WSA SCC 2023

Program

International ITG 26th Workshop on Smart Antennas and 13th Conference on Systems, Communications, and Coding

27.02 - 03.03.2023

Technische Universität Braunschweig, Altgebäude, Pockelsstraße 4, SN19.1

VDE ITG

Organizing Committee

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Ph.D. Pin-Hsun Lin, TU Braunschweig

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For further information please visit the conference website:
https://wsa-scc-2023.org/

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Overview

TPC Members

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Erik G. Larsson, Linköping University

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Gerhard Bauch, Hamburg University of Technology

Gerhard Fettweis, Technische Universität Dresden

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Gholamreza Alirezaei, RWTH Aachen University

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Giuseppe Durisi, Chalmers University of Technology,

Gottfried Lechner, University of South Australia

Holger Boche, Technical University of Munich

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Ioannis Kontoyiannis, University of Cambridge

Israel Leyva-Mayorga, Aalborg University

Juergen Freudenberger, University of Applied Sciences

Khac-Hoang Ngo, Chalmers University of Technology

Khaled Fazel, Rohde&Schwarz,

Laura Cottatellucci, University of Erlangen-Nuremberg

Laurent Schmalen, Karlsruhe Institute of Technology (KIT)

Lee Swindlehurst, University of California at Irvine

Luca Sanguinetti, University of Pisa

Marco Di Renzo, CNRS & Paris-Saclay University

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Norbert Goertz, Technical University of Vienna

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Pascal Chevalier, CNAM

Peter Jung, Technische Universität Berlin, Communications and Information Theory Group

Peter Rost, Karlsruhe Institute of Technology

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Ullrich Mönich, Technical University of Munich

Volker Kühn, University of Rostock

Wolfgang Utschick, Technical University of Munich

Yijie Mao, ShanghaiTech University

Zheng Chen, Linköping University

Program Overview

Monday
27. February 2023

13:30 - 14:00	Opening
14:00 - 14:45	**K1**: On-Demand Intelligence at the Wireless Edge
14:45 - 15:30	**S1**: Federated Learning
15:30 - 16:00	*Coffee Break*
16:00 - 17:30	**6G-1**: Explorative Concepts for 6G Air Interface
19:00 - 22:00	Welcome Reception

Tuesday
28. February 2023

09:00 - 09:45	**K2**: Extremal Combinatorics and Information Theory
09:45 - 10:30	**S2**: Source Coding
10:30 - 11:00	*Coffee Break*
11:00 - 11:45	**K3**: Access Protocols for Wireless Systems with Reconfigurable Intelligent Surfaces
11:45 - 12:30	**I1**: Industry Presentation by Ericsson
12:30 - 14:00	*Lunch Break,* **P1**: Poster Session
14:00 - 15:45	**6G-2**: Satellite Communications for 6G Networks
15:45 - 16:15	*Coffee Break*
16:15 - 17:45	**S3**: Reconfigurable Intelligent Surfaces

Wednesday
01. March 2023

09:00 - 09:45	**K4**: Lattices and Security: From Ancient Mathematics to Post-Quantum Cryptography
09:45 - 10:30	**S4**: Multidimensional Spaces
10:30 - 11:00	*Coffee Break*
11:00 - 11:45	**K5:** Multidimensional Constellation Shaping for Nonlinear Fiber Optics
11:45 - 12:30	**S5**: Optics
12:30 - 14:00	*Lunch Break,* **P2**: Demo Session
14:00 - 15:30	**S6**: Precoding
15:30 - 16:00	*Coffee Break*
16:00 - 17:45	**6G-3**: Smart Radio Environments for 6G Wireless Communication Systems

Thursday
02. March 2023

09:00 - 10:30	**S7**: Channel Coding
10:30 - 11:00	*Coffee Break*
11:00 - 11:45	**K6**: tbd
11:45 - 12:30	**S8**: Massive MIMO
12:30 - 14:00	*Lunch Break,* **P3**: Poster Session
14:00 - 16:00	**6G-4**: Integrated Sensing and Communication: Foundations and Perspectives
16:00 - 16:30	*Coffee Break*
16:30 - 18:00	**S9**: Antenna
19:00 - 23:00	Conference Dinner

Friday
03. March 2023

09:00 - 10:30	**S10**: Machine Learning
10:30 - 11:00	*Coffee Break*
11:00 - 12:30	**S11**: Communications & Sensing / Ray Tracing
12:30 - 12:45	Closing

Registration

Registration is open during the following hours:

27/02	12am - 5:30pm
28/02 - 02/03	8:30am - 5:30pm
03/03	8:30am - 1pm

Program Details

13:30 - 14:00 Lecture Hall	**Opening**

14:00 - 14:45
Lecture Hall

K1: On-Demand Intelligence at the Wireless Edge

Chair: Eduard A. Jorswieck

Deniz Gündüz

14:45 - 15:30
Lecture Hall

S1: Federated Learning

Chair: Eduard A. Jorswieck

14:45

A Novel Tree-Based Algorithm for Device Coordination in Over-the-Air Federated Learning

Mohammad Ali Sedaghat, Ali Bereyhi, Ralf R. Müller and Saba Asaad

15:05

Overhead Reduction in UAV-Assisted Federated Learning with Fast-Varying Environment

Sida Dai, Setareh Maghsudi, Lars Thiele and Slawomir Stanczak

15:30 - 16:00

Coffee Break

16:00 - 17:30
Lecture Hall

6G-1: Explorative Concepts for 6G Air Interface

6G Hub Special Session - Chair: Stephan ten Brink

Organized by Prof. Dr.-Ing. Laurent Schmalen (Karlsruhe Institute of Technology) and Prof. Dr.-Ing. Stephan ten Brink (University of Stuttgart)

16:00

A Multi-Task Approach to Robust Deep Reinforcement Learning for Resource Allocation

Steffen Gracla, Carsten Bockelmann and Armin Dekorsy

16:20

Autoencoder-based Joint Communication and Sensing of Multiple Targets

Charlotte Muth and Laurent Schmalen

16:40

Ensemble Belief Propagation Decoding for Short Linear Block Codes

Kira Kraft, Matthias Herrmann, Oliver Griebel and Norbert Wehn

17:00

Optimizing Serially Concatenated Neural Codes with Classical Decoders

Jannis A Clausius, Marvin Geiselhart and Stephan ten Brink

19:00 - 22:00
Dornse,
Altstadtrathaus

Welcome Reception

9:00 - 9:45
Lecture Hall

K2: Extremal Combinatorics and Information Theory

Chair: Deniz Gündüz

Igal Sason

9:45 - 10:30
Lecture Hall

S2: Source Coding

Chair: Deniz Gündüz

09:45

Model-Driven Deep Joint Source-Channel Coding over Time-Varying Channels

Can Karamanli, Tze-Yang Tung and Deniz Gündüz

10:05

Distributed Compression for Partially Cooperating Sensors and Gaussian Relevant Signals

Steffen Steiner and Volker Kühn

10:30 - 11:00

Coffee Break

Program Details

11:00 - 11:45
Lecture Hall

K3: Access Protocols for Wireless Systems with Reconfigurable Intelligent Surfaces

Chair: Dirk Wübben

Petar Popovski

11:45 - 12:30
Lecture Hall

I1: 6G – Connecting a cyber-physical world

Industry Presentation by Ericsson

12:30 - 14:00

Lunch Break

12:30 - 14:00
Pavilion

P1: Poster Session

Evaluation of the Fractional Approach for Iterative Algorithms in Compressed Sensing

Carmen Sippel and Robert F. H. Fischer

Comparison of Damping Approaches for AMP

Elena Sterk, Carmen Sippel and Robert F. H. Fischer

Vector Coded Caching Substantially Boosts MU-MIMO: Pathloss, CSI and Power-allocation Considerations

Hui Zhao and Petros Elia

Deep-LaRGE: Higher-Order SVD and Deep Learning for Model Order Selection in MIMO OFDM Systems

Brenda Vilas Boas, Wolfgang Zirwas and Martin Haardt

14:00 - 15:45
Lecture Hall

6G-2: Satellite Communications for 6G Networks

6G Hub Special Session - Chair: Bho Matthiesen

Organized by Dr.-Ing. Bho Matthiesen (University of Bremen), Dr.-Ing. Dirk Wübben (University of Bremen), Prof. Dr.-Ing. Armin Dekorsy (Universityof Bremen), and Prof. Petar Popovski (Aalborg University & University of Bremen)

14:00

LEO-to-User Assignment and Resource Allocation for Uplink Transmit Power Minimization

Hung Nguyen-Kha, Vu Nguyen Ha, Eva Lagunas, Symeon Chatzinotas and Grotz Joel

14:20

A Comparison between RSMA, SDMA, and OMA in Multibeam LEO Satellite Systems

Alea Schröder, Maik Röper, Dirk Wübben, Bho Matthiesen, Petar Popovski and Armin Dekorsy

14:40

Beamforming performance of satellite swarm-based antenna arrays for 6G direct-to-cell connectivity

Diego Tuzi, Thomas Delamotte and Andreas Knopp

15:00

Beam Splash Mitigation for NGSO Spectrum Coexistence between Feeder and User Downlink

Eva Lagunas, Ana Pérez-Neira, Joel Grotz, Symeon Chatzinotas and Björn Ottersten

15:20

Enabling Effective Multi-Link Data Distribution in NTN-based 6G Networks

Tomaso De Cola

15:45 - 16:15

Coffee Break

Program Details

16:15 - 17:45
Lecture Hall

S3: Reconfigurable Intelligent Surfaces
Chair: Aydin Sezgin

16:15

Analysis of Intelligent Surface-Aided MIMO Communication Systems

Johannes Russer, Dominik Semmler, Michael Joham, Josef A. Nossek and Wolfgang Utschick

16:35

Rate Region of MIMO RIS-assisted Broadcast Channels with Rate Splitting and Improper Signaling

Mohammad Soleymani, Ignacio Santamaria and Eduard A. Jorswieck

16:55

Alternating Minimization for the Downlink of Wideband IRS-Aided mmWave MIMO Systems

Darian Pérez-Adán, Michael Joham, Óscar Fresnedo, José P González-Coma, Wolfgang Utschick and Luis Castedo

17:15

Distributed Coordinated Beamforming for RIS-Aided Dynamic TDD Systems

Gerald Nwalozie and Martin Haardt

09:00 - 09:45
Lecture Hall

K4: Lattices and Security: From Ancient Mathematics to Post-Quantum Cryptography
Chair: Volker Kühn

Cong Ling

09:45 - 10:30
Lecture Hall

S4: Multidimensional Spaces
Chair: Volker Kühn

09:45

Four-Dimensional Hurwitz Signal Constellations With Convenient Bit Mapping and Set Partitioning

Sebastian Stern, Max Basler and Robert F.H. Fischer

10:05

Geometrical Properties Of Balls in Sum-Rank Metric

Cornelia Ott, Hedongliang Liu and Antonia Wachter-Zeh

10:30 - 11:00

Coffee Break

11:00 - 11:45
Lecture Hall

K5: Multidimensional Constellation Shaping for Nonlinear Fiber Optics
Chair: Robert F. H. Fischer

Alex Alvarado

11:45 - 12:30
Lecture Hall

S5: Optics
Chair: Robert F. H. Fischer

11:45

Learning a Time-Frequency Predistortion for Optical Coherent Digital Sub-Carrier Multiplexing

Tim Uhlemann, Vahid Aref and Stephan ten Brink

12:05

Comparison of Electronic and Optoelectronic Signal Generation for Wireless THz Communications

Joel Dittmer, Patrick Matalla, Christoph Füllner, Sandrine Wagner, Axel Tessmann, Christian Koos and Sebastian Randel

Program Details

12:30 - 14:00	**Lunch Break**

12:30 - 14:00
Pavilion

P2: Poster Session

ESPARGOS: An Ultra Low-Cost, Realtime-Capable Multi-Antenna WiFi Channel Sounder

Florian Euchner, Tim Matthias Schneider, Marc Gauger and Stephan ten Brink

RIS-Based Channel Modeling and Prototypical Validation

Kevin Weinberger, Simon Tewes, Markus Heinrichs, Rainer Kronberger and Aydin Sezgin

LEO-PNT with Starlink: development of a burst detection algorithm based on signal measurements

Winfried Stock, Christian A Hofmann and Andreas Knopp

Polarization and Correlation in MIMO Channels

Anvar Tukmanov, Jialai Weng and Ryan Husbands

Suboptimal Position Control as Enabler for Low-Cost Distance Estimation in Dynamic Multipath Networks

Marcel Kokorsch and Guido Dietl

An ultra reliable low latency Cloud RAN implementation in GNU Radio for automated guided vehicles

Johannes Demel, Carsten Bockelmann and Armin Dekorsy

Ultra low-power DSP for coherent 100ZR

Felix Frey

14:00 - 15:30
Lecture Hall

S6: Precoding
Chair: Peter Rost

14:00 **Statistical-CSI-Based Antenna Selection and Precoding in Uplink MIMO**

Chongjun Ouyang, Ali Bereyhi, Saba Asaad, Ralf R. Müller and Hongwen Yang

14:20 **Robust Transmit Beamforming Using OSTBC in a Multicast Network**

Junyi Li, Feng Wang and Yongwei Huang

14:40 **A Low Complexity Rate-Splitting Bilinear Precoder for Massive MIMO**

Marc Bjelkanovic, Donia Ben Amor, Michael Joham and Wolfgang Utschick

15:00 **Lattice-Reduction-Aided Preequalization for Physical-Layer Security in Wireless THz-Communication**

Rebekka Schulz and Robert F. H. Fischer

15:30 - 16:00 **Coffee Break**

16:00 - 17:45
Lecture Hall

6G-3: Smart Radio Environments for 6G Wireless Communication Systems
6G Hub Special Session - Chair: Robert Schober

Organized by Prof. Dr.-Ing. Robert Schober (Friedrich-Alexander-Universität Erlangen-Nürnberg) and Prof. Dr.-Ing. Vahid Jamali (Technical Universityof Darmstadt)

16:00 **Beam-Based Resource Allocation in THz-NOMA Networks**

Zhiguo Ding and H. Vincent Poor

Program Details

16:17 — **Secure Communication in Multifunctional Active Intelligent Reflection Surface-assisted Systems**

Shaokang Hu, Chang Liu, Derrick Wing Kwan Ng and Jinhong Yuan

16:34 — **RISNet: a Dedicated Scalable Neural Network Architecture for Optimization of Reconfigurable Intelligent Surfaces**

Bile Peng, Finn Siegismund-Poschmann and Eduard A. Jorswieck

16:51 — **RIS-enhanced Resilience in Cell-Free MIMO**

Kevin Weinberger, Robert-Jeron Reifert, Aydin Sezgin and Ertugrul Basar

17:08 — **Federated Learning with Integrated Over-the-Air Computation and Sensing in IRS-assisted Networks**

Paul Zheng, Yao Zhu, Mohamed Bouchaala, Yulin Hu, Slawomir Stanczak and Anke Schmeink

17:25 — **On the Degrees of Freedom of RIS-aided Holographic MIMO Systems**

Juan Carlos Ruiz-Sicilia, Xuewen Qian, Marco Di Renzo, Vincenzo Sciancalepore, Mérouane Debbah and Xavier Costa-Perez

09:00 - 10:30
Lecture Hall

S7: Channel Coding
Chair: Sebastian Stern

09:00 — **Automorphism Ensemble Polar Code Decoders for 6G URLLC**

Claus Kestel, Marvin Geiselhart, Lucas Johannsen, Stephan ten Brink and Norbert Wehn

09:20 — **Space-Efficient Quantized Polar Decoders Designed using the Information Bottleneck Method**

Syed Aizaz Ali Shah, Maximilian Stark and Gerhard Bauch

09:40 — **Semi-Deterministic Subspace Selection for Sparse Recursive Projection-Aggregation Decoding of Reed-Muller Codes**

Johannes Voigt, Holger Jäkel and Laurent Schmalen

10:00 — **Polar Coding for Physical-Layer Security**

Johannes Pfeiffer and Robert F. H. Fischer

10:30 - 11:00 — **Coffee Break**

11:00 - 11:45
Lecture Hall

K6: Next-Generation MIMO and the New Applications Enabled by this Technology
Chair: Ralf R. Müller

Erik G. Larsson

11:45 - 12:30
Lecture Hall

S8: Massive MIMO
Chair: Ralf R. Müller

11:45 — **Analysis of dense array massive MIMO with practical constraints**

Nitish Vikas Deshpande, Saeed Reza Khosravirad, Jinfeng Du, Harish Viswanathan, Miguel R. Castellanos and Robert Heath

Program Details

12:05

MMSE-Based Resource Allocation for Clustered Cell-Free Massive MIMO Networks

Saeed Mashdour, Rodrigo C. de Lamare, Anke Schmeink and João Paulo Sales Henriques Lima

12:30 - 14:00

Lunch Break

12:30 - 14:00
Pavilion

P3: Poster Session

Classification of PC Baseband Signals from Wireless Egress

M. Ahmed Leghari, Sina M Pralle, Soeren Peik, Sebastian Luetje and Werner Henkel

Compressive Sensing based Angle-of-Arrival Estimation of a Single Light Source using a Liquid Crystal Display

Andrej Harlakin, Max Schurwanz, Jan Mietzner and Peter A. Hoeher

Intelligent Reflecting Surface Enabled Wireless System with Antenna Selection at Source Under Transceiver HardwareImpairments

Chandan Kumar, Aman Kumar and Salil Kashyap

Intercarrier Interference at Terahertz Frequencies for IEEE Std 802.15.3d Multiband Transmissions

Johannes M. Eckhardt, Christoph Herold and Thomas Kürner

14:00 - 16:00
Lecture Hall

6G-4: Integrated Sensing and Communication: Foundations and Perspectives

6G Hub Special Session - Chair: Anke Schmeink

Organized by Prof. Giuseppe Caire (TU Berlin) and Prof. Dr.-Ing. Anke Schmeink (RWTH Aachen University)

14:00

A Comparative Study of Subspace-based Superresolution Path Delay Estimation Techniques

Zhongju Li, Ahmad Nimr, Philipp Schulz and Gerhard P. Fettweis

14:17

Multi-Scatter-Point Target Estimation for Sensing-Assisted OTFS Automotive Communication

Saeid Khalili Dehkordi, Jan C. Hauffen, Peter Jung, Rodrigo Hernangómez, Giuseppe Caire and Slawomir Stanczak

14:34

Sensing-assisted Physical Layer Security

Nanchi Su, Fan Liu and Christos Masouros

14:51

Adaptive Energy-Efficient Waveform Design For Joint Communication and Sensing using Multiobjective Multiarmed Bandits

Amir Rezaei Balef, Setareh Maghsudi and Slawomir Stanczak

15:08

6GEM Perspective on Joint Communication and Sensing

Gerd vom Bögel, Aydin Sezgin, Nils Pohl, Martin Vossiek, Michael Weimer, Jan Wessel, Christian Wietfeld, Ruben Thill, Marcus Haferkamp, Simon Häger and Stefan Böcker

15:25

Joint communication and target detection with multiple antennas

Hamdi Joudeh

15:42

MOXZ-Radio: A New Waveform for Sensing and Communication

Peter Jung, Philipp Walk, Dennis Wieruch and Kai Heuermann

Program Details

16:00 - 16:30 **Coffee Break**

16:30 - 18:00
Lecture Hall

S9: Antenna

Chair: Juergen Freudenberger

16:30 **Performance Evaluation of Array Calibration for Angle-of-Arrival-Based 5G Positioning**

Marcus Henninger, Swarnendu Sengupta, Silvio Mandelli and Stephan ten Brink

16:50 **Antenna Array Calibration Via Gaussian Process Models**

Sergey S. Tambovskiy, Gabor Fodor and Hugo M. Tullberg

17:10 **MIMO Systems with Reconfigurable Antennas: Joint Channel Estimation and Mode Selection**

Fariba Armandoust, Ehsan Tohidi, Martin Kasparick, Li Wang, Ahmet Hasim Gokceoglu and Slawomir Stanczak

17:30 **Deep Reinforcement Learning for mmWave Initial Beam Alignment**

Daniel Tandler, Sebastian Dörner, Marc Gauger and Stephan ten Brink

19:00 - 23:00
Restaurant Zucker

Conference Dinner

9:00 - 10:30
Lecture Hall

S10: Machine Learning

Chair: Rafael F. Schaefer

09:00 **Estimating Mutual Information for Link Adaptation in Generalized Spatial Modulation Systems with Neural Networks**

Daniel Nicolas Bailon, Volker Kühn, Sergo Shavgulidze and Jürgen Freudenberger

09:20 **Learning End-to-End Channel Coding with Diffusion Models**

Muah Kim, Rick Fritschek and Rafael F. Schaefer

09:40 **Spiking Neural Network Decision Feedback Equalization**

Eike Manuel Bansbach, Alexander von Bank and Laurent Schmalen

10:00 **An Improved Data Collection Framework for Enabling ML-based QoS Prediction for Vehicular Communication**

Anton Krause, Alexandros Palaios, Atul Kumar, Philipp Schulz, Gerhard P. Fettweis

10:30 - 11:00 **Coffee Break**

11:00 - 12:30
Lecture Hall

S11: Communications & Sensing / Ray Tracing

Chair: Armin Dekorsy

11:00 **Joint Communication and Sensing Beamforming for Passive Object Localization**

Mirza Uzair Baig, Julia Vinogradova, Gabor Fodor and Christopher Mollén

Program Details

11:20	**DFT-spread OFDM Frequency Domain Processing for Joint MIMO Radar and Communication**
	Max Schurwanz, Jan Mietzner and Peter A. Hoeher
11:40	**Ray Tracing Based Radio Channel Modelling Applied to RIS**
	Juha Pyhtila, Joonas Kokkoniemi, Pekka Sangi, Niklas Vaara and Markku Juntti
12:00	**Empirical Evaluation of Distributional Shifts in FDD Systems Based on Ray-Tracing**
	Michael Baur, Valentina Rizzello, Nicolás Alvarez Prado and Wolfgang Utschick
12:30 - 12:45	**Closing**

Invited Keynotes

Multidimensional Constellation Shaping for Nonlinear Fiber Optics

Dr. Alex Alvarado, *Eindhoven University of Technology*

Geometric and probabilistic signal shaping techniques have promised to squeeze the last fraction of a dB out of nonlinear optical fiber links. This talk will focus on one technique to achieve these gains, namely, the use of multidimensional geometrically-shaped modulation formats. We will discuss formats designed using information-theoretic quantities, where the two polarizations of the light and two consecutive time-slots are used to obtain four- and eight-dimensional formats, respectively. Recent developments in this area will be discussed, paying special attention to the increased transmission rates and increased nonlinearity tolerance offered by these multidimensional formats.

On-Demand Intelligence at the Wireless Edge

Prof. Dr. Deniz Gündüz, *Imperial College London*

In the first part of this talk, Prof. Gündüz will focus on the emerging `semantic' or goal-oriented communication paradigm, where communication networks are designed to extract and deliver the minimal amount of information required for the desired task. He will present a general framework for semantic and pragmatic communications with several novel examples. In the second part of the talk, he will introduce a new paradigm called "on-demand intelligence", which aims at the timely delivery of machine learning models over time-varying wireless channels.

Next-Generation MIMO and the New Applications Enabled by this Technology

Prof. Dr. Erik G. Larsson, *Linköping University*

Prof. Larsson will give a retrospect of the development of massive MIMO for 5G, and where this is heading in 6G. He will then discuss some emerging applications enabled by this next-generation MIMO technology, particularly the service of energy-neutral (passive) devices relying on backscattering communication, and 6G access points as enablers for edge intelligence.

Access Protocols for Wireless Systems with Reconfigurable Intelligent Surfaces

Prof. Dr. Petar Popovski, *Aalborg University*

The widespread adoption of Reconfigurable Intelligent Surfaces (RISs) in future practical wireless systems is critically dependent on the availability of efficient access protocols. The design of access protocols is based on the mode of operation of the control channel, used to exchange information for real-time control of the RIS. This talk will introduce the two principal options for a RIS control channel: in-band and out-of-band. Out-of-band control channel exerts control over the propagation environment, but is not affected by this control. In-band control channel uses the same communication resources as the data communication, such that it is affected by the control exerted on the propagation environment. These two options lead to different types of access protocols, which will be discussed in the talk. Next, a grant-free random access (RA) protocol will be presented, intended for a massive number of accessing users. The proposed protocol relies on a channel oracle, which enables the users to infer the best RIS configurations that provide opportunistic access. This inference is based on a model created during a training phase with a greatly reduced set of RIS configurations, inspired by the Shannon-Nyquist sampling theorem.

Lattices and Security: From Ancient Mathematics to Post-Quantum Cryptography

Dr. Cong Ling, *Imperial College London*

Number theory has been a subject of pure mathematics for a long period of time. A significant change in recent decades is that it has become an applied subject, driven by various applications to modern information technology. This talk will highlight some new applications of number theory, especially lattices and algebraic number theory, to the design of capacity-achieving codes for wireless communications and to the construction of cryptosystems with resilience against quantum attacks (aka post-quantum cryptography).

Extremal Combinatorics and Information Theory

Prof. Dr. Igal Sason, Technion – *Israel Institute of Technology, Haifa*

Extremal combinatorics deals with the problem of determining or bounding the maximum or minimum possible cardinality of a finite set of objects which satisfies certain requirements. Many interesting problems in extremal combinatorics are motivated by fundamental questions in information theory such as the Shannon capacity of graphs and its connection to Ramsey numbers and to perfect graphs, the zero-error capacity of communication channels, and Witsenhausen's rate for graphs. The Shannon entropy and other classical information measures also serve as powerful tools in proving various extremal combinatorial and graph-theoretic results, such as Shearer's lemma and its applications in extremal combinatorics and graph theory, the submodularity properties of information measures and their utility in the derivation of information inequalities and bounds in extremal graph theory, entropy-based proofs of combinatorial results such as Bregman's theorem in matrix theory, Spencer's theorem in discrepancy theory, problems related to intersection families in extremal set theory, and bounds for locally decodable codes. The purpose of the talk is to survey some developments in extremal combinatorics from the perspective of information theory.

WSASCC 2023 | City Map

Conference Site

Altgebäude
Pockelstraße 4

Welcome Reception

27.02.2023 - 7:00pm

Dornse
Altstadtmarkt 7

Conference Dinner

02.03.2023 - 7:00pm

Restaurant „Zucker"
Frankfurter Str. 2

Hotels / Legend

1 Hotel Deutsches Haus,
Ruhfäutchenplatz 1

2 Pentahotel Braunschweig,
Auguststraße 6

3 Haus Hotel zur Hanse,
Güldenstraße 7

4 Hotel Ritter St. Georg,
Alte Knochenhauerstr. 12

5 Frühlingshotel,
Bankplatz 7

6 Best Western (Stadtpalais),
Hinter Liebfrauen 1A

7 Plaza Inn Braunschweig City
Nord, Mittelweg 7

— — 2 km - walking   - - - 3,2 km - walking

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