



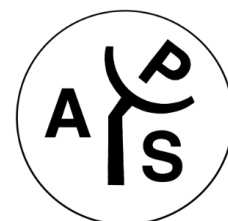
The 2023 IEEE International Workshop on Antenna Technology (iWAT 2023)

15-17 May 2023 | AAU Innovation, Thomas Manns Vej 25, 9220 Aalborg, Denmark



PROGRAMME BOOK

iwat2023.org



IEEE Antennas and
Propagation Society

Welcome Message from iWAT2023 General Chairs

With great pleasure, we welcome you to the 2023 IEEE International Workshop on Antenna Technology (iWAT) on 15 - 17 May 2023, in Aalborg, Denmark.

iWAT is a series of annual international antenna workshops that have been held in Singapore (2005), White Plains, USA (2006), Cambridge, UK (2007), Chiba, Japan (2008), Santa Monica, USA (2009), Lisbon, Portugal (2010), Hong Kong, China (2011), Tucson, USA (2012), Karlsruhe, Germany (2013), Sydney, Australia (2014), South Korea (2015), Orlando, USA (2016), Athens, Greece (2017), Nanjing, China (2018), Miami, USA (2019), Bucharest, Romania (2020), and Dublin, Ireland (2022).

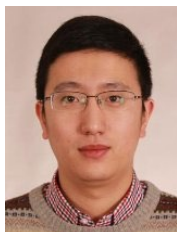
iWAT focuses on small antennas and related technology and has single-track invited oral presentations by prominent researchers and poster sessions that facilitate valuable interaction and networking among the delegates. The organising committee are impressed by the high quality of contributions and the number of participating research students.

We hope that iWAT2023 will be a forum for interaction on leading-edge state-of-the-art technologies in antenna design, advanced electromagnetic materials, theory and practical aspects of small antennas, antennas for medical applications, mm-wave and THz technologies and metamaterials.

iWAT2023 is organised by Aalborg University and is also technically co-sponsored by the IEEE Antennas and Propagation Society (IEEE AP-S) and the European Association on Antennas and Propagation (EurAAP). We thank the International Advisory Co-Chairs, Professor Zhi Ning Chen and Professor Raj Mittra and all our sponsors and exhibitors for their support and contribution to the realization of iWAT2023.

Aalborg is Denmark's fourth largest city and a lovely town. The city center of Aalborg, dating from the Middle Ages, lies on a series of clay banks between the former streams of Vesterå and Lilleå, which used to run into the sound. Despite effective drainage, the main streets, including Algade, still run east to west while the side streets run north to south. The Budolfi Church and the old town hall line Gammelortv, the old market square. The main shopping streets are Algade and Bispengade, the latter lying in between the modern Vesterbro thoroughfare and Nytorv square. Østerågade, once the old harbor, is noted for its merchants' mansions.

We are looking forward to meeting you in Aalborg, Denmark.



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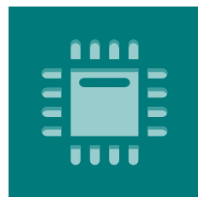


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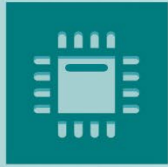
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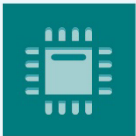
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Selected Papers from the The International Workshop on Antenna Technology—iWAT 2023

Guest Editors

Dr. Peng Mei, Dr. Shuai Zhang

Deadline

15 September 2023

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Special Issue

Invitation to submit

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iWAT 2023 Conference Programme

Time	14.05.2023	15.05.2023	16.05.2023	17.05.2023
8:45-9:00		Opening ceremony		
9:00-9:10			Keynote: Update of Modeling and Synthesis of Microwave Metalems Antennas	Keynote: Massive Spatial Multiplexing in 6G: What kind of antenna arrays are needed?
9:10-9:35		Keynote: On-chip terahertz antennas and arrays for 6G and beyond		
9:35-9:45				Industry Presentation
9:45-9:55		Coffee Break		
9:55-12:00		Invited Session: Metamaterials and Metasurfaces	Invited Session: Radars and Sensors	Invited Session: Antenna Technologies for Satellite Communications
12:00-13:10		Lunch		
13:10-13:45		Keynote: Experimental Antenna Research - Past and Future	Keynote: UWB Future 5G Transceivers & Wearable Electronics	Keynote: Antenna Booster Technology: from Fundamentals to Applications
13:45-13:55		Coffee Break		
13:55-14:55		Poster Session 1	Poster Session 2	Poster Session 3
14:55-15:05		Coffee Break		
15:05-17:35		Invited Session: Reconfigurable Intelligent Surfaces and 6G Antenna Arrays	Invited Session: Small and Wideband Antennas	Invited Session: Mm-wave and THz Antennas
17:35-18:00	Registration			
18:00-20:00	Welcome Reception	Lab Tour	Conference Gala Dinner	17:35-18:35 Lab Tour
Registration Time: 16:00-18:00, 14-05-2023; 07:45-16:00, 15-05-2023; 08:30-16:00, 16-05-2023.				

KEYNOTE SPEAKER



**Prof. Chi Hou CHAN,
City University of Hong Kong**

Monday, 15 May 2023

09:10-09:45

Title: On-chip terahertz antennas and arrays for 6G and beyond

Biography

Professor Chan received his PhD from the University of Illinois at Urbana-Champaign (UIUC) in 1987 under the tutelage of Professor Raj Mittra. Prior to joining the City University of Hong Kong in 1996, he was a tenured Associate Professor in the Department of Electrical Engineering, University of Washington, Seattle. Since 1998, he has been a Chair Professor of Electronic Engineering and is currently the Director of State Key Laboratory of Terahertz and Millimeter Waves (City University of Hong Kong). Initially trained in computational electromagnetics, his research interest has been extended to antennas, microwave and millimeter-wave components and systems, and more recently, terahertz science and technology. Professor Chan was elected a Fellow of IEEE in 2002 for his contributions to computational electromagnetics. He received the 2019 IEEE Antennas and Propagation Society Harrington-Mittra Award in Computational Electromagnetics and the 2019 Distinguished Alumni Award from the Department of Electrical and Computer Engineering, UIUC.

On-chip terahertz antennas and arrays for 6G and beyond

In this presentation, Professor Chan will present an overview of his research on on-chip antennas and arrays for the 6th generation (6G) wireless communications and beyond. For the passive antennas and arrays, his team focuses on improving the radiation performance in impedance and gain bandwidth and size reduction of the feeding network. Further manipulations of the radiation are achieved through off-chip lenses and metasurfaces. For beam steering and spatial power combining applications, antenna elements and their spacings need to be carefully designed to accommodate not only the antenna elements but also the active driving circuits within a limited chip size. All the passive and active antennas and arrays, operating up to 700 GHz, were fabricated by 65-nm CMOS technology and characterized by in-house measurement facilities.

KEYNOTE SPEAKER



**Prof. Gert Frølund Pedersen,
Aalborg University**

Monday, 15 May 2023

13:10-13:45

Title: Experimental antenna research — past and future

Biography

Gert Frølund Pedersen was born December 2nd 1965 in Denmark. He is married to Henriette D. S. Pedersen since 1991 and has seven children, 2 boys and 5 girls. He received the B.Sc. E. E. degree, with honours, in electrical engineering from the College of Technology, Dublin, Ireland in 1991, and the M.Sc. E. E. degree and Ph. D. from Aalborg University, Denmark in 1993 and 2003. He has been employed by Aalborg University since 1993 where he is now a full Professor, heading the Antenna, Propagation and Millimetre-wave Systems section with more than 30 full-time researchers.

His research has focused on radio communication for mobile terminals including small antennas, antenna systems, radio propagation and biological effects. He started the area of Over The Air (OTA) test for small active terminals including the antenna and developed the measuring setup, now used worldwide. He invented the integrated antenna in 1994 for mobile phones, used in most mobile phones today. He has worked closely with both national and international companies and designed more than 100 unique antenna solutions. He is currently involved in antenna systems for small devices, Satellites and 6G. His research merits include PI funding of more than 75 M€ mainly jointly with industry, and has published over 250 journal papers, 300 conference papers and holds more than 50 granted patents.

Experimental antenna research — past and future

Since the first mobile terminals and phones entered the market, many works on their actual coverage in the network have been carried out and troubles with the coverage reported. Now we have 5G advanced systems and the coverage is surely much better, but is the problem of good coverage everywhere solved? The talk will give a historical overview of the development of the methods used for evaluating the ability of a mobile phone to provide good coverage, including the vast experimental setups used and concluding with the Over The Air (OTA) measurements used worldwide today. Results of OTA performance evaluation of mobile phones done over the years for the Danish authorities will be shown, including the latest report listing the most popular phone models from spring 2023. Also the latest experimental setup in Aalborg will be shown — a large anechoic room which can take objects up to 3500 kg and measure all frequencies from around 100 MHz to THz. Examples of large constructions which can be measured are given; Wind turbine blades, live fighter jets and surely cars. During iWAT23 it will be possible to join tours to the new large antenna lab and see and ask questions to the lab engineers, as iWAT23 is taking place only a few hundred meters from the lab.

KEYNOTE SPEAKER



**Prof. Zhining Chen,
National University of Singapore**

Tuesday, 16 May 2023

09:00-09:35

Title: Update of Modeling and Synthesis of Microwave Metalens Antennas

Biography

Zhi Ning Chen is working in the Department of Electrical and Computer Engineering, National University of Singapore as a Professor and the Director of Advanced Research and Technology Innovation Center.

Dr Chen has published 680+ academic papers and six books and is holding 33 granted/filed patents. Recently he has focused more on the translational research and technology development of metamaterial, metasurface, and metaline-based antennas: metantennas.

Dr Chen was elevated the Fellow of Academy of Engineering, Singapore in 2019 and a Fellow of the IEEE for the contribution to small and broadband antennas for wireless applications in 2007. He is the recipient of IEEE John Kraus Antenna Award 2021.

Dr Chen is the founding General Chairs of IEEE International Workshop on Antenna Technology (iWAT 2005), IEEE Asia and Pacific Conference on Antennas and Propagation (APCAP 2012), and Marina Forum on EM Metamaterials (Mar-For 2021). He is the General Chair of IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting (APS/URSI 2021).

Update of Modeling and Synthesis of Microwave Metalens Antennas

Metalens at microwave bands has widely been studied for performance-enhanced antennas. The metalens antennas are capable of enhancing gain, achieving beamscanning, and converting polarization of EM waves. Using metamaterials and metasurfaces, the metalens has been more compact and thinner compared with full dielectric ones. This talk will update the recent progress in the modelling and synthesis of metalens antennas. First, the true transformation optics is applied to Luneburg lens for metamaterial-based compact antenna design. The transformed metalens antenna keeps the feed on/near the surface of lens, one of the most important features of Luneburg lens antenna. Then a deep learning-enabled synthesis method with prior knowledge is developed to increase the degrees of design freedom for the enhancement of phase shift range of metacells and the increase in database of metacells. As example, the gain bandwidth of metalens antenna is greatly enhanced.

KEYNOTE SPEAKER



**Prof. John L. Volakis,
Florida International University**

Tuesday, 16 May 2023

13:10-13:45

Title: UWB Future 5G Transceivers & Wearable Electronics

Biography

John L. Volakis is the Dean of the College of Engineering and Computing at Florida International University (FIU), and a Professor in the Electrical and Computer Engineering Dept. He is an IEEE, AAAS, NAI, URSI and ACES Fellow. Prior to coming to FIU, he was the Roy and Lois Chope Chair in Engineering at Ohio State and a Professor in the Electrical and Computer Engineering Dept. (2003-2017). He also served as the Director of the Ohio State Univ. ElectroScience Laboratory for 14 years. His career spans 2 years at Boeing, 19 years on the faculty at the University of Michigan-Ann Arbor, and 15 years at Ohio State. At Michigan he also served as the Director of the Radiation Laboratory (1998-2000).

Prof. Volakis has 39 years of engineering research experience, and has published over 450 journal papers, 950 conference papers, over 30 chapters and 31 patents. In 2004, he was listed by ISI Web of Science as one of the top 250 most referenced authors, and his google h-index=74 with over 29000 citations, among the largest in Engineering. He mentored over 100 Ph.Ds/Post-Docs and has written with them 43 papers which received best paper awards. He is one of the most active researchers in electromagnetics, RF materials and metamaterials, antennas and phased array, RF transceivers, textile electronics, millimeter waves and terahertz, EMI/EMC as well as EM diffraction and computational methods. He is also the authors of 9 books, including the Antenna Handbook, referred to as the "antenna bible." His research team is recognized for introducing and/or developing 1) hybrid finite method for microwave engineering, now defacto methods in commercial RF design packages, 2) novel composite materials for antennas & sensor miniaturization, 3) a new class of wideband conformal antennas and arrays with over 30:1 of contiguous bandwidth, referred to as tightly coupled dipole antennas, already garnering over 6 million citations, 4) textile surfaces for wearable electronics and sensors, 5) battery-less and wireless medical implants for non-invasive brain signal collection, 6) diffraction coefficients for material coated edges, and for 7) model-scaled radar scattering verification methods.

UWB Future 5G Transceivers & Wearable Electronics

Future communication links (future 5G) will require higher data rates, multiple beams, and higher transmit/receive gains, in addition to smaller weight, cost, and power. With the growing interest for reduced size platforms and the requirement for ultra-wideband (UWB) performance to address multi-functionality, there is a strong need for UWB RF front-ends with ultra flexible interfaces. The latter will include millimeter wave and THz capabilities to enable increased spectral efficiency, multi-functionality and security. Simultaneous transmit and receive (STAR) transceivers are also becoming a focus for the coming decade.

Further, in recent years, a variety of flexible fabric-based electronics have been proposed. To this end, our team proposed a new class of conductive textiles that have demonstrated unique capabilities in terms of flexibility, durability and manufacturing-ease using standard automated embroidery machinery. These electronic threads (E-threads) have the capability to generate fully embroidered microwave circuitry that has the same electrical properties as traditional microwave circuits printed on PCBs. As such, a new class of wearable devices that are fully integrated and inconspicuously placed within clothing is possible.

This presentation will focus on innovative methods for handling UWB communications with RF front end and back-end capabilities having historically low power and game-changing frequency-independent operation. They will include low power MIMO and beamforming across large bandwidths, from MHz to millimeter wave bands. Challenges in realizing future textile-based electronic devices, including wearable wideband transceivers will be presented. Among them, reliable wearable interconnects, chipsets that are less bulky and integrated with the textile circuitry, and manufacturing challenges will be discussed.

KEYNOTE SPEAKER



**Prof. Emil Björnson,
KTH Royal Institute of Technology**

Wednesday 17 May 2023

09:00-09:35

Title: Massive Spatial Multiplexing in 6G:What kind of antenna arrays are needed?

Biography

Emil Björnson is a Professor of Wireless Communication at the KTH Royal Institute of Technology, Stockholm, Sweden. He is an IEEE Fellow, Digital Futures Fellow, and Wallenberg Academy Fellow. He has a podcast and YouTube channel called Wireless Future. His research focuses on multi-antenna communications and radio resource management, using methods from communication theory, signal processing, and machine learning. He has authored three textbooks and has published a large amount of simulation code.

He has received the 2018 and 2022 IEEE Marconi Prize Paper Awards in Wireless Communications, the 2019 EURASIP Early Career Award, the 2019 IEEE Communications Society Fred W. Ellersick Prize, the 2019 IEEE Signal Processing Magazine Best Column Award, the 2020 Pierre-Simon Laplace Early Career Technical Achievement Award, the 2020 CTTC Early Achievement Award, and the 2021 IEEE ComSoc RCC Early Achievement Award. He also received six Best Paper Awards at the conferences.

Massive Spatial Multiplexing in 6G:What kind of antenna arrays are needed?

Multi-antenna communication technology can, in theory, provide great bit rates between a transmitter and receiver through spatial multiplexing; that is, sending different spatial layers over different propagation paths. Unfortunately, traditional systems operate in the far field where there is often at most one strong propagation path. This might change in 6G. By increasing the carrier frequency, adding more antennas, and densifying the network infrastructure, we will enter a paradigm where communications mostly happen in the radiative near-field. In this keynote, we will revisit the fundamentals of multiple-input multiple-output (MIMO) communications and explore the new features that arise in the near field. The relation between spatial modes, spherical wavefronts, and array geometries will be described and illustrated. Is massive spatial multiplexing the next untapped signal dimension that can sustain the capacity growth in future networks?

KEYNOTE SPEAKER



**Prof. Jaume Anguera,
Founder and CTO at Ignion and Universitat Ramon LLull**

Wednesday 17 May 2023

13:10-13:45

Title: Antenna Booster Technology: from Fundamentals to Applications

Biography

Dr. Jaume Anguera, IEEE Fellow, founder and CTO at the technology company Ignion (Barcelona, Spain). Associate Professor at Ramon LLull University and a member of the Smart Society research group. He is an inventor of more than 150 granted patents, most of them licensed to telecommunication companies. Among his most outstanding contributions is that of the inventor of Antenna Booster Technology, a technology that fostered the creation of Ignion. The wireless industry has adopted many of these products worldwide to allow wireless connectivity to IoT devices through a miniature component called an antenna booster that is ten times smaller than conventional antennas. Author of more than 260 scientific widely cited papers and international conferences (h-index 51). Author of 7 books. He has participated in more than 22 competitive research projects financed by the Spanish Ministry, CDTI, CIDEM (Generalitat de Catalunya), and the European Commission for an amount exceeding \$13M as a principal researcher in most of them. He has taught over 40 antenna courses worldwide (USA, China, Korea, India, UK, France, Poland, Czech Republic, Tunisia, Perú, Brazil, Canada, Spain). With over 23 years of R&D experience, he has developed part of his professional experience with Fractus in South Korea in designing miniature antennas for large Korean companies such as Samsung and LG. Since 2017 he has been with Ignion in the role of CTO. He leads the company's R&D activity to create new products, envisage new technologies, technical evangelism, and provide technology strategy to scale the company's business. He has received several national and international awards (ex. 2004 Best Ph. D Thesis -two prizes, one given by Telefónica Mobile, 2004 IEEE New Faces of Engineering, 2014 Finalist European Patent Award). He has directed the master/doctorate thesis to more than 160 students, many of them have received awards for their thesis (COIT, COITT, Ministry of Education). His biography appears in Who'sWho in the World and Who'sWho in Science and Engineering. He is associate editor of the IEEE Open Journal on Antennas and Propagation, Electronics Letters, and reviewer in several IEEE and other scientific journals. He is an IEEE Antennas and Propagation Distinguished Lecturer and vice-chair of the working group "Software and Modeling" at EurAAP.

More info at <http://users.salleurl.edu/~jaume.anguera/>

Antenna Booster Technology: from Fundamentals to Applications

Addressed to Antenna, Microwave, RF, Wireless, and Electronics engineers to learn about Antenna Booster Technology to design wireless devices embedding antenna boosters. Antenna boosters are off-the-shelf electrically small components that can be integrated inside any wireless device for operation at any frequency band (0.4GHz-10.6GHz) through the proper design of a matching network. The antenna booster frequency bands of operation are easily adjusted-not by modifying its geometry but through the suitable matching-network design. This is a more straightforward, faster, and more familiar method for RF/microwave and wireless engineers, who are acquainted with the design of matching networks at every stage of a telecommunication system-for example, filters and amplifiers. Attendants will learn the physical insights of antenna boosters and how to design wireless devices (ex., IoT) integrating antenna boosters covering from single band to multi-band applications using passive matching networks and reconfigurable architectures. The presentation will give a general overview of the fundamentals of the technology till recent applications of antenna boosters embedded in IoT devices.

iWAT 2023, Monday 15 May 2023, 08:45-12:00

08:45-09:10 Opening Ceremony

Keynote Session 1 09:10-09:45

09:10 On-chip terahertz antennas and arrays for 6G and beyond

Chi Hou CHAN, Professor, City University of Hong Kong

----- 09:45-09:55 Coffee Break -----

Invited Session 1 09:55-12:00

Metamaterials and Metasurfaces

Chairs: Oscar Quevedo-Teruel, Professor, KTH Royal Institute of Technology.

Davide Ramaccia, Professor, Roma Tre University.

09:55 Large-Aperture Cavity-Excited Metagrating Antennas for Dynamic Beam Switching
Ariel Epstein, Israel Institute of Technology

10:20 A Wave Physics Approach to Electronically Steerable Antennas
Xhoandri Lleshi, Greenerwave company

10:45 Gradient and Modulated Metasurfaces for Millimeter Wave Arrays and Beam-Formers
David González Ovejero, Centre National de la Recherche Scientifique - CNRS

11:10 Metasurface 2-D Leaky-Wave Antennas Fed by Multiple Sources
Davide Comite, Sapienza University of Rome

11:35 Scattering Performances of Metasurfaces Affected by Electromagnetic Phase Roughness
Davide Ramaccia, Roma Tre University

iWAT 2023, Monday 15 May 2023, 13:10-17:35

Keynote Session 2 13:10-13:45

13:10 Experimental Antenna Research - Past and Future

Gert Frølund Pedersen, Professor, Aalborg University

----- 13:45-13:55 Coffee Break -----

Invited Session 2 15:05-17:35

Reconfigurable Intelligent Surfaces and 6G Antenna Arrays

Chairs: Jay Guo, Professor, University of Technology Sydney.

Buon Kiong Lau, Professor, Lund University.

- 15:05 Reconfigurable Surfaces in Reverberation Chambers for Over-the-air Mobile Device Testing
Michael Jensen, Brigham Young University
- 15:30 Phased Multibeam Antennas Employing Generalized Joined Coupler Matrix
Jay Guo, University of Technology Sydney
- 15:55 Optical Antenna Array for 6G
Hiroyuki Arai, Yokohama National University
- 16:20 Broadband Dual-Polarized Vivaldi Base Station Array Antenna for 5G Smart Networks
Daniel Segovia Vargas, Universidad Carlos III de Madrid
- 16:45 Lens Antennas for Satellite Communications
Oscar Quevedo-Teruel, KTH Royal Institute of Technology
- 17:10 Characterization and Realization of Near-Field Beamforming with RISs for mm-Wave and THz Applications
Shuai Zhang, Aalborg University

iWAT 2023, Tuesday 16 May 2023, 09:00-12:00

Keynote Session 3 09:00-09:35

09:00 Update of Modeling and Synthesis of Microwave Metalens Antennas

Zhining Chen, Professor, National University of Singapore

----- 09:45-09:55 Coffee Break -----

Invited Session 3 09:55-12:00

Radars and Sensors (including car radar, EM imaging, etc.)

Chairs: George Shaker, Professor, University of Waterloo.

Ziqiang Tong, Technical Director of Radar, FreeTech Co. LTD, Shanghai.

09:55 Antenna Materials Development in Automotive Radars

Junko Konishi, AGC Electronics

10:20 Over-The-Air Automotive Radar System Testing

Gerhard Hamberger, Rohde & Schwarz

10:45 Integratable Antenna Concepts Based on Conformal Antennas for 3D Radar Systems

Christian Tschoban, Fraunhofer IZM

11:10 The Potential of Context-Aided Communications

Tommy Svensson, Chalmers University of Technology

11:35 Contactless Sensing Using Intelligent Walls

Qammer Abbasi, University of Glasgow

iWAT 2023, Tuesday 16 May 2023, 13:10-17:35

Keynote Session 4 13:10-13:45

13:10 UWB Future 5G Transceivers & Wearable Electronics

John L. Volakis, Professor, Florida International University

----- 13:45-13:55 Coffee Break -----

Invited Session 4 15:05-17:35

Small and Wideband Antennas (including Mobile terminal, IoT, wearable, medical device)

Chairs: Jaume Anguera, CTO and Founder at Ignion, and Professor, Universitat Ramon Llull.

Hanyang Wang, Chief Antenna Expert, Huawei Technologies.

15:05 Ultra-Thin Wideband Planar Antennas for Mobile Terminals

Hanyang Wang, Huawei Technologies

15:30 Novel Techniques Applied to MIMO Antenna Array for 5G Sub-7 GHz Smartphone Applications

Chow-Yen-Desmond Sim, Feng Chia University

15:55 Filtering Metasurface Lens for Chip-To-Chip Communications in Multicore Multichip Systems

Hossein Sarbandi Farahani, Graz University of Technology

16:20 5G Millimeter-Wave Dual-Band Beamforming Antenna and Wireless Link Tests

Sungtek Kahng, Incheon National University

16:45 Degrees of Freedom and Characteristic Modes

Mats Gustafsson, Lund University

17:10 High-Gain Wideband Dielectric Resonator Antenna Based on Multiple Modes Cylindrical Dielectric Resonator for mm-Wave Application

Daotong Li, Tohoku University

iWAT 2023, Wednesday 17 May 2023, 09:00-12:00

Keynote Session 5 09:00-09:35

09:00 **Massive Spatial Multiplexing in 6G:**

What kind of antenna arrays are needed?

Emil Björnson, Professor, KTH Royal Institute of Technology

----- 09:45-09:55 Coffee Break -----

Invited Session 5 09:55-12:00

Antenna Technologies for Satellite Communications

Chairs: José-Manuel Fernández González, Professor, Universidad Politecnica de Madrid.

Mauro Ettorre, Professor, Michigan State University.

- 09:55 LIS Antenna Challenges and Limitation
Yang Hao, Queen Mary University of London
- 10:20 Fast Prototyping of an L-Band Array Using Additive and Subtractive Techniques
Dejan Filipovic, University of Colorado Boulder
- 10:45 Comparison of Additively Manufactured Dual-Polarized Probe Antennas at Ku-Band
Juha Ala-Laurinaho, Aalto University
- 11:10 Reflectarrays for CubeSat Applications
Tonny Rubæk, TICRA
- 11:35 High-Gain Electronic Beamsteering Antennas for Millimeter Wave Wireless Communications
Viktor Chernikov, Marianna Ivashina, Chalmers University of Technology

iWAT 2023, Wednesday 17 May 2023, 13:10-17:35

Keynote Session 6 13:10-13:45

13:10 Antenna Booster Technology: from Fundamentals to Applications

Jaume Anguera, CTO and Founder at Ignion, and Professor, Universitat Ramon Llull

----- 13:45-13:55 Coffee Break -----

Invited Session 6 15:05-17:10

Mm-wave and THz Antennas

Chairs: Daniele Cavallo, Professor, Delft University of Technology.

Jian Yang, Professor, Chalmers University of Technology.

15:05 Applications of Artificial Dielectric Layers for mm-Wave Antennas

Daniele Cavallo, Delft University of Technology

15:30 Extension and Further Developments on Gap Waveguide Technology for mm-Wave Applications

Jian Yang, Chalmers University of Technology

15:55 High Speed and Resilient Wireless Interconnects in the Near Field

Mauro Ettorre, Michigan State University

16:20 Antenna System Requirements and Challenges Towards 6G – an Industrial View

Ingmar Andersson, Ericsson AB

16:45 On-Chip mmWave Slot Antenna Arrays with Improved Radiation Efficiency

Nima Ghalichechian, Georgia Institute of Technology

17:10-17:35 Closing Ceremony

Poster Session

Time: 13:55-14:55 15-17 May, 2023

- P1 Robust On-Body Antenna Based on Discretized Planar Surfaces
Riku Kormilainen, Konsta Langi and Anu Lehtovuori, Ville Viikari
- P2 Convex Body-Surface Curvature Influence on the On-Body Path Gain - a Numerical Investigation
Jonas Ørnskov Nielsen, Søren Helstrup Kvist, Kaj Bjarne Jakobsen
- P3 Link Budget Considerations for Reflecting Intelligent Surfaces in Radio Channels
Axel Hoffmann, Dirk Manteuffel
- P4 A Simple Decoupling Method for Millimeter-Wave Aperture-Coupled Patch Antenna Arrays
Yiming Zhang, Xu Li, Shaoqiu Xiao
- P5 Analysis Results of Single-Layered Reflectarray Antenna with Branch Elements
Masayoshi Takao, Ryusei Yamada, Shigeru Makino, Shin-ichi Yamamoto, Yasuhiro Nishioka
- P6 A Broadband Dipole Antenna Implemented with Solar Cell
Ahmed Ali, Heesu Wang, Ikmo Park
- P7 A Calibration Procedure for Two-Antenna Direction of Arrival Finding Systems
Adelaida Cristina Heiman, Razvan D. Tamas
- P8 Low-Cost Metagratings for Efficient Anomalous Reflection
Oz Diker, Ariel Epstein
- P9 Integration of Secure Key Generation and Data Encrypted Communication in Wireless Environment
Xuetong Chen
- P10 Large-Scale Tri-Modal Electromagnetic Structure for Ambient RF Energy Harvesting
Chi-Yuk Chiu and Charles Ng, Ross Murch
- P11 A Wide Beam Dielectric Resonator Antenna Based on Complementary Excitation Source
Qiang Sun
- P12 Conformal Array Designs Using Hybrid Synthesis Method with a Fast Radiation Pattern Calculation
Yuanyan Su, Anja K. Skrivervik, Denys Nikolayev, Icaro V Soares
- P13 Maximum Gain of an Electrically Small Cosines-Dipole-Based End-Fire Array
Alessio Tornese, Antonio Clemente, Christophe Delaveaud

- P14 2.5D Inductive Intertwined Frequency Selective Surface for Pass-Band Applications
Juan A. Vásquez Peralvo, Juan Duncan, Jorge L González Rios, Symeon Chatzinotas
- P15 Liquid-Dielectric-Based Patch Antenna with Polarization and Frequency Reconfiguration
Guangwei Yang, Dimitra Psychogiou
- P16 Aperture-Coupled Bowtie Patch Antenna Design for Autonomous Driving Applications
Lazaros Alexios Iliadis, Achilles D. Boursianis, Vasileios P. Rekkas, Zaharias D. Zaharis, Stavros Koulouridis, Sotirios Goudos
- P17 The SADEA Series: An AI-Driven Antenna Design Methodology
Bo Liu
- P18 Low-Cost Transmit-Array Antenna Prototype at Ka-Band Combining Low Profile and Mechanical Wide-Angle Beam Scanning
Sergio Matos, Álvaro F. Vaquero, Manuel Arrebola, Jorge R. Costa, Joao M. Felicio, Carlos A. Fernandes, Nelson Fonseca
- P19 Millimeter Wave Dielectric Resonator Antenna for Off-Body Communications with Grooved GP
Tarek Saleh Abdou, Salam Khamas
- P20 Balanced Duplex Filtering Dielectric Resonator Antenna with High Isolation Performance
Hongliang Tian, HaiWen Liu, Mo Huang
- P21 A Transmitarray Antenna for Simultaneous Beam Steering and Polarization Control
Yeong-Hoon Noh, Ic-Pyo Hong, Jong-Gwan Yook
- P22 On the Impact of an Antenna Field of View on the Classification of UAVs
Ahmed N. Sayed, Hajar Abedifirouzjaei, Omar Ramahi, George Shaker
- P23 A 2-30-GHz MFCW Radar for Vital Sign Detection Using Variable Carrier Frequencies
Tian-Wei Huang, Ti-Yu Chao, Yi-Hsien Lin, Kai-Jie Chuang, Chen Chien, Jeng-Han Tsai
- P24 Human-Aware Beamforming Method Based on Electromagnetic Field Strength Estimation
Haruki Yamamoto, Kyoshiro Muramatsu, Kentaro Murata, Naoki Honma
- P25 Connected Dipole Antenna Cluster of Enhanced Spherical Coverage CDF for mm-Wave Applications
Quangang Chen, Juha Ala-Laurinaho, Alexander Khripkov, Janne Ilvonen, Resti Montoya Moreno, Ville Viikari

- P26 In-Concrete Integrated Sensing and Communication Antenna Design for Concrete Maturity Monitoring
Jasper Goethals, José Roberto Tenório Filho, Stijn Matthys, Gunter Vermeeren, Wout Joseph, David Plets
- P27 A Low-Profile Light-Weight Ultra-Wideband Tightly Coupled Array for Sub-6 GHz Applications
Deming Sun, Zhang-Cheng Hao, Wenye Liu
- P28 Impact of Antenna Array Arrangement on MIMO Radar for Human Identification Application
Naoki Honma, Teppei Hayashi, Nobuyuki Shiraki, Kentaro Murata, Takeshi Nakayama, Shoichi Iizuka
- P29 Electrically Small VHF Monopole Antenna for Mobile Handset Application Using Magneto-Dielectric Material
Thomas Finet, Ala Sharaiha, Anne-Claude Tarot, Hanadi Breiss, Patrick Potier, Jean-Luc Mattei, Cyrille Le Meins, Pouliguen Philippe
- P30 Characteristic Mode Aided Design of Handset Antennas with High Isolations
Jinbo Yu, Hui Li
- P31 A Spiral Flower Shape Wearable Antenna for Smart Internet of Things
Rula S Alrawashdeh, Alaa Al-laymoun, Jiafeng Zhou
- P32 Machine Learning-Assisted Optimization for Antenna Topology Design
Qi Wu, Haiming Wang, Jiexi Yin, Wei Hong
- P33 A Compact Hybrid Liquid Antenna for Wi-Fi Applications
Viswanadh Ravi Teja Gudivada, Yi Huang, Hanyang Wang, Yu Chan Yang, Elliot L. Bennett
- P34 Wireless Channel-Adaptive Sensor-Integrated Reconfigurable Intelligent Surface Based on Deep Neural Network
Myeonggin Hwang, Youngno Youn, Cheonga Lee, Daehyeon Kim, Donggeun An, Wonbin Hong
- P35 Multi-Objective Optimization for Efficient End-Fire Superdirective Array Design
Abdellah Touhami, Sylvain Collardey, Ala Sharaiha
- P36 W-Band Cavity-Backed Folded-Slot Antenna Using GaAs Integrated Passive Device Technology
Jiayou Wang, Yin-Cheng Chang, Da-Chiang Chang, Shawn S. H. Hsu, Yi Huang

- P37 Sparse PESPAs with Low Sidelobe for Uniform Excitation and Low-Bit Control
Ming C, Qi Wu, Jiexi Yin, Chen Yu, Haiming Wang, Wei Hong
- P38 mmWave Mobile Devices with Reconfigurable Broadside and Endfire Radiation Using Shared Aperture Antenna-On-Display and Antenna-In-Package
Bumhyun Kim, Dongseop Lee, Wonbin Hong
- P39 A Compact Wideband Millimeter-Wave Beam-Scanning Antenna Array for Industry 4.0 and Beyond Applications
Abdul Jabbar, Zhibo Pang, Ghazanfar A. Safdar, Qammer H Abbasi, Muhammad Ali Imran, Masood Ur-Rehman
- P40 Reconfigurable Antenna with Circular Polarization on Dual WiMAX Bands Based on Liquid Metal Switching Capability
Vahid Sharbati, Xiu Long Bao, John Healy, Nan Zhang
- P41 Transmit-Reflect-Array Based Reconfigurable Bidirectional Beam-Steering Aperture
Jianxun Su
- P42 Prephase Method for 1-Bit Phase Compensation Single-Beam Scanning Reflective Metasurface Design
Jiexi Yin, Zhi Ning Chen, Haiming Wang, Qi Wu, Thomas Zwick
- P43 A Low-Profile Dual-Band Antenna with Even- and Odd-Mode Resonances for 5G Mobile Applications
Long Qian, Xiaodong Chen, Hanyang Wang, Hai Zhou, Meng Hou
- P44 Reconfigurable Water-Based Antennas
Rasmus E. Jacobsen, Samel Arslanagic
- P45 A Dielectric Lens Antenna with Reconfigurable Scanning Beams for K-Band Wind Profile Radar
Lei Yan, Kaihong Zheng, GuangLi Yang, Yong Luo
- P46 W-Band Comb-Line Array Antenna for Wind Turbine Blade Clearance Detection
JiaYi Chen and YiTong Jin, GuangLi Yang, Yong Luo
- P47 X-Band Circularly Polarized Antenna for CubeSat Communication
Saeid Karamzadeh
- P48 Characteristic Mode Analysis of a Flexible Wideband Antenna for Sub-6 GHz Wearable Applications
Deepthi Mariam John, Tanweer Ali, Shweta Vincent, Sameena Pathan, Praveen Kumar, Jaime Anguera

P49 3D Printed Conformal MIMO Antenna with Ladder- Shaped Isolating Structure for Wireless Applications

Jayshri S Kulkarni, Jaume Anguera, Brian Garner, Yang Li

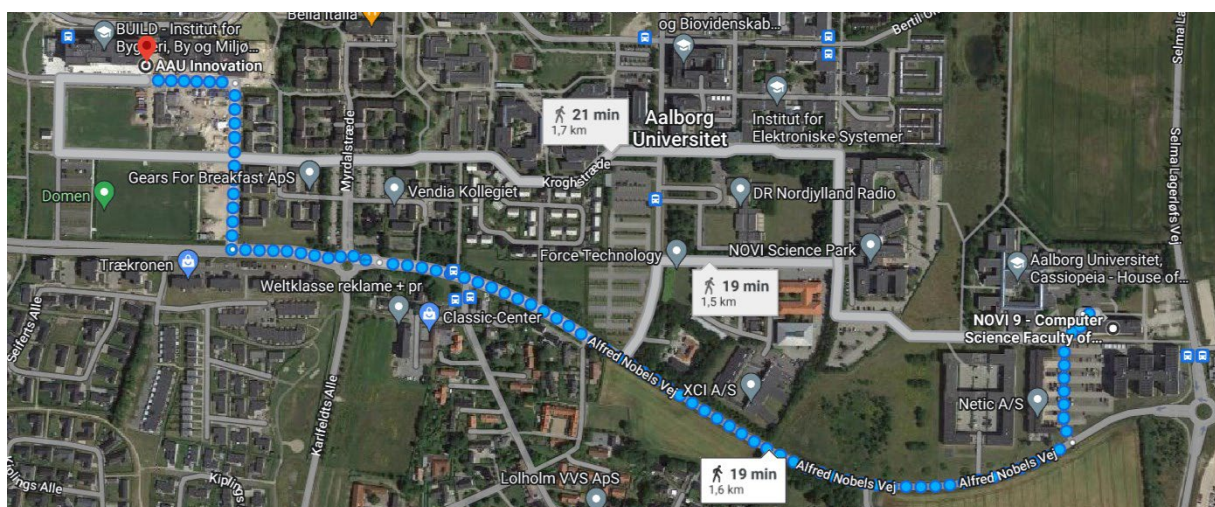
Note:

The conference venue of iWAT2023 has enough capacity to hold all posters simultaneously. To provide high-quality and comprehensive discussions for authors, iWAT2023 thereby decides to hold three-day poster session, where **all authors can present their posters for three days or with a preferred day. Please register it at the reception desk.**

Lab Tour

A lab tour to visit the antennas, propagation, and millimeter-wave system (APMS) section at Aalborg University is organized. *Everyone is welcome, please register at the reception desk.*

The address of the APMS lab is **Selma Lagerlöfs Vej 312, 9220 Aalborg Øst, Denmark.**



*The roadmap is for reference only.



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