



## [WeA1] Small Antennas and RF Sensors

<b>Date / Time</b>	Oct. 24 (Wed.), 2018 / 13:00-14:40
<b>Place</b>	Room A (Grand Ballroom 1)
<b>Session Chairs</b>	You-Chung Chung (Daegu University, Korea) Rangsan Wongsan (Suranaree University of Technology, Thailand)

### WeA1-1

13:00-13:20

#### TM<sub>02</sub> Quarter Mode Substrate-Integrated Waveguide Resonator for Dual Sensing of Chemicals

Ahmed Salim and Sungjoon Lim  
*Chung-Ang University, Korea*

### WeA1-2

13:20-13:40

#### Two-Element Compact Antenna Arrays with Four-Branch Diversity Using Directional Couplers and Phase Shifters

Kengo Nishimoto, Yasuhiro Nishioka, and Naofumi Yoneda  
*Mitsubishi Electric Corporation, Japan*

### WeA1-3

13:40-14:00

#### Dual-Beam Steering Antenna Using Switchable Small Patches on PCB Based Square Patch

Uaychai Yatongchai, Piyaphorn Meesawad, and Rangsan Wongsan  
*Suranaree University of Technology, Thailand*

### WeA1-4

14:00-14:20

#### Dual-Band Patch Antenna for Communication and Moisture Measurement of Coffee Bean

Hwan-Sul Chang and You-Chung Chung  
*Daegu University, Korea*

### WeA1-5

14:20-14:40

#### Design of Electrically Small and Thin Huygens Source Antenna

Su-Hyeon Lee, Sonapreetha Mohan Radha, Geonyeong Shin, and Ick-Jae Yoon  
*Chungnam National University, Korea*



## [WeB1] Channel Sounding and Estimation

<b>Date / Time</b>	Oct. 24 (Wed.), 2018 / 13:00-14:40
<b>Place</b>	Room B (Grand Ballroom 2)
<b>Session Chairs</b>	Hisato Iwai (Doshisha University, Japan) Jae-Young Chung (Seoul National University of Science and Technology, Korea)

### WeB1-1

13:00-13:20

#### Investigation of Channel Properties for 28 GHz Band in Urban Street Microcell Environments

Minoru Inomata, Tetsuro Imai, Koshiro Kitao, and Yukihiko Okumura  
*NTT DOCOMO, INC., Japan*

### WeB1-2

13:20-13:40

#### Characterization of Human Body Shadowing Loss at 2.5 GHz and 5.8 GHz in an Indoor Environment

Santiago Pérez-Peña<sup>1,2</sup>, Yuki Ito<sup>1</sup>, Kai Yoshida<sup>1</sup>, Hisato Iwai<sup>1</sup>, and Hideichi Sasaoka<sup>1</sup>  
<sup>1</sup>*Doshisha University, Japan*, <sup>2</sup>*Universidad Politécnica de Madrid, Spain*

### WeB1-3

13:40-14:00

#### Analysis of Diffraction Characteristics at 28GHz Band in a Vehicular Communication Environment

Shohei Kawasaki<sup>1</sup>, Yuki Ito<sup>1</sup>, Hisato Iwai<sup>1</sup>, Satoshi Nakano<sup>2</sup>, Yasuhiro Suegara<sup>3</sup>, Masaya Sibayama<sup>3</sup>,  
and Masahito Umehara<sup>3</sup>  
<sup>1</sup>*Doshisha University, Japan*, <sup>2</sup>*KDDI Corporation, Japan*, <sup>3</sup>*KDDI Research, Inc., Japan*

### WeB1-4

14:00-14:20

#### System Impairment Compensation of mmWave Channel Sounder with Multiple Antennas

Kyung-Won Kim, Myung-Don Kim, Heon-Kook Kwon, and Jae-Joon Park  
*ETRI, Korea*

### WeB1-5

14:20-14:40

#### Novel Channel Estimation Using Time and Frequency Correlation Properties for IEEE 802.11p

Joo-Young Choi<sup>1</sup>, Cheol Mun<sup>2</sup>, and Jong-Gwan Yook<sup>1</sup>  
<sup>1</sup>*Yonsei University, Korea*, <sup>2</sup>*Korea National University of Transportation, Korea*



## [WeC1] Computational Electromagnetics

<b>Date / Time</b>	Oct. 24 (Wed.), 2018 / 13:00-15:00
<b>Place</b>	Room C (Grand Ballroom 3)
<b>Session Chairs</b>	Ic-Pyo Hong (Kongju National University, Korea) Shinichiro Ohnuki (Nihon University, Japan)

### WeC1-1

13:00-13:20

#### A Fast Computation of Far Interactions in MLCBFM for Electromagnetic Analysis of Large Structures

Chan-Sun Park<sup>1</sup>, Ic-Pyo Hong<sup>2</sup>, Inkyun Jung<sup>3</sup>, and Jong-Gwan Yook<sup>1</sup>

<sup>1</sup>Yonsei University, Korea, <sup>2</sup>Kongju National University, Korea, <sup>3</sup>Korea Aerospace Industries, Korea

### WeC1-2

13:20-13:40

#### A Study on Eigenmode Analysis of Pillar-Type Photonic Crystal Waveguide

Koki Watanabe and Kamin Kangkarn

Fukuoka Institute of Technology, Japan

### WeC1-3

13:40-14:00

#### A General-Purpose Preconditioner for Method of Moments Matrices and a Novel Approach to Resolving the Low Frequency Breakdown Problem

Rajarshi Bhattacharya<sup>1,2</sup>, Nathawut Homsup<sup>1</sup>, and Raj Mittra<sup>1</sup>

<sup>1</sup>University of Central Florida, USA, <sup>2</sup>National Institute of Technology Patna, India

### WeC1-4

[Invited]

14:00-14:20

#### Auxiliary Divergence-Free Electromagnetic Fields

Raphael Kastner<sup>1,2</sup>

<sup>1</sup>Tel Aviv University, Israel, <sup>2</sup>University of Pennsylvania, USA

### WeC1-5

14:20-14:40

#### Numerical Accuracy of Finite-Difference Methods

Ryohei Ohnishi<sup>1</sup>, Di Wu<sup>1</sup>, Takashi Yamaguchi<sup>2</sup>, and Shinichiro Ohnuki<sup>1</sup>

<sup>1</sup>Nihon University, Japan, <sup>2</sup>Tokyo Metropolitan Industrial Technology Research Institute, Japan

### WeC1-6

14:40-15:00

#### An Efficient Unconditionally Stable RPIM Meshless Algorithm Solution of Helmholtz Wave Equation in Time Domain

R. Khalef, M. T. Benhabiles, F. Grine, Z. Cheraiet, L. Benkhaoua, H. Ammari, and M. L. Riabi

Université Frères Mentouri, Algeria



## [WeD1] mmWave and THz Arrays, Reflectors, and Lens

<b>Date / Time</b>	Oct. 24 (Wed.), 2018 / 13:00-14:20
<b>Place</b>	Room D (Napoli Room)
<b>Session Chair</b>	Jong-Eon Park (Hongik University, Korea)

### WeD1-1

13:00-13:20

#### Quad-Beam Bidirectional Single Metal Layer Array Antenna Optimized with Genetic Algorithm

Yu Dang, Shixiong Yin, Feiyang Deng, Jiaran Qi, and Hongmei Li  
*Harbin Institute of Technology, China*

### WeD1-2

13:20-13:40

#### An Element-Staggered, Wide-Angle Beam Scanning Transmitarray Antenna with Four Focuses Design

Nan-Nan Wang, Bing-Xu Zhao, Mu Fang, and Jing-Hui Qiu  
*Harbin Institute of Technology, China*

### WeD1-3

13:40-14:00

#### V-Band Planar Helical Antenna Using TGSV Technology

Aqeel Hussain Naqvi, Jeong Heum Park, Chang-Wook Baek, and Sungjoon Lim  
*Chung-Ang University, Korea*

### WeD1-4

14:00-14:20

#### Compact Omnidirectional 28 GHz 2X2 MIMO Antenna Array for 5G Communications

Md Nazmul Hasan and Munkyo Seo  
*Sungkyunkwan University, Korea*



## [WeE1] Wearable Device Networks and Medical Applications

<b>Date / Time</b>	Oct. 24 (Wed.), 2018 / 13:00-15:00
<b>Place</b>	Room E (Venice Room)
<b>Session Chairs</b>	Qiang Chen (Tohoku University, Japan) Ick-Jae Yoon (Chungnam National University, Korea)

### WeE1-1

13:00-13:20

#### Design of Inner-Layer Capsule Dipole Antenna For Ingestible Endoscope

Hiroyasu Sato<sup>1</sup>, Yang Li<sup>2</sup>, Junyi Xu<sup>1</sup>, and Qiang Chen<sup>1</sup>

<sup>1</sup>Tohoku University, Japan, <sup>2</sup>Tianjin Normal University, China

### WeE1-2

13:20-13:40

#### Analytic Study on the Small Antennas Coupling for Wireless Biotelemetry

Geonyeong Shin and Ick-Jae Yoon

Chungnam National University, Korea

### WeE1-3

13:40-14:00

#### Real-Time 2D Microwave Differential Imaging for Temperature Monitoring

Kwang-Jae Lee<sup>1</sup>, Jang-Yeol Kim<sup>1</sup>, Bo-Ra Kim<sup>1</sup>, Soon-Ik Jeon<sup>1</sup>, Nam Kim<sup>2</sup>, and Seong-Ho Son<sup>1</sup>

<sup>1</sup>ETRI, Korea, <sup>2</sup>Chungbuk National University, Korea

### WeE1-4

14:00-14:20

#### Analysis of High Frequency Curved Plate Applicator for Deep Hyperthermia in Breast Cancer Treatment by Using Dielectric Heating

Supawat Kotchapradit, Thanaset Thosdeekoraphat, Samran Santalunai, and Chanchai Thongsopa

Suranaree University of Technology, Thailand

### WeE1-5

14:20-14:40

#### Numerical Simulation and Experimental Validation on Focused Microwave Thermotherapy

Jang-Yeol Kim, Kwang-Jae Lee, Soon-Ik Jeon, Bo-Ra Kim, and Seong-Ho Son

ETRI, Korea

### WeE1-6

14:40-15:00

#### Investigation on Dielectric and Thermal Properties of Phantom for Focused Microwave Thermotherapy

Bo-Ra Kim, Kwang-Jae Lee, Jang-Yeol Kim, Soon-Ik Jeon, and Seong-Ho Son

ETRI, Korea



## [WeF1] [Special Session] Recent Advances in Electromagnetic Sensors for Wireless Sensing Applications

Date / Time	Oct. 24 (Wed.), 2018 / 13:00-15:00
Place	Room F (Miami Room)
Session Chairs	Danai Torrungrueng (King Mongkut's University of Technology North Bangkok, Thailand) Takeshi Fukusako (Kumamoto University, Jaan)

### WeF1-1

[Invited Speaker]

13:00-13:40

#### Recent Advances in RFID Sensors for Construction Material Monitoring Applications

Rattapong Suwalak<sup>1</sup>, Kittima Lertsakwimarn<sup>2</sup>, Chuwong Phongcharoenpanich<sup>1</sup>, Prayoot Akkaraekthalin<sup>2</sup>, and Danai Torrungrueng<sup>2</sup>

<sup>1</sup>King Mongkut's Institute of Technology Ladkrabang, Thailand,

<sup>2</sup>King Mongkut's University of Technology North Bangkok, Thailand

### WeF1-2

13:40-14:00

#### Paddy Moisture Measurement System in Hopper Silo by Using Near-Field Transmission Technique

Somporn Seewattananon<sup>1</sup>, Nopphamat Promasa<sup>1</sup>, Nonchanutt Chudpooti<sup>2</sup>, and Prayoot Akkaraekthalin<sup>2</sup>

<sup>1</sup>Rajamangala University of Technology Suvarnabhumi, Thailand,

<sup>2</sup>King Mongkut's University of Technology North Bangkok, Thailand

### WeF1-3

14:00-14:20

#### Beam Steering Technology of Near-Field Focused Phased Array of Antennas for RFID Applications

Chen-Yi Chang<sup>1</sup>, Hsi-Tseng Chou<sup>1</sup>, Zong-Chen Tsai<sup>1</sup>, Ming-Yu Lee<sup>2</sup>, and Chien-Te Yu<sup>2</sup>

<sup>1</sup>National Taiwan University, Taiwan, <sup>2</sup>Yuan-Ze University, Taiwan

### WeF1-4

14:20-14:40

#### Low-Profile and 4-Beam Antenna for Sensor Network Applications

Takeshi Fukusako, Nobuhiro Imaizumi, and Ryuji Kuse

Kumamoto University, Japan

### WeF1-5

14:40-15:00

#### Mitigation of Interference from Strong Scatters in Remote Sensing Scenarios

Yuan-Chang Hou and Wen-Jiao Liao

National Taiwan University of Science and Technology, Taiwan



## [WeG1] [Special Session] Innovative MIMO Related Technologies for Future Wireless Communication Systems

Date / Time	Oct. 24 (Wed.), 2018 / 13:00-15:00
Place	Room G (Sicily Room)
Session Chairs	Kentaro Nishimori (Niigata University, Japan) Qiang Chen (Tohoku University, Jaan)

### WeG1-1

[Invited Speaker]

13:00-13:40

#### Novel Technologies Using Massive MIMO Transmission toward 5G and its Beyond Systems

Kentaro Nishimori  
*Niigata University, Japan*

### WeG1-2

13:40-14:00

#### Evaluation of Polarization Composite Type Omnidirectional Antenna in Actual Environment

Kota Shishido<sup>1</sup>, Ichiro Oshima<sup>1</sup>, Takayoshi Sasaki<sup>1</sup>, Keisuke Sato<sup>1</sup>, and Kentaro Nishimori<sup>2</sup>  
<sup>1</sup>*Denki Kogyo Co. Ltd., Japan*, <sup>2</sup>*Niigata University, Japan*

### WeG1-3

14:00-14:20

#### Gain Enhancement of 60-GHz SIW Cavity-Backed Slot Array Antenna with Metallic Grooves

Youngtaek Hong and Jaehoon Choi  
*Hanyang University, Korea*

### WeG1-4

14:20-14:40

#### Enabling Full-Duplex MIMO Communication Exploiting Array Antenna Arrangement

Naoki Honma<sup>1</sup>, Shotaro Heianna<sup>1</sup>, Astuto Kawagoe<sup>1</sup>, Shizuka Tada<sup>1</sup>, Yoshiyuki Yamamoto<sup>2</sup>, Qiaowei Yuan<sup>3</sup>,  
and Qiang Chen<sup>2</sup>  
<sup>1</sup>*Iwate University, Japan*, <sup>2</sup>*Tohoku University, Japan*, <sup>3</sup>*National Institute of Technology, Sendai College, Japan*

### WeG1-5

14:40-15:00

#### Real-Time 5G Radio Wave Visualizer

Tetsuro Imai, Minoru Inomata, Koshiro Kitao, and Yukihiko Okumura  
*NTT DOCOMO, INC., Japan*



## [WeA2] Broadband and Multi-band Antennas I

Date / Time	Oct. 24 (Wed.), 2018 / 16:30-18:30
Place	Room A (Grand Ballroom 1)
Session Chairs	Johnson J. H. Wang (Wang Electro-Opto Corporation, USA) Young Joong Yoon (Yonsei University, Korea)

### WeA2-1

16:30-16:50

#### Broadband-Multiband Antennas Enabling Capacity & Security for Mobile Wireless 5G and Beyond

Johnson J. H. Wang

*Wang Electro-Opto Corporation, USA*

### WeA2-2

16:50-17:10

#### Study of Folded Bow-Tie Antenna with a Reflector

Jun Abiru<sup>1</sup>, Naobumi Michishita<sup>1</sup>, Hisashi Morishita<sup>1</sup>, Kenji Kawabata<sup>2</sup>, and Yasuhiro Murakami<sup>2</sup>

<sup>1</sup>National Defense Academy, Japan, <sup>2</sup>Fujitsu Limited, Japan

### WeA2-3

17:10-17:30

#### Design of Broadband Repeater Antenna with Firefighting Band for In-Building Mobile Communication

Kyeong-Sik Min<sup>1</sup>, Kwang-Gun Lee<sup>1</sup>, and Youngwook Kim<sup>2</sup>

<sup>1</sup>Korea Maritime and Ocean University, Korea, <sup>2</sup>California State University, USA

### WeA2-4

17:30-17:50

#### A Planar 3.4–9 GHz UWB Monopole Antenna

Md Nazmul Hasan and Munkyo Seo

*Sungkyunkwan University, Korea*

### WeA2-5

17:50-18:10

#### A Compact Modified E-Shaped Monopole Antenna for USB Dongle Applications

Suchitra Jeenawong<sup>1</sup>, Patchadaporn Sangpet<sup>1</sup>, Pichet Moeikham<sup>1</sup>, and Prayoot Akkaraekthalin<sup>2</sup>

<sup>1</sup>Rajamangala University of Technology Lanna Chiang Rai, Thailand,

<sup>2</sup>King Mongkut's University of Technology North Bangkok, Thailand

### WeA2-6

18:10-18:30

#### Characteristic Modes Analysis to Integrate a Feeding Network in a Wideband Superdirective Array

Hussein Jaafar, Sylvain Collardey, and Ala Sharaiha

*IETR, France*





## [WeB2] Millimeter-wave, THz and Optical Propagation

<b>Date / Time</b>	Oct. 24 (Wed.), 2018 / 16:30-18:30
<b>Place</b>	Room B (Grand Ballroom 2)
<b>Session Chairs</b>	Tae-In Jeon (Korea Maritime and Ocean University, Korea) Minseok Kim (Niigata University, Japan)

### WeB2-1

16:30-16:50

#### Multilevel Modulation by LED Luminance Distribution for Optical Camera Communication

Masahiro Kinoshita, Takuya Zinda, and Wataru Chujo  
*Meijo University, Japan*

### WeB2-2

16:50-17:10

#### 300-GHz Dual-Beam Frequency-Selective On-Chip Antenna for High- $T_c$ Superconducting Receivers

Xiang Gao<sup>1</sup>, Ting Zhang<sup>2</sup>, Jia Du<sup>1</sup>, and Y. Jay Guo<sup>2</sup>  
<sup>1</sup>*CSIRO Manufacturing, Australia*, <sup>2</sup>*University of Technology Sydney, Australia*

### WeB2-3

17:10-17:30

#### Development of Link Context-Aware Millimeter-Wave Beam Switching System Using Depth-Sensor

Minseok Kim, Hideaki Momose, and Tomoyuki Nakayama  
*Niigata University, Japan*

### WeB2-4

17:30-17:50

#### Long Distance Propagation of THz Pulses Having 0.4-THz Bandwidth

Gyeong-Ryul Kim<sup>1</sup>, D. Grischkowsky<sup>2</sup>, and Tae-In Jeon<sup>1</sup>  
<sup>1</sup>*Korea Maritime and Ocean University, Korea*, <sup>2</sup>*Oklahoma State University, USA*

### WeB2-5

17:50-18:10

#### Analysis of Delay and AOD Spread at 67 GHz for an Urban Micro Street Canyon Scenario

Michael Peter<sup>1</sup>, Wilhelm Keusgen<sup>1</sup>, Taro Eichler<sup>2</sup>, Kiyoshi Yanagisawa<sup>2</sup>, Koshiro Kitao<sup>3</sup>, Tetsuro Imai<sup>3</sup>, Minoru Inomata<sup>3</sup>, and Yukihiro Okumura<sup>3</sup>, and Takehiro Nakamura<sup>3</sup>  
<sup>1</sup>*Fraunhofer Heinrich Hertz Institute, Germany*, <sup>2</sup>*Rohde & Schwarz, Germany*, <sup>3</sup>*NTT Docomo, INC., Japan*

### WeB2-6

18:10-18:30

#### Analysis of the Effect of Antenna Beamwidth on Received Power in Large Indoor Environments Based on Millimeter-Wave Channel Measurements

Juyul Lee, Kyung-Won Kim, Jae-Joon Park, and Myung-Don Kim  
*ETRI, Korea*



## [WeC2] MIMO and Its Applications

Date / Time	Oct. 24 (Wed.), 2018 / 16:30-18:30
Place	Room C (Grand Ballroom 3)
Session Chairs	Andrés Alayón Glazunov (University of Twente, The Netherlands) Naoki Honma (Iwate University, Japan)

### WeC2-1

16:30-16:50

#### Performance Comparison between Block Maximum SNR Algorithm and MMSE Channel Inversion Algorithm in Multiuser-MIMO Systems

Kosuke Yonezu, Nobuyoshi Kikuma, and Kunio Sakakibara  
*Nagoya Institute of Technology, Japan*

### WeC2-2

16:50-17:10

#### Impact of Power Normalization on System-Level Performance in MU-MIMO with User Scheduling

Ryota Mizutani, Yukiko Shimbo, Hirofumi Suganuma, and Fumiaki Maehara  
*Waseda University, Japan*

### WeC2-3

17:10-17:30

#### Simultaneous Detection of Multiple Targets' Vital Signs Using MIMO Radar

Shun Hasebe, Dai Sasakawa, Kazuma Kishimoto, and Naoki Honma  
*Iwate University, Japan*

### WeC2-4

17:30-17:50

#### Study on Number of Selected Antennas in Massive MIMO Using Block Diagonalization

Yuki Yaku<sup>1</sup>, Kentaro Nishimori<sup>1</sup>, Yoshiki Shirasawa<sup>1</sup>, Ryotaro Taniguchi<sup>1</sup>, Yoshiaki Morino<sup>2</sup>, Takefumi Hiraguri<sup>2</sup>, and Nobuyoshi Kikuma<sup>3</sup>  
<sup>1</sup>*Niigata University, Japan*, <sup>2</sup>*Nippon Institute of Technology, Japan*, <sup>3</sup>*Nagoya Institute of Technology, Japan*

### WeC2-5

17:50-18:10

#### An Experimental Study on Indoor Massive 3D-MIMO Channel at 30-40 GHz Band

Jiliang Zhang<sup>1</sup>, Andrés Alayón Glazunov<sup>1,2</sup>, Jian Yang<sup>1</sup>, Xiaoli Chu<sup>3</sup>, and Jie Zhang<sup>3</sup>  
<sup>1</sup>*Chalmers University of Technology, Sweden*, <sup>2</sup>*University of Twente, The Netherlands*, <sup>3</sup>*University of Sheffield, UK*

### WeC2-6

18:10-18:30

#### Effect of Propagation Environment Control Method Using Drone MIMO Relay Station

Naoki Matsumura<sup>1</sup>, Kentaro Nishimori<sup>1</sup>, Ryotaro Taniguchi<sup>1</sup>, Tsutomu Mitsui<sup>1</sup>, and Takefumi Hiraguri<sup>2</sup>  
<sup>1</sup>*Niigata University, Japan*, <sup>2</sup>*Nippon Institute of Technology, Japan*



## [WeD2] Remote Sensing and Radar

<b>Date / Time</b>	Oct. 24 (Wed.), 2018 / 16:30-18:30
<b>Place</b>	Room D (Napoli Room)
<b>Session Chairs</b>	Hiroyuki Arai (Yokohama National University, Japan) Il-Suek Koh (Inha University, Korea)

### WeD2-1

16:30-16:50

#### Modeling and Simulation for Evaluation of Air-to-Ground Radar Baseband Echo Signals

Bora Seo<sup>1</sup>, Jae-Won Rim<sup>1</sup>, Il-Suek Koh<sup>1</sup>, Jong-Suk Yoon<sup>2</sup>, and Tae-Hyung Kim<sup>2</sup>

<sup>1</sup>Inha University, Korea, <sup>2</sup>LIG Nex1 Co., Ltd., Korea

### WeD2-2

16:50-17:10

#### Effect of Tilt-Modulation and Shadowing on Backscatterer of Ocean Surface

Jae-Won Rim and Il-Suek Koh

*Inha University, Korea*

### WeD2-3

17:10-17:30

#### Correlation between Microwave and Blood Pressure Response Waveforms

Jun Sato, Kazuma Kishimoto, Naoki Honma, Morio Iwai, and Koichiro Kobayashi

*Iwate University, Japan*

### WeD2-4

17:30-17:50

#### Design Method of Cardioid Pattern by CMA

Kazuki Kamiyama, Bakar Rohani, and Hiroyuki Arai

*Yokohama National University, Japan*

### WeD2-5

17:50-18:10

#### Study on the Feature Extraction Algorithm for Efficient Ballistic Target Discrimination

In-Oh Choi<sup>1</sup>, Min Kim<sup>1</sup>, Ki-Bong Kang<sup>1</sup>, Sang-Hong Park<sup>2</sup>, and Kyung-Tae Kim<sup>1</sup>

<sup>1</sup>POSTECH, Korea, <sup>2</sup>Pukyong National University, Korea

### WeD2-6

18:10-18:30

#### Target Discrimination for Multiple Vital Sign Detection with Super-Resolution Algorithm

Hyunjae Lee and Jong-Gwan Yook

*Yonsei University, Korea*



## [WeE2] [Special Session] Millimeter-Wave-Terahertz Antennas and Systems

<b>Date / Time</b>	Oct. 24 (Wed.), 2018 / 16:30-18:30
<b>Place</b>	Room E (Venice Room)
<b>Session Chairs</b>	Goutam Chattopadhyay (NASA-JPL/California Institute of Technology, USA) Tadao Nagatsuma (Osaka University, Japan)

### WeE2-1

[Invited Speaker]

16:30-17:10

#### Terahertz Antenna Technologies for Space Science Applications

Goutam Chattopadhyay<sup>1</sup>, Maria Alonso-DelPino<sup>1</sup>, Cecile Jung-Kubiak<sup>1</sup>, Theodore Reck<sup>1</sup>, Choonsup Lee<sup>1</sup>, Nacer Chahat<sup>1</sup>, Sofia Rahiminejad<sup>1</sup>, and David González-Ovejero<sup>2</sup>

<sup>1</sup>California Institute of Technology, USA, <sup>2</sup>IETR, France

### WeE2-2

17:10-17:30

#### Fabrication of Devices and Antennas for Millimeter-Wave and Terahertz Systems

Choonsup Lee<sup>1</sup>, D. Gonzalez-Ovejero<sup>2</sup>, M. Alonso-DelPino<sup>1</sup>, T. Reck<sup>1</sup>, A. Peralta<sup>1</sup>, I. Mehdi<sup>1</sup>, and Goutam Chattopadhyay<sup>1</sup>

<sup>1</sup>California Institute of Technology, USA, <sup>2</sup>IETR, France

### WeE2-3

17:30-17:50

#### Compact Measurement Setup for Antennas Operating in the 220-325 GHz Band

C. Belem Goncalves<sup>1,2,3</sup>, E. Lacombe<sup>1,2</sup>, Carlos del Río<sup>4</sup>, F. Gianesello<sup>1</sup>, C. Luxey<sup>2</sup>, and G. Ducournau<sup>3</sup>

<sup>1</sup>STMicroelectronics, France, <sup>2</sup>University Nice Sophia-Antipolis, France

<sup>3</sup>Institute of Electronics, Microelectronics and Nanotechnology, France, <sup>4</sup>Public University of Navarra, Spain

### WeE2-4

17:50-18:10

#### Antenna Technologies for Terahertz Communications

Tadao Nagatsuma

Osaka University, Japan

### WeE2-5

18:10-18:30

#### Spoof Surface Plasmon Based Planar THz Sensor System Using Dumbbell Shaped Unit Cell

M Jaleel Akhtar, Nilesh K Tiwari, and Surya P Singh

Indian Institute of Technology Kanpur, India



**[WeF2] [Special Session] Special Topics on High Gain, Multi-beam and Multi-band Phased Arrays**

<b>Date / Time</b>	Oct. 24 (Wed.), 2018 / 16:30-18:30
<b>Place</b>	Room F (Miami Room)
<b>Session Chairs</b>	Tzyh-Ghuang Ma (National Taiwan University of Science and Technology, Taiwan) Hsi-Tseng Chou (National Taiwan University, Taiwan)

**WeF2-1**

[Invited Speaker]

16:30-17:10

**A Breakthrough of Phase Control Unit in Phased Arrays - Phased Reconfigurable Synthesized Transmission Lines**

Tzyh-Ghuang Ma and Huy Nam Chu

*National Taiwan University of Science and Technology, Taiwan*

**WeF2-2**

17:10-17:30

**Compact High Gain Dual-Band Dual-Polarized Base Station Antenna**

Xiu Yin Zhang, Zhi Jie Zhang, Wen Duan, and Yun Fei Cao

*South China University of Technology, China*

**WeF2-3**

17:30-17:50

**Development of Luneburg Lens Type Antennas for Potential Mobile Communications at Millimeter Wave Frequencies**

Zhi-Da Yan<sup>1</sup>, Hsi-Tseng Chou<sup>1</sup>, and Yi-Sheng Chang<sup>2,3</sup>

<sup>1</sup>*National Taiwan University, Taiwan*, <sup>2</sup>*Yuan-Ze University, Taiwan*,

<sup>3</sup>*National Chung-Shan Institute of Science and Technology, Taiwan*

**WeF2-4**

17:50-18:10

Withdrawn

**WeF2-5**

18:10-18:30

**A Large Frequency Ratio Shared-Aperture Antenna Based on Structure Reuse**

Jin Fan Zhang<sup>1</sup>, Yu Jian Cheng<sup>1</sup>, and Shu Han Liu<sup>2</sup>

<sup>1</sup>*University of Electronic Science and Technology of China, China*, <sup>2</sup>*University of California, USA*



## [WeG2] [Special Session] Metasurface and Metasurface Antennas

Date / Time	Oct. 24 (Wed.), 2018 / 16:30-18:30
Place	Room G (Sicily Room)
Session Chairs	Hisashi Morishita (National Defense Academy, Japan) Wei E. I. Liu (National University of Singapore, Singapore)

### WeG2-1

[Invited Speaker]

16:30-17:10

#### Wideband Cavity Backed Metasurface Antenna under Multi-Mode Resonance

Wei E. I. Liu<sup>1</sup>, Zhi Ning Chen<sup>1</sup>, and Xianming Qing<sup>2</sup>

<sup>1</sup>National University of Singapore, Singapore, <sup>2</sup>Institute for Infocomm Research, Singapore

### WeG2-2

17:10-17:30

#### Anisotropic Metasurface for Orbital Angular Momentum Generation with Controlled Polarization

Jin Yang<sup>1,2</sup> and Qiang Cheng<sup>1</sup>

<sup>1</sup>Southeast University, China, <sup>2</sup>Science and Technology on Electronic Information Science Control Laboratory, China

### WeG2-3

17:30-17:50

#### Dual-Polarized Metasurfaces Composed of Multi-Layered Ceramic Capacitors

Naoyuki Kinai<sup>1</sup>, Naobumi Michishita<sup>1</sup>, Hisashi Morishita<sup>1</sup>, Teruki Miyazaki<sup>2</sup>, and Masato Tadokoro<sup>2</sup>

<sup>1</sup>National Defense Academy, Japan, <sup>2</sup>The Yokohama Rubber Co., Ltd., Japan

### WeG2-4

17:50-18:10

#### Waveguide Integrated Lumped Circuits Using the Cutoff and Evanescent Modes

Yue Li

Tsinghua University, China

### WeG2-5

18:10-18:30

#### A Wide-Band Power-Splitter Fed Wide-Band Array Antenna Adoptable to Low-Weight GPR Systems

Changhyeong Lee, Heejun Park, Gwang-Gyun Namgung, Jinyoung Kwon, and Sungtek Kahng

Incheon National University, Korea



## [ThA1] Antennas for Mobile and Wireless Applications I

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 09:00-10:40
<b>Place</b>	Room A (Grand Ballroom 1)
<b>Session Chairs</b>	Keizo Cho (Chiba Institute of Technology, Japan) Chisang You (LG Electronics, Korea)

### ThA1-1

09:00-09:20

#### Metal Integrated LTE Antennas for Full Vision Display Smartphones

Chisang You<sup>1</sup>, Byungwoon Jung<sup>1</sup>, Youngbae Kwon<sup>1</sup>, and Kin-Lu Wong<sup>2</sup>

<sup>1</sup>LG Electronics, Korea, <sup>2</sup>National Sun Yat-Sen University, Taiwan

### ThA1-2

09:20-09:40

#### Dual-Element of High-SHF PIFA MIMO Antenna for Future 5G Wireless Communication Devices

Bazilah Baharom, Mohd Tarmizi Ali, Robi'atun Adayiah Awang, Hajar Jaafar, and Hamizan Yon

Universiti Teknologi MARA, Malaysia

### ThA1-3

09:40-10:00

#### 2.4GHz Patch Antenna on Bio-Composite Substrate Using Quarter Wave Transmission Line

M. Y. Mat Zain, M. T. Ali, A. N. H. Hussin, and B. Baharom

Universiti Teknologi MARA, Malaysia

### ThA1-4

10:00-10:20

#### Dual-Polarized Reflector Backed Dipole Antenna Using Frequency Selective Reflector

Masato Hasegawa and Keizo Cho

Chiba Institute of Technology, Japan

### ThA1-5

10:20-10:40

#### EMSICC Based CRLH Compact Leaky-Wave Antenna with Enhanced Broadside Efficiency

Anirban Sarkar, Abhishek Sharma, Animesh Biswas, and M. J. Akhtar

Indian Institute of Technology Kanpur, India



## [ThB1] Broadband and Multi-band Antennas II

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 09:00-10:40
<b>Place</b>	Room B (Grand Ballroom 2)
<b>Session Chairs</b>	Yingjie Jay Guo (University of Technology Sydney, Australia) Prayoot Akkaraekthalin (King Mongkut's University of Technology North Bangkok, Thailand)

### ThB1-1

09:00-09:20

#### Low-Profile Cone Antenna with Trapezoidal Plate Element

Kazuya Matsubayashi, Naobumi Michishita, and Hisashi Morishita  
*National Defense Academy, Japan*

### ThB1-2

09:20-09:40

#### A Wideband (5.6:1) Antenna Array with a Simple Low Profile Feed Structure

Alpha O. Bah<sup>1</sup>, Pei-Yuan Qin<sup>1</sup>, and Y. Jay Guo<sup>1</sup>  
*University of Technology Sydney, Australia*

### ThB1-3

09:40-10:00

#### A Wideband Printed Slot Antenna Using Double Feed and Blended Stub with Reflector for GPR Applications

Nattaphon Dokjok, Wanwisa Thaiwirot, Akkarat Boonpoonga, and Prayoot Akkaraekthalin  
*King Mongkut's University of Technology North Bangkok, Thailand*

### ThB1-4

10:00-10:20

#### A Design of the Multi-Ring Ultra-Wideband Antenna for Bidirectional Radiation

Jinghui Qiu, Chen Xue, and Enze Zhang  
*Harbin Institute of Technology, China*

### ThB1-5

10:20-10:40

#### A Novel UWB Dipole Antenna with Stable Omnidirectional Pattern

Feiyang Deng, Shu Lin, Baoqi Zhu, Binshan Zhao, Yinghuijie Guo, and Caitian Yang  
*Harbin Institute of Technology, China*





## [ThC1] Scattering, Diffraction and RCS

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 09:00-10:40
<b>Place</b>	Room C (Grand Ballroom 3)
<b>Session Chairs</b>	Masahiko Nishimoto (Kumamoto University, Japan) Seong-Ho Son (ETRI, Korea)

### ThC1-1

09:00-09:20

#### Electromagnetic Plane Wave Diffraction by Thick Conducting Slits - E Polarization Case -

Khanh Nam Nguyen and Hiroshi Shirai  
*Chuo University, Japan*

### ThC1-2

09:20-09:40

#### Radar Cross Section of a Hemisphere FSS Radome Mounted on a Circular Cylinder

Hokeun Shin, Dong-Chan Son, Sangsu Lee, Jonghyup Lee, Seongro Choi, Hyungjun An, and Yong Bae Park  
*Ajou University, Korea*

### ThC1-3

09:40-10:00

#### Analysis of $H$ -Polarized Wave Scattering by a Metal Cylinder Covered with Inhomogeneous Material

Masahiko Nishimoto<sup>1</sup>, Budiman P.A. Rohman<sup>1,2</sup>, and Yoshihiro Naka<sup>3</sup>  
<sup>1</sup>Kumamoto University, Japan, <sup>2</sup>Indonesian Institute of Sciences, Indonesia,  
<sup>3</sup>Kyushu University of Health and Welfare, Japan

### ThC1-4

10:00-10:20

#### Real-Time Tracking of Moving Anomaly from Scattering Parameters

Won-Kwang Park<sup>1</sup>, Kwang-Jae Lee<sup>2</sup>, and Seong-Ho Son<sup>2</sup>  
<sup>1</sup>Kookmin University, Korea, <sup>2</sup>ETRI, Korea

### ThC1-5

10:20-10:40

#### Alternative Direct Sampling Method in 3D Inverse Electromagnetic Scattering Problem

Sangwoo Kang and Marc Lambert  
*CNRS Group of Electrical Engineering, Paris, France*



**[ThD1] [Special Session] IAET Special Session: Antenna Technologies for 4G/5G Mobile Communication Devices**

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 09:00-10:40
<b>Place</b>	Room D (Napoli Room)
<b>Session Chairs</b>	Wei-Yu Li (Industrial Technology Research Institute, Taiwan) Cheng-Tse Lee (ASUSTek Computer Inc., Taiwan)

**ThD1-1**

09:00-09:20

**Compact Quad-Offset Loop/IFA Hybrid Antenna Array for Forming Eight 3.5/5.8 GHz MIMO Antennas in the Future Smartphone**

Wei-Yu Li<sup>1</sup>, Wei Chung<sup>1</sup>, and Kin-Lu Wong<sup>2</sup>

<sup>1</sup>Industrial Technology Research Institute, Taiwan, <sup>2</sup>National Sun Yat-Sen University, Taiwan

**ThD1-2**

09:20-09:40

**A MIMO Dual-Polarized Antenna Array for Small Cell Application**

Chia-Lun Tang<sup>1</sup>, Chi-Ming Chiang<sup>1</sup>, Shih-Chi Lai<sup>1</sup>, Wen-Hsiu Hsu<sup>2</sup>, and Wei-Yan Chen<sup>2</sup>

<sup>1</sup>Auden Techno Corp., Taiwan, <sup>2</sup>Shu-Te University, Taiwan

**ThD1-3**

09:40-10:00

**AI-Based Antenna Technology for 5G Software-Defined Radio Platform**

Lan-Hsin Wang<sup>1</sup>, Fu-Ren Hsiao<sup>1</sup>, Yu-Xuan Zhang<sup>2</sup>, and Tsung-Wen Chiu<sup>2</sup>

<sup>1</sup>Advanced Wireless and Antenna Inc., Taiwan, <sup>2</sup>BWant Co., Ltd., Taiwan

**ThD1-4**

10:00-10:20

**Small-Sized, Tri-Band, Two-Antenna System Aimed for 4 × 4 Gbps Notebook Applications**

Cheng-Tse Lee and Saou-Wen Su

ASUSTek Computer Inc., Taiwan

**ThD1-5**

10:20-10:40

**An Eight-Band WWAN/LTE By-Hinge Printed Inverted-F Antenna on Laptop Computer**

Shu-Chuan Chen<sup>1</sup>, Chong-Wei Liou<sup>2</sup>, Chung-I G. Hsu<sup>2</sup>, and Jia-Yi Sze<sup>1</sup>

<sup>1</sup>National Defense University, Taiwan, <sup>2</sup>National Yunlin University of Science and Technology, Taiwan



## [ThE1] [Special Session] Innovative and Practical Antenna Designs

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 09:00-10:40
<b>Place</b>	Room E (Venice Room)
<b>Session Chairs</b>	Chow-Yen-Desmond Sim (Feng Chia University, Taiwan) Wen-Jiao Liao (National Taiwan University of Science and Technology, Taiwan)

### ThE1-1

09:00-09:20

#### A Coupled-Feed Monopole Antenna for UHF RFID Reader Application

Chow-Yen-Desmond Sim, Jia-He Zhuang, Wei-Sheng Liao, Jin-Rong Liou, Chia-Chin Hsu, and Jian-Yu Huang  
*Feng Chia University, Taiwan*

### ThE1-2

09:20-09:40

#### A Diversity-Based Multi-Antenna Design for Comprehensive RFID Tag Reading

Wen-Jiao Liao<sup>1</sup>, Yi-Chung Li<sup>1</sup>, Hao-De Tang<sup>1</sup>, Hsin-Chin Liu<sup>1</sup>, and Chin-Chung Nien<sup>2</sup>  
<sup>1</sup>*National Taiwan University of Science and Technology, Taiwan*, <sup>2</sup>*Industrial Technology Research Institute, Taiwan*

### ThE1-3

09:40-10:00

#### Metamaterial Self-Oscillating Active Antennas for Extending Readable Range of RFID

Tzyh-Ghuang Ma, Zhi-Hong Liu, Yu Wei Chang, and Huy Nam Chu  
*National Taiwan University of Science and Technology, Taiwan*

### ThE1-4

10:00-10:20

#### Dual-Band Embedded Antenna on Metallic Chassis for Tunable Low-Band and Broadband High-Band

Chien-Hao Chiu<sup>1</sup>, Shih-Chia Chiu<sup>2</sup>, Shih-An Yang<sup>2</sup>, Wang-Ta Hsieh<sup>2</sup>, and Shih-Yuan Chen<sup>1</sup>  
<sup>1</sup>*National Taiwan University, Taiwan*, <sup>2</sup>*ASUSTek Computer Inc., Taiwan*

### ThE1-5

10:20-10:40

#### Stent-Based Antennas for Smart Stent Applications

Shuo-Chih Chen, Zhe-Yuan Zhang, and Chien-Hao Liu  
*National Taiwan University, Taiwan*



**[ThF1] [Special Session] Antenna Measurements (AMTA) I**

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 09:00-10:40
<b>Place</b>	Room F (Miami Room)
<b>Session Chairs</b>	Jin-Seob Kang (KRISS, Korea) David R. Novotny (National Institute of Standards and Technology, USA)

**ThF1-1**

09:00-09:20

**Practical Considerations When Using Commercial Robotic Arms for Antenna Metrology**

David R. Novotny and Joshua A. Gordon

*National Institute of Standards and Technology, USA*

**ThF1-2**

09:20-09:40

**Accuracy Improvement of Antenna-Gain Self-Calibration Method with Electronic Calibration Module**

Michitaka Ameya, Sayaka Matsukawa, and Satoru Kurokawa

*AIST, Japan*

**ThF1-3**

09:40-10:00

**Estimation of the Maximum Directivity of the Antennas Using the Mutual Coupling between Two Antennas**

Ilkyu Kim and Sun-heon Lee

*Defense Agency for Technology and Quality, Korea*

**ThF1-4**

10:00-10:20

**Novel Specification Method for Electromagnetic Wave Leak Point of the Shielding Enclosure Using Time Domain Analysis**

Sayaka Matsukawa and Satoru Kurokawa

*AIST, Japan*

**ThF1-5**

10:20-10:40

**Antenna Measurement Comparison of 700-1100 MHz/R-/X-Band Horn Antennas**

Jin-Seob Kang, Jeong-Il Park, and Jeong-Hwan Kim

*KRISS, Korea*



**[ThG1] [Special Session] Recent Developments in Frequency Selective Surfaces, Metasurfaces and Low-observable Surfaces for Antennas**

Date / Time	Oct. 25 (Thu.), 2018 / 09:00-10:40
Place	Room G (Sicily Room)
Session Chair	Raj Mittra (University of Central Florida, USA)

**ThG1-1**

09:00-09:20

**Design of FSS for Wideband and Wide-Angle Coverage—Challenges and Possible Solutions**

Raj Mittra<sup>1,2</sup> and Nathawut Homsup<sup>1</sup>

<sup>1</sup>University of Central Florida, USA, <sup>2</sup>King Abdulaziz University, Saudi Arabia

**ThG1-2**

09:20-09:40

**A Switchable Reflect-Type Linear/Circular Polarizers Based on Active Metasurface**

You Li<sup>1</sup>, Qunsheng Cao<sup>1</sup>, and Yi Wang<sup>1,2</sup>

<sup>1</sup>Nanjing University of Aeronautics and Astronautics, China, <sup>2</sup>Southeast University, China

**ThG1-3**

09:40-10:00

**RCS Reduction of a Microstrip Patch Based on Broadband PRRS**

Jianxiao Wang, She Shang, Dawei Song, and Xiaojun Li

National Key Laboratory of Science and Technology on Space Microwave, China

**ThG1-4**

10:00-10:20

**A High-Gain and Low-RCS Fabry-Perot Antenna Using a Phase Gradient Metasurface**

Yongtao Jia, Ying Liu, and Shuxi Gong

Xidian University, China

**ThG1-5**

10:20-10:40

**Design of Low RCS Spiral Antenna with Low Profile**

Wenbo Zhang<sup>1</sup>, Ying Liu<sup>1</sup>, Shuxi Gong<sup>1</sup>, and Xianghui Wang<sup>2</sup>

<sup>1</sup>Xidian University, China, <sup>2</sup>Beijing Electro-Mechanical Engineering Institute, China



## [ThA2] Antennas for Mobile and Wireless Applications II

Date / Time	Oct. 25 (Thu.), 2018 / 13:20-14:40
Place	Room A (Grand Ballroom 1)
Session Chairs	Soon-Soo Oh (Chosun University, Korea) Naobumi Michishita (National Defense Academy, Japan)

### ThA2-1

13:20-13:40

#### Application of Negative Index Lens Antenna for 5G Mobile Base Station

S. Hamid<sup>1</sup>, M.T. Ali<sup>1</sup>, Y. Yamada<sup>2</sup>, N.H. Abd Rahman<sup>1,2</sup>, and N. Michishita<sup>3</sup>

<sup>1</sup>Universiti Teknologi MARA, Malaysia, <sup>2</sup>Universiti Teknologi Malaysia, Malaysia, <sup>3</sup>National Defense Academy, Japan

### ThA2-2

13:40-14:00

#### Simulation of an Antenna with Bidirectional Asymmetric Gain

Dong-Woo Kim<sup>1</sup>, Se-Woong Na<sup>2</sup>, Jin-Dae Kim<sup>2</sup>, Wook-Ki Park<sup>3</sup>, and Soon-Soo Oh<sup>1</sup>

<sup>1</sup>Chosun University, Korea, <sup>2</sup>Carnavicom, Korea, <sup>3</sup>IncheonTechnopark, Korea

### ThA2-3

14:00-14:20

#### A Yagi-Uda Antenna-Based RFID Tag for Books and Documents Management Applications

Yusei Takagi, Shigeki Takeda, Kenichi Kagoshima, and Masahiro Umehira

Ibaraki University, Japan

### ThA2-4

14:20-14:40

#### Measurement of a Novel UHF RFID Based Battery-Less Vibration Frequency Sensing Tag

Dongfang Feng, Takuya Higuchi, Yuri Kobayashi, Shigeki Takeda, Kenichi Kagoshima, and Masahiro Umehira

Ibaraki University, Japan



## [ThB2] Antenna Theory, Design, and Measurement

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 13:20-15:00
<b>Place</b>	Room B (Grand Ballroom 2)
<b>Session Chairs</b>	Nobuhiro Kuga (Yokohama National University, Japan) Wang-Sang Lee (Gyeongsang National University, Korea)

### ThB2-1

13:20-13:40

#### Cavity Resonance Free Wheeler Cap Method Using Cauchy Method for Amplitude Only Response

Nozomu Ishii and Takumi Kato  
*Niigata University, Japan*

### ThB2-2

13:40-14:00

#### Non-Contact PIM-Measurement of Magnetic Wave-Absorbing Materials by Using a Coaxial Tube

Yusuke Ishii, Shinji Ishiyama, and Nobuhiro Kuga  
*Yokohama National University, Japan*

### ThB2-3

14:00-14:20

#### Low-Profile Unidirectional Pattern Antenna Composed of Two Gate-Shaped Elements

Keita Nomoto and Nobuhiro Kuga  
*Yokohama National University, Japan*

### ThB2-4

14:20-14:40

#### Wide-Beam Choke Horn Antenna for Small Drone Detection

Laxmikant Minz, Hyun-Seong Kang, Muhammad Tayyab Azim, Rao Shahid Aziz, and Seong-Ook Park  
*KAIST, Korea*

### ThB2-5

14:40-15:00

#### A 915 MHz Dual Polarized Meandered Dipole Antenna with Dual Resonance

Dong-Geun Seo, Ji-Hong Kim, Seong-Hyeop Ahn, and Wang-Sang Lee  
*Gyeongsang National University, Korea*



## [ThC2] Antennas and Arrays for K-band and Above

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 13:20-15:00
<b>Place</b>	Room C (Grand Ballroom 3)
<b>Session Chairs</b>	Jiro Hirokawa (Tokyo Institute of Technology, Japan) Kunio Sakakibara (Nagoya Institute of Technology, Japan)

### ThC2-1

13:20-13:40

**Design of Feed and Radiation Elements for 2×2-Element Waveguide Slot Arrays by Filter Design Theory**

Takashi Tomura and Jiro Hirokawa

*Tokyo Institute of Technology, Japan*

### ThC2-2

13:40-14:00

**Design of a Ka-Band Circularly Polarized Waveguide Antenna with a Cross Iris**

Sungjoon Yoon and Jaehoon Choi

*Hanyang University, Korea*

### ThC2-3

14:00-14:20

**Design MIMO Antenna with U-Slot Rectangular Patch Array for 5G Applications**

Fajar Wahyu Ardianto, Farhan Fathir Lanang, Setyawan Renaldy, and Trasma Yunita

*Telkom University, Indonesia*

### ThC2-4

14:20-14:40

**CPW Feed for Millimeter-Wave SIW-Based Antipodal Vivaldi Antenna**

Zong-Huan Wu, Jing-Hui Qiu, Chen Liu, and Nan-Nan Wang

*Harbin Institute of Technology, China*

### ThC2-5

14:40-15:00

**Dielectric Loaded Coaxial Grooves Horn with Ku/Ka Feed Systems for Low Cross Polarization Use**

Atsushi Hiratsuna, Yuji Akagi, Hiroyuki Deguchi, and Mikio Tsuji

*Doshisha University, Japan*





## [ThD2] [Special Session] Ground Penetrating Radar

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 13:20-15:00
<b>Place</b>	Room D (Napoli Room)
<b>Session Chairs</b>	Kangwook Kim (GIST, Korea) Se-Yun Kim (KIST, Korea)

### ThD2-1

13:20-13:40

#### Detection of Deeply Located Dormant Tunnel Using Cross-Borehole Radar

Se-Yun Kim  
*KIST, Korea*

### ThD2-2

13:40-14:00

#### Design and Fabrication of Resistively Loaded Dipoles Using Planar Resistor Technology

Woong Kang<sup>1</sup> and Kangwook Kim<sup>2</sup>  
<sup>1</sup>*Korea Institute of Geoscience and Mineral Resources, Korea*, <sup>2</sup>*GIST, Korea*

### ThD2-3

14:00-14:20

#### Dual-Sensor Landmine Detection System Utilizing GPR and Metal Detector

Bobae Kim, Jihan Kang, Donghyun Kim, Jungwon Yun, Soonho Choi, and Inchan Paek  
*Hanwha Systems, Korea*

### ThD2-4

14:20-14:40

#### Iteration Strategy for Autofocusing Metric Evaluation in GPR Imaging

Haewon Jung and Kangwook Kim  
*GIST, Korea*

### ThD2-5

14:40-15:00

#### The Enhancement of Step-Frequency Multi-Carrier Ground Penetration Radar System

Dong Kyoo Kim<sup>1</sup>, Jin Myung Kim<sup>2</sup>, Eui Chul Lee<sup>2</sup>, Chanho Kim<sup>2</sup>, and Ho Young Ji<sup>2</sup>  
<sup>1</sup>*ETRI, Korea*, <sup>2</sup>*JCFT, Korea*



## [ThE2] [Special Session] Antenna and Propagation in ASEAN Community I

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 13:20-15:00
<b>Place</b>	Room E (Venice Room)
<b>Session Chairs</b>	Mohamad Kamal A Rahim (Universiti Teknologi Malaysia, Malaysia) Eko Tjipto Rahardjo (Universitas Indonesia, Indonesia)

### ThE2-1

13:20-13:40

#### Probability of Detection Using Reconfigurable Antenna

M. K. A. Rahim, K. H. B. Yusof, K.M Yusof, F. Zubir, and O. Ayop  
*Universiti Teknologi Malaysia, Malaysia*

### ThE2-2

13:40-14:00

#### Analyzing the Effects of User's Hands on the SAR of Multiple-Antenna Transmitters

Dinh Thanh Le and Soichi Watanabe  
*National Institute of Information and Communications Technology, Japan*

### ThE2-3

14:00-14:20

#### Passive UHF RFID Tag Antenna Using Polycarbonate and PDMS Material

N.M. Nadzir<sup>1</sup>, M.K.A. Rahim<sup>1</sup>, F. Zubir<sup>1</sup>, N.A. Samsuri<sup>1</sup>, O.Ayop<sup>1</sup>, and H. Majid<sup>2</sup>  
<sup>1</sup>*Universiti Teknologi Malaysia, Malaysia*, <sup>2</sup>*Universiti Tun Hussein Onn Malaysia, Malaysia*

### ThE2-4

14:20-14:40

#### Circular Patch Filtering Antenna Design Based on Hairpin Bandpass Filter

Dwi Astuti Cahyasiwi and Eko Tjipto Rahardjo  
*Universitas Indonesia, Indonesia*

### ThE2-5

14:40-15:00

#### Design of Narrow-Wall Slotted Waveguide Antenna with V-Shaped Metal Reflector for X-Band Radar Application

Derry Permana Yusuf, Fitri Yuli Zulkifli, and Eko Tjipto Rahardjo  
*Universitas Indonesia, Indonesia*



## [ThF2] [Special Session] Challenges in 5G Antenna Design and Possible Solutions I

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 13:20-15:00
<b>Place</b>	Room F (Miami Room)
<b>Session Chairs</b>	Raj Mittra (University of Central Florida, USA) Chi Hou Chan (City University of Hong Kong, Hong Kong, China)

### ThF2-1

13:20-13:40

#### Wideband Magneto-Electric Dipole Antennas for Millimeter-Wave Applications with Microstrip Line Feed

Jie Sun and Kwai-Man Luk

*City University of Hong Kong, Hong Kong, China*

### ThF2-2

13:40-14:00

#### A Novel Dual-Polarized Quadrapole Antenna with L-Shaped Coupling Feeding Lines

Qing-Xin Chu, Dong-Hua Huang, and Rui Wu

*South China University of Technology, China*

### ThF2-3

14:00-14:20

#### Near-Zero Dielectric Loss Millimeter-Wave Leaky-Wave Antenna Using Silicon MEMS Process

Yue Li, Peiqin Liu, and Zhijun Zhang

*Tsinghua University, China*

### ThF2-4

14:20-14:40

#### Broadband Circularly Polarized Dielectric Rod Antenna for Millimeter-Wave Communications

Zhuoqiao Ji, Kai Xu Wang, and Hang Wong

*City University of Hong Kong, Hong Kong, China*

### ThF2-5

14:40-15:00

#### 60GHz Phased Transmitarray Antenna for 5G

Shi-Wei Qu and Xiao-Han Chen

*University of Electronic Science and Technology of China, China*



## [ThG2] [Special Session] Metamaterial/Metasurface Characterization and Application

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 13:20-15:00
<b>Place</b>	Room G (Sicily Room)
<b>Session Chairs</b>	Sungtek Kahng (Incheon National University, Korea) Do-Hoon Kwon (University of Massachusetts Amherst, USA)

### ThG2-1

13:20-13:40

#### Experimental Characterization of a Circular Polarizer with All-Dielectric Chiral Metasurface

A. Yahyaoui<sup>1,2</sup>, H. Rmili<sup>1,3</sup>, T. Aguil<sup>1</sup>, and R. Mittra<sup>3,4</sup>

<sup>1</sup>University of Tunis El Manar, Tunisia, <sup>2</sup>University of Jeddah, Saudi Arabia,

<sup>3</sup>King Abdulaziz University, Saudi Arabia, <sup>4</sup>University of Central Florida, USA

### ThG2-2

13:40-14:00

#### Main Beam Manipulation of Patch Antenna Using Non-Uniform Meta-Surface

H. L. Zhu<sup>1</sup>, Y. X. Cao<sup>1</sup>, Can Ding<sup>2</sup>, Gao Wei<sup>1</sup>, and Y. Jay Guo<sup>2</sup>

<sup>1</sup>Northwestern Polytechnical University, China, <sup>2</sup>University of Technology Sydney, Australia

### ThG2-3

14:00-14:20

#### A Nature-Inspired Optimization Technique for Metasurfaces to Improve the Isolation between 5G MIMO Antennas

Abdul Rehman, Changhyeong Lee, Heejun Park, Gwang-Gyun Namgung, Jinyoung Kwon, and Sungtek Kahng

*Incheon National University, Korea*

### ThG2-4

14:20-14:40

#### Reflective Metasurfaces with an Arbitrary Prescribed Surface Field Distribution

Do-Hoon Kwon

*University of Massachusetts Amherst, USA*

### ThG2-5

14:40-15:00

#### Study on CRLH Leaky-Wave Antenna Using Varactor-Loaded Transmission Line Resonator

Yujiro Kushiya, Takuji Arima, and Toru Uno

*Tokyo University of Agriculture and Technology, Japan*



### [ThA3] Antennas for Mobile and Wireless Applications III

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 15:20-16:20
<b>Place</b>	Room A (Grand Ballroom 1)
<b>Session Chairs</b>	Chi-Fang Huang (Tatung University, Taiwan) Xiu Yin Zhang (South China University of Technology, China)

#### ThA3-1

15:20-15:40

##### Wideband Horizontally Polarized Omnidirectional Antenna with Small Size

Liang Hua Ye, Zhi Jie Zhang, Wen Duan, and Xiu Yin Zhang  
*South China University of Technology, China*

#### ThA3-2

15:40-16:00

##### Characteristics Analysis of WLAN Antennas Partially Enclosed by Metals

Chi-Fang Huang and Yao Niu  
*Tatung University, Taiwan*

#### ThA3-3

16:00-16:20

##### An Asymmetric Coplanar Strip-Fed Compact Yagi-Uda Antenna Utilizing Ground as Director

Naveen Kumar Maurya, Rajarshi Bhattacharya, and Seemanti Saha  
*National Institute of Technology Patna, India*



# ISAP 2018

2018 INTERNATIONAL SYMPOSIUM ON  
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## [ThB3] [Special Session] EurAAP Session: Enabling Technologies for Future Terrestrial and Satellite Communication Systems

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 15:20-16:20
<b>Place</b>	Room B (Grand Ballroom 2)
<b>Session Chairs</b>	Nelson J. G. Fonseca (European Space Agency, The Netherlands) Martin Johansson (Ericsson Research, Sweden)

**ThB3-1**

[Invited Speaker]

15:20-16:00

**A Review of Lens-Based Antenna Developments Supported by ESA for Future Satellite Missions**

Nelson J. G. Fonseca, Giovanni Toso, Maarten van der Vorst, Petar Jankovic, and Piero Angeletti

*European Space Agency, The Netherlands*

**ThB3-2**

16:00-16:20

**A Ka-Band Glide-Symmetric Planar Luneburg Lens with Combined Dielectric/Metasurface for 5G Communications**

Astrid Algaba Brazález<sup>1</sup>, Lars Manholm<sup>1</sup>, Martin Johansson<sup>1</sup>, Martin Mattsson<sup>2</sup>, and Oscar Quevedo-Teruel<sup>2</sup>

<sup>1</sup>*Ericsson Research, Sweden*, <sup>2</sup>*KTH Royal Institute of Technology, Sweden*



### [ThC3] [Special Session] 3D Printed Antennas

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 15:20-16:40
<b>Place</b>	Room C (Grand Ballroom 3)
<b>Session Chairs</b>	Ick-Jae Yoon (Chungnam National University, Korea) Xiaochen Chen (Tampere University of Technology, Finland)

#### ThC3-1

15:20-15:40

##### Fabrication and Evaluation of Carbon-Based Flexible RFID Tags on 3D-Printed Substrates

Han He, Xiaochen Chen, Leena Ukkonen, and Johanna Virkki  
*Tampere University of Technology, Finland*

#### ThC3-2

15:40-16:00

##### Super-Wideband Spidron Fractal Cube Antenna Using 3D Printing Technology

Oh Heon Kwon<sup>1</sup>, Won Bin Park<sup>1</sup>, Sungwoo Lee<sup>1</sup>, Jong Min Lee<sup>1</sup>, Young Mi Park<sup>2</sup>, and Keum Cheol Hwang<sup>1</sup>  
<sup>1</sup>*Sungkyunkwan University, Korea*, <sup>2</sup>*ADD, Korea*

#### ThC3-3

16:00-16:20

##### An Electrically Small Quasi-Isotropic Antenna Using 3D Printing Technology

Sonapreetha Mohan Radha, Geonyeong Shin, Su-Hyeon Lee, and Ick-Jae Yoon  
*Chungnam National University, Korea*

#### ThC3-4

16:20-16:40

##### Advanced Lens for Antenna Gain Enhancement Using 3D Printing Technology

Injoong Nam<sup>1</sup>, Seokmin Lee<sup>1</sup>, Eon-Seok Jo<sup>2</sup>, and Dongho Kim<sup>1</sup>  
<sup>1</sup>*Sejong University, Korea*, <sup>2</sup>*SK Hynix Inc., Korea*



### [ThD3] 2D and 3D Printed Antennas and Arrays

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 15:20-16:40
<b>Place</b>	Room D (Napoli Room)
<b>Session Chairs</b>	Hyoungsuk Yoo (Hanyang University, Korea) Rupam Das (University of Ulsan, Korea)

#### ThD3-1

15:20-15:40

##### Mutual Coupling Reduction Using Resistive Sheets

Seongjung Kim and Sangwook Nam  
*Seoul National University, Korea*

#### ThD3-2

15:40-16:00

##### A 35GHz Microstrip Array Module Design for Reconnaissance Radar

Jing-Hui Qiu, Chen Liu, Zong-Huan Wu, and Nan-Nan Wang  
*Harbin Institute of Technology, China*

#### ThD3-3

16:00-16:20

##### A Wide-Angle Beam Scanning Reflectarray Antenna with Four Focuses Design and Staggered Arrangement of Elements

Nan-Nan Wang, Bing-Xu Zhao, Mu Fang, and Jing-Hui Qiu  
*Harbin Institute of Technology, China*

#### ThD3-4

16:20-16:40

##### Suppression of Mobile Phone Exposure by Using Compact Electromagnetic-Bandgap Array

Rupam Das<sup>1</sup>, Sang-Bock Cho<sup>1</sup>, and Hyoungsuk Yoo<sup>2</sup>  
<sup>1</sup>University of Ulsan, Korea, <sup>2</sup>Hanyang University, Korea





### [ThE3] [Special Session] Antenna and Propagation in ASEAN Community II

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 15:20-16:40
<b>Place</b>	Room E (Venice Room)
<b>Session Chairs</b>	Monai Krairiksh (King Mongkut's Institute of Technology Ladkrabang, Thailand) Minh Thuy Le (Hanoi University of Science and Technology, Vietnam)

#### ThE3-1

15:20-15:40

##### Analysis of a Sensor Using Rician k-Factor for Identification of a Spherical Conductor Submerged in Soil

P. Yoiyod<sup>1</sup>, S. Pathoumvanh<sup>2</sup>, C. Phongcharoenpanich<sup>3</sup>, and M. Krairiksh<sup>3</sup>

<sup>1</sup>Rangsit University, Thailand, <sup>2</sup>National University of Laos, Lao,

<sup>3</sup>King Mongkut's Institute of Technology Ladkrabang, Thailand

#### ThE3-2

15:40-16:00

##### Multiband Antenna for RF Energy Harvesting

Ngan Nguyen<sup>1</sup>, Ninh Nguyen Tuan<sup>1</sup>, Quoc Cuong Nguyen<sup>1</sup>, Vu Bang Giang Truong<sup>2</sup>, Monai Krairiksh<sup>3</sup>, and Minh Thuy Le<sup>1</sup>

<sup>1</sup>Hanoi University of Science and Technology, Vietnam, <sup>2</sup>Vietnam National University, Vietnam,

<sup>3</sup>King Mongkut's Institute of Technology, Thailand

#### ThE3-3

16:00-16:20

##### Preliminary Study of the Natural Resonant Frequencies of Coconut (Cocos Nucifera L.) Fruit for Quality Identification

Tanawut Tantisopharak, Panisa Keowsawat, and Rachen Kanahna

Phetchaburi Rajabhat University, Thailand

#### ThE3-4

16:20-16:40

##### A Sensor for Continuous Fruit Classification Using Rician K-Factor

Prapan Leekul<sup>1</sup> and Monai Krairiksh<sup>2</sup>

<sup>1</sup>Rambhai Barni Rajabhat University, Thailand, <sup>2</sup>King Mongkut's Institute of Technology Ladkrabang, Thailand



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2018 INTERNATIONAL SYMPOSIUM ON  
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## [ThF3] [Special Session] Challenges in 5G Antenna Design and Possible Solutions II

<b>Date / Time</b>	Oct. 25 (Thu.), 2018 / 15:20-16:40
<b>Place</b>	Room F (Miami Room)
<b>Session Chairs</b>	Raj Mittra (University of Central Florida, USA) Chi Hou Chan (City University of Hong Kong, Hong Kong, China)

### ThF3-1

15:20-15:40

#### An Ultra-Low-Profile MIMO Antenna for 5G Smart-Phones

Daqing Liu, Ming Zhang, Bin Wang, and Jun Wang  
*Huawei Technologies Co. Ltd, China*

### ThF3-2

15:40-16:00

#### Millimeter-Wave Low-Mutual-Coupling MIMO Dielectric Resonator Antennas

X. Qin and Y. M. Pan  
*South China University of Technology, China*

### ThF3-3

16:00-16:20

#### MIMO Antenna System Throughput Simulation

Nicholas E. Buris  
*Shanghai University, China*

### Discussion

16:20-16:40



### [ThG3] [Special Session] Surface Electromagnetics: Phenomena, Theorem, and Applications

Date / Time	Oct. 25 (Thu.), 2018 / 15:20-16:40
Place	Room G (Sicily Room)
Session Chair	Fan Yang (Tsinghua University, China)

#### ThG3-1

[Invited Speaker]

15:20-16:00

#### Surface Electromagnetics and Its Application in Antenna Array Design

Fan Yang and Shenheng Xu  
*Tsinghua University, China*

#### ThG3-2

16:00-16:20

#### Synthesis and Analysis of Linear and Nonlinear Bianisotropic Metasurfaces

Karim Achouri<sup>1</sup>, Christophe Caloz<sup>2</sup>, and Olivier J.F. Martin<sup>1</sup>  
<sup>1</sup>*École Polytechnique Fédérale de Lausanne, Switzerland*, <sup>2</sup>*Polytechnique Montréal, Canada*

#### ThG3-3

16:20-16:40

#### The Development of Nonlinear Metasurface Absorbers: From Passive to Active

Zhangjie Luo and Tie Jun Cui  
*Southeast University, China*



## [FrA1] Passive and Active Components

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 08:30-10:10
<b>Place</b>	Room A (Grand Ballroom 1)
<b>Session Chairs</b>	Danai Torrungrueng (King Mongkut's University of Technology North Bangkok, Thailand) Rakesh Sinha (Chungnam National University, Korea)

### FrA1-1

08:30-08:50

#### Compact Phase Shifter for 4G Base Station Antenna

Chul-Keun Park<sup>1</sup>, Hee-Soo Kim<sup>1</sup>, Jeong-Won Kim<sup>1</sup>, and Kyeong-Sik Min<sup>2</sup>

<sup>1</sup>AT&S Co. Ltd., Korea, <sup>2</sup>Korea Maritime & Ocean University, Korea

### FrA1-2

08:50-09:10

#### Miniaturized Hybrid Couplers Using Quarter Wave-Like Transformers

Sarun Thaepunkulngam<sup>1</sup>, Panuwat Janpugdee<sup>1</sup>, and Danai Torrungrueng<sup>2</sup>

<sup>1</sup>Chulalongkorn University, Thailand, <sup>2</sup>King Mongkut's University of Technology North Bangkok, Thailand

### FrA1-3

09:10-09:30

#### Design of High Power Transmission Line Transformer for RF Heating Generator

Adisak Rattananamlom<sup>1</sup>, Supawat Kotchapradit<sup>1</sup>, Samran Santalunai<sup>1</sup>, Thanaset Thosdeekoraphat<sup>1</sup>, Phichet Moungnoul<sup>2</sup>, and Chanchai Thongsopa<sup>1</sup>

<sup>1</sup>Suranaree University of Technology, Thailand, <sup>2</sup>King Mongkut's Institute of Technology Ladkrabang, Bangkok, Thailand

### FrA1-4

09:30-09:50

#### Microfluidic Impedance Tuner

Minjae Lee and Sungjoon Lim

Chung-Ang University, Korea

### FrA1-5

09:50-10:10

#### Three-Dimensional Printed Stair-Like Metamaterial Absorber

Daecheon Lim and Sungjoon Lim

Chung-Ang University, Korea



## [FrB1] Reconfigurable, Adaptive, and Smart Antennas

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 08:30-09:50
<b>Place</b>	Room B (Grand Ballroom 2)
<b>Session Chairs</b>	Prayoot Akkaraekthalin (King Mongkut's University of Technology North Bangkok, Thailand) Sangwook Nam (Seoul National University, Korea)

FrB1-1

08:30-08:50

### Effect of a Surface Wave in Mutual Coupling for Printed Bow-Tie Antenna Array

Hanni Koo and Sangwook Nam  
*Seoul National University, Korea*

FrB1-2

08:50-09:10

### Rollover-Resistant Vehicular MRC Adaptive Array with Weighted Polarization Combining

Taishi Oda, Hiroya Tanaka, Kazuhiro Honda, and Koichi Ogawa  
*Toyama University, Japan*

FrB1-3

09:10-09:30

### Investigation of Various U-Shaped Slots in Reconfigurable Antenna Using RF MEMS Switches

Norfatihah Bahari<sup>1</sup>, Mohd Faizal Jamlos<sup>1</sup>, Suramate Chalermwisutkul<sup>2</sup>, Titipong Lertwiriya-prapa<sup>2</sup>,  
and Prayoot Akkaraekthalin<sup>2</sup>  
<sup>1</sup>*Universiti Malaysia Perlis, Malaysia*, <sup>2</sup>*King Mongkut's University of Technology North Bangkok, Thailand*

FrB1-4

09:30-09:50

### Design of Polarization Reconfigurable Antenna Using Liquid Metal

Aqeel Hussain Naqvi and Sungjoon Lim  
*Chung-Ang University, Korea*



## [FrC1] DOA Estimation

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 08:30-10:10
<b>Place</b>	Room C (Grand Ballroom 3)
<b>Session Chairs</b>	Nobuyoshi Kikuma (Nagoya Institute of Technology, Japan) Keizo Cho (Chiba Institute of Technology University, Japan)

### FrC1-1

08:30-08:50

#### Experiments on Interferometric Angle of Arrival Estimation Using a Simple Weight Network

Daishi Iwamoto, Nana Narukawa, Kazuhiro Honda, and Koichi Ogawa  
*Toyama University, Japan*

### FrC1-2

08:50-09:10

#### Study on Improvement of Position Estimation Accuracy of MUSIC Method Using Array Interpolation and Spatial Averaging

Kazuki Watakabe, Keizo Cho, and Hiroaki Nakabayashi  
*Chiba Institute of Technology, Japan*

### FrC1-3

09:10-09:30

#### Evaluation of Position Estimation of a Human Body around a Vehicle

Yuki Ito<sup>1</sup>, Hisato Iwai<sup>1</sup>, Hideichi Sasaoka<sup>1</sup>, and Kiyokazu Ieda<sup>2</sup>  
<sup>1</sup>*Doshisha University, Japan*, <sup>2</sup>*Aisin Seiki Co., Ltd., Japan*

### FrC1-4

09:30-09:50

#### Performance Improvement by Two-Step Search Method in DOA Estimation Based on Compressed Sensing

Toshiya Nasu, Nobuyoshi Kikuma, and Kunio Sakakibara  
*Nagoya Institute of Technology, Japan*

### FrC1-5

09:50-10:10

#### DOA Estimation of Desired Wave with Interference Rejection Using Beamspace Root-MUSIC

Kento Kataoka, Nobuyoshi Kikuma, and Kunio Sakakibara  
*Nagoya Institute of Technology, Japan*



**[FrD1] [Special Session] IAET Special Session: Mobile/Wireless Communication Antennas**

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 08:30-10:10
<b>Place</b>	Room D (Napoli Room)
<b>Session Chairs</b>	Jui-Han Lu (National Kaohsiung University of Science and Technology, Taiwan) Shu-Chuan Chen (National Defense University, Taiwan)

**FrD1-1**

08:30-08:50

**A Smartwatch Dipole Antenna for LTE/GPS/WWAN Applications**

Jui-Han Lu, Jing-Hui Zhuang, and Jia-Wen Hsu

*National Kaohsiung University of Science and Technology, Taiwan*

**FrD1-2**

08:50-09:10

**A Band Reconfigurable Antenna for a Mobile Phone with the Metal Cover**

Jui-Han Lu, Syue-Yi Syu, and Yong-Yong Zhang

*National Kaohsiung University of Science and Technology, Taiwan*

**FrD1-3**

09:10-09:30

**A Uniplanar Monopole Antenna for LTE/UMTS/WLAN in Tablet Computer Applications**

Jun-Wei Huang, Tzu-Chi Chu, You-Sheng Zhan, Bing-Liang Ke, and Hsin-Lung Su

*National Pingtung University, Taiwan*

**FrD1-4**

09:30-09:50

**LTE/5G C-Band MIMO Antennas for Laptop Computers**

Wen Shan Chen and Ming-Han Liang

*Southern Taiwan University of Science and Technology, Taiwan*

**FrD1-5**

09:50-10:10

**Microstrip Antenna for Ambient RF Energy Harvesting**

Shun-Yun Lin<sup>1</sup>, Yi Hsien Lin<sup>1</sup>, Yuan-Chih Lin<sup>2</sup>, Chun-Yu Tsai<sup>1</sup>, and Yan-Yu Tuan<sup>1</sup>

<sup>1</sup>*Cheng Shiu University, Taiwan*, <sup>2</sup>*Metal Industries Research&Development Centre, Taiwan*



**[FrE1] [Special Session] Antennas Aspects of 5G Communication in the next 5 Years**

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 08:30-10:10
<b>Place</b>	Room E (Venice Room)
<b>Session Chairs</b>	Wonbin Hong (POSTECH, Korea) Raj Mittra (University of Central Florida, USA)

**FrE1-1**

**08:30-08:50**

**Some Challenges in Millimeter Wave Antenna Designs for 5G**

Raj Mittra<sup>1,2</sup>

<sup>1</sup>University of Central Florida, USA, <sup>2</sup>King Abdulaziz University, Saudi Arabia

**FrE1-2**

**08:50-09:10**

**Advanced Coupled-Fed MIMO Antennas for Next Generation 5G Smartphones**

Chisang You<sup>1</sup>, Doochan Jung<sup>1</sup>, Moonsoo Song<sup>1</sup>, and Kin-Lu Wong<sup>2</sup>

<sup>1</sup>LG Electronics, Korea, <sup>2</sup>National Sun Yat-Sen University, Taiwan

**FrE1-3**

**09:10-09:30**

**A Dual-Band Circularly Polarized Antenna with Large Frequency Ratio for 5G Applications**

Shao Yong Zheng

Sun Yat-Sen University, China

**FrE1-4**

**09:30-09:50**

**28 GHz Pattern Reconfigurable Block Cell Antenna Featuring Electrically Small Profile**

Moogoong Choo, Junho Park, and Wonbin Hong

POSTECH, Korea

**FrE1-5**

**09:50-10:10**

**Wideband 39 GHz Vertically-Polarized Endfire Antenna-in-Package (AiP) Array Featuring Near-Planar Profile**

Junho Park, Seung Yoon Lee, and Wonbin Hong

POSTECH, Korea





## [FrF1] [Special Session] Antenna Measurements (AMTA) II

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 08:30-10:10
<b>Place</b>	Room F (Miami Room)
<b>Session Chairs</b>	Satoru Kurokawa (National Institute of Advanced Industrial Science and Technology, Japan) Daniel Janse van Rensburg (NSI-MI Technologies, USA)

FrF1-1

08:30-08:50

**Antenna Measurement System Using Radio over Fiber Transceiver with Vector Network Analyzer up to 6 GHz**

S. Kurokawa<sup>1</sup>, M. Hirose<sup>1</sup>, Y. Toba<sup>2</sup>, J. Terakado<sup>2</sup>, M. Onizawa<sup>2</sup>, and J. Ichijo<sup>2</sup>

<sup>1</sup>AIST, Japan, <sup>2</sup>Seiko Giken Co., Ltd., Japan

FrF1-2

08:50-09:10

**Near-Field / Far-Field Application for a Spherical Scanner at mm-Wave Frequencies**

Daniël Janse van Rensburg and John Wynne

NSI-MI Technologies, USA

FrF1-3

09:10-09:30

**Antenna Measurement System for 5G Application**

Geonho Jang, Seho Park, Hongsik Keum, Sangho Choi, and Goonyeon Kim

Korea Radio Promotion Association, Korea

FrF1-4

09:30-09:50

**Field Analysis with Novel Choke Ring Antenna for Bioelectromagnetic Exposure System at 28 GHz**

Philip A. Dzagbletey and Jae-Young Chung

Seoul National University of Science and Technology, Korea

FrF1-5

09:50-10:10

**Analysis of Site Attenuation for Calculable Dipole Antenna by the Mismatch Power Loss**

Ki-Chai Kim<sup>1</sup> and Hyuk-Jun Seo<sup>2</sup>

<sup>1</sup>Yeungnam University, Korea, <sup>2</sup>Daegu-Gyeongbuk Medical Innovation Foundation, Korea



## [FrG1] [Special Session] Metamaterial-related Antennas

Date / Time	Oct. 26 (Fri.), 2018 / 08:30-10:10
Place	Room G (Sicily Room)
Session Chairs	Hisamatsu Nakano (Hosei University, Japan) Richard W. Ziolkowski (University of Technology Sydney, Australia)

### FrG1-1

08:30-08:50

#### Dual-Functional Electrically Small Huygens Antenna System

Wei Lin and Richard W. Ziolkowski

*University of Technology Sydney, Australia*

### FrG1-2

08:50-09:10

#### A Small Real-Estate Platform for 5G Beamforming/Beam-Steering Antennas Shared with WBAN UHF-Band MIMO Antennas

Heejun Park, Gwang-Gyun Namgung, Changhyeong Lee, Jinyoung Kwon, and Sungtek Kahng

*Incheon National University, Korea*

### FrG1-3

09:10-09:30

#### Phase Change for CP Conical Radiation from a Metaloop Antenna

Hisamatsu Nakano, Tomoki Abe, and Junji Yamauchi

*Hosei University, Japan*

### FrG1-4

09:30-09:50

#### Coaxially Fed Monopole Antenna Composed of Composite Right/Left-Handed Transmission Line

Takatsugu Fukushima<sup>1</sup>, Naobumi Michishita<sup>1</sup>, Hisashi Morishita<sup>1</sup>, and Naoya Fujimoto<sup>2</sup>

<sup>1</sup>National Defense Academy, Japan, <sup>2</sup>Hitachi Kokusai Electric Inc., Japan

### FrG1-5

09:50-10:10

#### Polarization Control of Leaky Wave Radiation from Phase-Shifting Nonreciprocal CRLH Metamaterials

Junji Yamauchi<sup>1</sup>, Tetsuya Ueda<sup>1</sup>, and Tatsuo Itoh<sup>2</sup>

<sup>1</sup>Kyoto Institute of Technology, Japan, <sup>2</sup>University of California, USA



## [FrA2] [Special Session] Application of Machine Learning Algorithms to Antenna Design and Radar Signal Processing

Date / Time	Oct. 26 (Fri.), 2018 / 10:30-12:10
Place	Room A (Grand Ballroom 1)
Session Chair	Youngwook Kim (California State University, USA)

### FrA2-1

10:30-10:50

#### Application of Machine Learning to Antenna Design and Radar Signal Processing: A Review

Youngwook Kim

*California State University, USA*

### FrA2-2

10:50-11:10

#### Classification of Drone Type Using Deep Convolutional Neural Networks Based on Micro Doppler Simulation

Byunggil Choi and Daegun Oh

*DGIST, Korea*

### FrA2-3

11:10-11:30

#### Radar Application of Deep Neural Networks for Recognizing Micro-Doppler Radar Signals by Human Walking and Background Noise

Jihoon Kwon<sup>1,2</sup>, Seoungui Lee<sup>1,2</sup>, and Nojun Kwak<sup>2</sup>

<sup>1</sup>*Hanwha Systems, Korea*, <sup>2</sup>*Seoul National University, Korea*

### FrA2-4

11:30-11:50

#### Decision-Level Fusion Scheme of SVM and Naive Bayes Classifier for Radar Target Recognition

Young-Jae Choi<sup>1</sup>, In-Sik Choi<sup>1</sup>, and Dae-Young Chae<sup>2</sup>

<sup>1</sup>*Hannam University, Korea*, <sup>2</sup>*ADD, Korea*

### FrA2-5

11:50-12:10

#### Fast DCNN-Based Human Activity Classification with On-Body Antenna Using Generative Models

Hyeongmin Park and Taesup Moon

*Sungkyunkwan University, Korea*



# ISAP 2018

2018 INTERNATIONAL SYMPOSIUM ON  
ANTENNAS AND PROPAGATION

## [FrB2] EBG, Metamaterials and Applications

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 10:30-12:30
<b>Place</b>	Room B (Grand Ballroom 2)
<b>Session Chairs</b>	Naobumi Michishita (National Defense Academy, Japan) Rangsan Wongsan (Suranaree University of Technology, Thailand)

### FrB2-1

10:30-10:50

#### Thin Cylindrical Cloak Using Multi-Layer Ceramic Capacitors

Thanh Binh Nguyen<sup>1</sup>, Naobumi Michishita<sup>1</sup>, Hisashi Morishita<sup>1</sup>, Teruki Miyazaki<sup>2</sup>, and Masato Tadokoro<sup>2</sup>

<sup>1</sup>National Defense Academy, Japan, <sup>2</sup>The Yokohama Rubber Co., Ltd., Japan

### FrB2-2

10:50-11:10

#### Equivalent Circuit Modeling for Combination of Square-Shaped and H-Shaped SRRs

Pornpat Pramerudeechaisak, Piyaporn Mesawad, and Rangsan Wongsan

*Nakhon Ratchasima, Thailand*

### FrB2-3

11:10-11:30

#### Gain Enhancement of Asymmetric Horn for Secondary Radar Antenna System Using Hybrid Metamaterials

P. Khamsalee, P. Mesawad, and R. Wongsan

*Suranaree University of Technology, Thailand*

### FrB2-4

11:30-11:50

#### An Update on Use of Unstable Non-Foster Networks in Metamaterial-Inspired EM Structures

Silvio Hrabar, Igor Krois, and Leo Vincelj

*University of Zagreb, Croatia*

### FrB2-5

11:50-12:10

#### Meta-Dome Structure for Simultaneously Absorbing Radar and Protecting Environment

Heijun Jeong, Toan Trung Nguyen, and Sungjoon Lim

*Chung-Ang University, Korea*

### FrB2-6

12:10-12:30

#### A Broadband Metasurface for Cross Polarization Conversion Applications

Meraj E Mustafa and Farooq A. Tahir

*National University of Sciences and Technology, Pakistan*



## [FrC2] Sensor Networks, Adhoc Systems, and Mobile Communication Systems

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 10:30-12:30
<b>Place</b>	Room C (Grand Ballroom 3)
<b>Session Chairs</b>	Munkyo Seo (Sungkyunkwan University, Korea) Peeramed Chodkaveekityada (King Mongkut's Institute of Technology Ladkrabang, Thailand)

### FrC2-1

10:30-10:50

#### Sensitivity Analysis of Humidity Sensor with Various Sensing Region Length

Jin-Kwan Park<sup>1</sup>, Chorom Jang<sup>1</sup>, Hee-Jo Lee<sup>2</sup>, Hyang Hee Choi<sup>1</sup>, and Jong-Gwan Yook<sup>1</sup>

<sup>1</sup>Yonsei University, Korea, <sup>2</sup>Daegu University, Korea

### FrC2-2

10:50-11:10

#### Performance Analysis of Extended Sensor Sharing in Vehicular Ad Hoc Networks

Zhongyi Shen, Xin Zhang, and Dacheng Yang

Beijing University of Posts and Telecommunications, China

### FrC2-3

11:10-11:30

#### A Location-Based Extended Sensor Sharing Algorithm in Vehicular Ad Hoc Networks

Zhongyi Shen, Xin Zhang, and Dacheng Yang

Beijing University of Posts and Telecommunications, China

### FrC2-4

11:30-11:50

#### Design and Development of Effective Radiosonde for Rainmaking Process in Thailand

Peeramed Chodkaveekityada and Paramote Wardkein

King Mongkut's Institute of Technology Ladkrabang, Thailand

### FrC2-5

11:50-12:10

#### Compact Massive MIMO Antenna Using Cubic Arrangement Suitable for Indoor Base Station

Kosei Oikawa<sup>1</sup>, Kazunori Yuri<sup>1</sup>, Naoki Honma<sup>1</sup>, and Kentaro Nishimori<sup>2</sup>

<sup>1</sup>Iwate University, Japan, <sup>2</sup>Niigata University, Japan

### FrC2-6

12:10-12:30

#### On the Sparsity and Aperiodicity of a Base Station Antenna Array in a Downlink MU-MIMO Scenario

N. Amani<sup>1</sup>, R. Maaskant<sup>1,2</sup>, and W. A. Van Cappellen<sup>3</sup>

<sup>1</sup>Chalmers University of Technology, Sweden, <sup>2</sup>Eindhoven University of Technology, The Netherlands,

<sup>3</sup>Netherlands Institute for Radio Astronomy, The Netherlands



## [FrD2] EM Propagation Fundamentals and Measurements

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 10:30-12:30
<b>Place</b>	Room D (Napoli Room)
<b>Session Chairs</b>	Soon-Soo Oh (Chosun University, Korea) Hajime Fukuchi (Tokyo Metropolitan University, Japan)

### FrD2-1

10:30-10:50

#### Integration Time Dependence of Rainfall Rate Spatial Correlation Derived from Radar Rain Map

Hajime Fukuchi

*Tokyo Metropolitan University, Japan*

### FrD2-2

10:50-11:10

#### The Relation of Total Electron Content between Libreville and Ny-Alesund IGS Stations

S. Z. Hamzah, M. J. Homam, and M. Z. M. Alias

*Universiti Tun Hussein Onn Malaysia, Malaysia*

### FrD2-3

11:10-11:30

#### Analysis of Wave Propagation Using Half-Canyon Model

Hwa-Choon Lee<sup>1</sup>, Young-Chul Lee<sup>2</sup>, Byung-Lok Cho<sup>3</sup>, Il-Yong Lee<sup>4</sup>, Jong-Hyuk Lim<sup>4</sup>, Dae-Hwan Yoon<sup>4</sup>, Sung Won Park<sup>4</sup>, and Soon-Soo Oh<sup>1</sup>

<sup>1</sup>*Chosun University, Korea*, <sup>2</sup>*Mokpo National Maritime University, Korea*, <sup>3</sup>*Sunchon National University, Korea*,

<sup>4</sup>*National Radio Research Agency, Korea*

### FrD2-4

11:30-11:50

#### Statistical Analysis of 1090 MHz Signals Measured During a Flight Experiment

Junichi Honda and Takuya Otsuyama

*Electronic Navigation Research Institute, Japan*

### FrD2-5

11:50-12:10

#### Prediction Method by Deep-Learning for Path Loss Characteristics in an Open-Square Environment

Nobuaki Kuno and Yasushi Takatori

*NTT Corporations, Japan*

### FrD2-6

12:10-12:30

#### Multi-Path Channel Based Detection Metric for Passive Radar Systems

Hassan El-Sallabi, Abdulaziz Aldosari, and Yahia Basahl

*Qatar Armed Forces, Qatar*



## [FrE2] Reflector, Lens and Radomes

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 10:30-12:30
<b>Place</b>	Room E (Venice Room)
<b>Session Chairs</b>	Nelson J. G. Fonseca (European Space Agency, The Netherlands) Jae W. Lee (Korea Aerospace University, Korea)

### FrE2-1

10:30-10:50

#### A Linearly Polarized Reflectarray Suppressing Beam Shift

Hiroki Yamada, Kotaro Sakagawa, Hiroyuki Deguchi, and Mikio Tsuji  
*Doshisha University, Japan*

### FrE2-2

10:50-11:10

#### Reflectarray Antenna Constructed by Arranging Double Omega-Shaped Resonant Elements for Orthogonal-Polarization Conversion

Teruki Murayama, Shusuke Sasaki, Daichi Higashi, Hiroyuki Deguchi, and Mikio Tsuji  
*Doshisha University, Japan*

### FrE2-3

11:10-11:30

#### Comparison of Simulated Performance of Faceted & Flat Reflectarray Antennas

Chia Tse Tong<sup>1,2</sup>, Chong En Fui Raelene<sup>3</sup>, and Ker Chin Tian<sup>3</sup>  
<sup>1</sup>*National University of Singapore, Singapore*, <sup>2</sup>*DSO National Laboratories, Singapore*,  
<sup>3</sup>*NUS High School of Maths & Science, Singapore*

### FrE2-4

11:30-11:50

#### Analysis of Wideband Reflectarrays Based on Different Progressive Phase Centers

M. Hashim Dahri<sup>1</sup>, M. H. Jamaluddin<sup>1</sup>, M. Inam<sup>1</sup>, R. Selvaraju<sup>1</sup>, N. H. Shahadan<sup>2</sup>, and M. R. Kamarudin<sup>3</sup>  
<sup>1</sup>*Universiti Teknologi Malaysia, Malaysia*, <sup>2</sup>*Politeknik Ibrahim Sultan, Malaysia*, <sup>3</sup>*Cranfield University, UK*

### FrE2-5

11:50-12:10

#### Design of Dielectric Lens Antenna for 5G Mobile Base Station

Farizah Ansarudin<sup>1,2</sup>, Tharek Abd Rahman<sup>1</sup>, and Yoshihide Yamada<sup>1</sup>  
<sup>1</sup>*Universiti Teknologi Malaysia, Malaysia*, <sup>2</sup>*Universiti Kebangsaan Malaysia, Malaysia*

### FrE2-6

12:10-12:30

#### The Water Drop Lens: A Modulated Geodesic Lens Antenna Based on Parallel Curves

Nelson J. G. Fonseca<sup>1</sup>, Qingbi Liao<sup>2</sup>, and Oscar Quevedo-Teruel<sup>2</sup>  
<sup>1</sup>*European Space Agency, The Netherlands*, <sup>2</sup>*Royal Institute of Technology, Sweden*



## [FrF2] Wearable and Implantable Antennas

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 10:30-12:30
<b>Place</b>	Room F (Miami Room)
<b>Session Chairs</b>	Jae-Young Chung (Seoul National University of Science and Technology, Korea) Biswarup Rana (Seoul National University of Science and Technology, Korea)

### FrF2-1

10:30-10:50

#### Performance Improvement for Monopole Antenna with Circumferential Wire Medium

Rapin Kudpik, Piyaphorn Meesawad, and Rangsan Wongsan  
*Suranaree University of Technology, Thailand*

### FrF2-2

10:50-11:10

#### Dual Band Bowtie Antenna with Matching Stub for Medical Application

Seongjin Park<sup>1</sup>, Seonho Lim<sup>1</sup>, Donghyun Kim<sup>1</sup>, Hyungrak Kim<sup>2</sup>, and Young Joong Yoon<sup>1</sup>  
<sup>1</sup>*Yonsei University, Korea*, <sup>2</sup>*Daelim University College, Korea*

### FrF2-3

11:10-11:30

#### Electromagnetic Exposure on Human Phantom Model in Time-Reversed Wireless Power Transmission System

Joon-Hong Kim, Hoyoel Kim, and Sangwook Nam  
*Seoul National University, Korea*

### FrF2-4

11:30-11:50

#### Animal Skin Phantom for RFID UHF Transponder Development

Dominik Gottardi, Volker Wienstroer, and Rainer Kronberger  
*TH Cologne University of Applied Sciences, Germany*

### FrF2-5

11:50-12:10

#### Implantable Antenna Design for Wireless Brain Signal Monitoring

Biswarup Rana<sup>1</sup>, Jae-Yeon Shim<sup>2</sup>, and Jae-Young Chung<sup>3</sup>  
*Seoul National University of Science and Technology, Korea*

### FrF2-6

12:10-12:30

#### Relations of Input Resistance Increases and Current Distributions of a Normal-Mode Helical Antenna in a Human Body Condition

Norsiha Zainudin<sup>1</sup>, Yoshihide Yamada<sup>2</sup>, Tarik Abdul Latef<sup>1</sup>, Kamilia Kamardin<sup>2</sup>, and Nguyen Quoc Dinh<sup>3</sup>  
<sup>1</sup>*University of Malaya, Malaysia*, <sup>2</sup>*Universiti Teknologi Malaysia, Malaysia*, <sup>3</sup>*Le Quy Don Technical University, Vietnam*





## [FrG2] Frequency Selective Surfaces and Filters

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 10:30-12:10
<b>Place</b>	Room G (Sicily Room)
<b>Session Chair</b>	Saptarshi Ghosh (Chung-Ang University, Korea)

### FrG2-1

10:30-10:50

#### An Improved Multifunctional Frequency Selective Surface Based on Microfluidic Technology

Saptarshi Ghosh<sup>1</sup>, Ratanak Phon<sup>1</sup>, Manos M. Tentzeris<sup>2</sup>, and Sungjoon Lim<sup>1</sup>

<sup>1</sup>Chung-Ang University, Korea, <sup>2</sup>Georgia Institute of Technology, USA

### FrG2-2

10:50-11:10

#### Switchable Frequency Selective Surface Exhibiting Multifunctional Characteristics

Ratanak Phon, Saptarshi Ghosh, and Sungjoon Lim

Chung-Ang University, Korea

### FrG2-3

11:10-11:30

#### Triple-Band Beam Switching Antenna Based on Active Frequency Selection Surfaces

Jun Yu, Wen Jiang, and Shuxi Gong

Xidian University, China

### FrG2-4

[Invited Speaker]

11:30-12:10

#### Resonant Transmission of Electromagnetic Wave through Small Apertures

Young-Ki Cho

Kyungpook National University, Korea



# ISAP 2018

2018 INTERNATIONAL SYMPOSIUM ON  
ANTENNAS AND PROPAGATION

## [FrA3] EBG, Metamaterials and Nano-Electromagnetics

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 14:30-16:10
<b>Place</b>	Room A (Grand Ballroom 1)
<b>Session Chairs</b>	Prayoot Akkaraekthalin (King Mongkut's University of Technology North Bangkok, Thailand) Amit Kumar Singh (Indian Institute of Technology Delhi, India)

### FrA3-1

14:30-14:50

#### A Dual-Band Metasurface Using Ring Resonator with Interdigital Capacitors

K. Rakdanklang<sup>1</sup>, P. Chomtong<sup>1</sup>, P. Krachodnok<sup>2</sup>, and P. Akkaraekthalin<sup>2</sup>

<sup>1</sup>Suranaree University of Technology, Thailand, <sup>2</sup>King Mongkut's University of Technology, Thailand

### FrA3-2

14:50-15:10

#### Ultra-Wideband Metamaterial Using Complementary Ring with Inductive Load Strip

S. Sang-Arsa, P. Krachodnok, and R. Wongsan

Suranaree University of Technology, Thailand

### FrA3-3

15:10-15:30

#### Design of Dual-Band Metamaterial Using Jerusalem Cross Structure with Interdigital Technique for LTE and WLAN Systems

W. Kamonsin<sup>1</sup>, P. Chomtong<sup>2</sup>, P. Krachodnok<sup>1</sup>, and P. Akkaraekthalin<sup>2</sup>

<sup>1</sup>Suranaree University of Technology, Thailand, <sup>2</sup>King Mongkut's University of Technology North Bangkok, Thailand

### FrA3-4

15:30-15:50

#### Radial Graded Index Metasurface Lens for Beam Steering and Gain Enhancement

Amit K. Singh, Mahesh P. Abegaonkar, and Shibani K. Koul

Indian Institute of Technology Delhi, India

### FrA3-5

15:50-16:10

#### Planar Monopole Antenna with Offset Square Split Ring Resonator

Murtala Aminu-Baba, Mohammad Kamal A Rahim, Farid Zubir, Mohd Fairus Mohd Yusoff, and Noor Asmawati Samsuri

Universiti Teknologi Malaysia, Malaysia



### [FrB3] Other Antenna Topics

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 14:30-16:30
<b>Place</b>	Room B (Grand Ballroom 2)
<b>Session Chairs</b>	Beijia Liu (Harbin Institute of Technology, China) Gangil Byun (UNIST, Korea)

#### FrB3-1

14:30-14:50

##### Multimode Horn Antennas with Square Aperture Loading Grooves for Circular Beam and Low Cross-Polarization Characteristic

Reiko Omi, Ryo Wakabayashi, Hiroyuki Deguchi, and Mikio Tsuji  
*Doshisha University, Japan*

#### FrB3-2

14:50-15:10

##### A Novel Deployable Quasi-Yagi Monopole Antenna Using Origami Magic Spiral Cube

Syed Imran Hussain Shah and Sungjoon Lim  
*Chung-Ang University, Korea*

#### FrB3-3

15:10-15:30

##### Impulse Radiating Antenna Modeling Using Numerical Electromagnetics Code

Arim Ha and Kangwook Kim  
*GIST, Korea*

#### FrB3-4

15:30-15:50

##### A Study of an In-Line Slot Array Antenna Fed by a Zigzag Ridge Waveguide

Takashi Uno<sup>1</sup>, Narihiro Nakamoto<sup>1</sup>, Toru Fukasawa<sup>1</sup>, Takeshi Yamamoto<sup>1</sup>, Ikuya Kakimoto<sup>1</sup>, Naofumi Yoneda<sup>1</sup>, and Yoshihiko Konishi<sup>2</sup>  
<sup>1</sup>*Mitsubishi Electric Corporation, Japan*, <sup>2</sup>*Hiroshima Institute of Technology, Japan*

#### FrB3-5

15:50-16:10

##### Waveguide Slot Filtering Antenna with Metamaterial Surface

Wei Wang<sup>1</sup>, Zhi Zheng<sup>1</sup>, Hong-Tao Zhang<sup>1</sup>, Mou-Ping Jin<sup>1</sup>, and Ying Liu<sup>2</sup>  
<sup>1</sup>*East China Research Institute of Electronic Engineering, China*, <sup>2</sup>*Xidian University, China*

#### FrB3-6

16:10-16:30

##### Integrated Wideband/Reconfigurable Notched Band Dielectric Resonator Antenna

Beijia Liu, Jinghui Qiu, Changhui Wang, Hua Zong, Shengchang Lan, and Nannan Wang  
*Harbin Institute of Technology, China*



# ISAP 2018

2018 INTERNATIONAL SYMPOSIUM ON  
ANTENNAS AND PROPAGATION

## [FrC3] [Special Session] Advanced Applications of Artificial Electromagnetic Materials and Structures

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 14:30-16:10
<b>Place</b>	Room C (Grand Ballroom 3)
<b>Session Chairs</b>	Dongho Kim (Sejong University, Korea) Hang Wong (City University of Hong Kong, Hong Kong, China)

**FrC3-1**

14:30-14:50

### Lightweight 3-D Printed Metamaterial for Electromagnetic Wave Absorption

Saptarshi Ghosh<sup>1</sup>, Manos M. Tentzeris<sup>2</sup>, and Sungjoon Lim<sup>1</sup>

<sup>1</sup>Chung-Ang University, Korea, <sup>2</sup>Georgia Institute of Technology, USA

**FrC3-2**

14:50-15:10

### Frequency Selective Film Design for Building Walls for Blocking Wireless LAN Signal

Sung-Sil Cho, In-Gon Lee, and Ic-Pyo Hong

Kongju National University, Korea

**FrC3-3**

15:10-15:30

### 3D Printed Broadband Dielectric Lens Based on Subwavelength Metamaterial

Quan-Wei Lin and Hang Wong

City University of Hong Kong, Hong Kong, China

**FrC3-4**

15:30-15:50

### Two-Dimensional Retrodirective Metasurface Using Generalized Snell's Law

The Viet Hoang and Jeong-Hae Lee

Hongik University, Korea

**FrC3-5**

15:50-16:10

### Electrical Beam Scan Antenna Using Miniaturized Frequency Selective Reflectors

Seokmin Lee, Injoong Nam, and Dongho Kim

Sejong University, Korea



### [FrD3] [Special Session] Automotive EMC

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 14:30-16:50
<b>Place</b>	Room D (Napoli Room)
<b>Session Chairs</b>	Jaegon Shin (KATRI, Korea) Ki-Chai Kim (Yeungnam University, Korea)

#### FrD3-1

14:30-14:50

##### A Study on the EMI Effect of Impedance Mismatching for LVDS Single Transmission Line in Vehicle Camera System

Byeongchan Jo and Kibum Jung  
*E&R Co., Ltd., Korea*

#### FrD3-2

14:50-15:10

##### A Development of 146 ~222 MHz Folded Dipole Antenna in an Immunity Test of Portable Transmitters on Road Vehicle Components

Hyok Lee<sup>1</sup>, Myogeun Yang<sup>2</sup>, and Jaehoon Choi<sup>3</sup>  
<sup>1</sup>KATECH, Korea, <sup>2</sup>IVIEW, Korea, <sup>3</sup>Hanyang University, Korea

#### FrD3-3

15:10-15:30

##### Simulation of Radiated Emissions from a Low Voltage BLDC Motor

Jongkyong Lee<sup>1</sup>, Kibum Jung<sup>1</sup>, and Sungjun Park<sup>2</sup>  
<sup>1</sup>E&R Co., Ltd., Korea, <sup>2</sup>Hanon System, Korea

#### FrD3-4

15:30-15:50

##### 77 GHz Automotive Radar Simulation

A. Wien, W. Simon, and R. Kress  
*IMST GmbH, Germany*

#### FrD3-5

15:50-16:10

##### A Broadband Conical Antenna for Measuring Partial Discharge

Jong-Woo Park<sup>1</sup>, Sung-Woo Jung<sup>2</sup>, and Ki-Chai Kim<sup>1</sup>  
<sup>1</sup>Yeungnam University, Korea, <sup>2</sup>Gyeongbuk Research Institute of Vehicle Embedded Technology, Korea

#### FrD3-6

16:10-16:30

##### Analysis of Electromagnetic Pulse Coupling into Electronic Device Considering Wire and PCB Resonance

Sangin Kim<sup>1</sup>, Jongwon Lee<sup>2</sup>, Jin-Soo Choi<sup>2</sup>, and Jong-Gwan Yook<sup>1</sup>  
<sup>1</sup>Yonsei University, Korea, <sup>2</sup>ADD, Korea

#### FrD3-7

16:30-16:50

##### Analysis and Design of Microwave Plasma for Ozone Generator System by Using Magnetron Tube

Kachaporn Lhathum, Supawat Kotchapradit, Thanaset Thosdeekoraphat, Samran Santalunai, and Chanchai Thongsopa  
*Suranaree University of Technology, Thailand*



# ISAP 2018

2018 INTERNATIONAL SYMPOSIUM ON  
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## [FrE3] [Special Session] Antennas for Military Applications

Date / Time	Oct. 26 (Fri.), 2018 / 14:30-16:10
Place	Room E (Venice Room)
Session Chairs	Keum Cheol Hwang (Sungkyunkwan University, Korea) Jong-Myung Woo (Chungnam National University, Korea)

### FrE3-1

14:30-14:50

#### Military Antennas

Jae-Yoon Shin and Jong-Myung Woo  
*Chungnam National University, Korea*

### FrE3-2

14:50-15:10

#### An All Textile H-Plane SIW Horn Antenna with Corrugated Ground for Military Applications

Seongkyu Lee and Jaehoon Choi  
*Hanyang University, Korea*

### FrE3-3

15:10-15:30

#### Optimization of Cavity-Backed Patch Array Antenna Using Genetic Algorithm

Sang Il Kim<sup>1,3</sup>, Dong Hwan Kim<sup>1</sup>, Trinh Van Son<sup>3</sup>, Joon Young Park<sup>1</sup>, Doo Soo Kim<sup>2</sup>, and Keum Cheol Hwang<sup>3</sup>  
<sup>1</sup>*Hanwha Systems, Korea*, <sup>2</sup>*ADD, Korea*, <sup>3</sup>*Sungkyunkwan University, Korea*

### FrE3-4

15:30-15:50

#### Grating Lobe Reduced Waveguide Slot Array Antenna

Son Trinh-Van<sup>1</sup>, Sung Chan Song<sup>2</sup>, Seung-Hee Seo<sup>3</sup>, and Keum Cheol Hwang<sup>1</sup>  
<sup>1</sup>*Sungkyunkwan University, Korea*, <sup>2</sup>*Hanwha Systems, Korea*, <sup>3</sup>*ADD, Korea*

### FrE3-5

15:50-16:10

#### A Validity Study on Dip & Vacuum Brazing Method for Ka-Band Waveguide Slot Array Antenna

Chae-Hyun Jung, Jong-Gyun Baek, Kook-Joo Lee, Chang-Hyun Park, and Jongkuk Park  
*LIG Nex1 Co., Ltd., Korea*



### [FrF3] [Special Session] Millimeter Wave Metasurfaces for Communication and Sensing

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 14:30-16:10
<b>Place</b>	Room F (Miami Room)
<b>Session Chairs</b>	Jungsuek Oh (Seoul National University, Korea) Kuang Zhang (Harbin Institute of Technology, China)

#### FrF3-1

14:30-14:50

##### Principle of Ultra-Thin Metalenses and Applications in Manipulation of Electromagnetic Waves

Kuang Zhang, Ruiwei Dai, Yueyi Yuan, Xumin Ding, Guohui Yang, Jiahui Fu, and Qun Wu  
*Harbin Institute of Technology, China*

#### FrF3-2

14:50-15:10

##### Continuously Tapered Sinusoidally Modulated Reactance Surface Antenna

Doohyun Yang and Sangwook Nam  
*Seoul National University, Korea*

#### FrF3-3

15:10-15:30

##### Design of Frequency Selective Surface Loaded to Multilayer Dielectric Plate for Loss Reduction over Wide Incident Angle

Shota Ino, Tomihiro Ikegami, Kunio Sakakibara, Nobuyoshi Kikuma, and Toshikazu Hori  
<sup>1</sup>*Nagoya Institute of Technology, Japan*, <sup>2</sup>*University of Fukui, Japan*

#### FrF3-4

15:30-15:50

##### Design of Compact Flat Lens for 5G MIMO Array Antenna System

Seungtae Ko, Yoongeon Kim, Hyunjin Kim, and Youngjoo Lee  
*Samsung Electronics Co., Ltd., Korea*

#### FrF3-5

15:50-16:10

##### Cross Bowtie Antenna-Coupled Detector for Circularly Polarized Infrared Wave Sensing

Sangjo Choi  
*University of Ulsan, Korea*



### [FrG3] [Special Session] Signal Detection Technology

<b>Date / Time</b>	Oct. 26 (Fri.), 2018 / 14:30-16:30
<b>Place</b>	Room G (Sicily Room)
<b>Session Chairs</b>	Young Ju Park (ADD, Korea) Chiho Lee (ADD, Korea)

**FrG3-1**

14:30-14:50

**Beamforming Characteristics of a Phased Array Reflector Using a Log Periodic Dipole Antenna as an Array Element**

Sungjun Yoo and Hosung Choo

*Hongik University, Korea*

**FrG3-2**

14:50-15:10

**A Compact Wideband Substrate-Integrated Waveguide MIMO Antenna for Radar Detecting Application**

Yunnan Jin, Seongkyu Lee, Youngtaek Hong, Kyoseung Keum, and Jaehoon Choi

*Hanyang University, Korea*

**FrG3-3**

15:10-15:30

**A Cascade AOA Estimation Technique with Rectangular Array Antenna**

Tae Yun Kim, Ji Youn Mun, and Suk-Seung Hwang

*Chosun University, Korea*

**FrG3-4**

15:30-15:50

**A Parallel Multi-Channel Cooperative Spectrum Sensing in Cognitive Radio Networks**

Dongho Seo and Haewoon Nam

*Hanyang University, Korea*

**FrG3-5**

15:50-16:10

**Radiation from Concave Optical Fiber Tips Fabricated by Laser Induced Photothermal Effects**

Gyeongho Son and Kyoungsik Yu

*KAIST, Korea*

**FrG3-6**

16:10-16:30

**Prediction of Electromagnetic Wave Propagation in Dispersive Atmospheric Environments**

Changseong Kim, Jun Heo, Daeyeong Yoon, and Yong Bae Park

*Ajou University, Korea*