goodall and Alan C Bovik (University of Texas at Austin, USA); Nicholas Paulter, Jr. (National Institute of Standards and Technology, USA); Haris Vikalo (The University of Texas at Austin, USA)

**14:40 Binary Rate Distortion With Side Information: The Asymmetric Correlation Channel Case 235**
Andrei Sechelea (Vrije Universiteit Brussel, Belgium); Samuel Cheng (University of Oklahoma, USA); Adrian Munteanu and Nikos Deligiannis (Vrije Universiteit Brussel, Belgium)

**15:00 Stealthy Control Signal Attacks in Scalar LQG Systems 240**
Ruochi Zhang and Parvathinathan Venkitasubramaniam (Lehigh University, USA)

**MpGS-L: Advanced Filtering**

Room: Scotland A
Chair: Payton Lin (Research Center for Information Technology Innovation, Academia Sinica, Taiwan)
**14:00 Conjugate Gradient Acceleration of Non-Linear Smoothing Filters 245**
Andrew Knyazev and Alexander Malyshev (Mitsubishi Electric Research Laboratories (MERL), USA)

**14:20 Low-Complexity Digital Correction of 4-Channel Time-Interleaved ADC Frequency Response Mismatch using Adaptive I/Q Signal Processing 250**
Simran Singh (Airbus Defence and Space, Germany); Mikko Valkama (Tampere University of Technology, Finland); Michael Epp (Cassidian, Germany); Wolfgang Schlecker (Cassidian, Finland)

**14:40 Nonconvex Alternating Direction Method of Multipliers for Distributed Sparse Principal Component Analysis 255**
Davood Hajinezhad and Mingyi Hong (Iowa State University, USA)

**15:00 Edge-enhancing Filters with Negative Weights 260**
Andrew Knyazev (Mitsubishi Electric Research Laboratories (MERL), USA)

**MpGS-L: Modeling and Computation**

Room: Scotland B
Chair: Shruthi Kubatur (Purdue University, USA)
**14:00 Spatial Stimuli Gradient Sketch Model N/A**
Alex Pappachen James (Nazarbayev University & Enview R&D Labs, Kazakhstan); Joshin Mathew (Indian Institute of Information Technology an Management - Kerala, India)

**14:20 A Volumetric SRP with Refinement Step for Sound Source Localization N/A**
Markus V.S. Lima (Universidade Federal do Rio de Janeiro - UFRJ, Brazil); Wallace A. Martins (Federal University of Rio de Janeiro, Brazil); Leonardo Nunes (Microsoft, Brazil); Luiz W. P. Biscainho (Federal University of Rio de Janeiro, Brazil); Tadeu Ferreira (Fluminense Federal University, Brazil); Maurício da Costa (Universidade Federal do Rio de Janeiro, Brazil); Bowon Lee (Inha University, Korea)

**14:40 Energy-Aware Sensor Selection in Field Reconstruction N/A**
Sijia Liu (Syracuse University, USA); Aditya Vempaty (IBM Research, USA); Makan Fardad (Syracuse University, USA); Engin Masazade (Yeditepe University, Turkey); Pramod Varshney (Syracuse University, USA)

**15:00 Fast Computation of Generalized Waterfilling Problems N/A**
Naidu Kalpana (Indian Institute of Technology Hyderabad & Hyderabad, India); Mohammed Zafar Ali Khan (Indian Institute of Technology, Hyderabad, India)

**MpGS-L: Frequency Division Multiplexing**

Room: Scotland C
Chair: Taneli Riihonen (Aalto University School of Electrical Engineering, Finland)
**14:00 Data rate maximization based power allocation for OFDM System in a High-Speed Train Environment 265**
Zhichao Sheng (Shanghai University, P.R. China); Hoang D. Tuan (University of Technology, Sydney, Australia); Fang Yong (Shanghai University, P.R. China); Tam Ho (University of Technology, Sydney, Australia); Yanzan Sun (Shanghai University, P.R. China)

**14:20 Anti-sparse Representation for Continuous Function by Dual Atomic Norm with Application in OFDM 270**
Xinyue Shen and Yuantao Gu (Tsinghua University, P.R. China)

**14:40 Blind Parameter Estimation of GFDM Signals over Frequency-Selective Fading Channels 275**
Liang Chang (State Radio Monitoring Center, P.R. China); Geoffrey Li (Georgia Tech, USA); Jingchun Li (State Radio Monitoring Center, P.R. China)

**15:00 Cyclostationary-Based Jammer Detection Algorithm for Wide-band Radios using Compressed Sensing 280**

Muhammad Ozair Mughal and Tassadaq Nawaz (University of Genova, Italy); Lucio Marcenaro (Università degli Studi di Genova, Italy); Carlo S Regazzoni (University of Genoa, Italy)

## Monday, December 14, 15:50 - 17:10

### MqMM-L: Multimedia Signal Processing

Room: Diamond
Chair: Yu Sun (University of Central Arkansas, USA)

**15:50 Gait Analysis using a Single Depth Camera 285**

Minxiang Ye (The University of Strathclyde, United Kingdom); Cheng Yang, Vladimir Stankovic, Lina Stankovic and Andrew Kerr (University of Strathclyde, United Kingdom)

**16:10 Scalable HEVC Intra Frame Complexity Control Subject to Quality and Bitrate Constraints 290**

Yuebing Jiang (The University of New Mexico, USA); Cong Zong and Marios Pattichis (University of New Mexico, USA)

**16:30 On Unequal Error Protection Raptor Codes 295**

Hussein Fadhel (University of Mississippi, USA); Lei Cao (The University of Mississippi, USA)

### MqMI-L: Massive MIMO III

Room: Emerald
Chair: Shengqian Han (Beihang University, P.R. China)

**15:50 An Efficient CDI Acquisition Scheme Facilitating Large Scale Antenna systems 300**

Bin Yu and Pengfei Sun (Beijing Samsung Telecom R&D Center, P.R. China); Fang Yuan (Intel labs, P.R. China); Chengjun Sun (Beijing Samsung Telecom R & D Center, P.R. China); Dalin Zhu (Beijing Samsung Telecom R&D Center, P.R. China)

**16:06 Wideband Hybrid Precoder for Massive MIMO Systems 305**

Lingxiao Kong, Shengqian Han and Chenyang Yang (Beihang University, P.R. China)

**16:22 Differential Beamspace MIMO for High-Dimensional Multiuser Communication 310**

John Brady and Akbar Sayeed (University of Wisconsin-Madison, USA)

**16:38 Opportunistic Beam Training with Hybrid Analog/Digital Codebooks for mmWave Systems 315**

Mohammed E. Eltayeb, Ahmed Alkhateeb and Robert Heath (The University of Texas at Austin, USA); Tareq Y. Al-Naffouri (King Abdullah University of Science and Technology, USA)

**16:54 DOA Estimation and Achievable Rate Analysis for 3D Massive MIMO in Aeronautical Communication Systems 320**

Mohanad AL-Ibadi and Lingjia Liu (University of Kansas, USA); John Matyjas (AFRL Rome/NY, USA); Jianzhong Zhang (Samsung, USA)

**MqGS-L: Super-resolution Image Processing**

Room: Ireland A
Chair: Jinho Choi (Gwangju Institute of Science and Technology (GIST), Korea)

**15:50 Sparse Index Multiple Access 324**
Jinho Choi (Gwangju Institute of Science and Technology (GIST), Korea)

**16:10 Atypicality for Vector Gaussian Models 328**
Elyas Sabeti and Anders Høst-Madsen (University of Hawaii, USA)

**16:30 Piecewise Planar Super-Resolution for 3D Scene 333**
Gaoang Wang (University of Wisconsin-Madison, USA); Yuhen Hu (University of Wisconsin at Madison, USA); Hongrui Jiang (University of Wisconsin Madison, USA)

**16:50 Unsupervised Image Segmentation Using Comparative Reasoning and Random Walks 338**
Anuva Kulkarni (Carnegie Mellon University, USA); Filipe Condessa (IST and CMU, Portugal); Jelena Kovacevic (Carnegie Mellon University, USA)

**MqSB-L: Facility Management and Operation**

Room: Ireland B
Chair: Qiuyuan Huang (University of Florida, USA)

**15:50 Measurement and Verification of Energy Saving in Smart Building Technologies 343**
Michael Zeifman (Fraunhofer Center for Sustainable Energy Systems, USA)

**16:16 Virtual metering of electrical appliances through analysis of data from contactless sensing 348**
Suman Giri and Mario Berges (Carnegie Mellon University, USA)

**16:43 RSS Difference-aware Graph-based Semi-supervised Learning (RG-SSL) RSS Smoothing Method for Crowdsourcing Indoor Localization 353**
Liye Zhang (Harbin Institute of Technology & University of Toronto, P.R. China); Shahrokh Valaee (University of Toronto, Canada); Yubin Xu and Lin Ma (Harbin Institute of Technology, P.R. China); Le Zhang (University of Toronto, Canada)

**MqGS-L: Hierarchical Sampling Techniques**

Room: Ireland C
Chair: Xiao-Ping (Steven) Zhang (Ryerson University, Canada)

**15:50 Financial Time Series Volatility Analysis Using Gaussian Process State-Space Models 358**
Jianan Han and Xiao-Ping (Steven) Zhang (Ryerson University, Canada)

**16:10 Multi-Sensor Generalized Sequential Probability Ratio Test Using Level-Triggered Sampling 363**
Shang Li, Xiaoou Li, Xiaodong Wang and Jingchen Liu (Columbia University, USA)

**16:30 Spatio-Temporal Depth Data Reconstruction from A Subset of Samples 368**
Lee-Kang Liu (University of California, San Diego, USA); Truong Nguyen (University of California San Diego, USA)

**MqGS-L: Advanced Compressive Sensing Methods**

Room: Scotland A
Chair: Xingguo Li (University of Minnesota, USA)



**MqGS-L: Magnetic Resonance Imaging and Tomography**

Room: Scotland B
Chair: Kairan Sun (University of Florida, USA)



**MqGS-L: Signal Enhancement Approaches**

Room: Scotland C

Chair: Kyaw Zaw Ye (National Research University of Electronic Technology & National Research University of Electronic Technology, Russia)

**15:50 Predicting Reconstruction Quality Within Compressive Sensing for Atomic Force Microscopy 418**

Patrick Pedersen, Jan Østergaard and Torben Larsen (Aalborg University, Denmark)

**16:10 A New Approach for Face Recognition Under Makeup Changes 423**

Xiaolong Wang and Chandra Kambhamettu (University of Delaware, USA)

**16:30 Shaking and Speech-smile Vowels Classification: An Attempt at Amusement Arousal Estimation from Speech Signals 428**

Kevin El Haddad, Stephane Dupont and Huseyin Cakmak (University of Mons, Belgium); Thierry Dutoit (FPMS, Belgium)

**16:50 Method for increasing reliability for transmission state of power equipment energy 433**

Kyaw Zaw Ye (National Research University of Electronic Technology & National Research University of Electronic Technology, Russia); Evgeni Mikalovich Portnov (MIET, Russia); Kyaw Zin Lin (National Research University of Electronic Technology & MIET, Russia)

### Monday, December 14, 18:00 - 20:00

**Welcome Reception**

Room: 20Seven (27th Floor)

Food and beverage will be provided.

## Tuesday, December 15

### Tuesday, December 15, 08:30 - 09:30

**PLENARY-2: Incremental Methods for Additive Cost Convex Optimization**

Asu Ozdaglar
Room: England

Abstract: Motivated by machine learning problems over large data sets and distributed optimization over networks, we consider the problem of minimizing the sum of a large number of convex component functions. We study incremental gradient methods for solving such problems, which use information about a single component function at each iteration. We provide new convergence rate results under some assumptions. We also consider incremental aggregated gradient methods, which compute a single component function gradient at each iteration while using outdated gradients of all component functions to approximate the entire global cost function, and provide new linear rate results.This is joint work with Mert Gurbuzbalaban and Pablo Parrilo. Biography: Asu Ozdaglar received the B.S. degree in electrical engineering from the Middle East Technical University, Ankara, Turkey, in 1996, and the S.M. and the Ph.D. degrees in electrical engineering and computer science from the Massachusetts Institute of

Technology, Cambridge, in 1998 and 2003, respectively.She is the Joseph F. and Nancy P. Keithley Professor of Electrical Engineering and Computer Science Department at the Massachusetts Institute of Technology. She is also the director of the Laboratory for Information and Decision Systems and associate director of the Institute for Data, Systems, and Society. Her research expertise includes optimization theory, with emphasis on nonlinear programming and convex analysis, game theory, with applications in communication, social, and economic networks, distributed optimization and control, and network analysis with special emphasis on contagious processes, systemic risk and dynamic control.Professor Ozdaglar is the recipient of a Microsoft fellowship, the MIT Graduate Student Council Teaching award, the NSF Career award, the 2008 Donald P. Eckman award of the American Automatic Control Council, the Class of 1943 Career Development Chair, the inaugural Steven and Renee Innovation Fellowship, and the 2014 Spira teaching award. She served on the Board of Governors of the Control System Society in 2010 and was an associate editor for IEEE Transactions on Automatic Control. She is currently the area co-editor for a new area for the journal Operations Research, entitled "Games, Information and Networks. She is the co-author of the book entitled "Convex Analysis and Optimization" (Athena Scientific, 2003).

## Tuesday, December 15, 10:00 - 11:00

**TaEV-K: Keynote Talk**

Martin Dietz, Stefan Bruhn
Room: Diamond
Chair: Adriana Vasilache (Nokia Technologies, Finland)

The new codec for Enhanced Voiced Services (EVS), standardized by the 3rd Generation Partnership Project (3GPP) in September 2014, is a result of the 3GPP effort to provide a radically enhanced user experience for Voice over LTE (VoLTE) services. In the 3GPP study of use cases and requirements finalized in 2010, the objectives were set not only to significantly improve the existing voice communication quality of narrowband (NB) and wideband (WB) speech provided by the previous 3GPP codecs, but to enhance the user experience by introducing superwideband (SWB) speech covering up to 16 kHz of bandwidth. The study further required enhanced quality for generic audio content, robustness to packet losses and delay jitter, and backward interoperability with AMR-WB to streamline the new codec deployment.The resulting EVS codec spans the whole range of communications scenarios from very efficient low bitrate speech coding at 5.9 kb/s, up to transparent coding of generic audio content at 128 kb/s, covering the full audio bandwidth of 20 kHz. EVS offers high robustness against packet loss and it is the first communication codec providing state-of-the-art rendering of music signals. This has been achieved by building upon best speech and music coding technologies of previous standards with significant new improvements and functionalities.The presentation will cover the architecture of the EVS codec and give an overview of its major building blocks. It will explain the key advancements in EVS, in particular in the two main building blocks of the codec - the linear-prediction based coding of speech-dominant content and the transform-domain coding of generic audio - and the seamless switching between both models. The picture will be completed by presenting other important improvements in EVS, such as the techniques that make the codec robust to packet loss.This presentation complements the keynote "Standardization and Performance of the New 3GPP EVS Codec", which details the standardisation process as well as the performance evaluation of the EVS codec.Standardization and Performance of the New 3GPP EVS CodecThe new codec for Enhanced Voiced Services (EVS), standardized by the 3rd Generation Partnership Project (3GPP) in September

2014, is the result of a 3GPP effort to provide a radically enhanced user experience for Voice over LTE (VoLTE) service. The EVS codec addresses a wide range of communication scenarios comprising high-quality super-wideband (SWB) and full-band (FB) voice operation as well as high-capacity/high-quality narrowband (NB) and wideband (WB) voice operation. Optimum performance in any operating point in these scenarios and additionally unique music/non-speech signal performance and high robustness in error-prone VoIP transmission frameworks make the codec clearly the best choice among all known communication codecs. On top of this the EVS codec maintains backward compatibility with AMR-WB, thus avoiding any interoperability problems or any hard-cut decisions against AMR-WB during the introduction of the new Enhanced Voice Services.The presentation will provide an insider perspective into the standardization process of the new EVS codec. It will describe how the industry with its many competing players managed in an unpreceded effort to successfully develop and standardize this codec in an open, fair and constructive process. The presentation also enables an understanding of the performance of the codec both in relation to the performance requirements set by 3GPP for the EVS codec standardization and compared to other presently used state-of-the-art communication codecs.This presentation complements the keynote "Technology Advancements in the new 3GPP EVS Codec", which details the architecture and the algorithmic improvements of the EVS codec.

**TaGS-L: Image Contouring and 3D Modeling**

Room: Ireland A
Chair: Yun Zhu (University of Florida, USA)

**10:00 Globalized BM3D Using Fast Eigenvalue Filtering 438**
Koki Suwabe (Graduate School of BASE, Tokyo University of Agriculture and Technology, Japan); Masaki Onuki, Yuki Iizuka and Yuichi Tanaka (Tokyo University of Agriculture and Technology, Japan)

**10:20 A Subjective and Objective Quality Assessment of Tone-Mapped Images 443**
Akshai Krishna (Indian Institute of Technology Hyderabad, India); Sai Sheetal Chandra (GITAM University, Visakhapatnam, India); Sumohana Channappayya (Indian Institute of Technology Hyderabad, India); Shanmuganathan Raman (Indian Institute of Technology, Gandhinagar, India)

**10:40 3D Object Modeling and Recognition via Online Hierarchical Pitman-Yor Process Mixture Learning 448**
Wentao Fan (Huaqiao University, P.R. China); Faisal Osaimi (Umm Al-Qura University, Australia); Nizar Bouguila (Concordia University, Canada); Ji-Xiang Du (Huaqiao University, P.R. China)

**TaHB-K: Keynote Talk**

Approaches to multi-modal fusion of brain imaging data
Vince Calhoun
Room: Ireland B
Chair: Selin Aviyente (Electrical and Computer Engineering, Michigan State University, MI, USA)

**TaGS-L: Detection and Tracking Using Bayesian Framework**

Room: Scotland B
Chair: Kairan Sun (University of Florida, USA)

**10:00 Joint Composite Detection and Bayesian Estimation: A Neyman-Pearson Approach 453**
Shang Li and Xiaodong Wang (Columbia University, USA)

**10:20 Edge Preserving Multiscale Image Decomposition with Customized Domain Transform Filters 458**
Saho Yagyu (Graduate School of BASE, Tokyo University of Agriculture and Technology, Japan); Akie Sakiyama and Yuichi Tanaka (Tokyo University of Agriculture and Technology, Japan)

**10:40 Recursive Filters with Bayesian Quadratic Network Game Fusion 463**
Muyuan Zhai, Hui Feng and Tao Yang (Fudan University, P.R. China); Bo Hu (Fudan University, Shanghai, P.R. China)

**TaGP-L: Algorithms for Parallel Platforms**

Room: Scotland C
Chair: Yuhen Hu (University of Wisconsin at Madison, USA)
**10:00 A Real-Time Radio Transient Pipeline for ARTS 468**
Alessio Sclocco (Vrije Universiteit Amsterdam, The Netherlands); Joeri van Leeuwen (ASTRON, The Netherlands); Henri Bal (Vrije Universiteit, The Netherlands); Rob V van Nieuwpoort (Netherlands eScience Center & Vrije Universiteit Amsterdam and ASTRON, The Netherlands)

**10:20 Reconfigurable Filter Bank Design via Principal Component Analysis and Low Rank Approximation 473**
Chun-Hsi Huang, Gwo Giun(Chris) Lee and Chun-Fu Chen (National Cheng Kung University, Taiwan); Yinglong Xia (IBM T. J. Watson Research Center, USA); Ching-Yung Lin (IBM, USA)

**10:40 Tree-structured algorithm for efficient shearlet-domain light field reconstruction 478**
Suren Vagharshakyan, Robert Bregovic and Atanas Gotchev (Tampere University of Technology, Finland)

## Tuesday, December 15, 11:00 - 12:20

**TbEV-L: EVS codec: From general overview to specific coding topics**

Room: Diamond
Chair: Jeremie Lecomte (Fraunhofer IIS, Germany)
**11:00 System Aspects of the 3GPP Evolution towards Enhanced Voice Services 483**
Stefan Bruhn and Tomas Frankkila (Ericsson AB, Sweden); Frédéric Gabin (Ericsson AB, France); Karl Hellwig (Ericsson AB, Germany); Maria Hultström (Ericsson AB, Sweden)

**11:20 Audio Bandwidth Detection in the EVS Codec 488**
Václav Eksler (University of Sherbrooke & VoiceAge Corporation, Canada); Milan Jelinek (University of Sherbrooke, Canada); Wolfgang Jaegers (Fraunhofer Institute for Integrated Circuits IIS, Germany)

**12:00 Deviation Detection with Continuous Observations 537**
Pengfei Yang and Biao Chen (Syracuse University, USA)

**TaHB-L: Signal Processing Methods for Analyzing Functional Connectivity Networks**

Room: Ireland B
Chair: Selin Aviyente (Electrical and Computer Engineering, Michigan State University, MI, USA)
**11:00 Brain Functional Connectivity Analysis Using Mutual Information 542**
Zhe Wang, Ahmed Alahmadi, David Zhu and Tongtong Li (Michigan State University, USA)

**11:20 Estimating Multiresolution Dependency Graphs within the Stationary Wavelet Framework 547**
Alexander Gibberd and James D B Nelson (University College London, United Kingdom)

**11:40 A Tucker Decomposition Based Approach for Topographic Functional Connectivity State Summarization 552**
Arash Golibagh Mahyari (Michigan State University, USA); Selin Aviyente (Electrical and Computer Engineering, Michigan State University, MI, USA)

**12:00 Multiscale FC Analysis Refines Functional Connectivity Networks in Individual Brains 557**
Jacob Billings (Emory University, USA); Alessio Medda (Georgia Tech Research Institute & Georgia Institute of Technology, USA); Shella D Keilholz (Emory University, USA)

**TbGS-L: Signal and Image Quality Assessment**

Room: Ireland C
Chair: Sumohana Channappayya (Indian Institute of Technology Hyderabad, India)
**11:00 A Non-Parametric Framework for No-Reference Image Quality Assessment 562**
Redzuan Abdul Manap (Department of Electronic and Electrical Engineering, The University of Sheffield, Malaysia); Ling Shao (Northumbria University, United Kingdom); Alejandro F Frangi (University of Sheffield, United Kingdom)

**11:20 Generalized Graph Signal Sampling and Reconstruction 567**
Xiaohan Wang, Jiaxuan Chen and Yuantao Gu (Tsinghua University, P.R. China)

**11:40 Consumer Video Summarization Based on Image Quality and Representativeness Measure 572**
Dong-ju Jeong, Hyoung Jin Yoo and Nam Ik Cho (Seoul National University, Korea)

**12:00 Face Image Quality Assessment for Face Selection in Surveillance Video using Convolutional Neural Networks 577**
Vignesh S (IIT Hyderabad, India); Manasa Priya K and Sumohana Channappayya (Indian Institute of Technology Hyderabad, India)

**TbGS-L: Detection for Seismic Signals**

Room: Scotland A
Chair: Muhammad Amir Shafiq (Georgia Institute of Technology, USA)

**11:00 A Novel Physical Layer Spoofing Detection Based on Sparse Signal Processing 582**
Ning Wang (Beijing University of Posts and Telecommunications, P.R. China); Shi-Chao Lv (Institute of Information Engineering, Chinese Academy of Sciences, P.R. China); Ting Jiang (Beijing University of Posts & Telecommunications, P.R. China); Ge Zhou (Beijing University of Posts and Telecommunications, P.R. China)

**11:20 Face De-identification Using Facial Identity Preserving Features 586**
Hehua Chi (Wuhan University, USA); Yu-hen Hu (University of Wisconsin-Madison, USA)

**11:40 Full waveform microseismic inversion using differential evolution algorithm 591**
Lijun Zhu, Entao Liu and James H McClellan (Georgia Institute of Technology, USA)

**12:00 Seismic Interpretation of Migrated Data Using Edge-based Geodesic Active Contours 596**
Muhammad Amir Shafiq, Zhen Wang and Ghassan AlRegib (Georgia Institute of Technology, USA)

**TbGS-L: Image Processing for Coded Aperture**

Room: Scotland B
Chair: Kairan Sun (University of Florida, USA)
**11:00 Colored Coded Aperture Compressive Spectral Imaging: Design and Experimentation 601**
Hoover Rueda (University of Delaware, USA); Henry Arguello Fuentes (Universidad Industrial de Santander, Colombia); Gonzalo Arce (University of Delaware, USA)

**11:20 Synthetic Coded Apertures in Compressive Spectral Imaging: Experimental Validation 605**
Laura Galvis (University of Delaware, USA); Henry Arguello Fuentes (Universidad Industrial de Santander, Colombia); Gonzalo Arce (University of Delaware, USA)

**11:40 Approximate Message Passing in Coded Aperture Snapshot Spectral Imaging 609**
Jin Tan (North Carolina State U, USA); Yanting Ma (North Carolina State University, USA); Hoover Rueda (University of Delaware, USA); Dror Baron (North Carolina State University, USA); Gonzalo Arce (University of Delaware, USA)

**12:00 Spatio-spectral uniform multi-frame coded apertures for compressive spectral imaging 614**
Claudia Correa-Pugliese (University of Delaware, USA); Henry Arguello Fuentes (Universidad Industrial de Santander, Colombia); Gonzalo Arce (University of Delaware, USA)

**TbGP-L: Image Processing**

Room: Scotland C
Chair: Atanas Gotchev (Tampere University of Technology, Finland)
**11:00 Virtual HDR/LDR Image Synthesizer in Multi-Core Platform 619**
Tsun-Hsien Wang, Jen-Wen Wang and Ching-Te Chiu (National Tsing Hua University, Taiwan)

**11:20 Programmable Data Parallel Accelerator for Mobile Computer Vision 624**
Teemu Nyländen (University of Oulu, Finland); Heikki Kultala (Tampere University of Technology, Finland); Ilkka Hautala, Jani Boutellier, Jari Hannuksela and Olli Silvén (University of Oulu, Finland)

**11:40 Rapid Customization of Image Processors Using Halide 629**
Ville Korhonen, Pekka Jääskeläinen, Matias Koskela, Timo Viitanen and Jarmo Takala (Tampere University of Technology, Finland)

**12:00 A Hybrid Task Graph Scheduler for High Performance Image Processing Workflows 634**
Timothy Blattner (National Institute of Standards and Technology & University of Maryland Baltimore County, USA); Walid Keyrouz (National Institute of Standards and Technology, USA); Milton Halem (University of Maryland Baltimore County, USA); Shuvra Bhattacharyya (University of Maryland, USA); Mary Brady (NIST, USA)

## Tuesday, December 15, 12:20 - 14:00

**Lunch**

Room: Great Hall North

## Tuesday, December 15, 14:00 - 15:20

**TpEV-L: Coding tools in the EVS codec**

Room: Diamond
Chair: Guillaume Fuchs (Fraunhofer Institute of Integrated Circuits, Germany)

**14:00 Memory-Less Gain Quantization in the EVS Codec 638**
Vladimir Malenovsky (Université de Sherbrooke & VoiceAge, Canada); Milan Jelinek (University of Sherbrooke, Canada)

**14:20 A Novel Frequency Domain BWE with Relaxed Synchronization and Associated BWE Switching 642**
Lei Miao (Huawei, P.R. China); Zexin Liu, Xingtao Zhang and Chen Hu (Huawei Technologies Co Ltd, P.R. China); Jonathan Gibbs (Huawei Technologies Co Ltd & Oblisco Ltd, United Kingdom); Kihyun Choo and Eunmi Oh (Samsung Electronics, Korea); Václav Eksler (University of Sherbrooke & VoiceAge Corporation, Canada)

**14:40 Super-Wideband Fine Spectrum Quantization for Low-Rate High-Quality MDCT Coding Mode of the 3GPP EVS Codec 647**
Srikanth Nagisetty (Panasonic R & D Center Singapore, Singapore); Takuya Kawashima (Panasonic System Networks R&D Lab. Co., Ltd, Japan); Hiroyuki Ehara (Panasonic Corporation, Japan); Lasse Laaksonen (Nokia Technologies, Finland); Hosang Sung and Kihyun Choo (Samsung Electronics, Korea)

**15:00 Enhanced AMR-WB Bandwidth Extension in 3GPP EVS Codec 652**
Magdalena Kaniewska and Stéphane Ragot (Orange Labs, France); Zexin Liu, Lei Miao and Xingtao Zhang (Huawei Technologies Co. Ltd, P.R. China); Jonathan Gibbs (Huawei Technologies Co. Ltd, United Kingdom); Václav Eksler (VoiceAge Corp., Canada)

**TpOF-L: Cyber-Physical Security and Control**

Room: Emerald
Chair: Nikolaos Gatsis (The University of Texas at San Antonio, USA)

**14:00 Likelihood of Cyber Data Injection Attacks to Power Systems 657**
Yingshuai Hao, Meng Wang and Joe H. Chow (Rensselaer Polytechnic Institute, USA)

**14:20 Towards Resilient Cyber-Physical Control Systems 662**
Gabriel Salles-Loustau and Saman Zonouz (Rutgers University, USA)

**14:40 A Data-Driven Cyber-Physical Detection and Defense Strategy Against Data Integrity Attacks in Smart Grid Systems 667**
Jin Wei (The University of Akron, USA)

**15:00 Energy-Based Damping Evaluation for Exciter Control in Power Systems 672**
Luoyang Fang (Colorado State University, USA); Dongliang Duan (University of Wyoming, USA); Liuqing Yang (Colorado State University, USA)

**TpGS-L: Signal Modeling**

Room: Ireland A
Chair: Yanjia Sun (New Jersey Institute of Technology, USA)

**14:00 Near-infrared coloring via a contrast-preserving mapping model 677**
Chang-Hwan Son and Xiao-Ping (Steven) Zhang (Ryerson University, Canada); KangWoo Lee (Sungkyunkwan University, Korea)

**14:20 Switched dynamic structural equation models for tracking social network topologies 682**
Brian Baingana and Georgios B. Giannakis (University of Minnesota, USA)

**14:40 Dense Invariant Feature Based Support Vector Ranking for Person Re-identification 687**
Shoubiao Tan (Anhui University, P.R. China); Feng Zheng (The University of Sheffield, United Kingdom); Ling Shao (Northumbria University, United Kingdom)

**15:00 Distributed Average Consensus with Deterministic Quantization: An ADMM Approach 692**
Shengyu Zhu and Biao Chen (Syracuse University, USA)

**TpGS-L: Denoising Techniques for Speech Signals**

Room: Ireland C
Chair: Yuanwei Jin (University of Maryland Eastern Shore, USA)

**14:00 Using LSF Features for Speaker Verification in Noise 697**
Pujita Raman (Virginia Tech, USA); A. A. (Louis) Beex (DSPRL - Wireless@VT & Virginia Tech, USA)

**14:20 Two-Stage Data-Driven Single Channel Speech Enhancement with Cepstral Analysis Pre-Processing 702**
Yu Rao, Chetan Vahanesa and Chandan Karadagur Ananda Reddy (The University of Texas at Dallas, USA); Issa Panahi (University of Texas at Dallas, USA)

**14:40 Speech Enhancement in Modulation Domain Using Codebook-based Speech and Noise Estimation 707**

Vidhyasagar Mani and Benoit Champagne (McGill University, Canada); Wei-Ping Zhu (Concordia University, Canada)

**15:00 Single channel Speech Enhancement technique for low SNR quasi- periodic noise based on Reduced Order Linear Prediction 712**

Chandan Karadagur Ananda Reddy (The University of Texas at Dallas, USA); Vahid Montazeri (Teaching Assistant, USA); Yu Rao and Issa Panahi (The University of Texas at Dallas, USA)

**TpGS-L: Image Processing and Bioinformatics**

Room: Scotland A
Chair: Kairan Sun (University of Florida, USA)

**14:00 Dynamic Gesture Recognition with Wi-Fi Based on Signal Processing and Machine Learning 717**

Ge Zhou (Beijing University of Posts and Telecommunications, P.R. China); Ting Jiang (Beijing University of Posts & Telecommunications, P.R. China); Yue Liu and Wei Liu (China Mobile Research Institute, P.R. China)

**14:20 A New Frequency Lowering Technique for Mandarin-Speaking Hearing Aid Users 722**

Yen-Teh Liu (Research Center for Information Technology Innovation, Academia Sinica, Taiwan); Ronald Y. Chang (Academia Sinica, Taiwan); Yu Tsao (Research Center for Information Technology Innovation, Academia Sinica, Taiwan); Yi-ping Chang (Children's Hearing Foundation, Taiwan)

**14:40 A Riemannian Approach for Computing Geodesics in Elastic Shape Analysis 727**

Yaqing You (Florida State University, USA); Wen Huang (Universite Catholique de Louvain, Belgium); Kyle Gallivan (Florida State University, USA); Pierre-Antoine Absil (Université Catholique de Louvain, Belgium)

**15:00 A Comparative Study of Quality and Content-based Spatial Pooling Strategies in Image Quality Assessment 732**

Dogancan Temel and Ghassan AlRegib (Georgia Institute of Technology, USA)

**TpGS-L: Radar Signal Processing**

Room: Scotland B
Chair: Bo Li (Rutgers, The State University of New Jersey, USA)

**14:00 Radar Precoding for Spectrum Sharing Between Matrix Completion Based MIMO Radars and a MIMO Communication System 737**

Bo Li and Athina Petropulu (Rutgers, The State University of New Jersey, USA)

**14:26 A Parameter-Free MAP Image Reconstruction Algorithm for Impulse-Based UWB Ground Penetrating Radar 742**

Henry Ogworonjo and John Anderson (Howard University, USA); Lam Nguyen (Army Research Laboratory, USA)

**14:53 Adaptive Beamforming for MIMO Radar with Planar Array Antennas using Separable Weight Vectors 747**

Jie He (Chang'an University, P.R. China); Dazheng Feng (Xidian University, P.R. China); Cong Xiang (206 Institute, P.R. China)

**TpGP-L: Communications Applications**

Room: Scotland C
Chair: Jani Boutellier (University of Oulu, Finland)

**14:00 An Efficient GPU Implementation of a Multirate Resampler for Multi-carrier Systems 751**

Scott Kim and Shuvra Bhattacharyya (University of Maryland, USA)

**14:26 Mobile GPU Accelerated Digital Predistortion on a Software-defined Mobile Transmitter 756**

Kaipeng Li (Rice University, USA); Amanullah Ghazi and Jani Boutellier (University of Oulu, Finland); Mahmoud Abdelaziz and Lauri Anttila (Tampere University of Technology, Finland); Markku Juntti (University of Oulu, Finland); Mikko Valkama (Tampere University of Technology, Finland); Joseph R. Cavallaro (Rice University, USA)

**14:53 Exploiting Multi-Core SoC Architecture for MU-MIMO Schedulers 761**

Ganesh Venkatraman (University of Oulu & CWC, University of Oulu, Finland); Janne Janhunen and Markku Juntti (University of Oulu, Finland)

## Tuesday, December 15, 15:50 - 17:10

**TqEV-L: Packet loss robustness in the EVS codec**

Room: Diamond
Chair: Stefan Bruhn (Ericsson AB, Sweden)

**15:50 Delay-Less Frequency Domain Packet-Loss Concealment for Tonal Audio Signals 766**

Ralph Sperschneider (Fraunhofer IIS, Germany); Janine Sukowski (Citrix Online GmbH, Germany); Goran Markovic (Fraunhofer Institut für Integrierte Schaltungen (IIS), Germany)

**16:10 A Packet Loss Recovery Technique with Line Spectral Frequency Modification in 3GPP EVS Codec 771**

Kimitaka Tsutsumi (NTT Corporation, Japan); Kei Kikuiri (NTT DOCOMO Inc., Japan); Jeremie Lecomte (Fraunhofer IIS, Germany)

**16:30 Robust Speech Coding with EVS 775**

Anssi Rämö, Adriana Vasilache and Henri Toukomaa (Nokia Technologies, Finland)

**16:50 EVS demo**

**TqOF-L: Inference and Prediction**

Room: Emerald
Chair: Xiaohua (Edward) Li (State University of New York at Binghamton, USA)

**15:50 Very-Short Term Forecasting of Electricity Price Signals Using a Pareto Composition of Kernel Machines in Smart Power Systems 780**

Miltiadis Alamaniotis (Purdue University, USA); Nikolaos Bourbakis (Wright State University, USA); Lefteri Tsoukalas (Purdue University, USA)

**16:16 Matrix Completion with Columns in Union and Sums of Subspaces 785**

Pengzhi Gao, Meng Wang and Joe H. Chow (Rensselaer Polytechnic Institute, USA); Matthew Berger and Lee Seversky (Air Force Research Laboratory, USA)

**16:43 Single-Channel Compressive Sampling of Electrical Data for Non-Intrusive Load Monitoring 790**

Michelle Clark and Lutz Lampe (University of British Columbia, Canada)

**TqGS-L: Signal Processing Using Likelihood**

Room: Ireland A

Chair: Wei Shi (University of Illinois at Urbana-Champaign, USA)

**15:50 Decentralized Quadratically Approximated Alternating Direction Method of Multipliers 795**

Aryan Mokhtari (University of Pennsylvania, USA); Wei Shi (University of Illinois at Urbana-Champaign, USA); Qing Ling (University of Science and Technology of China, P.R. China); Alejandro Ribeiro (University of Pennsylvania, USA)

**16:10 Reducing the Ciphertext Expansion in Image Homomorphic Encryption via Linear Interpolation Technique 800**

Yunyu Li, Jiantao Zhou and Yuanman Li (University of Macau, Macao); Oscar C. Au (Hong Kong University of Science and Technology, Hong Kong)

**16:30 Robust Multi-Target Tracking in Outdoor Traffic Scenarios via Persistence Topology based Robust Motion Segmentation 805**

Somrita Chattopadhyay, Qian Ge, Chunpeng Wei and Edgar Lobaton (North Carolina State University, USA)

**16:50 Adaptive Patch-based Image Denoising by EM-Adaptation 810**

Stanley H Chan (Purdue University, USA); Enming Luo and Truong Nguyen (University of California San Diego, USA)

**TpHB-L: Multimodal Neuroimaging for Understanding Brain Function**

Room: Ireland B

Chair: Anubha Gupta (Indraprastha Institute of Information Technology Delhi, India)

**15:50 Motor Imagery Classification Using Multiresolution Analysis and Sparse Representation of EEG Signals 815**

Pouria Saidi, George Atia, Alan Paris and Azadeh Vosoughi (University of Central Florida, USA)

**16:10 Neural Correlates of Affective Context in Facial Expression Analysis: A Simultaneous EEG-fNIRS Study 820**

Yanjia Sun (New Jersey Institute of Technology, USA); Hasan Ayaz (Drexel University, USA); Ali Akansu (NJIT, USA)

**16:30 A Time-Frequency Based Bivariate Synchrony Measure for Reducing Volume Conduction Effects in EEG 825**

Marisel Villafañe-Delgado (Michigan State University, USA); Selin Aviyente (Electrical and Computer Engineering, Michigan State University, MI, USA)

**16:50 Joint Estimation of Activity Signal and HRF in fMRI using Fused LASSO 829**

Priya Aggarwal (Indraprastha Institute of Information Technology, Delhi, India); Anubha Gupta (Indraprastha Institute of Information Technology Delhi, India); Ajay Garg (All India Institute of Medical Sciences, India)

**TqGS-L: Efficient and Robust Signal Modeling**

Room: Ireland C
Chair: Xingguo Li (University of Minnesota, USA)

**15:50 A General Framework for the Design and Analysis of Sparse FIR Linear Equalizers 834**

Abubakr O. Al-Abbasi and Ridha Hamila (Qatar University, Qatar); Waheed U. Bajwa (Rutgers University, USA); Naofal Al-Dhahir (University of Texas at Dallas, USA)

**16:10 Locally Linear Low-rank Tensor Approximation 839**

Alp Ozdemir and Mark Iwen (Michigan State University, USA); Selin Aviyente (Electrical and Computer Engineering, Michigan State University, MI, USA)

**16:30 Reconstruction of graph signals: percolation from a single seeding node 844**

Santiago Segarra (University of Pennsylvania, USA); Antonio G. Marques (Universidad Rey Juan Carlos, Spain); Geert Leus (Delft University of Technology, The Netherlands); Alejandro Ribeiro (University of Pennsylvania, USA)

**16:50 A Small World Model for Improving Robustness of Heterogeneous Network 849**

Diansong Luo, Tie Qiu and Nakema Deonauth (Dalian University of Technology, P.R. China); Aoyang Zhao (School of Software, Dalian University of Technology, P.R. China)

**TqGS-L: Graph Signal Processing and Cryptography**

Room: Scotland A
Chair: Ulisses Braga-Neto (Texas A&M University, USA)

**15:50 Simulation of grain growth in polycrystalline materials: A signal processing perspective 853**

Shruthi Kubatur and Mary Comer (Purdue University, USA)

**16:10 Optimizing Spectral Diversity for Graph Signal Coarsening 858**

Pengfei Liu, Xiaohan Wang and Yuantao Gu (Tsinghua University, P.R. China)

**16:30 Parameter Control in Predistribution Schemes of Cryptographic Keys 863**

Jun Zhao (Carnegie Mellon University, USA)

**16:50 Critical Behavior in Heterogeneous Random Key Graphs 868**

Jun Zhao (Carnegie Mellon University, USA)

**TqGS-L: Massive MIMO**

Room: Scotland B
Chair: Taneli Riihonen (Aalto University School of Electrical Engineering, Finland)

**15:50 Likelihood-Based Modulation Classification for MU-MIMO Systems 873**
Hadi Sarieddeen and Mohammad Mansour (American University of Beirut, Lebanon); Louay Jalloul (Qualcomm Inc., USA); Ali Chehab (American University of Beirut, Lebanon)

**16:10 Broadbeam Design for Massive MIMO Systems with Uniform Rectangular Array 878**
Deli Qiao and Haifeng Qian (East China Normal University, P.R. China); Geoffrey Li (Georgia Tech, USA)

**16:30 Low-Complexity MIMO Detector with 1024-QAM 883**
Hadi Sarieddeen and Mohammad Mansour (American University of Beirut, Lebanon); Louay Jalloul (Qualcomm Inc., USA); Ali Chehab (American University of Beirut, Lebanon)

**16:50 Performance Analysis and Interference Cancellation for Heterogeneous Network with Massive MIMO 888**
Yinjun Liu (Beijing University of Posts and Telecommunications, P.R. China); Lu Lu (Georgia Institute of Technology, USA); Geoffrey Li (Georgia Tech, USA); Qimei Cui (Beijing University of Posts and Telecommunications, P.R. China)

**TqGP-L: DSP Implementations on Multicores**

Room: Scotland C
Chair: Sunwoo Kim (Hanyang University, Korea)

**15:50 Multicore Execution of Dynamic Dataflow Programs on the Distributed Application Layer 893**
Jani Boutellier and Amanullah Ghazi (University of Oulu, Finland)

**16:16 Sensor-Based Online Hand Gesture Recognition on Multi-Core DSPs 898**
Florian Grützmacher, Johann-P. Wolff and Christian Haubelt (University of Rostock, Germany)

**16:43 A Fast Parallel Matrix Inversion Algorithm based on Heterogeneous Multicore Architectures 903**
Denggao YU (Southeast University, P.R. China); Shiwen He (School of Information Science and Engineering, Southeast University, P.R. China); Yongming Huang, Guangshi Yu and Luxi Yang (Southeast University, P.R. China)

## Tuesday, December 15, 18:00 - 20:00

**Welcome Back Reception**

Room: 20Seven (27th Floor)

Food and beverage will be provided.

# Wednesday, December 16

## Wednesday, December 16, 08:30 - 09:30

### PLENARY-3: Deep Learning: Propelling Recent Rapid Advances in Artificial Intelligence

Li Deng
Room: England

Abstract: Deep learning has fundamentally changed the landscape of two important areas of artificial intelligence (AI): speech recognition since year 2010 and computer vision since 2012. The rapid progress in these AI areas that pertain to machine perception has given high hopes that deep learning will further thrust new advances in other areas of AI pertaining to cognition functions of human intelligence, including language processing, reasoning, attention, memory, knowledge, and decision making. In this talk I will first reflect on the historical path to the transformative success of deep learning in speech recognition, after providing brief reviews of earlier studies on (shallow) neural networks and on (deep) generative models relevant to the introduction of deep learning methods to speech recognition. Then, an overview will be given on sweeping achievements of deep learning in speech recognition since its initial success, which have resulted in across-the-board deployment of deep learning in modern speech recognition systems worldwide. The huge impact of deep learning in image recognition and computer vision is also described and analyzed in terms of the same enabling factors of big compute, big data, and innovations in deep architectures and learning methods as in speech recognition.Next, more challenging application areas of deep learning, including natural language processing, multimodal processing involving text, and deep reinforcement learning for decision making, will be selectively reviewed and analyzed. I will show examples of machine translation, contextual entity search, and automatic image captioning, where fresh ideas from deep learning, continuous-space embedding of natural language text in particular, are revolutionizing these AI application areas. Finally, a number of key issues and future directions of deep learning for AI tasks will be addressed and explored.Bio:Li Deng received the Ph.D. degree from the University of Wisconsin-Madison. He was a Professor at the University of Waterloo, Ontario, Canada during 1989-1999, and then joined Microsoft Research, Redmond, USA, where currently he leads R&D of deep learning as Partner Research Manager of its Deep Learning Technology Center. He authored or co-authored 5 books including the latest books of Deep Learning: Methods and Applications (2014) and of Automatic Speech Recognition: A Deep-Learning Approach (Springer, 2015). He is a Fellow of the Acoustical Society of America, a Fellow of the IEEE, and a Fellow of the International Speech Communication Association. He served on the Board of Governors of the IEEE Signal Processing Society. More recently, he served as Editors-In-Chief for IEEE Signal Processing Magazine and for IEEE/ACM Transactions on Audio, Speech and Language Processing.

## Wednesday, December 16, 10:00 - 11:00

### WaCP-L: Enablers for a CPS Approach to Physiological Systems

Room: Diamond
Chair: Yun Zhu (University of Florida, USA)

**10:00 Wireless Link Analysis of Cardiovascular Stent as Antenna for Biotelemetry 908**
Can Li (Tsinghua University, P.R. China); Peisen Zhao (The University of Texas at Austin, P.R. China); Jun Du, Chunxiao Jiang and Yong Ren (Tsinghua University, Beijing, P.R. China)

**10:20 Stationary regime for standing Wave Central Pattern Generator 913**
Roberto Martin del Campo Vera (University of Southern California, USA); Edmond Jonckheere (USC, USA)

**10:40 Control Mechanism Modeling of Human Cardiovascular-Respiratory System 918**
Sandeep Gutta, Qi Cheng and Bruce Benjamin (Oklahoma State University, USA)

**WaOF-K: Keynote**

Correlative Monitoring for Detection of False Data Injection Attacks in Smart Grids
George Michailidis
Room: Emerald
Chair: Deepa Kundur (University of Toronto, Canada)

The key objective of the Smart Grid is to integrate two-way communication technologiesacross power generation, transmission and distribution to deliver electricity efficiently, securely and cost-effectively. However, real-time messaging exposes the grid to security threats at the distribution level ranging from attacks that disable information exchange between smart meters and data fusion centers to spurious payload content that would lead to incorrect assessment of actual demand. Such activities have the potential to compromise grid stability and efficiency. In this talk we present a measurement-based situation awareness framework that combines evidence from sensors at home-area networks and aims to infer anomalies that signify a coordinated, well orchestrated attack on residential smart meters at various spatial-scales. We also discuss different threat models and mitigating strategies. The proposed framework leverages multi-view sensor readings to quickly detect power shifts to anomalous regimes. We evaluate the developed algorithms on real-world power traces and sensor readings.

**WaGS-L: Feature Extraction and Mapping**

Room: Ireland B
Chair: Naim Dahnoun (University of Bristol, United Kingdom)

**10:00 Lane Detection Based on Improved Feature Map and Efficient Region of Interest Extraction 923**
Umar Ozgunalp and Naim Dahnoun (University of Bristol, United Kingdom)

**10:20 Kernel-based Low-rank Feature Extraction on a Budget for Big Data Streams 928**
Fatemeh Sheikholeslami and Dimitris Berberidis (University of Minnesota, Twin Cities, USA); Georgios B. Giannakis (University of Minnesota, USA)

**10:40 Seizure Prediction using Hilbert Huang Transform on Field Programmable Gate Array 933**
Dilranjan Wickramasuriya, Lakshitha Wijesinghe and Sudaraka Mallawaarachchi (University of Moratuwa, Sri Lanka)

**WaGS-L: Clustering, Segmentation, and Reconstruction**

Room: Ireland C
Chair: Wei Han (Hong Kong University of Science and Technology, Hong Kong)

**10:00 Guided Signal Reconstruction with Application to Image Magnification 938**
Akshay Gadde (University of Southern California, USA); Andrew Knyazev (Mitsubishi Electric Research Laboratories (MERL), USA); Dong Tian (Mitsubishi Electric Research Labs, USA); Hassan Mansour (Mitsubishi Electric Research Laboratories, USA)

**10:20 Contour Based Segmentation of Chromosomes in G-Band Metaphase Images 943**
Jayanthi K b (K S Rangasamy College of Technology, India)

**10:40 Randomized User-Centric Clustering for Cloud Radio Access Network with PHY Caching 948**
An Liu, Vincent Lau and Wei Han (Hong Kong University of Science and Technology, Hong Kong)

**WaGS-L: TDOA and Indoor Human Tracking**

Room: Scotland B
Chair: Giuseppe Destino (CWC, University of Oulu, Finland)

**10:00 Informed TDoA-based Direction of Arrival Estimation for Hearing Aid Applications 953**
Mojtaba Farmani (Aalborg University, Denmark); Michael Syskind Pedersen (Oticon, Denmark); Zheng-Hua Tan (Aalborg University, Denmark); Jesper Jensen (Oticon, Denmark)

**10:30 Human Tracking using Wearable Sensors in the Pocket 958**
Wenchao Jiang and Zhaozheng Yin (Missouri University of Science and Technology, USA)

**WaGP-K: Multicore Digital Signal Processor for Heterogeneous Systems Era**

Keynote
John Glossner, Optimum Semiconductor Technologies
Room: Scotland C
Chair: Jarmo Takala (Tampere University of Technology, Finland)

## Wednesday, December 16, 11:00 - 12:20

**WbCP-L: Mathematical Strategies for a CPS Approach to Genomics and Proteomics Discovery**

Room: Diamond
Chair: Ulisses Braga-Neto (Texas A&M University, USA)

**11:00 Earth Mover's Distance for Differential Analysis of Heterogeneous Genomics Data 963**
Sheida Nabavi (University of Connecticut & BIDMC, Harvard Medical School, USA); Andrew Beck (Beth Israel Deaconess Medical Center and Harvard Medical School, USA)

**11:20 Inference of Sparse Gene Regulatory Network from RNA-Seq Time Series Data 967**
Alireza Karbalayghareh and Tao Hu (Texas A&M University, USA)

**11:40 Optimal State Estimation for Boolean Dynamical Systems using a Boolean Kalman Smoother 972**

Mahdi Imani and Ulisses Braga-Neto (Texas A&M University, USA)

**12:00 Differential Flux Balance Analysis of Quantitative Proteomic Data on Protein Interaction Networks 977**

Biaobin Jiang, David Gleich and Michael Gribskov (Purdue University, USA)

**WbOF-L: Storage**

Room: Emerald
Chair: Jin Wei (The University of Akron, USA)

**11:00 Optimal Scheduling of Networked Energy Storages 982**

Bharath Vellaboyana (University of Toronto, Canada); Afshin Oroojlooyjadid (Lehigh University, USA); Dariush Fooladivanda and Joshua Taylor (University of Toronto, Canada); Lawrence Snyder (Lehigh University, USA)

**11:20 Cost-Minimizing Distributed Algorithm for Managing Renewable-Integrated Power Grids 987**

Sun Sun (University of Toronto, Canada); Min Dong (University of Ontario Institute of Technology, Canada); Ben Liang (University of Toronto, Canada)

**11:40 Learning-Based Energy Management Policy with Battery Depth-of-Discharge Considerations 992**

Ting-Hsing Wang and Yao-Win Peter Hong (National Tsing Hua University, Taiwan)

**12:00 Optimal Energy Storage Management for Microgrids with ON/OFF Co-Generator: A Two-Time-Scale Approach 997**

Yiren Shen, Xiaoxian Ou, Jiarong Xu and Guanglin Zhang (Donghua University, P.R. China); Lin Wang (Shanghai Jiao Tong University, P.R. China); Dapeng Li (Nanjing University of Posts and Telecommunications, P.R. China)

**WbGS-L: Statistical Signal Processing**

Room: Ireland A
Chair: Weiyu Huang (University of Pennsylvania, USA)

**11:00 Persistent Homology Approximations of Network Distances 1002**

Weiyu Huang and Alejandro Ribeiro (University of Pennsylvania, USA)

**11:20 On the Particle-Assisted Stochastic Search In Cooperative Wireless Network Localization 1007**

Bingpeng Zhou and Qingchun Chen (Southwest Jiaotong University, P.R. China)

**11:40 Non-Intrusive Load Monitoring of HVAC Components using Signal Unmixing 1012**

Alireza Rahimpour (The University of Tennessee at Knoxville, USA); Hairong Qi (the University of Tennessee, USA)

**12:00 New Results On the Sum of Two Generalized Gaussian Random Variables 1017**
Hamza Soury (King Abdullah University for Science and Technology (KAUST), Saudi Arabia); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia)

**WbOW-L: Modulation and Coding**

Room: Ireland B
Chair: Zhaocheng Wang (Tsinghua University, P.R. China)

**11:00 On the Superposition Modulation for OFDM-based Optical Wireless Communication 1022**
Mohamed Sufyan Islim and Dobroslav A. Tsonev (University of Edinburgh, United Kingdom); Harald Haas (The University of Edinburgh, United Kingdom)

**11:20 Experimental Demonstration of High-Order Modulation for Optical Camera Communication 1027**
Wei Huang, Chen Gong, Peng Tian and Zhengyuan Xu (University of Science and Technology of China, P.R. China)

**11:40 Optical Spatial Modulation With Polarization Shift Keying over Atmospheric Turbulence Channels 1032**
Tuğba Özbilgin (Bogazici University & TUBITAK Uekae, Turkey); Mutlu Koca (Bogazici University, Turkey)

**12:00 Coding Performance for Signal Dependent Channels in Visible Light Communication System 1037**
Ming Yuan, Xiaoshi Sha, Xiao Liang and Ming Jiang (Southeast University, P.R. China); Jiaheng Wang (Southeast University & National Mobile Communications Research Lab, P.R. China); Chunming Zhao (National Mobile Communications Research Laboratory, Southeast University, P.R. China)

**WbGS-L: Image Enhancement and Calibration Techniques**

Room: Ireland C
Chair: Takanori Senoh (National Institute of Information and Communications Technology, Japan)

**11:00 Fast Depth Estimation Using Non-iterative Local Optimization for Super Multi-view Images 1042**
Takanori Senoh (National Institute of Information and Communications Technology, Japan); Koki Wakunami, Hisayuki Sasaki and Ryutaro Oi (NICT, Japan); Kenji Yamamoto (National Institute of Information and Communications Technology, Japan)

**11:20 Image Unmixing Success Estimation In Spatially Varying Systems 1047**
Ron Gaizman and Yehoshua Y. Zeevi (Technion - Israel Institute of Technology, Electrical Engineering Department, Israel)

**11:40 Multiple View Image Denoising Using 3D Focus Image Stacks 1052**
Shiwei Zhou (University of Wisconsin-Madison, USA); Yuhen Hu (University of Wisconsin at Madison, USA); Hongrui Jiang (University of Wisconsin Madison, USA)

**12:00 Simple Self-scalable Grid Classifier for Signal Denoising in Digital Processing Systems 1057**
Rubem Geraldo Vasconcelos Machado (Federal University of Minas Gerais, Brazil); Hilton Oliveira-Mota (Universidade Federal de Minas Gerais, Brazil)

**WbGS-L: Random Graphs and Transforms**

Room: Scotland A
Chair: Kairan Sun (University of Florida, USA)

**11:00 Robustness of Complex Networks with Applications to Random Graphs 1062**
Jun Zhao (Carnegie Mellon University, USA)

**11:20 Retrieving information lost by image denoising 1066**
Mushfiqur Rouf and Rabab Ward (University of British Columbia, Canada)

**11:40 A Finite Field Cosine Transform-Based Image Processing Scheme for Color Image Encryption 1071**
Juliano B. Lima (Federal University of Pernambuco, Brazil); Edmar da Silva (Universidade Federal de Pernambuco, Brazil); Ricardo Campello de Souza (Federal University of Pernambuco, Brazil)

**12:00 CRH: A Simple Benchmark Approach to Continuous Hashing 1076**
Miao Cheng (Qingdao University, P.R. China); Ah Chung Tsoi (Macau University of Science and Technology, Macao)

**WbGS-L: Interference Mitigation in Wireless Communications**

Room: Scotland B
Chair: Taneli Riihonen (Aalto University School of Electrical Engineering, Finland)

**11:00 Full-Duplex Relaying in MIMO-OFDM Frequency-Selective Channels with Optimal Adaptive Filtering 1081**
João S Lemos (Instituto de Telecomunicações/Instituto Superior Técnico, Portugal); Francisco A. Monteiro (Instituto de Telecomunicações & ISCTE - University Institute of Lisbon, Portugal); Ivo Sousa (Instituto de Telecomunicações/IST, University of Lisbon, Portugal); António J. Rodrigues (IT / Instituto Superior Técnico, Portugal)

**11:20 Interference Model and Analysis on Device-to-Device Cellular Coexist Networks 1086**
Hao Lu (University of Science and Technology of China, P.R. China); Yichen Wang (Xi'an Jiaotong University, P.R. China); Yan Chen (University of Electronic Science and Technology of China, P.R. China); K. J. Ray Liu (University of Maryland, USA)

**11:40 Joint Re-encoding and Successive Interference Cancellation for Multi-hop Relay Networks 1091**
Xiaohua (Edward) Li and Jeong Kyun Lee (State University of New York at Binghamton, USA)

**12:00 Optimal Pricing for Interference Control in Time-reversal Device-to-Device Uplinks 1096**
Qinyi Xu (University of Maryland College Park, USA); Yan Chen (University of Electronic Science and Technology of China, P.R. China); K. J. Ray Liu (University of Maryland, USA)

**WbGP-P: Algorithms vs. Architectures: Opportunities and Challenges in Multicore/GPU DSP**

Panel
Room: Scotland C
Chair: Gwo-Giun Lee (National Cheng Kung University, Taiwan)

## Wednesday, December 16, 12:20 - 14:00

**Lunch**

Room: Great Hall North

## Wednesday, December 16, 14:00 - 15:20

**WpGS-L: Acoustic Sensor Networks**

Room: Diamond
Chairs: Qiuyuan Huang (University of Florida, USA), Yun Zhu (University of Florida, USA)

**14:00 Heuristic IG-TDMA Protocol for Underwater Acoustic Sensor Networks 1101**
Xilin Cheng, Rongqing Zhang and Liuqing Yang (Colorado State University, USA); Xiang Cheng (Peking University, P.R. China)

**14:20 Physics Inspired CS based Underwater Acoustic Channel Estimation 1106**
Naushad Ansari (IIIT Delhi, India); Anubha Gupta (Indraprastha Institute of Information Technology Delhi, India); Ananya Sen Gupta (University of Iowa, USA)

**14:40 Acoustic data transmission by extension on the time domain approach 1111**
Seungkwon Beack (Electronics and Telecommunications Research Institute, Korea); Yong Ju Lee (ETRI(Electronics and Telecommunications Research Institute), Korea); TaeJin Park (Electronics and Telecommunications Research Institute & ETRI, Korea); Taejin Lee (ETRI(Electronics and Telecommunications Research Institute), Korea)

**15:00 Room Shape Reconstruction With a Single Mobile Acoustic Sensor 1116**
Fangrong Peng, Tiexing Wang and Biao Chen (Syracuse University, USA)

**WpOF-L: Optimal System Planning and Operations**

Room: Emerald
Chair: Meng Wang (Rensselaer Polytechnic Institute, USA)

**14:00 Multilevel Distributed Approach for DC Optimal Power Flow 1121**
Javad Mohammadi, June Zhang, Soummya Kar, Gabriela Hug and Jose Moura (Carnegie Mellon University, USA)

**14:16 Power Dispatch and Load Control with Generation Uncertainty 1126**
Pedram Samadi, Shahab Bahrami, Vincent W.S. Wong and Robert Schober (University of British Columbia, Canada)

**14:32 Microgrid Dispatch and Price of Reliability Using Stochastic Approximation 1131**
Luis M. Lopez-Ramos (Universidad Rey Juan Carlos, Spain); Vassilis Kekatos (Virginia Tech, USA); Antonio G. Marques (Universidad Rey Juan Carlos, Spain); Georgios B. Giannakis (University of Minnesota, USA)

**14:48 Placing and Sizing Distributed Photovoltaic Generators for Optimal Reactive Power Compensation 1136**
Mohammadhafez Bazrafshan and Nikolaos Gatsis (The University of Texas at San Antonio, USA)

**15:04 Nonsmooth Optimization for Optimal Power Flow over Transmission Networks 1141**
Ye Shi, Hoang D. Tuan, Steven Weidong Su and Tam Ho (University of Technology, Sydney, Australia)

**WpGS-L: Bayesian Classification**

Room: Ireland A
Chair: Ulisses Braga-Neto (Texas A&M University, USA)
**14:00 A length bias corrected likelihood-ratio test for the detection of differentially expressed pathways in RNA-Seq data 1145**
Ariana Broumand and Tao Hu (Texas A&M University, USA)

**14:20 Unsupervised Keyword Spotting using Bounded Generalized Gaussian Mixture Model with ICA 1150**
Muhammad Azam and Nizar Bouguila (Concordia University, Canada)

**14:40 A Nonparametric Bayesian Approach to Joint Multiple Dictionary Learning with Separate Image Sources 1155**
Shaoyang Li, Xiaoming Tao, Linhao Dong and Jianhua Lu (Tsinghua University, P.R. China)

**15:00 Robust Object Tracking via Adaptive Sparse Representation 1160**
Rahman Khorsandi and Mohamed Abdel-Mottaleb (University of Miami, USA)

**WpOW-L: Power, Multiuser and Interference**

Room: Ireland B
Chair: Steve Hranilovic (McMaster University, Canada)
**14:00 Improved Achievable Secrecy Rate of Visible Light Communication With Cooperative Jamming 1165**
Hajar Zaid (Ecole Nationale des Sciences Appliquées Oujda Morocco, Morocco); Zouheir Rezki (King Abdullah University of Science and Technologie (KAUST), Saudi Arabia); Anas Chaaban (King Abdullah University of Science and Technology, Saudi Arabia); Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST), Saudi Arabia)

**14:20 Multi-User MIMO-OFDM for Indoor Visible Light Communication Systems 1170**
Qi Wang, Zhaocheng Wang and Chen Qian (Tsinghua University, P.R. China); Jinguo Quan (Tsinghua university, P.R. China); Linglong Dai (Tsinghua University, P.R. China)

**14:40 Optical Interference Alignment for an Indoor Visible Light Communication X-Channel 1175**
Xiaoke Zhang, Qian Gao and Zhengyuan Xu (University of Science and Technology of China, P.R. China)

**15:00 Optimal Transmission Power in a Nonlinear VLC System 1180**
Shuang Zhao and Sunzeng Cai (Shanghai Institute of Microsystem and Information Technology, CAS, P.R. China); Kai Kang and Hua Qian (Chinese Academy of Sciences, P.R. China)

**WpGS-L: Video Coding, Detection, and Modeling**

Room: Ireland C
Chair: Jayanthi K b (K S Rangasamy College of Technology, India)

**14:00 Saliency guided Wavelet compression for low-bitrate Image and Video coding 1185**
Souptik Barua (Rice University, USA); Kaushik Mitra (Indian Institute of Technology, Madras, India); Ashok Veeraraghavan (Rice University, USA)

**14:20 Eccentricity Effect of Motion Silencing on Naturalistic Videos 1190**
Lark Kwon Choi and Lawrence Cormack (The University of Texas at Austin, USA); Alan C Bovik (University of Texas at Austin, USA)

**14:40 Key frames hysteresis-seeking based on motion change points for RGB-D video 1195**
Yong Nie and Peng Zhang (Fudan University, P.R. China); Bo Hu (Fudan University, Shanghai, P.R. China); Hui Feng (Fudan University, P.R. China)

**15:00 Unsupervised Estimation Of Uncertainty For Video Saliency Detection Using Temporal Cues 1200**
Tariq Alshawi, Zhiling Long and Ghassan AlRegib (Georgia Institute of Technology, USA)

**WpGS-L: Localization and Target Tracking**

Room: Scotland A
Chair: Giuseppe Destino (CWC, University of Oulu, Finland)

**14:00 A Closed-Form Method of Spatial De-aliasing for Multiple Speech Source Localization 1205**
Ying Dongwen (Institute of Acoustics, Chinese Academy of Sciences, P.R. China); Fei Li (Nanjing University of Posts and Telecommunications, P.R. China); Ge Zhan and Zhaoqiong Huang (Institute of Acoustics, Chinese Academy of Sciences, P.R. China); Yonghong Yan (Chinese Academy of Sciences, Key Laboratory of Speech Acoustics and Content Understanding, P.R. China)

**14:20 Target Tracking with Dynamic Convex Optimization 1210**
Alec Koppel (University of Pennsylvania, USA); Andrea Simonetto (Delft University of Technology, The Netherlands); Aryan Mokhtari (University of Pennsylvania, USA); Geert Leus (Delft University of Technology, The Netherlands); Alejandro Ribeiro (University of Pennsylvania, USA)

**14:40 Improving Target Tracking By Incorporating Shadowing Fading 1215**
Zhenghuan Wang, Fei Gao, Heng Liu, Shengxin Xu, Yaping Ni and Jie Yang (Beijing Institute of Technology, P.R. China)

**15:00 Sequential observer selection for source localization 1220**

Sabina Zejnilovic (Carnegie Mellon University, USA); Joao Gomes (ISR - Instituto Superior Tecnico, Portugal); Bruno Sinopoli (Carnegie Mellon University, USA)

**WpGS-L: Relay Systems**

Room: Scotland B

Chair: Taneli Riihonen (Aalto University School of Electrical Engineering, Finland)

**14:00 Energy Efficient Power Allocation and Relay Location for Asymmetric Bi-Directional Relaying 1225**

Xiaodong Ji (Nantong University, P.R. China); Wei-Ping Zhu (Concordia University, Canada); Daniel Massicotte (Universite du Quebec a Trois-Rivieres, Canada); Messaoud Ahmed-Ouameur (Nutaq inc., Canada)

**14:20 Outage Probability for Two-Way Solar-Powered Relay Networks with Stochastic Scheduling 1230**

Wei Li (Xi'an Jiaotong University & University of Maryland, P.R. China); Meng-Lin Ku (National Central University, Taiwan); Yan Chen (University of Electronic Science and Technology of China, P.R. China); K. J. Ray Liu (University of Maryland, USA)

**14:40 Diversity Analysis for Two-Way Multi-Relay Networks with Stochastic Energy Harvesting 1235**

Wei Li (Xi'an Jiaotong University & University of Maryland, P.R. China); Meng-Lin Ku (National Central University, Taiwan); Yan Chen (University of Electronic Science and Technology of China, P.R. China); K. J. Ray Liu (University of Maryland, USA)

**15:00 Jointly Optimal Power and Rate Allocation for Layered Broadcast Over Amplify-and-Forward Relay Channels 1240**

Mohamed Adel Attia (University of Arizona, USA); Mohammad Shaqfeh (Texas A&M University at Qatar, Qatar); Karim G Seddik (American University in Cairo, Egypt); Hussein Alnuweiri (Texas A&M University, Qatar)

**WpGP-L: Video Processing and Coding**

Room: Scotland C

Chairs: Ching-Te Chiu (National Tsing Hua University, Taiwan), Victor Sanchez (University of Warwick, United Kingdom)

**14:00 GPU Acceleration of the HEVC Decoder Inter Prediction Module 1245**

Diego F. de Souza (INESC-ID, IST, Universidade de Lisboa & INESC-ID, Portugal); Aleksandar Ilic (INESC-ID & IST, Universidade de Lisboa, Portugal); Nuno Roma (INESC-ID, IST, University of Lisbon, Portugal); Leonel A Sousa (INESC-ID / IST, Technical University of Lisbon, Portugal)

**14:20 Performance Evaluation of Kvazaar HEVC Intra Encoder on Xeon Phi Many-core Processor 1250**

Ari Koivula, Marko Viitanen, Ari Lemmetti, Jarno Vanne and Timo Hämäläinen (Tampere University of Technology, Finland)

**14:40 A Video Haze Removal System on Heterogeneous Cores 1255**
Mostafa M. El-Hashash and Hussein A. Aly (Military Technical College, Egypt); Tarek Mahmoud (EAF, Egypt); Wael Swelam (Egyptian Armed Forces, Egypt)

**15:00 Elastic GPU processing for streaming video data 1260**
Jussi Hanhirova, Vesa Hirvisalo and Ari Sundholm (Aalto University, Finland)

## Wednesday, December 16, 15:50 - 17:10

**WqGS-L: Sparse Data Analysis**

Room: Diamond
Chair: Weiyu Huang (University of Pennsylvania, USA)

**15:50 Generalised M-Lasso for robust, spatially regularised Hurst estimation 1265**
James D B Nelson (University College London, United Kingdom); Corina Nafornita (Politehnica University Timisoara, Romania); Alexandru Isar (Technical University of Timisoara, Romania)

**16:10 Bayesian LASSO in a Distributed Architecture 1270**
Marcela Mendoza, Sanggyun Kim and Todd Coleman (University of California, San Diego, USA)

**16:30 Fast Sparse Recovery via Non-Convex Optimization 1275**
Laming Chen and Yuantao Gu (Tsinghua University, P.R. China)

**16:50 Better Than l0 Recovery via Blind Identification 1280**
Richard Porter, Vladislav B Tadic and Alin M Achim (University of Bristol, United Kingdom)

**WqRT-L: Real-time Signal Processing**

Room: Emerald
Chair: Qiuyuan Huang (University of Florida, USA)

**15:50 Digital Filter with Confidence Input 1285**
Axel Heim and Martin Hoch (Microchip Technology, Germany)

**16:10 A 6.16Gb/s 4.7pJ/bit/iteration LDPC decoder for IEEE 802.11ad standard in 40nm LP-CMOS 1289**
Hiroyuki Motozuka, Naoya Yosoku, Takenori Sakamoto, Takayuki Tsukizawa, Naganori Shirakata and Koji Takinami (Panasonic Corporation, Japan)

**16:30 On the Energy Efficiency of Opportunistic Access in Wireless Home Networks 1293**
Ahmed Khattab (Cairo University, Egypt)

**16:50 DSP-based Fault Detection for DC-DC Converters 1298**
Tamer Kamel (Universiry of New Brunswick, Canada); Yevgen Biletskiy and Liuchen Chang (University of New Brunswick, Canada)

**WqGS-L: Biological and Biomedical Signal Processing**

Room: Ireland A
Chair: Kairan Sun (University of Florida, USA)

**15:50 Enhancing the Reliability of Epileptic Seizure Alarms for Scalp EEG Signals 1302**
Muhammad Imran Khalid, Saeed Aldosari and Saleh A Alshebeili (King Saud University, Saudi Arabia); Turky Al Otaiby (King ABDULAZIZ CITY for Science and Technology, Saudi Arabia)

**16:10 Joint Weighted Dictionary Learning and Classifier Training for Robust Biometric Recognition 1307**
Rahman Khorsandi (University of Miami, USA); Ali Taalimi (University of Tennessee, USA); Mohamed Abdel-Mottaleb (University of Miami, USA); Hairong Qi (the University of Tennessee, USA)

**16:30 Subject Independent Affective States Classification Using EEG Signals 1312**
Haiyan Xu and Konstantinos N Plataniotis (University of Toronto, Canada)

**16:50 Bird Sounds Classification by Large Scale Acoustic Features and Extreme Learning Machine 1317**
Kun Qian (Technical University Munich, Germany); Zixing Zhang (Universität Passau, Germany); Fabien Ringeval (Technical University Munich, Germany); Björn W Schuller (Imperial College London & University of Passau, United Kingdom)

**WqOW-L: Communication Systems and Relays**

Room: Ireland B
Chair: Chen Gong (University of Science and Technology of China, P.R. China)

**15:50 Amplify-and-Forward Integration of Power Line and Visible Light Communications 1322**
Mohammed Mossaad and Steve Hranilovic (McMaster University, Canada); Lutz Lampe (University of British Columbia, Canada)

**16:10 Constrained Clipping for PAPR Reduction in VLC Systems with Dimming Control 1327**
Kai Ying (Georgia Institute of Technology, USA); Zhenhua Yu (Texas Instruments, USA); Robert John Baxley (Bastille, USA); G. Tong Zhou (Georgia Tech, USA)

**16:30 Performance Analysis of a DF based Dual Hop Mixed RF-FSO System with a Direct RF Link 1332**
Sanya Anees (Indian Institute of Technology – Delhi, India); Priyanka Meena (Indian Institute of Technilogy, Delhi, India); Manav Bhatnagar (Indian Institute of Technology Delhi, India)

**16:50 Rate-adaptive selective relaying using time diversity for relay-assisted FSO communications 1337**
Ruben Boluda-Ruiz (University of Málaga, Spain); Antonio Garcia-Zambrana, Beatriz Castillo-Vazquez and Carmen Castillo-Vazquez (University of Malaga, Spain)

**WqGS-L: Advanced Signal Classifiers**

Room: Ireland C

Chair: Tulay Adali (University of Maryland, Baltimore County, USA)

**15:50 Minimum Variance Semi-Supervised Boosting for Multi-label Classification 1342**
Chenyang Zhao and Shaodan Zhai (Wright State University, USA)

**16:10 A Data-Driven Solution for Abandoned Object Detection: Advantages of Multiple Types of Diversity 1347**
Suchita Bhinge and Yuri Levin-Schwartz (University of Maryland, Baltimore County, USA); Gengshen Fu (Amazon, USA); Beatrice Pesquet-Popescu (Télécom ParisTech, France); Tulay Adali (University of Maryland, Baltimore County, USA)

**16:30 Characterization and Classification of Sonar Targets Using Ellipsoid Features 1352**
Daniel Schupp and Ananya Sen Gupta (University of Iowa, USA); Ivars Kirsteins (Naval Undersea Warfare Center, USA)

**16:50 Model-based Color Natural Stochastic Textures Processing and Classification 1357**
Ido Zachevsky (Technion, Israel); Yehoshua Y. Zeevi (Technion - Israel Institute of Technology, Electrical Engineering Department, Israel)

**WqGS-L: Coding and Compression of Signals**

Room: Scotland A

Chair: Mohammed Zafar Ali Khan (Indian Institute of Technology, Hyderabad, India)

**15:50 A Multitaper-Random Demodulator Model for Narrowband Compressive Spectral Estimation 1362**
Dimitrios Karampoulas (The Open University, Greece); Laurence S Dooley and Soraya Kouadri (The Open University, United Kingdom)

**16:10 Fast Intra-prediction for Lossless Coding of Screen Content in HEVC 1367**
Victor Sanchez (University of Warwick, United Kingdom)

**16:30 Perceptual Long-Term Harmonic plus Noise Modeling for Speech Data Compression 1372**
Faten Ben Ali (National Engineering School of Tunis, Tunisia); Sonia Djaziri-Larbi (Université Tunis El Manar & Ecole Nationale d'Ingénieurs de Tunis, Tunisia)

**16:50 Fast Coding Unit Selection Based on Local Texture Characteristics for HEVC Intra Frame 1377**
Miloš Radosavljević (University of Novi Sad, Serbia); Georgios Georgakarakos (Abo Akademi University, Finland); Sebastien Lafond (Åbo Akademi University, Finland); Dejan Vukobratović (University of Novi Sad, Serbia)

**WqGS-L: Signal Enhancement in SIMO and MISO Systems**

Room: Scotland B

Chair: Janne Janhunen (University of Oulu, Finland)

**15:50 Artificial-Noise Aided Transmit Design for Multi-User MISO Systems with Integrated Services 1382**
Weidong Mei and Lingxiang Li (University of Electronic Science and Technology of China, P.R. China); Zhi Chen (University of Electronic Science and Technology of China & University of

California, Riverside, P.R. China); Chuan Huang (University of Electronic Science and Technology of China, P.R. China)

**16:10 Decentralized Coordinated Beamforming for Weighted Sum Energy Efficiency Maximization in Multi-Cell MISO Downlink 1387**

Oskari Tervo (University of Oulu, Finland); Le-Nam Tran (Maynooth University, Ireland); Markku Juntti (University of Oulu, Finland)

**16:30 Iterative Optimization for Max-Min SINR in Dense Small-Cell Multiuser MISO SWIPT System 1392**

Ali A Nasir (National University of Sciences and Technology (NUST), Pakistan); Duy T Ngo (The University of Newcastle, Australia); Hoang D. Tuan (University of Technology, Sydney, Australia); Salman Durrani (The Australian National University, Australia)

**16:50 Multi-Linear Subspace Estimation and Projection for Efficient RFI Excision in SIMO Systems 1397**

Tilahun Getu (École de Technologie Supérieure (ETS), Canada); Wessam Ajib (Université du Québec à Montréal, Canada); Omar Yeste (LASSENA Labs, Canada)

**WqGP-L: DSP Implementations on Heterogeneous Platforms**

Room: Scotland C
Chair: Leonel A Sousa (INESC-ID / IST, Technical University of Lisbon, Portugal)

**15:50 Implementation and Analysis of the Histograms of Oriented Gradients Algorithm on a Heterogeneous Multicore CPU/GPU Architecture 1402**

Oliver Jakob Arndt (Leibniz Universität Hannover, Institute of Microelectronic Systems, Germany); Tobias Linde (Leibniz Universität Hannover, Germany); Holger Blume (Leibniz Universitaet Hannover, Germany)

**16:10 HSA-Enabled DSPs and Accelerators 1407**

John Glossner (Optimum Semiconductor Technologies, USA); Paul Blinzer (AMD & HSA Foundation, USA); Jarmo Takala (Tampere University of Technology, Finland)

**16:30 An Accelerated Signal Tracking Module Using a Heterogeneous Multi-GPU Platform for Real-time GNSS Software Receiver 1412**

Kwi Woo Park (Chungbuk National University, Korea); Sangwoo Lee and Sunwoo Kim (Hanyang University, Korea); Min-Joon Lee (Agency for Defense Development, Korea); Jae-Won Suh and Chansik Park (Chungbuk National University, Korea)

**16:50 Determining a Device Crossover Point in CPU/GPU Systems for Streaming Applications 1417**

Sudeep Kanur, Wictor Lund and Leonidas Tsiopoulos (Åbo Akademi University, Finland); Johan Lilius (TUCS and Abo Akademi, Finland)

# 2015 IEEE Global Conference on Signal and Information Processing (GlobalSIP)

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