

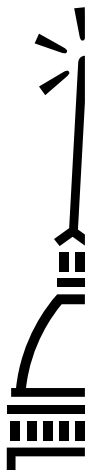


# ICEAA - IEEE APWC 24

International Conference on Electromagnetics  
in Advanced Applications

IEEE-APS Topical Conference on Antennas  
and Propagation in Wireless Communications

**SEPTEMBER 2-6, 2024**  
**LISBOA / PORTUGAL**





# ICEAA - IEEE APWC

**SEPTEMBER 2-6, 2024  
LISBOA / PORTUGAL**

ORGANIZED BY

**POLITECNICO DI TORINO**

IN COOPERATION WITH

**UNIVERSIDADE DE AVEIRO, PORTUGAL**

**POLYTECHNIC OF LEIRA, PORTUGAL**

**IEEE Antennas and Propagation Society**

**URSI, the International Union of Radio Science**

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## welcome to the conference

On behalf of the Steering Committee, of the Organizing Committee and of the Scientific Committee, we are glad to welcome all participants to the twenty-fifth edition of ICEAA and to the thirteenth edition of IEEE APWC, the IEEE-APS Topical Conference on Antennas and Propagation in Wireless Communications. These two conferences share a common organization, registration fee, submission site, workshops and short courses, and social events.

The 2024 edition of ICEAA and IEEE APWC is organized by the Politecnico di Torino in cooperation with the Universidade de Aveiro, Portugal, and the Polytechnic of Leira, Portugal, with the principal cosponsorship of the IEEE Antennas and Propagation Society and the technical cosponsorship of the International Union of Radio Science (URSI).

The combination of these Conferences has a wide scope which includes all kinds of advanced applications in Electromagnetics and new technology developments. Broad areas are covered, ranging from Electromagnetic Selective Structures to Radio Telescopes and Radio Astronomy Systems, from Electromagnetic Compatibility to Nonlinear Media, Resonances and Inverse Problems, from Antennas, Propagation and Components Technologies to Radar Cross Section and Asymptotic Techniques, from Electromagnetic Application to Biomedicine to Computational Electromagnetics, from Wireless Communications to Metamaterials and Metasurfaces.

Altogether the two conferences feature 49 sessions including 29 special sessions organized by renowned experts. About 404 papers are scheduled, out of the 605 submitted. As in previous editions invited papers will be presented at the Conferences, giving recent information on the state of the art and new technologies.

We also welcome two Distinguished Lecturers, Prof. Mahta Moghaddam, University of Southern California (USC), Los Angeles, CA, USA, and Prof. Zhi Ning Chen, National University of Singapore, who will be presenting plenary lectures at the Conferences.

On Friday morning, September 6, a free half-day Short Course on "Time Domain Simulation of Electromagnetic Problems Combined with Linear and Nonlinear Circuit Elements" will be given by Prof. Atef Z. Elsherbeni, Colorado School of Mines, USA.

The Conferences are held at the "Altis Grand Hotel," Rua Castilho 11, Lisbon, Portugal. The modern and sophisticated design of this hotel, combined with the excellence of its 5-star service, is the perfect combination to make your stay in the center of Lisbon unforgettable.

Don't miss the opportunity to visit Lisbon and its surroundings: we are sure you will enjoy them.

We look forward to seeing you in Lisbon in September.

### **Roberto D. Graglia**

Chairman of the ICEAA - IEEE APWC Organizing Committee

### **Piergiorgio L. E. Uslenghi**

Chairman of the ICEAA - IEEE APWC Scientific Committee

**DATES AND LOCATION**

The conferences (combined ICEAA and IEEE APWC) will be held from 2nd to 6th of September 2024, at the Altis Grand Hotel, Rua Castilho 11, Lisbon, Portugal.

**OFFICIAL LANGUAGE**

The official language is English. No simultaneous translation will be provided.

**PROCEEDINGS**

Each registered participant will obtain access for download to an electronic version of the Conference Proceedings via the conference's online portal.

**ON SITE REGISTRATION FEE**

The ICEAA and the IEEE APWC, share a common organization, registration fee, submission site and social events. The registration fee varies depending on number of papers presented, IEEE affiliation, and early or regular time of registration. Students up to the age of 30 enjoy a discounted rate. Full registration is required of all participants, including members of the Conference Committees, Session Chairs and Authors. A registration for each paper has been required from the corresponding author, in order for the paper to be included in the technical program. The registration fee includes attendance to all sessions, luncheons and coffee breaks, and possibility of downloading the Conference Proceedings from the conference portal.

**REGISTRATION DESK**

The registration desk will be located in the in the Mezzanine of the Hotel Altis. Accompanying persons and late registrants may register, or pre-registrants may pick up conference materials, from Monday to Thursday at the following times: 8:00÷17:30.

**MEALS AND REFRESHMENTS**

Fixed-menu luncheons (from Monday to Thursday) and coffee breaks are included in the registration fee. See staff at the Registration Desk for directions during the Conference.

**BANQUET**

The Conference Dinner and the Award Ceremony will be held on Wednesday 4 September 2024 at the Sud Lisboa Hall, Av. Brasília – Pavilhão Poente 1300-598 Lisboa, at 7.30 pm.

This is a ticketed event with limited number of places, so please book early to avoid disappointment. Additional tickets can be purchased at the Registration Desk. The winners of the 2024 ICEAA - IEEE APWC Awards will be announced at the Conference Dinner.

**AUDIOVISUAL EQUIPMENT**

Each meeting room will be equipped with a notebook. The presenting authors will not be allowed to use their personal computer for presentation; only the computer of the meeting rooms can be used for presentation. Authors' presentation files should be in either PowerPoint or PDF format. You must make sure that your presentation contains all of the fonts and any auxiliary or multimedia files needed, and that these files are copied on to the session room computer.

Please ensure that your presentation is loaded before the beginning of the first session of the day or during lunch breaks for afternoon sessions.

**INTERNET CONNECTION**

The Conference Centre features WI-FI Internet access.

**MESSAGES**

During the Conference, messages may be directed to participants via Email to: iceaa@seleneweb.com or iceaa24@iceaa.polito.it

Messages will be posted in front of the Registration desk.

**HOTEL ACCOMMODATIONS**

It is advisable to make an early reservation because hotels are subject to availability. A number of hotel rooms have been booked for the duration of the Conference at the Altis Hotel which, however, can only accommodate a limited number of guests. For those wishing to stay in Lisbon, we recommend making a reservation well in advance because hotels in Lisbon are generally fully booked if you book shortly before your arrival.

**TOURS & ACTIVITIES**

For the latest information on the Accompanying Person Programme and other Social Events please check [www.iceaa-offshore.org/](http://www.iceaa-offshore.org/) or refer to the Conference registration desk.

## USEFUL CONTACTS

### FOR TECHNICAL AND SCIENTIFIC ASPECTS:

#### ICEAA Secretariat

Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino  
Corso Duca degli Abruzzi 24, 10129 Torino  
Tel. +39-011-090-4000 (-4056, Prof. R.D. Graglia; -4012, Prof. G. Lombardi)  
E-mail: iceaa24@polito.it

### FOR LOGISTICS ASPECTS:

#### Selene s.r.l. (Mrs. Manuela Trincherò)

Via Medici, 23 - 10143 Torino  
Tel. +39 011 7499601  
E-mail: iceaa@seleneweb.com

For logistics aspects and hotel reservation during the Conference,  
please see staff at the Registration Desk

## ICEAA - IEEE APWC 2024 Young Scientist Award

A certificate and a prize of 800 Euro will be awarded to the young scientist (aged not more than thirty-six as of June 30, 2024) who presents and has authored the best ICEAA or IEEE APWC paper in terms of content and impact on Electromagnetics. The ICEAA - IEEE APWC Scientific Committee reserves the right to make no award if there are no papers of sufficient quality.

In case of eligible coauthors who are registered participants at ICEAA - IEEE APWC, each awardee will receive a certificate and the cash award will be shared equally among them. The winner(s) of the ICEAA - IEEE APWC 2024 Young Scientist Award will be announced at the Conference Dinner on Wednesday evening, October 11, 2024. Since the award announcement and presentation are made at the Conference Dinner, all candidates are expected to attend it.

## ICEAA 2024 Industrial Engineering Paper Award

This award is sponsored by the IEEE AP-S Industrial Initiatives and Listings Committee. A certificate and a prize of 500 Euro will be awarded to the authors of the most innovative paper in terms of practical, industrial engineering related to the fields of antennas, electromagnetics and propagation. In case of eligible co-authors who are registered participants at ICEAA, each awardee will receive a certificate and the cash award will be shared equally among them. Since the award announcement and presentation are made at the ICEAA - IEEE APWC Conference Dinner, all candidates are expected to attend it.

## Near-Real-Time Inverse Scattering for Intraoperative Microwave Monitoring of Thermal Therapies

### Abstract

The use of microwaves for biomedical diagnostics and treatment has been a growing area of research within both the electromagnetics and healthcare communities. For example, microwave medical imaging, which in essence is a multistatic radar system, has been investigated for noninvasive and non-ionizing diagnostics. Radio frequency (RF) ablation has been used for treatment of malignant lesions. Microwave hyperthermia has been used for enhancing drug absorption and promoting healing processes. For delivering thermal therapies, a persistent challenge is monitoring the temporal and spatial progression of heat deposition to prevent under- or over-treatment. Given the strong dependence of the permittivity of both healthy and malignant biological tissue on temperature, in the past several years our team has been investigating the efficacy of microwave imaging for monitoring of thermal treatments, especially in near-real-time for intra-operative purposes. As such, by using progressively accelerated inverse scattering methods for estimating tissue dielectric constant, we are able to map the temperature of the 3D treatment domain in near-real time. This talk will provide an overview of our recent work on microwave inverse scattering systems for the purpose of providing rapid thermal monitoring. We will describe a number of developments that have resulted in more accurate, higher-resolution, and rapid image generation, including the simultaneous use of multiple frequencies, optimization of transmit-receive measurement pairs, and the use of a convolutional neural network trained with MRI images. A sampling of results will be presented to show successful retrieval of dielectric constant and temperature fields with a precision of 1o C and spatial resolution of sub-cm at a refresh rate of about 1 frame per second, which has the promise of making this technology realistically useful in a clinical setting.



**Prof. Mahta Moghaddam**

Viterbi School of Engineering,  
University of Southern California  
(USC), Los Angeles, CA, USA

### Biography

Mahta Moghaddam is Distinguished Professor and Ming Hsieh Endowed Chair in Electrical and Computer Engineering at the Viterbi School of Engineering, University of Southern California (USC), Los Angeles, CA, USA. She currently serves as the Viterbi School Vice Dean for Research and Co-Chair of the USC President's Working Group on Sustainability. She is also the Co-Director of the USC Center for Sustainability Solutions. Prior to USC she was at the University of Michigan (2003-2011) and NASA Jet Propulsion Laboratory (JPL, 1991-2003). She received the B.S. degree in 1986 from the University of Kansas, Lawrence, Kansas with highest distinction, and the M.S. and Ph.D. degrees in 1989 and 1991, respectively, from the University of Illinois at Urbana-Champaign, all in Electrical and Computer Engineering. Mahta's expertise is in microwave sensing for environmental and biomedical applications. She was Systems Engineer for the Cassini Radar and served as Science Chair of the JPL Team X (Advanced Mission Studies Team). Her most recent research interests include the development of multistatic radar instrument and measurement technologies, including software-defined radar, for subsurface and subcanopy characterization, development of forward and inverse scattering techniques for layered random media especially for root-zone soil moisture, ground water, and permafrost applications, geophysical retrievals using signal-of-opportunity reflectometry, and transforming concepts of radar remote sensing to medical imaging and therapy systems. Mahta is a member of the Science Team of the Cyclones Global Navigation Satellite System (CYGNSS) mission, and the Arctic Boreal Vulnerability Experiment (ABOVE). She was the principal investigator of the AirMOSS NASA Earth Ventures 1 mission. She is a Fellow of IEEE and a member of the National Academy of Engineering.

## Antenna+AI: Generative Antenna Design Reshapes Metantenna Technology

### Abstract

Antenna technology has a rich history dating back to the 19th century, with continuous advancements aimed at meeting the escalating demands of wireless systems development. Over the past two decades, metamaterial-based antenna technologies have emerged as a significant avenue for enhancing various antenna parameters such as bandwidth, size reduction, gain enhancement, and mutual coupling suppression. Concurrently, the rapid evolution of artificial intelligence (AI), particularly generative neural network methodologies, presents a promising frontier in antenna design innovation.

This keynote speech explores the transformative potential of deep learning (DL), a subset of machine learning (ML) within AI, in revolutionizing antenna design. The presentation begins by outlining the prospective impact of DL on antenna innovation, followed by the introduction of two design exemplars employing generative adversarial networks (GANs). These examples illustrate novel approaches to metacell design within metasurfaces, achieved through pixelization techniques and DL-driven algorithms. Notably, the incorporation of prior knowledge (PK) in DL-enabled synthesis is elucidated, showcasing its efficacy in synthesizing metacells for metalens applications.

Furthermore, the presentation showcases how metalenses synthesized using PK-DL techniques exhibit breakthrough performance and offer additional functionalities in metalens antenna design. The discourse concludes by contemplating the future trajectory of Antenna+AI integration, highlighting its potential to redefine the boundaries of antenna engineering.



**Prof. Zhi Ning Chen**  
Provost Chair and Professor  
of ECE - National University  
of Singapore

### Biography

Zhi Ning Chen received his two PhD degrees in 1993 and 2003, respectively. Dr. Chen has worked in academic, research organizations, and industry since 1988. He is currently a Provost Chair Professor and the Director of the Advanced Research and Technology Innovation Center at the National University of Singapore. Dr. Chen is the founding General Chair of several international workshops and symposiums, including the International Workshop on Antenna Technology (iWAT in 2005), International Symposium on InfoComm & Mechatronics Technology in Bio-Medical & Healthcare Application (IS 3Tin3A in 2010), International Microwave Forum (IMWF in 2010), Asia-Pacific Conference on Antennas and Propagation (APCAP in 2012), and Marina Forum (Mar-For in 2021). He has also been involved in many international events as a general chair, chair, and member of technical program committees and international advisory committees. He has been invited to deliver over 110 keynote, plenary, and invited speeches at international academic and industry events. Dr. Chen has published over 700 academic papers and seven books, as well as held over 36 granted/filed patents and completed over 42 technology licensing deals with industry. He is a pioneer in developing small and ultra-wideband antennas, wearable/implanted medical antennas, package antennas, near-field antennas/coils, three-dimensional integrated LTCC arrays, microwave metamaterial-metasurface antennas. Currently, Dr. Chen is focusing on the translational research of metasurfaces into antenna engineering as well as the development of algorithms, particularly machine-learning-enabled synthesis methods for metantennas. Dr. Chen is the recipient of the IEEE John Kraus Antenna Award (2021) and many other academic and engineering awards. He was elevated to the Fellow of the Academy of Engineering, Singapore in 2019, Fellow of the Asia-Pacific Artificial Intelligence Association (AAIA), and is serving as Vice President of AAIA. He was also elevated to Fellow of the IEEE for his contribution to small and broadband antennas for wireless applications in 2007. He is serving as a Member of the AdCom of the IEEE Antennas and Propagation Society (since 2023). He served on the IEEE Council on RFID as a Vice President and a Distinguished Lecturer (2015-2021), as well as on the IEEE Transactions on Antennas and Propagation as an Associate Editor (2012-2018, 2023-), and the IEEE Antennas and Propagation Society as a Distinguished Lecturer (2009-2012).



## Time Domain Simulation of Electromagnetic Problems Combined with Linear and Nonlinear Circuit Elements

### Abstract

The finite-difference time-domain (FDTD) simulation technique is a versatile and extensible approach to simulation of RF, communications and microwave devices. The development of high-quality absorbing-boundary formulations, as well as the increasing availability of high-performance computing hardware including graphics processing units (GPUs) have further increased the FDTD technique's applicability to a wide variety of problems. In particular, simulations involving very complex 3D geometries, inhomogeneous media such as tissue or soil, or wide signal bandwidths are readily addressed using the FDTD technique.

The FDTD technique is further extended by a number of formulations which allow passive, active, linear and nonlinear electronic circuit components to be simulated in situ, within the FDTD domain. Current sources, resistors, capacitors, and inductors may be simulated using their constitutive current-voltage (I-V) properties. Semiconductor devices can also be simulated, using formulations based upon either empirical or circuit-theory models.

A major advance in semiconductor characterization and simulation has been the advent of polyharmonic distortion models, such as the X-Parameters. Whereas arbitrary linear loads may be simulated within the FDTD by means of their S-Parameters, there does not exist a comparable method for direct FDTD simulation of a device defined by its X-Parameters. We present here a technique for extracting X-Parameter information from FDTD simulation results, as well as a method for simulating a device within FDTD when its X-Parameters are known.

For FDTD simulation of nonlinear devices, our method has the following advantages. First, it is of lower computational complexity than some FDTD semiconductor models, which require iterative numeric solution of nonlinear equations. Second, it provides direct compatibility between



Prof. Atef Z. Elsherbeni

Electrical Engineering Department,  
Colorado School of Mines, USA

FDTD and the X-Parameters, without the intermediary step of estimating a device's circuit-theory-model parameters. Finally, simulation is carried out in one domain, without the iterative conversions between time and frequency domain which are required by harmonic-balance-based approaches

### Biography

Atef Z. Elsherbeni received an honor B.Sc. degree in Electronics and Communications, an honor B.Sc. degree in Applied Physics, and a M.Eng. degree in Electrical Engineering, all from Cairo University, Cairo, Egypt, in 1976, 1979, and 1982, respectively, and a Ph.D. degree in Electrical Engineering from Manitoba University, Winnipeg, Manitoba, Canada, in 1987. He started his engineering career as a part time Software and System Design Engineer from March 1980 to December 1982 at the Automated Data System Center, Cairo, Egypt. From January to August 1987, he was a Post-Doctoral Fellow at Manitoba University. Dr. Elsherbeni joined the faculty at the University of Mississippi in August 1987 as an Assistant Professor of Electrical Engineering. He advanced to the rank of Associate Professor in July 1991, and to the rank of Professor in July 1997. He was the Associate Dean of the College of Engineering for Research and Graduate Programs from July 2009 to July 2013 at the University of Mississippi. He then joined the Electrical Engineering and Computer Science (EECS) Department at Colorado School of Mines in August 2013 as the Dobelman Distinguished Chair Professor. He was appointed the Interim Department Head for EECS from 2015 to 2016 and from 2016 to 2018 he was the Electrical Engineering Department Head. He spent a sabbatical term in 1996 at the Electrical Engineering Department, University of California at Los Angeles (UCLA) and was a visiting Professor at Magdeburg University during the summer of 2005 and at Tampere University of Technology in Finland during the summer of 2007. In 2009 he was selected as Finland Distinguished Professor by the Academy of Finland and TEKES.

Dr. Elsherbeni is an IEEE Life Fellow and ACES Fellow. He is the Editor-in-Chief for ACES Journal, and a past Associate Editor to the Radio Science Journal. He was the Chair of the Engineering and Physics Division of the Mississippi Academy of Science, the Chair of the Educational Activity Committee for IEEE Region 3 Section, and the general Chair for the 2014 APS-URSI Symposium and the President of ACES Society from 2013 to 2015. Dr. Elsherbeni is selected as Distinguished Lecturer for IEEE Antennas and Propagation Society for 2020-2023. He is also the recent recipient of the 2023 IEEE APS Harington-Mitra Award for his contribution to computational electromagnetics with hardware acceleration.

# Monday 2

## ROOM ROMA I

09:00-10:00

### FORMAL OPENING

### PLENARY LECTURES

10:20-11:20

#### Near-Real-Time Inverse Scattering for Intraoperative Microwave Monitoring of Thermal Therapies

Mahta Moghaddam

11:20-12:20

#### Antenna+AI: Generative Antenna Design Reshapes Metantenna Technology

Zhi Ning Chen

## ROOM ROMA I

13:40-18:20

### SESSION 01 ICEAA

#### Natural and stimulated emissions in the ionosphere and magnetosphere - part 1, 2

Organized by G. Ganguli  
Chairs: G. Ganguli, C. Crabtree

## ROOM ROMA II

13:40-15:40

### SESSION 02 ICEAA

#### Advances in time - and frequency - domain methods

Organized by L. Klinkenbusch;  
T. Weiland  
Chairs: L. Klinkenbusch,  
T. Weiland

16:00-18:20

### SESSION 03 ICEAA

#### EMC/EMI/EMP/HPE

Chairs: R. Gardner,  
E. Schamiloglu

## ROOM BRUXELAS

13:40-17:00

### SESSION 04 ICEAA

#### Additive manufacturing for terrestrial and space antenna and feed chains

Organized by G. Addamo;  
M. Lumia; A. Sharma  
Chairs: G. Addamo, M. Lumia,  
A. Sharma

17:00-18:00

### SESSION 05 ICEAA

#### Frequency selective surfaces

Chairs: G. Addamo,  
M. Lumia

## ROOM MILAO I

13:40-16:40

### SESSION 06 ICEAA

#### Metasurfaces and symmetries

Organized by R. Kastner; R. Shavit  
Chairs: R. Kastner, R. Shavit

16:40-17:20

### SESSION 07 ICEAA

#### Antenna, rectifier and rectenna design for RF energy harvesting / wireless power transfer applications

Organized by S. Rengarajan;  
T. Khan  
Chairs: S. Rengarajan, T. Khan

17:20-18:20

### SESSION 08 IEEE APWC

#### Wireless power transmission and harvesting

Chairs: S. Rengarajan, T. Khan

## ROOM MILAO II

13:40-18:20

### SESSION 09 ICEAA

#### Microwave antennas, components and devices

Chairs: J.A. Ruiz-Cruz,  
F. Venneri



Coffee break

10:00-10:20



Lunch break

12:20-13:40



Coffee break

15:40-16:00

# Tuesday 3

## ROOM ROMA I

8:00-9:20

### SESSION 10 ICEAA

**Natural and stimulated emissions in the ionosphere and magnetosphere - part 3**

Organized by G. Ganguli  
Chair: C. Crabtree

9:20-12:00

### SESSION 11 ICEAA

**Electromagnetic properties of materials**

Chairs: G. Ganguli,  
P. Bernhardt

13:40-15:40

### SESSION 12 ICEAA

**Inverse scattering and imaging: theory; techniques and applications - In memory of Matteo Pastorino**

Organized by A. Randazzo  
Chair: A. Randazzo

16:00-18:00

### SESSION 13 ICEAA

**Inverse scattering and remote sensing**

Chairs: A. Randazzo,  
S.J. Ziegler

## ROOM ROMA II

8:00-18:20

### SESSION 14 ICEAA

**Numerical methods in electromagnetics**

Organized by R.D. Graglia,  
D.R. Wilton  
Chairs: .D. Graglia,  
D.R. Wilton

## ROOM BRUXELAS

8:00-10:00

### SESSION 15 ICEAA

**Electromagnetics in biomedical applications: advances in nervous system stimulation**

Organized by G. Bonmassar,  
A. Paffi  
Chairs: G. Bonmassar, A. Paffi

10:20-18:20

### SESSION 16 IEEE APWC

**Multi/wideband antennas and innovative antenna technology**

Organized by H. Nakano  
Chairs: H. Nakano, R.D. Tamas

## ROOM MILAO I

8:00-10:00

### SESSION 17 ICEAA

**Modern problems of mathematical and computational electromagnetics and their advanced applications**

Organized by M.N. Georgieva-Grosse, G.N. Georgiev  
Chairs: M.N. Georgieva-Grosse, G.N. Georgiev

10:20-11:40

### SESSION 18 ICEAA

**Electromagnetic modeling of devices and circuits**

Chairs: G. Junkin, R. Palmeri

11:40-18:20

### SESSION 19 ICEAA

**Metamaterials and metasurfaces**

Chairs: R.F.S. Caldeirinha,  
A. Hoffmann

## ROOM MILAO II

8:00-10:00

### SESSION 20 ICEAA/IEEE APWC

**Artificial intelligence applications to electromagnetics**

Organized by F. de Flaviis  
Chair: F. de Flaviis

10:40-14:20

### SESSION 21 IEEE APWC

**AI in electromagnetic applications**

Chairs: F. de Flaviis, Q. Ren

14:40-16:40

### SESSION 22 IEEE APWC

**Wireless communication and networks**

Chairs: P. Geranmayeh,  
R.C.B. Monteiro



Coffee break  
10:00-10:20



Lunch break  
12:20-13:40



Coffee break  
15:40-16:00

# Wednesday 4

## ROOM ROMA I

8:00-9:00

### SESSION 23 ICEAA

Technologies for mm waves and optoelectronics

Chairs: F. Costa, R. Neumann

9:00-14:20

### SESSION 24 ICEAA

Electromagnetic metasurfaces: design and applications

Organized by G. Manara, F. Costa

Chairs: G. Manara, F. Costa

14:20-17:40

### SESSION 25 ICEAA

Electromagnetic measurements

Chairs: F. Bevilacqua, M. Lumia

## ROOM ROMA II

8:20-17:20

### SESSION 26 ICEAA

Novel mathematical methods in electromagnetics

Organized by K. Kobayashi,

G. Lombardi, Y. Shestopalov

Chairs: K. Kobayashi,

G. Lombardi, Y. Shestopalov

## ROOM BRUXELAS

8:00-9:20

### SESSION 27 ICEAA

Microwave and mmwave sensors in advanced applications

Organized by C. Baer,

C. Schulz

Chairs: C. Baer, C. Schulz

9:20-14:20

### SESSION 28 ICEAA

Dielectric waveguides and polymer microwave fiber technology

Organized by C. Baer

Chair: C. Baer

14:20-15:20

### SESSION 29 ICEAA

Radar technologies

Chair: C. Baer, A. Hizal

16:00-17:40

### SESSION 30 ICEAA

Periodic and quasi-periodic electromagnetics

Organized by L. Matekovits,

K. Esselle

Chair: L. Matekovits,

K. Esselle

## ROOM MILAO I

8:00-14:40

### SESSION 31 ICEAA

Space relevant laboratory experiments

Organized by W.E. Amatucci,

E. Scime

Chairs: W.E. Amatucci,

E. Scime

14:40-17:40

### SESSION 32 IEEE APWC

Propagation and Channel modeling

Chairs: S. Malik, F. Paonessa

## ROOM MILAO II

8:00-14:20

### SESSION 33 ICEAA

Antennas

Chairs: P. Di Ninni,

L.M. Pessoa

14:20-17:40

### SESSION 34 ICEAA

Antenna array modelling

Organized by C. Craeye,

M. Botha

Chairs: C. Craeye,

M. Botha



Coffee break

10:00-10:20



Lunch break

12:20-13:40



Coffee break

15:40-16:00



Conference Dinner

19:30-24:00

# Thursday 5

## ROOM ROMA I

8:00-10:40

### SESSION 35 ICEAA

**Nonlinear media; resonances and inverse problems**

Organized by Y. Shestopalov  
Chair: Y. Shestopalov

10:40-12:00

### SESSION 36 ICEAA

**Mathematical advances in electromagnetics**

Organized by P.D. Smith, E. Vynogradova  
Chairs: P.D. Smith, E. Vynogradova

13:40-15:00

### SESSION 37 ICEAA

**Machine learning in antenna arrays and EMT based imaging**

Organized by A.E. Cetin, P. - Y. Chen  
Chairs: A.E. Cetin, P.-Y. Chen

15:00-18:00

### SESSION 38 ICEAA

**Communication technologies of rail transit in extreme scenarios**

Organized by Y. Wen  
Chair: Y. Wen

## ROOM ROMA II

8:00-10:00

### SESSION 39 ICEAA/IEEE APWC

**Antennas for RF passive sensors**

Organized by P. Pinho  
Chair: P. Pinho

10:20-14:20

### SESSION 40 IEEE APWC

**Antennas and arrays**

Chairs: P. Pinho, J. Zaid

14:20-18:00

### SESSION 41 ICEAA

**Recent advancement of electromagnetic theory**

Organized by H. Shirai  
Chair: H. Shirai

## ROOM BRUXELAS

8:00-11:40

### SESSION 42 ICEAA

**Radio telescopes and radio astronomy systems**

Organized by D. de Villiers, E. de Lera Acedo, R. Lehmensiek  
Chairs: D. de Villiers, E. de Lera Acedo, R. Lehmensiek

11:40-14:40

### SESSION 43 ICEAA

**Integral equation and hybrid methods**

Chair: F. Andriulli, I. Fenni

14:40-18:00

### SESSION 44 ICEAA

**Fast and efficient solvers and stable discretizations**

Organized by F. Andriulli  
Chair: F. Andriulli

## ROOM MILAO I

8:20-11:40

### SESSION 45 ICEAA

**Electromagnetic models and geophysical products for signal - of - opportunity reflectometry**

Organized by J. Fayne, J. Campbell  
Chairs: J. Fayne, J. Campbell

13:40-17:00

### SESSION 46 ICEAA

**Advanced architectures supporting radiationless anapole modes in electrodynamics and nanophotonics**

Organized by L. Matekovits, A. Basharin  
Chairs: L. Matekovits, A. Basharin

## ROOM MILAO II

8:20-10:00

### SESSION 47 ICEAA

**Electromagnetic sensing and imaging technologies for health applications**

Organized by L. Crocco, R. Cruz Conceição, F. Vipiana  
Chairs: L. Crocco, R. Cruz Conceição

10:20-14:40

### SESSION 48 ICEAA

**Electromagnetic applications to biomedicine**

Chairs: L. Crocco, R. Cruz Conceição

14:40-18:00

### SESSION 49 IEEE APWC

**Multi - band and UWB antennas and systems**

Chairs: B. Büyükkakin, T.Y. Lin



**Coffee break**  
10:00-10:20



**Lunch break**  
12:20-13:40



**Coffee break**  
15:40-16:00

conference schedule

# Friday 6



Coffee break  
10:00-10:20

 ROOM MILAO I

9:00-12:00

**SHORT COURSE**

**Time Domain Simulation of Electromagnetic Problems Combined with Linear and Nonlinear Circuit Elements**

Prof. Atef Z. Elsherbeni



# MONDAY 2

Monday, September 2- room Roma I

09:00-10:00

## Formal Opening

### Plenary lectures

10:20-11:20

## Near-Real-Time Inverse Scattering for Intraoperative Microwave Monitoring of Thermal Therapies

Mahta Moghaddam

Distinguished Professor and Ming Hsieh Endowed Chair in Electrical and Computer Engineering - Viterbi School of Engineering, University of Southern California (USC), Los Angeles, CA, USA

11:20-12:20

## Antenna+AI: Generative Antenna Design Reshapes Metantenna Technology

Zhi Ning Chen

Provost Chair and Professor of ECE - National University of Singapore

Monday, September 2 - H 13:40 / 18:20 - room Roma I

### session 01

ICEAA

## Natural and stimulated emissions in the ionosphere and magnetosphere - part 1

Organized by G. Ganguli

Chair: G. Ganguli

13:40-14:00

### SPACE DEBRIS IDENTIFICATION AND TRACKING

A Truitt, IARPA, United States

14:00-14:20

### ELECTRONIC MATERIAL TEST APPROACHES FOR NATURAL AND STIMULATED EMISSIONS IN THE IONOSPHERE AND MAGNETOSPHERE

B. Pokines, AFOSR, United States

14:20-14:40

### EXTENDED FLUID SIMULATIONS OF PRECURSOR ION ACOUSTIC SOLITONS

A. Sen, A. Mir, P. Bandyopadhyay, Institute for Plasma Research, India; S. Tiwari, IIT-Jammu, India; C. Crabtree, A. Fletcher, G. Ganguli, Naval Research Laboratory, United States

14:40-15:00

### USING NON-THERMAL ELECTROMAGNETIC RADIATION TO TRACK AND CHARACTERIZE SPACE DEBRIS

N. Renno, Y. Zhang, M. Akhavan-Tafti, T. Atilaw, E. Fischer, University of Michigan, United States

15:00-15:20

### SIMULATIONS OF NONLINEAR PLASMA STRUCTURES GENERATED BY CHARGED ORBITAL DEBRIS

A. Fletcher, C. Crabtree, G. Ganguli, R. Soto, NRL, United States; A. Sen, IPR, India

15:20-15:40

### PLASMA SIGNATURES OF SMALL ORBITAL DEBRIS IN LEO

G.L. Delzanno, P.A. Resendiz Lira, D. Svyatsky, O. Koshkarov, J.C. Holmes, C. Maldonado, G. Wilson, T. Espinoza, A. Rogers, S. Janhunnen, Los Alamos National Laboratory, United States

16:00-16:20

### PLASMA WAVE SIGNATURES ASSOCIATED WITH DUSTY SPACE DEBRIS

W.A. Scales, Virginia Tech, United States; B. Srinivasan, University of Washington, United States; C. Skolar, New Jersey Institute of Technology, United States

16:20-16:40

### CONSIDERATIONS FOR MODIFYING COLLECTIVE THOMSON SCATTERING FORWARD MODELS TO ACCOMMODATE SMALL SCALE ORBITAL DEBRIS

P.J. Erickson, Massachusetts Institute of Technology, United States; C. Crabtree, A.C. Fletcher, G. Ganguli, Naval Research Laboratory, United States

16:40-17:00

### QUANTUM INFORMATION SCIENCE APPROACH TO LINEAR AND NONLINEAR WAVE PROPAGATION

A. K. Ram, Massachusetts Institute of Technology, United States; E. Koukoutsis, K. Hizanidis, National Technical University, Greece; G. Vahala, William and Mary, United States; M. Soe, Rogers State University, United States; L. Vahala, Old Dominion University, United States

17:00-17:20

### APPLYING THE SPACETIME GEOMETRIC ALGEBRA IN MAGNETIZED PLASMA ELECTROMAGNETISM: IS IT ONLY A MATTER OF BEAUTY?

K. Hizanidis, ; E. Koukoutsis, National Technical University, Greece; P.C. Papagiannis, National Technical University, Greece; A.K. Ram, PSFC-MIT, United States; G. Vahala, William & Mary, United States

## Natural and stimulated emissions in the ionosphere and magnetosphere - part 2

Organized by G. Ganguli  
Chair: C. Crabtree

17:20-17:40

### RECONNECTING COMPRESSED CURRENT SHEETS: IMPACT OF HIGHLY SHEARED FLOWS AND RESULTING TURBULENCE

C. Crabtree, G. Ganguli, A. M. DuBois, US Naval Research Laboratory, United States; A. Sen, IPR, India

17:40-18:00

### DEVELOPMENT OF THE AMBIPOLAR ELECTRIC FIELD IN A COMPRESSED CURRENT SHEET WITH AND WITHOUT A GUIDE FIELD

A.M. DuBois, C. Crabtree, G. Ganguli, U.S. Naval Research Laboratory, United States

18:00-18:20

### MMS WAVE-PARTICLE OBSERVATIONS DURING MAGNETOTAIL PASSES

D.N. Baker, University of Colorado Boulder, Laboratory for Atmospheric and Space Physics, United States

Monday, September 2 - H 13:40/15:40 - room Roma II

## session 02

ICEAA

### Advances in time - and frequency - domain methods

Organized by L. Klinkenbusch, T. Weiland  
Chairs: L. Klinkenbusch, T. Weiland

13:40-14:00

### SELF-CONSISTENT WAKEFIELD AND SPACE-CHARGE SIMULATIONS FOR ELECTRON INJECTORS

J. Christ, E. Gjonaj, Technical University of Darmstadt, Germany

14:00-14:20

### WAKE FIELDS ANALYSIS OF CURVED TUBE SECTION OF PARTICLE ACCELERATOR BY TIME-DOMAIN BEM CONSIDERING LIENARD-WIECHERT FIELDS OF ELECTRON BUNCH

H. Kawaguchi, T. Kawamura, Muroran Institute of Technology, Japan

14:20-14:40

### INVESTIGATION OF THE SHADOWING AND RANGE EFFECTS CAUSED BY THE SCATTERING OF WIND-TURBINES IN SOME DISTANCE TO RADAR STATIONS

G.H. Greving, W.D. Beiermann, R. Mundt, NAVCOM Consult, Germany

14:40-15:00

### TOWARDS A BROADBAND-STABLE FAST METHOD FOR THE B-SPLINE DISCRETIZED ELECTRIC FIELD INTEGRAL EQUATION

D. Jukic, Universität Rostock, Germany; B. Hofmann, T.F. Eibert, Technische Universität München, Germany; S.B. Adrian, Universität Rostock, Germany

15:00-15:20

### CONVERGENCE STUDY OF HEXAHEDRAL AND TETRAHEDRAL H(CURL) BASIS FUNCTIONS FOR QUASI-AFFINELY REFINED CURVILINEAR FINITE ELEMENTS

L. L. Tóth, R. Dyczij-Edlinger, Saarland University, Germany

15:20-15:40

### ISOGEOMETRIC SHAPE OPTIMIZATION OF MULTI-TAPERED COAXIAL BALUNS SIMULATED BY AN INTEGRAL EQUATION METHOD

B. Balouchev, Technische Universität Darmstadt, Germany; J. Dölz, Universität Bonn, Germany; M. Nolte, S. Schöps, Technische Universität Darmstadt, Germany; R. Torchio, Università degli Studi di Padova, Italy

Monday, September 2 - H 16:00/18:20 - room Roma II

## session 03

ICEAA

### EMC/EMI/EMP/HPE

Chairs: R. Gardner, E. Schamiloglu

16:00-16:20

### FIELD COUPLING OF TRANSMISSION LINES TERMINATED BY BUCK AND NEGATIVE IMPEDANCE CIRCUITS

R.L. Gardner, Consultant, United States

16:20-16:40

### ANALYSIS OF CONDUCTED EMISSION EM NOISE IN HIGH VOLTAGE POWER CONVERSION SYSTEMS FOR ELECTRIC VEHICLE

J.Yu, K. Lee, Korea Automotive Technology Institute, Korea

16:40-17:00

### CALCULATION OF EMP CONDUCTED ENVIRONMENT BASED ON HIERARCHICAL UNCERTAINTY QUANTIFICATION METHOD

N. Dong, Xi'an Jiaotong University, China

17:00-17:20

### ADVANCING HIGH POWER MICROWAVE SOURCES AND ANTENNAS TO HIGHER FREQUENCIES

E. Schamiloglu, C.G. Christodoulou, University of New Mexico, United States

17:20-17:40

### STATISTICAL ESTIMATES OF INTENTIONAL ELECTROMAGNETIC INTERFERENCE IN UNSHIELDED TWISTED-WIRE PAIRS

T. Liang, School of Electric Engineering, Xi'an Jiaotong University, China ; G. Spadacini, F.Grassi, S. A. Pignari, Politecnico di Milano, Italy; Y.-z. Xie, Xi'an Jiaotong University, China

17:40-18:00

### AN INFLATABLE ELECTROMAGNETIC SIMULATOR BASED ON LOW-FREQUENCY-COMPENSATED TEM ANTENNA

Y. Zhou, Z.-h. Xu, Ya.-z. Xie, Xi'an Jiaotong University, China



18:00-18:20

#### **ASYMPTOTIC MODEL FOR NON-UNIFORM HIGH-FREQUENCY ELECTROMAGNETIC FIELD COUPLING TO TRANSMISSION LINES USING MATRIX PENCIL METHOD**

J. Guo, W.-c. Xie, Q.-s. Zheng, Y.-z. Xie, Xi'an Jiaotong University, China

Monday, September 2 - H 13:40/17:00 - room Bruxelles

#### **session 04**

ICEAA

### **Additive manufacturing for terrestrial and space antenna and feed chains**

Organized by G. Addamo; M. Lumia; A. Sharma

Chairs: G. Addamo, M. Lumia; A. Sharma

13:40-14:00

#### **ANTENNA TECHNOLOGIES FOR 1-100GHZ AND BEYOND SPECTRUM OPERATIONS**

D. Filipovic, S. Yen, T. Prince, D.-C. Son, C. Wallish, J. Platt, B. Cross, i. Pisani, M. Elmansouri, L. Boskovic, University of Colorado Boulder, United States

14:00-14:20

#### **ADDITIVE MANUFACTURING FOR 5G: OPPORTUNITIES AND CHALLENGES**

W.Zimbeck, A. Sharma, Brian B. Gibbons, A. Rakovsky, Johns Hopkins University, United States

14:20-14:40

#### **3D-PRINTED MILLIMETRE-WAVE WAVEGUIDE PASSIVE DEVICES AND ANTENNAS**

Y. Wang, Q.C. You, L. Qian, T. Skaik, University of Birmingham, United Kingdom

14:40-15:00

#### **3D-PRINTED BEAM-SWITCHING DIELECTRIC RESONATOR ANTENNA WITH AN INTEGRATED POLARIZER**

J. Przepiorowski, Technological University Dublin, Ireland; I. Munina, Trinity College Dublin, Ireland; M.J. Ammann, Technological University Dublin, Ireland

15:00-15:20

#### **ADDITIVE MANUFACTURING FOLDED REFLECTARRAY**

A. Massaccesi, Politecnico di Torino, Italy; A. Mazzinghi, University of Florence, Italy; A. Freni, University of Florence, Italy; M. Beccaria, P. Pirinoli, Politecnico di Torino, Italy

15:20-15:40

#### **ADVANCES IN MICROWAVE FILTERS BASED ON ADDITIVE MANUFACTURING TECHNOLOGIES**

L. Pelliccia, P. Vallerotonda, F. Cacciamani, RF Microtech Srl, Italy; C. Tomassoni, University of Perugia, Italy

16:00-16:20

#### **OPTIMIZATION OF ELECTRICAL CONDUCTIVITY OF MULTILAYER ADDITIVELY MANUFACTURED MICROWAVE COMPONENTS ON POLYMER SUBSTRATE BY LASER SINTERING**

R. Djebbi, N. Delhote, S. Verdeyme, O. Tantot, , University of Limoges, France; E. Pereira, L. Boyer, O. Durand, CTTC Centre de Transfert de Technologies Céramiques, Limoges, France; M. Valentin, ALPhANOV Talence, France

16:20-16:40

#### **ADDITIVE MANUFACTURED ANTENNAS AND FEEDS FOR TERRESTRIAL AND SPACE SYSTEMS**

A. Sharma, The Johns Hopkins University Applied Physics Laboratory, United States

16:40-17:00

#### **COMPARISON OF 3D-PRINTED FEED CHAIN ARCHITECTURES**

G. Addamo, O.A. Peverini, M. Lumia, C G. Virone, CNR-IEIIT, Italy; F. Calignano, Politecnico di Torino, Italy; N.J.G. Fonseca, Anywaves, France

Monday, September 2 - H 17:00/18:00 - room Bruxelles

#### **session 05**

ICEAA

### **Frequency selective surfaces**

Chairs: G. Addamo, M. Lumia

17:00-17:20

#### **DUAL-POLARIZED A-T-A FREQUENCY SELECTIVE RASORBER BASED ON CROSS-DIPOLE AND INTERDIGITAL RESONATOR**

R.S. Macilon, Federal University of Rio Grande do Norte, Brazil; A.G. D'Assunção Junior, Federal Institute of Education, Science and Technology of Paraíba, Brazil; V.P. Silva Neto, A.G. D'Assunção, Federal University of Rio Grande do Norte, Brazil

17:20-17:40

#### **THE RESEARCH ON A FSS WITH HIGH ROLL-OFF CHARACTERISTICS BASED ON SIW**

J. Fu, Harbin Institute of Technology, China ; Z. Zhang, Institute of Remote sensing Equipment, China; H. Feng, Harbin Institute of Technology, China; S. Nawaz Burokur, University Paris Nanterre, France; K. Zhang, Harbin Institute of Technology, China

17:40-18:00

#### **LOW-LOSS MINIATURIZED FSS FOR QUASI-OPTICAL FEED SYSTEM OF ATMOSPHERIC REMOTE SENSING**

Z. Chen, X. Li, F. Deng, North China Electric Power University, China; X. Ye, Beijing Institute of Technology, China; J. Hu, X. Yao, North China Electric Power University, China

Monday, September 2 - H 13:40/16:40 - room Milao I

#### **session 06**

ICEAA

### **Metasurfaces and symmetries**

Organized by R. Kastner; R. Shavit

Chairs: R. Kastner, R. Shavit

13:40-14:00

#### **POLARIZATION INVERSION IN PTD- SYMMETRIC SINGLE LAYERED POLARIZERS**

R. Geva, Tel Aviv University, Israel; M. G. Silveirinha, University of Lisbon, Portugal; R. Kastner, Tel Aviv University, Israel

14:00-14:20

#### **LINE-SOURCE ABOVE A SPATIOTEMPORALLY MODULATED METASURFACE**

M.K. Kreiczner, Y.H. Hadad, Tel-Aviv University, Israel

14:20-14:40

#### **DRUDE-LIKE SCATTERERS FOR RECONFIGURABLE MULTIPOLAR REFRACTIVE METASURFACES**

A. Monti, Roma Tre University, Italy; S. Vellucci, M. Barbuto, Niccolò Cusano University, Italy; L. Stefanini, D. Ramaccia, A. Toscano, F. Bilotti, Roma Tre University, Italy

14:40-15:00

#### **LEAKY-WAVE ANALYSIS AND DESIGN OF A CORRUGATED SECTORAL WAVEGUIDE**

M. Perrone, Politecnico di Torino, Italy; J. Sarrazin, G. Valerio, Sorbonne Université, France; G. Lombardi, Politecnico di Torino, Italy

15:00-15:20

#### **DISPERSION ANALYSIS OF 3D PERIODIC STRUCTURES WITH A HIGH LEVEL OF SYMMETRY**

H. Wang, P. Castillo-Tapia, O. Zetterstrom, KTH Royal Institute of Technology, Sweden; F. Mesa, Universidad de Sevilla, Spain; O. Quevedo-Teruel, KTH Royal Institute of Technology, Sweden

15:20-15:40

#### **SYMMETRIES IN TIME-VARYING MEDIA: ON THE CONSERVATION OF SPIN ANGULAR MOMENTUM, HELICITY, AND CHIRALITY**

M. M. Jajin, J. Vázquez-Lozano, I. Liberal, Public University of Navarra, Spain

16:00-16:20

#### **CIRCUIT MODELING OF METASURFACES WITH PRINTED ELEMENTS**

R. Shavit, Y. Tzabari, Ben-Gurion University of the Negev, Israel

16:20-16:40

#### **PHYSICS-COMPLIANT MODELING AND ESTIMATION OF RIS-PARAMETRIZED WIRELESS CHANNELS**

P. del Hougne, CNRS, IETR - Univ Rennes, France

Monday, September 2 - H 16:40/17:20 - room Milao I

### **session 07**

**ICEAA**

## **Antenna, rectifier and rectenna design for RF energy harvesting / wireless power transfer applications**

Organized by S. Rengarajan; T. Khan

Chairs: S. Rengarajan, T. Khan

16:40-17:00

#### **HIGH-GAIN AND BROADBAND MICROSTRIP ANTENNA USING TRIPLE-SLOTTED MECHANISM FOR 5G MILLIMETER-WAVE APPLICATIONS**

M. Saha, NIT Silchar, India; D. Sarkar, VIT-AP University, India; T. Khan, NIT Silchar, India; Pa. Pr.Shome, NIT Jalandhar, India; F. A. Talukdar, NIT Silchar, India; Se. Rengarajan, California State Univ Northridge, United States

17:00-17:20

#### **THE METHOD OF MAXIMUM POWER TRANSMISSION EFFICIENCY AND ITS APPLICATIONS**

W. Geyi, Nanjing University of Information Science and Technology, China

Monday, September 2 - H 17:20/18:20 - room Milao I

### **session 08**

**IEEE APWC**

## **Wireless power transmission and harvesting**

Chairs: S. Rengarajan, T. Khan

17:20-17:40

#### **PRACTICAL SUPERDIRECTIVE AND EFFICIENT RECTENNA FOR LOW-POWER RF ENERGY HARVESTING**

A. M. Graham, S. D. Asimonis, Queen's University Belfast, United Kingdom

17:40-18:00

#### **THE AIRY WAVE UTILIZATION FOR MM-WAVE WIRELESS POWER TRANSFER**

A. K. Baghel, P. Pinho, Universidade de Aveiro Portugal; N. Borges Carvalho, Instituto de Telecomunicacões, DETI, Portugal

18:00-18:20

#### **DESIGN CONSIDERATIONS AND IMPLEMENTATION OF COIL DETECTION AND OPTIMIZED SWITCHING FOR A MOVING FIELD INDUCTIVE POWER TRANSFER SYSTEM**

M. Haider, M. H. Metz, T. J. A. Russer, P. Russer, Technical University of Munich, Germany

Monday, September 2 - H 13:40/18:20 - room Milao II

### **session 09**

**ICEAA**

## **Microwave antennas, components and devices**

Chairs: J.A. Ruiz-Cruz, F. Venneri

13:40-14:00

#### **SMD COINCIDENT ANTENNA ARRAY FOR 2D FIELD ACQUISITION AND RECONSTRUCTION**

F. Ortolani, Ironbridge Electronics, Italy

14:00-14:20

#### **THE ROLE OF SECOND-ORDER SYMMETRIES IN WAVEGUIDE PROPAGATION AND ITS PECULIARITIES ON THE MODE-MATCHING PROBLEM USING THE 2D FINITE ELEMENT METHOD**

G. Garcia-Contreras, Universidad Autónoma de Madrid, Spain; J. Córcoles, J. A. Ruiz-Cruz, J. Ramón Montejo-Garai, J. M. Rebollar, Universidad Politécnica de Madrid, Spain

14:20-14:40

#### **COMPACT SHORTED ANNULAR RING PATCH ANTENNA LOADED WITH DNG MATERIAL**

A.R. Alajmi, College of Technological Studies, Kuwait

14:40-15:00

#### **DUAL-POLARIZED SINGLE-LAYER REFLECTARRAY AS PASSIVE REFLECTING SURFACE FOR 5G APPLICATIONS**

F. Venneri, S. Costanzo, Università della Calabria, Italy

15:00-15:20

#### **A 300-GHZ BROADBAND ON-CHIP ANTENNA INTEGRATED WITH A TRANSMITTER FRONT-END**

A. Korres, V. Manouras, Y. Papananos, National Technical University of Athens, Greece

15:20-15:40

### **ON THE THEORY OF SINGLE ASPHERIC LENS**

E. Hasanoglu Isik University, Turkey

16:00-16:20

### **ABS-BASED 3D PRINTED BOWTIE ANTENNA FED BY PLANAR MARCHAND BALUN FOR WIRELESS COMMUNICATION**

A.F. Faadhilah, S. Indriani, M.N. Arira, M.N. Karama, A.D. Prasetyo, A. Munir, Institut Teknologi Bandung, Indonesia

16:20-16:40

### **DESIGN OF X-BAND GAN POWER AMPLIFIER FOR SAR APPLICATIONS**

A.I Bayrak, Yeditepe University, Turkey; I. Sisman, Profen Communication Technologies, Turkey; T. Haykir Ergin, Yeditepe University, Turkey

16:40-17:00

### **SPECIALIZED X-BAND LNA DESIGN FOR SAR APPLICATIONS**

E.S. Mutlu, Yeditepe University, Turkey; I. Sisman, Profen Communication Technologies, Turkey; T. Haykir Ergin, Yeditepe University, Turkey

17:00-17:20

### **DESIGN AND IMPLEMENTATION OF X BAND SYNTHETIC APERTURE RADAR ANTENNA**

B. Büyükkakin, Yeditepe University, Turkey; I. Sisman, Profen Communication Technologies, Turkey; T. Haykir Ergin, Yeditepe University, Turkey

17:20-17:40

### **RESONATOR-LIKE ANTENNA FOR PARAMETRIC EXCITATION OF ULTRA-SHORT SPIN WAVES**

A. Slavin, Oakland University, United States

17:40-18:00

### **POWER ENHANCED HYBRID CHIREIX-DOHERTY TOPOLOGY**

M.D. Tanvir, A. Eroglu, University of Massachusetts Boston, United States; E. LuisLinarez, Qorvo, United States

18:00-18:20

### **NON-FOLDED CAPACITOR-BASED FLEXIBLE PHASE-DIFFERENCE BRANCH-LINE COUPLERS FOR BUTLER MATRIX FEEDING NETWORKS**

Zulfi, Institut Teknologi Bandung, Indonesia; R.F. Iskandar, Telkom University, Indonesia; S. Indriani, A. Munir, Institut Teknologi Bandung, Indonesia

# TUESDAY 3

Tuesday, September 3 - H 08:00/09:20 - room Roma I

## session 10

ICEAA

### **Natural and stimulated emissions in the ionosphere and magnetosphere - part 3**

Organized by G. Ganguli  
Chair: C. Crabtree

08:00-08:20

#### **PLASMA INSTABILITIES DRIVEN BY ELECTRON AND PROTON RING DISTRIBUTIONS**

P.H. Yoon, University of Maryland College Park, United States

08:20-08:40

#### **GENERATION OF WAVES BY ACTIVE PLASMA RELEASES IN THE MAGNETOSPHERE AND SOLAR WIND**

R. Bingham, STFC Rutherford Appleton Laboratory, United Kingdom

08:40-09:00

#### **REMOTE SENSING OF THE LOWER IONOSPHERE DURING THE APRIL 8, 2024 SOLAR ECLIPSE BY VLF TRANSMITTER SIGNAL VARIATIONS RECORDINGS**

O. Agapitov, UC BERKELEY, United States; M. Golkowski, University of Colorado Denver, United States

09:00-09:20

#### **ENERGETIC PARTICLE DYNAMICS AND MAGNETOSPHERIC PLASMA WAVES: OBSERVATIONS AND FUTURE MISSIONS**

S.G. Kanekal, NASA Goddard Space Flight Center, United States; L. Kurien, Catholic University of America, United States

Tuesday, September 3 - H 09:20/12:00 - room Roma I

## session 11

ICEAA

### **Electromagnetic properties of materials**

Chairs: G. Ganguli, P. Bernhardt

09:20-09:40

#### **ELECTROMAGNETIC VECTOR SENSOR SATELLITE FOR DETECTION OF HARMFUL SPACE DEBRIS**

P. Bernhardt, University of Alaska Fairbanks, United States; A. Howarth, University of Calgary, Canada; L. Scott, DRDC Canada, Canada; B. Eliasson, University of Strathclyde, United Kingdom; W. Bristow, Penn State, United States

09:40-10:00

**FDTD EXAMINATION OF PROPAGATION EFFECTS IN GPR WALL MONITORING**

S.R. Pennock, R.J. Watson, University of Bath, United Kingdom

10:20-10:40

**PERFECT NARROWBAND ABSORBERS USING SIMPLE LITHOGRAPHY-FREE STRUCTURES**

C. Lezaun, D. Navajas, I. Liberal, M. Beruete, Public University of Navarra, Spain

10:40-11:00

**HYBRID NEAR-FIELD SCANNING MICROWAVE MICROSCOPE WITH AN OPTICAL CONFOCAL SENSOR**

N. Vyshatko, A.Tselev, University of Aveiro CICECO, Portugal

11:00-11:20

**ENHANCING PAVEMENT INTEGRITY ASSESSMENT: THE ROLE OF ULTRA-WIDEBAND HORN ANTENNAS IN GROUND PENETRATING RADAR APPLICATIONS**

G.R.S. Neto, Universidade do Minho, Portugal; V.U. Oliveira, Universidade de Aveiro, Portugal; S. Fontul, Universidade NOVA de Lisboa, Portugal; F.M.C.P. Fernandes, Universidade Lusiana Norte, Portugal; J.C. Pais, Universidade do Minho, Portugal

11:20-11:40

**DIELECTRIC PROPERTIES OF CACTUS PEAR AND DACTYLOPIUS OPUNTIAE MEASUREMENT FOR ELECTROMAGNETIC APPLICATIONS**

F. EL Arroud, K. EL Fakhouri, Y. Zaarour, C. Ramdani, University of Mohammed VI Polytechnic, Morocco; M. Aznabet, Abdelmalek Essaadi University, Morocco; M. El Bouhssini, H. Griguer, University of Mohammed VI Polytechnic, Morocco

11:40-12:00

**COMPOSITES WITH COMBINED MAGNETOELECTRIC PROPERTIES**

P. Grinfeld, Drexel University, United States; S. Bilyk, M. Grinfeld, U.S. Army Research Laboratory, United States

Tuesday, September 3 - H 13:40/15:40 - room Roma I

**session 12**

ICEAA

**Inverse scattering and imaging: theory; techniques and applications - In memory of Matteo Pastorino**

Organized by A. Randazzo

Chair A. Randazzo

13:40-14:00

**A STUDY OF RESONANCE MODES FOR MICROWAVE IMAGING IN BIOMEDICAL APPLICATIONS**

A. Attar, J. LoVetri, University of Manitoba, Canada

14:00-14:20

**ELECTROMAGNETIC SOURCES LOCALIZATION PROBLEM FOR INDOOR SURVEILLANCE THROUGH OPPORTUNISTIC SENSORS**

R. Scapatucci, G. Gennarelli, L. Crocco, IREA-CNR, Italy

14:20-14:40

**3D INVERSE SCATTERING THROUGH AN APPROXIMATED 'YO' REFORMULATION: A PRELIMINARY INVESTIGATION**

M. T. Bevacqua, T. Isernia, Università degli Studi Mediterranea di Reggio Calabria, Italy

14:40-15:00

**MULTIPATH PROPAGATION INFLUENCE ON RETRIEVABLE INFORMATION IN INDOOR ELECTROMAGNETIC IMAGING**

I. Catapano, G. Gennarelli, P. Imperatore, National Research Council of Italy Italy; M. Barbiroli, Università di Bologna, Italy; F. Soldovieri, National Research Council of Italy, Italy

15:00-15:20

**DEEP AND REINFORCEMENT LEARNING APPROACH TO ENHANCED MICROWAVE IMAGING FOR TUMOR IDENTIFICATION**

S. Costanzo, A. Flores, University of Calabria, Italy

15:20-15:40

**MICROWAVE IMAGING OF PARTIALLY KNOWN TARGETS THROUGH A MILD DATA-DRIVEN APPROACH**

V. Schenone, A. Fedeli, C. Estatico, A. Randazzo, University of Genoa, Italy

Tuesday, September 3 - H 16:00/18:00 - room Roma I

**session 13**

ICEAA

**Inverse scattering and remote sensing**

Chairs: A. Randazzo, S.J. Ziegler

16:00-16:20

**THE VESELAGO LENS AS A SCATTERING PROBLEM: 2D SOLUTIONS THROUGH ASYMPTOTICS**

M. T. Bevacqua, Università degli Studi Mediterranea di Reggio Calabria, Italy; M. E. Keleshteri, University of Manitoba, Canada; V. Okhmatovski, J. LoVetri, University of Manitoba, Canada; T. Isernia, Università degli Studi Mediterranea di Reggio Calabria, Italy

16:20-16:40

**REAL-TIME IDENTIFICATION OF SMALL OBJECTS WITH INACCURATE BACKGROUND WAVENUMBER**

T. Ha, National Institute for Mathematical Sciences, Korea; W.-K. Park, Kookmin University, Korea

16:40-17:00

**A NONLINEAR INVERSE SCATTERING APPROACH TOWARDS RCS MODELING OF ARBITRARY TARGETS FOR DIGITAL TWIN APPLICATIONS**

H.F. Alqadah, S. Ziegler, US Naval Research Laboratory, United States

17:00-17:20

**BAYESIAN PARAMETER ESTIMATION FOR ELECTROMAGNETIC INVERSE SCATTERING USING CONTRAST SOURCE INVERSION AND HAMILTONIAN MONTE CARLO**

S.J. Ziegler, H.F. Alqadah, U.S. Naval Research Laboratory, United States

17:20-17:40

### **A TOPOLOGICAL REGULARIZATION TERM FOR INVERSE SCATTERING PROBLEMS**

S.J. Ziegler, U.S. Naval Research Laboratory, United States

17:40-18:00

### **3D GPU-BASED IMPLEMENTATION OF THE CONTRAST SOURCE INVERSION FOR BREAST LESION DETECTION**

A. Ronca, Politecnico di Torino, Italy; A. Arduino, L. Zilberti, O. Bottauscio, Istituto Nazionale di Ricerca Metrologica, Italy; G. Tiberi, UBT S.r.l., Italy

Tuesday, September 3 - H 08:00/18:20 - room Roma II

## **session 14**

**ICEAA**

## **Numerical methods in electromagnetics**

Organized by R.D. Graglia, D.R. Wilton

Chairs: R.D. Graglia, D.R. Wilton

08:00-08:20

### **ON A HIGH-FREQUENCY ANALYSIS OF SOME RELEVANT INTEGRAL EQUATIONS IN ELECTROMAGNETICS**

V. Giunzioni, Politecnico di Torino, Italy; A. Merlini, IMT Atlantique, France; F. P. Andriulli, Politecnico di Torino, Italy

08:20-08:40

### **GEOMETRY- AND PHYSICS-AWARE H-P ADAPTATION ALGORITHM FOR EFFICIENT ELECTROMAGNETIC SCATTERING SIMULATION**

C. Diaz-Caez, National Geospatial-Intelligence Agency, United States; S. Yan, Howard University, United States

08:40-09:00

### **P-REFINEMENT IN ELECTROMAGNETIC SIMULATIONS USING FINITE ELEMENT METHOD WITH MAXIMALLY ORTHOGONALIZED BASIS FUNCTIONS**

M. M. Ilic, S. V. Savic, University of Belgrade, Serbia

09:00-09:20

### **MULTI-SOLVER ELECTROMAGNETIC SIMULATION PLATFORM**

V.F. Martin, University of Extremadura, Spain; M. Parejo, D. Jerico, EM3WORKS, Spain; L. Landesa, University of Extremadura, Spain; M.G. Araujo, F. Obelleiro, University of Vigo, Spain; J.M. Taboada, University of Extremadura, Spain

09:20-09:40

### **AN EFFICIENT GPU ACCELERATION SCHEME FOR SOLVING ELECTROMAGNETIC PROBLEMS WITH MODERATE SCALES**

M.T. Zhu, H. Z. Lu, M. S. Tong, Tongji University, China

09:40-10:00

### **A MULTIPLICATIVE CALDERÓN PRECONDITIONER FOR THE B-SPLINE-BASED ELECTRIC FIELD INTEGRAL EQUATION**

B. Hofmann, T. F. Eibert, Technical University of Munich, Germany; F. P. Andriulli, Politecnico di Torino, Italy; S. B. Adrian, Universität Rostock, Germany

10:20-10:40

### **HIGH-PERFORMANCE DISCONTINUOUS GALERKIN TIME-DOMAIN METHOD FOR THE ANALYSIS OF ELECTROMAGNETIC RESONANT MODES**

G. Núñez Muñoz, Z. Peng, University of Illinois Urbana-Champaign, United States

10:40-11:00

### **TOWARD VECTOR GENERALIZED SOURCE INTEGRAL EQUATIONS**

Y. Dahan, Ben-Gurion University of the Negev, Israel; A. Boag, Tel Aviv University, Israel; Y. Brick, Ben-Gurion University of the Negev, Israel

11:00-11:20

### **EVALUATION OF THE TANGENTIAL-TO-VERTICAL COMPONENTS OF MICHALSKI-ZHENG'S LAYERED MEDIA GREEN'S FUNCTION THROUGH DUFFY TRANSFORM IN OFF-SOURCE SCENARIOS**

S. Zheng, V.Okhmatovski, University of Manitoba, Canada

11:20-11:40

### **COMPARATIVE ANALYSIS OF ANALYTIC AND NUMERICAL VERSIONS OF THE LAPLACIAN REPRESENTATION APPROACH FOR THE ASYMPTOTIC PART OF THE LAYERED-MEDIUM GREEN'S FUNCTION IN THE MIXED POTENTIAL FORMULATION**

E. Bleszynski, M.Bleszynski, T.Jaroszewicz, Monopole Research, United States; W. Johnson, Consultant, United States; J. Rivero, F. Vipiana, Politecnico di Torino, Italy; D. Wilton, University of Houston, United States

11:40-12:00

### **CLASSICAL AND QUANTUM COMPUTATIONAL ELECTROMAGNETICS: AN OVERVIEW**

B. Zhang, J. Zhu, Purdue University, United States; C. J. Ryu, University of Illinois Urbana-Champaign, United States; D.-Y Na, Pohang University of Science and Technology, Korea; W. C. Chew, Purdue University, United States

12:00-12:20

### **MACHINE PRECISION NUMERICAL EVALUATION OF REACTION INTEGRALS IN THE METHOD OF MOMENTS**

V. F. Martin, Universidad de Extremadura, Spain; J. Rivero, Politecnico di Torino, Italy; D. R. Wilton, University of Houston, United States; W. A. Johnson, Consultant, United States; F. Vipiana, Politecnico di Torino, Italy

13:40-14:00

### **RESONANT FREE MULTI-TRACE, SINGLE SOURCE EQUATIONS FOR PENETRABLE STRUCTURES**

C. Münger, K. Cools, Ghent University, Belgium

14:00-14:20

### **A SUMMARY OF RECENT ADVANCES IN FINITE ELEMENT PARTICLE IN CELL**

O. Ramachandran, Michigan State University, United States; B. Shanker, The Ohio State University, United States

14:20-14:40

#### **PYRAMIDALLY SHAPED ABSORBING BOUNDARY FOR FDTD SIMULATIONS**

R. D. Jones A. Z. Elsherbeni, Colorado School of Mines, United States; J. M. Kast, No Affiliation, United States; A. J. Weiss, No Affiliation, United States; V. Demir, Northern Illinois University, United States

14:40-15:00

#### **ANALYZING ULTRA-WIDEBAND ELECTROMAGNETIC PROBLEMS BY TIME-DOMAIN INTEGRAL EQUATION FORMULATIONS**

R. Bai, M.-D. Zhu, Xidian University, China

15:00-15:20

#### **FRAME-BASED ANALYSIS OF MONOSTATIC SCATTERING BY SEMI-TRANSPARENT CAVITIES**

C. Letrou, Institut Polytechnique de Paris, France, M. Hariz, A. Boag, Tel Aviv University, Israel

15:20-15:40

#### **EXTENDED MULTI-BRANCH BASIS FUNCTIONS FOR NON-CONFORMAL PROBLEMS**

M. Parejo, EM3WORKS, Spain; V.F. Martin, L. Landesa, J.M. Taboada, University of Extremadura, Spain

16:00-16:20

#### **NUMERICAL MODELING OF METAMATERIAL AND METASURFACE WITH MEDIA HOMOGENIZATION**

Q. Ren, Beihang University, China

16:20-16:40

#### **EXAMINING THE IMPACT OF GEOMETRY MODELING PRECISION ON THE ACCURACY OF MONOSTATIC RCS CALCULATIONS**

B. M. Ninković, J. E. Music, B. M. Kolundzija, WIPL-D, Serbia

16:40-17:00

#### **EVALUATION OF EQUIVALENT SHEET IMPEDANCE FROM ISOFREQUENCY CURVES**

D. Tihon, C. Craeye, UCLouvain, Belgium

17:00-17:20

#### **SIMPLE RANDOMIZED CUR ALGORITHMS FOR METHOD OF MOMENTS MATRIX COMPRESSION**

J.M. Rius, A. Heldring, E. Ubeda, Universitat Politècnica de Catalunya, Spain

17:20-17:40

#### **FINITE ELEMENT TEARING AND INTERCONNECTING METHOD FOR ELECTRO-ACOUSTIC MODELING OF ACOUSTIC-WAVE RESONATORS**

H. Li, J.Koskela, J. Massey, B.Willemsen, Resonant Inc., United States; J.M. Jin, University of Illinois at Urbana-Champaign, United States

17:40-18:00

#### **MODELLING THE QUANTUM HYDRODYNAMIC RESPONSE FROM AN ARBITRARILY SHAPED NANOANTENNA: A VOLUME INTEGRAL EQUATION APPROACH**

C. Mystilidis, X. Zheng, G.A. E. Vandenbosch, KU Leuven, Belgium

18:00-18:20

#### **INTERPOLATORY CURL-CONFORMING PYRAMIDAL ELEMENTS: PROGRESS AND RESULTS**

R.D. Graglia, P. Petrini, D. Franzó, Politecnico di Torino, Italy

Tuesday, September 3 - H 08:00/10:00 - room Bruxelles

### **session 15**

**ICEAA**

## **Electromagnetics in biomedical applications: advances in nervous system stimulation**

Organized by G. Bonmassar; A. Paffi

Chairs: G. Bonmassar, A. Paffi

08:00-08:20

#### **PULSED ELECTRIC FIELDS FOR REGENERATION OF INJURED SPINAL CORD: CALCIUM OSCILLATIONS MODELING**

A. Paffi, L. Caramazza, M. Colella, N. Dolciotti, Sapienza University of Rome, Italy; S. Fontana, F. Apollonio, M. Liberti, Sapienza University of Rome, Italy

08:20-08:40

#### **EVALUATING THE IMPACT OF A COMPLEX VOLUME CONDUCTOR MODEL ON NETWORK DYNAMICS FOR DEEP BRAIN STIMULATION**

J.P. Payonk, K. Spiliotis, J. Starke, R. Köhling, U. van Rienen, R. Appali, University of Rostock, Germany

08:40-09:00

#### **TOWARDS THE VALIDATION OF THE SEMI-SPECIFIC MODEL TO ASSESS PEMFS NEUROPROTECTIVE EFFECT THROUGH NUMERICAL DOSIMETRY**

M. Colella, N. Dolciotti, Sapienza University of Rome, Italy; L. Di Nardo, S. Fontana, Sapienza University of Rome, Italy; S. Salati, R. Cadossi, IGEA Clinical Biophysics, Spa, Italy; F. Apollonio, M. Liberti, Sapienza University of Rome, Italy

09:00-09:20

#### **ADAPTABLE MRI COILS FOR ENHANCED DEEP BRAIN STIMULATION IMAGING: A BIOENGINEER'S GUIDE FROM CONCEPT TO CLINIC**

L. Golestani Rad, Northwestern University, United States

09:20-09:40

#### **AN ABSORBABLE ECG SYSTEM COMPATIBLE TO MRI.**

G. Bonmassar, Harvard Medical School, United States; H. Millan, eMRI Systems LLP, United States

09:40-10:00

#### **A RIBBON FIGURE-8 COIL DESIGN FOR SCALABLE AND SELECTIVE TRANS-SPINAL MAGNETIC STIMULATION (TSM)**

F. Marturano, L. Gomez-Cid, I. Ay, G. Bonmassar, Massachusetts General Hospital, United States

session 16

IEEE APWC

**Multi/wideband antennas and innovative antenna technology**

Organized by H. Nakano

Chairs: H. Nakano, R.D. Tamas

10:20-10:40

**CP BEAM-STEERABLE METALINE ANTENNA SYSTEM**

H. Nakano, Science and Engineering, T. Abe, J. Yamauchi, Hosei University, Japan; A. Mehta, Swansea University, United Kingdom

10:40-11:00

**ALTERNATING GENERATION OF SINGLE AND MULTI-BEAM MODES USING THE SEQUENTIAL ROTATION TECHNIQUE IN ANTENNA ARRAYS**

D. Poughè, Reutlingen University of Applied Sciences, Germany

11:00-11:20

**DESIGN OF A METASURFACE CAVITY ANTENNA FOR MULTIPLE BANDS**

H. Wong, S.Gao, City University of Hong Kong, Hong Kong

11:20-11:40

**A MILLIMETER-WAVE PHASED ARRAY ANTENNA WITH SUBARRAYS FOR INDOOR APPLICATIONS**

S. Kaushal, N. Guan, Fujikura Ltd., Japan

11:40-12:00

**PIN-DIODE-BASED SWITCHABLE POLARIZED ANTENNA ARRAY WITH PHASE-SHIFTED PROXIMITY-COUPLED-FEED**

T. Yunita, E. Cahyaningsih, A.F. Faadhilah, A. Munir, Institut Teknologi Bandung, Indonesia

12:00-12:20

**OMNIDIRECTIONAL COMPACT MICROSTRIP ANTENNA IN 2.45GHZ BAND FOR OCEAN WIRELESS SENSOR NETWORK**

T. Fujimoto, Y. Arikawa, C.-E. Guan, Y. Maemura, University of Nagasaki, Japan

13:40-14:00

**A BOR-SPR ANTENNA OPERATING FROM 2 GHZ TO 18 GHZ**

Y. Oishi, Y. Masuda, M. Tanabe, Toshiba Infrastructure Systems & Solutions Corporation, Japan; H. Nakano, Hosei University, Japan

14:00-14:20

**WIDE-BAND OMNI-DIRECTIONAL ANTENNA OF CIRCULAR POLARIZATION**

W. Chen, D. Wu, Guangdong University of Technology, China ; Z. Shen, Yangtze Delta Region Academy of Beijing Institute of Technology, China

14:20-14:40

**DUAL CIRCULARLY POLARIZED METALINE ARRAY ANTENNA**

K. Sato, I. Oshima, DKK Co., Ltd., Japan; H. Nakano, Hosei University, Japan

14:40-15:00

**ULTRA-LOW-PROFILE WIDEBAND MAGNETO-ELECTRIC DIPOLE ANTENNA**

H. Wang, I. Park, Ajou University, Korea

15:00-15:20

**ENHANCED-BANDWIDTH T-MATCH FOLDED ANTENNA WITH ADVANCED REACTANCE TUNABILITY FOR CONJUGATE IMPEDANCE MATCHING WITH ICS**

M. Matsunaga, Shizuoka University, Japan

15:20-15:40

**COMPACT ROBUST ANTENNA COMPOSED OF METAL CASE WITH A SLOT AND INNER FOLDED DIPOLE ELEMENT**

Q. Q. Phung, Le Quy Don Technical Academy, Viet Nam; H. Hashiguchi, H. Morishita, National Defense Academy, Japan; M. Takeda, A. Yamamoto, K. Matsumoto, T. Hishikawa, Panasonic Corporation, Japan

16:00-16:20

**STUDY ON SIMULTANEOUS WIRELESS POWER TRANSFER IN AIR AND UNDERWATER USING MAGNETIC FIELD COUPLING**

T. Maruyama, O. Heinen, M. Nakatsugawa, National Institute of Technology-Hakodate College, Japan; K. Nakahira, National Institute of Technology- Okinawa College, Japan; M. Okamoto, National Institute of Technology-Ube College, Japan; I. Awai, Fujiwaves, Yamaguchi Laboratories, Japan

16:20-16:40

**SELF-INTERFERENCE MITIGATION IN IN-BAND FULL-DUPLEX SYSTEMS USING 1800 HYBRID COUPLER FOR 5G APPLICATION**

S. Indriani, A.F. Faadhilah, R.B. Renwarin, Zulfi, Institut Teknologi Bandung, Indonesia; J. Zaid, Huawei Technologies Canada, Canada; A. Munir, Institut Teknologi Bandung, Indonesia

16:40-17:00

**DUAL-FREQUENCY DECOUPLING CIRCUIT INTEGRATED WITH MATCHING CIRCUITS FOR A TWO-ELEMENT ARRAY**

K. Nishimoto, Y. Inasawa, Mitsubishi Electric Corporation, Japan

17:00-17:20

**RECENT PROGRESS IN SURFACE WAVE FLUID ANTENNAS**

B. Tang, University College London, United Kingdom; S. Gao, City University of Hong Kong, Hong Kong; Y. Shen, K.F. Tong, University College London, United Kingdom; H. Wong, City University of Hong Kong, Hong Kong; K.K. Wong, University College London, United Kingdom

17:20-17:40

**A GRAVITY CONTROL BEAM STEERABLE PATCH ANTENNA UTILIZING LIQUID METAL FLOWS IN FLUIDIC CHANNELS**

H. Cao, J. Kelly, Queen Mary University of London, United Kingdom

17:40-18:00

**EXPERIMENTAL EVALUATION OF THE TRANSMISSION PERFORMANCE BETWEEN A CIRCUIT-SHAPE SLOTTED WAVEGUIDE AND A  $\Lambda/2$  DIPOLE ANTENNA**

M. Nakatsugawa, Y. Sasaki, T. Maruyama, National Institute of Technology-Hakodate College, Japan; M. Omiya, Hokkaido University, Japan; Y. Tamayama, Nagaoka University of Technology, Japan

18:00-18:20

**PROBE CALIBRATION FOR DRONE-BORNE WIDEBAND ANTENNA MEASUREMENTS**

M. Pastorcici, A.M. Ursea, R.D. Tamas, Constanta Maritime University, Romania

Tuesday, September 3 - H 08:00/10:00 - room Milao I

**session 17**

ICEAA

**Modern problems of mathematical and computational electromagnetics and their advanced applications**

Organized by M.N. Georgieva-Grosse, G.N. Georgiev

Chairs: M.N. Georgieva-Grosse, G.N. Georgiev

08:00-08:20

**ON THE THEORY OF RESONANT INTERACTION OF ELECTROMAGNETIC WAVES WITH PERIODICALLY MODULATED FILLING OF A WAVEGUIDE**

E.A. Gevorkyan, Moscow Witte University, Russian Federation

08:20-08:40

**RESULTS OF SYNTHESIS OF AN ISOTROPIC REACTANCE STRUCTURE FROM GIVEN AMPLITUDE AND PHASE SCATTERING DIAGRAMS**

T. Y. Privalova, Southern Federal University, Russian Federation

08:40-09:00

**WIENER-HOPF METHOD IN PROBLEMS OF PLANE WAVE DIFFRACTION BY TWO OPPOSITE STAGGERED PERFECTLY CONDUCTING HALF-PLANES**

G. Alkina, S. Sautbekov, M. Sautbekova, Al-Farabi Kazakh National University, Kazakhstan

09:00-09:20

**A REVIEW OF THE METHOD OF AUXILIARY SOURCES (MAS) IN APPLIED ELECTROMAGNETICS**

H.T. Anastassiou, International Hellenic University, Greece; P.J. Papakanellos, Hellenic Air Force Academy, Greece; N.L. Tsitsas, Aristotle University of Thessaloniki, Greece

09:20-09:40

**THE GENERALIZED ELECTROMAGNETIC PROJECTION OPERATOR OVER A 3 DIMENSION PROBABILISTIC SPACE**

J.M. Velázquez-Arcos, J. Granados-Samaniego, A. Cid-Reborido, A. Pérez-Ricardez, C.A. Vargas, Metropolitan Autonomous University, Mexico

09:40-10:00

**CONTRIBUTION TO THE THEORY OF THE TWO-LAYERED FERRITE-DIELECTRIC CIRCULAR WAVEGUIDE**

M.N. Georgieva-Grosse, G.N. Georgiev, Consulting and Researcher in Physics, Mathematics and Computer Sciences, Bulgaria

Tuesday, September 3 - H 10:20/11:40 - room Milao I

**session 18**

ICEAA

**Electromagnetic modeling of devices and circuits**

Chairs: G. Junkin, R. Palmeri

10:20-10:40

**IMPACT OF MAGNETIC TRACTION ON DRIVE VIBRATION DYNAMICS**

G. Kobenkins, N. Rilevs, Riga Technical University, Latvia; M. Marinbahs, JSC "Riga Electric Machine Building Works", Latvia; A. Bizans, Riga Technical University, Latvia; O. Sliskis, JSC "Riga Electric Machine Building Works", Latvia

10:40-11:00

**FAST ANALYSIS OF SCATTERING FROM PARALLEL CYLINDERS IN THE PRESENCE OF PERFECT ELECTRIC CONDUCTORS**

R. Abdullin, G.M. Battaglia, A.F. Morabito, T. Isernia, Università Mediterranea di Reggio Calabria, Italy; L. Crocco, IREA-CNR, Italy; R. Palmeri, Università Mediterranea di Reggio Calabria, Italy

11:00-11:20

**DEVELOPMENT OF MULTILAYER METAMATERIAL ABSORBER FOR MEDICAL APPLICATIONS**

E. Eroglu, University of North Carolina, United States; B. Chowdhury, Intel, United States

11:20-11:40

**TIME DOMAIN KIRCHHOFF INTEGRATION IN FDTD**

G. Junkin, The Autonomous University of Barcelona, Spain

Tuesday, September 3 - H 11:40/18:20 - room Milao I

**session 19**

ICEAA

**Metamaterials and metasurfaces**

Chairs: R.F.S. Caldeirinha, A. Hoffmann

11:40-12:00

**DESIGN OF BROADBAND DUAL-POLARIZED META-ATOMS FOR REFLECTING META-SURFACES USING CHARACTERISTIC MODES**

A. Hoffmann, D. Manteuffel, Leibniz University Hannover, Germany

12:00-12:20

**OPTIMIZATION OF GRADIENT CORE RADOMES**

S. Poulsen, Saab Dynamics AB, Sweden

13:40-14:00

**PTFE-NI METAMATERIAL ABSORBER FOR OPTICAL APPLICATIONS**

C. C. De Moro do Carmo, Ú. do Carmo Resende, CEFET MG, Brazil; R. M. de Souza Batalha, PUC M.as, Brazil



14:00-14:20

**NON-INVASIVE GLUCOSE DETECTION USING TRIPLE-POLE TRIANGULAR CSRR SENSOR**

B. Tlili, M. Keshkar, N. R. Rishani, M. Alhomsy, Y. Benchoubane, Rochester Institute of Technology, United Arab Emirates

14:20-14:40

**A NOVEL WIDEBAND 1-BIT RECONFIGURABLE INTELLIGENT SURFACE DESIGN FOR 26 GHZ**

T.E.S. Oliveira, J.R. Reis, Instituto de Telecomunicações, Portugal; I. Cuiñas, Communications-atlanTTic Research Center, Department of Signal Theory, Spain; R.F.S. Caldeirinha, Instituto de Telecomunicações, Portugal

14:40-15:00

**POLARIZATION INDEPENDENT INTERCONNECTED SPLIT-RING RESONATOR WITH ENCLOSED F-SHAPE METAMATERIAL ABSORBER FOR WIRELESS TECHNOLOGY**

M. Faysal, International Islamic University Chittagong (IIUC), Bangladesh; M. Tariqul Islam, K. Uddin M. Lutful Hakim, B. Bais, ; K.Mat, Universiti Kebangsaan Malaysia, Malaysia; A. F. Almutairi, Kuwait University, Kuwait

15:00-15:20

**EXPERIMENTAL INVESTIGATION OF POLARIZATION PERFORMANCE FOR X-BAND METASURFACE ABSORBER**

B. Syihabuddin, D.A. Nurmantris, Institut Teknologi Bandung, Indonesia; L.O. Nur, Telkom University, Indonesia; A. Munir, Institut Teknologi Bandung, Indonesia

15:20-15:40

**DESIGN OF MULTIFUNCTIONAL METASURFACE BASED ON CONFORMATIONAL SPACE ANNEALING (CSA) ALGORITHM**

I.J. Hwang, D.J. Yun, I.H. Lee, Y.P. Hong, Korea Research Institute of Standards and Science, Korea

16:00-16:20

**WIENER-HOPF SOLUTION OF A BACKSCATTERING PROTECTED WAVEGUIDE**

X. Mitsalás, University of Siena, Italy; C. De Angelis, Università degli Studi di Brescia, Italy; S. Maci, University of Siena, Italy

16:20-16:40

**WIRELESS POWER TRANSMISSION USING AN INTELLIGENT METAMATERIAL ARRAY NON-HOMOGENEOUS**

I. O. Souza, U. do Carmo Resende, CEFET-MG, Brazil; Í.V. Soares, University of Rennes 1, France

16:40-17:00

**WIDEBAND 1-BIT FILTENNA-TO-FILTENNA CROSS-POLARIZATION CONVERTER FOR FILTERING TRANSMITARRAY**

K.-w. Tam, H. Lin, University of Macao, China ; S.-w. Wong, Shenzhen university, China ; We. Zhang, Soochow University, China ; N.Kong, University of Macau, China

17:00-17:20

**RADAR CROSS SECTION REDUCTION BASED ON DISORDERED METASURFACE**

Z. Li, J. Gao, Beijing University of Technology, China

17:20-17:40

**CAPACITIVE-LOADED ULTRA-THIN METAMATERIAL ABSORBER FOR X-BAND WITH POLARIZATION INSENSITIVITY**

P. Routray, D. Ghosh, IIT Bhubaneswar, India

17:40-18:00

**A DEPLOYABLE V-BAND REFLECTARRAY ANTENNA FOR 12U CUBESAT PLATFORM**

G. Liu, H. Wang, D. Zhu, X. Dong, National Space Science Center, CAS, China

18:00-18:20

**2-BIT REFLECTIVE ELECTROMAGNETIC SURFACE FOR X-BAND BEAM CONTROL FUNCTION**

D.A. Nurmantris, M.N. Arira, N. Sutisna, A. Munir, Institut Teknologi Bandung, Indonesia

Tuesday, September 3 - H 08:00/10:00 - room Milao II

**session 20**

**ICEAA/IEEE APWC**

**Artificial intelligence applications to electromagnetics**

Organized by F. de Flaviis

Chair: F. de Flaviis

08:00-08:20

**IPCSBR: A MESH-FREE INTELLIGENCE ASSISTED POINT-CLOUD SHOOTING AND BOUNCING RAYS METHOD**

K. Yang, C. Liu, W. Yu, T. Cui, Southeast University, China

08:20-08:40

**PHYSICS-INFORMED KOOPMAN AUTOENCODERS FOR DIMENSIONALITY REDUCTION AND FORECASTING OF NONLINEAR KINETIC PLASMA-WAVE INTERACTIONS**

I. Nayak, H.H. Saleh, M. Kumar, F.L. Teixeira, The Ohio State University, United States

08:40-09:00

**ENHANCING SOIL MOISTURE ESTIMATION WITH CONVOLUTIONAL NEURAL NETWORKS**

S. Bagherkhani, S. Alamdar, F. De Flaviis, University of California, Irvine, United States

09:00-09:20

**MACHINE LEARNING-ASSISTED MATRIX COMPRESSION FOR ELECTROMAGNETIC SCATTERING ANALYSIS**

R. Molina-Burgues, H. Lopez-Menchon, A. Heldring, E. Ubeda, J. Romeu, J.M. Rius, Universitat Politècnica de Catalunya, Spain

09:20-09:40

**INTELLIGENT AUTOMATION OF ANTENNA ARRAY SYNTHESIS FOR RF SAFETY SIMULATIONS**

R. Human, R. Swanepoel, IXUS, South Africa; D.J. Ludick, Stellenbosch, South Africa

09:40-10:00

**DEEP LEARNING PROCEDURES FOR THE INVERSE DESIGN OF ELECTROMAGNETIC DEVICES**

R. Palmeri, Università Mediterranea of Reggio Calabria, Italy; A. Yago Ruiz, MiWEndo Solutions, Spain; R. Scapaticci, IREA-CNR, Italy; T. Isernia, Università Mediterranea of Reggio Calabria, Italy; L. Crocco, IREA-CNR, Italy

## session 21

IEEE APWC

**AI in electromagnetic applications**

Chairs: F. de Flaviis, Q. Ren

10:40-11:00

**A MULTI-MODAL FUSION AND MESH-FREE RCS PREDICTION METHOD BASED ON POINTNET++**

Z. Yang, Q. Ren, Beihang University, China

11:00-11:20

**ANALYSIS OF COAXIAL MICROSTRIP PATCH ANTENNA USING ARTIFICIAL NEURAL NETWORK**

S. Borgaonkar, Shri G.S. Institute of Technology and Science, Indore, India; S.K. Jain, Centre for Remote Sensing and Satellite Technology (CRSST), SGSITS, Indore, India

11:20-11:40

**HYBRID QUANTUM-CLASSICAL REINFORCEMENT LEARNING IN PATCH ANTENNA DESIGN**

M.S. Arani, R. Shahidi, L. Zhang, Memorial University of Newfoundland, Canada

11:40-12:00

**A NEURAL NETWORK APPROACH FOR THE SOLUTION OF AN ELECTROMAGNETIC INVERSE SOURCE PROBLEM WITH SVD-BASED PRUNING**

A. Capozzoli, C. Curcio, A. Liseno, Università di Napoli Federico II, Italy

12:00-12:20

**DESIGN OF MULTIBAND LARGE REFLECTARRAY ANTENNAS FOR SPACE APPLICATIONS USING SUPPORT VECTOR MACHINES**

B. Imaz-Lueje, Universidad Rey Juan Carlos, Spain; D. Martinez-de-Rioja, Universidad Politécnica de Madrid, Spain; Á. F. Vaquero, J.A. López-Fernández, M. R. Pino, M. Arrebola, Universidad de Oviedo, Spain

13:40-14:00

**AI IN BIOELECTROMAGNETICS FOR THE ASSESSMENT OF SAFETY AND NEURORESTORATION STRATEGIES DURING ELECTRICAL STIMULATION THERAPIES**

A. Morales, University of Southern California, United States; J. Du, University of Southern California, United States; E. Iseri, University of Southern California, United States; G. Lazzi, University of Southern California, United States

14:00-14:20

**A CLUSTERING APPROACH FOR UNDERSTANDING BONE HEALTH USING RF TRANSMISSION CHARACTERISTICS**

N. Shrivastava, D. Ghosh, P. K. Sahu, IIT Bhubaneswar, India

## session 22

IEEE APWC

**Wireless communication and networks**

Chairs: P. Geranmayeh, R.C.B. Monteiro

14:40-15:00

**COMPARISON OF OPTIMIZATION TECHNIQUES AND MACHINE LEARNING METHODS FOR OPTIMIZED BEAMFORMING IN WIRELESS NETWORKS**

P. Geranmayeh, E. Grass, Humboldt University of Berlin and IHP GmbH, Germany

15:00-15:20

**EXPLORING GNSS POSITIONING ACCURACY FOR EMERGENCY CALLS IN MOBILE DEVICES: AN EMPIRICAL STUDY USING A GNSS SIMULATOR WITH A-GPS TECHNOLOGY**

R.C.B. Monteiro, J.B.R. Neto, R.F. Silva, J.O. Sousa, SIDIA R&amp;D Institute, Brazil

15:20-15:40

**VOLTE EMERGENCY CALL OVER ASSISTED-GPS: AN EXPERIMENTAL EVALUATION**

R.C.B. Monteiro, R.F. Silva, J.B.R. Neto, SIDIA R&amp;D Institute, Brazil; J.O. Sousa, M.G.L. Damasceno, J.J.A. Arnez, SIDIA R&amp;D Institute, Brazil

16:00-16:20

**A DIGITALLY CODED TIME-MODULATED TRANSMIT ARRAY: PERFORMANCE PREDICTION, OPTIMIZATION AND EXPERIMENTAL VERIFICATION**

T.T. Chia, DSO National Laboratories, Singapore; J.M. Cheng, Temasek Laboratories, Singapore; T.H. Chio, DSO National Laboratories, Singapore; L.X. Ng, NUS High School of Mathematics and Science, Singapore

16:20-16:40

**COMPARATIVE ANALYSIS OF 5G STANDALONE AND NON-STANDALONE IMPLEMENTATIONS USING ATOLL RADIO PLANNING**

L.B.A. Costa, S.T.M. Gonçalves, U. Resende do Carmo, A.M. da Silva Viana, CEFET-MG, Brazil

# Wednesday 4

Wednesday, September 4 - H 08:00/09:00 - room Roma I

## session 23

ICEAA

### Technologies for mm waves and optoelectronics

Chairs: F. Costa, R. Neumann

08:00-08:20

#### HIGH-VOLTAGE DRIVER CIRCUITS FOR ELECTRO-OPTICAL RF MODULATORS

R. Neumann, U. Stehr, M.A. Hein, Technische Universität Ilmenau, Germany

08:20-08:40

#### LOOP ANTENNA ARRAY FOR MM-WAVE APPLICATIONS

N.K. Maurya, M.J. Ammann, P. McEvoy, Technological University Dublin, Ireland

08:40-09:00

#### FIBER BRAGG GRATING ARRAY-BASED BELTS FOR RESPIRATORY ACTIVITY MONITORING: RESPIRATORY SIGNAL ANALYSIS

M. Mishra, P.K. Sahu, Indian Institute of Technology Bhubaneswar, India

Wednesday, September 4 - H 09:00/14:20 - room Roma I

## session 24

ICEAA

### Electromagnetic metasurfaces: design and applications

Organized by G. Manara, F. Costa

Chairs: G. Manara, F. Costa

09:00-09:20

#### PT-SYMMETRIC METASURFACES AND THEIR BEAMSHAPING AND BEAMFORMING APPLICATIONS

P.Y. Chen, University of Illinois Chicago, United States

09:20-09:40

#### A NEAR-FIELD APPROACH TO OPTIMIZE ELECTROMAGNETIC SKINS FOR MM-WAVE INDOOR COMMUNICATIONS

A. F. Vaquero, Universidad de Oviedo, Spain; E. Martinez-de-Rioja, Universidad Rey Juan Carlos, Spain; M. Arrebola, Universidad de Oviedo, Spain

09:40-10:00

#### MM-WAVE WIRELESS SENSOR NETWORKS WITH ZERO ENERGY CONSUMPTION THROUGH BACKSCATTERING METASURFACES

F. Costa, Si. Genovesi, S. Rodini, G. Manara, University of Pisa, Italy

10:20-10:40

#### FULL-METAL METASURFACE FOR SURFACE WAVE TAILORING

G Briand, A Barka, ONERA, France; S. N. Burokur, LEME, France

10:40-11:00

#### RECONFIGURABLE INTELLIGENT SURFACES FOR THZ: HARDWARE IMPAIRMENTS AND SWITCHING TECHNOLOGIES

S.A. Matos, Instituto Universitário de Lisboa (ISCTE-IUL) Lisbon, Portugal, Portugal; Y. Ma, University of Hertfordshire, United Kingdom; Q. Luo, University of Hertfordshire, United Kingdom; J. Deuermeier, NOVA University Lisbon, Portugal; L. Lucci, CEA Leti, France; P. Gavrilidis, University of Athens, Greece; A Kiazadeh, NOVA University Lisbon, Portugal; V Lain-Rubio, ACST, Germany; T. D. Phan, University of Oulu, Finland; P. J. Soh, University of Oulu, Finland; A. Clemente, CEA-LETI, France; L. M. Pessoa, INESC TEC, Portugal; G. C. Alexandropoulos, University of Athens, Greece

11:00-11:20

#### DUAL-BAND FREQUENCY SELECTIVE SURFACE IN QUARTZ FOR TRANSMITARRAY APPLICATIONS AT SUB-THZ

B. Ouardi, Univ Grenoble Alpes, CEA, France; R. Sauleau, Univ Rennes, CNRS, IETR - UMR CNRS 6164, France; A. Clemente, Univ Grenoble Alpes, France

11:20-11:40

#### DIFFRACTIVE DEEP NEURAL NETWORKS BASED ON PROGRAMMABLE NONLINEAR METASURFACES

Y. M. Ning, Q. Ma, T. J. Cui, Southeast University, China

11:40-12:00

#### UNLEASHING BANDWIDTH: PASSIVE HIGHLY DISPERSIVE MATCHING NETWORK ENABLING BROADBAND ABSORBING MICROWAVE SYSTEMS

P. Nayani, M. Moradi, Y. Radi, Syracuse University, United States

12:00-12:20

#### FABRY-PEROT CAVITY ANTENNAS WITH POLARIZATION-CONVERSION METASURFACE RADIATING ANGULARLY SCANNABLE CIRCULARLY POLARIZED PENCIL BEAMS

M. Madji, E. Negri, Sapienza University of Rome, Italy; W. Fuscaldo, CNR, Italy; D. Comite, S. A. Galli, P. Burghignoli, Sapienza University of Rome, Italy

13:40-14:00

#### DESIGN OF DRUDE METASURFACE ANTENNAS FOR HIGH-BAND COMPATIBILITY

J. Tao, P. Tang, H. Chen, Z. Wang, Zhejiang University, China

14:00-14:20

#### ADVANCES ON HUYGENS METASURFACE BASED TRANSMITARRAYS AT UNIVERSITY OF TECHNOLOGY SYDNEY

P.-Y. Qin, Y. Jay Guo, University of Technology Sydney, Australia

session 25

ICEAA

Electromagnetic measurements

Chairs: F. Bevilacqua, M. Lumia

14:20-14:40

**A PRELIMINARY EXPERIMENTAL DEMONSTRATION OF THE NORTON SURFACE WAVE IN A RADIO LINK**

H. A. Belaid, B. Poussot, S. Mostarshedi, J-M. Laheurte, Univ. Gustave Eiffel, France

14:40-15:00

**FAR-FIELD PREDICTION FROM A REDUCED NUMBER OF PHASELESS BIPOLAR NEAR FIELD DATA**

F. Bevilacqua, Università di Salerno, Italy; A. Capozzoli, C. Curcio, Università di Napoli Federico II, Italy; F. D'Agostino, F. Ferrara, C. Gennarelli, R. Guerriero, Università di Salerno, Italy; A. Liseno, Università di Napoli Federico II, Italy; M. Migliozi, Università di Salerno, Italy; J.C. Vardoxoglou, Loughborough University, United Kingdom

15:00-15:20

**HIGH-EFFICIENCY CYLINDRICAL INDUCTION COILS USING INDUCTION HEATING FOR FOOD INDUSTRY APPLICATIONS**

S. Yamadul, S. Santalunai, S. Samreong, J. Pakprom, Suranaree University of Technology, Thailand; W. Charoensiri, P. Janpangngern, T. Thosdeekoraphat, Suranaree University of Technology, Thailand; N. Santalunai, Rajamangala University of Technology Isan, Thailand; S. Santalunai, Suranaree University of Technology, Thailand; C. Thongsopa, Suranaree University of Technology, Thailand

15:20-15:40

**A RECONSTRUCTION METHOD FOR THE SURFACE POTENTIAL OF THE HIGH VOLTAGE CHARGED BODY BASED ON QUASI-STATIC ELECTRIC FIELD THEORY**

B. Zhang, S. He, L. Song, X. Chen, Xi'an Jiaotong University, China

16:00-16:20

**PRELIMINARY RESEARCH ON NONLINEAR CORRELATION COEFFICIENT CRITERION IN EMTR METHOD FOR SPATIAL RADIATION SOURCE LOCALIZATION**

L. Song, S. He, B. Zhang, X. Ning, X. Chen, Xi'an Jiaotong University, China

16:20-16:40

**AN APPROACH TO DISCRETIZE ONE-DIMENSIONAL EQUIVALENT RADIATING PANELS**

A. Capozzoli, ; C. Curcio, Università di Napoli Federico II, Italy; F. D'Agostino, Università di Salerno, Italy; A. Liseno, Università di Napoli Federico II, Italy; L. Pascarella, Università di Salerno, Italy

16:40-17:00

**PHASELESS IMAGING OF PLANAR TARGETS: AN EXPERIMENTAL RESULT**

F. Bevilacqua, A. Capozzoli, C. Curcio, Università di Napoli Federico II, Italy; F. D'Agostino, F. Ferrara, R. Guerriero, Università di Salerno, Italy; A. Liseno, Università di Napoli Federico II, Italy; M. Migliozi, Università di Salerno, Italy; J.C. Vardaxoglou, Loughborough University, United Kingdom

17:00-17:20

**MEDUSE: 10 GHZ LOCALIZED QUASI-PLANAR WAVE MEASURING BENCH**

S. Barouki, P. Hoffmann, CEA Gramat, France; A. Reineix, Xlim Reseach Institute, France

17:20-17:40

**DIELECTRIC SENSING OF DEEPLY SUBWAVELENGTH ANALYTES USING EPSILON-NEAR-ZERO WAVEGUIDES**

C. Lezaun, Public University of Navarra, Spain; V. Pacheco-Peña, Newcastle University, United Kingdom; M. Beruete, Public University of Navarra, Spain

session 26

ICEAA

Novel mathematical methods in electromagnetics

Organized by K. Kobayashi; G. Lombardi; Y. Shestopalov

Chairs: K. Kobayashi, G. Lombardi, Y. Shestopalov

08:20-08:40

**EXACT TRANSMISSION THROUGH A METAMATERIAL PARABOLIC-CYLINDER RADOME**

P.L.E Uslenghi, University of Illinois at Chicago, United States

08:40-09:00

**WELL-CONDITIONED T-MATRIX METHOD FOR A DIPOLE-EXCITED INFINITE DIELECTRIC CYLINDER**

F. Dikmen, M.E. Hatipoglu, Gebze Technical University, Turkey; K. Karaçuha, Istanbul Technical University, Turkey

09:00-09:20

**DIFFRACTION BY PLANAR JUNCTIONS OF UNIAXIAL CHIRAL HALF-PLANES**

G. Riccio, F. Ferrara, University of Salerno, Italy; G. Gennarelli, I.R.E.A. - C.N.R., Italy; R. Guerriero, F. Chiadini, University of Salerno, Italy

09:20-09:40

**A NOVEL DIMENSIONAL ALIGNMENT OF ELECTRIC AND MAGNETIC FIELD INTENSITY VECTORS IN FDTD FOR PML IMPLEMENTATION**

F. Erden, Turkish Naval Academy, Turkey

09:40-10:00

**FIELD AVERAGING TECHNIQUES IN ELECTROMAGNETIC PROBLEMS**

M. Nitas, Technical University of Denmark; M. Kafesaki, Foundation for Research and Technology-Hellas (FORTH-IESL), Greece; S. Arslanagic, Technical University of Denmark, Denmark

10:20-10:40

**SCATTERING AT A SUPERLUMINAL ARBITRARILY DECELERATING INTERFACE**

K. De Kinder, C. Caloz, KU Leuven, Belgium

10:40-11:00

**PLANE-WAVE DIFFRACTION BY A SLIT FORMED BY TWO HALF-PLANES WITH A FRACTIONAL BOUNDARY CONDITION: HIGHER ORDER ASYMPTOTICS**

T. Nagasaka, Ashikaga University, Japan; K. Kobayashi, Chuo University, Japan

11:00-11:20

**TE- WAVES IN WAVEGUIDE STRUCTURES FILLED WITH GRADED DIELECTRIC MEDIA**

M. Dalarsson, KTH Royal Institute of Technology, Sweden

11:20-11:40

**NUMERICAL ANALYSIS AND APPLICATIONS OF PLANAR SERIES FEED ANTENNAS FOR NEAR-FIELD UHF RFID, SENSING AND RADIATIVE WPT**

A.S. Andrenko, Kyoto University, Japan

11:40-12:00

**RIEMANN-SILBERSTEIN VECTORS: STREAMLINED ELECTROMAGNETICS WITH APPLICATIONS**

R. Kastner, Tel Aviv University, Israel

12:00-12:20

**ANALYSIS OF POWER FLOW AROUND METASURFACE SENSOR**

S. Yagitani, M. Ozaki, T. Imachi, Kanazawa University, Japan

13:40-14:00

**ENHANCING PERFORMANCE AND VERSATILITY OF WIRE ANTENNAS WITH METASURFACE COVERS**

A. Monti, Z. Hamzavi-Zarghani, Roma Tre University, Italy; S. Vellucci, M. Longhi, M. Barbuto, Niccolò Cusano University, Italy; D. Ramaccia, L. Stefanini, A. Toscano, F. Bilotti, Roma Tre University, Italy

14:00-14:20

**TWO-DIMENSIONAL RAY-TRACING MODEL FOR THE DESIGN OF MULTILAYERED DIELECTRIC LENSES IN COMBINATION WITH ARRAY ANTENNAS**

P. Castillo-Tapia, N. Flores-Espinosa, KTH Royal Institute of Technology, Sweden; F. Mesa, University of Seville, Spain; M.C. Viano, Viasat Antenna Systems S.A., Switzerland; O. Quevedo-Teruel, KTH Royal Institute of Technology, Sweden

14:20-14:40

**HIGH-PRECISION CALCULATION FOR THE CUT-OFF WAVE NUMBERS FOR WAVEGUIDES OF ARBITRARY CROSS SECTIONS WITH INNER CONDUCTORS**

E.D. Vinogradova, P.D. Smith, Macquarie University, Australia; Y.V. Shestopalov, University of Gävle, Sweden

14:40-15:00

**RESONANCE SCATTERING BY TWO CONCENTRIC SPHERICAL SHELLS WITH CIRCULAR APERTURES**

E. D. Vinogradova, Macquarie University, Australia

15:00-15:20

**2-D PHOTONIC CRYSTAL LEAKY-WAVE ANTENNAS: THEORETICAL INVESTIGATION AND DESIGN APPROACHES**

L. Tognolatti, Roma Tre University, Italy; V. Jandieri, University of Duisburg-Essen, Germany; C. Ponti, G. Schettini, P. Baccarelli, Roma Tre University, Italy

15:20-15:40

**NUMERICALLY STABLE ANALYTICAL COMPUTATION OF DOUBLE SURFACE INTEGRALS OVER ALMOST PARALLEL FLAT SUPPORTS FOR TIME AND FREQUENCY DOMAIN GALERKIN DISCRETIZATION OF WAVE SCATTERING PROBLEMS**

A. Zuccotti, K. Cools, Ghent University, Belgium

16:00-16:20

**A REVIEW OF EVALUATIONS OF RADAR CROSS-SECTION OF CANONICAL AND COMPLEX OBJECTS**

A. Elsherbeni, Colorado School of Mines, United States

16:20-16:40

**DEVELOPMENT OF SUPERSCATTERERS VIA GENETICAL OPTIMIZATION**

D. Vovchuk, Tel Aviv University/Riga Technical University, Israel; K. Grotov, A. Mikhailovskaya, D. Dobrykh, Tel Aviv University, Israel; T. Salgals, V. Bobrovs, Riga Technical University, Latvia; P. Ginzburg, Tel Aviv University, Israel

16:40-17:00

**THE SPECTRAL THEORY OF TRANSIENTS (STT): A UNIFIED FORMULATION WITH ILLUSTRATIVE EXAMPLES**

E. Heyman, Tel Aviv University, Israel

17:00-17:20

**THE FREDHOLM FACTORIZATION METHOD DIRECTLY APPLIED TO GENERALIZED WIENER-HOPF EQUATIONS FOR WEDGE DIFFRACTION PROBLEMS IN COMPLEX MEDIA**

V. Daniele, G. Lombardi, Politecnico di Torino, Italy

Wednesday, September 4 - 08:00/09:20 - room Bruxelles

**session 27**

ICEAA

**Microwave and mmwave sensors in advanced applications**

Organized by C. Baer; C. Schulz

Chairs: C. Baer, C. Schulz

08:00-08:20

**RADAR-BASED INVESTIGATION OF ELECTROMAGNETIC WAVES UNDER DIFFERENT TEMPERATURE AND HUMIDITY CONDITIONS**

J. Mahendran, F. Schenkel, I. Rolfes, C. Schulz, Ruhr University Bochum, Germany

08:20-08:40

**A MMWAVE PHASE CORRELATION BASED GAS VELOCITY SENSOR UTILIZING TIME DOMAIN MULTIPLEXED FIXED TARGET RADAR MEASUREMENTS**

C. Baer, Ruhr University Bochum, Germany; T. Jaeschke, 2Pi Labs GmbH, Germany

08:40-09:00

**RADAR-BASED TOMOGRAPHY WITH FILTERED BACKPROJECTION USING ATTENUATION AND TIME SHIFT PROFILES OF A REFERENCE REFLECTION**

I. Barenholtz, A. Al-Tayar, M. Funk, K. Dausien, D. Pohle, C. Schulz, I. Rolfes, J. Barowski, Ruhr University Bochum, Germany

09:00-09:20

**LITHOGRAPHY PROCESS VERIFICATION ON POROUS PET MEMBRANES FOR CELL MEASUREMENTS USING THZ-TDS IMAGING**

P. Hinz, M. Mueh, A. Diepolder, C. Damm, Ulm University, Germany

Wednesday, September 4 - 09:20/14:20 - room Bruxelles

**session 28**

ICEAA

**Dielectric waveguides and polymer microwave fiber technology**

Organized by C. Baer

Chair: C. Baer

09:20-09:40

**A COMPACT W-BAND TE<sub>10</sub>-TE<sub>01</sub> MODE CONVERTER FOR INDUSTRIAL RADAR APPLICATIONS**

C. Schulz, Ruhr University Bochum, Germany

09:40-10:00

**CLASSIFICATION OF RANGE-DOPPLER RADAR ECHOES FOR CONDITION MONITORING IN INDUSTRIAL PROCESSES: SHALLOW LEARNING VERSUS DEEP LEARNING**

R.J. Schmitz, M. Vogt, Ruhr University Bochum, M. Roitzheim, M. Hammes, Krohne Messtechnik GmbH, Germany; C. Schulz, Ruhr University Bochum, Krohne Messtechnik GmbH, Germany; J. Barowski, I. Rolfes, Ruhr University Bochum, Germany

10:20-10:40

**METAL SHEET THICKNESS MEASUREMENT USING DIELECTRIC WAVEGUIDES WITH MILLIMETER WAVE RADAR**

N. Muckermann, C. Baer, N. Pohl, Ruhr University Bochum, Germany

10:40-11:00

**ULTRA-BROADBAND MATERIAL CHARACTERIZATION IN W- AND D-BAND USING A FREE-SPACE SETUP**

M.Funk, I.Barengolts, J.Altholz, J.Barowski, C. Schulz, I. Rolfes, Ruhr University Bochum, Germany

11:00-11:20

**CIRCULAR DIELECTRIC WAVEGUIDES FOR D-BAND APPLICATIONS IN COMMUNICATIONS AND RADAR**

M. Schneider, University of Bremen, Germany

11:20-11:40

**EXPLORING THE POTENTIAL OF SIX-PORT TECHNOLOGY IN MICROWAVE NONDESTRUCTIVE TESTING: CURRENT STATUS AND FUTURE DIRECTIONS**

K. Haddadi, IEMN CNRS UMR 8520, France

11:40-12:00

**A COMPENSATION METHOD FOR REDUCING THE INFLUENCE OF PRINTING VOIDS ON THE WAVE PROPAGATION PROPERTIES OF FDM-MANUFACTURED DIELECTRIC WAVEGUIDES**

C. Baer, Ruhr University Bochum, Germany

12:00-12:20

**A DIELECTRIC WAVEGUIDE SOLUTION FOR AUTOMOTIVE HIGH-SPEED COMMUNICATION - A POTENTIAL EXTENSION TO TRADITIONAL SIGNAL TRANSMISSION OPTIONS?**

J. Wenninger, R. Klapfenberger, F. GraBl, G. Armbrrecht, Rosenberger Hochfrequenztechnik GmbH & Co. KG, Germany

13:40-14:00

**BEYOND THE IC - COUPLERS, CHANNELS AND COMPONENTS FOR HIGH-PERFORMANCE POLYMER MICROWAVE FIBER COMMUNICATION SYSTEMS**

K. Dens, M. De Baecke, B. Gungor, P. Reynaert, KU Leuven, Belgium

14:00-14:20

**INVESTIGATION ON LNN-SELF-CALIBRATION PROCEDURES FOR DIELECTRIC WAVEGUIDE MEASUREMENTS**

K. Dausien, I. Barengolts, L. Schmitt, M. Burfeindt, C. Baer, C. Schulz, J. Barowski, M. Hoffmann, I. Rolfes, Ruhr University Bochum, Germany

Wednesday, September 4 - 14:20/15:20 - room Bruxelles

**session 29**

ICEAA

**Radar technologies**

Chairs: C. Baer, A. Hizal

14:20-14:40

**ENHANCED CHIPLESS RFID DETECTION ALGORITHM FOR DENSE MULTIPATH CHANNELS BASED ON CALIBRATION EQUALIZATION TECHNIQUES**

M.El Hadidy, I. Bakri, RheinMain University of Applied Science, Germany

14:40-15:00

**INVERSE SYNTHETIC APERTURE RADAR IMAGING USING THE SIMULTANEOUS ITERATIVE RECONSTRUCTION TECHNIQUE**

D. Holtshausen, L. Grootboom, Stellenbosch University, South Africa

15:00-15:20

**X-BAND NEAR-FIELD GPR BASED ON COLLIMATED AND FOCUSED VORTEX WAVES USING ELLIPSOIDAL REFLECTOR**

R. Cetiner, A. Hizal, Aselsan, Turkey; S.S. Koc, METU, Turkey; H. Yildiz, Baskent University, Turkey

session 30

ICEAA

Periodic and quasi - periodic electromagnetics

Organized by L. Matekovits; K. Esselle

Chairs: L. Matekovits, K. Esselle

16:00-16:20

**EBG PERIODIC STRUCTURES WITH GLIDE-SYMMETRY HEXAGONAL LATTICES**

J.M Jimenez-Suarez, KTH Royal Institute of Technology, Sweden; F. Mesa, Universidad de Sevilla, Spain; O. Quevedo-Teruel, KTH Royal Institute of Technology, Sweden

16:20-16:40

**MEASURED PERFORMANCE OF DIELECTRIC ROD EBG LEAKY-WAVE ANTENNA**

L. Tognolatti, P. Baccarelli, C. Ponti, Roma Tre University, Italy; S. Ceccuzzi, ENEA, Italy; V. Jandieri, University of Duisburg-Essen, and CENIDE- Center for Nanointegration Duisburg-Essen, Germany; G. Schettini, Roma Tre University, Italy

16:40-17:00

**STUDY REGARDING THE TUNABILITY OF A FREQUENCY SELECTIVE SURFACE HAVING INCORPORATED ACTIVE DEVICES AND CONTROL NETWORK**

A.-M. Silaghi, C. Pescari, A.De Sabata, Politehnica University Timisoara, Romania; L. Matekovits, Politecnico di Torino, Italy; A.Neiconi, Politehnica University Timisoara, Romania

17:00-17:20

**DESIGN OF WIDEBAND METASURFACE STRUCTURE WITH THE AID OF BOTTOM-UP OPTIMIZATION**

S. Ozer, L. Kouhalvandi, Dogus University, Turkey; L. Matekovits, Politecnico di Torino, Italy; M. Alibakhshikenari, Universidad Carlos III de Madrid, Spain

17:20-17:40

**FEASIBILITY STUDY OF XLA VERY LIGHT SPACE-BORNE ORIENTABLE ANTENNA FOR TELECOMMUNICATION APPLICATIONS**

G. Perona, CSP - Innovazione nelle ICT, Italy; M. Allegretti, Politecnico di Torino, Italy; I. Bordi, Envisens Technologies srl, Italy

session 31

ICEAA

Space relevant laboratory experiments

Organized by W.E. Amatucci; E. Scime

Chairs: W.E. Amatucci, E. Scime

08:00-08:20

**SHEARED EXB STIRRING AND CROSS-FIELD ELECTRON INERTIAL LENGTH STRUCTURING GENERATED BY SHEAR ALFVÉN WAVE HEATING**

S. Vincena, W. Gekelman, T.A. Carter, J.E. Maggs, G.J. Morales, UCLA, United States

08:20-08:40

**ELF/VLF MICRO-ARRAY TRANSMITTERS WITH FE-CO HIGH- $\mu$  CORE FOR SPACE PLATFORMS**

B. Amatucci, K. Hrenyo, Naval Research Laboratory, United States; D. Papadopoulos, University of Maryland, United States; M. Finn, S. Bennett, A. Hyde, Naval Research Laboratory, United States

08:40-09:00

**FIRST RESULTS FROM THE LIEFSI CAMPAIGN**

J. Bowman, West Virginia University United States; E. Tejero, U.S Naval Research Laboratory, United States; J. Bonnell, University of California, Berkely, United States; W. Amatucci, U.S Naval Research Laboratory, United States; K. Goodrich, West Virginia University, United States

09:00-09:20

**EXPLORING NEUTRAL PARTICLE DYNAMICS WITH FS-TALIF IN FUSION SYSTEMS**

A. Diallo, Princeton Plasma Physics Laboratory, United States; A. Dogariu, Texas A&M University, United States; A. Starikovskiy, Princeton University, United States

09:20-09:40

**USING FIELD-PARTICLE CORRELATIONS TO DIAGNOSE WAVE-PARTICLE INTERACTIONS IN LABORATORY EXPERIMENTS**

G.G. Howes, University of Iowa, United States

09:40-10:00

**ENERGETIC ELECTRON GENERATION DURING ELECTRON-ONLY RECONNECTION**

E. Scime, G. Bartolo, R.S. Nirwan, T. Rood, S. Yadav, West Virginia University, United States

10:20-10:40

**RESULTS FROM THE LIEFSI CAMPAIGN - INTERPRETATIONS AND APPLICATIONS**

J.W. Bonnell, Space Sciences Laboratory, UC Berkeley, United States; J. Bowman, West Virginia University United States; E. Tejero, W. Amatucci, US Naval Research Laboratory, United States; K. Goodrich, West Virginia University, United States

10:40-11:00

**MAGNETOSPHERE-RELEVANT WAVE RESEARCH AT CALTECH INVOLVING OR MOTIVATED BY LAB EXPERIMENTS**

P. M. Bellan, M. Haw, Y.D. Yoon, Caltech, United States

11:00-11:20

**LABORATORY INVESTIGATION OF TRIGGERED EMISSIONS**

E.M. Tejero, US Naval Research Laboratory, United States; J.W.R. Schroeder, Wheaton College, United States; F.N. Skiff, University of Iowa, United States; A.M. Dubois, C.L. Enloe, C.E. Crabtree, US Naval Research Laboratory, United States; A.A. Sahai, V. Harid, University of Colorado, Denver, United States

11:20-11:40

**PLASMA PHYSICS AT COMETS - WHAT CAN WE LEARN FROM LABORATORY EXPERIMENTS?**

H. Gunell, Umeå University, Sweden; D. Schaeffer, University of California-Los Angeles, United States; C. Goetz, Northumbria University, United Kingdom; F. Cruz, Universidade de Lisboa, Portugal; C. S. Wedlund, Austrian Academy of Sciences, Austria; H. Nilsson, A. Moeslinger, G. Stenberg Wieser, N. Edberg, Swedish Institute of Space Physics, Uppsala, Sweden

11:40-12:00

**EXPERIMENTAL INVESTIGATION OF SOLITON FORMATION IN A SIMPLE ION-ELECTRON PLASMA**

P. Mehta, E. Scime, K. Kumar, T.Rood, G.Lusk, West Virginia University, United States

12:00-12:20

**DEBRIS PLASMA DENSITY PERTURBATIONS AS SEEN THROUGH A MODERN COLLECTIVE THOMSON SCATTER RADAR PROCESSING CHAIN**

J. B. Parham, J. Li, M. Dickson, G. Ginet, MIT Lincoln Laboratory, United States; P. J. Erickson, F. Lind, Haystack Observatory, United States; L. Paritsky, J. Swoboda, Haystack Observatory, United States

13:40-14:00

**STUDY OF DEBRIS-PLASMA INTERACTION IN THE EARTH'S IONOSPHERE.**

P. A. Resendiz Lira, G. L. Delzanno, D.Svyatsky, O. Koshkarov, J. Craig Holmes, Ca.Maldonado, G. Wilson, T. Espinoza, Los Alamos National Laboratory, United States

14:00-14:20

**EXPERIMENTAL INVESTIGATION OF ORBITAL DEBRIS SOLITON GENERATION**

B. Amatucci, E. Tejero, A. DuBois, L. Enloe, D. Blackwell, C. Crabtree, G. Ganguli, Naval Research Laboratory, United States; A. Sen, Institute for Plasma Research, India

14:20-14:40

**EXPERIMENTAL EXPLORATION FOR PRECURSOR SOLITONS IN A FLOWING PLASMA**

K. Kumar, T. Rood, G. Lusk, E.Scime, P. Mehta, West Virginia University, United States

Wednesday, September 4 - 14:40/17:40 - room Milao I

**session 32**

IEEE APWC

**Propagation and Channel modeling**

Chairs: S. Malik, F. Paonessa

14:40-15:00

**AN INITIAL STUDY OF HUMAN-SCALE BLOCKAGE IN SUB-THZ RADIO PROPAGATION WITH APPLICATION TO INDOOR PASSIVE LOCALIZATION**

F. Paonessa, G. Virone, S. Kianoush, A. Nordio, S. Savazzi, CNR-IEIIT, Italy

15:00-15:20

**BALANCING BETWEEN DATA EFFICIENCY AND RF-EMF EXPOSURE REDUCTION VIA BEAM SWITCHING IN 5G MM-WAVE CHANNEL**

S. Malik, R. Schulpen, L.A. Bronckers, U. Johannsen, Eindhoven University of Technology, Netherlands

15:20-15:40

**WIDEBAND JOINT ELEVATION-AZIMUTH ANGLE ESTIMATION BASED ON MULTIPLE FREQUENCY MODEL AND ATOMIC NORM MINIMIZATION**

J. Zhang, I M. Wu, Institute of Acoustics, Chinese Academy of Sciences, China; C. Hao, Da Xu, Chinese Academy of Sciences, China

16:00-16:20

**COMPARATIVE STUDY OF 5G AND WI-FI PRIVATE NETWORKS: A CASE STUDY**

G.R. Souza, U.C. Resend, S.T.M. GonÇalves, CEFET-MG, Brazil

16:20-16:40

**BRIDGING SIMULATION AND MEASUREMENTS THROUGH RAY-LAUNCHING ANALYSIS: A STUDY IN A COMPLEX URBAN SCENARIO ENVIRONMENT**

X. Long, Karlsruhe Institut für Technologie (KIT), Germany; A.M.A. Fellan, Rheinland-Pfälzische Technische Universität Kaiserslautern-Landau (RPTU), Germany; M. Pauli, Karlsruhe Institut für Technologie (KIT), Germany; H. Schotten, Rheinland-Pfälzische Technische Universität Kaiserslautern-Landau (RPTU), Germany; T. Zwick, Karlsruhe Institut für Technologie (KIT), Germany

16:40-17:00

**IMPACT OF PARALLEL INTERFERENCE ON FMCW RADAR DETECTION IN INDOOR ENVIRONMENTS**

P. Reitz, N. Franchi, M. Lübke, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany

17:00-17:20

**MODELING PATH LOSS IN STRUCTURED MANGO ORCHARDS: AN EMPIRICAL APPROACH IN ACCORDANCE WITH IEEE 802.11 STANDARDS**

K. M. Boga, H.Nandivelugu, S.Su. Raj Gaddala, D. Kandimalla, R. V. Prasad Yerra, Indian Institute of Information Technology Sri City, Chittoor, India

17:20-17:40

**PROPAGATION AND PERFORMANCE ANALYSIS OF 5G COMMUNICATIONS IN MARITIME ENVIRONMENTS**

R. Byl, F. Quitin, Université libre de Bruxelles, Belgium

Wednesday, September 4 - 08:00/14:20 - room Milao II

**session 33**

ICEAA

**Antennas**

Chairs: P. Di Ninni, L.M. Pessoa

08:00-08:20

**RECONFIGURABLE ANTENNAS ENABLED BY COMPLIANT MECHANISMS**

S. D. Campbell, G. Makertich-Sengerdy, P. L. Werner, D. H. Werner, The Pennsylvania State University, United States

08:20-08:40

**MEMRISTOR-BASED 1-BIT RECONFIGURABLE INTELLIGENT SURFACE FOR 6G COMMUNICATIONS AT D-BAND**

M. Elsaid, S.I. Inacio, H.M. Salgado, L.M. Pessoa, INESCCTEC, Portugal

08:40-09:00

**STEERING THE BEAM OF AN END-FIRE ANTENNA USING NEAR-FIELD META-STEERING METHOD**

K. Singh, M. I. Nabeel, D. Thalakatuna, K. Esselle, University of Technology Sydney, Australia



09:00-09:20

**TUNABLE FREQUENCY SELECTIVE ANTENNA BASED ON VARIABLE LIQUID METAL COUPLING LENGTH**

V. Sharbati, X. Bao, J.J. Healy, N. Zhang, University College Dublin, Ireland

09:20-09:40

**THE TRANSFORMER AS A BALUN**

E. Carpentieri, MBDA, Italy

09:40-10:00

**A MULTIBEAM ANTENNA ARRAY FED BY A NEW DESIGN OF RF BEAMFORMING NETWORK**

Y. Xu, University of Technology Sydney, Australia; H. Zhu, Commonwealth Scientific and Industrial Research Organization, Australia; J. Guo, University of Technology Sydney, Australia

10:20-10:40

**DEVELOPMENT OF FLEXIBLE TEXTILE PATCH ANTENNA USING COATING TECHNIQUE**

M.N. Arira, B. Syihabuddin, T. Yunita, A. Munir, Institut Teknologi Bandung, Indonesia

10:40-11:00

**MONOPOLE-BASED WIDEBAND ANTENNA WITH EMBEDDED BAND-NOTCH FOR APPLICATIONS IN UPPER UWB**

Y. Dang, T. Alam, M. Cheffena, Norwegian University of Science and Technology, Norway; K.G. Kjelgard, University of Oslo, Norway

11:00-11:20

**A COMPACT CAPSULE ANTENNA DESIGN BASED ON METAMATERIAL RESONATORS**

M. Ciflik, C. Basaran, Akdeniz University, Turkey

11:20-11:40

**DUAL-BAND CONFORMAL CAPSULE ANTENNA DESIGN FOR BIOTELEMETRY APPLICATIONS**

M. Kasli, M. Ciflik, C. Basaran, Akdeniz University, Turkey

11:40-12:00

**PROPAGATION OF HIGHER-ORDER WAVEGUIDE MODES FROM THE OMT INTO THE FAR FIELD**

M.S. de Villiers, A. Peens-Hough, South African Radio Astronomy Observatory, South Africa

12:00-12:20

**RADIATION AND POLARISATION PERFORMANCE OF SADINO: AN ITALIAN APERTURE ARRAY FOR TECHNOLOGICAL VERIFICATION TESTS IN RADIO ASTRONOMY**

P. Di Ninni, National Institute for Astrophysics, Italy; T.D. Carozzi, Onsala Space Observatory - Chalmers University of Technology, Sweden; M. Schiaffino, G. Comoretto, A. Melis, M. Murgia, National Institute for Astrophysics, Italy

13:40-14:00

**A FREQUENCY TUNABLE RECTANGULAR PATCH ANTENNA BASED ON ANISOTROPIC ARTIFICIAL MATERIAL AT C-BAND**

H. J. Martínez, M. A. Yarlequé, S. Alvarez, Pontificia Universidad Católica del Perú, Peru

14:00-14:20

**UWB ANTENNA WITH WLAN AND X-BAND REJECTION BASED ON METAMATERIALS**

I. Fortas, University of Boumerdes, Algeria; M. Ayad, University of Setif, Algeria; B. Zoubiri, Center for Development of Advanced Technologies- CDTA, Algeria; S. Tebache, Ecole Nationale Polytechnique (ENP), Algeria; K. Fertas, Ecole Nationale Polytechnique (ENP), Algeria

Wednesday, September 4 - 14:20/17:40 - room Milao II

**session 34**

ICEAA

**Antenna array modelling**

Organized by C. Craeye; M. Botha

Chairs: C. Craeye, M. Botha

14:20-14:40

**METHOD OF MOMENTS FOR THE TWO-DIMENSIONAL ANALYSIS OF ARRAY-FED METASURFACE ANTENNAS**

J. Dessy, UCLouvain, Belgium; M. Bodehou, Université d'Abomey-Calavi, Benin; C. Craeye, UCLouvain, Belgium

14:40-15:00

**NUMERICAL ANALYSIS OF FINITE ANTENNAS OVER TWO-DIMENSIONAL INFINITE PERIODIC STRUCTURES USING METHOD OF MOMENTS**

K. Konno, Tohoku University, Japan; Q. Chen, Tohoku University, Japan

15:00-15:20

**DD-MLFMA-SLOTFFT FRAMEWORK FOR THE ELECTROMAGNETIC SOLUTION OF MOUNTED FINITE PERIODIC STRUCTURES**

V.F. Martin, A. Serna, L. Landesa, University of Extremadura, Spain; F. Obelleiro, University of Vigo, Spain; M.G. Araujo, F. Vipiana, Politecnico di Torino, Italy; J.M. Taboada, University of Extremadura, Spain

15:20-15:40

**FAST ANALYSIS OF LARGE ANTENNA ARRAYS WITH STATIC AND DYNAMIC MACRO BASIS FUNCTION METHODS**

K. Sewraj, Université des Mascareignes, Mauritius; M.M. Botha, Stellenbosch University, South Africa

16:00-16:20

**A BROADBAND MULTIPOLE METHOD FOR THE SCATTERING ANALYSIS OF ANTENNA ARRAYS**

Q. D. Gueuning, E. de Lera Acedo, University of Cambridge, United Kingdom; A. K. Brown, Queen Mary University of London, United Kingdom; O. O'Hara, University of Cambridge, United Kingdom

16:20-16:40

**EFFICIENT ANALYSIS OF SKA-LOW ANTENNA ARRAYS WITH DYNAMIC MACRO BASIS FUNCTIONS**

A.S. Conradie, M.M. Botha, Stellenbosch University, South Africa

16:40-17:00

**A METHOD TO ENHANCE THE ACTIVE MODAL CONFIGURATION OF A CIRCULARLY POLARIZED PATCH ANTENNA ARRAY USING CHARACTERISTIC MODES**

L. Mörlein, D. Manteuffel, Leibniz University Hannover, Germany

17:00-17:20

**ARRAY SYNTHESIS USING SPHERICAL WAVE ELEMENTS FOR EMF COMPLIANCE**

R. Swanepoel, IXUS, South Africa; D.I.L. De Villiers, D.J. Ludick, Stellenbosch, South Africa

17:20-17:40

**ANTENNA CHARACTERIZATION BY THE BACK-SCATTERING MEASUREMENT METHOD USING THE INTEGRATED RF-FRONTEND AS LOAD MODULATION DEVICE**

I. Shilinkov, V. Chernikov, R. Maaskant, M. Ivashina, Chalmers University of Technology, Sweden

# THURSDAY 5

Thursday, September 5 - H 08:00/10:40 - room Roma I

**session 35**

ICEAA

**Nonlinear media; resonances; and inverse problems**

Organized by Y. Shestopalov

Chair: Y. Shestopalov

08:00-08:20

**FREQUENCY INVERSION METHOD AND DEVICE FOR MALIGNANT MELANOMA DETECTION USING RF/MICROWAVES**

L. Beilina, A. Eriksson, Chalmers University of Technology and University of Gothenburg, Sweden; N. Neittaanmäki, University of Gothenburg, Sweden

08:20-08:40

**A HYBRID FINITE ELEMENT/FINITE DIFFERENCE METHOD FOR RECONSTRUCTION OF DIELECTRIC PROPERTIES OF CONDUCTIVE OBJECTS**

E. Lindström, L. Beilina, Chalmers University of Technology and University of Gothenburg, Sweden

08:40-09:00

**WIDE-ANGLE BROADBAND CANCELLATION OF SCATTERING FROM METASURFACES WITH OAM AND COMBINED PHASE PROFILES**

A. I. Semenikhin, D. V. Semenikhina, Y. V. Yukhanov, A. M. Zikina, Southern federal university, Russian Federation

09:00-09:20

**EXPLICIT DETERMINATION OF THE SPECTRUM OF NORMAL WAVES IN AN INHOMOGENEOUS PLANE-PARALLEL DIELECTRIC LAYER WITH A PARABOLIC PERMITTIVITY PROFILE**

E. Smolkin, University of Gävle, Sweden

09:20-09:40

**DYNAMIC MODEL FOR PREDICTING INSTABILITY OF MULTIPHASE PROCESSES: DIRECT AND INVERSE PROBLEMS**

Y. Shestopalov, Russian Technological University MIREA, Russian Federation; A. Shakhverdiev, Russian State Geological Prospecting University, Russian Federation

09:40-10:00

**DIFFRACTION BY CIRCULAR PIN: WIENER-HOPF METHOD**

S. Sautbekov, M. Sautbekova, G. Alkina, Al-Farabi Kazakh National University, Kazakhstan

10:20-10:40

**INTEGRO-DIFFERENTIAL EQUATIONS IN THE PROBLEM OF ELECTROMAGNETIC WAVE SCATTERING ON A DIELECTRIC BODY COVERED WITH GRAPHENE**

Y. Smirnov, Penza State University, Russian Federation; Y. Shestopalov, Russian Technological University MIREA, Russian Federation; O. Kondyrev, Penza State University, Russian Federation

Thursday, September 5 - H 10:40/12:00 - room Roma I

**session 36**

ICEAA

**Mathematical advances in electromagnetics**

Organized by P.D. Smith; E. Vynogradova

Chairs: P.D. Smith, E. Vynogradova

10:40-11:00

**REFLECTION AND TRANSMISSION AT A PARABOLIC-CYLINDER INTERFACE**

P.L.E. Uslenghi, University of Illinois at Chicago, United States

11:00-11:20

**A FAST MULTIPLICATION ALGORITHM FOR GABOR COEFFICIENTS**

S. Eijssvogel, R.J. Ditz, M.C. van Beurden, Eindhoven University of Technology, Netherlands

11:20-11:40

**ACCURATE ANALYSIS OF THE HIGH-FREQUENCY NEAR-FIELD ARISING AS A RESULT OF PLANE WAVE DIFFRACTION ON AN OPEN METALLIC SPHERICAL SHELL**

E. D. Vinogradova, Macquarie University, Australia

11:40-12:00

**REGULARIZED SOLUTION OF 2D SCATTERING FROM IMPEDANCE-LOADED CAVITIES**

P.D. Smith, E.D. Vinogradova, Macquarie University, Australia

Thursday, September 5 - H 13:40/15:00 - room Roma I

**session 37**

ICEAA

**Machine learning in antenna arrays and EMT based imaging**

Organized by A.E. Cetin; P. - Y. Chen

Chairs: A.E. Cetin, P.-Y. Chen

13:40-14:00

**PHASELESS RADAR COINCIDENCE IMAGING VIA LOW-RANK MATRIX RECOVERY THEORY**

B. Yonel, N. Choudhury, B. Yazici, Rensselaer Polytechnic Institute, United States

14:00-14:20

**DEEP LEARNING FOR SAR SHIP CLASSIFICATION: FOCUS ON UNBALANCED DATASETS AND INTER-DATASET GENERALIZATION**

C.M. Awais, University of Pisa, Italy; M. Reggiannini, National Research Council (CNR), Institute of Information Science and Technologies (ISTI), Italy

14:20-14:40

**EFFECT OF DATA COMPRESSION ON CRACK LOCATION PREDICTION USING ACOUSTIC EMISSION SENSOR ARRAYS**

E. Hamdan, X. Zhu, D. Ozevin, P.Y. Chen, A.E. Çetin, University of Illinois Chicago, United States

14:40-15:00

**ELECTROMAGNETICALLY UNCLONABLE FUNCTION WITH IMMUNITY TO MACHINE LEARNING ATTACKS**

Y. Ren, H. Pan, A. Enis Cetin, P.-Y. Chen, University of Illinois Chicago, United States

Thursday, September 5 - H 15:00/18:00 - room Roma I

**session 38**

**ICEAA**

**Communication technologies of rail transit in extreme scenarios**

Organized by Y. Wen

Chair: Y. Wen

15:00-15:20

**BDS FOR RAILWAY TRAIN LOCALIZATION TEST AND EVALUATION USING 3D ENVIRONMENTAL CHARACTERISTICS**

W. Qiao, J. Wang, D. Lu, J. Liu, B. Cai, Beijing Jiaotong University, China

15:20-15:40

**LIO-SAM FOR VEHICLE LOCALIZATION USING FGO ARCHITECTURE**

L. Yue, D. Lu, B. Cai, J. Wang, J. Liu, W. Jiang, Beijing Jiaotong University, China

16:00-16:20

**FAULT ANALYSIS AND OPTIMIZATION DESIGN OF ELECTRONIC IGNITION SYSTEM FOR FUEL POWERED VEHICLES**

D.Wang, China Faw Group CO., LTD, China ; Yi. We, Ji. Hu, Beijing Jiaotong University, China; X.Zhu, Hongji Han, W. Liu, China Faw Group CO., LTD, China

16:20-16:40

**DESIGN AND TESTING OF A SPECIALIZED ANTENNA ARRAY FOR GNSS RECEIVER ANTI-INTERFERENCE ENHANCEMENT**

W. Wang, Y. Wen, Y. Liu, Beijing Jiaotong University, China

16:40-17:00

**RESEARCH ON THE INFLUENCE OF INTERNAL PARAMETERS OF SIC MOSFET ON EMI OF TRACTION INVERTER**

J.N. Cui, Y.H. Wen, Beijing Jiaotong University, China ; X.M. Liu, Changchun Railway Vehicle Co., Ltd, China ; D. Zhang, J. Ren, Beijing Jiaotong University, China

17:00-17:20

**RESEARCH ON ELECTROMAGNETIC COMPATIBILITY OF WIRELESS TRANSMISSION IN HIGH- SPEED RAILWAY TRAIN CONTROL SYSTEM BASED ON KNOWLEDGE GRAPH**

X. Geng, P. Dong, F.P. Kong, China Railway Information Technology Group Co., Ltd, China ; K. Xiong, Beijing Jiaotong University, China

17:20-17:40

**RESEARCH ON ELECTROMAGNETIC COMPATIBILITY OF MAGLEV TRAIN ON HIGH-SPEED MAGLEV DEMONSTRATION LINE**

S. Xiao, Z.Q. Zhang, CRRCC Qingdao Sifang Co., Ltd., China ; T. Zan Su, J.B. Zhang, X. Jia, Beijing Jiaotong University, China

17:40-18:00

**AN INNOVATIVE COMBINED TRAIN SPEED MEASUREMENT METHOD FOR MEDIUM-LOW SPEED MAGLEV TRAINS**

H. Susu, China Academy of Railway Science Co. Ltd, China

Thursday, September 5 - H 08:00/10:00 - room Roma II

**session 39**

**ICEAA/IEEE APWC**

**Antennas for RF passive sensors**

Organized by P. Pinho

Chair: P. Pinho

08:00-08:20

**ULTRA-WIDEBAND VIVALDI ANTENNA FOR THROUGH-WALL-RADAR APPLICATIONS**

M. Amador, A. Rouco, D. Albuquerque, P. Pinho, Universidade de Aveiro, Portugal

08:20-08:40

**MULTILAYER K-BAND 4x4 PLANAR ARRAY FOR SATELLITE COMMUNICATIONS**

A. Ramos, T. Varum, J. N. Matos, Instituto de Telecomunicações, Universidade de Aveiro, Portugal

08:40-09:00

**MEASUREMENT SETUP OF A KA BAND SWITCHABLE CIRCULARLY POLARIZED PHASED ARRAY MODULE FOR LEO SATELLITE COMMUNICATIONS SYSTEMS**

A. Ramos, T. Varum, J. N. Matos, Instituto de Telecomunicações, Universidade de Aveiro, Portugal

09:00-09:20

**MM-WAVE NEAR-FIELD FOCUSED ANTENNA ARRAY FOR CHIPLESS RFID DETECTION**

S. Rodini, S. Genovesi, G. Manara, F. Costa, University of Pisa, Italy

09:20-09:40

**DUAL-PORT FOLDED DIPOLE ANTENNA FOR HARMONIC RFID OVER METALLIC SURFACES**

V.U. Oliveira, N.B. Carvalho, Instituto de Telecomunicações, Portugal

09:40-10:00

**PIN-DIODE CONTROLLED SLOT-FED MED ANTENNA FOR 5G SUB-6 GHZ APPLICATIONS**

K. Kaboutari, Universidade de Aveiro, Portugal; A. Siahcheshm, Islamic Azad University, Iran; M. Shokri, Zh. Amiri, Urmia University, Iran; A. Abraray, P. Pinho, Universidade de Aveiro, Portugal; Ch. Ghobadi; J. Nourinia, Urmia University, Iran,; S. Maslovski, Universidade de Aveiro, Portugal

## session 40

IEEE APWC

## Antennas and arrays

Chairs: P. Pinho, J. Zaid

10:20-10:40

**CONSTELLATION WITH OPTIMAL LEO SPACING FOR SATELLITE-TO-MOBILE DOWNLINK COMMUNICATION**

R.I. Fernandez, Y. Ma, R. Tafazolli, University of Surrey, United Kingdom

10:40-11:00

**X BAND ANTENNAS FOR NASA'S INTERSTELLAR MAPPING AND ACCELERATION PROBES (IMAP) MISSION**

A. Sharma, The Johns Hopkins University Applied Physics Laboratory, United States

11:00-11:20

**COUPLING REDUCTION IN TWO BY TWO MIMO VIVALDI ANTENNAS FOR FULL DUPLEX APPLICATIONS**

J. Zaid, Huawei Technologies, Canada; J. Griffiths, Huawei Technologies, Canada

11:20-11:40

**FULL-WAVE EM SIMULATION ANALYSIS OF HUMAN BODY BLOCKAGE BY DENSE 2D ANTENNA ARRAYS**

F. Fieramosca, Politecnico di Milano, Italy; V. Rampa, CNR - Consiglio Nazionale delle Ricerche, Italy; M. D'Amico, Politecnico di Milano, Italy; S. Savazzi, CNR - Centro Nazionale delle Ricerche, Italy

11:40-12:00

**EFFICIENCY OPTIMIZATION FOR ELECTRICALLY SMALL ANTENNAS**

L. Persano, M. Jadid, C. Delaveaud, T.P. Vuong, Univ. of Grenoble Alpes, France

12:00-12:20

**A SIMULATION STUDY OF SPECIFIC ABSORPTION RATE WITH TWISTED LOOP ANTENNAS**

W. Fu, M. Wikner, H. Lindohf, S. Clendinning, S. He, KTH Royal Institute of Technology, Sweden

13:40-14:00

**INTEGRATED ANTENNA DESIGN FOR AUTONOMOUS TRAIN CONTROL SYSTEM**

D.-J. Lee, I. Byun, R.-G. Jeong, Korea Railroad Research Institute, Korea

14:00-14:20

**CIRCULARLY POLARIZED COMPACT ANTENNA DESIGN WITH OAM STRUCTURED WAVE BEAM RECOVERY USING PYRAMIDAL HORN REFLECTOR**

T. A. C. Barros, Federal University of Campina Grande, Brazil; G. Fontgalland, University of Mount Union, United States; F. L. Teixeira, Ohio State University, United States; P. H. F. Silva, Federal Institute of Paraiba, Brazil; E. E. C. Oliveira, State University of Paraiba, Brazil

## session 41

ICEAA

## Recent advancement of electromagnetic theory

Organized by H. Shirai

Chair: H. Shirai

14:20-14:40

**A STUDY ON LATERAL WAVE FOR EDGE DIFFRACTION OF ELECTROMAGNETIC WAVE BY DIELECTRIC WEDGES**

D. M.h Nguyen, H. Shirai, Chuo University, Japan

14:40-15:00

**EXPERIMENTAL VALIDATION OF AN EM SCATTERING FORMULATION FOR BUILDINGS WITH MULTIPLE WINDOWS**

C. M. Bui, H. Shirai, Chuo University, Japan

15:00-15:20

**METHOD FOR ESTIMATING SCATTERER INFORMATION FROM THE RESPONSE WAVEFORM OF A BACKWARD TRANSIENT SCATTERED FIELD WHEN A LINE SOURCE AND AN OBSERVATION POINT ARE AT DIFFERENT POSITIONS**

K. Goto, T. Kawano, T. Toribe, National Defense Academy of Japan, Japan

15:20-15:40

**METHOD FOR ESTIMATING SCATTERER INFORMATION FROM THE RESPONSE WAVEFORM OF A BACKWARD TRANSIENT SCATTERED FIELD WHEN A LINE SOURCE AND AN OBSERVATION POINT ARE AT SAME POSITION**

K. Goto, T. Kawano, T. Kulphan, National Defense Academy of Japan, Japan

16:00-16:20

**STUDY ON IMPROVEMENT OF THE FAST INVERSE LAPLACE TRANSFORM FOR TRANSIENT ANALYSES**

K. Watanabe, Fukuoka Institute of Technology, Japan

16:20-16:40

**EVALUATION METHOD FOR WHOLE-BODY EXPOSURE FROM 5G BASE STATIONS USING SUPERPOSITION**

Y. Kushiya, T. Nagaoka, National Institute of Information and Communications Technology, Japan

16:40-17:00

**T-METHOD TIME-DOMAIN ANALYSIS OF EDDY CURRENTS ON BELLOWS DUCT OF BOOSTER SYNCHROTRON IN SYNCHROTRON RADIATION FACILITY**

H. Kawaguchi, Muroran Institute of Technology, Japan; M. Katoh, Hiroshima University, Japan

17:00-17:20

**POLARIMETRIC SCATTERING ESTIMATION OF URBAN BUILDINGS BY USING POLSAR DATA**

H. Yamada, C. Kobayashi, R. Sato, Niigata University, Japan

17:20-17:40

**POLARIMETRIC FEATURE INVESTIGATION OF SCATTERING FROM MANMADE STRUCTURES FOR IMPROVING CHANGE DETECTION OF FLOOD-AFFECTED URBAN AREA**

R. Sato, M. Watabe, H. Yamada, Y. Yamaguchi, Niigata University, Japan

17:40-18:00

**NON-LINE-OF-SIGHT IMAGING BY LINEARIZED INVERSE SCATTERING METHOD BASED ON PHYSICAL OPTICS**

H. Suenobu, T. Nakanishi, Y. Nishioka, Y. Inasawa, Mitsubishi Electric Corporation, Japan; S.Kidera, The University of Electro-Communications, Japan

Thursday, September 5 - H 08:00/11:40 - room Bruxelles

**session 42**

ICEAA

**Radio telescopes and radio astronomy systems**

Organized by D. de Villiers; E. de Lera Acedo; R. Lehmensiek

Chairs: D. de Villiers, E. de Lera Acedo, R. Lehmensiek

08:00-08:20

**DESIGN AND MEASUREMENTS OF A PROTOTYPE QUADRUPLE-RIDGED FLARED HORN FOR THE NGVLA RADIO TELESCOPE**

R. Lehemensiek, NRAO, United States; D. de Villiers, Stellenbosch University, South Africa

08:20-08:40

**MULTI-MODAL MEASUREMENT OF WAVEGUIDE ORTHOMODE TRANSDUCERS FOR QUAD-RIDGE HORN-FEEDS**

J.M. Kotze, W. Steyn, P. Meyer, Stellenbosch University, South Africa

08:40-09:00

**TOWARDS PRACTICAL IMPLEMENTATION OF TRI-RIDGED ORTHOMODE TRANSDUCERS**

A. Lötter, D.I.L. de Villiers, Stellenboch University, South Africa

09:00-09:20

**18-32.3 GHZ CRYOGENIC FRONT-END FOR 40 M YEBES RADIOTELESCOPE**

F. Tercero, O. García-Pérez, Observatorio de Yebes, Spain; G. Gómez-Molina, Observatorio de Yebes, Spain; R. Sanchez-Montero, University of Alcalá, Spain

09:20-09:40

**A HYBRID CAVITY-PLANAR P-BAND ILLUMINATOR FOR PRIMARY FOCUS REFLECTOR ANTENNA**

P. Bolli, INAF - Arcetri Astrophysical Observatory, Italy; L. Mezzadrelli, Sirio Antenne, Italy; G. Kyriakou, INAF - Arcetri Astrophysical Observatory, Italy; F. Perini, INAF - Institute of Radio Astronomy, Italy

09:40-10:00

**ON THE FEASIBILITY OF A GENERIC PHASED ARRAY FEED FOR THE EUROPEAN VLBI NETWORK**

S. Aslam, The Netherlands Institute for Radio Astronomy (ASTRON), Netherlands; O. Talcoth, L. Manholm, S. Agneessens, Ericsson AB, Sweden; U. Johannsen, Eindhoven University of

Technology (TU/e), Netherlands; D.S. Prinsloo, The Netherlands Institute for Radio Astronomy (ASTRON), Netherlands

10:20-10:40

**A CONNECTED VIVALDI APERTURE ARRAY OUTRIGGER STATION FOR THE BINGO RADIOTELESCOPE**

P. Motta, Universidade de São Paulo, Brazil; D. S. Prinsloo, R. Witvers, M. Arts, ASTRON, Netherlands Institute for Radio Astronomy, Netherlands; F. Abdalla, University College London, United Kingdom; E. Abdalla, A. Pereira de Sousa, Universidade de São Paulo, Brazil; S. Barth, B. da Silva, S. Rakotozafy, S. Bosse, B. Censier, J. M. Martin, Observatoire Radioastronomique de Nancay, France

10:40-11:00

**MULTI-BAND RADIO ASTRONOMY RECEIVERS: A CONCEPT EXPLORATION**

T. Stander, University of Pretoria, South Africa; A. de Witt, South African Radio Astronomy Observatory, South Africa; D.I.L. de Villiers, Stellenbosch University, South Africa; S. Malan, South African Radio Astronomy Observatory, South Africa; I. Jinzeng, National Astronomical Observatories of China, China ; S.E. Kurtz, National Autonomous University of Mexico, Mexico

11:00-11:20

**ANTENNA GAIN PATTERN BLINDNESS DUE TO MUTUAL COUPLING IN BROADBAND ARRAYS**

J. Cumner, D. Anstey, Q. Gueuning, O. O'Hara, E. de Lera Acedo, University of Cambridge, United Kingdom; A. Brown, Queen Mary, University of London, United Kingdom; A. Faulkner, F. Dulwich, P. Scott, University of Cambridge, United Kingdom

11:20-11:40

**INVESTIGATING FREQUENCY DEPENDENCY IN CHARACTERISTIC BASIS FUNCTION PATTERN MODELLING WITH GEOMETRIC PERTURBATIONS**

C.M. Pieterse, M. Venter, D.I.L. de Villiers, Stellenbosch University, South Africa

Thursday, September 5 - H 11:40/14:40 - room Bruxelles

**session 43**

ICEAA

**Integral equation and hybrid methods**

Chairs: F. Andriulli, I. Fenni

11:40-12:00

**GRADIENT-INFORMED WEIGHTED SUM MULTI-OBJECTIVE TOPOLOGY OPTIMIZATION IN ELECTROMAGNETICS**

F. Lucchini, R. Torchio, P. Alotto, Università degli Studi di Padova, Italy

12:00-12:20

**USE OF 2ND ORDER RAO-WILTON-GLISSON BASIS FUNCTIONS TO MODEL SCATTERING BY STRONGLY NONLINEAR SURFACES**

J. Prakash, K. Cools, Ghent University, Belgium

13:40-14:00

**COMPARING MOM-CBFM AND DDA APPROACHES IN SOLVING EM SCATTERING OF REALISTIC SOLID HYDROMETEORS AT SUBMILLIMETER WAVELENGTHS**

I. Fenni, JIFRESSE UCLA, United States; K.S. Kuo, University of Maryland, United States; H. Roussel, Sorbonne Universités, France

14:00-14:20

**ADAPTIVE SPATIAL RESOLUTION FOR SPATIAL SPECTRAL INTEGRAL EQUATIONS**

R.Dilz, Eindhoven University of Technology, Netherlands

14:20-14:40

**ON COMPUTATION OF GREEN'S FUNCTION FOR 1-D PERIODIC STRUCTURES IN PLANAR LAYERED MEDIA**

M.E. Hatipoglu, Gebze Technical University, Turkey; A. Sanli, Softeal Ltd., Turkey; A. Alparslan, Trakya University, Turkey; F. Dikmen, Y.A. Tuchkin, Gebze Technical University - Emeritus, Turkey

Thursday, September 5 - H 14:40/18:00 - room Bruxelles

**session 44**

ICEAA

**Fast and efficient solvers and stable discretizations**

Organized by F. Andriulli

Chair: F. Andriulli

14:40-15:00

**EFFICIENT SOLUTIONS OF TIME-DOMAIN VOLUME INTEGRAL EQUATIONS BASED ON MESHLESS DISCRETIZATION**

S.Y. Li, M. S. Tong, Tongji University, China

15:00-15:20

**ON A NOVEL CALDERÓN PRECONDITIONING STRATEGY BASED ON HIGH-ORDER QUASI-HELMHOLTZ PROJECTORS**

J. Bourhis, D. Franzò, Politecnico di Torino, Italy; A. Merlini, IMT Atlantique, France; F. P. Andriulli, Politecnico di Torino, Italy

15:20-15:40

**MONOSTATIC RCS IN A LARGE NUMBER OF DIRECTIONS: FEASIBILITY STUDY**

B. M. Kolundzija, University of Belgrade, Serbia

16:00-16:20

**PARALLEL FAST ITERATIVE H-MATRIX LOCALLY CORRECTED NYSTRÖM DISCRETIZATION OF INTEGRAL EQUATIONS WITH AN INACCURATE H-MATRIX PRECONDITIONER**

O. Babazadeh, University of Manitoba, Canada; J. Hu, University of Southern California, United States; E. Sever, Aselsan, Turkey; I. Jeffrey, University of Manitoba, Canada; C. Sideris, University of Southern California, United States; V.r Okhmatovski, University of Manitoba, Canada

16:20-16:40

**TOWARD THE DESIGN OF PRECONDITIONERS FOR THE GLOBAL MULTI-TRACE INTEGRAL EQUATION FOR THE VECTOR POTENTIAL**

P. Olyslager, H. Rogier, K. Cools, Ghent university, Belgium

16:40-17:00

**A TIME DOMAIN COMBINED FIELD INTEGRAL EQUATION FOR OPEN SCREENS**

P. Olyslager, H. Rogier, K. Cools, Ghent University, Belgium

17:00-17:20

**ORIGAMI BASIS FUNCTIONS FOR MODELING THE CURVATURE CORRECTION IN H-REFINEMENT METHODS VIA METHOD OF MOMENTS**

V.F. Martin, L. Landesa, University of Extremadura, Spain; J.A. Tobón, Politecnico di Torino, Italy; J.M. Taboada, University of Extremadura, Spain; F. Vípiana, Politecnico di Torino, Italy

17:20-17:40

**COMPARISON OF NESTED AND NON-NESTED DIRECT SOLVER PERFORMANCE FOR GENERALIZED SOURCE INTEGRAL EQUATIONS**

Y. Dahan, A. O. Maimon, Y. Brick, Ben-Gurion University of the Negev, Israel

17:40-18:00

**ON A NOVEL PIVOTING STRATEGY FOR THE NESTED CROSS APPROXIMATION**

J. M. Tetzner, S. B. Adrian, Universität Rostock, Germany

Thursday, September 5 - H 08:20/11:40 - room Milano I

**session 45**

ICEAA

**Electromagnetic models and geophysical products for signal of opportunity reflectometry**

Organized by J. Fayne; J. Campbell

Chairs: J. Fayne, J. Campbell

08:20-08:40

**INTERFEROMETRIC COHERENCE OF BISTATIC RADAR OBSERVATIONS AND SPATIAL RESOLUTION**

S. Yueh, X. Xu, T. Wang, M. Chaubell, California Institute of Technology, United States

08:40-09:00

**COHERENT REFLECTOMETRY FROM SPACE: SENSITIVITY TO SEA-SURFACE HEIGHT AND ATMOSPHERIC DISTURBANCE**

M. Semmling, Institute for Solar-Terrestrial Physics DLR-SO, Germany; W. Li, Institute for Space Studies Catalunya IEEC, ICE-CSIC, Spain; J. Wickert, German Research Centre for Geosciences GFZ, Germany; E. Cardellach, Institute for Space Studies Catalunya IEEC, ICE-CSIC, Spain; A. Dielacher, Beyond Gravity Austria BGA, Austria; H. Nahavandchi, Norwegian University of Science and Technology NTNU, Norway

09:00-09:20

**HYDROSWARM: TOWARDS FINE RESOLUTION 2D IMAGING OF SURFACE WATER WITH GNSS-R FLIGHT FORMATION**

E. Cardellach, Institute of Space Sciences (ICE-CSIC), Institute of Space Studies of Catalonia (IEEC), Spain; W. Hill, N. Bernardini, M. Unwin, Surrey Satellite Technology Ltd (SSTL), United Kingdom; C. Pirat, European Space Agency (ESA, ESTEC), Netherlands

09:20-09:40

**ESA SCOUT HYDROGNSS: A SATELLITE MISSION USING GNSS REFLECTIONS TO MONITOR HYDROLOGICAL CLIMATE VARIABLES**

M. Unwin, SSTL, United Kingdom; E. Cardellach, IEEC/ICE-CSIC, Spain; N. Pierdicca, Sapienza University of Rome, Italy; J.P. Lejault, ESA, Netherlands

09:40-10:00

**AN OVERVIEW OF CYGNSS'S LEVEL-3 STORM CENTRIC, MERGED WIND SPEED PRODUCT**

A. Warnock, SRI International, United States; C. Ruf, A. Russel, University of Michigan, United States; M. Al-Khaldi, The Ohio State University, United States; R. Balasubramaniam, University of Michigan, United States

10:20-10:40

**AN ANALYSIS OF COMMERCIAL LEVEL-2 GNSS-R DATA PRODUCTS FROM THE NASA CSDA ARCHIVE**

M. Al-Khaldi, J. Johnson, The Ohio State University, United States; D. McKague, D. Twigg, A. Russel, University of Michigan, United States

10:40-11:00

**ADVANCING HYDROLOGICAL INSIGHTS: DAILY SURFACE WATER DYNAMICS THROUGH CYGNSS DATA IN TROPICAL WETLANDS**

T. Pu, C. Gerlein-Safdi, University of California, Berkeley, United States

11:00-11:20

**QUANTIFYING UNCERTAINTY IN MACHINE LEARNING BASED SOIL MOISTURE RETRIEVAL FROM GNSS-R MEASUREMENTS**

G. Tsagkatakis, FORTH, Greece; A. Melebari, USC, United States; J. Campbell, USC, United States; E. Hodges, USC, United States; M. Moghaddam, USC, United States

11:20-11:40

**COMPARISON OF VEGETATION SCATTERING MODELS FOR GNSS-R**

J. D. Campbell, M. Moghaddam, University of Southern California, United States

Thursday, September 5 - H 13:40/17:00 - room Milao I

**session 46**

**ICEAA**

**Advanced architectures supporting radiationless anapole modes in electrodynamics and nanophotonics**

Organized by L. Matekovits; A. Basharin

Chair: L. Matekovits, A. Basharin

13:40-14:00

**TUNABLE BOUND STATES IN THE CONTINUUM IN TOROIDAL METASURFACES**

F. Kovalev, Australian National University, Australia; A. Miroshnichenko, University of New South Wales Canberra, Australia; A. Basharin, University of Eastern Finland, Finland; H. Toepfer, Technische Universität Ilmenau, Germany; I. Shadrivov, Australian National University, Australia

14:00-14:20

**CHIRAL REALM OF PHOTONIC BOUND STATES IN THE CONTINUUM (INVITED)**

M.V. Gorkunov, Shubnikov Institute of Crystallography, NRC "Kurchatov Institute", Russian Federation

14:20-14:40

**BROADBAND TRANSPARENCY OBSERVATION IN DIFFERENT TOPOLOGIES**

A. Ospanova, M. Cojocari, G. Matveev, M. Bukharin, University of Eastern Finland, L. Matekovits, Politecnico di Torino, Italy; A. Basharin, University of Eastern Finland

14:40-15:00

**NONRECIPROcity IN TOROIDAL ELECTRODYNAMICS**

N. Papisimakis, C. Mididoddi, N. I. Zheludev, University of Southampton, United Kingdom

15:00-15:20

**RESEARCH OF ANAPOLE MODES IN RING-SHAPED SUBWAVELENGTH PERIODIC STRUCTURES FABRICATED ON THIN FREE-STANDING METAL FILM**

S. R. Ayyagari, Center for Physical Sciences and Technology, Lithuania; A. Basharin, University of Eastern Finland, Finland; S. Indrišunias, D. Pashnev, V. Janonis, Center for Physical Sciences and Technology, Lithuania; P. Kuzhir, University of Eastern Finland, Finland; G. Ducournau, Université de Lille, France; I. Kašalynas, Center for Physical Sciences and Technology, Lithuania

15:20-15:40

**FREE-STANDING COMPOUND ANAPOLES**

A.A. Basharin, University of Eastern Finland, Finland

16:00-16:20

**ADVANCED ANAPOLE EFFECTS IN DIELECTRIC AND METALLIC METASURFACES**

I. Allayarov, Leibniz university Hannover, Germany; E. Hassan, Umeå University, Sweden; A.B. Evlyukhin, A. Calà Lesina, Leibniz University Hannover, Germany

16:20-16:40

**INVESTIGATION OF DIELECTRIC DEEP-GROOVE-GRATINGS AS A QUARTER WAVEPLATE IN THE TERAHERTZ RANGE**

S.Revanth Ayyagari, V. Janonis, FTMC, Lithuania; A. K Klein, University Duisburg-Essen, Germany; S. Indrišunias, D.Pashnev, D. Seliuta, FTMC, Lithuania; A. Stöhr, University Duisburg-Essen, Germany; I. Kašalynas, FTMC, Lithuania; G. Ducournau, Université de Lille, France

16:40-17:00

**HIGH Q-FACTOR DUAL-LAYER ANAPOLE METAMATERIAL**

M. Cojocari, G. Matveev, University of Eastern Finland, Finland; L. Matekovits, G. Dassano, Politecnico di Torino, Italy; P. Kuzhir, A. Basharin, University of Eastern Finland, Finland

## session 47

ICEAA

## Electromagnetic sensing and imaging technologies for health applications

Organized by L. Crocco; R. Cruz Conceição; F. Vipiana

Chairs: L. Crocco, R. Cruz Conceição

08:20-08:40

### BONE TISSUE REGENERATION MONITORING USING MAGNETIC SCAFFOLD VIA MICROWAVE IMAGING: A FEASIBILITY ASSESSMENT

S. Zappia, IREA-CNR, Italy; M.B. Lodi, Università di Cagliari, Italy; R. Palmeri, Università Mediterranea of Reggio Calabria, Italy; A. Fanti, Università di Cagliari, Italy; L. Crocco, R. Scapaticci, IREA-CNR, Italy

08:40-09:00

### STUDYING THE EFFECTS OF WATER CONTENT IN BREAST MICROWAVE IMAGING WITH A VOLUNTEER

D. M. Godinho, A. Simões, B. Mendes, G. Canastra, I. A. Correia, J. Saraiva, R. Dias, R. C. Conceição, Universidade de Lisboa, 1749-016 Lisbon, Portugal

09:00-09:20

### NUMERICAL ASSESSMENT OF A MICROWAVE IMAGING TECHNIQUE FOR PEDIATRIC STROKE DIAGNOSTICS

V. Schenone, A. Fedeli, University of Genoa, Italy; C. Parodi, IRCCS Istituto Giannina Gaslini, Italy; I. Bisio, A. Sciarrone, University of Genoa, Italy; A. Rossi, IRCCS Istituto Giannina Gaslini, Italy; F. Lavagetto, A. Randazzo, University of Genoa, Italy

09:20-09:40

### A BREAST MICROWAVE SENSING SYSTEM UTILIZING A FIXED ANTENNA ARRAY: SYSTEM DESIGN AND FEASIBILITY OF MATERIAL CHARACTERIZATION USING TRANSMISSION MEASUREMENTS

F. Eashour, S. Pistorius, University of Manitoba, Canada

09:40-10:00

### COMPARATIVE ASSESSMENT OF ELECTRO-MECHANICAL AND SOLID-STATE SWITCHING MATRICES FOR A PORTABLE MICROWAVE (PMWI) SCANNER IN BRAIN IMAGING APPLICATIONS

M. Gugliermi, D. O. Rodriguez-Duarte, S. Garino, S. Corallo, C. Origlia, J. A. Tobon Vasquez, Politecnico di Torino, Italy; R. Scapaticci, L. Crocco, National Research Council, CNR, Naples, Italy; F. Vipiana, Politecnico di Torino, Italy

## session 48

ICEAA

## Electromagnetic applications to biomedicine

Chairs: L. Crocco, R. Cruz Conceição

10:20-10:40

### ESTIMATION OF WHOLE-BODY AVERAGED SARS IN COMPUTATIONAL HUMAN MODELS FOR PLANE WAVE EXPOSURE AT FREQUENCIES FROM 10 GHZ TO 60 GHZ

T. Nagaoka, National Institute of Information and Communications Technology, Japan

10:40-11:00

### BIOMEDICAL IMAGING AND IMPRESSIONING USING LOW-FREQUENCY ELECTROMAGNETIC ENERGY

O. Ramahi, H. Akbari-Chelaresi, M. Hernandez, G. Tashtarian, University of Waterloo, Canada

11:00-11:20

### GRADIOMETER-BASED ASSESSMENT OF MAGNETIC NANOPARTICLES QUANTIFICATION

G. Barbieri, J. Arbustini, L.I.A. Acharán, A. Bahr, M. Gerken, CAU University, Germany

11:20-11:40

### IN-BODY AND ON-BODY ANTENNAS FOR THE ISM 2.45 GHZ BAND

P.T. Pinho, Universidade de Aveiro, Portugal; C. Mendes, A. Ribeiro, Instituto Superior de Engenharia de Lisboa, Portugal

11:40-12:00

### CONFORMAL ELECTROMAGNETIC SKIN BASED ON FLEXIBLE MATERIALS

R. Rizzo, IETR - University of Rennes, France; G. Ruello, R. Massa, University of Napoli Federico II, Italy; M. Zhadobov, G. Sacco, IETR - CNRS, France

12:00-12:20

### PRELIMINARY STUDY OF SPINAL FIXATION SYSTEM EFFECT ON NEURAL ACTIVATION DURING SPINAL CORD STIMULATION

L. Yang, X. Yang, J. Zheng, J. Chen, University of Houston, United States

13:40-14:00

### ANISOTROPIC 3D PRINTED UNIT CELLS FOR MORE REALISTIC EEG PHYSICAL HEAD PHANTOMS

P. Kadera, J. Lacik, Brno University of Technology, Czech Republic

14:00-14:20

### DESIGN AND MODELING OF MAGNETOELECTRIC MICRO-PARTICLES FOR NEUROMODULATION

R.P. Narayanan, Walton Institute for Information and Communication Systems Science, Ireland; A. Khaleghi, Norwegian University of Science and Technology, Norway

14:20-14:40

### A COMPARISON OF ECG AND FMCW RADAR HEART BEAT MEASUREMENTS BASED ON AN ENVELOPE ANALYSIS

A. Marnach, L. Dirksmeyer, V. Lücken, Hochschule Trier, Germany; A.R. Diewald, Hochschule Trier, Germany



Thursday, September 5 - H 14:40/18:00 - room Milao II

**session 49**

**IEEE APWC**

**Multi - band and UWB antennas and systems**

Chairs: B. Büyükkakin, T.Y. Lin

14:40-15:00

**PERFORMANCE IMPROVEMENT OF 5G METASURFACE ANTENNAS**

T. Islam, North Carolina A&T State University, United States; A. Eroglu, University of Massachusetts Boston, United States

15:00-15:20

**A BROADBAND HIGH-GAIN D-BAND DIELECTRIC RESONATOR ANTENNA WITH SUBSTRATE-INTEGRATED WAVEGUIDE EDGED SLOT FEED IN GAAS IPD**

T.Y. Lin, S.G. Lin, Y.C. Chang, C.P. Hsieh, D.C. Chang, Taiwan Semiconductor Research Institute, Taiwan

15:20-15:40

**DESIGN OF DUAL BAND K AND KA CORRUGATED HORN ANTENNA FOR SATELLITE COMMUNICATION APPLICATIONS**

B. Büyükkakin, Yeditepe University, Turkey; I. Sisman, Profen Communication Technologies, Turkey; T. Haykir Ergin, Yeditepe University, Turkey

16:00-16:20

**DEVELOPMENT OF A TAPERED CPW-FED SPLINE-BASED PLANAR MONOPOLE ANTENNA WITH ULTRA-WIDEBAND CHARACTERISTICS**

D. P. Setiawan, Telkom University, Indonesia; A. Munir, Institut Teknologi Bandung, Indonesia

16:20-16:40

**LOW-PROFILE MULTIBAND FILTERING PATCH ANTENNA**

Xi. Lin, J. Huang, H. Liu, C. Zhou, Dalian University of Technology, China

16:40-17:00

**A MULTI-BAND SLOT-COUPLED RECTANGULAR DIELECTRIC RESONATOR ANTENNA USING E-COUPPLING TECHNIQUE**

Z. Shou, Z. Wu, University of Manchester, United Kingdom; H. Wang, H. Zhou, M. Hou, Huawei Technologies (China) Co., Ltd., China

17:00-17:20

**UWB SLOT BOW-TIE ANTENNA FOR FMCW GPR APPLICATIONS**

L. Matsepe, W. Steyn, L. Grootboom, Stellenbosch University, South Africa

17:20-17:40

**A DUAL-BAND WIDEBAND ANTENNA ON THIN POLYIMIDE FILM WITH RECTANGULAR SLOT-LOADED DGS**

M.F. M. Omar, S.K. A. Rahim, M.F. Ain, Universiti Sains Malaysia, Malaysia; A. A. Manaf, Collaborative Microelectronic Design Excellence Center (CEDEC), Malaysia; E.H. Lim, Universiti Tunku Abdul Rahman, Malaysia

17:40-18:00

**AN UWB ANTENNA WITH TOTAL AND SHARP REJECTION OF WIMAX BAND USING METAMATERIAL CELLS**

K. Fertas, F. Fertaas, UMBB, Algeria; S. Tebache, ENP, Algeria

# FRIDAY 6

Friday, September 6 - H 9:00/12:00 - room Milao I

**Short course**

**Time Domain Simulation of Electromagnetic Problems Combined with Linear and Nonlinear Circuit Elements**

Prof. Atef Z. Elsherbeni

Electrical Engineering Department at Colorado School of Mines - USA

## list of reviewers

G. Addamo, Italy  
W.E. Amatucci, USA  
F. Andriulli, Italy  
C. Baer, Germany  
A. Boag, Israel  
G. Bonmassar, USA  
A. Bosisio, Italy  
M. Botha, South Africa  
J. Campbell, USA  
S. Campbell, USA  
A.E. Cetin, USA  
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F. Costa, Italy  
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L. Crocco, Italy  
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