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All technical activities at IEEE SPAWC 2019 take place in the Hotel Montfleury Conference Center, with posters in rooms "Oslo" and "Stockholm" and all presentations and talks in the amphitheater "Californie".

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Wednesday, July 3

Wednesday, July 3 9:00 - 10:00

K1: Keynote Yonina Eldar

Recovering lost information in analog-to-digital conversion

Room: californie

Chair: Florian Kaltenberger (Eurecom, France)

Abstract: The famous Shannon-Nyquist theorem has become a landmark in analog to digital conversion and the development of digital signal processing algorithms. However, in many modern applications, the signal bandwidths have increased tremendously, while the acquisition capabilities have not scaled sufficiently fast. Furthermore, the resulting high rate digital data requires storage, communication and processing at very high rates which is computationally expensive and requires large amounts of power. In the context of medical imaging sampling at high rates often translates to high radiation dosages, increased scanning times, bulky medical devices, and limited resolution. In this talk we consider a general framework for sub-Nyquist sampling and processing in space, time and frequency which allows to dramatically reduce the number of antennas, sampling rates and band occupancy in a variety of applications. Our framework relies on exploiting signal structure and the processing task. We consider applications of these ideas to a variety of problems in communications, radar and ultrasound imaging and show several demos of real-time sub-Nyquist prototypes including a wireless ultrasound probe, sub-Nyquist MIMO radar, cognitive radio, shared spectrum radar, and an analog combiner prototype. We then show how these ideas can be used to overcome fundamental resolution limits in optical microscopy and ultrasound imaging and demonstrate sub-Nyquist devices operating beyond the standard resolution limits combining high spatial resolution with short integration time.

Bio: Yonina Eldar is a Professor in the Department of Mathematics and Computer Science, Weizmann Institute of Science, Rechovot, Israel. She was previously a Professor in the Department of Electrical Engineering at the Technion, where she held the Edwards Chair in Engineering. She is also a Visiting Professor at MIT, a Visiting Scientist at the Broad Institute, and an Adjunct Professor at Duke University and was a Visiting Professor at Stanford. She received the B.Sc. degree in physics and the B.Sc. degree in electrical engineering both from Tel-Aviv University (TAU), Tel-Aviv, Israel, in 1995 and 1996, respectively, and the Ph.D. degree in electrical engineering and computer science from the Massachusetts Institute of Technology (MIT), Cambridge, in 2002. She is a member of the Israel Academy of Sciences and Humanities, an IEEE Fellow and a EURASIP Fellow. She has received many awards for excellence in research and teaching, including the IEEE Signal Processing Society Technical Achievement Award (2013), the IEEE/AESS Fred Nathanson Memorial Radar Award (2014) and the IEEE Kiyo Tomiyasu Award (2016). She was a Horev Fellow of the Leaders in Science and Technology program at the Technion and an Alon Fellow. She received the Michael Bruno Memorial Award from the Rothschild Foundation, the Weizmann Prize for Exact Sciences, the Wolf Foundation Krill Prize for Excellence in Scientific Research, the Henry Taub Prize for Excellence in Research (twice), the Hershel Rich Innovation Award (three times), the Award for Women with Distinguished Contributions, the Andre and Bella Meyer Lectureship, the Career Development Chair at the Technion, the Muriel & David Jacknow Award for Excellence in Teaching, and the Technion's Award for Excellence in Teaching (two times). She received several best paper awards and best demo awards together with her research students and colleagues, was selected as one of the 50 most influential women in Israel, and was a member of the Israel Committee for Higher Education. She is the Editor in Chief of Foundations and Trends in Signal Processing and a member of several IEEE Technical Committees and Award Committees.

Wednesday, July 3 10:00 - 11:30

RS10: ML-based Channel coding and detection

Room: stockholm

Chair: Namyoon Lee (POSTECH, Korea)

RS11: Relaying based Cooperative Communications

Room: stockholm

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Room: Foyer

Chair: Florian Kaltenberger (Eurecom, France)

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13:00 ***Autonomous Aerial Cellular Relaying Robots.....N/A***
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13:30 ***A Coexisting MIMO-Radar MIMO-Communications Hardware Prototype.....N/A***
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Wednesday, July 3 14:00 - 15:00

K3: Keynote Rui Zhang

Accessing from the sky: UAV challenges from a communication and signal processing perspective

Room: californie

Chair: Florian Kaltenberger (Eurecom, France)

Abstract: Unmanned aerial vehicles (UAVs) have found numerous applications in wireless communication, as either aerial user or mobile access point (AP). Compared to conventional terrestrial wireless systems, UAVs' communications face new challenges due to their high altitude above the ground and great flexibility of movement, bringing several crucial issues such as how to exploit line-of-sight (LoS) dominant UAV-ground channels while mitigating resulted strong interference, meet distinct UAV communication requirements on critical control messages versus high-rate payload data, cater for the stringent constraints imposed by the size, weight, and power (SWAP) limitations of UAVs, as well as leveraging the new degree of freedom via controlling the UAV trajectory for communication performance enhancement. In this talk, we will provide an overview of the above challenges and practical issues in UAV communications, their state-of-the-art solutions (with an emphasis on promising signal processing and optimization techniques used for them), as well as important directions for future research.

Bio: Dr. Rui Zhang (Fellow, IEEE) received the Ph.D. degree from Stanford University in electrical engineering. He is now a Dean's Chair Associate Professor in the Department of Electrical and Computer Engineering, National University of Singapore. His research interests include wireless information and power transfer, UAV communication, MIMO, cognitive radio, and optimization methods. He has published over 320 papers, which have been cited more than 26,000 times. He has been listed as a Highly Cited Researcher by Thomson Reuters/Clarivate Analytics since 2015. His works have received several IEEE awards, including the IEEE Marconi Prize Paper Award in Wireless Communications, the IEEE Communications Society Heinrich Hertz Prize Paper Award, the IEEE Signal Processing Society Best Paper Award, Young Author Best Paper Award, and Donald G. Fink Overview Paper Award. He has served as an Editor for several IEEE journals, including TWC, TCOM, JSAC, TSP, etc., and as TPC co-chair or organizing committee member for over 30 international conferences. He is an IEEE Distinguished Lecturer.

Wednesday, July 3 15:00 - 16:30

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Room: stockholm

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Room: oslo

Chair: Ioannis Krikidis (University of Cyprus, Cyprus)

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Room: oslo_

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Room: stockholm_

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Room: stockholm

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Wednesday, July 3 16:30 - 17:30

TT2: Thematic Talks: Distributed Robotics, Drones

Room: californie

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Thursday, July 4

Thursday, July 4 9:00 - 10:00

K5: Keynote Reinaldo A. Valenzuela

Delivering 5/6G performance: mmWave spectrum opportunities and challenges

Room: californie

Chair: David Gesbert (Eurecom Institute, France)

Abstract: The insatiable demand for media rich content and the increasing availability of advanced devices such as smart phones, tablets, etc., has forced the mobile communications eco system to consider the next generation solutions to address these needs. 5G, already in early commercial deployment, is responding to these needs with options such as Small Cells, HetNets, Carrier Aggregation, Machine-to-Machine, Internet-of-Things, Relays, Device-to-Device, massive MIMO and operation in the vast spectrum available in the millimeter wave range, among others. In this talk, I will review some of the opportunities and challenges inherent to these higher bands, and how they can be best addressed to deliver practical solutions to the challenges outlined above in 5G and beyond.

Bio: Member NAE. Fellow IEEE. IEEE Eric E. Sumner Award. Bell Labs Fellow. WWRF Fellow, 2014 IEEE CTTC Technical Achievement Award, 2015 IEEE VTS Avant Garde Award. B.Sc. U. of Chile, Ph.D. Imperial College. Director, Communication Theory Department, Distinguished Member of Technical Staff, Bell Laboratories. Engaged in propagation measurements and models, MIMO/space time systems achieving high capacities using transmit and receive antenna arrays, HetNets, small cells and next generation air interface techniques and architectures. He has published 200 papers and 44 patents. He has over 29,000 Google Scholar citations and is a 'Highly Cited Author' In Thomson ISI and a Fulbright Senior Specialist.

Thursday, July 4 10:00 - 11:30

RS16: Distributed Resource Allocation

Room: oslo_

Chair: Amir Leshem (Bar-Ilan University, Israel)

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Room: stockholm

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Thursday, July 4 12:30 - 14:00

D2: Demonstrations

Room: Foyer

Chair: Florian Kaltenberger (Eurecom, France)

Thursday, July 4 14:00 - 15:00

K2: Keynote Nikos Sidiropoulos

How Classical Machine Learning can help Modern Wireless Communications

Room: californie

Chair: David Gesbert (Eurecom Institute, France)

Abstract: Data-driven approaches have swept all walks of science and engineering in recent years, with deep neural networks, deep reinforcement learning, and adversarial networks becoming the new staples that everyone uses to tackle a very wide variety of problems. While the empirical success of these methods is truly impressive when a lot of training data is available, there are still many problems that can in fact benefit from classical machine learning tools. In this talk, I will focus on showcasing the remarkable potential of latent factor analysis in the context of modern wireless communications. In particular, I will talk about edge-cell interferometry - a technique we recently devised that can reliably decode edge-cell users that are only 3dB above the noise floor, without requiring knowledge of their channels. I will also talk about how latent factor analysis can be used to tackle very hard estimation and optimization problems on the way to 5G and well beyond.

Bio: Nikos Sidiropoulos earned the Diploma in Electrical Engineering from Aristotle University of Thessaloniki, Greece, and M.S. and Ph.D. degrees in Electrical Engineering from the University of Maryland at College Park, in 1988, 1990 and 1992, respectively. He has served on the faculty of the University of Virginia, University of Minnesota, and the Technical University of Crete, Greece, prior to his current appointment as Louis T. Rader Professor and Chair of ECE at UVA. From 2015 to 2017 he was an ADC Chair Professor at the University of Minnesota. His research interests are in signal processing, communications, optimization, tensor decomposition, and factor analysis, with applications in machine learning and communications. He received the NSF/CAREER award in 1998, the IEEE Signal Processing Society (SPS) Best Paper Award in 2001, 2007, and 2011, served as IEEE SPS Distinguished Lecturer (2008-2009), and currently serves as Vice President - Membership of IEEE SPS. He received the 2010 IEEE Signal Processing Society Meritorious Service Award, and the 2013 Distinguished Alumni Award from the University of Maryland, Dept. of ECE. He is a Fellow of IEEE (2009) and a Fellow of EURASIP (2014).

Thursday, July 4 15:00 - 16:30

RS12: Energy Harvesting

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Room: stockholm

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Thursday, July 4 16:30 - 17:30

TT4: Thematic Talks: Machine Learning for Communications

Room: californie

Chair: Florian Kaltenberger (Eurecom, France)

16:30 ***Learning-Based Channel Estimation for Various Antenna Array Configurations.....690***
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17:00 ***Spiking Neural Networks for Low-Power Edge Intelligence.....N/A***
Osvaldo Simeone (King's College London, United Kingdom (Great Britain))

Friday, July 5

Friday, July 5 9:00 - 10:00

K4: Keynote Petar Popovski

How Reliability, Latency, Massiveness, and Distributed Ledger Technology are Transforming IoT Connectivity

Room: californie

Chair: Laura Cottatellucci (University of Erlangen-Nuremberg, Germany)

Abstract: The future wireless landscape, often associated with 5G, envisions three types of connectivity: enhanced Mobile Broadband (eMBB), Ultra-Reliable Low-Latency Communication (URLLC), and massive Machine Type Communication (mMTC). The latter two are seen as two generic types that support Internet of Things (IoT) communication, putting forward new types of requirements and research challenges, such as: protocols that operate with short packets, techniques to achieve and assess extremely high reliability, tradeoffs between massiveness and high-reliability, etc. This set of challenges is further enriched by the advent of distributed ledger technology (DLT), blockchain and smart contracts that allow autonomous interaction among IoT devices. The consensus protocols that set the basis for blockchain systems are critically reliant on communication, but they change the traffic pattern that has been envisioned for pre-blockchain IoT communication systems. This talk will give a perspective on the communication engineering challenges related to the emerging systems for IoT connectivity, elaborate on the fundamental tradeoffs and outline methods and architectures to solve them.

Bio: Petar Popovski is a Professor of Wireless Communications with Aalborg University. He received his Dipl. Ing and Magist. Ing. degrees in communication engineering from the University of Sts. Cyril and Methodius in Skopje and the Ph.D. degree from Aalborg University in 2005. He has over 300 publications in journals, conference proceedings, and edited books. He is featured in the list of Highly Cited Researchers 2018, compiled by Web of Science. He holds over 30 patents and patent applications. He received an ERC Consolidator Grant (2015), the Danish Elite Researcher award (2016), IEEE Fred W. Ellersick prize (2016) and IEEE Stephen O. Rice prize (2018). He is currently a Member at Large at the Board of Governors in IEEE Communication Society. Prof. Popovski is a Steering Committee Member of IEEE SmartGridComm and IEEE TRANSACTIONS ON GREEN COMMUNICATIONS AND NETWORKING. He previously served as a Steering Committee Member of the IEEE INTERNET OF THINGS JOURNAL. He is currently an Area Editor of the IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS. Prof. Popovski is the General Chair for IEEE SmartGridComm 2018 and IEEE Communication Theory Workshop 2019. His research interests are in the area of wireless communication and communication theory.

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Room: stockholm

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Room: stockholm_

Chair: Dirk Slock (EURECOM, France)

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SS12: Special Session on Signal Processing Advances for Emerging Transceiver Hardware

Room: oslo

Chairs: George C. Alexandropoulos (University of Athens, Greece), Ralf R. Müller (Friedrich-Alexander Universität Erlangen-Nürnberg, Germany)

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Christos Liaskos (Institute of Computer Science, Foundation of Research and Technology, Hellas, Greece); Ageliki Tsioliaridou (Foundation for Research and Technology, FORTH, Greece); Shuai Nie (Georgia Institute of Technology, USA); Andreas Pitsillides (University of Cyprus, Cyprus); Sotiris Ioannidis (Foundation for Research and Technology - Hellas, Greece); Ian F. Akyildiz (Georgia Institute of Technology, USA)

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Room: oslo

Chair: Sundeep Rangan (New York University, USA)

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Friday, July 5 11:30 - 13:00

RS1: 5G and Beyond: Advanced Topics

Room: Stockholm3

Chairs: Timothy N. Davidson (McMaster University, Canada), David Gregoratti (Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Spain)

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Room: stockholm
Chair: Dirk Slock (EURECOM, France)

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Room: stockholm_
Chair: Inbar Fijalkow (ETIS / ENSEA - University Cergy-Pontoise - CNRS, France)

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Room: oslo_
Chair: Petar Popovski (Aalborg University, Denmark)

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Chairs: Ioannis Krikidis (University of Cyprus, Cyprus), Samir M. Perlaza (INRIA, France)

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Room: oslo
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