




# ICECOM2019

23RD INTERNATIONAL CONFERENCE ON  
APPLIED ELECTROMAGNETICS AND COMMUNICATIONS

CONFERENCE

PROCEEDINGS

DUBROVNIK, CROATIA

SEPTEMBER 30, 2019 - OCTOBER 2, 2019

**Contact & Technical information:**

KoREMA

Unska 3, HR-10000 Zagreb, Croatia

**Phone:** +385 1 612 98 69

**Fax:** +385 1 612 98 70

**E-mail:** [korema@korema.hr](mailto:korema@korema.hr)

**URL:** [www.korema.hr](http://www.korema.hr)

ISBN 978-953-6037-74-2



## Conference Proceedings

# 23<sup>rd</sup> International Conference on Applied Electromagnetics and Communications

30 September – 2 October 2019  
Dubrovnik, Croatia

---

## **ICECom 2019, Conference Proceedings** (USB stick)

**Publisher:** KoREMA - Croatian Society for Communications, Computing, Electronics, Measurement and Control; Unska 3, HR-10000 Zagreb, Croatia

**Editors:** Zvonimir Šipuš, Marko Bosiljevac, Davor Bonefačić

**Design:** DREI DESIGN j.d.o.o., Peteranečki put 25, Zagreb, Croatia

ISBN 978-953-6037-74-2

© by KoREMA, Croatian Society for Communications, Computing, Electronics, Measurement and Control, Zagreb, Croatia, 2019  
All rights reserved.

All papers are published exactly as received, on author's responsibility.

---

Cover photo: Dubrovnik panorama, Croatia

**Organized by:**

IEEE Croatia Section  
IEEE AP Chapter  
IEEE MTT Chapter  
IEEE AESS/GRSS Joint Chapter  
KoREMA – Croatian Society for Communications, Computing, Electronics,  
Measurement and Control, Zagreb, Croatia; member of IMEKO and IFAC

**Supporting Organizations:**

Ministry of Science, Education and Sports of Republic of Croatia

**Co-sponsored by:**

University of Zagreb, Faculty of Electrical Engineering and Computing  
University of Dubrovnik  
AMTA - Antenna Measurement Techniques Association  
Italian AMTA Node

**Conference Chair**

Davor Bonefačić, University of Zagreb, FER, Croatia

**Honorary Chair**

Juraj Bartolić, University of Zagreb, FER, Croatia

**Technical Program Committee (TPC)**

Özlem Aydin Civi, Middle East Technical University, Turkey  
Dubravko Babić, University of Zagreb, Croatia  
Juraj Bartolić, University of Zagreb, Croatia  
Davor Bonefačić, University of Zagreb, Croatia  
Francesco D'Agostino, University of Salerno, Italy  
Alessandro Fanti, University of Cagliari, Italy  
Angelo Freni, University of Florence, Italy  
Anthony Grbic, University of Michigan, Ann Arbor, USA  
Andrej Hrovat, Jožef Stefan Institute, Slovenia  
Stefano Maci, University of Siena, Italy  
Dragan Poljak, University of Split, Croatia  
Oscar Quevedo-Teruel, KTH Royal Institute of Technology, Stockholm, Sweden  
Zbynek Raida, Brno University of Technology, Czech Republic  
Eva Rajo-Iglesias, University Carlos III of Madrid, Spain  
Oscar Rubiños López, University of Vigo, Spain  
Anja Skrivervik, École Polytechnique Fédérale de Lausanne, Switzerland  
Zvonimir Šipuš, University of Zagreb, Croatia **(Chair)**  
Radovan Zentner, University of Zagreb, Croatia

**Organizing Committee**

Dario Bojanjac, University of Zagreb, FER, Croatia  
Marko Bosiljevac, University of Zagreb, FER, Croatia  
Nikša Burum, University of Dubrovnik, Dubrovnik, Croatia  
Ana Katalinić Mucalo, HAKOM, Croatia  
Radovan Zentner, University of Zagreb, Croatia **(Chair)**

**Conference web page:**

<http://www.icecom.org>

The Conference is held at:

**Center for Advanced Academic Studies**

Address: Don Frana Bulića 4  
HR-20000 Dubrovnik  
Croatia

Phone: +385 20 32 63 00

Fax: +385 20 32 63 90

E-mail: [office@caas.unizg.hr](mailto:office@caas.unizg.hr)

URL: <http://www.caas.unizg.hr/>

**Conference Desk opening hours:**

Sunday, 29 <sup>th</sup> September 2019:	17:00 ÷ 19:00
Monday, 30 <sup>th</sup> September 2019:	08:00 ÷ 13:00 and 14:30 ÷ 19:00
Tuesday, 1 <sup>st</sup> October 2019:	08:00 ÷ 12:00
Wednesday, 2 <sup>nd</sup> October 2019:	08:00 ÷ 13:00

## Chairmen Message

Dear delegates, dear colleagues and friends,

The organizing team of the ICECom 2019 wishes you a warm welcome to the 23<sup>rd</sup> edition of the International Conference on Applied Electromagnetics and Communications.

The Conference is organized by the Faculty of Electrical Engineering and Computing of the University of Zagreb, the University of Dubrovnik, and KoREMA Society (Croatian Society for Communications, Computing, Electronics, Measurement and Control) in cooperation with IEEE Croatia Section, IEEE AP, MTT, AESS/GRSS Croatia Chapters, AMTA, and Italian AMTA Node.

We thank all the authors for submitting their papers for ICECom 2019 and the reviewers who carefully evaluated the submitted manuscripts and selected the best among them for presentation. Many thanks go to special session organizers who have gathered outstanding papers in six focused sessions. Keynote lectures are special highlight of all ICECom conferences and therefore we greatly appreciate this year keynote speakers for sharing their expertise with all participants of ICECom 2019. Last but not least, we thank the small but dedicated team of volunteers who worked for several months to organize and prepare ICECom 2019.

At the beginning of the Conference two keynote lectures are focused on antennas and arrays, i.e. digital beamforming and leaky-wave antennas. The Conference continues in regular and special sessions with various topics like medical and biomedical applications, antenna arrays and metasurfaces, fundamental limits in antennas, compact and wearable antennas, measurement techniques for antennas and RCS, propagation measurement and modelling, numerical methods, communication systems, microwave devices and circuits, radar and remote sensing, etc. ICECom 2019 lasts three days with two parallel oral sessions. The program is planned with the best intention to avoid overlapping of similar topics as much as possible.

Special feature of ICECom 2019 is the Satellite workshop dedicated to the topics related to the design of small satellites for scientific missions. It consists of three invited lectures and several presentations of students from the Faculty of Electrical Engineering in Zagreb involved with CubeSat mission FERSAT. The Workshop is the third parallel session on Tuesday and Wednesday and is open to ICECom 2019 delegates.

Social events have been planned to allow the participants of ICECom 2019 to gather in less formal atmosphere, exchanging ideas, and enjoying the beauties of Dubrovnik and its surroundings.

We wish you to enjoy both the technical and social parts of ICECom 2019 and to have a great time in Dubrovnik.

Juraj Bartolić  
Honorary Chair



Davor Bonefačić  
Conference Chair



Zvonimir Šipuš  
TPC Chair



Radovan Zentner  
OC Chair



## Keynote Speakers

**Boris Tomasic** was born in Rijeka, Croatia, on August 8, 1945. He received the Dipl. Ing. degree in electrical engineering from Fakulteta za Electrotehniko, Univerza v Ljubljani, Slovenia, in 1971 and the M.S. and Ph.D. degrees in electrical engineering from Polytechnic Institute of New York, Brooklyn, NY, in 1975 and 1981, respectively.



From 1975 to 1980, he was a Research Assistant at Polytechnic Institute of New York, performing research on conformal and planar array antennas. Since 1981 he has been with the Air Force Research Laboratory (AFRL), Sensors Directorate, first at Hanscom AFB, MA and presently at Wright-Patterson AFB OH. From 2007 to 2011 he was the Technical Advisor in the Antenna Technology Branch which has the responsibility for developing the technology base for antennas within the Air Force. Dr. Tomasic is responsible for planning and conducting research and development studies in the field of electromagnetic radiation, propagation and diffraction. His research interest is in the areas of antenna theory, planar and conformal phased arrays for airborne and space applications, mm-wave electronically scanned array antennas, digital beamforming, and metamaterials. From 1981 to 1990, he was adjunct faculty member at the University of Massachusetts teaching graduate courses in electromagnetics and antenna theory. Dr. Tomasic is a member of Sigma Xi, URSI Commission B, and senior member of IEEE. From 1986 to 1989 and from 1997 to 1999 he served as associate editor for IEEE Transactions on Antennas and Propagation. He is an Air Force Research Laboratory Fellow and recipient of the 57<sup>th</sup> Annual Department of Defense Distinguished Civilian Service Award.

**Karu Esselle** received BSc degree in electronic and telecommunication engineering with First Class Honours from the University of Moratuwa, Sri Lanka, and MSc and PhD degrees in electrical engineering from the University of Ottawa, Canada. He is a Professor of Electronic Engineering, Macquarie University, Sydney, Director of WiMed Research Centre (one of the two) and the Past Associate Dean – Higher Degree Research (HDR) of the Division of Information and Communication Sciences. He has also served as a member of the Dean's Advisory Council and the Division Executive from 2003 to 2008 and as the



Head of the Department several times. He is also the chair of the Board of management of Australian Antenna Measurement Facility, and elected Chair of both IEEE New South Wales

(NSW) Section, and IEEE NSW AP/MTT Chapter, in 2016 and 2017. He directs the Centre for Collaboration in Electromagnetic and Antenna Engineering, and has been selected as one of the three new Distinguished Lecturers of IEEE AP Society for 2017-2020. He was elevated to IEEE Fellow grade for his contributions to resonance-based antennas. He is also a Fellow of Engineers Australia. Professor Esselle has authored almost 500 research publications. Since 2002, his research team has been involved with research grants, contracts and PhD scholarships worth over 15 million dollars. Professor Esselle has been invited to serve as an international expert / research grant assessor by several nationwide research funding bodies overseas. He has been invited by Australian and overseas universities to assess applications for promotion to professorial levels. Professor Esselle has provided expert assistance to more than a dozen companies including Intel, Hewlett Packard Laboratory (USA) and Cisco Systems (USA). He is an Associate Editor of IEEE Transactions on Antennas and Propagation and IEEE Access. His research activities are posted in the web at <http://web.science.mq.edu.au/~esselle/>.

## ICECom 2019 - Short Program

<a href="#">Monday, 30<sup>th</sup> September 2019</a>		
	Hall A	Hall B
09:00-09:10	Opening ceremony	—
09:10-10:10	<a href="#">Plenary session – Keynote lecture 1</a>	—
10:10-11:10	<a href="#">Plenary session – Keynote lecture 2</a>	
11:10-11:40	Coffee break	
11:40-13:00	<a href="#">Advances in Medical Applications of Electromagnetic Fields (1)</a>	<a href="#">Antenna Arrays</a>
13:00-14:30	Lunch break	
14:30-16:30	<a href="#">Advances in Medical Applications of Electromagnetic Fields (2)</a>	<a href="#">Microwave and RF Devices and Circuits</a>
16:30-17:00	Coffee break	
17:00-19:00	<a href="#">Measurement Techniques for Antennas and Targets RCS</a>	<a href="#">Communication Systems – Characterization and Components</a>
19:15-21:00	Welcome cocktail	

<a href="#">Tuesday, 1<sup>st</sup> October 2019</a>		
	Hall A	Hall B
08:30-10:10	<a href="#">Numerical Methods and High Performance Computing in Electromagnetics</a>	<a href="#">Radar and Remote Sensing</a>
10:10-10:40	Coffee break	
10:40-12:20	<a href="#">Compact Antennas, Wearable Antennas and Sensors: Design Issues, Modeling and Experimentation</a>	<a href="#">Propagation Measurements and Models</a>
13:00-21:00	Excursion and Conference dinner	

<a href="#">Wednesday, 2<sup>nd</sup> October 2019</a>		
	Hall A	Hall B
09:00-11:00	<a href="#">Fundamental Limits and Optimal Antennas</a>	<a href="#">Active Electromagnetic Structures</a>
11:00-11:30	Coffee break	
11:30-13:50	<a href="#">Biomedical and Electromagnetic Compatibility Issues</a>	<a href="#">Reflectarrays and Metasurfaces</a>
13:50-14:20	Closing ceremony	—

## Introduction to ICECom Satellite Workshop

Space industry has been rapidly developing in the last twenty years, and space-based services and space programs, or the terrestrial sector in the broader sense (such as the EU Copernicus and Galileo programs for Earth observation), create socio-economic added value and thus help in the development of each participating country. Unused capacity when launching large satellites enables the very small satellites of standard format as secondary payloads at prices acceptable for universities and small businesses. This allows building and launch nanosatellites and picosatellites for scientific purposes or for educational missions. The aim of the ICECOM Satellite Workshop is to cover relevant topics related to the design of small satellites for scientific missions.

This workshop features presentations from industry and academia and will include presentations from students of the Faculty of Electrical Engineering in Zagreb involved with CubeSat mission FERSAT.



Dubravko Babić  
Workshop chair



Dario Bojanjac  
Program co-chair



Marko Bosiljevac  
Program co-chair



## Invited lecturers

**Walter Ballheimer** is co-founder and CEO of German Orbital Systems GmbH (GOS). He specialized in satellite technology, with emphasis on electronics and remote sensing payloads. Participated in multiple student satellite projects and as a student assistant conducted lectures and was responsible for BEESAT-1 mission operations. After graduating from the university, he worked at the chair of astronautics and aeronautics where he was involved in multiple satellite projects, including BEESAT, TechnoSat and TUBIN. He specialized in remote sensing payloads and satellite electronics.



GOS was founded 2014 with the goal to provide an affordable access to space technology for a broad range of customers. Since then I am responsible for our strategy, the business development as well as top level engineering decisions. German Orbital Systems is the only German company focusing on CubeSats. Our core business is building turnkey satellite missions for customers, we also build separation sequence controllers for cluster launches. Large part of our revenues is invested in research. We have ongoing research projects in space debris monitoring as well as in additive manufacturing of structures and in novel electrical power systems. German Orbital Systems is not venture backed.

**Stefan Cikota**, mag. Phys., is a Ph.D. student in Astrophysics at Faculty of Science, University of Zagreb, with an Assistant position at Faculty of Electrical Engineering and Computing - FER, Department of Applied Physics in Zagreb, Croatia. His research interests are various, but mainly related to the Solar System formation, evolution, and the small Solar System bodies. During his undergraduate studies at the University of Zurich, he started to collaborate with the La Sagra Sky Survey (MPC code J75) located in southern Spain, where he contributed to the development of data acquisition and reduction pipelines and co-discovered over 3100 minor planets, including 1 comet and 12 Near-Earth Asteroids. He has named some of his discoveries, including asteroid (187700) Zagreb, named after the Croatian capital.



Since 2009 he has been collaborating with Instituto de Astrofísica de Andalucía (IAA-CSIC) on studies of physical properties of Trans-Neptunian Objects, and mass-loss mechanisms on small Solar System bodies. He is author and co-author of 12 scientific papers published in

peer-reviewed journals, including the prestigious Nature. In 2017 he joined the Major Atmospheric Gamma Imaging Cherenkov (MAGIC) collaboration and in 2019 the Cherenkov Telescope Array (CTA) Consortium. He is a member of the Croatian Astronomical Society and the Croatian Physical Society.

He is interested in the aerospace industry, and as a member of the National reference group for Space formed by Ministry of Science and Education of the Republic of Croatia, he is committed to positioning Croatia in the European Space Policy and establishing a Croatian aerospace sector.

**Anja Skrivervik** obtained her electrical engineering degree from Ecole Polytechnique Fédérale de Lausanne in 1986, and her PhD from the same institution in 1992, for which she received the Latsis award. After a stay at the University of Rennes as an invited Research Fellow and two years in the industry, she returned part time to EPFL as an Assistant Professor in 1996, and is now a Professeur Titulaire at this institution, where she is the head of the Microwave and Antenna Group. Her research activities include electrically small antennas, antennas in biological media, periodic structures, reflect- and transmitarrays, and numerical techniques for electromagnetics. She is author or co-author of more than 200 peer reviewed scientific publications. Her teaching activities include courses on microwaves and antennas, and she has course at Bachelor, Master and PhD levels. She was director of the EE section form 1996-2000, and is currently the director of the EE doctoral school at EPFL.



She is very active in European collaboration and European projects. She was the chairperson of the Swiss URSI until 2012, is a Board member of the European School on Antennas and is frequently requested to review research programs and centers in Europe. She is a member of the board of directors of the European Association on Antennas and Propagation (EurAAP) since 2017.

Tuesday, 1 <sup>st</sup> October 2019	Hall C
<b>ICECom Satellite Workshop (09:00 – 11:40)</b>	
Chair: Dubravko Babić	

09:00	Dubravko Babić, UNIZG-FER, Croatia <b>ICECom Student Satellite Workshop Introduction</b>
09:10	Walter Ballheimer, German Orbital Systems GmbH, Germany <b>Invited Lecture 1</b>
10:10	<b>Coffee break</b>
10:40	Stefan Cikota, UNIZG-FER, Croatia <b>Invited Lecture 2</b>

Wednesday, 2 <sup>nd</sup> October 2019	Hall C
<b>ICECom Satellite Workshop (09:00 – 13:00)</b>	
Chair: Josip Vuković	

09:00	<b>Student session</b>
11:00	<b>Coffee break</b>
11:30	Anja Skrivervik and Miroslav Veljović, EPFL, Switzerland <b>Invited Lecture 3</b>
12:30	Dubravko Babić, UNIZG-FER, Croatia <b>FERSAT Project</b>

## ICECom 2019 - Conference Program

Monday, 30 <sup>th</sup> September 2019	Hall A
<b>Opening Ceremony (09:00 – 09:10)</b>	

Monday, 30 <sup>th</sup> September 2019	Hall A
<b>Plenary Session (09:10 – 11:10)</b>	
Chairs: Davor Bonefačić and Juraj Bartolić	

09:10	Boris Tomasic <b>Self-Calibration and Mutual Coupling Compensation in Digital Beamforming Arrays</b> <i>Keynote lecture</i>
10:10	Karu Esselle <b>Leaky-Wave Antennas: From Niche Applications to Mass Market</b> <i>Keynote lecture</i>

Monday, 30 <sup>th</sup> September 2019	Hall A
<b>Advances in Medical Applications of Electromagnetic Fields (1<sup>st</sup> part)</b> (11:40 – 13:00)	
Session organizers: Lorenzo Crocco, Alessandro Fanti and Matteo Bruno Lodi	
Chairs: Alessandro Fanti and Matteo Bruno Lodi	

11:40	Giacomo Muntoni, Alessandro Fanti and Giorgio Montisci <b>Multi-disciplinary Approach of Microwave Hyperthermia Treatment</b>
12:00	Eric Lemmer, Daniel Schmiech, Simon Mueller, Aly Marnach, Thull René and Andreas Diewald <b>Development of a 24 GHz Front-End and first test measurements for Breathing and Heartbeat Monitoring inside a Cot</b>
12:20	Jorge Alberto Tobon Vasquez, Rosa Scapaticci, Giovanna Turvani, Gennaro Bellizzi, Nadine Joachimowicz, Bernard Duchêne, Mario Roberto Casu, Lorenzo Crocco, Francesca Vipiana and Enrico Tedeschi <b>Design and Experimental Testing of a Microwave Device for Monitoring Cerebrovascular Diseases</b>
12:40	Igor Bisio, Claudio Estatico, Alessandro Fedeli, Fabio Lavagetto, Gian Luigi Mancardi, Matteo Pastorino, Andrea Randazzo and Andrea Sciarrone <b>A Microwave Imaging System for the Characterization of Brain Stroke: Testing Against Simulated and Experimental Data</b>

Monday, 30<sup>th</sup> September 2019

Hall B

**Antenna Arrays (11:40 – 13:00)**

Chairs: Sergey Shabunin and Juraj Bartolić

11:40	Sergey Shabunin, Juraj Bartolic and Danil Trifonov <b>Minimization of the Phase Shifter Control Current in Antenna Arrays with Switchable Radiation Patterns</b>
12:00	Giulia Buttazzoni, Fulvio Babich, Riccardo Tuninato, Francesca Vatta and Massimiliano Comisso <b>Phase-Only Pattern Synthesis with Interference Suppression for Large-Scale Antenna Arrays</b>
12:20	Giada Maria Battaglia, Tommaso Isernia and Andrea Francesco Morabito <b>Optimal Antenna Array Pattern Synthesis via Hybrid Optimization</b>
12:40	Andreas Diewald and Simon Mueller <b>Fast and Easy Implementation of a Leaky Wave Antenna for the 24 GHz ISM Band</b>

Monday, 30 <sup>th</sup> September 2019	Hall A
<b>Advances in Medical Applications of Electromagnetic Fields (2<sup>nd</sup> part)</b> (14:30-16:30)	
Session organizers: Lorenzo Crocco, Alessandro Fanti and Matteo Bruno Lodi	
Chairs: Alessandro Fanti and Matteo Bruno Lodi	

14:30	Matteo Bruno Lodi, Andrea Vargiu, Alessandro Fanti, Luca Zanatta and Giuseppe Mazzearella <b>A Mathematical Model for Magnetically Targeted Drug Delivery Using Magnetic Prosthetic Implants for Bone Tissue</b>
14:50	Daniela M. Godinho, João M. Felício, Carlos A. Fernandes and Raquel C. Conceição <b>Feasibility Study of Focal Lens for Multistatic Microwave Breast Imaging</b>
15:10	Michele Alessandro Chiapperino, Claudio Maria Lamacchia, Angelo Palmisano, Pietro Bia, Alessandro Miani and Luciano Mescia <b>Electroporation Modelling Based on the Effective Thickness of Irregularly Shaped Cell Membrane and the Dynamics of Pore Sizes</b>
15:30	Cemanur Aydinalp, Sulayman Joof and Tuba Yilmaz <b>Sensing Depth Analysis of Open-Ended Coaxial Probe for Skin Cancer Detection</b>
15:50	Sassan Schäfer, Simon Mueller, Daniel Schmiech and Andreas Diewald <b>Evaluation of Antenna Pattern for Vital Sign Monitoring of Elderly People</b>
16:10	Lorenz Dirksmeyer, Daniel Schmiech and Andreas Diewald <b>Separation of Two Close Targets in CW-Radar Measurement in the Example of Respiration Monitoring</b>

Monday, 30<sup>th</sup> September 2019

Hall B

**Microwave and RF Devices and Circuits (14:30-16:30)**

Chairs: Denis Letavin and Ivan Lujo

14:30	Toshiki Tabei, Zhewang Ma and Masataka Ohira <b>A Compact Wideband Bandstop Filter Using Microstrip Ring Structure</b>
14:50	Francesco Chiadini, Roberta De Simone, Vincenzo Fiumara and Antonio Scaglione <b>Fractal Defected Ground Microstrip</b>
15:10	Denis Letavin <b>Design of a Compact Directional Coupler on a Flexible Substrate</b>
15:30	Denis Letavin <b>Microstrip Matrix Butler Area which is Reduced by the use of Compact Directional Couplers</b>
15:50	Linlin Wu and Kaiyuan Lu <b>Investigate a New Type of Vibration-Driven Based Active Actuator for Capsule Robot</b>
16:10	Ivan Lujo, Marko Bosiljevac and Zvonimir Sipus <b>Comparison of Different Statistical Methods for Specklegram-Based Fiber Optic Vibration Sensor</b>

Monday, 30 <sup>th</sup> September 2019	Hall A
<b>Measurement Techniques for Antennas and Targets RCS (17:00 -19:00)</b>	
Session organizers: Francesco D'Agostino and Claudio Curcio	
Chairs: Francesco D'Agostino and Claudio Curcio	

17:00	Amedeo Capozzoli, Claudio Curcio and Angelo Liseno <b>Sensitivity Analysis of the Singular Value Optimization Method for Antenna Characterization</b>
17:20	Francesco D'Agostino, Flaminio Ferrara, Claudio Gennarelli, Rocco Guerriero and Massimo Migliozi <b>Laboratory Tests Validating a Non-Redundant NF/FF Transformation with Spherical Spiral Scan for Non-Centered Mounted Long Antennas</b>
17:40	Pax Wei <b>RCS Measurements on Extended Objects for Radar Field Probes</b>
18:00	Luca Olmi, Pietro Bolli, Luca Carbonaro, Luca Cresci, Andrea Donati, Pasqualino Marongiu, Enzo Natale, Renzo Nesti, Dario Panella and Daniela Mugnai <b>Simulations and Tests of a Super-Resolving Optical Module Using a Satellite Antenna</b>
18:20	Stefania Matteoli, Lorenzo Ciorba, Fabio Paonessa, Giuseppe Virone, Giuseppe Addamo, Oscar A. Peverini, Pietro Bolli, Giuseppe Pupillo, Kristian Zarb Adami, Alessio Magro, Eloy de Lera Acedo, Edgar Colín-Beltrán and Nima Razavi Ghods <b>UAV-based Far-Field Measurements on the SKA Aperture Array Verification System</b>
18:40	Giacomo Muntoni, Luca Schirru, Giorgio Montisci, Tonino Pisanu and Marco Simone <b>The New Space Debris Dedicated Receiving Chain of the Sardinia Radio Telescope</b>

Monday, 30 <sup>th</sup> September 2019	Hall B
<b>Communication Systems – Characterization and Components</b> (17:00 -19:00)	
Chairs: Sandra Costanzo and Radovan Zentner	

17:00	Martin Erb, Christian Steger, Josef Preishuber-Pflügl and Martin Troyer <b>An Automated Measurement System for Modeling and Characterization of NFC Communication Systems</b>
17:20	Sandra Costanzo, Francesca Venneri and Giuseppe Di Massa <b>Liquid Crystal-Based Reconfigurable Reflectarray Cells for 5G Systems</b>
17:40	Marco Simone <b>An Automatic Design of 5G Antennas through PSO and CST</b>
18:00	Kai Liu, Cheng Tao, Liu Liu and Tao Zhou <b>Low-Complexity Antenna Selection in Low-Resolution Massive MIMO Systems</b>
18:20	Guichao Chen, Kai Liu, Cheng Tao, Liu Liu and Tao Zhou <b>Performance Analysis of Millimeter Wave Massive MIMO System with Low-Precision ADCs</b>
18:40	Goran Belačić and Radovan Zentner <b>Mobile Network based Geolocation Estimation System Consisting of an Online Database and Android Application</b>

Tuesday, 1 <sup>st</sup> October 2019	Hall A
<b>Numerical Methods and High Performance Computing in Electromagnetics (08:30 -10:10)</b>	
Session organizers: Alessandro Fanti, Angelo Liseno and Santi Concetto Pavone	
Chairs: Alessandro Fanti and Angelo Liseno	

08:30	Dragan Poljak, Anna Susnjara, Vicko Doric, Silvestar Sesnic, Mario Cvetkovic and Hrvoje Dodig
	<b>On Some Multiphysics Models for Electromagnetic-Thermal-Hydrodynamics (ETHD) Analysis</b>
08:50	Tomoaki Nagaoka
	<b>GPU Acceleration of Largescale Multiphysics Simulation Coupled Electromagnetic and Thermal Fields</b>
09:10	Amedeo Capozzoli, Claudio Curcio and Angelo Liseno
	<b>Non-Uniform FFT (NUFFT) Algorithms for Antenna Radiation</b>
09:30	Jorge Alberto Tobon Vasquez, Zhen Peng, Jin-Fa Lee, Giuseppe Vecchi and Francesca Vipiana
	<b>Mesh Refinement for Surface Integral Equations based on Residual Error Estimation</b>
09:50	Aleksey Karpov, Sergey Knyazev, Lubov Lesnaya and Sergey Shabunin
	<b>How the Green's Functions May Be Used for Correct Measurements of Homogeneous and Inhomogeneous Dielectric Sheets</b>

Tuesday, 1 <sup>st</sup> October 2019	Hall B
<b>Radar and Remote Sensing (08:30 – 10:10)</b>	
Chairs: Lara Pajewski and Juraj Bartolić	

08:30	Lara Pajewski and Simone Meschino <b>SPOT-GPR Analysis of Ground Penetrating Radar Signals Recorded over the Limestone Region of the IFSTTAR Geophysical Test Site: Preliminary Results</b>
08:50	Riza Erhan Akdogan and Yasemin Altuncu <b>Reconstruction of 3D Objects Buried Under Into Half-Space by Using Variational Born Iterative Method</b>
09:10	Ryosuke Kato, Masaharu Takahashi, Nozomu Ishii, Qiang Chen and Hiroshi Yoshida <b>Investigation of a 3D Undersea Positioning System Using Electromagnetic Waves</b>
09:30	Manuel Steins and Andreas Diewald <b>Digital Doppler Effect Generation with CORDIC Algorithm for Radar Target Simulations</b>
09:50	Lara Pajewski <b>An Overview of the Educational Activities on Ground Penetrating Radar Carried out in COST Action TU1208</b>

Tuesday, 1 <sup>st</sup> October 2019	Hall A
<b>Compact Antennas, Wearable Antennas and Sensors: Design Issues, Modeling and Experimentation (10:40 – 12:20)</b>	
Session organizers: Sandra Costanzo	
Chairs: Sandra Costanzo and Davor Bonefačić	

10:40	Sandra Costanzo and Giovanni Ammendola <b>Compact Textile Wearable Antenna for Security Applications</b>
11:00	Sandra Costanzo and Vincenzo Cioffi <b>Dielectric Models for the Accurate Design of Wearable Diabetes Sensors</b>
11:20	Davor Bonefacic and Juraj Bartolić <b>Effects of Moisture on Resonant and Wideband Textile Antennas</b>
11:40	Hisashi Morishita <b>A Broadband Printed Antenna with Radiation Patterns of Dipole</b>
12:00	Hisashi Morishita <b>A Simple Method for Decoupling of Two PIFAs by Using Parasitic Elements</b>

Tuesday, 1<sup>st</sup> October 2019

Hall B

**Propagation Measurements and Models (10:40 – 12:20)**

Chairs: Tomaž Javornik and Radovan Zentner

10:40	Klemen Bregar, Tomaž Javornik, Andrej Hrovat, Mihael Mohorčič and Gorazd Kandus <b>Passive Ultra-Wideband Coarse Localization and Activity Detection System for Assisted Living</b>
11:00	Andrej Hrovat, Ke Guan, Teodora Kocevaska and Tomaž Javornik <b>3D Indoor Environment Characterization based on Radio Scanning: Initial Idea and Methodology</b>
11:20	Nada Bel-Haj-Maati, Nadine Malhouroux, Patrice Pajusco and Michel Ney <b>Massive MIMO Channel Measurements and Simulations at 3.7 GHz in Outdoor Environment</b>
11:40	Branimir Ivšić, Zvonimir Šipuš, Juraj Bartolić and Josip Babić <b>Modelling of Ultrawideband Propagation Scenarios for Safe Human-Robot Interaction in Warehouse Environment</b>

Wednesday , 2 <sup>nd</sup> October 2019	Hall A
<b>Fundamental Limits and Optimal Antennas (09:00 – 11:00)</b>	
Session organizers: Anja Skrivervik and Zvonimir Šipuš	
Chairs: Anja Skrivervik and Zvonimir Šipuš	

09:00	Miloslav Capek, Lukas Jelinek, Mats Gustafsson and Vit Losenicky <b>Fundamental Bounds on Dissipation Factor for Wearable and Implantable Antennas</b>
09:30	Mats Gustafsson and Miloslav Capek <b>Physical Bounds on Antennas in Complex Environments</b>
10:00	Andrea Neto, Angelo Freni, and Nuria Llombart <b>The Observable Field: a Review</b>
10:30	Anja Skrivervik, Marko Bosiljevac, Isabel Santos and Zvonimir Šipuš <b>Design of in-Body Antennas Based on Fundamental Radiation Limitations</b>

Wednesday , 2<sup>nd</sup> October 2019

Hall B

**Active Electromagnetic Structures (9:00 – 11:00)**

Chairs: Silvio Hrabar and Ivan Bonić

9:00	Silvio Hrabar <b>Active Electromagnetic Structures – Past, Present, and Future</b> <i>Invited introductory talk</i>
9:20	Francesco Chiadini, Roberta De Simone, Vincenzo Fiumara and Antonio Scaglione <b>Temperature Dependent Defect Modes at Terahertz Regime</b>
9:40	Ivan Bonić and Silvio Hrabar <b>Dispersion Analysis of Active Artificial EM Structures using Method of Complex Trajectory</b>
10:00	Leo Vincelj, Silvio Hrabar and Igor Krois <b>Non-linear Model of Negative Impedance Converter for use in non-Foster Circuitry</b>
10:20	Ante Brizic, Silvio Hrabar, Dominik Zanic and Igor Krois <b>Investigation of Immittance Inverter based on Band-pass Non-Foster Negative Capacitor</b>
10:40	Aleksandar Kiricenko and Silvio Hrabar <b>Quadrature non-Foster-inspired Matching of Short Transmitting Dipole: Basic Preliminary Experiments</b>

Wednesday , 2 <sup>nd</sup> October 2019	Hall A
<b>Biomedical and Electromagnetic Compatibility Issues (11:30 – 13:50)</b>	
Chairs: Masaharu Takahashi and Dragan Poljak	

11:30	Artur de São José, Virginie Deniau, Úrsula Resende and Ricardo Adriano <b>Mitigating Intentional Electromagnetic Interferences over the GSM-R System with Adaptive Filters</b>
11:50	Dragan Poljak, Marin Galić and Lara Pajewski <b>Analytical Calculation of Integral Measures for Quantifying Human Exposure to HF Signals with Continuous Spectra</b>
12:10	Zeynep Macit, Cemanur Aydinalp, Ayse Buse Ozdabak Sert, Fatma Nese Kok and Tuba Yilmaz <b>Microwave Dielectric Properties of Osteosarcoma Cell Line (SAOS-2) Suspensions</b>
12:30	Kazuyuki Saito, Masaharu Takahashi, Tomoaki Nagaoka and Soichi Watanabe <b>SAR Evaluations of Phantom Surface Close to Wireless LAN Router with Beam Steering Technique</b>
12:50	Aly Marnach, Daniel Schmiech, Jonas Berg, Simon Mueller, Candido Vieira and Andreas Diewald <b>Electromotive Dummy for Simulation of Breathing and Heart Beat Physiology</b>
13:10	Aly Marnach, Daniel Schmiech and Andreas Diewald <b>Illumination Coverage Measurement of an I/Q-Radar System for a Baby Incubator</b>
13:30	Antonio Šarolić and Anđela Matković <b>Effect of the Coaxial Dielectric Probe Diameter on Its Permittivity Sensing Depth at 2 GHz – Simulation Study</b>

Wednesday , 2 <sup>nd</sup> October 2019	Hall B
<b>Reflectarrays and Metasurfaces (11:30 – 13:30)</b>	
Session organizers: Sandra Costanzo and Francesca Venneri	
Chairs: Zvonimir Šipuš and Zoran Ereš	

11:30	Jordan Budhu and Anthony Grbic <b>A Rigorous Approach to Designing Reflectarrays</b>
11:50	Muhamamd Usman Afzal, Ali Lalbakhsh, Touseef Hayat and Karu Esselle <b>Recent Progress on Development of Near-Field Structures for Radio-Frequency Front-End Antennas</b>
12:10	Tamami Maruyama, Qiang Chen and Noriharu Suematsu <b>Applied Reflectarray Based on Metasurface for Wireless Power Transmission Efficiency</b>
12:30	Dominik Barbarić, Marko Bosiljevac and Zvonimir Šipuš <b>Analysis of Cascaded Curved Metasurfaces with Spatially-Varying Impedance Distribution</b>
12:50	Damir Zidar and Silvio Hrabar <b>Circuit-Theory Interpretation of Space Harmonics Interaction in Glide-Symmetry Structures</b>
13:10	Zoran Ereš, Marko Bosiljevac and Zvonimir Šipuš <b>Realization of Gap-Waveguide Leaky Wave Antenna Using Low-Cost Metallization Procedure</b>

Wednesday , 2<sup>nd</sup> October 2019

**Hall A**

**Closing Ceremony (13:50 – 14:20)**

# Index of authors

Addamo, G.	s_16_5
Adriano, R.	s_33_1
Akdogan, R.E.	s_22_2
Altuncu, Y.	s_22_2
Ammendola, G.	s_23_1
Aydinalp, C.	s_14_4 s_33_3
Babic, J.	s_24_4
Babich, F.	s_13_2
Barbaric, D.	s_34_4
Bartolic, J.	s_13_1 s_23_3 s_24_4
Battaglia, G.M.	s_13_3
Belacic, G.	s_17_6
Bel-Haj-Maati, N.	s_24_3
Bellizzi, G.	s_12_4
Berg, J.	s_33_5
Bia, P.	s_14_3
Bisio, I.	s_12_3
Bolli, P.	s_16_4 s_16_5
Bonafacic, D.	s_23_3
Bonic, I.	s_32_3
Bosiljevac, M.	s_15_6 s_31_4 s_34_4 s_34_6
Bregar, K.	s_24_1
Brizic, A.	s_32_5
Budhu, J.	s_34_1
Buttazoni, G.	s_13_2
Capek, M.	s_31_1 s_31_2
Capozzoli, A.	s_16_1 s_21_3
Carbonaro, L.	s_16_4
Casu, M.R.	s_12_4
Chen, G.	s_17_5
Chen, Q.	s_22_3 s_34_3
Cheng, T.	s_17_4 s_17_5
Chiadini, F.	s_15_2 s_32_2
Chiapperino, M.A.	s_14_3
Cioffi, V.	s_23_2
Ciorba, L.	s_16_5
Colin-Beltran, E.	s_16_5
Comisso, M.	s_13_2
Conceicao, R.C.	s_14_2
Costanzo, S.	s_17_2 s_23_1 s_23_2
Cresci, L.	s_16_4
Crocco, L.	s_12_4
Curcio, C.	s_16_1 s_21_3
Cvetkovic, M.	s_21_1
D'Agostino, F.	s_16_2
De Simone, R.	s_15_2 s_32_2
Deniau, V.	s_33_1
Di Massa, G.	s_17_2
Diewald, A.	s_12_2 s_13_4 s_14_5 s_14_6 s_22_4 s_33_5 s_33_6
Dirksmeyer, L.	s_14_6
Donati, A.	s_16_4
Doric, V.	s_21_1
Duchene, B.	s_12_4
Erb, M.	s_17_1
Eres, Z.	s_34_6
Esselle, K.	s_11_3 s_34_2
Estatico, C.	s_12_3
Fanti, A.	s_12_1 s_14_1
Fedeli, A.	s_12_3
Felicio, J.M.	s_14_2
Fernandes, C.A.	s_14_2
Ferrara, F.	s_16_2
Fiumara, V.	s_15_2 s_32_2
Freni, A.	s_31_3
Galic, M.	s_33_2
Gennarelli, C.	s_16_2
Godinho, D.M.	s_14_2
Grbic, A.	s_34_1
Guan, K.	s_24_2
Guerriero, R.	s_16_2
Gustafsson, M.	s_31_1 s_31_2
Hayat, T.	s_34_2
Hrabar, S.	s_32_1 s_32_3 s_32_4 s_32_5 s_32_6 s_34_5
Hrovat, A.	s_24_1 s_24_2
Isernia, T.	s_13_3
Ishii, N.	s_22_3
Ivsic, B.	s_24_4
Javornik, T.	s_24_1 s_24_2
Jelinek, L.	s_31_1
Joachimowicz, N.	s_12_4
Joof, S.	s_14_4
Kandus, G.	s_24_1
Karpov, A.	s_21_5
Kato, R.	s_22_3
Kiricenko, A.	s_32_6
Knyazev, S.	s_21_5
Kocevska, T.	s_24_2
Kok, F.N.	s_33_3
Krois, I.	s_32_4 s_32_5
Lalbahsh, A.	s_34_2

# Index of authors

Lamacchia, C.M.	s_14_3
Lavagetto, F.	s_12_3
Lemmer, E.	s_12_2
Lera Acedo, E.	s_16_5
Lesnaya, L.	s_21_5
Letavin, D.	s_15_3 s_15_4
Liseno, A.	s_16_1 s_21_3
Liu, K.	s_17_4 s_17_5
Liu, L.	s_17_4 s_17_5
Llombart, N.	s_31_3
Lodi, M.B.	s_14_1
Losenicky, V.	s_31_1
Lu, K.	s_15_5
Lujo, I.	s_15_6
Ma, Z.	s_15_1
Macit, Z.	s_33_3
Magro, A.	s_16_5
Malhouroux, N.	s_24_3
Mancardi, G.L.	s_12_3
Marnach, A.	s_12_2 s_33_5 s_33_6
Marongiu, P.	s_16_4
Maruyama, T.	s_34_3
Matkovic, A.	s_33_7
Matteoli, S.	s_16_5
Mazzarella, G.	s_14_1
Meschino, S.	s_22_1
Mescia, L.	s_14_3
Miani, A.	s_14_3
Migliozzi, M.	s_16_2
Mohorcic, M.	s_24_1
Montisci, G.	s_12_1 s_16_6
Morabito, A.F.	s_13_3
Morishita, H.	s_23_4 s_23_5
Mueller, S.	s_12_2 s_13_4 s_14_5 s_33_5
Mugnai, D.	s_16_4
Muntoni, G.	s_12_1 s_16_6
Nagaoka, T.	s_21_2 s_33_4
Natale, E.	s_16_4
Nesti, R.	s_16_4
Neto, A.	s_31_3
Ney, M.	s_24_3
Ohira, M.	s_15_1
Olmi, L.	s_16_4
Ozdabak Sert, A.B.	s_33_3
Pajewski, L.	s_22_1 s_22_5 s_33_2
Pajusco, P.	s_24_3
Palmisano, A.	s_14_3
Panella, D.	s_16_4
Paonessa, F.	s_16_5
Pastorino, M.	s_12_3
Peaverini, O.A.	s_16_5
Pfeiffer, C.	s_11_2
Pisanu, T.	s_16_6
Poljak, D.	s_21_1 s_33_2
Preishuber-Pflugl, J.	s_17_1
Pupillo, G.	s_16_5
Randazzo, A.	s_12_3
Razavi Ghods, N.	s_16_5
Rene, T.	s_12_2
Resende, U.	s_33_1
Saito, K.	s_33_4
Sao Jose, A.	s_33_1
Sarolic, A.	s_33_7
Scaglione, A.	s_15_2 s_32_2
Scapatucci, R.	s_12_4
Schafer, S.	s_14_5
Schirru, L.	s_16_6
Schmiech, D.	s_12_2 s_14_5 s_14_6 s_33_5 s_33_6
Sciarrone, A.	s_12_3
Sesnic, S.	s_21_1
Shabunin, S.	s_13_1 s_21_5
Simone, M.	s_16_6 s_17_3
Sipus, Z.	s_15_6 s_24_4 s_31_4 s_34_4 s_34_6
Skrivervik, A.	s_31_4
Steger, C.	s_17_1
Steins, M.	s_22_4
Suematsu, N.	s_34_3
Susnjara, A.	s_21_1
Tabei, T.	s_15_1
Takahashi, M.	s_22_3 s_33_4
Tao, C.	s_17_4 s_17_5
Tedeschi, E.	s_12_4
Tomasic, B.	s_11_2
Trifonov, D.	s_13_1
Troyer, M.	s_17_1
Tuninato, R.	s_13_2
Turvani, G.	s_12_4
Usman Afzal, M.	s_34_2
Vargiu, A.	s_14_1
Vasquez, J.A.T.	s_12_4 s_21_4

## Index of authors

---

Vatta, F.	s_13_2
Vecchi, G.	s_21_4
Venneri, F.	s_17_2
Vieira, C.	s_33_5
Vincelj, L.	s_32_4
Vipiana, F.	s_12_4 s_21_4
Virone, G.	s_16_5
Watanabe, S.	s_33_4
Wei, P.	s_16_3
Wu, L.	s_15_5
Yilmaz, T.	s_14_4 s_33_3
Yoshida, H.	s_22_3
Zanatta, L.	s_14_1
Zanic, D.	s_32_5
Zarb Adami, K.	s_16_5
Zentner, R.	s_17_6
Zhou, T.	s_17_4 s_17_5
Zidar, D.	s_34_5

---