



ICEAA 16
IEEE APWC 16

SEPTEMBER 19-23 2016
CAIRNS AUSTRALIA



ICEAA 16

International Conference on
**ELECTROMAGNETICS IN
ADVANCED APPLICATIONS**

IEEE APWC 16

IEEE-APS Topical Conference on
**ANTENNAS AND PROPAGATION
IN WIRELESS COMMUNICATIONS**

SEPTEMBER 19-23 2016
CAIRNS AUSTRALIA

ICEAA 16

IEEE APWC 16

Organized by

Politecnico di Torino

Macquarie University

In cooperation with

IEEE Antennas and Propagation Society

URSI, the International Union of Radio Science

Sponsored by

IEEE Antennas and Propagation Society

Macquarie University

Politecnico di Torino

International Union of Radio Science (URSI)

**Istituto Superiore Mario Boella sulle Tecnologie
dell'Informazione e delle Telecomunicazioni**

Administrative support services

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FINAL PROGRAM

ICEAA - IEEE APWC COMMITTEES

STEERING COMMITTEE

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Paul D. Smith,	Macquarie University, Australia
Riccardo Tascone,	Head of CNR-IEIT, Italy
Piergiorgio L.E. Uslenghi,	University of Illinois at Chicago, USA

ORGANIZING COMMITTEE

Chairman of ICEAA - IEEE APWC Organizing Committee:
Roberto D. Graglia, Politecnico di Torino, Italy

Chairman of ICEAA - IEEE APWC 2016

Local Organizing Committee:

Paul D. Smith, Macquarie University, Australia

Technical Program Chair:

Piergiorgio L.E. Uslenghi, University of Illinois at Chicago, USA

Publication Chair and Proceedings production:

Guido Lombardi, Politecnico di Torino, Italy

IEEE-APS representative:

Trevor S. Bird, Macquarie University, Australia

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Piergiorgio L.E. Uslenghi, University of Illinois at Chicago, USA

Webmaster and Proceedings production:

Guido Lombardi, Politecnico di Torino, Italy

Industry exhibits and sponsorship:
Penny Sandercock, ICMS Australasia

Secretariat/Treasurer/administration:
Penny Sandercock, ICMS Australasia

Members:

Guido Lombardi, Politecnico di Torino, Italy
Ladislau Matekovits, Politecnico di Torino, Italy
Paolo Petrini, Politecnico di Torino, Italy
Amin Abbosh, University of Queensland, Australia
Karu Esselle, Macquarie University, Australia
Christophe Fumeaux, University of Adelaide, Australia
Jay Guo, University of Technology Sydney, Australia
Christine Hale, Macquarie University, Australia
Stuart Hay, CSIRO, Australia
Ananda Mohan Sanagavarapu, University of Technology Sydney, Australia
David Thiel, Griffiths University Queensland, Australia
Scott Tyo, UNSW Canberra, Australia
Elena Vynogradova, Macquarie University, Australia

SCIENTIFIC COMMITTEE

P. L. E. Uslenghi , USA, Chair;	H. Nakano , Japan;
S. Benedetto , Italy;	A.J. Parfitt , Australia;
T. S. Bird , Australia;	A.F. Peterson , USA;
M.M. Botha , South Africa;	C. Pichot , France;
F. G. Canavero , Italy;	H. C. Reader , South Africa;
M. F. C�tedra , Spain;	P. Russer , Germany;
W. C. Chew , USA;	M. Salazar-Palma , Spain;
D. B. Davidson , South Africa;	T.K. Sarkar , USA;
D. Erricolo , USA;	M. S. Sharawi , Saudi Arabia;
K. Esselle , Australia;	P.D. Smith , Australia;
R. D. Graglia , Italy;	R. Tascone , Italy;
L. G�rel , Turkey;	J.F. Vega Stavro , Colombia;
E. Heyman , Israel;	Y. Wen , China;
G. Lazzi , USA;	W. Wiesbeck , Germany;
M. A. Lyalinov , Russia;	D. R. Wilton , USA.

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 eighteenth edition of ICEAA, and to the sixth 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 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 Cognitive Radio to Electromagnetic Compatibility and Intentional Electromagnetic Interference; from Antennas, Propagation, and Components Technologies to Radar Cross Section and Asymptotic Techniques; from Electromagnetic Applications to Biomedicine to Computational Electromagnetics; from Wireless Communications to Metamaterials.

Altogether the two conferences feature 38 sessions including 19 special sessions organized by renowned experts. The ICEAA 2016 Conference program consists of 27 sessions and includes 16 Special Sessions; the IEEE APWC 2016 Conference program consists of 11 sessions, including 3 Special Sessions. About 270 papers are scheduled, out of the 527 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 thank the Chair of the Scientific Committee (Prof. George Uslenghi) and reviewers for their contribution to the review of papers accepted for inclusion in the Conferences.

On Wednesday morning, September 21, a free half-day Short Course entitled “The physics and mathematics of the signal propagation mechanism in cellular wireless communication systems” will be given by Prof. T.K. Sarkar of Syracuse University, Syracuse, New York, USA. Two other full-day Short Courses will be held on Friday, September 23: one on “High-power electromagnetics” by Dr. D. V. Giri of the University of New Mexico, USA, and the other entitled “Introduction to aperture antennas and arrays” by Prof. T. S. Bird of Antengenuity / Macquarie University, Sydney, Australia.

The Conferences are organized by the Politecnico di Torino and by the Macquarie University. The Politecnico di Torino, a State University founded in 1859, is one of the major technical universities in Italy. Since its foundation in 1964, Macquarie has risen to be a progressive and influential institution in the sciences and engineering, both in Australia and internationally.

The Conferences are held at the “Cairns Convention Centre” Cnr Sheridan St & Wharf St, Cairns, Queensland, Australia. The award winning Cairns Convention Centre is only ten minutes from the Cairns International Airport which is Australia’s gateway to the Asia Pacific. The Centre is renowned for its unique environmental design and is the entry to the Great Barrier Reef and ancient tropical rainforests. Don’t miss the opportunity to visit the many interesting places in Cairns and its surroundings: we are sure you will enjoy them.

We look forward to seeing you in Cairns in September.

Roberto D. Graglia

Chairman of the ICEAA - IEEE APWC Organizing Committee

Paul D. Smith

Chairman of the ICEAA - IEEE APWC Local Organizing Committee

GENERAL INFORMATION

DATES AND LOCATION

The conferences will be held from 19th to 23rd of September 2016, at the “Cairns Convention Centre” Cnr Sheridan St & Wharf St, Cairns, Queensland, Australia (see map).

OFFICIAL LANGUAGE

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

PROCEEDINGS

At the registration, each participant will receive a copy of the Conference Proceedings.

ON SITE REGISTRATION FEE

The ICEAA and the IEEE APWC conference share a common organization, registration fee, submission site, workshops and short courses, and social events.

On site registration fees are:

IEEE members: 950.00 AUD

Non-IEEE members: 1,050.00 AUD

Full registration is required of all participants, including members of the Conference Committees, Session Chairs and Authors.

The registration fee includes attendance to all sessions, morning tea and afternoon tea daily, Welcome Reception, Conference Banquet, and participants’ briefcase containing the Conference Proceedings and other material.

REGISTRATION DESK

A registration desk will be located in the Foyer of the Convention Centre. Late registrants may register, or pre-registrants may pick up conference materials, at the following times:

Monday 19 September:	7.30am – 6.00pm
Tuesday 20 September:	7.00am – 5.30pm
Wednesday 21 September:	7.30am – 5.30pm
Thursday 22 September:	7.30am – 3.30pm
Friday 23 September:	7.30am – 12pm

MEALS AND REFRESHMENTS

Morning tea and afternoon tea are included in the registration fee. A café will be open at the Cairns Convention Centre for delegates to purchase food at lunch breaks, otherwise the Cairns Esplanade is home to a variety of stores, cafes and restaurants. See staff at the Registration Desk for directions during the Conference.

WELCOME RECEPTION AND BANQUET

A Welcome Reception will be offered to the participants on Monday night, at 5.30pm at the Cairns Convention Centre. Additional tickets for partners are available at 40AUD per person. A Banquet will be offered to the participants on Wednesday night, at 7pm at the Cairns Convention Centre. Additional tickets for partners are available at 95AUD per person. Additional tickets for both functions can be purchased from the Registration Desk.

The winner(s) of the 2016 ICEAA - IEEE APWC Best Student Paper Award will be announced at the Banquet.

PARKING

Undercover parking is available at the Cairns Convention Centre for 5AUD per entry. Entrance to the car park is via Sheridan Street.

AUDIOVISUAL EQUIPMENT

Each meeting room will be equipped with a notebook. Other equipment will be available only upon written request to the Organizing Committee, to be received before September 3. 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 should ensure that their presentations are loaded via the Speakers' Preparation Room at the Cairns Convention Centre at least 3 hours prior to their presentation. Any authors presenting first thing in the morning should go to the Speakers' Preparation Room the day before their presentation.

Presentations should be loaded in the Speakers' Preparation Room using a USB flash memory stick. It is requested that you do not use a U3-enabled flash memory stick (for example, most recent SanDisk brand memory sticks are U3 enabled). A technician will be available in the room to assist.

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.

INTERNET CONNECTION

The Cairns Convention Centre features WI-FI Internet access:
Network: ccc-convention - Password: cairns2016

MESSAGES

During the Conference, messages may be directed to participants via Email (info2016conference@iceaa-offshore.com) or by calling the Registration Desk at +61 7 4042 4300.

Messages will be posted next to the Registration Desk in the foyer of the Convention Centre.

TRANSPORTATION

The Cairns Convention Centre is within walking distance of the Conference hotels, as well as most other Cairns accommodation options. Taxis will be frequently available if required, otherwise bookings can be made by calling 13 10 08.

Cairns Airport is only 10 minutes by car from the city centre. As well as taxis, there is a shuttle service Airport Connect from the airport to the southbound side of Sheridan Street (for further information see <http://www.cairnsairport.com.au/airport-connect-shuttle/>)

WEATHER

In mid-September, the weather in Cairns is warm and sunny; temperatures will range from 18-30 degrees Celsius. Occasional showers are possible; therefore raincoats or umbrellas may be useful.

HOTEL ACCOMMODATIONS

A number of hotel rooms in different price categories have been booked for the duration of the Conference. Bookings can be made via the online registration form until 12 August, after which date bookings will need to be made direct with the hotel properties. It is advisable to make an early reservation because hotels are subject to availability.

TOURS & ACTIVITIES

For the latest information on the Accompanying Person Programme and other Social Events please check www.iceaa-offshore.org, or refer to the Conference registration desk.

USEFUL ADDRESSES

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)

Fax +39-011-090-4015/-4099

E-mail: iceaa16@iceaa.polito.it

For general enquiries or requests regarding the Conference:

Penny Sandercock, Event Manager

info2016conference@iceaa-offshore.org

For information regarding registration and/or accommodation:

Elis De Souza, Conference Services Coordinator

registration2016conference@iceaa-offshore.org

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

TECHNICAL EXHIBITION

A technical exhibition will be held on the Mezzanine Level at the Cairns Convention Centre. Exhibitors and others requiring further information on this matter should contact:

Emma Bowyer, Director of Sponsorships & Exhibitions
sponsorship2016conference@iceaa-offshore.org

During the Conference exhibitors and others requiring further information should contact staff at the Registration Desk.

ICEAA - IEEE APWC 2016 BEST STUDENT PAPER AWARD

The ICEAA - IEEE APWC has established the ICEAA - IEEE APWC Award to recognize the author(s) who present at the ICEAA - IEEE APWC joint conferences an exceptional paper in terms of content and impact on Electromagnetics. In selecting the awardees, other factors considered are originality, clarity and timeliness of the paper. There will be up to two awards. One award will be for the best paper submitted by a student at an Australian or New Zealand university in IEEE Region 10, and one for the best paper submitted by a student in any IEEE Region. The ICEAA Scientific Committee gratefully acknowledges the financial support of the IEEE Antennas and Propagation Society in sponsoring the awards in IEEE Region 10. The awards in other Regions are sponsored by ICEAA - IEEE APWC.

A certificate and a prize of 1000 AUD will be awarded to the student in each category who has authored the best paper. 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 ICEAA Scientific Committee reserves the right to make no award if there are no papers of sufficient quality.

The finalists for this Award must present their paper in a special poster session scheduled for Monday afternoon, September 19 2016, on the Mezzanine Level of the Cairns Convention Centre. The winners of the ICEAA - IEEE APWC 2016 Best Student Paper Award will be announced at the Conference Banquet on Wednesday evening, September 21, 2016. Since the award announcement and presentation are made at the Conference Banquet, all candidates are expected to attend it.

PLENARY LECTURES



RECONFIGURABLE OVER-THE-AIR CHAMBER FOR MULTI-ANTENNA WIRELESS DEVICE TESTING

Prof. Michael A. Jensen
Brigham Young University, USA

Abstract - Over-the-air (OTA) testing of wireless devices is designed to assess performance of a radio with its antenna system in realistic communication environments. This is particularly important for multi-antenna devices since the ability of the array to enhance communication performance depends critically on the angular structure of the electromagnetic propagation. OTA device testing in realistic but repeatable environments is typically performed using either an expensive multi-antenna anechoic chamber that provides a high level of multipath control or a low-cost mode-stirred reverberation chamber that offers limited multipath control. We introduce a reconfigurable OTA chamber that is excited by a small number of feed ports and whose walls consist of programmable inhomogeneous electromagnetic reflectors. Simulations and measurements on two different prototypes of this topology demonstrate that through control of the wall reflection coefficients and the port excitations, the chamber offers significant control over the achieved fading distribution, spatial correlation, and power angular spectrum at the device under test.

Biography - Michael Jensen received the B.S. and M.S. degrees in Electrical Engineering from Brigham Young University (BYU) in 1990 and 1991, respectively, and the Ph.D. in Electrical Engineering from the University of California, Los Angeles in 1994. Since 1994, he has been a member of the faculty at BYU where he is currently a Distinguished University Professor of Electrical and Computer Engineering and the Dean

of the College of Engineering and Technology. He has published over 250 articles and book chapters on the topics of antennas, propagation, and signal processing for wireless communication, with emphasis on multi-antenna communication systems. He has been recipient of the Best Student Paper Award at the IEEE Antennas and Propagation Society Symposium in 1993, the H. A. Wheeler Applications Prize Paper Award in the IEEE Transactions on Antennas and Propagation in 2002, and several outstanding faculty awards at Brigham Young University. He was elevated to the grade of IEEE Fellow in 2008. He is currently President of the IEEE Antennas and Propagation Society and has previously served as the Editor-in-Chief of the IEEE Transactions on Antennas and Propagation.



THE AUSTRALIAN SQUARE KILOMETER ARRAY PATHFINDER AND FUTURE DIRECTIONS IN SKA

Dr. Stuart G. Hay
CSIRO, Australia

Abstract - The Australian Square Kilometer Array Pathfinder (ASKAP) is a new telescope for radio astronomy being developed by CSIRO on a radio-quiet site in Western Australia. It features innovative phased array feeds (PAFs), combining wideband and tightly coupled antenna elements closely integrated with low-noise amplifiers and followed by extensive digital processing. This expands the instantaneous field-of-view of the telescope, allowing fast and sensitive surveys over the 0.7-1.8GHz range and providing opportunity for discovery of transient phenomena. Commencing in 2007, the project has been through a number of stages of technology development and has now reached a commissioning phase, where the benefits of the PAFs are being demonstrated. This talk will review ASKAP developments and discuss future directions in the international SKA project.

Biography - Stuart G. Hay received the B.E and Ph.D in Electrical Engineering from the University of Queensland in 1985 and 1994 respectively. From 1986 to 1989 and since

1994 he has been with Australia's CSIRO where he is currently a Principal Research Scientist. He has worked on various aspects of Electromagnetics and Antennas with publications on shaped reflectors, wide field-of-view multibeam and beam-scanning antennas and connected arrays. Stuart served as Associate Editor of the IEEE Transactions on Antennas and Propagation from 2008-2013. He was a guest Editor of a special issue of this journal, on Antennas for Next Generation Radio Telescopes. From 2009-2015 Stuart was Chair of the Technical Program Committee of the Australian Symposium on Antennas.

IEEE APS CHAPTER CHAIRS MEETING

On **Tuesday September 20, 2016** a meeting of all the IEEE APS Chapter Chairs with Dr. Trevor S. Bird, Past-President of the IEEE Antennas and Propagation Society, and Dr. Ajay K. Poddar, Chair of the IEEE APS Chapter Activities Committee, is scheduled in Meeting Room 4 - Mezzanine Level, from 12:05 to 13:30.

SHORT COURSES

THE PHYSICS AND MATHEMATICS OF THE SIGNAL PROPAGATION MECHANISM IN CELLULAR WIRELESS COMMUNICATION SYSTEMS

Prof. Tapan K. Sarkar of Syracuse University, Syracuse, NY, USA, will hold a half-day short course on the physics and mathematics of the signal propagation mechanism in cellular wireless communication systems, on Wednesday morning, September 21. The short course is free for the Conference registrants. Participants may register for this short course at the conference registration desk.

HIGH-POWER ELECTROMAGNETICS

Dr. D. V. Giri of the University of New Mexico, USA, will hold a full-day short course on high-power electromagnetics, on Friday, September 23. Participants may register for this short course at the conference registration desk.

INTRODUCTION TO APERTURE ANTENNAS & ARRAYS

Prof. Trevor S. Bird of the Macquarie University and Antengenuity, Sydney, Australia, will hold a full-day introductory short course on aperture antennas and radar, on Friday, September 23. Participants may register for this short course at the conference registration desk.

CONFERENCE SCHEDULE*

*PLEASE CHECK THE DETAILED PROGRAM IN THE FOLLOWING PAGES

MONDAY, SEPTEMBER 19, 2016

HALL A MEZZANINE LEVEL

9:00-9:30 FORMAL OPENING

9:30-10:10

PLENARY ADDRESS by IEEE AP-S President Michael A. Jensen

Brigham Young University, Provo, Utah, USA

RECONFIGURABLE OVER-THE-AIR CHAMBER FOR MULTI-ANTENNA WIRELESS DEVICE TESTING

10:40-11:20

PLENARY ADDRESS by Stuart G. Hay

CSIRO, Australia

THE AUSTRALIAN SQUARE KILOMETER ARRAY PATHFINDER

HALL A MEZZANINE LEVEL	ROOM 4 MEZZANINE LEVEL	ROOM 5 MEZZANINE LEVEL	ROOM 6 MEZZANINE LEVEL
11:20-15:00 Session 1 ICEAA Organized by H. Shirai RECENT ADVANCEMENT OF ELECTROMAGNETIC THEORY Chairs: K. Goto, H. Shirai	11:20-15:00 Session 3 ICEAA Organized by M.N. Georgieva-Grosse and G. N. Georgiev MODERN PROBLEMS OF MATHEMATICAL AND COMPUTATIONAL ELECTROMAGNETICS AND THEIR ADVANCED APPLICATIONS Chairs: M.N. Georgieva-Grosse, G. N. Georgiev	11:20-16:00 Session 5 IEEE APWC WIRELESS COMMUNICATIONS AND TECHNOLOGIES Chairs: P. Nepa, G. Virone	11:20-15:00 Session 7 IEEE APWC COMMUNICATION SATELLITE ANTENNAS Chairs: N. Misran, J. Zhou
15:40-17:00 Session 2 ICEAA Organized by J.-M. Jin and W. Yu ADVANCES IN COMPUTATIONAL ELECTROMAGNETICS Chairs: J.-M. Jin, W. Yu	15:40-17:20 Session 4 ICEAA Organized by M. Moghaddam and U. Khankhoje COMPUTATIONAL ADVANCES IN RADAR SCATTERING FROM ROUGH AND VEGETATED SURFACES Chairs: U. Khankhoje, M. Moghaddam	16:00-17:20 Session 6 IEEE APWC CHANNEL MODELING Chairs: P. Nepa, G. Virone	15:40-17:20 Session 8 ICEAA ELECTROMAGNETIC PROPERTIES OF MATERIALS Chairs: K. Esselle, S. Nordebo

FOYER MEZZANINE LEVEL

13:40 - 17:20

**POSTER SESSION FOR THE FINALISTS OF
THE ICEAA - IEEE APWC 2016 BEST STUDENT PAPER COMPETITION**

Coffee break 10:10-10:40 - Lunch break 12:20-13:40 - Coffee break 15:20-15:40

Welcome Reception at Cairns Convention Centre 17:30

TUESDAY, SEPTEMBER 20, 2016

ROOM 3 MEZZANINE LEVEL	ROOM 4 MEZZANINE LEVEL	ROOM 5 MEZZANINE LEVEL	ROOM 6 MEZZANINE LEVEL
<p>8:00-12:00</p> <p>Session 9 IEEE APWC ELECTROMAGNETIC PROPAGATION Chairs: B. Bellekens, S. D. Lynch</p>	<p>8:00-10:00</p> <p>Session 12 ICEAA Organized by E. Mokole ULTRAWIDEBAND THEORY, TECHNOLOGY, APPLICATIONS, AND SYSTEMS Chairs: D. Ghosh, E. Mokole</p>	<p>8:20-15:20</p> <p>Session 15 ICEAA Organized by D.B. Davidson, E. de Lera Acedo, P. Hall, and G. Virone ANTENNA SYSTEMS FOR RADIO ASTRONOMY Chairs: D.B. Davidson, E. de Lera Acedo, P. Hall, and G. Virone</p>	<p>8:00-10:00</p> <p>Session 17 ICEAA Organized by M. Gustafsson and L. Jonsson OPTIMIZATION AND OPTIMAL ANTENNAS Chairs: L. Jonsson, D. Sjöberg</p>
<p>13:40-16:20</p> <p>Session 10 ICEAA INVERSE SCATTERING AND REMOTE SENSING Chairs: S.J. Anderson, T. Fickenscher</p>	<p>10:20-12:00</p> <p>Session 13 IEEE APWC LOW-PROFILE WIDEBAND ANTENNAS Chairs: D. Ghosh, E. Mokole</p>	<p>15:40-17:20</p> <p>Session 16 ICEAA RADAR CROSS SECTION AND ASYMPTOTIC TECHNIQUES Chairs: D.V. Semenikhina, P.L.E. Uslenghi</p>	<p>10:20-17:20</p> <p>Session 18 IEEE APWC Organized by H. Nakano WIDEBAND/MULTIBAND ANTENNAS AND EMERGING ANTENNA TECHNOLOGIES I Chairs: T. Kawamo, H. Nakano</p>
<p>16:20-17:20</p> <p>Session 11 IEEE APWC RFID TECHNOLOGIES Chairs: S. Kharkovsky, P. Nepa</p>	<p>13:40-17:20</p> <p>Session 14 ICEAA ELECTROMAGNETIC MODELING OF DEVICES AND CIRCUITS Chairs: A.M. Abbosh, A. K. Poddar</p>		

MEETING ROOM 4 MEZZANINE LEVEL

12:05-13:30

IEEE CHAPTER CHAIRS MEETING

T.S. Bird, Past-President of the IEEE AP Society,
A. K. Poddar, Chair of the IEEE AP Society Chapter Activities Committee

Coffee break 10:00-10:20 - Lunch break 12:00-13:40 - Coffee break 15:20-15:40

WEDNESDAY, SEPTEMBER 21, 2016

ROOM 3 MEZZANINE LEVEL	ROOM 4 MEZZANINE LEVEL	ROOM 5 MEZZANINE LEVEL	ROOM 6 MEZZANINE LEVEL
<p>8:00-11:00</p> <p>Session 19 IEEE APWC Organized by H. Nakano WIDEBAND/MULTIBAND ANTENNAS AND EMERGING ANTENNA TECHNOLOGIES II Chairs: T. Kawamo, H. Nakano</p>	<p>8:00-11:00</p> <p>Session 22 ICEAA Organized by J.M. Arnold and P. Smith MATHEMATICAL ADVANCES IN ELECTROMAGNETICS Chairs: M.C. van Beurden, P. Smith</p>	<p>8:00-14:20</p> <p>Session 26 ICEAA Organized by R.D. Graglia, and D.R. Wilton COMPUTATIONAL ELECTROMAGNETICS Chairs: R.D. Graglia, D.R. Wilton</p>	<p>8:20-12:00</p> <p>Free Short Course on THE PHYSICS AND MATHEMATICS OF THE SIGNAL PROPAGATION MECHANISM IN CELLULAR WIRELESS COMMUNICATION SYSTEMS Lecturer: T.K. Sarkar</p>
<p>11:00-14:40</p> <p>Session 20 IEEE APWC ANTENNAS Chairs: C. Y. Chiu, C. Fumeaux</p>	<p>11:00-12:00</p> <p>Session 23 ICEAA FREQUENCY SELECTIVE SURFACES Chairs: S.-W. Qu, Z. Shen</p>	<p>14:20-15:20</p> <p>Session 27 ICEAA FINITE METHODS Chairs: R.D. Graglia, D.R. Wilton</p>	<p>13:20-14:40</p> <p>Session 29 ICEAA EMC Chairs: R.L. Gardner, D.V. Giri</p>
<p>14:40-17:00</p> <p>Session 21 IEEE APWC Organized by S. Hay ARRAY AND LENS ANTENNAS Chair: S. Hay</p>	<p>13:20-16:00</p> <p>Session 24 ICEAA Organized by Z. Shen NOVEL FREQUENCY-SELECTIVE STRUCTURES Chairs: S.-W. Qu, Z. Shen</p>	<p>15:40-17:20</p> <p>Session 28 ICEAA TECHNOLOGIES FOR MM AND SUB-MM WAVES Chairs: E. de Lera Acedo, Y. Yang</p>	<p>14:40-17:20</p> <p>Session 30 IEEE APWC MULTI-BAND AND UWB ANTENNAS AND SYSTEMS Chairs: S. Barbin, T. Bird</p>
	<p>16:00-17:20</p> <p>Session 25 ICEAA ELECTROMAGNETIC MEASUREMENTS Chairs: H.F. Alqadah, A. Sutinjo</p>		

Coffee break 10:00-10:20 - Lunch break 12:00-13:20 - Coffee break 15:20-15:40

Banquet at Cairns Convention Centre 19:00

THURSDAY, SEPTEMBER 22, 2016

ROOM 3 MEZZANINE LEVEL	ROOM 4 MEZZANINE LEVEL	ROOM 5 MEZZANINE LEVEL	ROOM 6 MEZZANINE LEVEL
<p>8:00-11:20</p> <p>Session 31 ICEAA</p> <p>Organized by J. Guo</p> <p>ANTENNAS FOR MOBILE COMMUNICATIONS</p> <p>Chair: J. Guo</p>	<p>8:40-12:00</p> <p>Session 33 ICEAA</p> <p>Organized by Y. Shestopalov</p> <p>INVERSE PROBLEMS AND NONLINEAR MEDIA</p> <p>Chairs: L. Angermann, Y. Shestopalov</p>	<p>8:00-14:20</p> <p>Session 35 ICEAA</p> <p>Organized by K. Ito</p> <p>ELECTROMAGNETICS FOR HEALTHCARE AND MEDICAL APPLICATIONS</p> <p>Chairs: K. Ito, S. Huang</p>	<p>8:00-10:00</p> <p>Session 36 ICEAA</p> <p>ELECTROMAGNETIC THEORY</p> <p>Chairs: T.K. Sarkar, M.C. van Beurden</p>
<p>11:20-15:40</p> <p>Session 32 ICEAA</p> <p>ANTENNAS AND ARRAYS</p> <p>Chairs: T. Bird, Y. Rahmat-Samii</p>	<p>13:20-15:40</p> <p>Session 34 ICEAA</p> <p>Organized by Y. Wen</p> <p>COMMUNICATION AND SIGNALING TECHNOLOGIES OF RAILWAY</p> <p>Chairs: B. Cai, Y. Wen</p>		<p>10:20-12:00</p> <p>Session 37 ICEAA</p> <p>Organized by D.V. Giri, F. Vega</p> <p>HIGH-POWER ELECTROMAGNETICS, SOURCES AND EFFECTS</p> <p>Chairs: D. Giri, F. Vega</p>
			<p>13:20-15:20</p> <p>Session 38 ICEAA</p> <p>Organized by K.P. Esselle, L. Matekovits</p> <p>ANTENNAS AND ELECTROMAGNETIC DEVICES INSPIRED BY ELECTROMAGNETIC BAND GAP</p> <p>Chairs: K.P. Esselle, T. Kikkawa</p>

Coffee break 10:00-10:20 - Lunch break 12:00-13:20

FRIDAY, SEPTEMBER 23, 2016

CONFERENCE ROOM 1 MEZZANINE LEVEL	CONFERENCE ROOM 2 MEZZANINE LEVEL
<p>8:00-17:20</p> <p>Short Course on</p> <p>HIGH-POWER ELECTROMAGNETICS</p> <p>Lecturer: D.V. Giri</p>	<p>9:20-16:00</p> <p>Short Course on</p> <p>INTRODUCTION TO APERTURE ANTENNAS AND ARRAYS</p> <p>Lecturer: T.S. Bird</p>

FINAL PROGRAM

MONDAY, SEPTEMBER 19, 2016, 11:20 - MEZZANINE LEVEL, HALL A

SESSION 01 - ICEAA

RECENT ADVANCEMENT OF ELECTROMAGNETIC THEORY

organized by H. Shirai

chair K. Goto, H. Shirai

11:20-11:40

SCATTERING OF A TE PLANE WAVE FROM A PERIODIC SURFACE BETWEEN DIFFERENT DIELECTRICS

A. Komiyama, Osaka Electro Communication University, Japan

11:40-12:00

NOVEL-CLOSED FORM SOLUTIONS FOR DESIGNING EXTENDED COMPOSITE RIGHT/LEFT HANDED TRANSMISSION LINES

H.B. Chu, H. Shirai, Chuo University, Japan

12:00-12:20

TRANSMISSION CHARACTERISTICS OF CRLH RECTANGULAR WAVEGUIDES CONSTRUCTED BY THE CUTOFF MODES OF TM AND TE WAVES

K. Uyama, S. Nishimura, H. Deguchi, M. Tsuji, Doshisha University, Japan

13:40-14:00

UNDERSTANDING OF PHYSICAL MECHANISM IN GA-DESIGNED UWB FILTER AND IMPROVEMENT OF PASSBAND CHARACTERISTICS BY THE SIMPLIFIED STRUCTURE

Y. Takeuchi, H. Deguchi, M. Tsuji, Doshisha University, Japan;

14:00-14:20

HIERARCHICAL GENERATION OF CHARACTERISTIC BASIS FUNCTIONS COMBINED WITH SINGULAR VALUE DECOMPOSITION

T. Tanaka, Y. Inasawa, Y. Nishioka, H. Miyashita, Mitsubishi Electric Corporation, Japan

14:20-14:40

FREQUENCY-DOMAIN UNIFORM ASYMPTOTIC SOLUTION FOR SCATTERED ELECTRIC FIELD BY A 2-D COATED CONDUCTING CYLINDER COVERED WITH A THIN LOSSY MEDIUM

K. Goto, K. Hagiwara, Y. Takeno, S. Tokumaru, L. Okada, National Defense Academy, Japan

14:40-15:00

FREQUENCY-DOMAIN ASYMPTOTIC SOLUTIONS FOR SCATTERED ELECTRIC FIELD BY A 2-D COATED CONDUCTING CYLINDER COVERED WITH A THICK DIELECTRIC MEDIUM

K. Hagiwara, K. Goto, S. Tokumaru, L. Okada, Y. Takeno, National Defense Academy, Japan

MONDAY, SEPTEMBER 19, 2016, 15:40 - MEZZANINE LEVEL, HALL A

SESSION 02 - ICEAA

ADVANCES IN COMPUTATIONAL ELECTROMAGNETICS

organized by J.-M. Jin and W. Yu

chair J.-M. Jin, W. Yu

15:40-16:00

HYBRID HIGH FREQUENCY MODELING OF COMPLEX ELECTROMAGNETIC PROBLEMS

C.F. Wang, C.Y. Kee, Z.-L. Liu, F.-G. Hu, National University of Singapore, Singapore

16:00-16:20

A MULTI-SOLVER FRAMEWORK FOR ELECTROMAGNETIC ANALYSIS

J. Guan, S. Yan, J.-M. Jin, University of Illinois, United States

16:20-16:40

VECTOR UNIT ACCELERATION TECHNIQUE FOR DGTD METHOD

L. Zhao, H. Chen, G. Chen, W. Yu, Jiangsu Normal University, China

16:40-17:00

EXPERIMENTAL VALIDATION OF ULTRA-THIN METALENSES FOR N-BEAM EMISSIONS BASED ON TRANSFORMATION OPTICS

Y. Yuan, K. Zhang, X. Ding, Q. Wu, Harbin Institute of Technology, China

MONDAY, SEPTEMBER 19, 2016, 11:20 - MEZZANINE LEVEL, ROOM 4

SESSION 03 - ICEAA

MODERN PROBLEMS OF MATHEMATICAL AND COMPUTATIONAL ELECTROMAGNETICS AND THEIR ADVANCED APPLICATIONS

organized by G.N. Georgiev and M.N. Georgieva-Grosse

chair G.N. Georgiev, M.N. Georgieva-Grosse

11:20-11:40

ELECTROMAGNETIC SCATTERING OF AN H-POLARIZED PLANE WAVE BY A DOUBLE TRIHEDRAL REFLECTOR WITH A SEMI-INFINITE SLOT

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

11:40-12:00

CUT-OFF CHARACTERISTICS OF THE AZIMUTHALLY MAGNETIZED FERRITE-DIELECTRIC CIRCULAR WAVEGUIDE FOR THE NORMAL TE_{0N} MODES

*G.N. Georgiev, University of Veliko Tirnov, Bulgaria;
M.N. Georgieva-Grosse, Consulting and Researcher in Physics and Computer Science, Germany*

12:00-12:20

GUARANTEED ESTIMATION FOR INVERSE PROBLEMS IN ELECTROMAGNETICS AND ACOUSTICS

A. Nakonechny, Y. Podlipenko, T. Shevchenko Kyiv National University, Ukraine; Y. Shestopalov, University of Gävle, Sweden

13:40-14:00

STUDY OF THE INTERACTION USER HEAD-ULTRAWIDEBAND MIMO ANTENNA ARRAY FOR MOBILE TERMINALS

S.S. Zhekov, A. Tatomirescu, O. Franek, G.F. Pedersen, Aalborg University, Denmark

14:00-14:20

A NEW METHOD FOR EXACT COMPUTATION OF THE DIFFERENTIAL PHASE SHIFT IN THE CIRCULAR WAVEGUIDE, LOADED WITH AN AZIMUTHALLY MAGNETIZED FERRITE CYLINDER AND A DIELECTRIC TOROID

M.N. Georgieva-Grosse, Consulting and Researcher in Physics and Computer Science, Germany; G.N. Georgiev, University of Veliko Tirnovo, Bulgaria

14:20-14:40

ON ABSENCE OF SOURCES AT INFINITY AND UNIQUENESS FOR WAVEGUIDE SOLUTIONS

B. Nilsson, Linnaeus University, Sweden; A. Ioannidis, Hellenic Naval Academy, Greece; Y. Ivanenko, S. Nordebo, Linnaeus University, Sweden

14:40-15:00

SIMULATION OF PHOTONIC WAVEGUIDES WITH DETERMINISTIC APERIODIC NANOSTRUCTURES FOR BIOSENSING

L.T. Neustock, M. Paulsen, S. Jahns, Kiel University, Germany; J. Adam, University of Southern Denmark, Denmark; M. Gerken, Kiel University, Germany

MONDAY, SEPTEMBER 19, 2016, 15:40 - MEZZANINE LEVEL, ROOM 4

SESSION 04 - ICEAA

COMPUTATIONAL ADVANCES IN RADAR SCATTERING FROM ROUGH AND VEGETATED SURFACES

organized by M. Moghaddam and U. Khankhoje

chair U. Khankhoje, M. Moghaddam

15:40-16:00

POLARIZATION RESPONSE OF A CLOUD OF FINITE ROUGH CYLINDERS

R. Trivedi, U.K. Khankhoje, IIT Delhi, India

16:00-16:20

SYNERGISTIC USE OF AIRMOSS P-BAND SAR WITH THE SMAP L-BAND RADAR-RADIOMETER FOR SOIL MOISTURE RETRIEVAL

R. Akbar, MIT, United States; R. Chen, A. Tabatabaenejad, M. Moghaddam, University of Southern California, CA, United States

16:20-16:40

EXPLORING THE EFFECT OF FOREST SPATIAL HETEROGENEITY USING COHERENT THREE-DIMENSIONAL RADAR BACKSCATTERING MODEL

L. Yang, Chinese Academy of Sciences, China; M. Moghaddam, University of Southern California, CA, United States; Q. Liu, Chinese Academy of Sciences, China; R. Chen, University of Southern California, CA, United States;

16:40-17:00

THE EFFECT OF RADAR CONFIGURATION ON EFFECTIVE CORRELATION LENGTH

L. Zhu, J.P. Walker, N. Ye, C. Rudiger, Monash University, Australia

17:00-17:20

POLARIMETRIC SIMULATIONS OF BISTATIC SCATTERING FROM SEA SURFACES AT LOW WIND SPEEDS AT L AND C BANDS

J. Yang, Second Institute of Oceanography, China; Y. Du, Zhejiang University, China; J. Shi, Institute of Remote Sensing Applications, China; D. Li, Zhejiang University, China

MONDAY, SEPTEMBER 19, 2016, 11:20 - MEZZANINE LEVEL, ROOM 5

SESSION 05 - IEEE APWC

WIRELESS COMMUNICATIONS AND TECHNOLOGIES

chair P. Nepa, G. Virone

11:20-11:40

ENERGY EFFICIENCY AND SPECTRUM EFFICIENCY TRADE-OFF OVER OPTIMAL RELAY LOCATION IN BIDIRECTIONAL RELAY NETWORKS

M.I. Khalil, S.M. Berber, K.W. Sowerby, The University of Auckland, New Zealand

11:40-12:00

ANTENNA GAIN RESPONSE IN THE OUT-OF-BAND REGION FOR UNWANTED EMISSIONS OF AAS/MASSIVE MIMO

E. Pucci, F. Ghasemzadeh, L. Rexberg, Ericsson AB, Sweden

12:00-12:20

WIRELESS POWER TRANSMISSION INSIDE REINFORCED CONCRETE SLAB USING A RESONANT ANTIPODAL VIVALDI ANTENNA

Z. Esmati, S. Kharkovsky, B. Samali, Western Sydney University, Australia

13:40-14:00

NEAR-FIELD FOCUSED ANTENNAS: FROM OPTICS TO MICROWAVES

P. Nepa, A. Buffi, University of Pisa, Italy; H.-T. Chou, National Taiwan University, Taiwan

14:00-14:20

A NEW RF RECTIFIER TOPOLOGY WITH ENHANCED OPERABLE POWER RANGE

M. Abdallah, J. Costantine, American University of Beirut, Lebanon; A. Ramadan, F. Bin Sultan University, Saudi Arabia; Y. Tawk, Notre Dame University, Lebanon; C. Christodoulou, University of New Mexico, NM, United States

14:20-14:40

STEPPED-FM UWB SENSOR WITH MULTIPLE STEP FREQUENCIES

H. Koizumi, A. Kajiwara, The University of Kitakyushu, Japan

14:40-15:00

WIRELESS VITAL RADIO SENSOR USING MAXIMUM ENTROPY METHOD

E. Tsutsumi, A. Kajiwara, The University of Kitakyushu, Japan

15:00-15:20

INTRA-VEHICLE WIRELESS HARNESS WITH MESH-NETWORKING

I. Takayama, A. Kajiwara, The University of Kitakyushu, Japan

15:40-16:00

BIOLOGICAL INFORMATION SENSING USING AN AUTOREGRESSIVE MOVING AVERAGE MODEL

Y. Uomoto, A. Kajiwara, The University of Kitakyushu, Japan

MONDAY, SEPTEMBER 19, 2016, 16:00 - MEZZANINE LEVEL, ROOM 5

SESSION 06 - IEEE APWC

CHANNEL MODELING

chair P. Nepa, G. Virone

16:00-16:20

**DIRECTIONAL EVALUATION OF RECEIVE POWER,
RICIAN K-FACTOR AND RMS DELAY SPREAD OBTAINED FROM
POWER MEASUREMENTS OF 60 GHZ INDOOR CHANNELS**

*E. Zöchmann, M. Lerch, S. Caban, R. Langwieser, C.F.
Mecklenbräuker, M. Rupp, TU Wien, Austria*

16:20-16:40

**COMPARISON OF SAGE AND BBF FOR MULTIPATH ANGULAR
AND DELAY SPREAD CHARACTERISTICS WITH 28 GHZ CHANNEL
MEASUREMENTS**

*J. Liang, M.-D. Kim, J. Lee, J.-J. Park, B. Park, K.-W. Kim, ETRI,
South Korea*

16:40-17:00

**JOINT PROBABILITY DISTRIBUTION OF POWER DELAY PROFILES
BASED ON 28 GHZ CHANNEL MEASUREMENTS**

*K.-W. Kim, M.-D. Kim, J.-J. Park, J. Lee, J. Liang, B. Park, ETRI,
South Korea*

17:00-17:20

**IONOSPHERE CHARACTERIZATION USING RECEIVED HF
COMMUNICATION SIGNALS**

*S.D. Lynch, E. Bertot, K. Bales, SPAWAR Systems Center - Pacific,
United States*

MONDAY, SEPTEMBER 19, 2016, 11:20 - MEZZANINE LEVEL, ROOM 6

SESSION 07 - IEEE APWC

COMMUNICATION SATELLITE ANTENNAS

chair N. Misran, J. Zhou

11:20-11:40

**A DUAL-POLARIZED ARRAY ANTENNA FOR ON-THE-MOVE
APPLICATIONS IN KU-BAND**

*H. Zhang, W. Wang, M. Jin, X. Lu, East China Research Institute of
Electronic Engineering, China;*

11:40-12:00

**A SQUARE PATCH ANTENNA LOADED WITH WRENCH-SHAPED
TUNING RINGS FOR CNSS APPLICATIONS WITH GPS**

*J.H. Zhou, L.P. Yang, B.Q. You, M.Y. Dong, J. Li, W. Quan, Xiamen
University, China*

12:00-12:20

**A DUAL-FRAME MICROSTRIP ANTENNA WITH FOUR-BRIDGE
FEEDING CONTROL FOR CNSS APPLICATIONS**

*B.Q. You, J. Huang, Xiamen University, China; Y.P. Shang, Xinghai
Communication Science and Technology Co., Ltd., China; B.F. Hu,
J.H. Zhou, Xiamen University, China*

13:40-14:00

A CENTER-FED BEIDOU ANTENNA WITH ZERO PHASE CENTER

K.-K. Zheng, Q.-X. Chu, South China University of Technology, China

14:00-14:20

ANALYSIS ON ELEMENT SHAPE GEOMETRIES TO ENHANCE REFLECTION COEFFICIENT AND GAIN OF REFLECTARRAY ANTENNA

S. H. Yusop, N. Misran, M.F. Mansor, University Kebangsaan Malaysia, Malaysia; M. Abu, Universiti Teknikal Malaysia Melaka, Malaysia;

14:20-14:40

CAPACITIVE LOADING RADIATING ELEMENT FOR RECONFIGURABLE REFLECTARRAY AT KU-BAND

M. Ramli, N. Misran, M.F.B. Mansor, M.T. Islam, Universiti Kebangsaan Malaysia, Malaysia;

14:40-15:00

ANTENNA SYSTEM FOR NANO-SATELITE MISSION GOMX-3

A. Tatomirescu, G.F. Pedersen, Aalborg University, Denmark; J. Christiansen, D. Gerhardt, GomSpace ApS, Denmark;

MONDAY, SEPTEMBER 19, 2016, 15:40 - MEZZANINE LEVEL, ROOM 6

SESSION 08 - ICEAA

ELECTROMAGNETIC PROPERTIES OF MATERIALS

chair K. Esselle, S. Nordebo

15:40-16:00

SIMULATION-DRIVEN PARTICLE SWARM OPTIMIZATION OF SPATIAL PHASE SHIFTERS

A. Lalbakhsh, M. U. Afzal, K. Esselle, Macquarie University, Australia

16:00-16:20

DETERMINATION OF DIELECTRIC PERMITTIVITY OF CONCRETE USING MICROWAVE DIELECTRIC-LOADED DUAL-WAVEGUIDE SENSOR FOR INFRASTRUCTURE HEALTH MONITORING

M.A. Islam, S. Kharkovsky, Western Sydney University, Australia

16:20-16:40

APPROXIMATION OF DIELECTRIC SPECTROSCOPY DATA WITH HERGLOTZ FUNCTIONS ON THE REAL LINE AND CONVEX OPTIMIZATION

Y. Ivanenko, S. Nordebo, Linnaeus University, Sweden

16:40-17:00

REALIZATION OF HIGH-EFFICIENCY ANOMALOUS REFLECTION USING PHASE GRADIENT METASURFACE AT UHF

H. Sun, Z. Li, X. Chen, L. Liu, B. Xu, C. Gu, Nanjing University of Aeronautics and Astronautics, China

17:00-17:20

HIGH ACCURACY SOLUTION OF THE TIME-DEPENDENT RADIATIVE TRANSFER EQUATION FOR PULSE PROPAGATION IN OBSCURING RANDOM MEDIA

E.H. Bleszynski, M.K. Bleszynski, T. Jaroszewicz, Monopole Research, United States

SESSION 09 - IEEE APWC

ELECTROMAGNETIC PROPAGATION

chair B. Bellekens, S. D. Lynch

08:00-08:20

VALIDATION OF AN INDOOR RAY LAUNCHING RF PROPAGATION MODEL

B. Bellekens, R. Penne, M. Weyn, University of Antwerp, Belgium

08:20-08:40

A SELF-LEARNING BASED ANTENNA SYSTEM FOR INDOOR WIRELESS NETWORK

W. Ni, G.Xu, Jiangsu Automation Research Institute, China

08:40-09:00

STUDY OF A 3DMLUV-FIA METHOD FOR EM SCATTERING FROM DIELECTRIC OBJECT AND ROUGH SURFACE

G. Zhu, S. He, J. He, Wuhan University, China; X. Wu, Naval University of Engineering, China

09:00-09:20

APPLICATION OF WIDEBAND AND NARROW-BAND CHANNEL MODELS TO GPS SATELLITE SIGNAL PROPAGATION IN URBAN ENVIRONMENTS

H.H. Moghadam, Ecole de Technologie Superieure (ETS), QC, Canada; N. Hendijani, University of Colorado Denver, CO, United States; A.B. Kouki, Ecole de Technologie Superieure (ETS), QC, Canada

09:20-09:40

A PATH LOSS AND FADING MODEL FOR RSSI-BASED LOCALIZATION IN FORESTED AREAS

T. Nowak, M. Hartmann, T. Zech, J. Thielecke, University of Erlangen-Nürnberg, Germany

09:40-10:00

INVESTIGATIONS INTO THE OCCURRENCE OF EVAPORATION DUCTS WITHIN THE ENGLISH CHANNEL

N. Mufti, University of Engineering & Technology Peshawar, Pakistan; D.R. Siddle, University of Leicester, United Kingdom

10:20-10:40

MODELLING OF THE VERTICAL RADIO REFRACTIVITY NEAR ARABIAN SEA

S. Najib, R. Mehreen, N. Mufti, University of Engineering & Technology Peshawar, Pakistan

10:40-11:00

AN INVESTIGATION OF THE RADIO REFRACTIVE CONDITIONS IN LOWEST PORTIONS OF THE TROPOSPHERE NEAR MARGALLA HILLS, PAKISTAN

M. Abdullah, H.E. Ullah, H. Rasheed, N. Mufti, University of Engineering & Technology Peshawar, Pakistan

11:00-11:20

UPDATING HF NOISE MODELS USING OPEN SOURCE DATASETS

E. M. Bertot, S. D. Lynch, Space & Naval Warfare Systems Center Pacific, CA, United States

11:20-11:40

HIGH-FREQUENCY WAVE FIELD ESTIMATION USING GAUSSIAN RAY BUNDLE SUPERPOSITION ON DELAUNAY TRIANGULATION

D. J. Alford-Lago, S. D. Lynch, Space & Naval Warfare Systems Center Pacific, CA, United States

11:40-12:00

A SURVEY OF DIFFERENT TECHNIQUES OF DETERMINING THE REFRACTIVE PARAMETERS

A. Ullah, S. Rehman, N. Mufti, University of Engineering & Technology Peshawar, Pakistan

TUESDAY, SEPTEMBER 20, 2016, 13:40 - MEZZANINE LEVEL, ROOM 3

SESSION 10 - ICEAA

INVERSE SCATTERING AND REMOTE SENSING

chair S.J. Anderson, T. Fickenscher

13:40-14:00

SYNTHESIS OF NONSTATIONARY ANISOTROPIC IMPEDANCE PLANE FOR SPECIFIED FREQUENCY SPECTRUM OF THE REFLECTED SIGNAL

Yu. V. Yukhanov, T. Yu. Privalova, Southern Federal University, Russia

14:00-14:20

OBSERVING GEOPHYSICAL STATE VARIABLES AND THEIR DYNAMICS WITH DECAMETRIC RADAR

S.J. Anderson, University of Adelaide, Australia

14:20-14:40

IMPACT OF BLADE SHAPE AND PITCH ANGLE ON WIND TURBINE FORWARD SCATTERING

M.B. Raza, T. Fickenscher, Helmut Schmidt University, Germany

14:40-15:00

INFLUENCE OF FIELD POLARITY ON HARMONIC RADAR DETECTION OF CONCEALED ELECTRONICS

*K. Hong, S. Braidwood, Defence Science and Technology, Australia;
A. Halappa, T. Kilpatrick, B. Keane, Teledyne Australia, Australia;
D. Longstaff, Contractor, Australia;*

15:00-15:20

GROUND PENETRATING RADAR APPLICATIONS IN BURIED IMPROVISED EXPLOSIVE DEVICE (IED) DETECTION

*C. Abeynayake, Defence Science and Technology Group, Australia;
M.D. Tran, University of South Australia, Australia*

15:40-16:00

RESONANT MODE FEATURE EXTRACTION VIA A COMPRESSIVE MULTI-FREQUENCY LINEAR SAMPLING METHOD

H.F. Alqadah, Naval Research Laboratory, Washington DC, United States

16:00-16:20

ALGEBRAIC RECONSTRUCTION TECHNIQUES FOR INVERSE IMAGING

K. Yaswanth, S. Bhattacharya, U.K. Khankhoje, IIT Delhi, India

TUESDAY, SEPTEMBER 20, 2016, 16:20 - MEZZANINE LEVEL, ROOM 3

SESSION 11 - IEEE APWC

RFID TECHNOLOGIES

chair S. Kharkovsky, P. Nepa

16:20-16:40

COMPARISON OF UWB CHIPLESS RFID TAGS ON FLEXIBLE SUBSTRATES FABRICATED USING EITHER ALUMINUM, COPPER OR SILVER

M. Barahona, D. Betancourt, F. Ellinger, Technische Universität Dresden, Germany

16:40-17:00

INVESTIGATION OF UHF POWER FLOW IN THE VICINITY OF A STEEL I-BEAM FOR OPTIMIZATION OF ITS HEALTH MONITORING USING WIRELESS SENSOR INTEGRATED RFID TAG ANTENNA SYSTEM

D. Jayawardana, S. Kharkovsky, R. Liyanapathirana, Western Sydney University, Australia

17:00-17:20

MULTI-FACET FOCUSED MICROWAVE ANTENNAS

H.-T. Chou, National Taiwan University, Taiwan; P. Nepa, University of Pisa, Italy

TUESDAY, SEPTEMBER 20, 2016, 08:00 - MEZZANINE LEVEL, ROOM 4

SESSION 12 - ICEAA

ULTRAWIDEBAND THEORY, TECHNOLOGY, APPLICATIONS, AND SYSTEMS

organized by E. Mokole

chair D. Ghosh, E. Mokole

08:00-08:20

INTRODUCTION TO ULTRAWIDEBAND THEORY/TECHNOLOGY/SYSTEMS

E.L. Mokole, Independent Consultant, United States; T.K. Sarkar, Syracuse University, United States

08:20-08:40

OVERVIEW OF ULTRAWIDEBAND SYSTEMS

T.K. Sarkar, Syracuse University, NY, United States; E.L. Mokole, Private Consultant, DC, United States; M. Salazar-Palma, Universidad Carlos III de Madrid, Spain

08:40-09:00

A MEASUREMENT-BASED BLOCKING DISTRIBUTION FOR IMPROVING LOCALIZATION IN WAREHOUSE ENVIRONMENTS

N. Rabeah, KACST, Saudi Arabia; S. Aditya, USC, CA, United States; F. Alawwad, KACST, Saudi Arabia; A. F. Molisch, USC, CA, United States; H. Behairy, KACST, Saudi Arabia

09:00-09:20

NEXT GENERATION NETWORKS: SOFTWARE DEFINED RADIO, EMERGING TRENDS

U.L. Rohde, A.K. Poddar, Synergy Microwave Corp., NJ, United States; T.K. Sarkar, Syracuse University, NY, United States

09:20-09:40

UWB IN HEALTHCARE

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

09:40-10:00

PRINCIPLES OF MIMO RADAR BASED ON ULTRAWIDEBAND THROB SIGNALS

M. G. Hussain, Kuwait University, Kuwait

TUESDAY, SEPTEMBER 20, 2016, 10:20 - MEZZANINE LEVEL, ROOM 4

SESSION 13 - IEEE APWC

LOW-PROFILE WIDEBAND ANTENNAS

chair D. Ghosh, E. Mokole

10:20-10:40

DESIGN OF LOW-PROFILE BROADBAND DUAL-POLARIZED INTEGRATED PATCH SUB-ARRAY FOR X-BAND SAR PAYLOAD ON SMALL SATELLITE

X. Zhao, B. N. Tian, S. P. Yeo, NUS, Singapore; L. C. Ong, Institute for Infocomm Research, Singapore

10:40-11:00

AN EXTREMELY WIDEBAND TAPERED BALUN FOR APPLICATION IN TIGHTLY COUPLED ARRAYS

A.O. Bah, P.-Y. Qin, Y.J. Guo, University of Technology Sydney, Australia

11:00-11:20

A NOVEL UWB FOLDED MONOPOLE

L. Scorrano, G. Chinino, M. Anelli, Elettronica S.p.A., Italy

11:20-11:40

AN OPTIMUM DESIGN OF LOW-PROFILE ULTRA-WIDEBAND HF SKELETAL WIRE DUOCONICAL MONOPOLE ANTENNA WITH PARASITIC GROUNDED POLES

X.-L. Zhang, East China Research Institute Of Electronic Engineering, China; H.-T. Gao, Wuhan University, China; Q.-C Zhang, East China Research Institute Of Electronic Engineering, China;

11:40-12:00

HYBRID TUNABLE WIDEBAND SINGLE FEED ANTENNA ELEMENT FOR SMARTPHONES SUPPORTING CARRIER AGGREGATION

S. Stanev, A. Tatomirescu, Aalborg University, Denmark

TUESDAY, SEPTEMBER 20, 2016, 13:40 - MEZZANINE LEVEL, ROOM 4

SESSION 14 - ICEAA

ELECTROMAGNETIC MODELING OF DEVICES AND CIRCUITS

chair A.M. Abbosh, A. Poddar

13:40-14:00

A 700W PUSH-PULL GAN POWER AMPLIFIER FOR P-BAND AEROSPACE APPLICATION

S. Tang, L. Gu, Q. Wang, X. Li, Y. Xu, T. Chen, Nanjing Electronic Devices Institute, China; Y. Yang, Macquarie University, Australia

14:00-14:20

MODELING OF BONDING WIRES ARRAY AND ITS APPLICATION IN THE DESIGN OF A 120 W X-BAND INTERNALLY MATCHED ALGAN/GAN POWER AMPLIFIER

L. Gu, S. Tang, Y. Xu, Nanjing Electronic Devices Institute, China; Y. Yang, Macquarie University, Australia; T. Chen, Nanjing Electronic Devices Institute, China

14:20-14:40

**NOISE GENERATION IN DYNAMIC WIRELESS
POWER TRANSFER**

A. Delgado, National University of Colombia, Colombia

14:40-15:00

**IN-PHASE POWER DIVIDER USING THREE PARALLEL COUPLED
LINES FOR MEDIUM POWER APPLICATIONS**

U.T. Ahmed, A.M. Abbosh, The University of Queensland, Australia

15:00-15:20

**WIDEBAND IN-PHASE POWER DIVIDER USING CASCADED
PARALLEL COUPLED MICROSTRIP LINES**

U.T. Ahmed, A.M. Abbosh, The University of Queensland, Australia

15:40-16:00

**MODIFIED GYSEL POWER DIVIDER FOR HYPERTHERMIA
USING MICROSTRIP TO SLOTLINE TRANSITIONS**

U.T. Ahmed, A.M. Abbosh, The University of Queensland, Australia

16:00-16:20

**DEVELOPMENT OF DUAL-BAND MICROSTRIP BANDPASS
FILTER BASED ON SPLIT RING RESONATOR**

A. Munir, Institut Teknologi Bandung, Indonesia

16:20-16:40

**A FAST SIMULATION ENVIRONMENT FOR
SMART SYSTEMS VALIDATION IN PRESENCE
OF ELECTROMAGNETIC INTERFERENCES**

*E. Fraccaroli, M. Lora, F. Fummi, Università degli Studi di Verona,
Italy; P. Montuschi, Politecnico di Torino, Italy*

16:40-17:00

**TRIPLE-MODE CAVITY BANDPASS FILTER USING
CORNER-CUT PERTURBATIONS**

*Q.-T. Huang, Q.-X. Chu, S.-W. Wong, South China University
of Technology, China*

17:00-17:20

**METAMODELING AS AN EFFECTIVE TOOL FOR THE DESCRIPTION
OF 2D SUPERLATTICE PHOTONIC CRYSTALS**

I. Voznyuk, S. Boutami, A. Gliere, CEA-LETI, France

TUESDAY, SEPTEMBER 20, 2016, 08:20 - MEZZANINE LEVEL, ROOM 5

SESSION 15 - ICEAA

ANTENNA SYSTEMS FOR RADIO ASTRONOMY

organized by D.B. Davidson, E. de Lera Acedo, P. Hall, G. Virone

chair D.B. Davidson, E. de Lera Acedo, P. Hall, G. Virone

08:20-08:40

**ROLE OF RADIO ASTRONOMY AS A TESTBED FOR FUTURE
WIRELESS APPLICATIONS**

T.S. Bird, Macquarie University, Australia

08:40-09:00

**WIDEBAND ANTENNAS FOR PRECISION SPECTRAL
RADIOMETERS FOR COSMOLOGY**

*R. Subrahmanyam, A. Raghunathan, N. Udaya Shankar, S. Singh, S.
Puthige, N. Mahesh, M. S. Rao, Raman Research Institute, India*

09:00-09:20

MULTI-ELEMENT VERTICAL ARRAY FOR ZERO-SPACING INTERFEROMETRY

A. T. Sutinjo, D. Ung, R. B. Wayth, P. J. Hall, Curtin University, Australia

09:20-09:40

THE HYDROGEN EPOCH OF REIONIZATION ARRAY (HERA)

D.R. DeBoer, University of California, United States

09:40-10:00

THE HYDROGEN EPOCH OF REIONIZATION ARRAY (HERA) IMPROVEMENT OF THE ANTENNA RESPONSE WITH A MATCHING NETWORK AND SCIENTIFIC IMPACTS

N. Fagnoni, E. De Lera Acedo, University of Cambridge, United Kingdom

10:20-10:40

ADVANCED, EFFICIENT PRIMARY BEAM MODELING FOR THE MURCHISON WIDEFIELD ARRAY RADIO TELESCOPE

R. Wayth, T. Colegate, M. Sokolowski, A. Sutinjo, D. Ung, ICRAR/ Curtin University, Australia

10:40-11:00

APERTURE ARRAY VERIFICATION SYSTEM 1: OVERVIEW OF A SQUARE KILOMETRE ARRAY PROTOTYPE

P.J. Hall, Curtin University, Australia; P. Benthem, ASTRON, Netherlands; A.T. Sutinjo, Curtin University, Australia

11:00-11:20

ON THE EFFECTS OF MUTUAL COUPLING IN THE ACTIVE REFLECTION COEFFICIENT OF WIDE-FIELD SCANNING ELECTRICALLY LARGE RANDOM PHASED ARRAYS

E. de Lera Acedo, University of Cambridge, United Kingdom; M. Arts, ASTRON, Netherlands; C. Craeye, H. B. Van, University Catholique de Louvain, Belgium

11:20-11:40

SYSTEM NOISE REDUCTION THROUGH NULL STEERING IN LARGE WIDEBAND SPARSE ARRAYS

A. El-makadema, Y. Zhang, M. Yang, A.K. Brown, The University Of Manchester, United Kingdom

11:40-12:00

THE UAV-BASED TEST SOURCE AS AN END-TO-END VERIFICATION TOOL FOR APERTURE ARRAYS

F. Paonessa, G. Virone, CNR, Italy; P. Bolli, G. Pupillo, J. Monari, F. Perini, A. Mattana, G. Naldi, M. Poloni, Marco Schiaffino, INAF, Italy; A. M. Lingua, M. Piras, P. Dabove, I. Aicardi, Politecnico di Torino, Italy; G. Addamo, O. A. Peverini, R. Orta, R. Tascone, CNR, Italy

13:40-14:00

ERROR SENSITIVITY ANALYSIS FOR MULTI-COPTER PLANAR POSITIONING ON LOW-GAIN NEARFIELD MEASUREMENTS

H. Pienaar, D.B. Davidson, Stellenbosch University, South Africa

14:00-14:20

A HARDWARE CALIBRATOR FOR THE RAPID INSTRUMENT

N. Razavi-Ghods, E. de Lera Acedo, University of Cambridge, United Kingdom; F. Lind, C. Eckert, MIT Haystack Observatory, MA, United States

14:20-14:40

PASSIVE DEVICES FOR ANTENNA MULTI-FEED SYSTEMS OPERATING AT Q AND W BAND

O.A. Peverini, G. Virone, G. Addamo, M. Lumia, Z. Farooqui, R. Tascone, CNR-IEIT, Italy

14:40-15:00

TESTING A MODIFIED ASKAP MARK II PHASED ARRAY FEED ON THE 64 M PARKES RADIO TELESCOPE

A. P. Chippendale, R. J. Beresford, X. Deng, M. Leach, J. E. Reynolds, CSIRO, Australia; M. Kramer, MPIfR, Germany, T. Tzioumis, CSIRO, Australia

15:00-15:20

THE AUSTRALIAN RADIO QUIET ZONE – WESTERN AUSTRALIA: OBJECTIVES, IMPLEMENTATION AND EARLY MEASUREMENTS

C. Wilson, K. Chow, L. Harvey-Smith, B. Indermuehle, CSIRO, Australia; M. Sokolowski, R. Wayth, ICRAR/Curtin University, Australia

TUESDAY, SEPTEMBER 20, 2016, 15:40 - MEZZANINE LEVEL, ROOM 5

SESSION 16 - ICEAA

RADAR CROSS SECTION AND ASYMPTOTIC TECHNIQUES

chair D.V. Semenikhina, P.L.E. Uslenghi

15:40-16:00

BINARY STRUCTURES SIMILAR TO CHECKERBOARD, WITH ANISOTROPIC IMPEDANCE METASURFACE FOR RCS REDUCTION

D.V. Semenikhina, A.I. Semenikhin, Y.V. Yukhanov, A.V. Klimov, Southern Federal University, Russia

16:00-16:20

ANTENNA PATTERN COMPENSATION TECHNIQUE FOR NEAR FIELD MIMO RADAR IMAGING

Y.Z. Liu, X. Xu, Beihang University, China

16:20-16:40

COMPUTATIONAL RESEARCH ON CALIBRATION TARGET FOR FULL-POLARIMETRIC SCATTERING MEASUREMENT

Y. Bai, H.C. Yin, C.Z. Dong, Science and Technology on Electromagnetic Scattering Laboratory, China

16:40-17:00

STUDY OF PASSIVE AIRCRAFT SURVEILLANCE RADAR USING DTTB SIGNAL DELAY

T. Otsuyama, J. Honda, Electronic Navigation Research Institute, Japan;

17:00-17:20

AN IMPROVED APPROACH FOR MULTI-TARGET DETECTION AND TRACKING IN AUTOMOTIVE RADAR SYSTEMS

M. Khalil, A. Eltrass, O. Elzaafarany, B. Galal, K. Walid, A. Tarek, O. Ahmadien, Alexandria University, Egypt

TUESDAY, SEPTEMBER 20, 2016, 08:00 - MEZZANINE LEVEL, ROOM 6

SESSION 17 - ICEAA

OPTIMIZATION AND OPTIMAL ANTENNAS

organized by **M. Gustafsson, L. Jonsson**

chair **L. Johnsson, D. Sjöberg**

08:00-08:20

WORST-CASE SENSITIVITY ANALYSIS (WCSA) BY PARTICLE SWARM OPTIMIZATION (PSO): APPLICATIONS IN REALISTIC OPTIMAL ANTENNA DESIGNS

B. Zhang, Y. Rahmat-Samii, UCLA, CA, United States

08:20-08:40

CONVEX OPTIMIZATION FOR ENDFIRE ARRAY ANTENNAS

D. Sjöberg, J. Helander, Lund University, Sweden

08:40-09:00

RELIABILITY-AWARE OPTIMIZATION FOR THE SIDELobe LEVEL OF LEAKY-WAVE ANTENNAS

*N. Nguyen-Trong, C. Fumeaux, University of Adelaide, Australia;
A. Kouassi, S. Lallechere, P. Bonnet, Institut Pascal, France;*

09:00-09:20

Q-FACTOR AND EFFICIENCY OF CARBON NANOTUBE ANTENNAS

F. Majeed, Griffith University, Australia; M. Shahpari, University Technology Sydney, Australia; D. Thiel, Griffith University, Australia;

09:20-09:40

RECOVERABLE ENERGY OF ANTENNAS

X. Zheng, G. A. E. Vandenbosch, V. V. Moshchalkov, KU Leuven, Belgium

09:40-10:00

ANTENNA Q BASED LIMITATIONS FOR SMALL AND NON-SMALL STRUCTURES

*B.L.G. Jonsson, KTH Royal Institute of Technology, Sweden;
M. Gustafsson, Lund University, Sweden*

TUESDAY, SEPTEMBER 20, 2016, 10:20 - MEZZANINE LEVEL, ROOM 6

SESSION 18 - IEEE APWC

WIDEBAND/MULTIBAND ANTENNAS AND

EMERGING ANTENNA TECHNOLOGIES

organized by **H. Nakano**

chair **T. Kawamo, H. Nakano**

10:20-10:40

RADIATION BEAM WITH A LARGE TILT ANGLE

H. Nakano, Y. Kameta, J. Yamauchi, Hosei University, Japan

10:40-11:00

ACCURATE FEED POSITION DESIGNING FOR PRECISE MALAYSIA BEAM COVERAGE

*N.F Fauzi, M.T. Ali, N.H. Abd.Rahman, UiTM, Malaysia;
Y. Yamada, UTM, Malaysia;*

11:00-11:20

ACHIEVEMENT OF A BIFURCATED BEAM BY A BEND ARRAY CONFIGURATION

Z. Tengah, M.T. Ali, N.H. Abd. Rahman, I.P. Ibrahim, N.E. Adb. Rashid,

Universiti Teknologi Mara, Malaysia; Y. Yamada, Malaysia-Japan International Institute of Technology, UTM, Malaysia;

11:20-11:40

SMALL SIZE DUAL BAND MONOPOLE ANTENNA OF SMART WATCH FOR CELLULAR COMMUNICATION

Y. Tasaka, H. Iwasaki, Shibaura Institute of Technology, Japan

11:40-12:00

A DESIGN OF BI-DIRECTIONAL AND LOW-PROFILE ANTENNA USING MICROSTRIP ELEMENT

T. Fukusako, Y. Ogata, Kumamoto University, Japan

13:40-14:00

A DUAL-BAND SINGLE-FEED CIRCULARLY POLARIZED MICROSTRIP PATCH ANTENNA WITH A CROSS SLOT

M. Matsunaga, Ehime University, Japan

14:00-14:20

BIAS NETWORK AND DIODE PARASITICS OF A RECONFIGURABLE STACKED MICROSTRIP PATCH ANTENNA AT 60 GHZ

A. Bondarik, A.D. Sjoberg, Lund University, Sweden

14:20-14:40

WIDEBAND PRINTED INVERTED-F ANTENNA WITH UNIDIRECTIONAL RADIATION PATTERN

T. Fujimoto, J. Taguri, Nagasaki University, Japan

14:40-15:00

PRINTED INVERTED L ANTENNA ON DIELECTRIC SUBSTRATE EXCITED BY MICROSTRIP LINE

M. Taguchi, T. Taniguchi, Nagasaki University, Japan

15:00-15:20

REFLECTARRAY DESIGN FOR SMALL ANTENNA USING META-SURFACE

T. Maruyama, S. Endo, National Institute of Technology, Japan;

Q. Chen, S. Kameda, N. Suematsu, Tohoku University, Japan

15:40-16:00

WIDEBAND CIRCULARLY POLARIZED SLOT COUPLED METASURFACE-BASED ARRAY ANTENNA

S.X. Ta, I. Park, Ajou University, South Korea

16:00-16:20

ACCURACY ESTIMATIONS OF A NEGATIVE REFRACTIVE INDEX CYLINDRICAL LENS ANTENNA DESIGNING

S. Hamid; M.T. Ali, N.H. Abd Rahman, I. Pasya, UiTM, Malaysia;

Y Yamada, UTM, Malaysia; N. Michishita, NDA, Japan;

16:20-16:40

INVESTIGATION ON THE REACTANCE LOADING AND EM COUPLING FEED FOR A DESIGN OF A DUAL FREQUENCY PLANAR ANTENNA

K. Kagoshima, M. Uchida, S. Takeda, M. Umehira, Ibaraki University, Japan

16:40-17:00

RESONANT STRUCTURES AND APPLICATIONS TO MOBILE HANDSET ANTENNAS

H. Y. Wang, Huawei Technologies, United Kingdom; H. L. Xu, Huawei Technologies, China

17:00-17:20

**DESIGN OF A LOW SAR MULTIBAND ANTENNA
FOR MOBILE APPLICATIONS**

*Y. Koga, M. Kai, Fujitsu Laboratories Limited, Japan; K. Fujieda,
H. Egawa, Fujitsu Kyushu Network Technologies LTD, Japan*

WEDNESDAY, SEPTEMBER 21, 2016, 08:00 - MEZZANINE LEVEL, ROOM 3

SESSION 19 - IEEE APWC

**WIDEBAND/MULTIBAND ANTENNAS
AND EMERGING ANTENNA TECHNOLOGIES**

organized by H. Nakano
chair T. Kawamo, H. Nakano

08:00-08:20

AN INVISIBLE VEHICLE ROOF ANTENNA

*N. Guan, H. Tayama, M. Ueyama, Y. Yamaguchi, H. Chiba, Fujikura
Ltd., Japan*

08:20-08:40

**DESIGN OF A HELICAL ANTENNA ARRAY AND THE
COMPENSATION TECHNIQUE FOR ITS BORESIGHT ERROR OF
RADIATION PATTERNS**

C.-F. Huang, B.-C. Peng, Tatung University, Taiwan

08:40-09:00

A SPIRAL ANTENNA ABOVE A HYBRID HIS-EBG REFLECTOR

M. Tanabe, Toshiba, Japan

09:00-09:20

DIAMOND ARRAY OF DIAMOND ELEMENTS

*T. Kawano, National Defense Academy, Japan; H. Nakano,
Hosei University, Japan*

09:20-09:40

**WIDEBAND DIPOLE ANTENNA ARRAY FOR DIGITAL TV
BROADCASTING APPLICATIONS**

*P. Keowsawat, PBRU, Thailand; P. Osklang, KMITL, Thailand;
R. Kanahna, PBRU, Thailand; C. Phongcharoenpanich, KMITL, Thailand*

09:40-10:00

**DEMONSTRATION OF A HIGHLY EFFICIENT
SEAWATER ANTENNA**

*S. Akimoto, T. Yanagi, T. Fukasawa, H. Miyashita, Mitsubishi Electric
Corporation, Japan*

10:20-10:40

DUAL BAND MACKAY-E WITH E SHAPED RADIATOR

*S. Makino, T. Moroya, M. Kotaka, K. Itoh, K. Noguchi, T. Hirota,
Kanazawa Institute of Technology, Japan*

10:40-11:00

**ANALYSIS OF A METAL DISC-SHAPED TERAHERTZ SURFACE
WAVE SPLITTER WITH A CENTER ROD**

*J. Shibayama, D. Kusunoki, J. Yamauchi, H. Nakano, Hosei
University, Japan;*

SESSION 20 - IEEE APWC

ANTENNAS

chair C.Y. Chiu, C. Fumeaux

11:00-11:20

WATCH-SIZED FOUR-PORT DUAL-BAND MIMO ANTENNAS

C.-Y. Chiu, R.D. Murch, The Hong Kong University of Science and Technology, China

11:20-11:40

CARBON FIBER REINFORCED POLYMER INTEGRATED ANTENNA MODULE

G. Artner, R. Langwieser, R. Zemmann, C.F. Mecklenbräuer, Technische Universität Wien, Austria

11:40-12:00

COMPRESSIVE DIRECTION-FINDING ANTENNA ARRAY

H.E.A. Laue, W.P. du Plessis, University of Pretoria, South Africa;

13:20-13:40

HELICALLY COUNTER-POISED MONOPOLE ANTENNA

D. Govender, UOFA / DSTG, Australia; J. Magarelli, A. Caldwell, DSTG, Australia; C. Fumeaux, UOFA, Australia

13:40-14:00

COMPACT CIRCULARLY POLARIZED SLITS-LOADED MICROSTRIP PATCH ANTENNA WITH SYMMETRIC-FRACTAL BOUNDARY

S. Kumar, D. K. Vishwakarma, PDPM Indian Institute of Information Technology, Jabalpur, India

14:00-14:20

A COMPACT COPLANAR 4-PORT MIMO ANTENNA FOR HIGH-SPEED UWB APPLICATIONS

T.K. Roshna, U. Deepak, P. Mohanan, Cochin University of Science And Technology, India

14:20-14:40

MULTIPLE SIGNAL CLASSIFICATION ALGORITHM COMPENSATED BY EXTENDED KALMAN PARTICLE FILTERING FOR WI-FI THROUGH WALL MULTI-TARGET TRACKING

K. Ahmed, K. Attiah, A. Eltrass, Alexandria University, Egypt

SESSION 21 - IEEE APWC

ARRAY AND LENS ANTENNAS

organized by **S. Hay**

chair S. Hay

14:40-15:00

PERFORMANCE OF A 2 LAYER RADIAL HOLE EFFECTIVE MEDIA LENS

D.P. Gray, Xi'an Jiatong Liverpool University, China; N. Nikolic, CSIRO, Australia; J. Thornton, Antennas Research, United Kingdom

15:00-15:20

FREQUENCY PERFORMANCE OF 4-LAYER DISCRETIZED LUNEBURG LENSES

D.P. Gray, Xi'an Jiatong Liverpool University, China; N. Nikolic, CSIRO, Australia; J. Thornton, Antennas Research, United Kingdom

15:40-16:00

PROSPECTS FOR MICROWAVE IMAGING OF THE LYMPHATIC SYSTEM IN THE AXILLARY

J. Liu, S.G. Hay, CSIRO, Australia

16:00-16:20

DIRECTIONAL ANTENNAS FOR POINT-TO-MULTIPOINT MILLIMETRE-WAVE COMMUNICATIONS

J.A. Zhang, S.Hay, CSIRO, Australia; Y.J. Guo, UTS, Australia

16:20-16:40

HETEROGENEOUS DIELECTRICS IN CONNECTED ARRAY ANALYSIS WITH CBFM

S.G. Hay, CSIRO, Australia

16:40-17:00

EQUIVALENT TWO-PORT FOR RECEIVER NOISE FIGURE OF CONNECTED ARRAY ANTENNAS WITH CONSTRAINED BEAMFORMING

S.G. Hay, CSIRO, Australia

WEDNESDAY, SEPTEMBER 21, 2016, 08:00 - MEZZANINE LEVEL, ROOM 4

SESSION 22 - ICEAA

MATHEMATICAL ADVANCES IN ELECTROMAGNETICS

organized by J.M. Arnold and P. Smith

chair M.C. van Beurden, P. Smith

08:00-08:20

THROUGH-THE-WALL RADAR DETECTION ANALYSIS VIA NUMERICAL MODELING OF MAXWELL'S EQUATIONS

M. Charnley, Rutgers University, NJ, United States; A. Wood, AFIT, OH, United States

08:20-08:40

ELECTROMAGNETIC SCATTERING OF AN H-POLARIZED WAVE BY A SLOTTED SEMI-ELLIPTICAL CHANNEL TRUNCATED BY A METAL PLANE

S.M.T. De Souza, Pontificia Universidade Catolica de Minas Gerais, Brazil; T. Moraes, Centro Federal de Educacao Tecnologica de Minas Gerais, Brazil; D.F.G.G. Pereira, Pontificia Universidade Catolica de Minas Gerais, Brazil; P.L.E. Uslenghi, UIC, IL, USA

08:40-09:00

RECENT ADVANCES IN THE SPECTRAL THEORY OF OPEN STRUCTURES: EXISTENCE AND DISTRIBUTION OF THE SPECTRA OF RUNNING WAVES FOR A CLASS OF OPEN WAVEGUIDES

Y. Shestopalov, University of Gävle, Sweden

09:00-09:20

A CHARACTERIZATION METHOD FOR ELECTROMAGNETIC FIELDS IN A STACK OF LOSSY DIELECTRIC SLABS WITH RANDOM MATERIAL PROPERTIES

E. Barzegar, S.J.L. van Eijndhoven, M.C. van Beurden, TU/e, Netherlands

09:20-09:40

**ENHANCEMENTS OF COMPUTATIONAL EFFICIENCY
OF DGTD METHODS**

L. D. Angulo, University of Granada, Spain; J. Alvarez, Airbus DS, Spain; Z. Tong, National University of Defense and Technology, China; A.R. Bretones, S.G. Garcia, University of Granada, Spain

09:40-10:00

**SCATTERING OF E- AND H- POLARIZED PLANE WAVES
BY TWO-DIMENSIONAL AIRFOILS: A COMPARATIVE ANALYSIS**

E. Vinogradova, Macquarie University, Australia;

10:20-10:40

**SCATTERING FROM STRUCTURES WITH ACUTE,
OBTUSE AND REFLEX CORNERS**

A.J. Markowskei, P.D. Smith, Macquarie University, Australia

10:40-11:00

**FINITE-DIFFERENCE GREEN'S FUNCTIONS ON A 3-D CUBIC
LATTICE - INTEGER VERSUS FIXED-PRECISION ARITHMETIC
RECURRENCE SCHEMES**

*B.P. de Hon, Eindhoven University of Technology, Netherlands;
J.M. Arnold, University of Glasgow, United Kingdom*

WEDNESDAY, SEPTEMBER 21, 2016, 11:00 - MEZZANINE LEVEL, ROOM 4

SESSION 23 - ICEAA

FREQUENCY SELECTIVE SURFACES

chair S.-W. Qu, Z. Shen

11:00-11:20

**A NOVEL DESIGN OF FREQUENCY SELECTIVE SURFACE WITH LOW
BEAM'S ABERRATION AND INSENSITIVE TO THE BEAM WAIST
RADIUS OF INCIDENCE WAVE IN QUASI-OPTICAL FEED SYSTEM**

X. Yao, M. Bai, J. Miao, Beihang University, China

11:20-11:40

**THREE-DIMENSIONAL FREQUENCY SELECTIVE STRUCTURE WITH
WIDE PASSBAND AND SHARP ROLL-OFF**

B. Liang, M. Bai, J. Miao, Beihang University, China

11:40-12:00

**A WIDEBAND NON-RESONANT FSS WITH FINITE NUMBER OF
UNIT CELLS FOR MOBILE PHONE SAR REDUCTION**

N. Kumaran, K. Arunachalam, Indian Institute of Technology, India

WEDNESDAY, SEPTEMBER 21, 2016, 13:20 - MEZZANINE LEVEL, ROOM 4

SESSION 24 - ICEAA

NOVEL FREQUENCY-SELECTIVE STRUCTURES

organized by Z. Shen

chair S.-W. Qu, Z. Shen

13:20-13:40

REFLECTION EFFICIENCY OF TERAHERTZ METASURFACE

S.-W. Qu, P.-Y. Feng, L. Chen, University of Electronic Science and Technology of China, China; B.-J. Chen, City University of Hong Kong, China; X. Bai, University of Electronic Science and Technology of China, China; K.B. Ng, C.H. Chan, City University of Hong Kong, China

13:40-14:00

METASURFACE FOR POLARIZATION AND PHASE MANIPULATION OF THE ELECTROMAGNETIC WAVE SIMULTANEOUSLY

X. Ding, K. Zhang, J. Fu, F. Meng, G. Yang, Q. Wu, Harbin Institute of Technology, China;

14:00-14:20

FUNCTIONAL STRUCTURES APPLIED TO DOUBLY CURVED SURFACES

A. Ericsson, D. Sjöberg, C. Larsson, T. Martin, Lund University, Sweden

14:20-14:40

TUNABLE BANDPASS FREQUENCY SELECTIVE SURFACE WITH EMBEDDED BIASING

A. Ebrahimi, The University of Adelaide, Australia; Z. Shen, Nanyang Technological University, Singapore; W. Withayachumnankul, S. Al-Sarawi, D. Abbott, The University of Adelaide, Australia

14:40-15:00

WAVEGUIDE 3-D FSS BY 3-D PRINTING TECHNIQUE

W. Tang, J. Zhu, C. Wang, J. Ge, Z. Yu, W. Zhuang, Nanjing Normal University, China

15:00-15:20

MINIATURIZED FREQUENCY SELECTIVE SURFACE AND BROADBAND FREQUENCY SELECTIVE SURFACE DESIGN

Q. Wu, G. Yang, J. Fu, F. Meng, K. Zhang, W. Kong, X. Ding, Harbin Institute of Technology, China

15:40-16:00

WIDEBAND POLARIZATION ROTATOR BASED ON FREQUENCY SELECTIVE SURFACES

J. Wang, Nanjing University of Science and Technology, China; Z. Shen, Nanyang Technological University, Singapore; W. Wu, Nanjing University of Science and Technology, China

WEDNESDAY, SEPTEMBER 21, 2016, 16:00 - MEZZANINE LEVEL, ROOM 4

SESSION 25 - ICEAA

ELECTROMAGNETIC MEASUREMENTS

chair H.F. Alqadah, A. Sutinjo

16:00-16:20

CHARACTERIZATION OF CONDUCTIVE TEXTILES FOR WEARABLE RFID APPLICATIONS

S.P Pinapati, D.C. Ranasinghe, C. Fumeaux, University of Adelaide, Australia

16:20-16:40

A CORRECTION FORMULATION FOR RCS MEASUREMENT OF DIHEDRAL REFLECTOR WITH QUASI-MONOSTATIC GEOMETRY

P. Wu, X. Xu, Beihang University, China;

16:40-17:00

ANALYSIS OF HUMAN EXPOSURE DUE TO WIFI SIGNALS BASED ON A NOVEL MEASUREMENT METHODOLOGY

M. Fernandez, I. Peña, D. Guerra, A. Arrinda, University of the Basque Country, Spain

17:00-17:20

**DIFFERENCE CO-ARRAY METHODS FOR RECONSTRUCTING
ELEMENTARY DIPOLE SOURCES FROM NEAR-FIELD
MEASUREMENTS IN UNDERWATER MEDIUMS**

H.F. Alqadah, Naval Research Laboratory, D.C., United States

WEDNESDAY, SEPTEMBER 21, 2016, 08:00 - MEZZANINE LEVEL, ROOM 5

SESSION 26 - ICEAA

COMPUTATIONAL ELECTROMAGNETICS
organized by **R.D. Graglia and D.R. Wilton**
chair R.D. Graglia, D.R. Wilton

08:00-08:20

**ANALYSIS AND DESIGN OF METASURFACES FOR WAVE
MANIPULATION USING THE MULTILEVEL GREEN'S FUNCTION
INTERPOLATION METHOD**

*P.Zhao, Hangzhou Dianzi University, China; D. Liu, Huawei Corp.,
China; C. H. Chan, University of Hong Kong, China;*

08:20-08:40

**ON A DEDICATED VOLUME INTEGRAL EQUATION SOLVER FOR
NANOPARTICLE-ON-MIRROR (NPOM) STRUCTURES**

X. Zheng, G. A. E. Vandenbosch, V. V. Moshchalkov, KU Leuven, Belgium

08:40-09:00

**IMPACT OF THE EVALUATION PRECISION OF THE REACTION
INTEGRALS OF THE METHOD OF MOMENTS ON THE SOLUTION OF
PLASMONIC PROBLEMS NEAR THE QUASI-STATIC REGIME**

*D. M. Solis, University of Vigo, Spain; J. M. Taboada, University of
Extremadura, Spain; F. Obelleiro, University of Vigo, Spain;
L. Landesa, University of Extremadura, Spain; J. L. Rodriguez,
University of Vigo, Spain*

09:00-09:20

**RIGHT-HAND SIDE EFFECT ON THE CONVERGENCE OF INTEGRAL
EQUATION BASED SYSTEMS**

*Q. Liu, HKU, China; S. Sun, UESTC, China; W. C. Chew, Q. Dai, UIUC,
IL, United States; L. Jiang, HKU, China*

09:20-09:40

**EXACT-ARITHMETIC HSS-INVERSION ALGORITHM
FOR FAST DIRECT SOLUTION OF ELECTRICALLY LARGE VOLUME
INTEGRAL EQUATIONS**

M. Ma, D. Jiao, Purdue University, IN, United States

09:40-10:00

**ELECTRIC-MAGNETIC BALANCED ABSORBER GREEN'S
FUNCTION METHOD FOR MOM MATRIX THINNING**

*R. Kastner, N. Shay, Tel Aviv University, Israel; D. S. Weile, University
of Delaware, DE, United States*

10:20-10:40

**A DIAGONAL FACTORIZATION FOR INTEGRAL EQUATION
MATRICES**

R. J. Adams, J. C. Young, University of Kentucky, KE, United States

10:40-11:00

A MULTILEVEL GREEN FUNCTION INTERPOLATION METHOD TO EFFICIENTLY CONSTRUCT THE EFIE MOM-MATRIX FOR 2D-PERIODIC PEC STRUCTURES IN 3D SPACE

P. Jorna, V. Lancellotti, M.C. van Beurden, Eindhoven University of Technology, Netherlands

11:00-11:20

EFFICIENT COMPUTATION OF GREEN'S FUNCTIONS FOR UNIAXIAL ANISOTROPIC LAYERED MEDIA

D. Li, D. R. Wilton, D. R. Jackson, J. Chen, University of Houston, TX, United States

11:20-11:40

MODELING CYLINDRICAL-SECTORAL STRUCTURES WITH THE BOR-FDTD METHOD

M. Hadi, S.F. Mahmud, Kuwait University, Kuwait; A. Elsherbeni, Colorado School of Mines, CO, United States

11:40-12:00

A NOVEL DGTD METHOD AND ENGINEERING APPLICATIONS

W. Yu, ZCOMU, United States; L. Zhao, G. Chen, JSNU, China

13:20-13:40

GENERATION OF NONMINIMUM PHASE AND TIME DOMAIN RESPONSE USING AMPLITUDE-ONLY DATA

T.K. Sarkar, Syracuse University, United States; M. Salazar-Palma, Universidad Carlos III de Madrid, Spain

13:40-14:00

A HYBRID 2D TO 3D FULL WAVE INDOOR PROPAGATION MODEL

I. Kavanagh, C. Brennan, Dublin City University, Ireland

14:00-14:20

APPLYING CHARACTERISTIC MODE ANALYSIS TO FINITE ANTENNA ARRAY DESIGN

D.J. Ludick, D.B. Davidson, Stellenbosch University, South Africa

WEDNESDAY, SEPTEMBER 21, 2016, 14:20 - MEZZANINE LEVEL, ROOM 5

SESSION 27 - ICEAA

FINITE METHODS

chair R.D. Graglia, D.R. Wilton

14:20-14:40

A NUMERICAL COMPARISON BETWEEN EFIE/MOM AND CCD METHODS FOR EM SCATTERING IN TWO DIMENSIONS

A. Seagar, H. Espinosa, Griffith University, Australia

14:40-15:00

A SIMPLE METHOD FOR STATIC LOAD BALANCING OF PARALLEL FDTD CODES

O. Franek, Aalborg University, Denmark

15:00-15:20

ADAPTIVE GENERATION OF THE MULTIPLE-SCATTERING CHARACTERISTIC BASIS FUNCTIONS

X. Chen, C. Fei, H. Sun, Z. Li, C. Gu, Nanjing University of Aeronautics and Astronautics, China

WEDNESDAY, SEPTEMBER 21, 2016, 15:40 - MEZZANINE LEVEL, ROOM 5

SESSION 28 - ICEAA

TECHNOLOGIES FOR MM AND SUB-MM WAVES

chair E. de Lera Acedo, Y. Yang

15:40-16:00

CONTINUOUSLY TUNABLE DELAY LINE BASED ON EYE-LIKE RING RESONATOR

A. T. L. Hui, X. Yi, S. Song, L. Nguyen, University of Sydney, Australia

16:00-16:20

VEHICLE LOCATION ESTIMATION BASED ON 79GHZ UWB RADAR EMPLOYING ROAD OBJECTS

K. Uchiyama, A. Kajiwara, The University of Kitakyushu, Japan

16:20-16:40

STEPPED FM HIGH RANGE-RESOLUTION SENSOR WITH MUSIC

K. Ogawa, A. Kajiwara, The University of Kitakyushu, Japan

16:40-17:00

DESIGN OF AN ON-CHIP BANDPASS FILTER USING INVERSE-COUPLED RESONATOR

X. Zhu, Y. Yang, Macquarie University, Australia; Q. Xue, City University of Hong Kong, China;

17:00-17:20

A WIDEBAND INTEGRATED MARCHAND BALUN IN SILICON TECHNOLOGY FOR MILLIMETER- WAVE APPLICATIONS

Y. Zhong, Y. Yang, Macquarie University, Australia

WEDNESDAY, SEPTEMBER 21, 2016, 13:20 - MEZZANINE LEVEL, ROOM 6

SESSION 29 - ICEAA

EMC

chair R.L. Gardner, D.V. Giri

13:20-13:40

A NOVEL STRONG ELECTROMAGNETIC PULSE PROTECTION METHOD FOR RF FRONT-END

Z. Lu, D. Zhou, C. Wang, Y. Qin, National University of Defense Technology, China

13:40-14:00

PULSE INJECTION OF A PT SYMMETRIC CIRCUIT

R. L. Gardner, Consultant, VA, United States

14:00-14:20

PULSE INJECTION OF ELECTROMECHANICAL SYSTEMS

R. L. Gardner, Consultant, VA, United States

14:20-14:40

NUMERICAL CALCULATION OF SPECIFIC ABSORPTION RATE FOR SMART-WATCH WITH PLANAR INVERTED F ANTENNA

S. Hong, J.-H. Kwon, ETRI, South Korea

WEDNESDAY, SEPTEMBER 21, 2016, 14:40 - MEZZANINE LEVEL, ROOM 6

SESSION 30 - IEEE APWC

MULTI-BAND AND UWB ANTENNAS AND SYSTEMS

chair S. Barbin, T. Bird

14:40-15:00

UWB COMPACT CPW-FED CIRCULAR/ELLIPTICAL SLOT ANTENNAS WITH GEAR-SHAPED TUNING STUB

Q.C. Ying, W.B. Dou, Southeast University, China

15:00-15:20

A NOVEL WIDEBAND MULTI-PERMITTIVITY COMPOSITE DIELECTRIC RESONATOR ANTENNA FOR WIRELESS APPLICATIONS

R. Cicchetti, E. Miozzi, O. Testa, University of Rome 'La Sapienza', Italy

15:40-16:00

UWB ELLIPTICALLY-TAPERED ANTIPODAL VIVALDI ANTENNA FOR MICROWAVE IMAGING APPLICATIONS

M. Moosazadeh, S. Kharkovsky, Z. Esmati, B. Samali, Western Sydney University, Australia

16:00-16:20

TIME AND FREQUENCY DOMAIN CHARACTERISATION OF A 3D-PRINTED BI-CONICAL ANTENNA DISPERSION

J. A. Andriambeloson, P. G. Wiid, University of Stellenbosch, South Africa

16:20-16:40

SIMULATION ANALYSIS OF AUTOMOBILE LOGO PRINTED UWB MONOPOLE ANTENNAS

D. Zhou, Y. Qin, Z. Lu, National University of Defense Technology, China

16:40-17:00

WIND TURBINE BLADE DEFLECTION SENSING SYSTEM BASED ON UWB TECHNOLOGY

O. Franek, S. Zhang, T.L. Jensen, P.C.F. Eggers, K. Olesen, Aalborg University, Denmark; C. Byskov, LM Wind Power, Denmark; G.F. Pedersen, Aalborg University, Denmark

17:00-17:20

DESIGN OF A QUASI-HEMISPHERICAL UWB ANTENNA

S.S. Zhekov, A. Tatomirescu, O. Franek, G.F. Pedersen, Aalborg University, Denmark

THURSDAY, SEPTEMBER 22, 2016, 08:00 - MEZZANINE LEVEL, ROOM 3

SESSION 31 - ICEAA

ANTENNAS FOR MOBILE COMMUNICATIONS

organized by J. Guo

chair J. Guo

08:00-08:20

WIDEBAND HIGH-GAIN CIRCULARLY POLARIZED PLANAR ANTENNA BASED ON POLARIZATION ROTATOR

Y. Jia, Y. Liu, S. Gong, Xidian University, China

08:20-08:40

WIDE-BAND SIW CAVITY-BACKED CIRCULAR POLARIZED ARRAY ANTENNAS WITH SEQUENTIAL ROTATION TECHNIQUE

*D.-F. Guan, PLA University of Science and Technology, China;
C. Ding, H. Sun, University of Technology Sydney, Australia;
F. Yuan, PLA University of Science and Technology, China*

08:40-09:00

DESIGN OF 2.5-DIMENSIONAL MINIATURIZED FREQUENCY SELECTIVE SURFACE

W. Jiang, K. Zhang, S. Gong, Xidian University, China; T. Dong, Space Star Technology Co., Ltd, China

09:00-09:20

LOW-COST 3D PRINTED COMPACT CIRCULARLY POLARIZED ANTENNA WITH HIGH EFFICIENCY AND WIDE BEAMWIDTH

X. Chen, Xidian University, China; Y. J. Guo, P. Y. Qin, University of Technology Sydney, Australia; G. Fu, Xidian University, China

09:20-09:40

A BROADBAND MICROSTRIP-CPW FED CIRCULAR-POLARIZED ANTENNA

H. Liu, Y. Liu, S. Gong, Xidian University, China; T. Wan, Xi'an Research Institute of Navigation Technology, China

09:40-10:00

Q FACTOR AND INSERTION LOSS ANALYSIS OF HALF-HEIGHT PIN RIDGE GAP WAVEGUIDE

F. Fan, Xidian University, China; J. Yang, Chalmers University of Technology, Sweden; Z. Yan, Y. Liu, Xidian University, China

10:20-10:40

METAL CYLINDER CAVITIES FOR HARMONIC SUPPRESSION IN STRIPLINE POWER DIVIDERS

X. Huan-huan, T. Wan, China; Y. Wang, Xi'an Research Institute of Navigation Technology, China; Z. Yun-lin, Xi'an Research Institute of Navigation Technology, China

10:40-11:00

A DUAL-BAND HALF-WIDTH MICROSTRIP LEAKY-WAVE ANTENNA FOR BEAM SCANNING IN THE FORWARD AND BACKWARD DIRECTIONS

D.K. Karmokar, Y.J. Guo, P.-Y. Qin, University of Technology Sydney, Australia; K.P. Esselle, T. S. Bird, Macquarie University, Australia

11:00-11:20

CHARACTERISTICS OF WIDEBAND PHASED ARRAY WITH TWO-LAYER METASURFACE

X. Yang, G. Zhao, W. Hu, Xidian University, China; Y. J. Guo, University of Technology Sydney, Australia; Y. Z. Yin, Xidian University, China; A. O. Bah, University of Technology Sydney, Australia

THURSDAY, SEPTEMBER 22, 2016, 11:20 - MEZZANINE LEVEL, ROOM 3

SESSION 32 - ICEAA

ANTENNAS AND ARRAYS

chair T. Bird, Y. Rahmat-Samii

11:20-11:40

3D PRINTED MINIATURIZED QUADRIFILAR HELIX ANTENNA

Y. Tawk, M. Chahoud, M. Fadous, E. Hanna, Notre Dame University, Lebanon; J. Costantine, American University of Beirut, Lebanon; F. Ayoub, C. Christodoulou, University of New Mexico, NM, United States

11:40-12:00

PHASED ARRAY FAR FIELD IN THE TIME DOMAIN

R.L. Haupt, P. Nayeri, Colorado School of Mines, CO, United States

13:20-13:40

OPTIMIZATION OF CLOSE-IN ANTI-MISSILE SHIPBORNE GUN WEAPON SYSTEM BY PHASED ARRAY RADAR

G. Xu, Y. Wang, W. Ni, G. Pan, Jiangsu Automation Research Institute, China

13:40-14:00

SNAP-ON BUTTONS AS DETACHABLE SHORTING VIAS FOR WEARABLE TEXTILE ANTENNAS

S.J. Chen, D.C. Ranasinghe, C. Fumeaux, The University of Sydney, Australia

14:00-14:20

ACCURATE NETWORK MODEL TO SIMPLIFY THE DESIGN AND OPTIMIZATION OF THE COMPOSITE RIGHT-LEFT HANDED TRANSMISSION LINE (CRLH-TL)

K. Chen, Y. Zhang, X. Liu, S. He, G. Zhu, Wuhan University, China

14:20-14:40

EXPERIMENTAL APPROACH OF X-BAND SLOTTED MICROSTRIP PATCH ANTENNA ARRAY WITH NON-UNIFORM CURRENT DISTRIBUTION

A. Munir, Y. P. Saputra, Institut Teknologi Bandung, Indonesia; Y.Y. Maulana, Indonesian Institute of Sciences, Indonesia

14:40-15:00

A LOW-PROFILE PRINTED ANTENNA FOR UWB APPLICATIONS

R.A. Santos, A.C. Sodr e Jr, Inatel, Brazil; S.E. Barbin, USP, Brazil

15:00-15:20

A SINGLE BAND BEAM SCANNING ACTIVE PHASED ARRAY ANTENNA

B. Majumdar, K.P. Esselle, Macquarie University, Australia

15:20-15:40

KA BAND UMBRELLA REFLECTORS FOR CUBESATS: REVISITING OPTIMAL FEED LOCATION AND GAIN LOSS

V. Manohar, J.M. Kovitz, Y. Rahmat-Samii, UCLA, CA, United States

THURSDAY, SEPTEMBER 22, 2016, 08:40 - MEZZANINE LEVEL, ROOM 4

SESSION 33 - ICEAA

INVERSE PROBLEMS AND NONLINEAR MEDIA

organized by Y. Shestopalov

chair L. Angermann, Y. Shestopalov

08:40-09:00

INFLUENCE OF NOISE ON DISSIPATIVE SOLITONS AND THEIR INTERACTION

H.R. Brand, University of Bayreuth, Germany; O. Descalzi, Universidad de los Andes, Chile

09:00-09:20

MECHANICAL MOTION IN SOLID AND LIQUID ELECTROMAGNETIC METAMATERIALS

I.V. Shadrivov, Australian National University, Australia;

09:20-09:40

NONLINEAR COUPLED TE-TM WAVES IN GOUBAU LINE

E. Smolkin, Y. Shestopalov, University of Gävle, Sweden

09:40-10:00

TENSOR PERMITTIVITY RECONSTRUCTION OF MULTI-SECTIONAL DIAPHRAGM IN A RECTANGULAR WAVEGUIDE

Y.V. Shestopalov, University of Gävle, Sweden; Yu. G. Smirnov, E. D. Derevyanchuk, Penza State University, Russia

10:20-10:40

GALERKIN METHOD FOR SOLVING THE SCALAR PROBLEM OF DIFFRACTION BY A PARTIALLY SHIELDED INHOMOGENEOUS BODY

E. Smolkin, University of Gävle, Sweden; A. Tsupak, Penza State University, Russia;

10:40-11:00

MODELING AND OPTIMIZATION IN CLOAKING PROBLEMS FOR MAXWELL EQUATION

G.V. Alekseev, A.V. Lobanov, Institute of Applied Mathematics FEB RAS, Russia; Yu. E. Spivak, Far Eastern Federal University, Russia

11:00-11:20

NUMERICAL ANALYSIS OF INVERSE PROBLEMS FOR NONLINEAR COMBUSTION MODEL

G.V. Alekseev, Institute of Applied Mathematics FEB RAS, Russia; S.S. Minaev, Far Eastern Federal University, Russia; D.A. Tereshko, Institute of Applied Mathematics FEB RAS, Russia;

11:20-11:40

ADAPTIVE OPTIMIZATION ALGORITHM FOR THE COMPUTATIONAL DESIGN OF NANOPHOTONIC STRUCTURES

L. Beilina, L. Mpinganzima, P. Tassin, Chalmers University of Technology, Sweden

11:40-12:00

ADAPTIVE FINITE ELEMENT METHOD FOR THE SOLUTION OF ELECTROMAGNETIC INVERSE PROBLEM USING LIMITED OBSERVATIONS

J. Bondestam Malmberg, L. Beilina, Chalmers University of Technology and Gothenburg University, Sweden;

THURSDAY, SEPTEMBER 22, 2016, 13:20 - MEZZANINE LEVEL, ROOM 4

SESSION 34 - ICEAA

COMMUNICATION AND SIGNALING TECHNOLOGIES OF RAILWAY

organized by Y. Wen ICEAA

chair B. Cai, Y. Wen

13:20-13:40

RESEARCH ON THE WIRELESS CHANNEL STATISTICAL CHARACTERISTICS OF HIGH-SPEED RAILWAY BASED ON BIG DATA

J.B. Zhang, Y.H. Wen, Z.H. Tan, Beijing JiaoTong University, China

13:40-14:00

STATISTICAL ANALYSIS ON EMI TO VEHICULAR SIGNALING SYSTEM IN CRH

Y.H. Wen, J.B. Zhang, Beijing Jiaotong University, China

14:00-14:20

RESEARCH ON THE INFLUENCE OF 27T AXLE-LOAD TO THE RELIABILITY ANALYSIS OF HUMP REDUCER

Y. Guo, Y. Wen, J. Xiao, Beijing JiaoTong University, China

14:20-14:40

STUDY ON THE INTERNAL SURFACE CHARGING OF H2/O2 ENGINE NOZZLES

H. F. Cao, J. B. Zhang, J. Ren, J. J. Xiao, Beijing Jiaotong University, China

14:40-15:00

RESEARCH OF THE APPLICATION TECHNIQUE OF BDS IN THE WESTERN LOW DENSITY RAILWAY-LINES

S. Wei, W. Yi, C. Bai-gen, W. Jian, L. Jiang, J. Wei, Beijing Jiaotong University, China

15:00-15:20

REAL-TIME RELIABILITY EVALUATION METHOD FOR TRAIN-GROUND COMMUNICATION SUBSYSTEM BASED ON DYNAMIC BAYESIAN NETWORKS

C. Baigen, C. Bin, S. Wei, W. Jian, L. Jiang, L. Debiao, J. Wei, Beijing Jiaotong University, China

15:20-15:40

A MULTI-MODE MULTI-CHANNEL ADAPTIVE TRANSMISSION SYSTEM FOR ONLINE STATE MONITORING OF THE TROLLEYBUS

Z. Wang, S. Li, B. Cai, Beijing Jiaotong University, China; G. Wang, T. Zhang, H. Zhang, CNR Tangshan Railway Vehicle Corporation, China

THURSDAY, SEPTEMBER 22, 2016, 08:00 - MEZZANINE LEVEL, ROOM 5

SESSION 35 - ICEAA

ELECTROMAGNETICS FOR HEALTHCARE AND MEDICAL APPLICATIONS

organized by K. Ito

chair K. Ito, S. Huang

08:00-08:20

FORCEPS TYPE MICROWAVE SURGICAL DEVICE WITH TISSUE COAGULATION DETECTION MECHANISM

K. Saito, N. Ogasawara, K. Ito, Chiba University, Japan

08:20-08:40

ADVANCED PHYSICAL PHANTOMS FOR EVALUATION OF INTERACTIONS BETWEEN THE HUMAN BODY AND ELECTROMAGNETIC WAVES

K. Ito, Chiba University, Japan

08:40-09:00

THORACIC FLUID DETECTION AND MONITORING SYSTEM USING METAMATERIAL LOADED YAGI-ANTENNA ARRAY

S.A. Rezaeieh, A. Zamani, A.M. Abbosh, The University of Queensland, Australia

09:00-09:20

IMPROVED MICROWAVE MEDICAL IMAGING USING VIRTUAL ANTENNA ARRAY

A. Zamani, S. A. Rezaeieh, A.M. Abbosh, The University of Queensland, Australia

09:20-09:40

MICROWAVE HEAD IMAGING USING MULTI-FREQUENCY TOMOGRAPHY

L. Guo, A. Abbosh, University of Queensland, Australia

09:40-10:00

PULSE COMPRESSION WITH MINIMUM UNCERTAINTY: AN EFFICIENT MICROWAVE MEDICAL IMAGING TECHNIQUE

A. Afsari, A. Abbosh, The University of Queensland, Australia

10:20-10:40

LOW-COST MICROWAVE BIOMEDICAL IMAGING

K.S. Bialkowski, J. Marimuthu, A.M. Abbosh, The University of Queensland, Australia

10:40-11:00

DUAL-ARM MODIFIED-SPIRAL TEXTILE ANTENNA FOR WEARABLE MEDICAL COMMUNICATION APPLICATIONS

B. Basari, Universitas Indonesia, Indonesia; R. Aziz, Indramayu Polytechnique, Indonesia; F.Y. Zulkifli, E.T. Rahardjo, Universitas Indonesia, Indonesia

11:00-11:20

PERFORMANCE COMPARISON OF DIRECTIONAL AND OMNIDIRECTIONAL ULTRA-WIDEBAND ANTENNAS IN NEAR-FIELD MICROWAVE HEAD IMAGING SYSTEMS

A.T. Mobashsher, A.M. Abbosh, The University of Queensland, Australia

11:20-11:40

TECHNIQUES FOR RF LOCALIZATION OF WIRELESS CAPSULE ENDOSCOPY

A. S. Mohan, A. Boddupalli, Md D. Hossain, F. Gozasht, S.S.H. Ling, UTS, Australia

11:40-12:00

ELECTROMAGNETIC ACOUSTICS: TOWARDS REVOLUTIONARY IMAGING AND THERAPY

Y. Zheng, F. Gao, X. Feng, Nanyang Technological University, Singapore

13:20-13:40

METAMATERIAL-INSPIRED TRANSVERSE ELECTROMAGNETIC (TEM) HEAD COIL AT 10.5 T

S.Y. Hang, Singapore University of Technology and Design, Singapore

13:40-14:00

ON THE BORN APPROXIMATION FOR DIFFERENTIAL MICROWAVE IMAGING USING VOLUME INTEGRAL EQUATION FORMULATION

M. Bjelogrić, EPFL, Switzerland; B. Fuchs, Université de Rennes 1, France; J.R. Mosig, M. Mattes, EPFL, Switzerland

14:00-14:20

BRAIN STROKE LOCALIZATION BY USING MICROWAVE-BASED SIGNAL CLASSIFICATION

Y. Wu, M. Zhu, D. Li, Donghua University, China; Y. Zhang, University of Pittsburgh, United States; Y. Wang, University of Queensland, Australia

SESSION 36 - ICEAA

ELECTROMAGNETIC THEORY

chair T.K. Sarkar, M.C. van Beurden

08:00-08:20

**ELECTROMAGNETIC SCALAR AND VECTOR POTENTIALS
ON THE PROBLEM OF LEFT-HAND MATERIALS CONDITIONS**

*J. M. Velazquez Arcos, J. Granados Samaniego, C. A. Vargas,
Universidad Autonoma Metropolitana, Mexico*

08:20-08:40

**AN EFFICIENT SPATIAL SPECTRAL INTEGRAL-EQUATION METHOD
FOR EM SCATTERING FROM FINITE OBJECTS IN LAYERED MEDIA**

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

08:40-09:00

**APPROXIMATING NON-SPHERICAL SINGULARITIES AS
SPHERICAL SINGULARITIES FOR OBJECTS AT AN INTERFACE
BETWEEN TWO LAYERS**

*S. Sakai, A.G. Tijhuis, M.C. van Beurden, Eindhoven University of
Technology, Netherlands*

09:00-09:20

**PLANE WAVE DIFFRACTION BY A SMALL RECTANGULAR
APERTURE IN A THICK CONDUCTING SCREEN**

H. Serizawa, National Institute of Technology, Japan

09:20-09:40

FAR FIELD'S STARTING DISTANCE

*M.N. Abdallah, T.K. Sarkar, Syracuse University, NY, United States;
M. Salazar-Palma, Universidad Carlos III de Madrid, Spain*

09:40-10:00

A 3D PRINTED DUAL-RIDGED HORN ANTENNA

*B. Majumdar, Macquarie University, Australia; D. Baer, Northern
Sydney Institute, Australia; S. Chakraborty, K.P. Esselle, M. Heimlich,
Macquarie University, Australia;*

SESSION 37 - ICEAA

HIGH-POWER ELECTROMAGNETICS, SOURCES AND EFFECTS

organized by D.V. Giri, F. Vega

chair D.V. Giri, F. Vega

10:20-10:40

MODE CONVERTERS FOR HIGH-POWER MICROWAVES

D.V. Giri, University of New Mexico, United States

10:40-11:00

**FUNCTIONAL SUSCEPTIBILITY OF COTS DEVICES TO IEMI
AT LOCAL AND LARGE-SCALE LEVELS**

C.K Kasmi, J.L.E. Lopes Esteves, FNISA, France

11:00-11:20

**A TTL-CONTROLLED TRIGGER GENERATOR WITH
RISE- TIME OF NANOSECOND LEVEL**

X. Ge, Y. Xie, Xi'an Jiaotong University, China

11:20-11:40

STUDY OF THE SPACE-CHARGE LIMITED CURRENT IN CIRCULAR DIODES APPLIED TO VIRTUAL CATHODE OSCILLATOR

E. Neira, F. Vega, Universidad Nacional de Colombia, Colombia

11:40-12:00

COMPARISON OF ANALYTICAL DESCRIPTIONS FOR EARLY TIME HIGH-ALTITUDE ELECTROMAGNETIC PULSE WAVEFORM (E1)

Y. Zhou, Y. Xie, Xi'an Jiaotong University, China

THURSDAY, SEPTEMBER 22, 2016, 13:20 - MEZZANINE LEVEL, ROOM 6

SESSION 38 - ICEAA

ANTENNAS AND ELECTROMAGNETIC DEVICES INSPIRED BY ELECTROMAGNETIC BAND GAP

organized by K.P. Esselle, L. Matekovits

chair K.P. Esselle, T. Kikkawa

13:20-13:40

WIDEBAND SINGLE-FEED HIGHLY DIRECTIVE RESONANT CAVITY ANTENNAS WITH ALL-DIELECTRIC SUPERSTRUCTURES

R. M. Hashmi, A. A. Baba, K. P. Esselle, Macquarie University, Australia

13:40-14:00

DESIGN OF UWB ANTENNAS FOR BREAST CANCER DETECTION

H. Song, S. Kubota, Hiroshima University, Japan; X. Xiao, Tianjin University, China; T. Kikkawa, Hiroshima University, Japan

14:00-14:20

SLOW WAVE EBG-BASED TRANSMISSION LINES AND APPLICATIONS

J. Selga, P. Vélez, J. Bonache, F. Martín, Universitat Autònoma de Barcelona, Spain

14:20-14:40

COMPUTATIONAL MODELING OF NONLINEAR OPTICAL RESPONSE OF 2D-3D HETEROMATERIALS

N. Panoiu, M. Weismann, University College London, United Kingdom

14:40-15:00

PLANAR OPTICS BY GRADIENT METASURFACES

S. Sun, Fudan University, China

15:00-15:20

RADIATION PERFORMANCE AND PROFILE COMPARISON OF ALL-DIELECTRIC PHASE-CORRECTED ELECTROMAGNETIC BANDGAP RESONATOR ANTENNAS AND HYPERBOLIC LENS ANTENNAS

M.U. Afzal, K.P. Esselle, Macquarie University, Australia

FREE SHORT COURSE ON

**THE PHYSICS AND MATHEMATICS
OF THE SIGNAL PROPAGATION MECHANISM
IN CELLULAR WIRELESS COMMUNICATION SYSTEMS**

Instructor: Tapan K. Sarkar Syracuse University, Syracuse, NY, USA

The objective of this short course is to introduce a new physics based visualization of the Electromagnetic wave propagation mechanism in cellular wireless communication systems. We also illustrate from a mathematical point of view that an electromagnetic macro model can accurately predict the dominant component of the propagation path loss in a cellular wireless communication. The reason a macro model can provide accurate results that agree with experiments is because the trees, buildings, and other man made obstacles contribute second order effects to the propagation path loss as the dominant component is the free space propagation of the signal and the effect of the Earth over which the signal is propagating. It is demonstrated using both measurements and an analytical theoretical model that the propagation path loss inside a cellular communication cell is first about 30 dB per decade of distance and later on, usually outside the cell, it is about 40 dB per decade of distance between the transmitter and the receiver irrespective of their heights from the ground. This implies that the electric field decays first at a rate of $\rho^{-1.5}$ inside the cell and later on, usually outside the cell, as ρ^{-2} , where ρ stands for the distance between the transmitter and the receiver. It will also be illustrated that the so called slow fading is due to the interference between the direct wave and the ground wave as introduced by Sommerfeld over a hundred years ago. All these statements can be derived from the approximate integration of the Sommerfeld integrals using a modified path for the steepest descent method and also using an accurate purely numerical methodology. An optical analog model will be presented based on the image theory developed by Van der Pol to illustrate the mechanism of radio wave propagation in a cellular wireless communication system where the path loss is 30 dB per decade or the field decays as $\rho^{-1.5}$. This macro model is used to refine the experimental data collection system for the propagation path loss and it is also illustrated how the antenna tilt both mechanical and electrical can be incorporated in the macro model to predict the propagation path loss. Finally, an observation is made on how to further improve the propagation mechanism by observing the second channel from the mobile to the base station. Numerical data will reveal that the proposed methodology is a much better way to deploy base station antennas.

SHORT COURSE ON

HIGH-POWER ELECTROMAGNETICS

Instructor: Dave V. Giri University of New Mexico, USA

OUTLINE

- 1) **Classification of HPEM based on bandwidth**
UWB and High-Power Microwave (HPM) are parts of many types of HPEM signals. International IEC Standard 61000-2-13 on classifying High-Power EM signals will be discussed.
- 2) **HPM Sources and Phase Locking**
Various vacuum devices like Magnetron, Klystron, Reltron, and Vircator etc will be discussed. Ways of phase-locking HPM sources will be discussed here.
- 3) **HPM Facilities and their Capabilities and Diagnostics:**
Review of some of the indoor and outdoor HPM facilities that exist in the world. Antenna design, type of HPM source, the type of antenna for some of these systems will be discussed.
- 4) **High-Power Moderate Band Systems:**
This is an emerging technology. HPM is a single frequency signal. We are now building High-Power systems with 10 to 20 % bandwidth. Source technologies, antenna systems and how they are used for vulnerability measurements will be discussed.
- 5) **Hyperband Systems:**
Ultra-wideband (UWB) systems that radiate very high-level transient waveforms and exhibit operating bandwidths of over two decades are now in demand for a number of applications. Such systems are known to radiate impulse-like waveforms with risetimes around 100 picoseconds (ps) and peak electric field values of 10s of kV/m.
- 6) **The most powerful UWB System**
We describe a large, high voltage transient system built at the Air Force Research Laboratory, Kirtland AFB, NM, during 1997-1999. The pulsed power system centers on a very compact resonant transformer capable of generating over 1 MV at a pulse repetition frequency (PRF) of 600 Hz. This is switched via an integrated transfer capacitor and an oil peaking switch onto an 85-W Half-IRA (Impulse Radiating Antenna). This unique system will deliver a far radiated field with a full-width half maximum (FWHM) on the order of 100 ps, and a field-range product ($r E_{far}$) of ~ 5.3 MV, exceeding all previously reported results by a factor of several.
- 7) **Application of Hyperband Systems:**
With Hyperband systems with bandwidths of nearing the theoretical maximum of 200%, many applications become possible. These applications have evolved in the last 5 to 8 years.
- 8) **Documented EM Effects:**
EM effects are real and they happen all the time, even in civilian facilities such as hospitals and on board aircrafts. A list of documented EM effects will be discussed.

The cost of the Workshop is AU\$80; it includes refreshments.

SHORT COURSE ON

INTRODUCTION TO APERTURE ANTENNAS & ARRAYS

Instructor: Prof. Trevor S. Bird, FTSE, LFIEEE, Macquarie University, Antengenuity, PO Box 306, Eastwood NSW 2122, Australia

The topic of aperture antennas includes many antennas in common daily use. Typical examples include waveguides, horns, reflectors, lenses, slits, slots and microstrip antennas. In this Workshop the underlying theory of these antennas is described as well of their applications. The intention is to provide an introduction to some basic aperture antennas and their design. It will be assumed that attendees are familiar with the basics of Maxwell's equations, fields and waves.

Aperture antennas are normally associated with directional beams and, indeed, this is their role in many applications. Aperture antennas can also occur on non-planar or curved surfaces such as on aircraft or ground-based vehicles. These antennas may consist of a single radiator or in arrays. In this form they are often used to provide directional or shaped beams.

A limitation of a directional planar antenna is that when it is scanned from broadside the beam broadens and the pattern deteriorates. When the antenna is conformal to a convex surface, such as a cylinder or a cone, the beam can be scanned in discrete steps through an arc while maintaining a constant pattern. Of importance in the design of low sidelobe antenna arrays, both planar and conformal, is predicting the effect of mutual coupling between the array elements. Maximum performance is achieved from arrays when the coupling between elements is fully taken into account.

The cost of the Workshop is AU\$80; it includes refreshments and a copy of the author's book 'Fundamentals of Aperture Antennas and Arrays', which the attendees will receive when they arrive. The book will be used as the notes for the Workshop.

Topics to be covered include:

- 1) **Introduction (30 min)**
 - Definition of aperture antenna
 - Equivalent sources
 - Fields radiated by an aperture
 - Basic antenna parameters
- 2) **Waveguide and horn antennas (1 hr)**
- 3) **Reflector antennas (1 hr)**
- 4) **Arrays of aperture antennas (1 hr)**
- 5) **Other aperture antennas (1 hr)**
 - reflectarrays
 - lenses
 - Fabry-Perot resonators

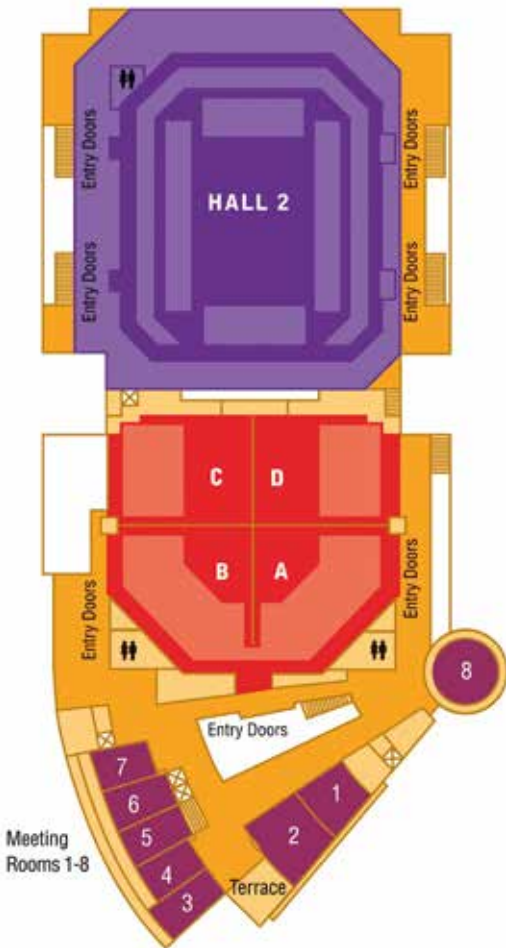
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MAP



EXHIBITION LEVEL



MEZZANINE LEVEL

NOTES



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