D1: Demo Session (invited)

Coordinated Multipoint - Multiuser Superposition Transmission
Johannes Dommel, Lars Thiele and Barış Göktepe (Fraunhofer Heinrich Hertz Institute, Germany); Cornelius Hellge (Fraunhofer HHI, Germany)

First Visual Demonstration of Transmit and Receive Spatial Modulations Using the "Radio Wave Display"
Dinh-Thuy Phan-Huy (Orange-France Telecom, France); Yvan Kokar (IETR-INSA Rennes, France); Jean Rioult (IFSTTAR, France); Nadine Malhouroux (France Telecom Research & Development, France); Jean-Christophe Prévotet (INSA, France); Philippe Ratajczak (Orange Labs, France); Maryline Hélard (INSA Rennes & IETR Institute of Electronics and Telecommunications of Rennes, France); Abdelwaheb Ourir and Kammel Rachedi (Institut Langevin ESPCI Paris CNRS, France); Christian Leray (Atos, France); Julien de Rosny (Institut Langevin, Valenciennes, France); Alain Le Cornec and Azeddine Gati (Orange Labs, France); Thierry Sarrebourse (Orange-France Telecom, France); Patrice Pajusco (TELECOM Bretagne, France); Marco Di Renzo (Paris-Saclay University / CNRS, France)

Centralized Signal Processing Zero-Forcing Capable Massive MIMO SDR Hardware Using Multi Gigabit Transceivers
Andreas Benzin (Technische Universitaet Berlin, Germany); Giuseppe Caire (Technische Universität Berlin, Germany)

A Testbed for Experimenting 5G-V2X Requiring Ultra Reliability and Low-Latency
Hanwen Cao, Sandip Gangakhedkar, Ali Ali and Mohamed Gharba (Huawei German Research Center, Germany); Joseph Eichinger (Huawei Technologies Duesseldorf GmbH, European Research Center (ERC), Germany)

Demo: an LTE compatible massive MIMO testbed based on OpenAirInterface
Xiwen Jiang (EURECOM, France); Florian Kaltenberger (Eurecom, France)

S1: Random matrix theory and statistical physics in the analysis and design of MIMO systems (invited)

Nonlinear Precoders for Massive MIMO Systems with General Constraints
Ali Bereyhi (Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) & Institute for Digital Communications (IDC), Germany); Mohammad Ali Sedaghat (Friedrich Alexander University of Erlangen-Nürnberg, Germany); Saba Asaad (University of Tehran, Iran & Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany); Ralf R. Müller (FAU Erlangen-Nürnberg, Germany)

Random Operator-Valued Models: Combining Stochastic and Algebraic Models
Mario Diaz (Queen's University, Canada)

Sums of correlated Wishart Random Matrices
Mario Kieburg (Universität Bielefeld, Germany)

The Gallager Bound in Fiber Optical MIMO

Apostolos Karadimitrakis (University of Athens, Greece); Romain Couillet (CentraleSupélec, France); Aris L. Moustakas (University of Athens, Greece); Luca Sanguinetti (University of Pisa & CentraleSupélec, Italy)

Coding for Caching in 5G Networks

Antonia Tulino (Bell Labs and Federico II, USA & Università Federico II, Italy)

Regularized Zero-Forcing for Massive MIMO: Error Analysis and Optimal Tuning

Tareq Y. Al-Naffouri (King Abdullah University of Science and Technology, USA)

S2: Massive MIMO (regular)

On the Optimality of Mixed-ADC Massive MIMO with MRC Detection

Hessam Pirzadeh (University of California, Irvine, USA); Lee Swindlehurst (University of California at Irvine, USA)

Optimized Combination of Conventional and Constrained Massive MIMO Arrays

Markus Staudacher (Technische Universität München, Germany); Gerhard Kramer (Technical University of Munich, Germany); Wolfgang Zirwas (Nokia Siemens Networks GmbH&CoKG, Germany); Rakash SivaSiva Ganesan (Bell Labs, Nokia, Germany); Berthold Panzner (Nokia Networks, Germany)

Internal Self-Calibration Methods for Large Scale Array Transceiver Software-Defined Radios

Andreas Benzin (Technische Universitaet Berlin, Germany); Giuseppe Caire (Technische Universität Berlin, Germany)

PSK Precoding in Multi-User MISO Systems

Andreas Noll (Technical University of Munich, Germany); Hela Jedda (Technische Universität München, Germany); Josef A. Nossek (TU Munich, Germany & Federal University of Ceara, Fortaleza, Brazil)

A Novel Single-RF Outphasing MIMO Architecture

Bernhard Gäde (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany); Mohammad Ali Sedaghat (Friedrich Alexander University of Erlangen-Nürnberg, Germany); Christoph Rachinger (University of Erlangen-Nuremberg, Germany); Ralf R. Müller (FAU Erlangen-Nürnberg, Germany); Georg Fischer (FAU Erlangen-Nürnberg)

S3: Signal Processing for Massive MIMO (invited)

Analysis of MMSE Precoding and Equalization in Massive MIMO Systems

Michael Joham, David Neumann and Wolfgang Utschick (Technische Universität München, Germany)

Bring Massive MIMO to Practice: Testbed measurement & baseband processing

Liang Liu, Ove Edfors, Fredrik Tufvesson, Steffen Malkowsky and Joao Vieira (Lund University, Sweden); Erik L Bengtsson (Sony Mobile, Sweden); Hemanth Prabhu (Lund University, Sweden)

Downlink pilots in cellular and cell-free massive MIMO: Do we need them?

Hien Ngo and Erik G. Larsson (Linköping University, Sweden)

Improved channel estimation for massive MIMO systems using hybrid pilots with pilot anchoring

Karthik Upadhya and Sergiy A. Vorobyov (Aalto University, Finland); Mikko Vehkapera (University of Sheffield, United Kingdom)

Efficient Channel State Information Acquisition in Massive MIMO Systems using Non-Orthogonal Pilots

Paul Ferrand (Huawei Technologies France, France); Alexis Decurninge (Huawei Technologies, France); Maxime Guillaud (Huawei Technologies, Mathematical and

Algorithmic Sciences Lab, France); Luis G. Ordóñez (Huawei Technologies Co. Ltd., France)

P1: Poster Session I

Two-Step Knowledge-Aided Iterative ESPRIT Algorithm
Silvio Bernardes, Pinto (Pontifical Catholic University of Rio de Janeiro, Brazil); Rodrigo C. de Lamare (Pontifical Catholic University of Rio de Janeiro & University of York, Brazil)

Multiuser Downlink Hybrid Analog-Digital Beamforming with Individual SINR Constraints
Miguel Ángel Vázquez (Centre Tecnològic de les Telecommunicacions de Catalunya (CTTC/CERCA), Spain); Luis Blanco (Centre Tecnològic de les Telecommunicacions de Catalunya, Spain); Ana Pérez-Neira (CTTC, Spain)

A Better Decision Rule for OFDM with Subcarrier Index Modulation
Qinwei He and Anke Schmeink (RWTH Aachen University, Germany)

Hybrid Beamforming Strategy for Wideband Millimeter Wave Channel Models
Hsiao-Lan Chiang (Technical University of Dresden, Germany); Wolfgang Rave (Dresden University of Technology, Germany); Gerhard Fettweis (Technische Universität Dresden, Germany)

Single-User MIMO ML Successive Interference Canceling Receiver with HARQ-IR Protocol
Elena Lukashova and Florian Kaltenberger (Eurecom, France); Raymond Knopp (Institut Eurecom, France)

Side-Link Assisted Hybrid Automatic Repeat Request for Ultra-Reliable Low Latency Communications
Bengi Aygun, Silvio Mandelli and Thorsten Wild (Nokia Bell Labs, Germany); Stephan Saur (Nokia, Germany); Frank Schaich (Nokia Bell Labs, Germany)

Evaluating the throughput performance at 2 GHz and 3.5 GHz in a massive MIMO system
Blanca Ramos Elbal (TU Wien); Fjolla Ademaj, Stefan Schwarz and Markus Rupp (TU Wien, Austria)

Direction of Arrival Based Positioning in Three Dimensional Coordinates
Martin Kurras and Lars Thiele (Fraunhofer Heinrich Hertz Institute, Germany); Xiao Peng and Naoto Ishii (NEC Corporation, Japan)

Nonlinear Digital Self-Interference Cancellation with Reduced Complexity for Full Duplex Systems
Mustafa Emara (Technical University Munich & Intel Deutschland GmbH, Germany); Kilian Roth (Technical University Munich, Germany); Leonardo Gomes Baltar (Intel Corporation, Germany); Josef A. Nossek (TU Munich, Germany & Federal University of Ceara, Fortaleza, Brazil); Michael Faerber (Intel Deutschland GmbH, Germany)

Measurement and Characterization of the Temporal Behavior of Fixed Massive MIMO Links
Stefan Wesemann (Nokia Bell Labs & Nokia, Germany); Heinz Schlesinger (Bell Labs, Alcatel-Lucent, Germany); Andreas Pascht (Alcatel-Lucent, Bell Labs, Germany); Oliver Blume (Nokia Bell Labs, Germany)

Equalization and Precoding in Multi-User MIMO Relaying Systems and Their Diversity Bottleneck
Sebastian Stern (Ulm University, Germany); Yeicatl Ramos Vazquez (Ulm University); Robert F.H. Fischer (Ulm University, Germany)

Sum-Power Minimization Under Rate Constraints in Full-Duplex MIMO Interference-Channels
Ali Cagatay Cirik (University of British Columbia, Canada); Omid Taghizadeh (RWTH Aachen University, Germany); An Liu (Hong Kong University of Science and Technology, Hong Kong); Lutz Lampe (University of British Columbia, Canada); Rudolf Mathar (RWTH Aachen University, Germany)

Initial Access Assisted by an Auxiliary Transceiver for Millimeter-Wave Networks
Jian Luo and Nikola Vucic (Huawei Technologies Duesseldorf GmbH, Germany); Mario H. Castañeda (Huawei Technologies Duesseldorf GmbH & European Research Center, Germany); Yilin Li (Huawei Technologies Duesseldorf GmbH, Germany); Wen Xu (Huawei & Huawei Technologies Duesseldorf GmbH - European Research Center (ERC), Germany)

On the Worst-Case Noise in Gaussian MIMO Systems with Proper and with Improper Signaling
Christoph Hellings and Wolfgang Utschick (Technische Universität München, Germany)

An Investigation on Energy and Spectral Efficient Robust Design of Fog Radio Access Network
Di Chen and Volker Kuehn (University of Rostock, Germany)

General Rank Beamforming Using High Order OSTBC For Multicasting Networks
David Schenck (Technische Universität Darmstadt, Germany); Dima Taleb (Communication Systems Group, Germany); Marius Pesavento (Technische Universität Darmstadt & Merckstr. 25, Germany); Aydin Sezgin (RUB, Germany)

16 QAM Communication with 1-Bit Transmitters
Donia Ben Amor and Hela Jedda (Technische Universität München, Germany); Josef A. Nossek (TU Munich, Germany & Federal University of Ceara, Fortaleza, Brazil)

User-Centric Communications versus Cell-free Massive MIMO for 5G Cellular Networks
Stefano Buzzi (University of Cassino and Lazio Meridionale/CNIT, Italy); Carmen D'Andrea (University of Cassino and Southern Lazio, Italy)

On Implicit and Explicit Channel Estimation for Compress and Forward Relaying OFDM Schemes Designed by Information Bottleneck Graphs
Daniel Kern and Volker Kuehn (University of Rostock, Germany)

Multi-User Hybrid Precoding for Millimeter-Wave Communications Based on a Linear Successive Allocation Method
Christoph Stöckle, Wolfgang Utschick and Michael Joham (Technische Universität München, Germany); Jian Luo (Huawei Technologies Duesseldorf GmbH, Germany)

Iterative GFDM Receiver based on the PARATUCK2 Tensor Decomposition
Kristina Naskovska and Sher Ali Cheema (TU Ilmenau, Germany); Martin Haardt (Ilmenau University of Technology, Germany); Bulat Valeev (Kazan National Research Technical University n. a. A. N. Tupolev - KAI, Germany); Yury Evdokimov (Kazan National Research Technical University n. a. A. N Tupolev-KAI, Russia)

S4: Physical layer security in wireless MIMO systems (invited)

Resource Allocation for Secure Full-Duplex Radio Systems
Yan Sun (Friedrich-Alexander University of Erlangen-Nuremberg, Germany); Derrick Wing Kwan Ng (University of New South Wales, Australia); Robert Schober (University of British Columbia, Canada)

On the Capacity Region of Deterministic Strong IC with Multicast and Secure Unicast Messages
Hendrik Vogt, Zohaib Awan and Aydin Sezgin (RUB, Germany)

Optimal Trade-off Between Transmission Rate and Secrecy Rate in Gaussian MISO Wiretap Channels
Phuong Le Cao (KTH Royal Institute of Technology, Sweden); Tobias J. Oechtering (KTH Royal Institute of Technology & School of Electrical Engineering, EE, Sweden)

Comparison Between Asymmetric and Symmetric Channel-Based Authentication for MIMO Systems
Stefano Tomasin (University of Padova, Italy)

S5: Sparsity and Random Matrix Theory (regular)

Rayleigh Quotient Based Analysis of MIMO Linear Receivers
Giuseppa Alfano (Politecnico di Torino, Italy); Alessandro Nordio (IEIIT-CNR, Italy); Carla-Fabiana Chiasserini (Politecnico di Torino, Italy)

Deep Channel Estimation
David Neumann, Thomas Wiese and Wolfgang Utschick (Technische Universität München, Germany)

On The Evaluation of Blind Pilot Decontamination in Finite Dimensions
Ebrahim Amiri (University of Erlangen-Nürnberg, Germany); Ralf R. Müller (FAU Erlangen-Nürnberg, Germany); Wolfgang Gerstacker (University of Erlangen-Nuernberg, Germany)

Binary Iterative Hard Thresholding for Frequency-Sparse Signal Recovery
Niklas Koep and Rudolf Mathar (RWTH Aachen University, Germany)

Blind Estimation of Sparse Multi-User Massive MIMO Channels
Amine Mezghani (University of California, Irvine, USA); Lee Swindlehurst (University of California at Irvine, USA)

S6: Applications of machine learning and compressive sensing in communications (invited)

Blind Demixing and Deconvolution with Noisy Data: Near-optimal Rate
Dominik Stöger (Technical University of Munich, Germany); Peter Jung (TU-Berlin, Communications and Information Theory Group & Fraunhofer HHI - Heinrich Hertz Institute, Germany); Felix Krahmer (Technische Universität München, Germany)

Fast Bayesian Signal Recovery in Compressed Sensing with Partially Unknown Discrete Prior
Norbert Goertz (Vienna University of Technology (TU Wien), Austria); Gabor Hannak (Vienna University of Technology, Austria)

The Fast Slepian Transform
Mark Davenport (Georgia Institute of Technology, USA)

Exploiting Bilinear Forms: Time-varying Wireless Channel estimation via Non-convex and Convex Optimization
Sajjad Beygi and Urbashi Mitra (University of Southern California, USA)

Exact BER Analysis of Convex-Relaxation-Based Signal Recovery in MIMO
Babak Hassibi (California Institute of Technology, USA)

P2: Poster Session II

Fair Beam Allocation in Millimeter-Wave Multiuser Transmission
Fırat Karababa, Furkan Küçük and Tolga Girici (TOBB University of Economics and Technology, Turkey)

Outage Analysis in DF Relay Assisted Two-Way Communication with RF Energy Harvesting
Sutanu Ghosh (Indian Institute of Engineering Science and Technology & JIS GROUP, India); Tamaghna Acharya (Indian Institute of Engineering Science and Technology Shibpur, India); Santi Prasad Maity (Indian Institute of Engineering Science and Technology, Shibpur, India)

On Shortening the Effective mmWave MIMO Channel Impulse Response
Nikola Vucic and Marcin Iwanow (Huawei Technologies Duesseldorf GmbH, Germany); Mario H. Castañeda (Huawei Technologies Duesseldorf GmbH & European Research Center, Germany); Jian Luo (Huawei Technologies Duesseldorf GmbH, Germany); Wen Xu

Germany); Wen Xu (Huawei & Huawei Technologies Duesseldorf GmbH - European Research Center (ERC), Germany)

Multi-User Frame Synchronization in Wireless Networks with Sporadic User Activity
Ayham Zedan, Benjamin Knoop and Dagmar Peters-Drolshagen (University of Bremen, Germany); Steffen Paul (University Bremen, Germany)

High Resolution Time-Delay Estimation via Direction of Arrival Estimation and Khatri-Rao Factorization for Multipath Mitigation
Daniel Valle de Lima (University of Brasília, Brazil); Joao Paulo Carvalho Lustosa da Costa (University of Brasília & Ilmenau University of Technology and Fraunhofer Institute for Integrated Circuits IIS, Brazil); Felix Antreich (Federal University of Ceara (UFC), Brazil); Ricardo Kehrle Miranda (University of Brasilia, Brazil); Giovanni Del Galdo (Fraunhofer Institute for Integrated Circuits IIS & Technische Universität Ilmenau, Germany)

IEEE 802.11ax: Effects of IQ Mismatching on the Performance of Uplink Multi-User MIMO
Roger Pierre Fabris Hoefel (Federal University of Rio Grande do Sul, Brazil)

S7: Reliable and Low-Latency Wireless Communications (invited)

Towards Spatially and Temporally Consistent Channel Modeling for Reliable V2X Communication
Mate Boban (Huawei European Research Center, Germany); Xitao Gong (Huawei Technologies Duesseldorf GmbH, Germany); Konstantinos Manolakis (Huawei Technologies, Germany); Wen Xu (Huawei & Huawei Technologies Duesseldorf GmbH - European Research Center (ERC), Germany)

Finite Length Coding in Edge Computing Scenarios
Sebastian Schiessl (KTH Royal Institute of Technology, Sweden); Hussein Al-Zubaidy (KTH Royal Institute of Technology); Mikael Skoglund and James Gross (KTH Royal Institute of Technology, Sweden)

Overview of 5G URLLC
Volker Braun (Alcatel-Lucent, Germany); Le-Hang Nguyen (Bell Labs, Alcatel-Lucent, Germany); Silvio Mandelli and Hans-Peter Mayer (Nokia Bell Labs, Germany)

Frameless ALOHA with Combined Latency-Reliability Guarantees
Francisco Lázaro (German Aerospace Center (DLR), Germany); Čedomir Stefanović (Aalborg University & University of Novi Sad, Denmark); Petar Popovski (Aalborg University, Denmark)

Wireless Communications with Ultra-High Performances (WirelessHP) for Critical Industrial Controls
Zhibo Pang (ABB AB Corporate Research, Sweden)

S8: Wireless Networks (regular)

Energy Saving in Heterogeneous Cellular Networks with User Classification
Sudarshan Sadananda (RWTH Aachen, Germany); Arash Behboodi and Rudolf Mathar (RWTH Aachen University, Germany)

Distributed Multi-Object Auctions for Energy Transfer between Harvesting Nodes
Miguel Angel Gutierrez-Estevez (Fraunhofer Heinrich Hertz Institute, Germany); Slawomir Stanczak (Fraunhofer Heinrich Hertz Institute & Technische Universität Berlin, Germany)

An Efficient Method for Avoiding Shadow Fading Maps in System Level Simulations
Thomas Dittrich (Technische Universität Wien, Austria); Martin Taranetz and Markus Rupp (TU Wien, Austria)