

Millimeter Wave Communications for 5G

In this talk, the current research status of China 5G is briefly introduced, including the candidate frequency bands, goal and key technologies etc. Then, the research advances in millimeter wave indoor and outdoor communications for 5G is presented. Especially, the research advance in IEEE 802.11aj(45GHz) or Q-LINKPAN in China is reviewed, which was proposed mainly by the authors and now is considered as a part of Chinese 5G. Besides, the development and measurement of multibeam antennas for 5G massive MIMO are also reviewed.

About the speaker

Prof. Wei Hong / Southeast University, China



Wei Hong received the B.S. degree from the University of Information Engineering, Zhengzhou, China, in 1982, and the M.S. and Ph.D degrees from Southeast University, Nanjing, China, in 1985 and 1988, respectively, all in radio engineering.

Since 1988, he has been with the State Key Laboratory of Millimeter Waves and serves for the director of the lab since 2003, and is currently a professor and the dean of the School of Information Science and Engineering, Southeast

University. In 1993, 1995, 1996, 1997 and 1998, he was a short-term Visiting Scholar with the University of California at Berkeley and at Santa Cruz, respectively. He has been engaged in numerical methods for electromagnetic problems, millimeter wave theory and technology, antennas, RF technology for wireless communications etc. He has authored and co-authored over 300 technical publications with over 5000 citations, and authored two books. He thrice awarded the first-class Science and Technology Progress Prizes issued by the Ministry of Education of China and Jiangsu Province Government etc. Besides, he also received the Foundations for China Distinguished Young Investigators and for "Innovation Group" issued by NSF of China.

Dr. Hong is a Fellow of IEEE, Fellow of CIE, Vice-Presidents of Microwave Society and Antenna Society of CIE, IEEE MTT-S AdCom Member, Chairperson of IEEE MTT-S/AP-S/EMC-S Joint Nanjing Chapter, and served for the associate editor of IEEE Trans. on MTT during 2007-2010, and the editor board members for IJAP, China Communications, and Chinese Science Bulletin etc.

Wireless Transmission Technology for Ultra-high- definition Television

Digital satellite broadcasting and digital terrestrial broadcasting have been launched in 2000 and 2003, respectively. Through these developments, the digital HDTV broadcasting spread out widely across Japan. In parallel, NHK has been advancing research and development of 8K Super Hi-Vision—ultra high-definition TV (UHDTV) surpassing the resolution of HDTV. 8K images are composed of horizontal resolution of 7,680 pixels and vertical resolution of 4,320 pixels, resulting in 16 times the information of HDTV. For Super Hi-Vision sound, three-dimensional (3D) audio is composed of 22.2 channels. 8K Super Hi-Vision gives the audience a highly realistic sensation as if they are at the scene through high- capacity video and 3D surround sound.

It has been more than twenty years since research and development of 8K Super Hi-Vision began in 1995. During this time, NHK has developed a variety of Super Hi-Vision-related technologies, such as cameras, displays, audio equipment, recording equipment, and transmission systems. In 2016, we began trial 8K broadcasting via a broadcasting satellite using these technologies. Furthermore, we plan to begin full-fledged broadcasting in 2018.

In this address, I will give an overview of 8K Super Hi-Vision, which continues to evolve, and introduce the road map for the start of actual broadcasting. I will also introduce recent technologies for the wireless UHDTV transmission systems developed by NHK to date.

About the speaker

Mr. Tomohiro Saito / NHK Science & Technology Research Laboratories, Japan



Tomohiro Saito joined NHK (Japan Broadcasting Corporation) in 1987. From 1990, he worked at NHK Science & Technology Research Laboratories (STRL) and engaged in research and development related to digital transmission and transmission system, especially on digital satellite television broadcasting (ISDB-S). He worked at Engineering Administration Department and engaged in international standardization activity with groups such as ITU. He was the head of Advanced Transmission Systems Research Division of STRL from 2014 and has been Executive Research Engineer of STRL since 2015.

5G Trial in 2018 PyeongChang Winter Olympics - Technical challenges & preparations

The 5G network will allow ultra-fast data transfer, significantly decrease latency, and also support massive connectivity of heterogeneous devices. Although the telecoms industry has already started working on 5G, network operators, vendors, and regulatory bodies have yet to agree on a standard for spectrum and radio technologies. To clear this hurdle and timely roll out commercial 5G services, KT is actively working on both 5G R&D and global standardization, closely collaborating with industry, government, and global telecom alliances. KT already announced the vision of 5G GiGAtopia in MWC 2015 and is accordingly preparing 5G pre-commercial services for 2018 PyeongChang Winter Olympic Games. In this talk, we will share KT's view and vision on 5G, and also introduce what KT has done so far, and what KT is currently working on for launching 5G networks in collaboration with our partners, mainly focusing on our 5G pre-commercial specifications and corresponding service plan.

About the speaker

Mr. Jongsik Lee / KT, Korea



Jongsik Lee is currently the head of 5G TF in Infra Lab. of Institute of Convergence Technology. He joined KT in 1998 and has worked on various wireless areas including 3G, Mobile WiMAX, and LTE-related R&D project. Since 2014, he has been leading LTE Evolution and 5G-related R&D projects. He received the B.S. & M.S. degrees in Electrical Engineering from the Seoul National University in 1996 and in 1998, respectively. His main research areas were RF and microwave engineering.

Analysis of Low Loss Magneto-Dielectric Antenna for the Mobile Communication

A theoretical analysis of a cylindrical ferrite resonator antenna with steady magnetization utilizing the boundary conditions of a magnetic wall is presented. We theoretically derived exact eigenvalue equations for the mode-splitting phenomenon of hybrid mode. The presented theory is used to measure the permeability tensor and analysis the antenna performance.

Prof. Seong-Ook Park /

Korea Advanced Institute of Science and Technology, Korea

About the speaker



Seong-Ook Park received the M.S. degree from Korea Advanced Institute of Science and Technology (KAIST), Daejeon, in 1989, and the Ph.D. degree from Arizona State University, Tempe, in 1997, under the supervision of Professors Constantine A. Balanis. From March 1989 to August 1993, he was a Research Engineer with Korea Telecom, Daejeon, working with microwave systems and networks. He later joined the Telecommunication Research Center, Arizona State University, until September 1997. He has been a member of the faculty at

the Information and Communications University from October 1997 to 2008, and has been currently a full professor since 2009 at KAIST. He has studied the improvement of antenna function inside of handset platforms, analytical and numerical techniques in the area of electromagnetics wave, and the precision technique of antenna measurement. His main focus is on the theoretical analysis of a ferrite antenna, low loss Magneto-Dielectric antenna, and the new material based miniature antenna system. He has over 145 publications in refereed journals. He recently served as the Director General, Satellite Technology Research Center, KAIST.

Functional Metamaterial Devices for Manipulation of Waves in Microwave Region Based on Transformation Optics

As an effective approach for manipulating propagation of waves, transformation optics has inspired many novel applications during past decades. In this paper, our recent efforts in metamaterial devices for manipulation of waves in microwave region are reviewed with emphasis on (1) multifunctional device with three different kinds of electromagnetic properties, (2) homogeneous illusion device exhibiting transformed and shifted scattering effect and (3) wave bending devices with homogeneous complementary material. Our designs possess potential applications in fields of electromagnetic engineering.

About the speaker

Prof. Qun Wu / Harbin Institute of Technology, China



WU QUN received his B.Sc. in Radio Engineering, M. Eng. In Electromagnetic Fields and Microwaves, and Ph.D. in Communication and Information Systems, all at Harbin Institute of Technology (HIT), Harbin, China in 1977, 1988, and 1999, respectively. He worked as a Visiting Professor at Seoul National University (SNU) in Korea, from 1998 to 1999, and Pohang University of Science and Technology, from 1999 to 2000, and a two-month short period of visiting professor at National University of Singapore from 2003 to 2010 and Nanyang Technological University in 2011, respectively. Since 1990, he has been with School of Electronics and Information Engineering at HIT, China, where he is currently a Professor and a director of Center for Microwaves and EMC.

He published several books like Electromagnetic Compatibility: Principle and Techniques, Microwave Engineering and Techniques, Simulation and Design for RF & Microwave Circuits by Using Genesys, Theory and Applications of Metamaterials. Professor Wu has published nearly 200 international and regional refereed journal papers. He is a Member of Chinese Microwave Society, and senior member of the IEEE. He is a technical reviewer for several international journals. His recent research interests are mainly metamaterials, RF active and passive circuits, antennas and antenna array. He is also a vice chair for IEEE Harbin section, and chair of IEEE Harbin EMC/AP/MTT joint society chapter.

3D Printing Technology for RF and THz Antennas

Additive manufacturing (AM), or often called 3D printing is an emerging research area which has received much attention recently. It allows 3D objects with arbitrary geometry to be printed automatically layer by layer. 3D printing technology offers several advantages compared to conventional manufacturing techniques such as capability of more flexible design, prototyping time and cost reduction, less human interaction and faster product development cycle. This paper reviews state-of-the-art 3D printed antennas from microwave to THz frequencies and offers practical and futuristic perspectives on the potentials and challenges of 3D printed antennas.

About the speaker

Prof. Hao Xin / The University of Arizona, USA



Hao Xin, Professor of Electrical and Computer Engineering at the University of Arizona. He is named an Arizona Engineering fellow in Aug. 2013. He is the inaugural director of the Cognitive Sensing Center at the University of Arizona starting Jan. 2016. He joined University of Arizona since August 2005 as an assistant professor. He was promoted to tenured associate professor in 2009 and to full professor in 2012. He received his Ph.D in Physics from Massachusetts Institute of Technology in February 2001. From 2000 to

2003, he was a research scientist with the Rockwell Scientific Company. He was a Sr. Principal Multidisciplinary Engineer with Raytheon Company from 2003 to 2005.

His primary research interests are in the area of microwave / millimeter wave / THz antennas, devices, circuits and their applications in wireless communication and sensing systems. His recent research activities have covered a broad range of high frequency technologies, including applications of new technologies and materials in microwave and millimeter wave circuits such as electromagnetic band gap crystals and other meta-materials, carbon nano-tubes devices, solid state devices and circuits, active or semi-active antennas, and passive circuits. He has authored over 250 referred publications and 14 patents (13 issued and 1 pending) in the areas of microwave and millimeter-wave technologies, random power harvesting based on ferro-fluidic nano-particles and carbon nanotube based devices. His group's work on active metamaterials have been published in prestigious journals including Physical Review Letters, Nature Communications, etc., and have received extensive media coverage (the story on the active metamaterial work received over 200 million hits). He is a senior member of IEEE and chair of the joint chapter of IEEE AP/MTT/EMC/COMM in Tucson AZ. He is a general co-chair of the 8th International Workshop on Antenna Technology. He also serves as an associate editor for IEEE Antennas and Wireless Propagation Letters. hxin@ece.arizona.edu 520-626-6941.

Phased Array of Switched Beam Elements and Applications

This paper presents a two-element phased array antenna. The phase shifter for each element has one bit and each element has four beam directions. The suitable distance between elements provides side lobe level of less than -10 dB and gain higher than 6.3 dBi. With this simple configuration, this array antenna is useful in modern wireless communications and sensing applications.

Prof. Monai Krairiksh /
King Mongkut's Institute of Technology Ladkrabang, Thailand

About the speaker



Monai KRAIRIKSH was born in Bangkok, Thailand. He received the B.Eng., M.Eng. and D.Eng. degrees in electrical engineering from King Mongkut's Institute of Technology Ladkrabang (KMITL), Thailand in 1981, 1984, and 1994, respectively. He was a visiting research scholar at Tokai University in 1988 and at Yokosuka Radio Communications Research Center, Communications Research Laboratory (CRL) in 2004. He joined the KMITL and is currently a Professor at the Department of Telecommunication Engineering. He has served as the Director of the Research Center for Communications and Information Technology during 1997-2002. His main research interests are in antennas for mobile communications and microwave in agricultural applications. Dr. Krairiksh was the chairman of the IEEE MTT/AP/Ed joint chapter in 2005 and 2006. He served as the General Chairman of the 2007 Asia-Pacific Microwave Conference, and the advisory committee of the 2009 International Symposium on Antennas and Propagation. He was the President of the Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association (ECTI) in 2010 and 2011 and was an editor-in-chief of the ECTI Transactions on Electrical Engineering, Electronics, and Communications. He was recognized as a Senior Research Scholar of the Thailand Research Fund in 2005 and 2008 and a Distinguished Research Scholar of the National Research Council of Thailand. He has been a distinguished lecturer of IEEE Antennas and Propagation Society during 2012-2014.

Water Vapor Estimation using the Propagation Delay of Digital Terrestrial Broadcasting Waves

The feasibility of measuring water vapor from the propagation delay of digital terrestrial broadcasting waves is under investigation. A real-time delay measurement system with software-defined radio technique is developed. In this paper, experimental results with this system using reflected waves are reported. We have succeeded in observing the propagation delay between the observing point and the reflector from the balance between phases of direct waves and reflected waves. Data obtained with this technique may contribute to improve numerical forecast of localized severe weather phenomena through data assimilations.

Dr. Seiji Kawamura /
National Institute of Information and Communications Technology, Japan

About the speaker



Seiji Kawamura is a senior researcher at Applied Electromagnetic Research Institute, National Institute of Information and Communications Technology (NICT), Japan. He received his B.E., M.E., and Ph.D. in informatics from Kyoto University, Kyoto, Japan, in 1998, 2000, and 2003, respectively. During his M.E. and Ph.D. programs, he studied at Radio Science Center for Space and Atmosphere (RASC, currently RISH), Kyoto University, and served as a Japan Society for the Promotion of Science (JSPS) doctoral course student fellow from 2000 to 2003. After completing his doctorate, he served as a JSPS postdoctoral fellow at Communications Research Laboratory (CRL, currently NICT) and then joined the NICT in 2006. He worked at NICT Okinawa Electromagnetic Technology Center, Onna, Okinawa from 2007 to 2011. He started his research from ionospheric studies using the MU radar at the graduate school. Then his interest moved down to the mesosphere (using MF radars) and to the troposphere (using weather radars and wind profiler radars). His main focus is R&D of radar remote sensing technologies using software-defined radio.

Design and Characterization of Cost-Effective Planar Antennas with Steerable Beams: Gap Waveguides, SMT and Random LOS

This paper presents the recent developments of gap waveguide technology and random-LOS OTA test technology. The applications on beam-steerable massive MIMO antennas and the characterization with random-LOS are emphasized.

Associate Prof. Jian Yang / Chalmers University of Technology, Sweden

About the speaker



Jian Yang received the B.Sc. degree in electrical engineering from the Nanjing University of Science and Technology, Nanjing, China, in 1982, the M.Sc. degree in electrical engineering from the Nanjing Research Center of Electronic Engineering, Nanjing, in 1985, and the Swedish Licentiate and Ph.D. degrees from Chalmers University of Technology, Gothenberg, Sweden, in 1998 and 2001, respectively.

From 1985 to 1996, he was with the Nanjing Research Institute of Electronics Technology, Nanjing, China, as a Senior Engineer. From 1999 to 2005, he was with the Department of Electromagnetics, Chalmers University of Technology, Gothenberg, Sweden, as a Research Engineer. During 2005 and 2006, he was with COMHAT AB as a Senior Engineer. From 2006 to 2010, he was an Assistant Professor and, since 2010, he has been an Associate Professor with the Department of Signals and Systems, Chalmers University of Technology. His research interests include 60–120-GHz antennas, terahertz antennas, MIMO antennas, ultrawideband (UWB) antennas and UWB feeds for reflector antennas, UWB radar systems, UWB antennas in near-field sensing applications, hat-fed antennas, reflector antennas, radome design, and computational electromagnetics.

Assistant Prof. Andrés Alayón Glazunov / Chalmers University of Technology, Sweden

About the speaker



Andrés Alayón Glazunov is currently an Assistant Professor at the Department of Signals and Systems, Chalmers University of Technology, Gothenburg, Sweden. He obtained the M.Sc. (Engineer-Researcher) degree in Physical Engineering from Saint Petersburg State Polytechnical University, Russia, and the Ph.D. degree in Electrical Engineering from Lund University, Sweden, during 1988-1994 and 2006-2009, respectively. He has held various positions at research labs in the Swedish telecom industry, e.g., member of the Research

Staff at Ericsson Research, Senior Research Engineer at Telia Research, and Senior Specialist in Antenna Systems and Propagation at TeliaSonera. In academia, he has held a Marie Curie

Senior Research Fellowship at the Centre for Wireless Network Design (CWIND), University of Bedfordshire, UK, and a post-doc position at the Electromagnetic Engineering Lab, KTH-The Royal Institute of Technology, Stockholm, Sweden.

Alayón Glazunov has been one of the pioneers in establishing OTA measurement techniques. He has conducted, or is conducting research, in areas related to advanced receiver performance evaluation, applied electromagnetic wave propagation, stochastic channel modelling, smart and MIMO antennas and systems, network optimization, fundamental limitations on antenna-channel interactions, and Over-The-Air (OTA) performance evaluation of wireless devices. He has actively contributed to the European COST Actions 259 and 273. He has contributed to the EVEREST and NEWCOM European research projects as well as to the 3GPP and the ITU standardization bodies.

Alayón Glazunov is the author of various scientific and technical publications. He is the co-author and co-editor of *LTE-Advanced and Next Generation Wireless Networks* (Wiley 2012).

Design of Antennas with Crossed Dipoles

With the rapid development of today's wireless communication markets, higher demands have been raised for the antenna design, including compact sizes, high efficiencies, broad bandwidths, multiple bands, specific radiation profiles, ease of fabrication and integration, and low costs. The crossed dipole is a common type of modern antenna with an RF- to the millimeter-wave frequency range. Therefore, crossed dipole antennas have been widely developed for current and future wireless communication systems. They can generate isotropic, omnidirectional, unidirectional, dual-polarized, and circularly polarized (CP) radiation. Moreover, by incorporating a variety of primary radiation elements, they are suitable for single-band, multiband, and wideband operations.

Two techniques, namely insertions a meander line and an arrowhead-shaped end in each dipole arm, are used to realize a compact size of the cross dipole. For CP radiation with single-feed, the dipoles with the reduced length are crossed through a pair of vacant-quarter printed ring. For multi-band applications, each dipole arm is divided into multi-branches with different lengths to obtain multiple resonances. Wideband radiating elements such as bowtie dipoles are employed for wideband applications. To improve the radiation pattern, these radiators are combined with different reflectors, namely metallic cavity and artificial magnetic conductor surfaces.

In this Workshop, the designs, characteristics, and applications of crossed dipole antennas along with recent developments will be presented. Considerations of profile miniaturization, radiation pattern control, bandwidth enhancement, and multiband operation are emphasized.

About the speaker

Prof. Ikmo Park / Ajou University, Korea



Ikmo Park received the B.S. degree in Electrical Engineering from the State University of New York at Stony Brook, and M.S. and Ph.D. degrees in Electrical Engineering from the University of Illinois at Urbana-Champaign. He joined the Department of Electrical and Computer Engineering at Ajou University in March 1996. Prior to joining Ajou University, he has been working with the Device & Materials Laboratory of LG Corporate Institute of Technology, Seoul, Korea, where he had been engaged in research and development of various antennas

for personal communication systems, wireless local area networks, and direct broadcasting systems. He was a Visiting Professor at the Department of Electrical and Computer Engineering, POSTECH, Pohang, Korea, from March 2004 to February 2005, and the Department of Electrical and Computer Engineering, University of Arizona, Tucson, Arizona, USA, from July 2011 to June 2012.

He has authored and co-authored over 300 technical journal and conference papers. He also holds over 30 patents. He served as a Chair of the Department of Electrical and Computer Engineering at Ajou University. He is a member of Board of Directors at the Korea Institute of Electromagnetic Engineering and Science (KIEES). He serves as chairs, organizers, and members of the program committees for various conferences, workshops, and short courses in electromagnetic related topics. His current research interests include the design and analysis of microwave, millimeter-wave, terahertz wave, and nano-structured antennas. He is also a member of Eta Kappa Nu and Tau Beta Pi.

Reflectarray Antennas: Theory, Designs, and Applications

In the recent years, reflectarrays have emerged as a new generation of high-gain antennas, which have attracted an increasing interest in the antenna community because of their low-profile, low-mass, and low-cost features. The reflectarray antenna is a hybrid design that combines many favorable features of reflectors and printed arrays. The aim of this short course is to present a comprehensive overview of reflectarray system design and state-of-the-art technology. This short course will enable attendees to understand the basics of reflectarray systems, become familiar with reflectarray design, analysis techniques, and enabling technologies, and apply this knowledge to designing reflectarrays for various applications.

The proposed curriculum for this course consists of two parts. In the first part, the history of reflectarray antenna development is first reviewed and then basic theories for analysis and design of reflectarray antennas are presented in detail. This section of the course builds the fundamental knowledge one needs to have in order to understand the governing dynamics of a reflectarray antenna system, and efficiently design and analyze reflectarray antennas. The second part of the course is intended for researchers that have a good knowledge of the basic theories in reflectarray, and aim at designing reflectarray antennas for specific applications. This part starts with a discussion on bandwidth limitation and solutions for broadband designs, and afterwards several advanced application oriented topics in reflectarray antennas will be presented.

About the speaker

Prof. Fang Yang / Tsinghua University, China



Fan Yang received the B.S. and M.S. degrees from Tsinghua University, Beijing, China, and the Ph.D. degree from the University of California at Los Angeles (UCLA).

From 2002 to 2004, he was a Post-Doctoral Research Engineer and Instructor with the Electrical Engineering Department, UCLA. In 2004, he joined the Electrical Engineering Department, The University of Mississippi as an Assistant Professor, and was promoted to an Associate Professor. In 2011, he joined

the Electronic Engineering Department, Tsinghua University as a Professor, and has served as the Director of the Microwave and Antenna Institute since then.

Dr. Yang's research interests include antennas, periodic structures, computational electromagnetics, and applied electromagnetic systems. He has published over 200 journal articles and conference papers, five book chapters, and three books entitled *Scattering Analysis of Periodic Structures Using Finite-Difference Time-Domain Method* (Morgan & Claypool, 2012), *Electromagnetic Band Gap Structures in Antenna Engineering* (Cambridge Univ. Press, 2009), and *Electromagnetics and Antenna Optimization Using Taguchi's Method* (Morgan & Claypool, 2007).

Dr. Yang served as an Associate Editor of the *IEEE Transactions on Antennas and Propagation* (2010-2013) and an Associate Editor-in-Chief of *Applied Computational Electromagnetics Society (ACES) Journal* (2008-2014). He was the Technical Program Committee (TPC) Chair of 2014 IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting.

Dr. Yang has been the recipient of several prestigious awards and recognitions, including the Young Scientist Award of the 2005 URSI General Assembly and the 2007 International Symposium on Electromagnetic Theory, the 2008 Junior Faculty Research Award of the University of Mississippi, the 2009 inaugural IEEE Donald G. Dudley Jr. Undergraduate Teaching Award, and the 2011 Recipient of Global Experts Program of China.

WS3

Workshop 3

Fundamentals of Practical Antenna Measurement to Get More Accurate Data for Input Impedance and Pattern

To examine the antenna characteristics, quantities to be measured are classified according to circuit and spatial aspects. For circuit aspect, there are input impedance, radiation resistance, VSWR, return loss, reflection coefficient, radiation efficiency and bandwidth. For spatial aspect, there are radiation pattern, directivity, gain, beam width, polarization, effective area, RCS, radiation efficiency and bandwidth. In this workshop, for circuit aspect, I will discuss input impedance measurement using a vector network analyzer or VNA, with electrical length compensation and the effect of unbalanced current on the coaxial cable. For spatial aspect, will discuss pattern measurements and related error sources with the methods to reduce them, and gain measurements using comparative method.

About the speaker

Prof. Nozomu Ishii / Niigata University, Japan



Nozomu Ishii received B.S., M.S., and Ph.D degrees from Hokkaido University, Sapporo, Japan, in 1989, 1991, and 1996, respectively. In 1991, he joined the faculty of Engineering at Hokkaido University. Since 1998, he has been with the faculty of Engineering at Niigata University, Japan, where he is currently an Associate Professor of the Department of the Biocybernetics. His current interests are in the area of small antennas and antenna analysis and measurement. He is the author of textbook entitled “Antenna Basic Metrology” written in Japanese. He is now the Chairperson of Expert Committee on Advanced Measurement Technology for Radio Equipment and Antenna System, IEICE, Japan. He is a member of the IEEE.

A New Look at Transformation Optics (TO) Approach for Designing Electromagnetic Devices such as Flat Lenses, and Cloaks

In this tutorial presentation we will discuss the basics of the Transformation Optics (TO) method, aka the Transformation Electromagnetics approach, to designing a number of “microwave” devices such as: cloaks; flat lenses; and reflectarrays. Recently, there has been considerable interest in using the transformation optics (TO) algorithm, which is based upon transforming the geometry of an object from real space to virtual space while keeping the Maxwell’s field solutions from real space to virtual space intact, because it provides an alternative (to traditional) and innovative way to design a class of EM devices. However, the caveat is that the TO algorithm typically leads to designs that call for anisotropic epsilon and mu values in real space, in order to preserve the field variations as we navigate from the real space to virtual space and vice versa. Furthermore, depending on the geometry of the problem, the values may be very unrealistic to realize in practice, even when artificially synthesized materials aka metamaterials (MTM) are employed for the realization, whose use often leads to designs that are narrowband, lossy, dispersive and polarization-sensitive—attributes that are clearly undesirable for practical applications. We show how we can address this problem encountered with the TO by using an algorithm based on “Field Transformation (FT),” as opposed to geometry transformation. The FT algorithm has been designed to transform the electromagnetic field distribution in an input aperture, generated by a given source distribution, to a desired distribution in the exit aperture. We show how we can cast the design problem into a Scattering Matrix approach, where in the case of RCS reduction problem the design is based on controlling only the Magnitude of S_{11} , whereas for the Lens or Reflectarray problems, we are specifying only the desired Phase of S_{12} without being concerned about its magnitude. In contrast to this, the TO imposes strict conditions on both the magnitude and phase characteristics of S_{11} and S_{12} , which in turn calls for anisotropic dielectric and magnetic metamaterials. The Scattering Matrix/Field Transformation approach avoids these problems altogether and is able to work with epsilon-only materials for the lens and reflectarray problems, and with realizable magneto-dielectrics with complex μ and epsilon materials, which have wideband characteristics and which do not suffer from the shortcomings of the MTMs.

A number of practical examples will be included in the presentation, not only to point out the shortcomings of the TO, but to also show how we can get around its difficulties in a systematic way when dealing with some real-world problems.

***Prof. Raj Mittra /
Pennsylvania State University / University of Central Florida, USA***

About the speaker



Raj Mittra is Professor in the Electrical Engineering department of the Pennsylvania State University. He is also the Director of the Electromagnetic Communication Laboratory, which is affiliated with the Communication and Space Sciences Laboratory of the EE Department. Prior to joining Penn State he was a Professor in Electrical and Computer Engineering at the University of Illinois in Urbana Champaign. He is a Life Fellow of the IEEE, a Past-President

of AP-S, and he has served as the Editor of the Transactions of the Antennas and Propagation Society. He won the Guggenheim Fellowship Award in 1965, the IEEE Centennial Medal in 1984, the IEEE Millennium medal in 2000, the IEEE/AP-S Distinguished Achievement Award in 2002, the AP-S Chen-To Tai Distinguished Educator Award in 2004 and the IEEE Electromagnetics Award in 2006. He has been a Visiting Professor at Oxford University, Oxford, England and at the Technical University of Denmark, Lyngby, Denmark. He has also served as the North American editor of the journal AEÜ. His professional interests include the areas of Communication Antenna Design, RF circuits, computational electromagnetics, electromagnetic modelling and simulation of electronic packages, EMC analysis, radar scattering, frequency selective surfaces, microwave and millimetre wave integrated circuits, and satellite antennas. He has published over 1000 journal and symposium papers and more than 40 books or book chapters on various topics related to electromagnetics, antennas, microwaves and electronic packaging. He also has four patents on communication antennas to his credit. He has supervised about 100 Ph.D. theses, 85 M.S. theses, and has mentored more than 50 postdocs and Visiting scholars. He has directed, as well as lectured in, numerous short courses on Computational Electromagnetics, Electronic Packaging, Wireless antennas, Metamaterials and Transformation Optics, both nationally and internationally.

Ultra Wideband Phased Arrays and Transceivers

Wide band antennas and arrays are essential for high resolution imaging, cognitive sensing, high data rate communication links, multi-waveform, and multi-function frontends for holistic spectrum utilization and secure communications. With wireless data traffic expected to grow more than 40% annually in the foreseeable future, wideband RF front ends will play an essential role in the years to come. However, there is a longstanding difficulty in realizing small and conformal aperture version of these arrays. But recent miniaturization techniques, bandwidth enhancements and establishment of theoretical limits, feed technology, digital beam forming transceivers and post-processing algorithms have led to a new class of conformal antennas and tight-coupled arrays that can operate from UHF to millimeter wave frequencies. This short course will cover RF front-ends from the array aperture to transceivers and digital processors to realize ultra wideband communications with channel coding for spread spectrum communications. The course will cover: 1) theory and realization of ultra wideband conformal arrays with as much as 14:1 bandwidths, 2) theoretical bandwidth limits versus array thickness, 3) ultra wideband balanced feeds, 3) material and superstrates for optimal array design, 4) beam forming techniques at near grazing angles, 5) reconfiguration methods for bandwidth rejection and passband control, 6) low power and low cost digital beam formers via on-site coding, and 7) reduced hardware back-ends. This short course is based on the work of many Ph.D. students and collaborators at the Ohio State ElectroScience Lab. They include: Chi-Chih Chen, Kubilay Sertel, Elias Alwan, Waleed Khalil, Nima Ghalichechian, Brian Dupaix, Abe Akhiyat, Justin Kasemodel, Ioannis Tzanidis, William Moulder, Jonathan Doane, Satheesh Bojja venkatakrishnan, Dimitris Papantonis and Markus Novak.

Prof. John L. Volakis / The Ohio State University, USA

About the speaker



John L. Volakis was born in Chios, Greece in 1956 and immigrated to the U.S.A. in 1973. He is the Chope Chair Professor at The Ohio State University, Electrical and Computer Engineering Dept. and also serves as the Director of the ElectroScience Laboratory. He was on the faculty of the University of Michigan-Ann Arbor from 1984 to 2003, serving as the Director of the Radiation Laboratory from 1998-2000. He is the author/co-author of 8 books, over 370 journal articles and 700 conference articles, with almost all of these in the IEEE

APS venues. Over the years, he carried out research in antennas, wireless communications and propagation, radar scattering and diffraction, computational methods, electromagnetic compatibility and interference, design optimization, RF materials, multi-physics engineering, bioelectromagnetics, and medical sensing. Volakis has graduated/mentored nearly 80 doctoral students/post-docs with 27 of them receiving best paper awards at conferences. His service to Professional Societies include: 2004 President of the IEEE Antennas and Propagation Society, twice the general Chair of the IEEE Antennas and Propagation Symposium, Vice Chair of USNC/URSI Commission B, IEEE APS Distinguished Lecturer, IEEE APS Fellows Committee Chair, IEEE-wide Fellows committee

member & Associate Editor of several journals. He is a Fellow of IEEE and ACES, and in 2004 he was listed by ISI among the top 250 most referenced authors. Among his awards are: The Univ. of Michigan College of Engineering Research Excellence award (1993), Scott award from The Ohio State Univ. College of Engineering for Outstanding Academic Achievement (2011), IEEE Tai Teaching Excellence award (2011), the IEEE Henning Mentoring award (2013), the IEEE Antennas & Propagation Distinguished Achievement award (2014), and the Ohio State Univ. Distinguished Scholar Award (2016).

Multi-Probe Antenna Measurement Systems with Applications to Telecom, Space and Defense

This course is a fast pace introduction to modern applications of multi-probe near field antenna measurements. Following a brief introduction to general antenna measurements and near field measurements theory, the course will focus on the implementation of multi-probe system for different antenna measurements applications in areas such as telecom, space and defense. The course will emphasize the state of the art of two challenging scenarios for antenna measurement such as MIMO and Active Antenna Systems.

Course outline:

- Theory and application of far-field and near field antenna measurements
- Modulated scattering technique and implementation in multi probe systems
- Post-processing and link between measurements and numerical simulation
- Application in telecom and defense measurement scenarios
- Introduction to state-of-the art SISO and MIMO measurements

About the speaker

Mr. Lars J. Foged /Microwave Vision Group, Italy



Lars Jacob Foged was born in Viborg, Denmark in 1966. He received his B.Sc from Aarhus Teknikum, Denmark in 1988 and M.Sc. in Electrical Engineering from California Institute of Technology, USA in 1990.

He became a “graduate trainee” of the European Space Agency, ESTEC in the Netherlands and spent the following ten years designing antennas for high performance communication and navigation satellites. In 2001, he joined SATIMO and founded the branch office in Italy. Since then, he has held different

technical leadership positions in SATIMO and later Microwave Vision Group. He is currently the scientific director of Microwave Vision Group and associate director of Microwave Vision Italy.

He was a member of the EURAAP delegate assembly from 2009 to 2012 and responsible for the working group on antenna measurements. He was Vice-Chair of the Eucap 2011 conference in Rome, Industrial Chair of Eucap 2012 and 2014 conference in Prague and Den Haag and Technical Program Chair of Eucap 2016 in Davos. Since 2006, he is a member of the board of the European School of Antennas (ESOA), and technical responsible and teacher in the biannual antenna measurement course.

He is a senior member of IEEE and fellow of AMTA. He is secretary of the IEEE antenna standards committee and near-field working group since 2004. He is contributing to the IEC 62209 standard(s) on human exposure to electromagnetic fields since 2010. In 2016 he was appointed chairman of the Industry Initiatives Committee (IIC), a standing committee of IEEE APS. Time permitting he is an occasional reviewer on the IEEE Antennas and Wireless Propagation Letters and IEEE Transactions on Antennas and Propagation.

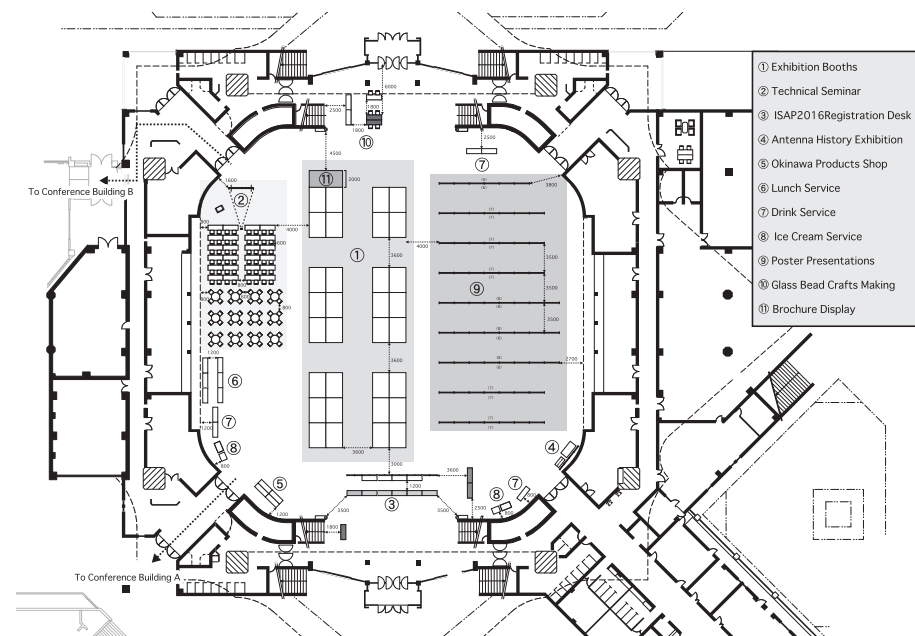
He has authored and co-authored more than 200 journal and conference papers on antenna design and measurement topics, contributed to 3 books and standards, and holds 4 patents.

Exhibition

Show hours

Tuesday	October 25	9:00 – 17:00
Wednesday	October 26	9:00 – 17:00
Thursday	October 27	9:00 – 17:00

Exhibition Hall Layout



Exhibitors

We are thankful to our Exhibitors for their support.

Exhibition Booth

*Alphabetical Order

ANRITSU CORPORATION	ANSYS Japan	AWR Japan (National Instruments)
Denki Kogyo Co., Ltd.	Device.Co.,Ltd	E&C Engineering K.K.
FARAD Corporation	FUJITSU LABORATORIES LTD.	Growth inc.
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NHK(JAPAN BROADCASTING CORPORATION)	NSI-MI Japan Co., Ltd.	NSI-MI Technologies, LLC.
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The National Institute of Advanced Industrial Science and Technology (AIST)	WIPL-D(Japan), Inc.	

Technical Seminar**Oct. 25 (Tue)**

12:50-13:20	NSI-MI Technologies "How to Specify and Understand Positioning Accuracy in Antenna Measurement Systems"
13:25-13:55	ANSYS Japan K.K. "Advanced Antenna and Wireless Design for IoT, 5G, and Automated Cruise using ANSYS HFSS and ANSYS Savant."
14:00-14:30	WIPL-D d.o.o. "Antenna design using the CMA (Characteristic Mode Analysis) Solver"

Oct. 26 (Wed)

12:50-13:20	MICROWAVEVISION, VITEC GLOBAL ELECTRONICS "MVG Antenna measurement solution"
13:25-13:55	MARUBUN / PCTEL "Interference case study for LTE network--how can we hunt it- ?"

14:00-14:30	Rohde & Schwarz "Fixture compensation and multipoint network analyzer"
14:35-15:05	Altair "Introduction of the Latest HyperWorks 14 FEKO"

Oct. 27 (Thu)

12:50-13:20	WIPL-D d.o.o. "RCS simulation of F35, Fighter Aircraft at 10 GHz using DDS, Domain Decomposition Solver"
13:25-13:55	National Instruments (AWR Japan K.K.) "An Integrated Design Flow for Seamless Antenna design - From System Level Evaluation to Prototype"
14:00-14:30	Nippon Pillar Packing Co.,Ltd. "Introduction of Fluoro-Carbon Resin Substrate for mmW Application"

Brochure Display

*Alphabetical Order

Candox Systems Inc.	CORONA PUBLISHING CO.,LTD.	Hitachi Kokusai Electric Inc.
Keysight Technologies	KMW Japan Inc	KOJIMA INDUSTRIES CORPORATION
MASPRO DENKOH CORP.	Mobile Techno Corp.	Oaks Corporation
TOYOTA CENTRAL R&D LABS., INC.		

Technical Program

October 25 (Tue)

1A1: Opening Ceremony 09:30 - 10:10 (Room A)

Chair: Nobuyoshi Kikuma (Nagoya Institute of Technology, Japan)

1A2: Plenary Talk 10:10 - 12:30 (Room A)

Co-Chairs: Jiro Hirokawa (Tokyo Institute of Technology, Japan)

Keizo Cho (Chiba Institute of Technology, Japan)

- 1: **Millimeter Wave Communications for 5G**
Wei Hong, *Southeast University, China*
- 2: **Wireless Transmission Technology for Ultra-high-definition Television**
Toru Kuroda, *NHK Science & Technology Research Laboratories, Japan*
- 3: **5G Trial in 2018 PyeongChang Winter Olympics - Technical challenges & preparations**
Jongsik Lee, *Korea Telecom, Korea*

1A3: Metamaterial-Inspired Antennas I 14:00 - 15:40 (Room A)

Co-Chairs: Sungtek Kahng (Incheon National University, Korea)

Naobumi Michishita (National Defense Academy, Japan)

- 1: **14:00 Invited: Functional Metamaterial Devices for Manipulation of Waves in Microwave Region based on Transformation Optics**
#Qun Wu, Jin-shuo Mei, Xumin Ding and Kuang Zhang, *Harbin Institute of Technology, China*
- 2: **14:40 A Small and Thin Metasurface Loop Antenna**
Dajung Han, Changhyeong Lee, Muhammad Kamran Kattak and #Sungtek Kahng, *Incheon National University, Korea*
- 3: **15:00 Design of Broadband and Low-loss Double Negative Electromagnetic Metamaterials with Solid-State Arrangement**
Xiaoxiao Zhou, Shixing Yu and #Long Li, *Xidian University, China*
- 4: **15:20 Beam Steering Using Graphene-based Magnetic Resonator**
#Xiaobing Li, Weibing Lu, Jian Wang and Baohu Huang, *Southeast University, China*

October 25 (Tue)

1A4: Metamaterial-Inspired Antennas II 16:00 - 17:40 (Room A)

Co-Chairs: Richard W. Ziolkowski (University of Arizona, United States)

Naobumi Michishita (National Defense Academy, Japan)

- 1: **16:00 Design of a Printed, Metamaterial-Based Beamformer**
Brian B. Tierney and #Anthony Grbic, *University of Michigan, United States*
- 2: **16:20 Surface Wave Manipulation based on Transformation Optics: from Design to Manufacturing**
Luigi La Spada and #Yang Hao, *Queen Mary University of London, United Kingdom*
- 3: **16:40 Efficient, Electrically Small Metamaterial-Inspired Antennas with High Directivity**
Ming-Chun Tang⁽¹⁾ and #Richard W. Ziolkowski^(2,3), ⁽¹⁾*Chongqing University, China*, ⁽²⁾*University of Arizona, United States*, ⁽³⁾*University of Technology Sydney, Australia*
- 4: **17:00 Enhancement of Bandwidth for Low-Profile Omnidirectional Zeroth-Order Resonant Antennas**
Tetsuya Ueda⁽²⁾, Kohei Enomoto⁽²⁾, #Masakazu Ikeda⁽¹⁾, Yuji Sugimoto⁽¹⁾, Hiroaki Kuraoka⁽³⁾ and Shiro Koide⁽³⁾, ⁽¹⁾*NIPPON SOKEN, INC., Japan*, ⁽²⁾*Kyoto Institute of Technology, Japan*, ⁽³⁾*DENSO CORPORATION, Japan*
- 5: **17:20 Composite Right/Left-Handed Coplanar Strip Leaky Wave Antenna for MIMO Applications**
Takuya Seki⁽¹⁾, #Ichiro Oshima⁽¹⁾, Naobumi Michishita⁽²⁾ and Keizo Cho⁽³⁾, ⁽¹⁾*Denki Kogyo Co., Ltd., Japan*, ⁽²⁾*National Defense Academy, Japan*, ⁽³⁾*Chiba Institute of Technology, Japan*

1B3: Antennas for Mobile Communications I 14:00 - 15:40 (Room B)

Co-Chairs: Keizo Cho (Chiba Institute of Technology, Japan)

Parayoot Akkaraekthalin (King Mongkut's University of Technology North Bangkok, Thailand)

- 1: **14:00 Conformal Integrated Multi-Layer Thin-Film Antenna by Novel LITA Technologies for Smartwatch Wearable Device Applications**
#Wei-Yu Li⁽¹⁾, Wei Chung⁽¹⁾, Fu-Ren Hsiao⁽²⁾, Tune-Hune Kao⁽¹⁾ and Meng-Chi Huang⁽¹⁾, ⁽¹⁾*Industrial Technology Research Institute (ITRI), Taiwan*, ⁽²⁾*Advanced-Connectex INC. (ACON), Taiwan*
 - 2: **14:20 Dual-Band Handset Antenna Based on Multi-Branch Monopole for LTE/WWAN Applications**
#Tzu-Heng Cheng, Jen-Kuei Tsai, Wan-Ting Hung and Shih-Yuan Chen, *National Taiwan University, Taiwan*
 - 3: **14:40 Compact Multi-Layer Handset Phone 13.56 MHz NFC Antenna Design by Novel Laser-Induced Thin-Film Antenna (LITA) Technologies**
#Wei-Yu Li⁽¹⁾, Wei Chung⁽¹⁾, Fu-Ren Hsiao⁽²⁾, Tsung-Lin Li⁽²⁾, Tune-Hune Kao⁽¹⁾ and Meng-Chi Huang⁽¹⁾, ⁽¹⁾*Industrial Technology Research Institute (ITRI), Taiwan*, ⁽²⁾*Advanced-Connectex INC. (ACON), Taiwan*
 - 4: **15:00 A Slot Antenna with Multiple Steps for Mobile Phone Applications**
#Wei-Hua Zong⁽¹⁾, Xiao-Mei Yang⁽¹⁾, Shan-Dong Li⁽¹⁾, Xiang-Yang Wei⁽²⁾, Xi-Tao Guo⁽³⁾, Zhe-Jun Jin⁽¹⁾, Xiao-Yun Qu⁽⁴⁾ and Xia Xiao⁽¹⁾, ⁽¹⁾*Qingdao University, China*, ⁽²⁾*Goertek Inc, China*, ⁽³⁾*Beijing Hexiehangdian Information and Technology Co., Ltd, China*, ⁽⁴⁾*Shandong Aerospace Electronics and Technology Institute, China*
- 15:20 Break Time

Technical Program

October 25 (Tue)

1B4: Antennas for Mobile Communications II 16:00 - 17:40 (Room B)

Co-Chairs: Ala Sharaiha (University of Rennes 1, France)
Amane Miura (NICT, Japan)

- 1: 16:00 **A Compact EBG Structure using Interdigital Capacitor Resonator Technique for LTE Antenna**
#Piyaporn Krachodnok⁽¹⁾, Pongsathorn Chomtung⁽²⁾ and Prayoot Akkaraekthalin⁽²⁾,
⁽¹⁾Suranaree University of Technology, Thailand, ⁽²⁾King Mongkut's University of Technology North Bangkok, Thailand
 - 2: 16:20 **A Compact D-CRLH Metamaterial Antenna for WLAN and WiMAX Multiband**
#Hieu Ngoc Quang and Hiroshi Shirai, *Chuo University, Japan*
 - 3: 16:40 **TX-RX Isolation Method based on Polarization Diversity, Spatial Diversity and TX Beamforming**
#Ehsan Foroozanfar, Elisabeth De Carvalho and Gert Frøelund Pedersen, *Aalborg University, Denmark*
 - 4: 17:00 **An Open Terminated Folded Inverted-L Antenna with Slits**
#Keisuke Noguchi, Akihiro Tanaka, Shigeru Makino, Tetsuo Hirota and Kenji Itoh, *Kanazawa Institute of Technology, Japan*
- 17:20 Break Time

1C3: Antenna Technologies in Wireless Power Transfer 14:00 - 15:40 (Room C)

Co-Chairs: Seungyoung Ahn (Korea Advanced Institute of Science and Technology, Korea)
Hiroshi Hirayama (Nagoya Institute of Technology, Japan)

- 1: 14:00 **85 kHz Band 44 kW Wireless Power Transfer System for Rapid Contactless Charging of Electric Bus**
#Tetsu Shijo, Kenichirou Ogawa, Fumi Moritsuka, Masatoshi Suzuki, Hiroaki Ishihara, Yasuhiro Kanekiyo, Koji Ogura, Masaaki Ishida, Shuichi Obayashi, Shuhei Shimmyo, Koji Maki, Fumiaki Takeuchi and Nobumitsu Tada, *Toshiba Corporation, Japan*
- 2: 14:20 **Evaluation of Electromagnetic Field Radiation from Wireless Power Transfer Electric Vehicle**
#Kibeom Kim⁽¹⁾, Jonghoon Kim⁽¹⁾, Hongkyun Kim⁽¹⁾, Jangyong Ahn⁽¹⁾, Hyun Ho Park⁽²⁾ and Seungyoung Ahn⁽¹⁾, ⁽¹⁾Korea Advanced Institute of Science and Technology, Korea, ⁽²⁾The University of Suwon, Korea
- 3: 14:40 **Design Procedure for Wireless Power Transfer to Integrated Circuit**
#Dukju Ahn⁽¹⁾ and In Kui Cho⁽²⁾, ⁽¹⁾Incheon National University, Korea, ⁽²⁾Electronics and Telecommunications Research Institute, Korea
- 4: 15:00 **A Compact Shorted Patch Rectenna Design with Harmonic Rejection Properties**
Jui-Hung Chou⁽¹⁾, Ding-Bing Lin⁽²⁾ and #Ling Tien⁽²⁾, ⁽¹⁾National Chung-Shan Institute of Science and Technology, Taiwan, ⁽²⁾National Taipei University of Technology, Taiwan
- 5: 15:20 **A Broadband Rectenna For Harvesting Low-Power RF Energy**
Heng Ye, and #Qing-Xin Chu, *South China University of Technology, China*

October 25 (Tue)

1C4: Wireless Power Transfer 16:00 - 17:40 (Room C)

Co-Chairs: Tomohiro Seki (Nihon University, Japan)
Dukju Ahn (Incheon National University, Korea)

- 1: 16:00 **Cross Coupling Cancellation for All Frequencies in Multiple-Receiver Wireless Power Transfer Systems**
#Danyang Cui, Takehiro Imura and Yoichi Hori, *The University of Tokyo, Japan*
- 2: 16:20 **Multi-band Coil Design for Wireless Power Transfer at 85 kHz and 6.78 MHz Using High Order Resonant Frequency of Short End Coil**
#Koichi Furusato, Takehiro Imura and Yoichi Hori, *The University of Tokyo, Japan*
- 3: 16:40 **Improvement of Transmission Efficiency using Shielded-Loop Antenna for Wireless Power Transfer**
#Naoya Kajiuura and Hiroshi Hirayama, *Nagoya Institute of Technology, Japan*
- 4: 17:00 **A Simplified Path Interference Model in 2D Multi-Hop Wireless Power Transfer System**
#Ryota Shibuya, Toru Kawajiri and Hiroki Ishikuro, *Keio University, Japan*
- 5: 17:20 **Impedance Matching using Folded Spiral Antenna for Coupled-resonant Wireless Power Transfer**
#Masanori Ando and Hiroshi Hirayama, *Nagoya Institute of Technology, Japan*

1D3: Propagation Models for International Regulations by ITU-R and Related Topics I 14:00 - 15:40 (Room D)

Co-Chairs: Hajime Suzuki (CSIRO, Australia)
Naoki Kita (NTT, Japan)

- 1: 14:00 **Propagation Prediction Methods for International Regulation: the Work of ITU-R Study Group 3**
#Carol D. Wilson, *CSIRO Astronomy and Space Science, Australia*
- 2: 14:20 **Building Entry Loss Model for 24 to 31GHz band**
#Bolun Guo⁽¹⁾, Yong Wu⁽¹⁾, Jian Jiao⁽¹⁾, Boya Lv⁽¹⁾, Feng Zhou⁽²⁾, Zhen Ma⁽³⁾ and Jing-lu Sun⁽²⁾, ⁽¹⁾Huawei Technologies Co., LTD, China, ⁽²⁾China Academy of Information and Communication Technology, China, ⁽³⁾Beijing University of Posts and Telecommunication, China
- 3: 14:40 **Effect of Reflected Waves from Outdoor Buildings on Outdoor-to-Indoor Path Loss in 0.8 to 37 GHz Band**
#Minoru Inomata⁽¹⁾, Motoharu Sasaki⁽¹⁾, Takeshi Onizawa⁽¹⁾, Koshiro Kitao⁽²⁾ and Tetsuro Imai⁽²⁾, ⁽¹⁾NTT corporation, Japan, ⁽²⁾NTT DOCOMO, INC, Japan
- 4: 15:00 **Path Loss Measurements and Modeling for Indoor Office Scenario at 28 and 38 GHz**
#Myung-Don Kim, Jinyi Liang, Juyul Lee, Jaejoon Park and Bonghyuk Park, *Electronics and Telecommunications Research Institute, Korea*
- 5: 15:20 **Path Loss Characteristics between Different Floors from 0.8 to 37 GHz in Indoor Office Environments**
#Motoharu Sasaki⁽¹⁾, Minoru Inomata⁽¹⁾, Wataru Yamada⁽¹⁾, Naoki Kita⁽¹⁾, Takeshi Onizawa⁽¹⁾, Masashi Nakatsugawa⁽¹⁾, Koshiro Kitao⁽²⁾ and Tetsuro Imai⁽²⁾, ⁽¹⁾NTT Corporation, Japan, ⁽²⁾NTT DOCOMO, Inc., Japan

Technical Program

October 25 (Tue)

1D4: Propagation Models for International Regulations by ITU-R and Related Topics II 16:00 - 17:40 (Room D)

Co-Chairs: Naoki Kita (NTT, Japan)
Hajime Suzuki (CSIRO, Australia)

- 1: 16:00 **Arrival Angular Characteristics at Low Base Station facing the Street in Micro Cell for Mobile Communications**
#Hideki Omote and Masayuki Miyashita, *Softbank Corp., Japan*
- 2: 16:20 **Estimating Tropospheric Ducting Effects from Received Signal Quality of Digital TV Services**
#Hajime Suzuki⁽¹⁾, Jinghui Wu⁽²⁾ and Roger Bunch⁽²⁾, ⁽¹⁾CSIRO, Australia, ⁽²⁾Free TV Australia, Australia
- 3: 16:40 **Radio Link Clear-air Fading Prediction from Surface Weather Station Data**
Stephen J. Salamon, Hedley J. Hansen and #Derek Abbott, *University of Adelaide, Australia*
- 4: 17:00 **Long-term Rain Attenuation Statistics and Variations in Ku Band Satellite Communications**
#Hidemi Miura and Yasuyuki Maekawa, *Osaka Electro-Communication University, Japan*
- 5: 17:20 **Effects of Rain Area Motions on Site Diversity Techniques in Ku Band Satellite Signal Attenuation**
#Yasuyuki Maekawa, Naoki Kubota and Yoshiaki Shibagaki, *Osaka Electro-Communication University, Japan*

1E3: Multi-Frequency Antennas 14:00 - 15:40 (Room E)

Co-Chairs: Mayumi Matsunaga (Ehime University, Japan)
Haim Matzner (Holon Institute of Engineering, Israel)

- 1: 14:00 **Low-profile Cavity-backed Archimedean Spiral Antenna with a Stop Band**
#Hisamatsu Nakano, Rintaro Kato and Junji Yamauchi, *Hosei University, Japan*
- 2: 14:20 **Side Lobe Suppression by Various Conical Wall Edge of Multiband Spiral Antenna**
#Kyeong-Sik Min, *Korea Maritime and Ocean University, Korea*
- 3: 14:40 **A Strip-helical Dipole Antenna with Wide Bandwidth and High Gain**
#Xihui Tang and Jilun Zhang, *Shenzhen University, China*
- 4: 15:00 **Miniaturization of Logarithmic Spiral Antenna using Fibonacci Sequence and Koch Fractals**
#Chetna Sharma and Dinesh Kumar V, *PDPM Indian Institute of Information Technology Design and Manufacturing, India*
- 5: 15:20 **Low Profile Dual-Polarized Wideband Antenna**
#Abdul Sattar Kaddour⁽¹⁾, Serge Bories⁽¹⁾, Anthony Bellion⁽²⁾ and Christophe Delaveaud⁽¹⁾, ⁽¹⁾University Grenoble-Alpes, France, ⁽²⁾CNES, France

October 25 (Tue)

1E4: 3D-Printed Lens and Antennas 16:00 - 17:40 (Room E)

Co-Chairs: Hao Xin (University of Arizona, United States)
Qiang Chen (Tohoku University, Japan)

- 1: 16:00 **3D-Printed Fresnel Zone Plate Lens**
#Shiyu Zhang, Will Whittow and Yiannis Vardaxoglou, *Loughborough University, United Kingdom*
 - 2: 16:20 **3D-Printed Graded Index Lens for RF Applications**
Shiyu Zhang⁽¹⁾, #Yiannis Vardaxoglou⁽¹⁾, Will Whittow⁽¹⁾ and Raj Mittra⁽²⁾, ⁽¹⁾Loughborough University, United Kingdom, ⁽²⁾University of Central Florida, United States & KAU, Saudi Arabia
 - 3: 16:40 **3D Printed Reflectarray Antenna at 60 GHz**
Bao-Jie Chen⁽¹⁾, Huan Yi⁽²⁾, Kung Bo Ng⁽¹⁾, Shi-Wei Qu⁽²⁾ and #Chi Hou Chan⁽¹⁾, ⁽¹⁾City University of Hong Kong, China, ⁽²⁾University of Electronic Science and Technology of China, China
 - 4: 17:00 **A 3D Printed Near-Isotropic Antenna for Wireless Sensor Networks**
Muhammad Fahad Farooqui and #Atif Shamim, *King Abdullah University of Science and Technology (KAUST), Saudi Arabia*
- 17:20 **Break Time**

1F3: Reconfigurable and Tunable Antennas I 14:00 - 15:40 (Room F)

Co-Chairs: Kin-Lu Wong (National Sun Yat-sen University, Taiwan)
Yuichi Kimura (Saitama University, Japan)

- 1: 14:00 **Polarization Reconfigurable Frequency-scanning Antenna Based on Half Mode Substrate Integrated Waveguide**
Aixin Chen and #Jiaheng Wang, *Beihang University, China*
- 2: 14:20 **Polarization Reconfigurable Omnidirectional Antennas**
#RongLin Li and Yi Fan, *South China University of Technology, China*
- 3: 14:40 **Switched-Beam Antenna for Small Cell Application**
#Chia-Lun Tang and Chun-Hua Chen, *Auden Techno Corp., Taiwan*
- 4: 15:00 **Pattern Reconfigurable Slot Antenna Array**
Alexis Martin, Vincent Le Neillon and #Mohammed Himdi, *Universite de Rennes 1, France*
- 5: 15:20 **Frequency Reconfigurable Antenna for Wireless Applications**
#Rajya Lakshmi Valluri and Devi Perla, *ANITS, India*

Technical Program

October 25 (Tue)

1F4: Reconfigurable and Tunable Antennas II 16:00 - 17:40 (Room F)

Co-Chairs: QiaoWei Yuan (National Institute of Technology, Sendai College, Japan)
Mohamed Himdi (Universite de Rennes, France)

- 1: 16:00 **Graphene Metamaterials Array Based Reconfigurable Antenna**
#Xianjun Huang^(1,2), Abdullah Alburaihan⁽¹⁾, Ting Leng⁽¹⁾, Zhirun Hu⁽¹⁾, Jijun Huang⁽²⁾, Yujian Qin⁽²⁾ and Peiguo Liu⁽²⁾, ⁽¹⁾University of Manchester, United Kingdom, ⁽²⁾National University of Defense Technology, China
- 2: 16:20 **A Reconfigurable Multiband CPW-Fed Antenna Based on a Quad-Mode Slot-Line Resonator**
#Biao Peng^(1,2), Shufang Li⁽¹⁾, Ardavan Rahimian⁽²⁾, Qianyun Zhang⁽²⁾, Li Deng⁽¹⁾, Qingsheng Zeng⁽³⁾ and Yue Gao⁽²⁾, ⁽¹⁾Beijing University of Posts and Telecommunications, China, ⁽²⁾Queen Mary University of London, United Kingdom, ⁽³⁾University of Ottawa, Canada
- 3: 16:40 **Measurement of 15 GHz Beam Adjustable Microstrip Antenna Arrays with a Variable Short Stub and with a Varactor Diode**
#Shunsuke Kamimura⁽¹⁾, Sakuyoshi Saito⁽¹⁾, Yuichi Kimura⁽¹⁾, Riichiro Nagareda⁽²⁾ and Masayuki Nakano⁽³⁾, ⁽¹⁾Saitama University, Japan, ⁽²⁾KDDI Corp, Japan, ⁽³⁾KDDI R&D Laboratories, Japan
- 4: 17:00 **Influence of the Mesh Dimensions on Optically Transparent and Active Antennas at Microwaves**
#Alexis Martin, Xavier Castel, Mohammed Himdi and Olivier Lafond, Université de Rennes 1, France
- 5: 17:20 **A Hybrid Antenna with Solid and Liquid Materials**
Chenglong Lin⁽¹⁾, #Gaosheng Li^(1,2), Peiguo Liu⁽¹⁾, Yujian Qin⁽¹⁾ and Yi Huang⁽²⁾, ⁽¹⁾National University of Defense Technology, China, ⁽²⁾University of Liverpool, United Kingdom

October 26 (Wed)

2A1: EurAAP Session: Recent Advances in European Antennas and Propagation Research I 9:00 - 10:40 (Room A)

Co-Chairs: Juan R. Mosig (Ecole polytechnique federale de Lausanne EPFL, Switzerland)
Lars J. Foged (Microwave Vision Group, Italy)

- 1: 9:00 **Invited: Design and Characterization of Cost-Effective Planar Antennas with Steerable Beams: Gap Waveguides, SMT and Random LOS**
Jian Yang and #Andres Alayon Glazunov, Chalmers University of Technology, Sweden
- 2: 9:40 **Multiple Beam Antenna based on a Parallel Plate Waveguide Continuous Delay Lens Beamformer**
#Hervé Legay⁽¹⁾, Ségolène Tubau⁽¹⁾, Etienne Girard⁽¹⁾, Jean-Philippe Fraysse⁽¹⁾, Renaud Chiniard⁽¹⁾, Cheikh Diallo⁽²⁾, Ronan Sauleau⁽²⁾, Mauro Ettorre⁽²⁾ and Nelson Fonseca⁽³⁾, ⁽¹⁾Thales Alenia Space, France, ⁽²⁾University of Rennes 1, France, ⁽³⁾Moltek Consultants Ltd for the European Space Agency, The Netherlands
- 3: 10:00 **Dual-Band Terahertz Reflectarray Integrated on a Silicon Substrate**
Hamed Hasani^(1,2), Santiago Capdevila⁽¹⁾, Michele Tamagnone⁽¹⁾, Clara Moldovan⁽¹⁾, Wolfgang A. Vitale⁽¹⁾, Adrian M. Ionescu⁽¹⁾, Custódio Peixeiro⁽²⁾, Anja Skrivervik⁽²⁾ and #Juan R. Mosig⁽¹⁾, ⁽¹⁾EPFL, Switzerland, ⁽²⁾University of Lisbon, Portugal
- 4: 10:20 **A Phased Array Antenna with Horn Elements for 300 GHz Communications**
#Sebastian Rey⁽¹⁾, Thomas Merkle⁽²⁾, Axel Tessmann⁽²⁾ and Thomas Kürner⁽¹⁾, ⁽¹⁾Technische Universität Braunschweig, Germany, ⁽²⁾Fraunhofer Institut für Angewandte Festkörperphysik IAF, Germany

2A2: EurAAP Session: Recent Advances in European Antennas and Propagation Research II 11:00 - 12:40 (Room A)

Co-Chairs: Jian Yang (Chalmers University of Technology, Sweden)
Jiro Hirokawa (Tokyo Institute of Technology, Japan)

- 1: 11:00 **Recent and Future Research Trends in Planar Multi-beam Antennas in the Millimeter Wave Range at IETR-France**
Karim Tekkouk^(1,2), #Mauro Ettorre⁽¹⁾, Francesco Foglia Manzillo⁽¹⁾, Thomas Potelon⁽¹⁾, Maciej Smierzchalski⁽¹⁾, Darwin Blanco⁽¹⁾, Laurent Le Coq⁽¹⁾ and Ronan Sauleau⁽¹⁾, ⁽¹⁾Universite de Rennes 1, France, ⁽²⁾Tokyo Institute of Technology, Japan
- 2: 11:20 **Detection and Suppression of Scattered Fields from Coplanar Micro-Probe and Positioner in Millimeter Wave On-Chip Antenna Measurements**
#Lars J. Foged⁽¹⁾, Lucia Scialacqua⁽¹⁾, Per O. Iversen⁽²⁾ and E. Szpindor⁽²⁾, ⁽¹⁾Microwave Vision Italy, Italy, ⁽²⁾ORBIT/FR, Inc., United States
- 3: 11:40 **Ka Band Active Array Antenna for Mobile Satellite Communications**
#Manuel Sierra Castañer, Jose Manuel Fernández González, Manuel Sierra Pèrez, Adrià Tamayo Dominguez and Alfonso Muriel Barrado, Universidad Politécnica de Madrid, Spain
- 4: 12:00 **Progress in Body-Worn Antennas for On-Body Propagation**
#Kaj B. Jakobsen, Technical University of Denmark, Denmark
- 5: 12:20 **Antenna Current Optimization and Optimal Design**
#Mats Gustafsson, Lund University, Sweden

Technical Program

October 26 (Wed)

2A3: Meteorological Sensing 16:00 - 17:40 (Room A)

Co-Chairs: Nobuyoshi Kikuma (Nagoya Institute of Technology, Japan)
Satoshi Fujii (University of the Ryukyus, Japan)

- 1: 16:00 **Invited: Water Vapor Estimation using the Propagation Delay of Digital Terrestrial Broadcasting Waves**
#Seiji Kawamura, Hiroki Ohta, Hiroshi Hanado, Masayuki Yamamoto, Nobuyasu Shiga, Kouta Kido, Satoshi Yasuda, Tadahiro Goto, Ryuuichi Ichikawa and Jun Amagai, *National Institute of Information and Communications Technology, Japan*
- 2: 16:40 **Analysis of Directional Dependence of Site Diversity Gain using Rain Radar Data**
#Yushi Inose and Hajime Fukuchi, *Tokyo Metropolitan University, Japan*
- 3: 17:00 **Observational Study on Precipitation Patterns in the Fukui Plain by using Weather Radar and Wind Profiler Radars**
#Tomoyuki Nakajo⁽¹⁾, Masayuki Yamamoto⁽²⁾ and Hiroyuki Hashiguchi⁽³⁾, ⁽¹⁾*Fukui University of Technology, Japan*, ⁽²⁾*NICT, Japan*, ⁽³⁾*Kyoto University, Japan*
- 4: 17:20 **Convective Rain Study with Radiometer, Radar and Electric Field Observations at a Tropical Location**
#Animesh Maitra, Soumyajyoti Jana and Rohit Chakraborty, *University of Calcutta, India*

2B1: MIMO Antennas and Decoupling Technologies 9:00 - 10:40 (Room B)

Co-Chairs: Wen-Shan Chen (Southern Taiwan University of Technology, Taiwan)
Shigeki Takeda (Ibaraki University, Japan)

- 1: 9:00 **MIMO Dongle Antennas for LTE700 Applications**
#Wen-Shan Chen, Ching-Yu Huang, Hung-Jui Hsu and Tzu-Chi Lu, *Southern Taiwan University of Science and Technology, Taiwan*
- 2: 9:20 **A Simple Wave-Traps MIMO Antenna Design for WLAN Application**
#Wen-Hsiu Hsu⁽¹⁾, Shan-Cheng Pan⁽¹⁾ and Chia-Lun Tang⁽²⁾, ⁽¹⁾*Shu-Te University, Taiwan*, ⁽²⁾*Auden Techno Corp, Taiwan*
- 3: 9:40 **Field Test Results and Analysis of A Semi-Automatic Effective Diversity Gain Measurement System for MIMO and Diversity Antennas**
#Wen-Jiao Liao, Chia-Hong Chuang and Bang-Yun Dai, *National Taiwan University of Science and Technology, Taiwan*
- 4: 10:00 **Broadband Characteristic of Dual-Band Decoupling for Closely Spaced Antennas**
#Keita Kuriyama⁽¹⁾, Hiroshi Sato⁽²⁾ and Masaharu Takahashi⁽¹⁾, ⁽¹⁾*Chiba University, Japan*, ⁽²⁾*Panasonic Corporation, Japan*
- 5: 10:20 **Experimental Evaluation of Inter-Array Decoupling Technique Suitable for MIMO Full-Duplex System**
#Masakuni Tsunozawa⁽¹⁾, Naoki Honma⁽¹⁾, Kazuya Takahashi⁽¹⁾, Kentaro Murata⁽²⁾ and Kentaro Nishimori⁽³⁾, ⁽¹⁾*Iwate University, Japan*, ⁽²⁾*National Defense Academy, Japan*, ⁽³⁾*Niigata University, Japan*

October 26 (Wed)

2B2: Advanced Base Station Antennas 11:00 - 12:40 (Room B)

Co-Chairs: Masayuki Nakano (KDDI R&D Labs., Japan)
Ichiro Oshima (Denki Kogyo Co., Ltd., Japan)

- 1: 11:00 **9-GHz-Band Active Antenna System for Cellular Base Stations**
#Keisuke Sato, Yukitaka Takahashi and Ichiro Oshima, *Denkikogyo Co., Ltd., Japan*
- 2: 11:20 **Antenna Radiation Pattern Arrangement with Pipe-Formed Frequency Selective Surface**
#Toyohisa Takano⁽¹⁾, Suguru Yamagishi⁽¹⁾, Masayuki Nakano⁽²⁾ and Ho Yu Lin⁽²⁾, ⁽¹⁾*SUMITOMO ELECTRIC INDUSTRIES, LTD., Japan*, ⁽²⁾*KDDI R&D Laboratories Inc., Japan*
- 3: 11:40 **Dual Polarized Antenna Using a Part of Spherical Reflector with a Rim**
#Yasuko Kimura⁽¹⁾, Yoshio Ebine⁽²⁾ and Yoshihiro Ishikawa⁽¹⁾, ⁽¹⁾*NTT DOCOMO, INC., Japan*, ⁽²⁾*NAZCA Co., Ltd., Japan*
- 4: 12:00 **Gain Enhancement of Slot Array for Base Station Using Cavity of Curved-Woodpile Metamaterial**
#Rangsang Wongsan⁽¹⁾ and Paowphattra Kamphikul⁽²⁾, ⁽¹⁾*Suranaree University of Technology, Thailand*, ⁽²⁾*Chiang Mai University, Thailand*
- 5: 12:20 **Broadband Multiband Phased Array Antennas for Cellular Communications**
Ray Butler, #Igor Timofeev and Martin Zimmerman, *Commscope, United States*

2B3: Electromagnetic Wave Theory I 16:00 - 17:40 (Room B)

Co-Chairs: Ryoichi Sato (Niigata University, Japan)
Yoshio Inasawa (Mitsubishi Electric Corporation, Japan)

- 1: 16:00 **Accurate Analysis of Electromagnetic Shielding Problems using MoM SIE Method**
Branko Lj. Mrdakovic⁽¹⁾ and #Branko M. Kolundzija⁽²⁾, ⁽¹⁾*WIPL-D d.o.o, Serbia*, ⁽²⁾*University of Belgrade, Serbia*
- 2: 16:20 **SPACA-MLFACA Algorithm for Fast Solution of Electromagnetic Scattering Problems**
#Xinlei Chen^(1,2), Chao Fei⁽¹⁾, Yang Zhang⁽¹⁾, Zhuo Li^(1,2) and Changqing Gu⁽¹⁾, ⁽¹⁾*Nanjing University of Aeronautics and Astronautics, China*, ⁽²⁾*Southeast University, China*
- 3: 16:40 **Performance Evaluation of RCS Near-Field-to-Far-Field Transformation Technique for Aircrafts**
#Yasuhiro Nishioka, Yoshio Inasawa, Tai Tanaka and Hiroaki Miyashita, *Mitsubishi Electric Corporation, Japan*
- 4: 17:00 **Simulation Accuracy of Normal-Mode Helical Antenna Used in Human Body**
#Nguyen Thanh Tuan⁽¹⁾, Yoshihide Yamada⁽¹⁾, Dang Tien Dung⁽²⁾, Nguyen Quoc Dinh⁽²⁾ and Naobumi Michishita⁽³⁾, ⁽¹⁾*Universiti Teknologi Malaysia, Malaysia*, ⁽²⁾*Le Quy Don Technical University, Vietnam*, ⁽³⁾*National Defense Academy, Japan*
- 5: 17:20 **Accuracy Enhanced Beamforming Method Based on Envelope Surface Extraction for Non-contact UWB Breast Cancer Radar**
Fuki Endo and #Shouhei Kidera, *The University of Electro-Communications, Japan*

Technical Program

October 26 (Wed)

2C1: Frequency Selective Surfaces 9:00 - 10:40 (Room C)

Co-Chairs: Toshikazu Hori (University of Fukui, Japan)
Qun Wu (Harbin Institute of Technology, China)

- 1: 9:00 **Spatial Filter with Multilayered FSS for Wideband Orthogonal Polarization Conversion**
#Shiro Handa, Toshikazu Hori and Mitoshi Fujimoto, *University of Fukui, Japan*
- 2: 9:20 **Experimental Investigation of 2-bit Active Frequency Selective Surface**
Chenchen Yang, #Yi Wang, Huangyan Li and Qunsheng Cao, *Nanjing University of Aeronautics and Astronautics, China*
- 3: 9:40 **Metamaterial Absorber using Complementary Circular Sector Resonator**
#Nguyen Toan Trung and Sungjoon Lim, *Chung-Ang University, Korea*
- 4: 10:00 **3D-Printed Frequency Selective Surfaces for Microwave Absorbers**
#Rainer Kronberger and Patrick Soboll, *TH Koeln University of Technology, Germany*
- 5: 10:20 **Design of Metamaterial Lens for Antenna Array**
#Guohong Du, Junqing Lan and Haoran Sun, *Chengdu University of Information Technology, China*

2C2: Metasurface Technologies I 11:00 - 12:40 (Room C)

Co-Chairs: Young Joong Yoon (Yonsei University, Korea)
Yang Hao (Queen Mary University of London, United Kingdom)

- 1: 11:00 **Quasi-Isotropic Chiral Particles Composed of Twisted Thin-Wire Staples**
#Masamitsu Asai⁽¹⁾, Hideaki Wakabayashi⁽²⁾ and Jiro Yamakita^{(2), (1)} *Kindai University, Japan, (2) Okayama Prefectural University, Japan*
 - 2: 11:20 **Graphene Supercapacitor based Resistive Loops for Ultra Broadband Microwave Absorption**
#Jian Wang, Wei Bing Lu, Jin Zhang, Zhen Guo Liu, Hao Chen, Xiao Bing Li and Bao Hu Huang, *Southeast University, China*
 - 3: 11:40 **Investigation on Carpet Cloaking and Illusion Using Metasurface**
Aritomo Wada, #Yuki Fujimoto, Hiroyuki Deguchi and Mikio Tsuji, *Doshisha University, Japan*
 - 4: 12:00 **Planar Metasurface as Generator of Bessel Beam Carrying Orbital Angular Momentum**
Yueyi Yuan⁽¹⁾, Junqian Niu⁽²⁾, Xumin Ding⁽¹⁾, Kuang Zhang⁽¹⁾ and #Qun Wu⁽¹⁾, *(1) Harbin Institute of Technology, China, (2) Beijing Institute of Electronic System Engineering, China*
- 12:20 **Break Time**

October 26 (Wed)

2C3: Metasurface Technologies II 16:00 - 17:40 (Room C)

Co-Chairs: Kwok L. Chung (Qingdao University of Technology, China)
Takeshi Fukusako (Kumamoto University, Japan)

- 1: 16:00 **Recent Research Progress in Microwave Metasurfaced Antenna**
#Kwok L. Chung⁽¹⁾, Yansheng Li⁽¹⁾, Hailiang Zhu⁽²⁾ and Chunwei Zhang^{(1), (1)} *Qingdao Technological University, China, (2) Northwestern Polytechnical University, China*
- 2: 16:20 **RCS Reduction Characteristics of Thin Wave Absorbers Composed of Flat and Curved Metasurfaces**
#Yuka Ishii⁽¹⁾, Tomohiro Masaki⁽¹⁾, Naobumi Michishita⁽¹⁾, Hisashi Morishita⁽¹⁾ and Hideki Hada^{(2), (1)} *National Defense Academy, Japan, (2) Fujitsu, Ltd., Japan*
- 3: 16:40 **Gain Characteristics Improvement of Broadband Circular Polarized Patch Antenna Using Artificial Ground Structure**
#Yujiro Kai and Takeshi Fukusako, *Kumamoto University, Japan*
- 4: 17:00 **A Novel Base Station Antenna Based on Rectangular Waveguide**
#Hailiang Zhu⁽¹⁾, Can Ding⁽²⁾, Gao Wei⁽¹⁾ and Yingjie Jay Guo^{(2), (1)} *Northwestern Polytechnical University, China, (2) University of Technology Sydney, Australia*
- 5: 17:20 **Broadband Circularly Polarized Reflectarray Antenna Using Metasurface Polarizer**
#Koichi Furuya and Takeshi Fukusako, *Kumamoto University, Japan*

2D1: Indoor Propagation 9:00 - 10:40 (Room D)

Co-Chairs: Tetsuro Imai (NTT Docomo, Japan)
Hideki Omote (Softbank Corporation, Japan)

- 1: 9:00 **Performance Evaluation of Propagation Control Devices for Active Propagation Control**
#Ryo Araki, Kenichiro Kamohara, Hisato Iwai and Hideichi Sasaoka, *Doshisha University, Japan*
- 2: 9:20 **Radio Propagation Loss Study by Hybrid Simulation for Smart Meter Communication in Apartment Building**
Nodoka Nakagaki⁽¹⁾, #Yasushi Yamao⁽¹⁾, Reina Nagayama⁽²⁾ and Takuya Kawata^{(2), (1)} *The University of Electro-Communications, Japan, (2) Tokyo Gas Co., Ltd., Japan*
- 3: 9:40 **LOS Probability Modeling for 5G Indoor Scenario**
#Jian Li, *Huawei Technologies Co., LTD., China*
- 4: 10:00 **Empirical Model Indoor Corridor Path Loss at 5 GHz**
#Chi-Hou Chio and Sio-Weng Ting, *University of Macau, China*
- 5: 10:20 **Three-dimension Channel Spatial Characteristics Emulation Based on Genetic Algorithm in a MIMO OTA Setup**
#Muyuan Li, Weimin Wang, Yongle Wu, Yuanan Liu and Shulan Li, *Beijing University of Posts and Telecommunications, China*

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2D2: Outdoor and Tunnel Propagation 11:00 - 12:40 (Room D)

Co-Chairs: Niklas Jaldén (Ericsson Research, Sweden)

Yasuyuki Maekawa (Osaka Electro-Communication University, Japan)

- 1: 11:00 **Radio Propagation Simulation and Measurement Inside a Curved and Sloped Subway Tunnel**
#Gilbert S. Ching⁽¹⁾, Satoshi Nishida⁽²⁾, Asako Okuno⁽¹⁾ and Yukiko Kishiki⁽¹⁾, ⁽¹⁾Kozo Keikaku Engineering Inc., Japan, ⁽²⁾Kyosan Electric Mfg. Co., Ltd., Japan
- 2: 11:20 **Radio Propagation Measurement of Subway Tunnel for CBTC Systems**
#Satoshi Nishida⁽¹⁾, Gilbert S. Ching⁽²⁾, Yukiko Kishiki⁽²⁾ and Yuichiro Nakayama⁽³⁾, ⁽¹⁾Kyosan Electric Manufacturing Co., Ltd., Japan, ⁽²⁾Kozo Keikaku Engineering Inc., Japan, ⁽³⁾Token-System Co., Ltd., Japan
- 3: 11:40 **Study of the Millimeter-wave Propagation Characteristics in the Railway Environment**
#Kazuki Nakamura, Daisuke Yamaguchi, Nagateru Iwasawa and Kunihiro Kawasaki, Railway Technical Research Institute, Japan
- 4: 12:00 **Effect of Building on VHF Propagation above Airport Surface**
#Atsushi Kezuka, Susumu Saito, Takayuki Yoshihara and Shinji Saitoh, Electronic Navigation Research Institute, Japan
- 5: 12:20 **The Effect of Human Body Blockage to Path Loss Characteristics in Crowded Areas**
#Mitsuki Nakamura, Motoharu Sasaki, Minoru Inomata and Takeshi Onizawa, NTT Corporation, Japan

2D3: Propagation-Related Topics 16:00 - 17:40 (Room D)

Co-Chairs: Bolun Guo (Huawei Technologies Co., Ltd., China)

Wataru Chujo (Meijo University, Japan)

- 1: 16:00 **Influence of Reflected Waves on Communication between Floors of LOS Buildings**
#Masayuki Miyashita, Hideki Omote and Ryo Yamaguchi, SoftBank Corporation, Japan
- 2: 16:20 **Evaluation of the Human Detection System using UHF Band TV Waves for the Car Security**
#Koichi Shin, Kohei Yabata, Koki Momota and Masahiro Nishi, Horoshima City University, Japan
- 3: 16:40 **Field Evaluation on High or Low Mobile Terminal Velocity Decision Algorithm Using Doppler Spread Detection**
#Sourabh Maiti, Manabu Mikami and Kenji Hoshino, Softbank Corp., Japan
- 4: 17:00 **Isolation Characteristics of Full-Duplex Visible Light Communication with Image Sensor**
Tomoki Kondo, Ryotaro Kitaoka and #Wataru Chujo, Meijo University, Japan
- 5: 17:20 **Comparison of Slit Transmittances between Metal Plates at Terahertz Range and PEC Plate**
#Jong-Eon Park and Hosung Choo, Hongik University, Korea

October 26 (Wed)

2E1: Characteristic Mode Analysis for Small Antenna Design I 9:00 - 10:40 (Room E)

Co-Chairs: Hiroyuki Arai (Yokohama National University, Japan)

Naobumi Michishita (National Defense Academy, Japan)

- 1: 9:00 **Characteristic Mode Analysis of Smart Phone Antenna using HW FEKO**
#Ridho Chayono⁽¹⁾, Peter Futter⁽²⁾ and Jordi Soler Castany⁽³⁾, ⁽¹⁾Altair Engineering Ltd., Japan, ⁽²⁾Altair Development, SA (Pty) Ltd, South Africa, ⁽³⁾Altair Engineering Inc., United States
- 2: 9:20 **Design of Four Elements MIMO Antenna Using the Theory of Characteristic Mode**
#Kanata Takahashi⁽¹⁾, Rohani Bakar⁽¹⁾, Hiroyuki Arai⁽¹⁾, Taisuke Ihara⁽²⁾ and Yoshihiro Ishikawa⁽²⁾, ⁽¹⁾Yokohama National University, Japan, ⁽²⁾NTT DOCOMO, Inc., Japan
- 3: 9:40 **Characteristic Current Based MIMO Antenna Performance Estimation in Chassis Mode Platform**
Jusun Won and #Sangwook Nam, Seoul National University, Korea
- 4: 10:00 **Decoupling of TX and RX Antennas in a Full-duplex Mobile Terminal**
#Ehsan Foroozanfard, Elisabeth De Carvalho and Gert Frolund Pedersen, Aalborg University, Denmark
- 5: 10:20 **Characteristic Mode Analysis of Hemispherical Shell for Helmet Antenna Design**
#Nobuhito Nomura, Naobumi Michishita and Hisashi Morishita, National Defense Academy, Japan

2E2: Characteristic Mode Analysis for Small Antenna Design II 11:00 - 12:40 (Room E)

Co-Chairs: Raj Mittra (University of Central Florida, United States)

Naoki Honma (Iwate University, Japan)

- 1: 11:00 **New Techniques for Realizing Desired Radiation Patterns of Antennas and Arrays Mounted on Complex Platforms**
Raj Mittra^(1,2) and #Chao Li^(1,3), ⁽¹⁾University of Central Florida, United States, ⁽²⁾King Abdul Aziz University, Saudi Arabia, ⁽³⁾University of Jinan, China
- 2: 11:20 **Far-Field Orthogonality of Volume-Based Characteristic Modes for Real Materials**
#Zachary T. Miers and Buon Kiong Lau, Lund University, Sweden
- 3: 11:40 **Ray Tracing Analysis of Asymptotic Capacity Based on TCM**
#Minori Sasaki⁽¹⁾, Naoki Honma⁽¹⁾, Keisuke Konno⁽²⁾, Qiang Chen⁽²⁾ and Yoshitaka Tsunekawa⁽¹⁾, ⁽¹⁾Iwate University, Japan, ⁽²⁾Tohoku University, Japan
- 4: 12:00 **Relations between the Characteristic Modes(CMs)and the X Modes(XMs)**
#Jiang-Feng Lin and Qing-Xin Chu, South China University of Technology, China
- 5: 12:20 **Efficient Interpolation of Characteristic Modes**
#Qi Wu, Zhao Yang and Donglin Su, Beihang University, China

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October 26 (Wed)

2E3: Antenna Measurements 16:00 - 17:40 (Room E)

Co-Chairs: Katsushige Harima (NICT, Japan)

Rainer Kronberger (TH Koeln University of Technology, Germany)

- 1: 16:00 **Microwave Field Measurement by using Semiconductor Scatterer with Optical Modulation**
#Takahiro Kurosawa, *Akita Industrial Technology Center, Japan*
- 2: 16:20 **Simulation of Direct Measurement Method for Balanced and Unbalanced Mode of a Small Antenna**
#Takashi Yanagi, Toru Fukasawa and Hiroaki Miyashita, *Mitsubishi Electric Corporation, Japan*
- 3: 16:40 **On an Expression of Antenna Factor for Transmitting Small Loop Antenna in Liquid**
#Nozomu Ishii^(1,2), Lira Hamada⁽¹⁾, Chakarothei Jerdvisanop⁽¹⁾, Kanako Wake⁽¹⁾ and Soichi Watanabe⁽¹⁾, ⁽¹⁾*National Institute of Information and Communications Technology, Japan*, ⁽²⁾*Niigata University, Japan*
- 4: 17:00 **Simulation and Experimental Investigation of Jig Using Semi-Rigid Cable for S-Parameter Method**
#Ryuta Tozawa, Takayuki Sasamori, Teruo Tobana and Yoji Isota, *Akita Prefectural University, Japan*
- 5: 17:20 **Influence of Jig Made of Microstrip Line for S-Parameter Method**
#Kazuma Endo, Takayuki Sasamori, Teruo Tobana and Yoji Isota, *Akita Prefectural University, Japan*

2F1: Filters and EMC 9:00 - 10:40 (Room F)

Co-Chairs: Takayuki Sasamori (Akita Prefectural University, Japan)

Jin-Seob Kang (Korea Research Institute of Standards and Science, Korea)

- 1: 9:00 **Multistep Hook Bandpass Filter**
Ramon Siangcharee, #Reungyot Lerdwanittip and Apirada Namsang, *Civil Aviation Training Center, Thailand*
- 2: 9:20 **A Triple-band BPF using Cross coupled of Tri-section SIRs with Capacitive Load**
#Pongsathorn Chomtong, Suwaluckhorn Meesomklin and Prayoot Akkaraekthalin, *King Mongkut's University of Technology North Bangkok, Thailand*
- 3: 9:40 **A 5-bit RF MEMS Switch Time Delay Line Shifter**
#Jin Lin, *Nanjing Research Institute of Electronics Technology, China*
- 4: 10:00 **Study of Crosstalk between Microstrip Lines through a Ground Slot of PCB**
#Teruo Tobana, Takayuki Sasamori and Yoji Isota, *Akita Prefectural University, Japan*
- 10:20 **Break Time**

October 26 (Wed)

2F2: Reflector Antennas and Feeds 11:00 - 12:40 (Room F)

Co-Chairs: Erik Jorgensen (TICRA, Denmark)

Susumu Nakazawa (NHK, Japan)

- 1: 11:00 **Radiation Pattern Analysis for Reflector Antennas using the Near-Field Measurements of Primary Feed**
#Michio Takikawa, Yoshio Inasawa and Hiroaki Miyashita, *Mitsubishi Electric Corporation, Japan*
- 2: 11:20 **Optimization of a Parabolic Reflector Antenna Parameters for Malaysia Beam Coverage**
#Nur Faiqah Fauzi⁽¹⁾, Mohd Tarmizi Ali⁽¹⁾, Nurul Huda Abd. Rahman⁽¹⁾ and Yoshihide Yamada⁽²⁾, ⁽¹⁾*University Teknologi MARA, Malaysia*, ⁽²⁾*Universiti Teknologi Malaysia, Malaysia*
- 3: 11:40 **A 3D-Printed Compact Dual-Circularly Polarized Corrugated Horn with Integrated Septum Polarizer**
#Tan-Huat Chio⁽¹⁾, Guan-Long Huang⁽¹⁾, Shi-Gang Zhou⁽¹⁾ and Wai-Yean Lim⁽²⁾, ⁽¹⁾*National University of Singapore, Singapore*, ⁽²⁾*QVista Pte Ltd, Singapore*
- 4: 12:00 **Multistep Rectangular Horn Loading Grooves for Orthogonally Polarized Elliptical Beam**
Naoki Kubo, #Reiko Omi, Hiroyuki Deguchi and Mikio Tsuji, *Doshisha University, Japan*
- 12:20 **Break Time**

2F3: MIMO and Related Technologies 16:00 - 17:40 (Room F)

Co-Chairs: Hiroyuki Tsuji (NICT, Japan)

Tomoki Murakami (NTT, Japan)

- 1: 16:00 **Inter-symbol Interference Suppression Scheme Employing Periodic Signals in Network MIMO-OFDM Systems**
#Hirofumi Suganuma, Tomoki Maruko and Fumiaki Maehara, *Waseda University, Japan*
- 2: 16:20 **Interference Detection Performance using Asynchronous MU-MIMO and Self-Interference Cancellation Technique**
#Kazuma Ando⁽¹⁾, Kentaro Nishimori⁽¹⁾, Takefumi Hiraguri⁽²⁾, Yoshiaki Morino⁽²⁾ and Hideo Makino⁽¹⁾, ⁽¹⁾*Niigata University, Japan*, ⁽²⁾*Nippon Institute of Technology, Japan*
- 3: 16:40 **Performance Evaluation of Wireless Communications using Orbital Angular Momentum Multiplexing**
#Doohwan Lee⁽¹⁾, Theerat Sakdejyont⁽²⁾, Hirofumi Sasaki⁽¹⁾, Hiroyuki Fukumoto⁽¹⁾ and Tadao Nakagawa⁽¹⁾, ⁽¹⁾*NTT Corporation, Japan*, ⁽²⁾*The University of Tokyo, Japan*
- 4: 17:00 **Preamble Signal Shortening Employing Least Squares Search Methods in MIMO-OFDM Base Wireless LAN Systems**
#Joseph Muguro and Shuji Kubota, *Shibaura Institute of Technology, Japan*
- 5: 17:20 **Measured Separation of Sectorized Reception for ITS V2V Relay-Assisted Communication in Urban Environment**
#Le Tien Trien and Yasushi Yamao, *The University of Electro-Communications, Japan*

Technical Program

October 26 (Wed)

POS1: Poster Session I

14:00 - 15:40 (Exhibition Hall)

- 1: **A Non-Foster Circuit Design for Antenna Miniaturization**
Abdullah Haskou, Dominique Lemur, Sylvain Collardey and #Ala Sharaiha, *Universite de Rennes 1, France*
- 2: **Metal-Frame Inverted-F Antenna for the LTE Metal-Casing Smartphone**
#Wan-Chin Wu and Kin-Lu Wong, *National Sun Yat-sen University, Taiwan*
- 3: **Mutual Influence Reduction of Dual Band Reflector Backed Dipole Antenna Using Edge Folded FSR**
#Yusuke Tanizawa and Keizo Cho, *Chiba Institute of Technology, Japan*
- 4: **A Dual-Band Frequency-Tunable Varactor-Loaded Single-Layer Multi-Ring Microstrip Antenna**
#Toru Ikeda, Sakuyoshi Saito and Yuichi Kimura, *Saitama University, Japan*
- 5: **A Compact Substrate Integrated Waveguide Circularly Polarized Horn Antenna**
#Yifan Yin, Behnam Zarghooni and Ke Wu, *Ecole Polytechnique (University of Montreal), Canada*
- 6: **Design and Fabrication of a Dual-polarized Corporate-feed Waveguide 32x32-slot Array Antenna with an Orthmode Transducer for 40 GHz Band**
#Taihei Fujino⁽¹⁾, Jiro Hirokawa⁽¹⁾, Makoto Ando⁽¹⁾, Takuya Seki⁽²⁾, Katsumori Sasaki⁽²⁾ and Ichiro Oshima⁽²⁾, ⁽¹⁾*Tokyo Institute of Technology, Japan*, ⁽²⁾*Denki Kogyo Co., Ltd, Japan*
- 7: **Vertically Polarized Omni-Directional Loop Slot Array Antenna for Mobile Base Station**
#Ryosuke Kaneda and Hiroyuki Arai, *Yokohama National University, Japan*
- 8: **Comparison between One-body 2-D Beam-switching Butler Matrix and 2-D Beam-switching Rotman Lens**
#Dong-Hun Kim⁽¹⁾, Jiro Hirokawa⁽¹⁾, Karim Tekkouk⁽¹⁾, Makoto Ando⁽¹⁾ and Ronan Sauleau⁽²⁾, ⁽¹⁾*Tokyo Institute of Technology, Japan*, ⁽²⁾*Universite de Rennes, France*
- 9: **Accuracy Investigation of 2-D Near-Field Far-Field Transformation Using 2.5-D Targets**
#Shuntaro Omi⁽¹⁾, Toru Uno⁽¹⁾, Takuji Arima⁽¹⁾ and Takao Fujii⁽²⁾, ⁽¹⁾*Tokyo University of Agriculture and Technology, Japan*, ⁽²⁾*Fujitsu System Integration Laboratory, Japan*
- 10: **E-band 3-D Metal Printed Wideband Planar Horn Array Antenna**
#Abbas Vosoogh⁽¹⁾, Per-Simon Kildal⁽¹⁾, Vessen Vassilev⁽¹⁾, Ashraf Uz Zaman⁽¹⁾ and Stefan Carlsson⁽²⁾, ⁽¹⁾*Chalmers University of Technology, Sweden*, ⁽²⁾*Gapwaves, Sweden*
- 11: **Probe-Positioning Error Estimation for Planar Near-Field Phaseless Measurements**
#Riho Suzuki and Hiroyuki Arai, *Yokohama National University, Japan*
- 12: **An E-band Slotted Waveguide Monopulse Array Antenna with Corporate-feed Using Diffusion Bonding of Laminated Plates**
#Xin Xu, Jiro Hirokawa and Makoto Ando, *Tokyo Institute of Technology, Japan*

October 26 (Wed)

POS1: Poster Session I

14:00 - 15:40 (Exhibition Hall)

- 13: **Coupling Characteristics between Two Dipole Antennas over Free Access Transmission Line using Paper Substrate**
#Yuka Shinozaki, Takuya Okura and Hiroyuki Arai, *Yokohama National University, Japan*
- 14: **Verification of Simple Calibration Method for Multi-baseline SAR Tomography**
#Masanori Gocho⁽¹⁾, Hiroyoshi Yamada⁽¹⁾, Motofumi Arai⁽²⁾, Ryoichi Sato⁽¹⁾, Yoshio Yamaguchi⁽¹⁾ and Shoichiro Kojima⁽³⁾, ⁽¹⁾*Niigata University, Japan*, ⁽²⁾*Mitsubishi Space Software Co., Ltd., Japan*, ⁽³⁾*National Institute of Information and Communications Technology, Japan*
- 15: **Seasonal Characteristics of Overreach Interferences from Japan and Korea in Digital TV Waves**
#Shotaro Taniyama, Koichi Shin and Masahiro Nishi, *Hiroshima City University, Japan*
- 16: **High-resolution Imaging and Identification of Multiple Pedestrians Using UWB Doppler Radar Interferometry and Adaptive Array Processing**
#Motoshi Anabuki⁽¹⁾, Shigeaki Okumura⁽¹⁾, Takuya Sakamoto^(1,2), Kenshi Saho⁽³⁾, Toru Sato⁽¹⁾, Mototaka Yoshioka⁽⁴⁾, Kenichi Inoue⁽⁴⁾, Takeshi Fukuda⁽⁴⁾ and Hiroyuki Sakai⁽⁴⁾, ⁽¹⁾*Kyoto University, Japan*, ⁽²⁾*University of Hyogo, Japan*, ⁽³⁾*Ritsumeikan University, Japan*, ⁽⁴⁾*Panasonic Corporation, Japan*
- 17: **Simulation of Passive Time-Reversal Surveillance System for Detection of Target Invasion Inside Forested Environment**
#Joonsuk Kim⁽¹⁾, Il-Suek Koh⁽²⁾ and Yongshik Lee⁽¹⁾, ⁽¹⁾*Yonsei University, Korea*, ⁽²⁾*Inha University, Korea*
- 18: **Technique of Tracking Multiple Pedestrians Using Monostatic Ultra-wideband Doppler Radar with Adaptive Doppler Spectrum Estimation**
#Shigeaki Okumura⁽¹⁾, Takuro Sato⁽¹⁾, Takuya Sakamoto^(1,2) and Toru Sato⁽¹⁾, ⁽¹⁾*Kyoto University, Japan*, ⁽²⁾*University of Hyogo, Japan*
- 19: **Fundamental Study on Data Volume Reduction for Squint Mode SAR with Millimeter Wave Automotive Radar by Using Compressed Sensing**
#Yusuke Kobayashi⁽¹⁾, Hiroyoshi Yamada⁽¹⁾, Yoshio Yamaguchi⁽¹⁾ and Yuuichi Sugiyama⁽²⁾, ⁽¹⁾*Niigata University, Japan*, ⁽²⁾*Fujitsu TEN Limited, Japan*
- 20: **Height Estimation Based Image Compensation Method for Layover Distorted CSAR Image**
#Taichi Nakamura, Fang Shang, Shohei Kidera and Tetsuo Kirimoto, *University of Electro-Communications, Japan*
- 21: **Application of Meta-film Surface Impedance to Equivalent Transmission Line Model of Meta-Surface for Scattering Analysis**
#Akie Kuriyama, Toru Uno and Takuji Arima, *Tokyo University of Agriculture and Technology, Japan*
- 22: **Edge Preserved Extrapolation Method for Full Polarimetric RPM Imaging with UWB Radars**
#Tatsuo Takatori and Shouhei Kidera, *The University of Electro-Communications, Japan*

Technical Program

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14:00 - 15:40 (Exhibition Hall)

- 23: **Experimental Evaluation on Uplink MU-MIMO using High-Density Distributed Antennas Selection**
#Sho Yoshida⁽¹⁾, Kentaro Nishimori⁽¹⁾, Tomoki Murakami⁽²⁾, Koichi Ishihara⁽²⁾, Yasushi Takatori⁽²⁾ and Masato Mizoguchi⁽²⁾, ⁽¹⁾Niigata University, Japan, ⁽²⁾NTT, Japan
- 24: **Channel Capacity of Multi-User Full-Duplex MIMO in Actual Outdoor Environment**
#Yuta Kashino⁽¹⁾, Naoki Honma⁽¹⁾, Masakuni Tsunazawa⁽¹⁾ and Kentaro Nishimori⁽²⁾, ⁽¹⁾Iwate University, Japan, ⁽²⁾Niigata University, Japan
- 25: **Impact of Fractal Loop on Wireless Power Transmission for Travelling Mobility Scooter**
Yuuji Sakayanagi, #Shota Togawa, Kenta Konagaya and Yoshihiko Kuwahara, Shizuoka University, Japan
- 26: **Improving Accuracy of RSSI-Based Indoor Localization Using Three-Element Array**
#Ryota Tazawa⁽¹⁾, Naoki Honma⁽¹⁾, Miura Atsusi⁽²⁾ and Minamizawa Hiroto⁽²⁾, ⁽¹⁾Iwate University, Japan, ⁽²⁾Embedded Resource Integration, Inc., Japan
- 27: **Analytical Study of Rectifier Circuit for Wireless Power Transfer Systems**
#Yuki Akihara⁽¹⁾, Tetsuya Hirose⁽¹⁾, Sota Masuda⁽¹⁾, Nobutaka Kuroki⁽¹⁾, Masahiro Numa⁽¹⁾ and Masanori Hashimoto⁽²⁾, ⁽¹⁾Kobe University, Japan, ⁽²⁾Osaka University, Japan
- 28: **Feasibility Study of Wide-band MACKKEY**
#Tetsuo Moroya, Shigeru Makino, Yasuharu Ohtsubo, Keisuke Noguchi, Tetsuo Hirota and Kenji Itoh, Kanazawa Institute of Technology, Japan
- 29: **Exact Matching Approach with Circuit Element Ohmic Loss**
#Qiaowei Yuan and Satoshi Suzuki, National Institute of Technology, Sendai College, Japan
- 30: **Low Profile Top-Loaded Antenna with Broad Beamwidth**
#Jing Xia, Yong-Pin Chen and Shi-Wei Qu, University Of Electronic Science And Technology Of China, China
- 31: **Design for the Feeding Structure of a Metal Cap with Two Slots Attaching at the Edge of a Mobile Module Substrate for 60GHz Band**
#Haruhisa Hirayama, Jiro Hirokawa and Makoto Ando, Tokyo Institute of Technology, Japan
- 32: **Investigation of the Film Antenna for Wireless Power Transmission to the Capsular Endoscope**
#Shigehiro Kai and Masaharu Takahashi, Chiba University, Japan
- 33: **A Compact 2-Port Half-Shaped Cubical PIFA Design for Pattern Reconfigurable MIMO Terminal**
#Surentiran Padmanathan, Azremi Abdullah Al-Hadi, Ping Jack Soh and Mohd Faizal Jamlos, Univesity Malaysia Perlis, Malaysia
- 34: **Small Embedded LTE/WWAN Antenna for a Laptop Computer**
#Shu-Chuan Chen⁽¹⁾, Yun-Tsan Lee⁽¹⁾ and Po-Wei Wu⁽²⁾, ⁽¹⁾National Defense University, Taiwan, ⁽²⁾National Yunlin University of Science and Technology, Taiwan

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- 35: **Measurement of a Slot Antenna Backed by a Half Cylindrical Cavity made of Conductive Textiles**
#Yuto Ishii and Hitoshi Shimasaki, Kyoto Institute of Technology, Japan
- 36: **An Isolation Technique for Closely Stacked MIMO Antennas**
#Seonho Lim⁽¹⁾, Woo Cheol Choi⁽¹⁾, Young Joong Yoon⁽¹⁾ and Chisang You⁽²⁾, ⁽¹⁾Yonsei University, Korea, ⁽²⁾LG Electronics, Korea
- 37: **Circuit Parameters Maximizing Phase Dispersion of Frequency Dispersive Phase Shifter for Multi-Band Base Station Antenna**
#Yasuhito Yanagisawa⁽¹⁾, Keizo Cho⁽¹⁾, Naobumi Michishita⁽²⁾ and Ichiro Oshima⁽³⁾, ⁽¹⁾Chiba Institute of Technology, Japan, ⁽²⁾National Defense Academy, Japan, ⁽³⁾Denki Kogyo Co., Ltd., Japan
- 38: **Low-sidelobe Design of a Waveguide Reflectioncanceling Slot Array Antenna in the 60GHz Band**
#Mikihiro Aruga⁽¹⁾, Miao Zhang^(1,2), Jiro Hirokawa⁽¹⁾ and Makoto Ando⁽¹⁾, ⁽¹⁾Tokyo Institute of Technology, Japan, ⁽²⁾Xiamen University, China
- 39: **Research on a Novel Balanced Antipodal Vivaldi Antenna for MMW Imaging System**
#Wang Nannan, Fang Mu, Du Tianyao, Qiu Jinghui and Alexander Denisov, Harbin Institute of Technology, China
- 40: **Two-dimensional Beam Scanning of Optical Antenna by Circular Waffle Waveguide**
#Sei Ashihara, Hiroshi Hashiguchi and Hiroyuki Arai, Yokohama National University, Japan
- 41: **Simulation Study of a Ka-band Beam Scanning Slot Array Antennas Based on Substrate Integrated Waveguide**
#Zhai Xuan, Qiu Jing-hui, Yang Cai-tian and Fu Yan-zhi, Harbin Institute of Technology, China
- 42: **Design of Microstrip-input Taper-structures for Required Beam Shape in Rotman-lens Phase Shifter**
#Yuta Suzuki, Kunio Sakakibara and Nobuyoshi Kikuma, Nagoya Institute of Technology, Japan
- 43: **Modified L-type eLoran transmitting Antenna for Co-location with an AM Antenna**
#Hanni Koo and Sangwook Nam, Seoul National University, Korea
- 44: **Design of Circularly Polarized Pyramid Dielectric Resonator Antenna**
#Beijia Liu, Jinghui Qiu, Guanjun Liu, Hua Zong and Oleksandr Denisov, Harbin Institute of Technology, China
- 45: **Loss Reduction of Microstrip-to-Waveguide Transition Suppressing Leakage from Gap between Substrate and Waveguide by Choke Structure**
#Yuta Mizuno, Kunio Sakakibara and Nobuyoshi Kikuma, Nagoya Institute of Technology, Japan

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- 46: **Compact Planar Transmission-line Transition Direct-connecting from a Waveguide to Four Microstrip-lines**
#Shigenori Kitanaka, Kunio Sakakibara and Nobuyoshi Kikuma, *Nagoya Institute of Technology, Japan*
- 47: **Cross-Arranged Dielectric Resonator Antenna with Cross Slot Excitation**
#Zhe Chen and Hang Wong, *City University of Hong Kong, Hong Kong*
- 48: **A Compact Antipodal Vivaldi Antenna with Improved Radiation Performance**
#Hao Li, Lijia Chen, Jinghui Qiu and Caitian Yang, *Harbin Institute of Technology, China*
- 49: **Double-slot Antipodal Vivaldi Antenna for Improved Directivity and Radiation Patterns**
#Youngmin So⁽¹⁾, Woojoong Kim⁽¹⁾, Jaesik Kim⁽¹⁾, Young Joong Yoon⁽¹⁾ and Jinsung Park⁽²⁾, ⁽¹⁾*Yonsei University, Korea*, ⁽²⁾*Agency for Defense Development, Korea*
- 50: **Dual Polarized Vivaldi Antenna for Digital Television Applications**
Zengrui Li, #Xiaole Kang, Jianxun Su, Hui Zhang and Dazhi Piao, *Communication University of China, China*
- 51: **Polarization Improvement through Sinuous Antenna Arm Modification**
#Yunsu Kang and Kangwook Kim, *Gwangju Institute of Science and Technology, Korea*
- 52: **High Gain Yagi-Uda Origami Antenna**
#Syed Imran Hussain Shah and Sungjoon Lim, *Chung-Ang University, Korea*
- 53: **A Study on Broadband Printed Bell-Shaped Monopole Antenna with Short Stub**
#Nobuyasu Takemura, Takayoshi Moriyama, Joichiro Suzuki, Takuya Takeda and Takefumi Hiraguri, *Nippon Institute of Technology, Japan*
- 54: **Wideband Printed Rectangular Monopole Antenna for Circularly Polarization**
#Takaya Ishikubo and Takafumi Fujimoto, *Nagasaki University, Japan*
- 55: **Broadband Circularly Polarized Bowtie Dipole Antenna**
#Zhi-Ya Zhang, Guang Fu and Dan Wu, *Xidian University, China*
- 56: **Broadband Circularly Polarized Patch Antenna for WLAN System Application**
#Chunlan Lu⁽¹⁾, Changsong Wu⁽¹⁾, Juhong Shen⁽²⁾, Yan Zhang⁽³⁾ and Fanqiu Meng⁽¹⁾, ⁽¹⁾*College of Communications Engineering, China*, ⁽²⁾*Troops of 63811 PLA, China*, ⁽³⁾*The 28th Research Institute of China Electronics Technology Group Corporation, China*
- 57: **Stub-loaded Broadband Dual-Polarized Antenna for 2G/3G/LTE Base Stations**
#Rui Wu and Qing-Xin Chu, *South China University of Technology Guangzhou, China*

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- 58: **A Compact Circular Polarization Active Phased Array Antenna with Low Axial Ratio**
#Chao-ran Hu, Shu Lin, Ling Liu, Cai-tian Yang, Ming-chuan Wei and Xi-bin Cao, *Harbin Institute of Technology, China*
- 59: **High FoM Liquid Crystal based Microstrip Phase Shifter for Phased Array Antennas**
#Longzhu Cai, Huan Xu, Jinfeng Li and Daping Chu, *University of Cambridge, United Kingdom*
- 60: **A Compact Multi-Beam Antenna Without Beam Forming Network**
Dongfang Guan⁽¹⁾, #Can Ding⁽²⁾ and Y. Jay Guo⁽²⁾, ⁽¹⁾*National University of Defence Technology, China*, ⁽²⁾*University of Technology Sydney (UTS), Australia*
- 61: **A Microstrip Antenna Array on a Narrow Wall of a Rectangular Waveguide for Linear Polarization Perpendicular to the Axis**
#Shintaro Shimamori, Sakuyoshi Saito and Yuichi Kimura, *Saitama University, Japan*
- 62: **Principle and Realization of an ESPAR Antenna Using L and C**
#Dae-Geun Yang, Eun-Seok Jang, Kyung-Soo Kim, Che-Young Kim and Sung-Soo Hong, *Kyungpook National University, Korea*
- 63: **Simple Design of Null-fill for Linear Array**
#Masashi Yamamoto⁽¹⁾, Hiroyuki Arai⁽¹⁾, Yoshio Ebine⁽²⁾ and Masahiko Nasuno⁽²⁾, ⁽¹⁾*Yokohama National University, Japan*, ⁽²⁾*NAZCA Ltd., Japan*
- 64: **Evaluation of Power Spectrum of 2-element Dipole Antenna with Periodically Variable Antenna Pattern**
#Kosei Kawano⁽¹⁾, Yusuke Idoguchi^(1,2) and Masato Saito⁽¹⁾, ⁽¹⁾*University of the Ryukyus, JAPAN*, ⁽²⁾*IKEGAMI TSUSHINKI CO.,LTD.*
- 65: **Iterative FFT Algorithm for Thinning Planar Array**
#Ying Suo, Shuangbin Yin and Wei Li, *Harbin Institute of Technology, China*
- 66: **Optimization of Smooth Walled Horn Antenna using Multilevel Fast Multipole Method**
#Kohei Tsukamoto and Hiroyuki Arai, *Yokohama National University, Japan*
- 67: **Fused Deposition Modelling for Microwave Circuits & Antennas**
Darren Cadman, Shiyu Zhang and #Yiannis Vardaxoglou, *Loughborough University, United Kingdom*
- 68: **Planar Circularly Polarized Circular Antenna with Clover Slot for RFID System**
#Jui-Han Lu and Hai-Ming Chin, *National Kaohsiung Marine University, Taiwan*
- 69: **The Radial Line Concentric Slot Array Antenna**
#Tao Zhou, Yasuhiro Tsunemitsu and Naohisa Goto, *Takushoku University, Japan*
- 70: **Design of Waveguide Shut Slot Arrays Formed on Copper-plated Dielectric Sticks in Millimeter-wave Band**
#Yuta Miyachi, Kunio Sakakibara and Nobuyoshi Kikuma, *Nagoya Institute of Technology, Japan*

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- 71: **A Printed H-plane Horn Antenna with Loaded Dielectric-metal Composite Lens in Ka band**
#Zong Hua, Chen Yue, Lin Shu, Liu Beijia, Li Hongmei and Wu Qun, *Harbin Institute of Technology, China*
- 72: **BIC-Based Optimization of the Identification of Multipath Propagation Clusters in MIMO Wireless Systems**
#Daniel Dominic N. Abinoja and Lawrence Y. Materum, *De La Salle University, Philippines*
- 73: **An Autocorrelated Inverse Method for Nakagami-m Envelope Simulation**
#Shi Lei⁽¹⁾, Li Qi⁽¹⁾, Zhao Lei⁽²⁾ and Guo Zhen⁽¹⁾, ⁽¹⁾*Xidian University, China*, ⁽²⁾*Xi'an University of Finance and Economics, China*
- 74: **Miniaturization of RFID Reader Front-End Circuit Based on Low Temperature Co-fired Ceramic**
#Hongmei Li, Yayun Zu, Ying Zhao and Lifei Bao, *Harbin Institute of Technology, China*
- 75: **A Proposal to Improve Ray Launching Techniques**
#Andres Navarro⁽¹⁾, Dinael Guevara⁽²⁾ and Narcis Cardona⁽³⁾, ⁽¹⁾*Universidad Icesi, Colombia*, ⁽²⁾*Universidad Francisco de Paula Santander, Colombia*, ⁽³⁾*Universitat Politècnica de Valencia, Spain*
- 76: **Innovative Root Finding and Tracing Algorithms in Complex Domain for Treatment of Lossy Transmission Lines**
#Wojciech Marynowski and Piotr Kowalczyk, *Gdansk University of Technology, Poland*
- 77: **An RF Multiplier Integrated Planar Antenna for DOA Estimation**
#Rimi Rashid, Daiki Hattori, Eisuke Nishiyama and Ichihiko Toyoda, *Saga University, Japan*
- 78: **Non-Contact Respiration Measurement Using Ultra-wideband Array Radar with Adaptive Beamforming Technique for Cancer Radiotherapy**
#Masashi Muragaki⁽¹⁾, Shigeaki Okumura⁽¹⁾, Takuya Sakamoto^(1,2) and Toru Sato⁽¹⁾, ⁽¹⁾*Kyoto University, Japan* ⁽²⁾*University of Hyogo, Japan*
- 79: **Extension of Two-Level Nested Array with Larger Aperture and More Degrees of Freedom**
#Yuki Iizuka and Koichi Ichige, *Yokohama National University, Japan*
- 80: **Acceleration for Wind Velocity Vector Estimation by Neural Network for Single Doppler LIDAR**
#Taro Matsuo⁽¹⁾, Guanghao Sun⁽¹⁾, Shouhei Kidera⁽¹⁾, Tetsuo Kirimoto⁽¹⁾, Hiroshi Sakamaki⁽²⁾ and Teruyuki Hara⁽²⁾, ⁽¹⁾*University of Electro-Communications, Japan*, ⁽²⁾*Mitsubishi Electric Corporation, Japan*
- 81: **Frame Rate Analysis of Video Synthetic Aperture Radar (ViSAR)**
#He Yan, Xinhua Mao, Jindong Zhang and Daiyin Zhu, *Nanjing University of Aeronautics and Astronautics, China*

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14:00 - 15:40 (Exhibition Hall)

- 82: **Multiple Target Tracking and Separation Technique Based on Texture Information in Range-Time Image using Ultra-Wideband Radar**
#Takuro Sato⁽¹⁾, Takuya Sakamoto^(1,2), Shigeaki Okumura⁽¹⁾ and Toru Sato⁽¹⁾, ⁽¹⁾*Kyoto University, Japan*, ⁽²⁾*University of Hyogo, Japan*
- 83: **Oceanographic Observation in Hyuga-Nada by the High-Frequency Ocean Radar**
#Hirotaka Oshiro⁽¹⁾, Satoshi Fujii⁽¹⁾ and Tsutomu Tokeshi⁽²⁾, ⁽¹⁾*University of the Ryukyus, Japan*, ⁽²⁾*Miyazaki Prefectural Government, Japan*
- 84: **Observation of The 2011 Tohoku Tsunami by Using HF Radar in Ise Bay**
#Yu Toguchi⁽¹⁾, Satoshi Fujii⁽¹⁾ and Hirofumi Hinata⁽²⁾, ⁽¹⁾*University of the Ryukyus, Japan*, ⁽²⁾*Ehime University, Japan*
- 85: **Ocean Wave Measurement using Synthetic Aperture Radar Cross-track Interferometry**
#Akitsugu Nadai, Toshihiko Umehara, Shoichiro Kojima and Jyunpei Uemoto, *National Institute of Information and Communications Technology, Japan*
- 86: **Accuracy Analysis of Propagating-Path Identification Using FDTD Method and Compressive Sensing**
#Tomohiro Komatsu, Naoki Honma and Yoshitaka Tsunekawa, *Iwate University, Japan*
- 87: **Optimum Directivity of Base Station Antenna in Street Microcell**
Tsukasa Matsuta, Toshikazu Hori and #Mitoshi Fujimoto, *University of Fukui, Japan*
- 88: **Novel Frequency Selective Surface with Quasi-Elliptic Response**
#Wen Jiang, Shuxi Gong, Shuai Zhang and Tao Hong, *Xidian University, China*
- 89: **Beam-Steering Multi-Layer Metasurface at 35GHz**
#Jiaran Qi, Shanshan Xiao, Zhiying Yin and Jinghui Qiu, *Harbin Institute of Technology, China*
- 90: **The Ultra-Wideband RF MEMS Single-Pole-Four-Throw Switch**
#Jin Lin, *Nanjing Research Institute of Electronics Technology, China*
- 91: **Approximate Field Continuity Conditions for Thin Anisotropic Conductive Layer**
#Adam Kusiek, Wojciech Marynowski and Jerzy Mazur, *Gdansk University of Technology, Poland*
- 92: **Resonance Frequency Calculation of Microstrip Structure Located on Cylindrical Surface Using Hybrid Technique**
Adam Kusiek and #Rafal Lech, *Gdansk University of Technology, Poland*
- 93: **Large-Scale Electromagnetic Analysis of Realistic Human-Body Exposure Using GPU Supercomputer**
#Jerdvisanop Chakarothai, Kanako Wake and Soichi Watanabe, *National Institute of Information and Communications Technology, Japan*
- 94: **Breast Cancer Treatment by Combining Microwave Hyperthermia and Radiation Brachytherapy**
#Oiendriila B Debnath⁽¹⁾, Kazuyuki Saito⁽²⁾, Koichi Ito⁽²⁾ and Mitsuru Uesaka⁽¹⁾, ⁽¹⁾*University of Tokyo, Japan*, ⁽²⁾*Chiba University, Japan*

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- 95: **UWB Vivaldi Array Using Frequency Selective Surface for Low RCS Applications**
Wenbo Xing, #Tao Hong, Wen Jiang, Shuxi Gong and Yanping Li, *Xidian University, China*
- 96: **RCS Evaluation of Reflectarray Antennas by Using the Asymptotic Technique**
#Shih-Chung Tuan⁽¹⁾ and Hsi-Tseng Chou⁽²⁾, ⁽¹⁾*Oriental Institute of Technology, Taiwan*, ⁽²⁾*National Taiwan University, Taiwan*
- 97: **Double-layered Boundary Extraction Using Extended Envelope with Multi-static UWB Radars**
#Risako Tanaka⁽¹⁾ and Shouhei Kidera⁽²⁾, ⁽¹⁾*Tokyo Institute of Technology, Japan*, ⁽²⁾*The University of Electro-Communications, Japan*
- 98: **Precise Scattering Center Extraction for ISAR Image using the Shooting and Bouncing Ray**
#Dal-Jae Yun, Jae-In Lee, Ky-Ung Bae and Noh-Hoon Myung, *Korea Advanced Institute of Science and Technology (KAIST), Korea*
- 99: **Study of Correlation Coefficients of the Receiver Pair in Microwave Tomography**
#Yuuki Ono, Toshihiro Kamiya, Latifah Mohamed and Yoshihiko Kuwahara, *Shizuoka University, Japan*
- 100: **Sleeve Antenna with Left-handed Choke Structure**
#Takatsugu Fukushima, Naobumi Michishita and Hisashi Morishita, *National Defense Academy, Japan*
- 101: **Design of Low-RCS and Gain Enhancement Microstrip Antenna Based on Miniaturized Polarisation-Dependent AMC**
Jing Mu⁽¹⁾, #Hao Wang⁽¹⁾, Xun Jiang⁽¹⁾, Dalong Xu⁽¹⁾ and Yong Huang⁽²⁾, ⁽¹⁾*Nanjing University of Science and Technology, China*, ⁽²⁾*Suzhou Bohai Microsystem CO. LTD, China*
- 102: **Low-profile Checkerboard Electromagnetic Band-Gap Surface**
#Sung Hoe Kim, Youngsub Kim and Young Joong Yoon, *Yonsei University, Korea*
- 103: **X-band Metamaterial Absorber with Circular Rings for Size Reduction**
#Mohammed Mustapha Gajibo, Mohamad Kamal A. Rahim, Noor A. Murad and Osman Ayop, *Universiti Teknologi Malaysia, Malaysia*
- 104: **Self-interference Reduction in Full-duplex Repeater Using Realistic MIMO-OFDM Signal with End-fire Arranged Arrays**
#Yoshiyuki Yamamoto⁽¹⁾, Masakuni Tsunazawa⁽²⁾, Naoki Honma⁽²⁾ and Qiang Chen⁽¹⁾, ⁽¹⁾*Tohoku University, Japan*, ⁽²⁾*Iwate University, Japan*
- 105: **Performance Comparison of Multi-Beam Massive MIMO by the Switch Configuration**
#Kohei Kameyama⁽¹⁾, Kentaro Nishimori⁽¹⁾, Takefumi Hiraguri⁽²⁾, Hiroyoshi Yamada⁽¹⁾ and Hideo Makino⁽¹⁾, ⁽¹⁾*Niigata University, Japan*, ⁽²⁾*Nippon Institute of Technology, Japan*

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14:00 - 15:40 (Exhibition Hall)

- 106: **Kalman-based Moving Object Tracking Using Nonuniform Pulse Transmission Scheme**
#Nobuya Arakawa⁽¹⁾, Koichi Ichige⁽¹⁾ and Osamu Shibata⁽²⁾, ⁽¹⁾*Yokohama National University, Japan*, ⁽²⁾*Murata Manufacturing Co., Ltd., Japan*
- 107: **Performance Evaluation for Multi-User Environment by NOMA and Beam-Forming with User Scheduling**
#Motoaki Suzuki, Kentaro Nishimori and Hideo Makino, *Niigata University, Japan*
- 108: **Basic Study on Human Detection by MIMO Sensor with Antennas at Ceiling and Floor**
#Kento Sato⁽¹⁾, Kentaro Nishimori⁽¹⁾, Naoki Honma⁽²⁾ and Hideo Makino⁽¹⁾, ⁽¹⁾*Niigata University, Japan*, ⁽²⁾*Iwate University, Japan*
- 109: **Narrowband Interference Mitigation in Angle-Frequency Direct Product Domain in UWB Receivers**
#Kazutaka Kikuta and Akira Hirose, *The University of Tokyo, Japan*
- 110: **Performance Evaluation of Multi-beam Massive MIMO Using Multi-level Modulation**
#Ryotaro Taniguchi, Kentaro Nishimori, Kohei Kameyama and Hideo Makino, *Niigata University, Japan*
- 111: **Study on Effective Loading Pattern of Magnetic Sheet Attached on WPT System**
#Hiromu Odanaka⁽¹⁾, Takaho Sekiguchi⁽¹⁾, Yoshinobu Okano⁽¹⁾ and Satoshi Ogino⁽²⁾, ⁽¹⁾*Tokyo City University, Japan*, ⁽²⁾*Microwave Absorbers Inc., Japan*
- 112: **Linear Motion Type Transfer Robot using the Wireless Power Transfer System**
#Masayoshi Sugino⁽¹⁾, Hiroshi Kondo⁽²⁾ and Shigeru Takeda⁽³⁾, ⁽¹⁾*NIPPON SOKEN, INC., Japan*, ⁽²⁾*DENSO CORPORATION, Japan*, ⁽³⁾*DENSO WAVE INCORPORATED, Japan*
- 113: **Experimental Evaluation of Inductive Power Transfer System Using Multiple Concatenated Parallel-Line-Feeder Segments**
#William-Fabrice Brou, Quang-Thang Duong and Minoru Okada, *Nara Institute of Science and Technology, Japan*
- 114: **Highly-Efficient Power Transmitter Coil Design for Small Wireless Sensor Nodes**
#Souta Masuda⁽¹⁾, Tetsuya Hirose⁽¹⁾, Yuki Akihara⁽¹⁾, Nobutaka Kuroki⁽¹⁾, Masahiro Numa⁽¹⁾ and Masanori Hashimoto⁽²⁾, ⁽¹⁾*Kobe University, Japan*, ⁽²⁾*Osaka University, Japan*
- 115: **Study of Noise Reduction from SMPS in the Wireless Power Transmission System**
#Sangbong Jeon, Jong-Hwa Kwon, Byung Chan Kim, Jung-Ick Moon, Seong-Min Kim, Sang-Won Kim and In-Kui Cho, *Electronics and Telecommunications Research Institute, Korea*

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- 116: **Experimental Investigation of Contact Currents in the Vicinity of a Wireless Power Transfer System in 100 kHz Band**
#Kanakano Wake⁽¹⁾, Jerdvisanop Chakarothai⁽¹⁾, Yuhei Aoki^(1,2), Takuji Arima^(1,2), Toru Uno⁽²⁾ and Soichi Watanabe⁽¹⁾, ⁽¹⁾National Institute of Information and Communications Technology, Japan, ⁽²⁾Tokyo University of Agriculture and Technology, Japan
- 117: **High-Efficiency Wireless Power Transfer by Controlling Free Resonant Frequencies**
#Dong-Wook Seo, Jae-Ho Lee and Mi-Ryong Park, *Electronics and Telecommunications Research Institute (ETRI), Korea*
- 118: **Wireless Power Transfer System for External Memory Hard by using Small Magnetic Coils**
#In-Kui Cho, Seong-Min Kim, Jeong-Ik Moon, Jae-Hun Yoon and Hyung-Do Choi, *ETRI, Korea*
- 119: **Effectiveness of Transmitting Cross Coil Stacked with Arrayed Coils in Wireless Power Transfer with Magnetically Coupled Resonance**
#Kazunari Mase, Nobuyoshi Kikuma and Kunio Sakakibara, *Nagoya Institute of Technology, Japan*
- 120: **Study on Rectenna Harmonics Reradiation for Microwave Power Transfer with a Harmonics-Based Retrodirective System**
#Shogo Kawashima, Naoki Shinohara and Tomohiko Mitani, *Kyoto University, Japan*
- 121: **A Multi-frequency WIPT System with a Stable Communication Carrier**
#Shan Jiang, Chang Chen, Chi Zhang and Weidong Chen, *Chinese Academy of Science, China*
- 122: **On a Transmission Efficiency of Tape-wound Spiral Antenna for Coupled Resonant Wireless Power Transfer**
#Keigo Nakamura and Hiroshi Hirayama, *Nagoya Institute of Technology, Japan*
- 123: **A Novel Wireless Power Transmission System Using Microstrip Coil Structure with Ferrite and Dielectric Layers**
#Fang-Hua Liu, Shi Pu, *Wuhan University of Technology, China*
- 124: **An H-Plane Wide-Angle Rectenna Using an In-Phase/Anti-Phase Dual-Feed Antenna**
#Hiroshi Satow, Yuki Tanaka, Eisuke Nishiyama and Ichihiko Toyoda, *Saga University, Japan*
- 125: **Compact Mikaelian Lens Design Using Metasurface Structure**
#Cheng Jie Syue⁽¹⁾, Malcolm Ng Mou Kehn⁽¹⁾ and Oscar Quevedo-Teruel⁽²⁾, ⁽¹⁾National Chiao Tung University, Taiwan, ⁽²⁾Royal Institute of Technology, Sweden

October 27 (Thu)

3A1: Recent Progress in Millimeter-Wave and THz Antenna Technologies I

9:00 - 10:40 (Room A)

Co-Chairs: Kyeong-Sik Min (Korea Maritime and Ocean University, Korea)
Kunio Sakakibara (Nagoya Institute of Technology, Japan)

- 1: 9:00 **Invited: 3D Printing Technology for RF and THz Antennas**
Min Liang, Junqiang Wu, Xiaoju Yu and #Hao Xin, *University of Arizona, United States*
- 2: 9:40 **Plate-Laminated Corporate-Feed Slotted Waveguide Array Antenna at 350-GHz Band by Silicon Process**
#Karim Tekkouk⁽¹⁾, Jiro Hirokawa⁽¹⁾, Kazuki Oogimoto⁽²⁾, Tadao Nagatsuma⁽²⁾, Hiroyuki Seto⁽³⁾, Yoshiyuki Inoue⁽³⁾ and Mikiko Saito⁽⁴⁾, ⁽¹⁾Tokyo Institute of Technology, Japan, ⁽²⁾Osaka University, Japan, ⁽³⁾Kyoto University, Japan, ⁽⁴⁾Waseda University, Japan
- 3: 10:00 **Design and Fabrication of High-Gain 3-Dimensional Printed Reflectarray Antenna for W-Band Millimeter-Wave Radar Applications**
#Shunichi Futatsumori, Kazuyuki Morioka, Akiko Kohmura, Nobuhiro Sakamoto and Naruto Yonemoto, *Electronic Navigation Research Institute, Japan*
- 4: 10:20 **Terahertz Dual Polarizations Offset Reflector Antenna Using Sic And CFRP Material**
#Wang Hongjian and Yi Min, *National Space Science Center, China*

3A2: Recent Progress in Millimeter-Wave and THz Antenna Technologies II

11:00 - 12:40 (Room A)

Co-Chairs: Manabu Yamamoto (Hokkaido University, Japan)
Zhang-Cheng Hao (Southeast University, China)

- 1: 11:00 **Development of MMW Waveguide Slot Arrays for Gigabit Wireless Access in 5G Cellular Network**
#Miao Zhang^(1,2), Jiro Hirokawa⁽²⁾ and Makoto Ando⁽²⁾, ⁽¹⁾Xiamen University, China, ⁽²⁾Tokyo Institute of Technology, Japan
- 2: 11:20 **A D-band High-Gain Antenna for Terahertz Applications**
#Zhang-Cheng Hao and Jia Wang, *Southeast University, China*
- 3: 11:40 **Terahertz Reflectarray and Transmitarray**
#Shi-Wei Qu⁽¹⁾, Peng-Yu Feng⁽¹⁾, Huan Yi^(1,2), Baojie Chen⁽²⁾, Kung Bo Ng⁽²⁾, Chi Hou Chan⁽²⁾ and Geng-Bo Wu⁽¹⁾, ⁽¹⁾University of Electronic Science and Technology of China (UESTC), China, ⁽²⁾City University of Hong Kong, China
- 4: 12:00 **Through-Hole Less Microstrip Line to Waveguide Transition with Quarter-Wavelength Open Stubs**
#Hiromasa Nakajima, Akimichi Hirota, Naofumi Yoneda and Hiroaki Miyashita, *Mitsubishi Electric Corporation, Japan*
- 5: 12:20 **PWW Bandpass Filter for 60 GHz Band Based on 2D MoM Design Optimization**
#Ryohei Hosono, Yusuke Uemichi, Osamu Nukaga, Xu Han and Ning Guan, *Fujikura Ltd., Japan*

Technical Program

October 27 (Thu)

3A3: Next 50 Years Antennas and Propagation Technologies in Japan 16:00 - 17:40 (Room A)

Co-Chairs: Hiroki Shoki (Toshiba Corporation, Japan)
Yoshihiko Konishi (Hiroshima Institute of Technology, Japan)

- 1: 16:00 **Antenna Systems for Next 50 Years**
#Kentaro Nishimori, *Niigata University, Japan*
- 2: 16:25 **My Personal Expectations about Electromagnetics Analysis and Simulation Techniques for Next 50 Years**
#Takuji Arima, *Tokyo University of Agriculture and Technology, Japan*
- 3: 16:50 **Expectation for Metamaterials for Antenna Applications**
#Naobumi Michishita, *National Defense Academy, Japan*
- 4: 17:15 **Future 50 Years of Mobile Radio Propagation Research**
#Koshiro Kitao, *NTT DOCOMO, INC., Japan*

3B1: Recent Advances in Computational Electromagnetics I 9:00 - 10:40 (Room B)

Co-Chairs: Takuji Arima (Tokyo University of Agriculture and Technology, Japan)
Ruey-Bing Hwang (National Chiao Tung University, Taiwan)

- 1: 9:00 **Solution of Electrically Large Scattering Problems using the Characteristic Basis Function Method**
Chao Li^(1,2) and #Raj Mittra^(1,3), ⁽¹⁾*University of Central Florida, United States*,
⁽²⁾*University of Jinan, China*, ⁽³⁾*King Abdul Aziz University, Saudi Arabia*
- 2: 9:20 **Analysis of Electromagnetic Pulse Responses by a Conducting Cylinder with Inhomogeneous Dielectric Coating**
#Masahiko Nishimoto⁽¹⁾ and Yoshihiro Naka⁽²⁾, ⁽¹⁾*Kumamoto University, Japan*,
⁽²⁾*Kyushu University of Health and Welfare, Japan*
- 3: 9:40 **Large-Scale FDTD Analysis of 4.4 GHz-band Propagation Characteristics in Aircraft Cabin**
#Kanji Yahagi⁽¹⁾, Masami Shirafune⁽¹⁾, Takashi Hikage⁽¹⁾, Manabu Yamamoto⁽¹⁾,
Toshio Nojima⁽¹⁾, Shoichi Narahashi⁽¹⁾, Syunichi Futatsumori⁽²⁾, Akiko Kohmura⁽²⁾
and Naruto Yonemoto⁽²⁾, ⁽¹⁾*Hokkaido University, Japan*, ⁽²⁾*National Institute of Maritime, Port and Aviation Technology, Japan*
- 4: 10:00 **ARMA/FDTD Analysis of Loop Antennas near Human Body for MHz Band Wireless Power Transfer System**
#Keita Asano, Toru Uno and Takuji Arima, *Tokyo University of Agriculture and Technology, Japan*
- 5: 10:20 **A Beam Tracking System - System Analysis Incorporating Electromagnetic Field Simulation**
#Ruey-Bing(Raybeam) Hwang, *National Chiao Tung University, Taiwan*

October 27 (Thu)

3B2: Recent Advances in Computational Electromagnetics II 11:00 - 12:40 (Room B)

Co-Chairs: Shinichiro Ohnuki (Nihon University, Japan)
Maokun Li (Tsinghua University, China)

- 1: 11:00 **Scattering of Light by Periodic Array of Metal-Coated Nanocylinders on Dielectric Slab**
#Kiyotoshi Yasumoto⁽¹⁾, Vakhtang Jandieri⁽²⁾, Peiwen Meng⁽³⁾ and Yunfei Liu⁽¹⁾,
⁽¹⁾*Nanjing Forestry University, China*, ⁽²⁾*Free University of Tbilisi, Republic of Georgia*, ⁽³⁾*Delft University of Technology, Netherlands*
- 2: 11:20 **Accelerating Nonlinear Inversion Algorithms on GPU platform for Electromagnetic Data**
#Maokun Li⁽¹⁾, Xue Yang Wang⁽¹⁾ and Aria Abubakar⁽²⁾, ⁽¹⁾*Tsinghua University, China*,
⁽²⁾*Schlumberger, United States*
- 3: 11:40 **Basic Study of an InSb Grating Filter in the Terahertz Region**
Jun Shibayama, #Ryo Umezawa, Junji Yamauchi and Hisamatsu Nakano, *Hosei University, Japan*
- 4: 12:00 **A Discontinuous Galerkin Augmented Electric Field Integral Equation for Low-Frequency Electromagnetic Scattering Analysis**
Yibei Hou, Xuezhe Tian and #Gaobiao Xiao, *Shanghai Jiao Tong University, China*
- 5: 12:20 **Propagation Characteristics for Dielectric Waveguide Composed of Dielectric Circular Cylinder with Air-hole Cylinder Array**
Ryosuke Ozaki and #Tsuneki Yamasaki, *Nihon University, Japan*

3B3: Electromagnetic Wave Theory II 16:00 - 17:40 (Room B)

Co-Chairs: Hiroshi Shirai (Chuo University, Japan)
Rafal Lech (Gdansk University of Technology, Poland)

- 1: 16:00 **Electromagnetic Scattering by Simplified Crack Models on Conducting Ground Plane**
#Ryoichi Sato⁽¹⁾ and Hiroshi Shirai⁽²⁾, ⁽¹⁾*Niigata University, Japan*, ⁽²⁾*Chuo University, Japan*
- 2: 16:20 **Infinite Current Behavior along a Subwavelength Perfectly Conducting Concave Wedge**
#Thierry Gilles, *Royal Military Academy, Belgium*
- 3: 16:40 **Modified Cauchy Distribution Model of High-Order Passive Intermodulation**
#Lu Tian, Yi Wang, Ruofan Wang and Xiangyuan Bu, *Beijing Institute of Technology, China*
- 4: 17:00 **Scattering of Light by Multilayered Cylindrically Periodic Arrays of Metal-Coated Nanocylinders**
Haiyang Cao⁽¹⁾, Kiyotoshi Yasumoto⁽¹⁾, #Yunfei Liu⁽¹⁾, Vakhtang Jandieri⁽²⁾ and Dan Zhang⁽¹⁾, ⁽¹⁾*Nanjing Forestry University, China*, ⁽²⁾*University of Duisburg-Essen, Germany*
- 5: 17:20 **Study of Optical Coupling at Junction of Plasmonic Waveguides**
Shinichiro Ohnuki, #Masahiro Kamigaki, Yuichi Kageyama, Hideomi Hashiba and Shuichiro Inoue, *Nihon University, Japan*

Technical Program

October 27 (Thu)

3C1: Antennas and Propagation for 5G Systems 9:00 - 10:40 (Room C)

Co-Chairs: Katsuyuki Haneda (Aalto University School of Electrical Engineering, Finland)
Jiro Hirokawa (Tokyo Institute of Technology, Japan)

- 1: 9:00 **Prototype System Evaluation and Field Trial of 40 GHz-band Directional Division Duplex (DDD) Radio System**
#Yu Sudoh⁽¹⁾, Yasuhiro Toriyama⁽¹⁾, Koichiro Akahori⁽¹⁾, Yuki Hashimoto⁽¹⁾, Kazuya Kojima⁽¹⁾, Toru Taniguchi⁽¹⁾, Miao Zhang^(2,3), Jiro Hirokawa⁽²⁾ and Makoto Ando⁽²⁾,
⁽¹⁾Japan Radio Co., Ltd., Japan, ⁽²⁾Tokyo Institute of Technology, Japan, ⁽³⁾Xiamen University, China
- 2: 9:20 **Multiplexing Efficiency of High Order MIMO in Mobile Terminal for 5G communication at 15GHz**
#Zhinong Ying⁽¹⁾, Kun Zhao^(1,2), Thomas Bolin⁽¹⁾, Sailing He⁽²⁾, Alessandro Scannavini⁽³⁾, Lars J. Foged⁽³⁾ and Gross Nicolas⁽³⁾, ⁽¹⁾SONY Mobile Communications AB, Sweden, ⁽²⁾KTH Royal Institute of Technology, Sweden, ⁽³⁾Microwave Vision Group, France
- 3: 9:40 **Radio Channel Sounding Campaigns in EU H2020 mmMAGIC Project for 5G Channel Modeling**
#Katsuyuki Haneda⁽¹⁾, Michael Peter⁽²⁾, Jonas Medbo⁽³⁾, Mark Beach⁽⁴⁾, Raffaele d'Errico⁽⁵⁾, Shangbin Wu⁽⁶⁾ and Jean-Marc Conrat⁽⁷⁾, ⁽¹⁾Aalto University School of Electrical Engineering, Finland, ⁽²⁾Fraunhofer HHI, Germany, ⁽³⁾Ericsson Research, Sweden, ⁽⁴⁾University of Bristol, United Kingdom, ⁽⁵⁾CEA-LETI, France, ⁽⁶⁾Samsung Research, United Kingdom, ⁽⁷⁾Orange, France
- 4: 10:00 **A Novel Method for Inter-Cell Interference Cancellation in Cellular Networks**
Shuo Yang, Kyunghoon Kim, Heungseop Ahn and #Seungwon Choi, Hanyang University, Korea
- 5: 10:20 **Investigation of Planar Near-Field Measurement of Millimeter-Wave Antenna for 5G Application**
#Bo Xu^(1,4), Jakob Helander⁽²⁾, Andreas Ericsson⁽²⁾, Zhinong Ying⁽³⁾, Sailing He⁽¹⁾, Mats Gustafsson⁽²⁾ and Daniel Sjöberg⁽²⁾, ⁽¹⁾KTH Royal Institute of Technology, Sweden, ⁽²⁾Lund University, Sweden, ⁽³⁾SONY Mobile Communications AB, Sweden, ⁽⁴⁾Zhejiang University, China

October 27 (Thu)

3C2: MIMO Based Techniques for Future Wireless Communication Systems 11:00 - 12:40 (Room C)

Co-Chairs: Tsuyoshi Kashima (Huawei Technologies Japan K.K., Japan)
Kentaro Nishimori (Niigata University, Japan)

- 1: 11:00 **Large Scale Massive MIMO Field Trial for 5G Mobile Communications System**
#Tsuyoshi Kashima⁽¹⁾, Jing Qiu⁽²⁾, Haihua Shen⁽²⁾, Chen Tang⁽²⁾, Tingjian Tian⁽²⁾, Xin Wang⁽³⁾, Xiaolin Hou⁽³⁾, Huiling Jiang⁽³⁾, Anass Benjebbour⁽⁴⁾, Yuya Saito⁽⁴⁾ and Yoshihisa Kishiyama⁽⁴⁾, ⁽¹⁾Huawei Technologies Japan K.K., Japan, ⁽²⁾Huawei Technologies Co., Ltd, China, ⁽³⁾DOCOMO Beijing Communications Laboratories, Co., Ltd., China, ⁽⁴⁾NTT DOCOMO, INC., Japan
- 2: 11:20 **Downlink Multiuser MIMO-OFDM Transmission using Simple Receive Antenna Selection**
#Tomoki Murakami⁽¹⁾, Keisuke Ujihara⁽²⁾, Yasushi Takatori⁽¹⁾, Masato Mizoguchi⁽¹⁾ and Fumiaki Maehara⁽²⁾, ⁽¹⁾Nippon Telegraph and Telephone Corporation, Japan, ⁽²⁾Waseda University, Japan
- 3: 11:40 **Comparison of Large Scale Parameters of mmWave Wireless Channel in 3 Frequency Bands**
Hua Yan⁽¹⁾, Ziming Yu⁽¹⁾, Yanshen Du⁽¹⁾, #Jia He⁽¹⁾, Xiongfei Zou⁽¹⁾, David Steer⁽²⁾ and Guangjian Wang⁽¹⁾, ⁽¹⁾Huawei Tech. Co., Ltd, China, ⁽²⁾Huawei Technologies Canada Co., Ltd., Canada
- 4: 12:00 **Ray-tracing Based Performance Evaluation of 5G mmWave Massive MIMO in Hotspots**
#Chenwei Wang⁽¹⁾, Haralabos Papadopoulos⁽¹⁾, Koshiro Kitao⁽²⁾ and Tetsuro Imai⁽²⁾, ⁽¹⁾DOCOMO Innovations, Inc., United States, ⁽²⁾NTT DOCOMO INC, Japan
- 5: 12:20 **Testbed Implementation of Near-field Magnetic MIMO Communication System using SDR**
#Sukhyun Hwang, Han-Joon Kim, Kyung Tae Kim and Ji-Woong Choi, Daegu Gyeongbuk Institute of Science & Technology, Korea

Technical Program

October 27 (Thu)

3C3: 5G Radio Propagation 16:00 - 17:40 (Room C)

Co-Chairs: Koshiro Kitao (NTT DOCOMO, Japan)

Tommi Jamsa (Huawei Technologies Sweden AB, Sweden)

- 1: 16:00 **Outdoor-to-Indoor Channel Characteristics at 20 GHz**
#Ngochao Tran, Tetsuro Imai and Yukihiko Okumura, *NTT DOCOMO INC., Japan*
- 2: 16:20 **Mm-Wave Outdoor-to-Indoor Channel Measurement In An Open Square Smallcell Scenario**
#Minseok Kim⁽¹⁾, Tatsuki Iwata⁽¹⁾, Kento Umeki⁽¹⁾, Karma Wangchuk⁽²⁾, Jun-ichi Takada⁽²⁾ and Shigenobu Sasaki⁽¹⁾, ⁽¹⁾*Niigata University, Japan*, ⁽²⁾*Tokyo Institute of Technology, Japan*
- 3: 16:40 **Investigations on the Frequency Dependence of the Delay Spread in an UMi Street Canyon Scenario**
#Michael Peter, Richard J. Weiler, Fabian Undi, Farouk El-Kanawati, Stephan Jaeckel, Leszek Raschkowski, Lars Thiele, Kei Sakaguchi and Wilhelm Keusgen, *Fraunhofer Heinrich Hertz Institute, Germany*
- 4: 17:00 **Indoor High-Resolution Channel Characterization**
#Niklas Jaldén⁽¹⁾, Jonas Medbo⁽¹⁾, Henrik Asplund⁽¹⁾, Nicholas Tompson⁽²⁾ and Dennis Sundman⁽¹⁾, ⁽¹⁾*Ericsson Research, Sweden*, ⁽²⁾*Telstra Corporation, Australia*
- 5: 17:20 **Study of Dominant Path Probability**
#Tommi Jämsä, Gerhard Steinböck and Mattias Gustafsson, *Huawei Technologies Sweden AB, Sweden*

3D1: Radar, Remote Sensing, and Applications I 9:00 - 10:40 (Room D)

Co-Chairs: Hirokazu Kobayashi (Osaka Institute of Technology, Japan)

Jian Yang (Univ. Science & Technology Beijing, China)

- 1: 9:00 **Time Series Observation of Wetland “Sakata” by PiSAR-2**
Yoshio Yamaguchi⁽¹⁾, Hiroyoshi Yamada⁽¹⁾ and #Shoichiro Kojima⁽²⁾, ⁽¹⁾*Niigata University, Japan*, ⁽²⁾*National Institute of Information and Communication Technology, Japan*
- 2: 9:20 **Constraint Least-Squares Estimation for Polarimetric Parameters in Compact Data**
#Junjun Yin⁽¹⁾ and Jian Yang⁽²⁾, ⁽¹⁾*University of Science and Technology Beijing, China*, ⁽²⁾*Tsinghua University, China*
- 3: 9:40 **Lab Color Space Assignment for Decomposed Fully Polarization Pi-SAR Data**
Cheng-Yen Chiang^(1,3), Kun-Shan Chen⁽²⁾, # Chih-Yuan Chu⁽³⁾, Yoshio Ymaguchi⁽⁴⁾ and Kuo-Chin Fan⁽¹⁾, ⁽¹⁾*National Central University, Taiwan*, ⁽²⁾*Chinese Academy of Science, China*, ⁽³⁾*G-AVE Technology Corp., Taiwan*, ⁽⁴⁾*Niigata University, Japan*
- 4: 10:00 **Accuracy Enhanced RPM Method Using Doppler Based Range Points Clustering for 140GHz Band UWB Radar**
#Shouhei Kidera⁽¹⁾, Yuta Sasaki⁽¹⁾, Shang Fang⁽¹⁾, Tetsuo Kirimoto⁽¹⁾, Kenshi Saho⁽²⁾ and Toru Sato⁽³⁾, ⁽¹⁾*The University of Electro-Communications, Japan*, ⁽²⁾*Ritsumeikan University, Japan*, ⁽³⁾*Kyoto University, Japan*
- 5: 10:20 **An Inverse Scattering Method for Lossy Objects Using Time-Reversed Fields**
#Toshifumi Moriyama⁽¹⁾, Toshiyuki Tanaka⁽¹⁾ and Takashi Takenaka⁽²⁾, ⁽¹⁾*Nagasaki University, Japan*, ⁽²⁾*South China Normal University, China*

October 27 (Thu)

3D2: Radar, Remote Sensing, and Applications II 11:00 - 12:40 (Room D)

Co-Chairs: Shouhei Kidera (The University of Electro-Communications, Japan)

Animesh Maitra (University of Calcutta, India)

- 1: 11:00 **Least Square Image Reconstruction Method for Sparse Array Radar System**
Iakov Chernyak and #Motoyuki Sato, *Tohoku University, Japan*
- 2: 11:20 **Radar Waveform Design for Extended Random Target Model with Random Pose Angle Parameters**
#Hyoung-soo Kim and Sung-il Yang, *Hanyang University, Korea*
- 3: 11:40 **A Maneuvering Target Detection in Time-Series Doppler Spectrums with Self-Organizing Model**
#Hiroyuki Yamaguchi, *Air Systems Research Center, Japan*
- 4: 12:00 **Short-Chirp Signal-based Ground Penetrating Radar System for Detecting Shallow-Depth Pipelines**
#Masaru Tsunasaki⁽¹⁾, Atsuo Senga⁽²⁾ and Ichiro Sugimoto⁽³⁾, ⁽¹⁾*Osaka Gas Co., Ltd., Japan*, ⁽²⁾*Nippon Signal Co., Ltd., Japan*, ⁽³⁾*Laboratory of Energy & Human Life Science Inc., Japan*
- 5: 12:20 **Doppler Compensation of MISO Range Response in Subband Division LFM Pulse MIMO Radar**
#Ryuhei Takahashi, Toru Takahashi and Hirohisa Tasaki, *Mitsubishi Electric Corporation, Japan*

3D3: Reflectarray 16:00 - 17:40 (Room D)

Co-Chairs: Shigeru Makino (Kanazawa Institute of Technology, Japan)

Fan Yang (Tsinghua University, China)

- 1: 16:00 **A Study of the Broadband Characteristic of Reflectarray Antennas Using Aberration Theory**
#Kento Takeshima⁽¹⁾, Shigeru Makino⁽¹⁾, Keisuke Noguchi⁽¹⁾, Tetsuo Hirota⁽¹⁾, Kenji Itoh⁽¹⁾, Takeshi Siode⁽²⁾ and Michio Takikawa⁽²⁾, ⁽¹⁾*Kanazawa Institute of Technology, Japan*, ⁽²⁾*Mitsubishi Electric Corporation, Japan*
- 2: 16:20 **Design of Dual-Band Reflectarray using Genetic Algorithm**
#Tamami Maruyama⁽¹⁾, Q Chen⁽²⁾, S Kameda⁽²⁾ and N Suematsu⁽²⁾, ⁽¹⁾*National Institute of Technology, Hakodate College, Japan*, ⁽²⁾*Tohoku University, Japan*
- 3: 16:40 **Electromagnetic Model of All-Metal Reflectarray Antennas with Non-Resonant Elements**
#Yao-Jiu Chen⁽¹⁾, Hsi-Tseng Chou⁽²⁾ and Hsien-Kwei Ho⁽¹⁾, ⁽¹⁾*Yuan Ze University, Taiwan*, ⁽²⁾*National Taiwan University, Taiwan*
- 4: 17:00 **High-Performance Curved Reflectarrays for Telecommunication Applications**
Min Zhou, #Erik Jørgensen and Stig B. Sørensen, *TICRA, Denmark*
- 5: 17:20 **Reflectarray with Arbitrarily Shaped Elements for Linear-to-Circular Polarization**
Shogo Matsumoto, #Hiroki Yamada, Hiroyuki Deguchi and Mikio Tsuji, *Doshisha University, Japan*

Technical Program

October 27 (Thu)

3E1: Circularly Polarized Antennas 9:00 - 10:40 (Room E)

Co-Chairs: Kangwook Kim (Gwangju Institute of Science and Technology, Korea)
Akinori Matsui (Saitama Institute of Technology, Japan)

- 1: 9:00 **Pillbox Antenna Integrating Amplitude Monopulse Technique in SIW Technology**
#Karim Tekkouk^(1,2), Mauro Ettore⁽¹⁾ and Ronan Sauleau⁽¹⁾, ⁽¹⁾University of Rennes 1, France, ⁽²⁾Tokyo Institute of Technology, Japan
- 2: 9:20 **A Compact Circularly Polarized SIW Slot Antenna**
#Hengfei Xu, Jianyi Zhou and Zhiqiang Yu, Southeast University, China
- 3: 9:40 **Millimeter-Wave High-Gain Wideband Circularly Polarized Antenna Array by Employing Aperture-Coupled Magneto-Electric Dipoles**
#Yujian Li⁽¹⁾, Jingxue Wang⁽¹⁾, Junhong Wang⁽¹⁾ and Kwai-Man Luk⁽²⁾, ⁽¹⁾Beijing Jiaotong University, China, ⁽²⁾City University of Hong Kong, China
- 4: 10:00 **Design of Tilted Beam Circularly Polarized Antenna for CP-SAR Sensor Onboard UAV**
#Yohandri⁽¹⁾, Asrizal⁽¹⁾ and Josaphat Tetuko Sri Sumantyo⁽²⁾, ⁽¹⁾FMIPA Universitas Negeri Padang, Indonesia, ⁽²⁾Chiba University, Japan
- 5: 10:20 **A Circularly Polarized Radial Line Dielectric Resonator Antenna Array**
#Lin Shi, Ming Su, Yuanan Liu, Jianguo Yu and Shulan Li, Beijing University of Posts and Telecommunications, China

3E2: Electromagnetic Analysis 11:00 - 12:40 (Room E)

Co-Chairs: Hiroyasu Sato (Tohoku University, Japan)
Titipong Lertwiriayaprapa (King Mongkut's University of Technology North Bangkok, Thailand)

- 1: 11:00 **Fast and Memory-Efficient Method for Full-Wave Analysis of Electrically Large Reflector Antennas and Satellite Platforms**
#Erik Jørgensen, Oscar Borries, Peter Meincke and Niels Vesterdal, TICRA, Denmark
- 2: 11:20 **Radiation Modes Investigation of Huygens Source Type Antenna Using Spherical Wave Expansion**
#Abdul Sattar Kaddour⁽¹⁾, Serge Bories⁽¹⁾, Antonio Clemente⁽¹⁾, Anthony Bellion⁽²⁾ and Christophe Delaveauc⁽¹⁾, ⁽¹⁾University Grenoble Alpes, France, ⁽²⁾CNES, France
- 3: 11:40 **Radiation Analysis of an Equivalent Magnetic UHF-RFID Tag Located on a Coated Metallic Sphere using UTD method**
Kittisak Phaebua⁽¹⁾, Pitchanun Wongsiritorna⁽²⁾, #Titipong Lertwiriayaprapa⁽¹⁾ and Chuwong Phongcharoenpanicha⁽²⁾, ⁽¹⁾King Mongkut's University of Technology North Bangkok, Thailand, ⁽²⁾King Mongkut's Institute of Technology Ladkrabang, Thailand
- 4: 12:00 **The FDTD Analysis of the Radiation Pattern of an Antenna Mounted on a Rocket**
#Yiwei He⁽¹⁾, Toshihiro Sezai⁽²⁾ and Koji Sunami⁽²⁾, ⁽¹⁾Osaka Electro-Communication University, Japan, ⁽²⁾JAXA, Japan
- 5: 12:20 **Advances in FETI Methods for the Simulation of Multi-Source Electromagnetic Problems**
#Andre Barka and Francois-Xavier Roux, The French Aerospace Lab, France

October 27 (Thu)

3E3: Antennas for Wireless Applications 16:00 - 17:40 (Room E)

Co-Chairs: Tan-Huat Chio (National University of Singapore, Singapore)
Daisuke Uchida (Toshiba Corporation, Japan)

- 1: 16:00 **Two by Two MIMO Antenna Composed of Inverted L Elements Printed on Dielectric Substrate**
#Mitsuo Taguchi and Shoji Mori, Nagasaki University, Japan
- 2: 16:20 **An Ink-Reducing Printed Rectangular CPW Antenna Design via Selective Area Thickening**
#Pornanong Pongpaibool, Patharakorn Rattanawan, Matanee Kitjaroen, Werayuth Wallada and Siwaruk Siwamogsatham, National Electronics and Computer Technology Center, Thailand
- 3: 16:40 **Design of Antipodal Vivaldi Antennas Using Kernel Regression Optimization**
#Gangil Byun and Hosung Choo, Hongik University, Korea
- 4: 17:00 **Development of GPS Antenna Mounted on Shoes for Human's Position Observation**
#Tetsuya Nakamura and Yoshinobu Okano, Tokyo City University, Japan
- 5: 17:20 **Beam Divergence Reduction Using Dielectric Lens for Orbital Angular Momentum Wireless Communications**
#Hiroyuki Fukumoto, Hirofumi Sasaki, Doohwan Lee and Tadao Nakagawa, NTT, Japan

3F1: Array Antenna Technologies I 9:00 - 10:40 (Room F)

Co-Chairs: Seong-Ook Park (Korea Advanced Institute of Science and Technology, Korea)
Satoshi Yamaguchi (Mitsubishi Electric Corporation, Japan)

- 1: 9:00 **Design of a Double Layer Cavity backed Slot Array Antenna in Gap Waveguide Technology**
#Peiye Liu, Ashraf Uz Zaman and Pei-Simon Kildal, Chalmers University of Technology, Sweden
- 2: 9:20 **Design of Broadband Planar Array Composed of 2x2 Slotted Cavities Fed by E-plane Waveguide Parallel-Feeding Circuit in Millimeter-wave Band**
#Katsuhiro Miyazaki, Kunio Sakakibara and Nobuyoshi Kikuma, Nagoya Institute of Technology, Japan
- 3: 9:40 **A Low-profile, Decade Bandwidth, Tightly-Coupled Vivaldi Phased Array**
Jing Dai⁽¹⁾, #Hao Wang⁽¹⁾, Haiqing Wang⁽¹⁾, Xun Jiang⁽¹⁾, Dalong Xu⁽²⁾ and Yong Huang⁽²⁾, ⁽¹⁾Nanjing University of Science and Technology, China, ⁽²⁾Suzhou Bohai Microsystem CO., LTD, China
- 4: 10:00 **A Photonic Phased Array Using Frequency Quadrupling without Optical Filtering**
#Yuta Hasegawa, Yusuke Nakatani, Yusuke Uemichi, Xu Han, Ryohei Hosono and Ning Guan, Fujikura Ltd., Japan
- 10:20 **Break Time**

Technical Program

October 27 (Thu)

3F2: Array Antenna Technologies II 11:00 - 12:40 (Room F)

Co-Chairs: Shin-ichiro Matsuzawa (Toyota Central R & D Labs., Inc., Japan)
Eko Rahardjo (Universitas Indonesia, Indonesia)

- 1: 11:00 **Dual-Circularly Polarized Parabolic Reflector Antenna with Microstrip Antenna Array for 12-GHz Band Satellite Broadcasting Reception**
#Masafumi Nagasaka, Susumu Nakazawa and Shoji Tanaka, *NHK, Japan*
- 2: 11:20 **A Prototype Array-fed Shaped Reflector Antenna for 21-GHz Band Broadcasting Satellite**
#Susumu Nakazawa, Masafumi Nagasaka and Shoji Tanaka, *NHK, Japan*
- 3: 11:40 **A 3.37:1 Bandwidth and Low-profile Tightly Coupled Array Antenna**
#Hakjune Lee and Sangwook Nam, *Seoul National University, Korea*
- 4: 12:00 **Study on Primary Radiator using Leaky-Wave Antenna with Left-Handed Waveguides**
#Shigeyuki Nishimura, Hiroyuki Deguchi and Mikio Tsuji, *Doshisha University, Japan*
- 5: 12:20 **CRLH Leaky-Wave Antenna using Transmission Line Resonators**
#Yujiro Kushiyama, Takuji Arima and Toru Uno, *Tokyo University of Agriculture and Technology, Japan*

3F3: Millimeter Wave Antennas 16:00 - 17:40 (Room F)

Co-Chairs: Miao Zhang (Xiamen University, China)
Chi H. Chan (City University of Hong Kong, Hong Kong)

- 1: 16:00 **Millimeter-Wave Tapered Slot Array for Automotive Radar Applications**
Meijiao Li⁽¹⁾, Paul Schmalenberg⁽²⁾ and #Jae Seung Lee⁽²⁾, ⁽¹⁾*University of California Davis, United States*, ⁽²⁾*Toyota Research Institute North America, United States*
- 2: 16:20 **Influence of Resin Cover on Antenna Gain for Automotive Millimeter Wave Radar**
#Shin-ichiro Matsuzawa and Toshiaki Watanabe, *Toyota Central R & D Labs., Inc., Japan*
- 3: 16:40 **Antenna Arrays with Slot Open Waveguide Radiation Elements**
#Vladimir Veremey, *Qualcomm Inc., United States*
- 4: 17:00 **A Study of Orbital Angular Momentum Generated by Parabolic Reflector with Circular Array Feed**
#Tung Nguyen, Ryuji Zenkyu, Masashi Hirabe, Tsuguo Maru and Eisaku Sasaki, *NEC Corporation, Japan*
- 5: 17:20 **SIW Cavity-Backed Circularly Polarized Dual Loop Antenna with Broadband at Ka Band**
#Huan Mei, Xuexia Yang and Yingjie Yu, *Shanghai University, China*

October 27 (Thu)

POS2: Poster Session II 14:00 - 15:40 (Exhibition Hall)

- 1: **A Multiband Antenna Based on a CRLH Structure for Mobile Handsets**
#RongLin Li, Liang Zheng, *South China University of Technology, China*
- 2: **Efficiency Improvement of Mobile Antenna by Controlling Ground Structure**
#Sangmoon Yoo and Hyeongdong Kim, *Hanyang University, Korea*
- 3: **Low Profile Weak Coupling PIFA Based On EBG Structures**
#Xiaogang Zhang⁽¹⁾, Jun Cao⁽¹⁾, Mouping Jin⁽¹⁾ and Pei Li⁽²⁾, ⁽¹⁾*China Electronics Technology Group Corporation No.38 Research Institute, China*, ⁽²⁾*Key Lab of Aperture Array and Space Application, China*
- 4: **Small-size Half-loop Frame Antenna Integrated with a USB Connector and Having a Narrow Ground Clearance for the LTE Metal-framed Smartphone**
#Li-Yu Chen and Kin-Lu Wong, *National Sun Yat-Sen University, Taiwan*
- 5: **A Small Quadrifilar Helical Antenna with Parallel Resonance Circuit for Dual-Band Application**
#Hiroaki Sakamoto, Takashi Yanagi, Toru Fukasawa and Hiroaki Miyashita, *Mitsubishi Electric Co., Japan*
- 6: **Radiation Efficiency of Multi-arm Open-ended Spherical Helix Antennas**
#Keisuke Fujita and Hiroshi Shirai, *Chuo University, Japan*
- 7: **Wide Beamwidth Quadrifilar Helix Antenna with Improved Axial Ratio**
Uisheon Kim, Seah Choi and #Giho Kim, *EMW Co., Ltd., Korea*
- 8: **Gap-Coupled Miniaturized Antenna on IPD Process for WLAN Tablet Computer**
#Chao-Shun Yang⁽¹⁾, Ta-Yeh Lin⁽²⁾, Da-Chiang Chang⁽²⁾ and Guo-Wei Huang⁽¹⁾, ⁽¹⁾*National Nano Device Laboratories, Taiwan*, ⁽²⁾*National Chip Implementation Center, Taiwan*
- 9: **Design of Printed Antenna for USB Dongle for IEEE 802.11 a/b/g Application**
#Wen-Shan Chen, Guang-Yuan Cai and Tzu-Chi Lu, *Southern Taiwan University of Science and Technology, Taiwan*
- 10: **A Preliminary Study on Design Coverage Extension of Automatic Composition Design for Human Body-Equivalent Phantoms with Low Relative Permittivity and Low Conductivity**
#Takaki Kurashige and Tadahiko Maeda, *Ritsumeikan University, Japan*
- 11: **Internal Inductance Correction for Permittivity Measurements of Planar Transmission Lines**
#Patrick Seiler, Bernhard Klein and Dirk Plettemeier, *Technische Universität Dresden, Germany*
- 12: **Radiation Efficiency Measurements of Embroidered Textile Radiating Elements Placed in the Vicinity of a Human Equivalent Phantom**
#Hiromichi Nomura and Tadahiko Maeda, *Ritsumeikan University, Japan*

Technical Program

October 27 (Thu)

POS2: Poster Session II

14:00 - 15:40 (Exhibition Hall)

- 13: **Optimal Test Set-up for Generating Rayleigh Fading Channel in Reverberation Chamber**
Tien Manh Nguyen⁽¹⁾, #Jae-Young Chung⁽¹⁾ and Jong Hwa Kwon⁽²⁾, ⁽¹⁾Seoul National University of Science and Technology, Korea, ⁽²⁾Electronics and Telecommunications Research Institute, Korea
- 14: **Two-Port S-Parameter Measurement of Wide-Band Balun**
#Kuniaki Suto and Akinori Matsui, *Saitama Institute of Technology, Japan*
- 15: **High-Gain Microstrip Antenna for Microwave Power Transmission**
#Junhui Ou⁽¹⁾, Andrey S. Andrenko⁽²⁾, Chao Fu^(1,2), Zhaojia Xie^(1,2) and Hongzhou Tan^(1,2), ⁽¹⁾Sun Yat-sen University, China, ⁽²⁾SYSU-CMU Shunde International Joint Research Institute, China
- 16: **The Simulation Design of a Low-Side Lobe Level High Gain and Broadband Microstrip Patch Antenna Array**
Zhang Yu-wei, #Lin Shu, Liu Ling, Yang Cai-tian, Lan Sheng-chang and Liu Hao, *Harbin Institute of Technology, China*
- 17: **Research of Planar Inverted-F Antenna Based on Electromagnetic Band Gap**
#Hongmei Li, Yayun Zu, Ying Zhao and Lifei Bao, *Harbin Institute of Technology, China*
- 18: **A High-Gain Planar Dual Reflector Antenna**
#Zong Hua, Zhang He, Lin Shu, Li Hongmei, Liu Beijia and Wu Qun, *Harbin Institute of Technology, China*
- 19: **Semiconductor-Based Reflector Antenna Using Integrated PIN Diodes**
#Young-Kyun Cho, Cheol Ho Kim, SeokBong Hyun, Kwang Chun Lee and Bong Hyuk Park, *Electronics and Telecommunications Research Institute (ETRI), Korea*
- 20: **A Dual-band Omni-directional Printed Antenna Array for WLAN Application Design**
#Si Zhang^(1,2), Shao-bin Liu⁽¹⁾, Cai-tian Yang⁽²⁾, Ling Liu⁽²⁾, Chao-ran Hu⁽²⁾, Peng Zhao⁽²⁾ and Di Wu⁽³⁾, ⁽¹⁾Nanjing University of Aeronautics and Astronautics, China, ⁽²⁾Harbin Institute of Technology, China, ⁽³⁾China Mobile Group Design Institute Co. Ltd. Heilongjiang branch, China
- 21: **A Broadband Probe-Fed 4x4 Array Antenna for Ku-band Applications**
#Chung-Yi Hsu⁽¹⁾, Lih-Tyng Hwang⁽¹⁾, Fa-Shian Chang⁽²⁾, Shun-Min Wang⁽²⁾ and Chih-Feng Liu⁽²⁾, ⁽¹⁾National Sun Yat-Sen University, Taiwan, ⁽²⁾Cheng Shiu University, Taiwan
- 22: **Sidelobe Reduction in Uniformly-Fed Microstrip Arrays by Applying Parasitic Elements**
Shai Nasirov⁽¹⁾, Ely Levine⁽²⁾ and #Haim Matzner⁽¹⁾, ⁽¹⁾Holon Institute of Technology, Israel, ⁽²⁾Afeke College of Engineering, Israel
- 23: **Traveling-wave Design of Cross-junction Power-dividers for Two-dimensional Microstrip Planar Array with 45-degree Polarization in Submillimeter-wave Band**
#Yuta Mouri, Shigenori Kitanaka, Kazumasa Shida, Kunio Sakakibara and Nobuyoshi Kikuma, *Nagoya Institute of Technology, Japan*

October 27 (Thu)

POS2: Poster Session II

14:00 - 15:40 (Exhibition Hall)

- 24: **A Near-Field Focused Planar Microstrip Array for 2.4 GHz RFID Readers**
#Ji-nuan Lin, Nan-nan Wang and Tian-yao Du, *Harbin Institute of Technology, China*
- 25: **Design of 8 × 8 Slot Array based on Inverted Microstrip Gap Waveguide**
#Jinlin Liu, Abbas Vosoogh, Ashraf Uz Zaman and Per-Simon Kildal, *Chalmers University of Technology, Sweden*
- 26: **Reduction of Reflection Loss from Dielectric Plate by Reflection-phase Control of Frequency Selective Surface**
#Goro Nomoto, Masamu Chiba, Kunio Sakakibara and Nobuyoshi Kikuma, *Nagoya Institute of Technology, Japan*
- 27: **The Waveguide Slot Array Antenna using Non Resonant Mode to Improve Grating Lobes**
#Kento Ueda, Yasuhiro Tsunemitsu and Naohisa Goto, *Takushoku University, Japan*
- 28: **Heartbeat and Respiratory Monitoring Using Standing Wave Radar and Independent Component Analysis**
#Daiki Matsumoto and Yoshihiko Kuwahara, *Shizuoka University, Japan*
- 29: **Analysis of The Radial Line Slot Array Antenna with Cross Slot Mutual Coupling Effects**
#Kouichi Sugita, Yasuhiro Tsunemitsu and Naohisa Goto, *Takushoku University, Japan*
- 30: **A High Gain Monopolar Patch Antenna with Low Profile**
#Kai Xu Wang and Hang Wong, *City University of Hong Kong, Hong Kong*
- 31: **Design of Patch Type Meta-surface for Orthogonal Polarization Conversion**
#Yasuhiro Tomii, Toshikazu Hori and Mitoshi Fujimoto, *University of Fukui, Japan*
- 32: **Design Method of Unit Cell Structure for Realizing Broadband Artificial Magnetic Conductor**
#Masaru Nagata, Toshikazu Hori and Mitoshi Fujimoto, *University of Fukui, Japan*
- 33: **Design of a High Gain and Dual Polarized Transmitarray Using FSS of Smaller Unit Cells**
Chung-Yi Hsu⁽¹⁾, Lih-Tyng Hwang⁽¹⁾, #Pei-Shou Lee⁽¹⁾, Shun-Min Wang⁽²⁾ and Fa-Shian Chang⁽²⁾, ⁽¹⁾National Sun Yat-sen University, Taiwan, ⁽²⁾Cheng Shiu University, Taiwan
- 34: **The Impact of Ground Plane to A Capacitor Loaded Rectangular Patch Antenna**
K. L. Lai, #Shin-Hung Wu and M. C. Liang, *National University of KaoHsiung, Taiwan*
- 35: **A 325-500 GHz High Gain Antenna for Terahertz Applications**
#Kuikui Fan, Zhang-Cheng Hao and Wei Hong, *Southeast University, China*
- 36: **Optimization of a Small Lens for a Leaky-Wave Slit Dipole Antenna at the Terahertz Band**
Niamat Hussain and #Ikmo Park, *Ajou University, Korea*

Technical Program

October 27 (Thu)

POS2: Poster Session II

14:00 - 15:40 (Exhibition Hall)

- 37: **Integrated Pseudo-Lens Structures for On-Chip Antennas at 180 GHz**
#Ronny Hahnel, Bernhard Klein and Dirk Plettemeier, *Technische Universität Dresden, Germany*
- 38: **A 60GHz Self-Shielded Yagi Antenna with Pyramidal Horn**
#Tae Hwan Jang, Hong Yi Kim and Chul Soon Park, *KAIST, Korea*
- 39: **60 GHz-band Compact Photonic Antenna Module with Integrated Photodiode**
#Kotoko Furuya, Shigeyuki Akiba, Jiro Hirokawa and Makoto Ando, *Tokyo Institute of Technology, Japan*
- 40: **0.65 - 7 GHz Ultra-Wideband Spherical Self-Complementary Antenna**
#Jin-young Jeong⁽¹⁾, Jae-young Chung⁽¹⁾ and Jong Hwa Kwon⁽²⁾, ⁽¹⁾*Seoul National University of Science and Technology, Korea*, ⁽²⁾*Electronics and Telecommunications Research and Institute(ETRI), Korea*
- 41: **Quasi-self-complementary Antenna for Band-notched UWB Applications**
Chih-Yu Huang, Jian-Ming Wu, Cheng-Shong Hong, Bo-Ru Zeng and #Cheng-Kuei Wu, *National Kaohsiung Normal University, Taiwan*
- 42: **Design of Balanced Slot UWB Antenna with High CM Rejection**
#Hsiao-Lan Chan⁽¹⁾, Ching-Her Lee⁽¹⁾ and Chung-I G. Hsu⁽²⁾, ⁽¹⁾*National Changhua University of Education, Taiwan*, ⁽²⁾*National Yunlin University of Science and Technology, Taiwan*
- 43: **An Ultra-Wideband 45° Oblique Polarized Antenna Array**
#Fang Jia^(1,2), Jin Mouping⁽¹⁾ and Zhang Xiaolin⁽¹⁾, ⁽¹⁾*China Electronic Technology Group Corporation No.38 Research Institute, China*, ⁽²⁾*Key Lab of Aperture Array and Space Application, China*
- 44: **An Ultra-Wideband Horizontally Polarized Omnidirectional Connected Vivaldi Array Antenna**
Hu Liu, #Ying Liu and Shuxi Gong, *Xidian University, China*
- 45: **Wavefront Curvature Correction for Missile Borne Spotlight SAR Polar Format Image**
#Panhu Li, Xinhua Mao and He Yan, *Nanjing University of Aeronautics & Astronautics, China*
- 46: **Low Frequency Diffraction Effects when Shaping the Offset Gregorian Reflector System of the SKA**
#Dirk I.L. de Villiers⁽¹⁾, Robert Lehmensiek⁽²⁾ and Marianna V. Ivashina⁽³⁾, ⁽¹⁾*Stellenbosch University, South Africa*, ⁽²⁾*EMSS Antennas (Pty) Ltd, South Africa*, ⁽³⁾*Chalmers University of Technology, Sweden*
- 47: **Approximate Noise Temperature Calculations of Offset Gregorian Reflector Systems**
Robert Lehmensiek⁽¹⁾ and #Dirk IL de Villiers⁽²⁾, ⁽¹⁾*Cape Peninsula University of Technology, South Africa*, ⁽²⁾*Stellenbosch University, South Africa*
- 48: **New Design of Multilayer Wideband GNSS Antenna with Dual Layer Strip Lines Fed**
#Yang Lin⁽¹⁾, Zheng Xianbao⁽²⁾ and Li Xi⁽¹⁾, ⁽¹⁾*Xidian University, China*, ⁽²⁾*Xi'an Electronic Engineering Research Institute, China*

October 27 (Thu)

POS2: Poster Session II

14:00 - 15:40 (Exhibition Hall)

- 49: **Compact Quad-band Slot Antenna for GPS L1, WiMAX, and WLAN Applications**
#Haiyan Piao, Yunnan Jin, Jinpil Tak and Jaehoon Choi, *Hanyang University, Korea*
- 50: **A CPW-Fed Slot Antenna with Dual Band and Dual Circular Polarization**
#Changsong Wu⁽¹⁾, Chunlan Lu⁽¹⁾, Juhong Shen⁽²⁾ and Zhihui Ye⁽³⁾, ⁽¹⁾*College of Communications Engineering, PLAUST, China*, ⁽²⁾*Troops of 63811 PLA, China*, ⁽³⁾*Nanjing University of Science and Technology, China*
- 51: **Dual-band Circular Polarization Antenna with Mu-zero Resonance and First-order Negative Mode**
#Chang-Hyun Lee and Jeong-Hae Lee, *Hongik University, Korea*
- 52: **Efficient Design of a Novel Wide-illumination-angle Ku/Ka-band Feed for Reflector Antennas**
#Pengyu Zhang, Jiaran Qi and Jinghui Qiu, *Harbin Institute of Technology, China*
- 53: **Pattern Reconfigurable Conical Dielectric Resonator Antenna with Parasitic Elements**
#Beijia Liu, Jinghui Qiu, Nannan Wang, Caitian Yang and Oleksandr Denisov, *Harbin Institute of Technology, China*
- 54: **Wideband Linear Polarization Reconfigurable Magneto-electric Dipole Antenna**
#Fan Wu and Kwai-Man Luk, *City University of Hong Kong, China*
- 55: **A Microstrip Antenna With Circular Polarization Switching Capability for X-band Applications**
#Muhammad Asad Rahman⁽¹⁾, Eisuke Nishiyama⁽¹⁾, Md. Azad Hossain⁽²⁾, Quazi Delwar Hossain⁽²⁾ and Ichihiko Toyoda⁽¹⁾, ⁽¹⁾*Saga University, Japan*, ⁽²⁾*Chittagong University of Engineering and Technology, Bangladesh*
- 56: **Prototype Measurement of Active Reflectarray Antenna using a Diode Grid in the W-band**
#Akiko Kohmura, Naruto Yonemoto, Shunichi Futatsumori and Kazuyuki Morioka, *Electronic Navigation Research Institute (ENRI), Japan*
- 57: **An OAM Mode Reconfigurable Antenna**
BaiYang Liu, Hui Liu and #RongLin Li, *South China University of Technology, China*
- 58: **A Compact Four-element MIMO Antenna with High Isolation Based on EBG**
#Hui Zhang, Jin Chen, Dazhi Piao, Zengrui Li, and Jianxun Sun, *Communication University of China, China*
- 59: **Transmission Characteristic Comparison between Right and Left Handed Leaky Wave Antennas Composed of CRLH Coplanar Strip Line**
#Akira Sakamoto⁽¹⁾, Keizo Cho⁽¹⁾, Naobumi Michishita⁽²⁾, Takuya Seki⁽³⁾ and Ichiro Oshima⁽³⁾, ⁽¹⁾*Chiba Institute of Technology, Japan*, ⁽²⁾*National Defense Academy, Japan*, ⁽³⁾*Denki kogyo Co., Ltd, Japan*
- 60: **A Novel Cassegrain Antenna with an FSS Sub-reflector and Cylinder Matcher**
Hao Liu, #Alexander Denisov, Jinghui Qiu and Shu Lin, *Harbin Institute of Technology, China*

Technical Program

October 27 (Thu)

POS2: Poster Session II

14:00 - 15:40 (Exhibition Hall)

- 61: **A Sensing Antenna for Liquid Leak Detection System Using Synthesized Transmission Line on Integrated Passive Device Process**
Hung Hsuan Chen, Huy Nam Chu and #Tzyh-Ghuang Ma, *National Taiwan University of Science and Technology, Taiwan*
- 62: **Non-Linear Optimization of the Excitation Coefficients of an Array Antenna of a Large-number Elements to reduce the Amplitude Ripples in the mm-Wave Hotspot Area Illumination**
#Dan Mohri, Makoto Ando and Jiro Hirokawa, *Tokyo Institute of Technology, Japan*
- 63: **Signal Flow Graph model for Distance-dependent Transfer Function between two antennas in Short-Range Communication**
#Thanh Phan Do, Kiyomichi Araki, Jiro Hirokawa and Makoto Ando, *Tokyo Institute of Technology, Japan*
- 64: **Calculation of the Basis Patterns of 5-element Dipole ESPAR Antennas**
#Se-Ah Choi, Ui-Sheon Kim, Ki-Ho Kim and Hak-Keun Choi, *EMW, Korea*
- 65: **$\lambda/16$ Spaced ESPAR Antenna Using Analog RF Switches for Single RF Chain**
#Jung-Nam Lee, Yongho Lee, Yuro Lee and Tag-Jung Kim, *Electronics and Telecommunication Research Institute, Korea*
- 66: **New Design of Dual-band Unequal Wilkinson Power Divider**
#Li Xi⁽¹⁾, Zheng Xianbao⁽²⁾ and Yang Lin⁽¹⁾, ⁽¹⁾*Xidian University, China*, ⁽²⁾*Xi'an Electronic Engineering Research Institute, China*
- 67: **Development of a High-Resolution 1.3 GHz Wind Profiler Radar**
#Masayuki K. Yamamoto⁽¹⁾, Seiji Kawamura⁽¹⁾ and Koji Nishimura⁽²⁾, ⁽¹⁾*National Institute of Information and Communications Technology (NICT), Japan*, ⁽²⁾*National Institute of Polar Research, Japan*
- 68: **Effect of Vertical Wind on Rain Drop Size Distributions in the Boundary Layer**
Gargi Rakshit, Rohit Chakraborty and #Animesh Maitra, *University of Calcutta, India*
- 69: **Simultaneous Rotation and Distance Measurement using Multiband Circularly Polarized Radio Link**
#Adam Narbudowicz^(1,2), Max J. Ammann⁽¹⁾ and Dirk Heberling⁽²⁾, ⁽¹⁾*Dublin Institute of Technology, Ireland*, ⁽²⁾*RWTH Aachen University, Germany*
- 70: **Spaceborne SAR Performance Improvement By Antenna Pattern Optimization**
#Young-Jin Won^(1,2) and Jae-Hyun Lee⁽²⁾, ⁽¹⁾*Korea Aerospace Research Institute, Korea*, ⁽²⁾*Chungnam National University, Korea*
- 71: **Preliminary Experimental Result of Optical Fiber Connected Passive Primary Surveillance Radar**
#Junichi Honda and Takuya Otsuyama, *Electronic Navigation Research Institute, Japan*
- 72: **Target Detection System in Sea Clutter Based on Simulated Radar Processing**
#Xia Wu, *Tongji University, China*

October 27 (Thu)

POS2: Poster Session II

14:00 - 15:40 (Exhibition Hall)

- 73: **SAR Reflection Pattern Change of Large-Scale Structures**
#Shota Tsuchida and Hajime Fukuchi, *Tokyo Metropolitan University, Japan*
- 74: **Schumann Resonances and Long Term Sunspot Number Variations**
#Yi Wang, Xiao Yuan and Qunsheng Cao, *Nanjing University of Aeronautics and Astronautics, China*
- 75: **Effect of Synchronization Error and Pseudo-Noise on Noise Suppression System for AM Radio**
#Shinya Ito⁽¹⁾, Mitoshi Fujimoto⁽¹⁾, Toshikazu Hori⁽¹⁾, Tomohisa Harada⁽²⁾ and Yoshiyuki Hattori⁽²⁾, ⁽¹⁾*University of Fukui, Japan*, ⁽²⁾*Toyota Central R&D Labs., Inc., Japan*
- 76: **Noise Robust Time of Arrival Estimation Method Using Hierarchical Bayesian Based Compressed Sensing Algorithm**
#Akira Moro, Fang Shang, Shouhei Kidera and Tetsuo Kirimoto, *The University of Electro-Communications, Japan*
- 77: **Inverse SAR Imaging of Circularly and Linearly Polarized Synthetic Aperture Radar**
#Yuta Izumi⁽¹⁾, Sevket Demirci⁽²⁾, Mohd Zafri Baharuddin⁽¹⁾ and Josaphat Tetuko Sri Sumantyo⁽¹⁾, ⁽¹⁾*Chiba University, Japan*, ⁽²⁾*Mersin University, Turkey*
- 78: **Successive Position Estimation Method for Multiple Object using UWB signal**
#Yuki Muranishi, Mitoshi Fujimoto and Toshikazu Hori, *University of Fukui, Japan*
- 79: **Theoretical Examination in Near Filed Object Position Estimation**
#Takuro Mamiya⁽¹⁾, Mitoshi Fujimoto⁽¹⁾, Toshikazu Hori⁽¹⁾, Takanobu Tabata⁽²⁾ and Satoshi Hori⁽²⁾, ⁽¹⁾*University of Fukui, Japan*, ⁽²⁾*Kojima Industries CO., Ltd, Japan*
- 80: **Study on Partial Discharge Propagation in Power Transformer Based on the Ant System Algorithm**
#Juneseok Lee, Sungkyu Lee and Jaehoon Choi, *Hanyang University, Korea*
- 81: **A Study on Channel Model for THz Band**
#Kazuhiro Tsujimura⁽¹⁾, Kenta Umabayashi⁽¹⁾, Joonas Kokkonen⁽²⁾ and Janne Lehtomäki⁽²⁾, ⁽¹⁾*Tokyo University of Agriculture and Technology, Japan*, ⁽²⁾*University of Oulu, Finland*
- 82: **Geometry Performance for 5G mmWave Cellular Networks**
Nadisanka Rupasinghe⁽¹⁾, Yuichi Kakishima⁽²⁾, Ismail Guvenc⁽¹⁾, #Koshiro Kitao⁽³⁾ and Tetsuro Imai⁽³⁾, ⁽¹⁾*Florida International University, United States*, ⁽²⁾*Docomo Innovations, Inc., United States*, ⁽³⁾*NTT Docomo, Inc., Japan*
- 83: **Angle-of-arrival Fluctuations of Electromagnetic Wave Propagation through the Solar Corona**
#Guanjun Xu⁽¹⁾ and Zhaohui Song^(1,2), ⁽¹⁾*Harbin Institute of Technology, China*, ⁽²⁾*East China Normal University, China*
- 84: **Rain Front and Rain Area Motions Related to Ku Band Satellite Signal Attenuation**
#Naoki Kubota, Yasuyuki Maekawa and Yoshiaki Shibagaki, *Osaka Electro-Communication University, Japan*

Technical Program

October 27 (Thu)

POS2: Poster Session II 14:00 - 15:40 (Exhibition Hall)

- 85: **X-Band Tunable Frequency Selective Surface with Embedded Bias Network**
Kunzhe Zhang, #Wen Jiang, Shuxi Gong and Tao Hong, *Xidian University, China*
- 86: **Some Analytic Formulations of Weakly Singular Integrals over Polygon for IPO Applications**
#Jae-Won Rim and Il-Suek Koh, *Inha University, Korea*
- 87: **Evaluation of Transmission Quality by Time-Domain Analysis for High-Speed Interconnectors**
#Chi-Fang Huang and Yu-Ching Hung, *Tatung University, Taiwan*
- 88: **Analysis of Magnetic Photonic Crystals Using Complex Envelope ADI-FDTD Method**
#Sang-Gyu Ha, Jeahoon Cho, Minseok Park, Jaewoo Baek and Kyung-Young Jung, *Hanyang University, Korea*
- 89: **The Minimum Sample Region Required to Predict the Far-Field RCS from the Bistatic Near-Field Data**
Jiaojiao Dang, Nanjing Li, Yuan Luo and #Zuxun Song, *Northwestern Polytechnical University, China*
- 90: **Plane Wave Scattering from Omega-medium Cylindrical Objects of Arbitrary Cross-section**
#Rafal Lech, *Gdansk University of Technology, Poland*
- 91: **Efficient Parametric Analysis of Cavity-Backed Slot Coupled DRA with Finite Element Method**
#Adam Lamecki, Lukasz Balewski and Michal Mrozowski, *Gdansk University of Technology, Poland*
- 92: **Shielding Effect by a Buried Metallic Pipe against the Induced Voltage**
#Kang-In Lee and Sangmu Lee, *Electronics and Telecommunications Research Institute, Korea*
- 93: **Fourth Order Debye Model for the Skin at the Millimetre-Wave Band Using Heuristic Genetic Algorithm**
#Syed A.R. Naqvi, Beadaa Mohammad and Amin M. Abbosh, *The University of Queensland, Australia*
- 94: **Dual-Band Unequal Wilkinson Power Divider with High Power-Dividing Ratio**
#Fang-Yu Lei, Yi-Hsin Pang and Ming-Cheng Liang, *National University of Kaohsiung, Taiwan*
- 95: **Differential Unequal Power Divider with Bandpass Response**
#Yu-Ting Chiu, Yi-Hsin Pang and Hsiang-Cheh Huang, *National University of Kaohsiung, Taiwan*
- 96: **Balanced-to-Balanced Rat-Race Coupler with Bandpass Response**
#Yu-Ju Huang and Yi-Hsin Pang, *National University of Kaohsiung, Taiwan*
- 97: **High Selectivity and isolation Microstrip Diplexer With Mixed Electromagnetic Coupling**
Tianwei Zhu, #Hongwei Deng, Tao Zhang, Fei Liu and Yongjiu Zhao, *Nanjing University of Aeronautics and Astronautics, China*

October 27 (Thu)

POS2: Poster Session II 14:00 - 15:40 (Exhibition Hall)

- 98: **Microstrip Filter with Reconfigurable Frequency Responses Based on Capacitor Chips**
#Achmad Munir and Hardy Lukius, *Institut Teknologi Bandung, Indonesia*
- 99: **Quadruple-Mode Wideband Filter Using Slotted Substrate Integrated Waveguide Circular Cavity**
#Fei Huang and Jianyi Zhou, *Southeast University, China*
- 100: **Microfluidic Chemical Sensor based on SIW Cavity**
#Muhammad Usman Memon and Sungjoon Lim, *Chung-Ang University, Korea*
- 101: **Study of Dual-Frequency Absorbing Materials Based on Frequency Selective Surfaces**
#Yin Xinyu, Oleksandr Denisov, Qiu Jinghui and Liu Hao, *Harbin Institute of Technology, China*
- 102: **Design of an All-dielectric Band-stop Frequency Selective Surface**
#Jinpil Tak and Jaehoon Choi, *Hanyang University, Korea*
- 103: **FEM Simulation of Induced Interference Voltage at Implantable Cardiac Pacemaker Due to Wireless Power Transfer in HF-band**
#Naoki Tanaka⁽¹⁾, Takashi Hikage⁽¹⁾, Juan Corcoles⁽²⁾ and Toshio Nojima⁽¹⁾, ⁽¹⁾Hokkaido University, Japan, ⁽²⁾Universidad Autonoma de Madrid, Spain
- 104: **Calculation of SAR and Temperature in Pregnant Female Models for a Half-Wavelength Dipole Antenna at 900 MHz and 2 GHz**
#Tomoaki Nagaoka⁽¹⁾, Akihiro Tateno⁽²⁾, Kazuyuki Saito⁽³⁾, Masaharu Takahashi⁽³⁾, Soichi Watanabe⁽¹⁾ and Koichi Ito⁽³⁾, ⁽¹⁾National Institute of Information and Communications Technology, Japan, ⁽²⁾Hitachi Kokusai Electric Inc., Japan, ⁽³⁾Chiba University, Japan
- 105: **Confocal Imaging by Turning Antennas with CMOS Integrated Circuits for Breast Cancer Detection**
#Hang Song⁽¹⁾, Hayato Kono⁽¹⁾, Yuji Seo⁽¹⁾, Afreen Azhari⁽¹⁾, Xia Xiao⁽²⁾ and Takamaro Kikkawa⁽¹⁾, ⁽¹⁾Hiroshima University, Japan, ⁽²⁾Tianjin University, China
- 106: **Evaluation of Human Sitting-up Detection System using Electromagnetic Noise from Power-supply Line**
#Yuki Wakasa, Yuri Tanai, Koichi Shin and Masahiro Nishi, *Hiroshima City University, Japan*
- 107: **RSSI-Based Estimation Method of Living-Body Direction Using Parasitic Antennas**
#Katsumi Sasaki⁽¹⁾, Naoki Honma⁽¹⁾, Takeshi Nakayama⁽²⁾ and Shoichi Iizuka⁽²⁾, ⁽¹⁾Iwate University, Japan, ⁽²⁾Panasonic Corporation, Japan
- 108: **Basic Study of Optically Transparent Functional Wall Having Absorption and Permeation Effect**
#Keita Nakamura and Yoshinobu Okano, *Tokyo City University, Japan*
- 109: **Wearable Metamaterial Absorber using Screen Printed Chanel logo**
#Dongju Lee and Sungjoon Lim, *Chung-Ang University, Korea*

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October 27 (Thu)

POS2: Poster Session II

14:00 - 15:40 (Exhibition Hall)

- 110: **Experimental Estimation of E-Field Distribution in a Vehicle under Multipath Propagation Environment Using a Reverberation Chamber**
#Katsushige Harima⁽¹⁾, Tetsuya Nakamura⁽²⁾, Daich Akita⁽²⁾ and Shinobu Ishigami⁽³⁾,
⁽¹⁾National Institute of Information and Communications Technology, Japan, ⁽²⁾TOYO Corporation, Japan, ⁽³⁾Tohoku Gakuin University, Japan
- 111: **Design of Wideband Directional Couplers Using Three Types of Broadside Coupled-Lines**
#In Bok Kim⁽¹⁾, Sung Kyun Kim⁽²⁾, Wahab Mohyuddin⁽²⁾, Hyun Chul Choi⁽²⁾ and Kang Wook Kim⁽²⁾, ⁽¹⁾LIG Nex1 CO. Ltd, Japan, ⁽²⁾Kyungpook National University, Korea
- 112: **2-loop Antenna Measurement Method for the Emission Noise Test of Automotive Component**
#Yasuyuki Matsuda⁽¹⁾, Hiroyuki Arai⁽¹⁾, Takanori Uno⁽²⁾, Ichiro Akahori⁽²⁾ and Toshiyasu Tanaka⁽³⁾, ⁽¹⁾Yokohama National University, Japan, ⁽²⁾DENSO EMC ENGINEERING SERVICE CORPORATION, Japan, ⁽³⁾Microwave Factory Co., Ltd., Japan
- 113: **Reduction of Edge Diffraction Effect of MUT Holder Using EM Absorber in W-band Free-space Material Measurements**
#Jin-Seob Kang, Jeong-Hwan Kim and Jeong-Il Park, Korea Research Institute of Standards and Science (KRISS), Korea
- 114: **The Design of Current Probe in the IEC Conducted Emission Measurement above 1 GHz**
#Yin-Cheng Chang^(1,2), Ta-Yeh Lin⁽²⁾, Ping-Yi Wang⁽¹⁾, Shawn S. H. Hsu⁽¹⁾, Mao-Hsu Yen⁽³⁾, Yen-Tang Chang⁽⁴⁾, Ming-Shan Lin⁽⁴⁾ and Da-Chiang Chang⁽²⁾, ⁽¹⁾National Tsing Hua University, Taiwan, ⁽²⁾National Applied Research Laboratories, Taiwan, ⁽³⁾National Taiwan Ocean University, Taiwan, ⁽⁴⁾Bureau of Standards, Metrology and Inspection, M.O.E.A, Taiwan
- 115: **Field Strength Estimation through a Vehicle Structure using Topological Model and PWB Method**
#Jae-Min Lee⁽¹⁾, JaeW Lee⁽¹⁾ and Jong-Hoon Han⁽²⁾, ⁽¹⁾Korea Aerospace University, Korea, ⁽²⁾National Security Research Institute, Korea
- 116: **Stretchable Frequency Selective Surfaces for Large-Area-Tuning and High-Power Applications**
#Yu-Chieh Hung and Chien-Hao Liu, National Taiwan University, Taiwan
- 117: **A Practical Microwave Absorber Design based on Salisbury Screens**
#Shih-Chung Tuan⁽¹⁾, Hsi-Tseng Chou⁽²⁾, Yi-Sheng Chang^(3,4), Hsieh-Ming Kun⁽⁴⁾, Pai-Lu Wang⁽⁴⁾ and Jun-Wen Zhang⁽⁴⁾, ⁽¹⁾Oriental Institute of Technology, Taiwan, ⁽²⁾National Taiwan University, Taiwan, ⁽³⁾Yuan Ze University, Taiwan, ⁽⁴⁾National Chung-Shan Institute of Science & Technology, Taiwan
- 118: **Study on the Effective Loading Method of the Magnetic Sheet for NFC / WPT Dual-Band Antenna**
#Takaho Sekiguchi⁽¹⁾, Hiromu Odanaka⁽¹⁾, Yoshinobu Okano⁽¹⁾ and Satoshi Ogino⁽²⁾,
⁽¹⁾Tokyo City University, Japan, ⁽²⁾Microwave Absorbers Inc., Japan
- 119: **Transmission Characteristics of RFID Antennas in a Closed Space**
#Luong Anh Tuan⁽¹⁾, Naobumi Michishita⁽¹⁾, Hisashi Morishita⁽¹⁾ and Takayuki Koshi⁽²⁾, ⁽¹⁾National Defense Academy, Japan, ⁽²⁾Komatsu Ltd., Japan

October 27 (Thu)

POS2: Poster Session II

14:00 - 15:40 (Exhibition Hall)

- 120: **Design of the High-sensitivity RFID Sensor Tag with MOEA/D-DE**
#Xiaotian Song⁽¹⁾, Gang Wang^(1,2) and Yuxing He⁽¹⁾, ⁽¹⁾University of Science and Technology of China, China, ⁽²⁾Chinese Academy of Sciences, China
- 121: **Development of Nearby Tags Detection Unit with UHF-RFID Technology**
#Kiyosuke Mayama and Yoshinobu Okano, Tokyo City University, Japan

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October 28 (Fri)

4A1: Recent Advances in Antennas and Propagation in ASEAN countries I 9:00 - 10:40 (Room A)

Co-Chairs: Jiro Hirokawa (Tokyo Institute of Technology, Japan)
Mohamad Kamal A. Rahim (Universiti Teknologi Malaysia, Malaysia)

- 1: 9:00 **Invited: Phased Array of Switched Beam Elements and Application**
Chainarong Kittiyanyunya and #Monai Krairiksh, *King Mongkut's Institute of Technology Ladkrabang, Thailand*
- 2: 9:40 **Design of Beam Steering Antenna for Localization Applications**
#Thi Duyen Bui^(1,2), Van Duc Ngo⁽¹⁾, Ba Hieu Nguyen⁽¹⁾, Quoc Cuong NGUYEN⁽¹⁾ and Minh Thuy LE⁽¹⁾, ⁽¹⁾*Hanoi University of Science and Technology, Viet Nam*, ⁽²⁾*Electric Power University, Viet Nam*
- 3: 10:00 **A Tri-band Slot Antenna using Capacitive CPW and Meander Line Stub Technique**
Pongsathorn Chomtung, Suwaluck Meesonmkin and #Prayoot Akkaraekthalin, *King Mongkut's University of Technology North Bangkok, Thailand*
- 4: 10:20 **Dual Band Electromagnetic Band Gap Structure with Wideband Antenna**
Muhammad Abdul Hamid, Mohamad Kamal A Rahim and Umar Mussa, *Universiti Teknologi Malaysia, Malaysia*

4A2: Recent Advances in Antennas and Propagation in ASEAN countries II 11:00 - 12:40 (Room A)

Co-Chairs: Monai Krairiksh (King Mongkut's Institute of Technology Ladkrabang, Thailand)
Minh-Thuy Le (Hanoi University of Science and Technology, Viet Nam)

- 1: 11:00 **Design of Circularly Polarized Unidirectional Antenna using Probe-Excited Circular Ring Antenna above the Square Reflector with Inserted Metallic Slabs**
Chuwong Phongcharoenpanich⁽¹⁾, #Kittima Lertsakwimarn⁽²⁾, Rungsinee Sukkamat⁽¹⁾, Nattaset Mhudtongon⁽¹⁾, Sompol Kosulvit⁽¹⁾ and Prayoot Akkaraekthalin⁽³⁾, ⁽¹⁾*King Mongkut's Institute of Technology Ladkrabang, Thailand*, ⁽²⁾*Rambhai Barni Rajabhat University, Thailand*, ⁽³⁾*King Mongkut's University of Technology North Bangkok, Thailand*
- 2: 11:20 **Circular Polarized Textile Antenna at 2.4 GHz**
Umar Mussa, #Mohamad kamal A Rahim and Muhammad Abdul Hamid, *Universiti Teknologi Malaysia, Malaysia*
- 3: 11:40 **Stretching Method Using Chebyshev Polynomial for Linear Sparse Array Antenna Design**
Efri Sandi, Fitri Yuli Zulkifli, Basari and #Eko Tjipto Rahardjo, *Universitas Indonesia, Indonesia*
- 4: 12:00 **A Dipole Antenna using Sierpinski Carpet Fractal Technique for RF Altimeter System.**
Jirada Thongbai⁽¹⁾, Apirada Namsang⁽¹⁾ and #Pongsathorn Chomtung⁽²⁾, ⁽¹⁾*Civil Aviation Training Center, Thailand*, ⁽²⁾*King Mongkut's University of North Bangkok, Thailand*
- 5: 12:20 **Development of Automatic G/T Measurement Program for THAICHOTE Ground Station**
#Likhit Waranon⁽¹⁾, Pawut Karnngandee⁽²⁾ and Rapiat Ritronnasak⁽¹⁾, ⁽¹⁾*Geo-Informatics and Space Technology Development Agency (GISTDA), Thailand*, ⁽²⁾*Sripatum University, Thailand*

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4A3: Small Antennas 14:00 - 15:40 (Room A)

Co-Chairs: Hisashi Morishita (National Defense Academy, Japan)
Qing-Xin Chu (South China University of Technology, China)

- 1: 14:00 **Invited: Analysis of Low Loss Magneto-Dielectric Antenna for the Mobile Communication**
#Seong-Ook Park, Tae-Wan Kim and Byeong-Yong Park, *KAIST, Korea*
- 2: 14:40 **Evaluation of Bandwidth for Tunable Antennas with Physical Limitations on Small Antennas**
#Seiya Kishimoto and Makoto Higaki, *Toshiba Corporation, Japan*
- 3: 15:00 **An Efficient Design Method of a Folded Inverted-L Antenna Including a Matching Circuit**
#Takashi Yamagajo, Yohei Koga and Manabu Kai, *Fujitsu Laboratories Limited, Japan*
- 4: 15:20 **A Compact Dual-Band Circularly Polarized Spiral Antenna**
#Mayumi Matsunaga, *Ehime University, Japan*

4B1: Wearable Device Networks 9:00 - 10:40 (Room B)

Co-Chairs: Masaharu Takahashi (Chiba University, Japan)
Jaehoon Choi (Hanyang University, Korea)

- 1: 9:00 **Curved Dual Band Film Antenna of Smart Watch for Cellular Communications**
#Yuki Tasaka and Hisao Iwasaki, *Shibaura Institute of Technology, Japan*
- 2: 9:20 **Design of an All-textile Antenna Integrated in Military Beret for GPS/RFID Applications**
#Heejae Lee, Jinpil Tak, Youngtaek Hong and Jaehoon Choi, *Hanyang University, Korea*
- 3: 9:40 **Dual Band Magnetic Textile Antenna for Body Area Network Application**
Basari, Abdurrahman Wahid, Fitri Yuli Zulkifli and Eko Tjipto Rahardjo, *Universitas Indonesia, Indonesia*
- 4: 10:00 **Textile Antenna for Biological Information Monitoring**
#Yuta Nakatani and Masaharu Takahashi, *Chiba University, Japan*
- 5: 10:20 **Dynamic Characteristics of Intrabody Communication Channels**
#Nozomi Haga, Yusaku Kasahara and Kuniyuki Motojima, *Gunma University, Japan*

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4B2: Human Body Interactions and Sensors 11:00 - 12:40 (Room B)

Co-Chairs: Takashi Hikage (Hokkaido University, Japan)
Basari (Universitas Indonesia, Indonesia)

- 1: 11:00 **Experimental Study of Transmission Factor Through Conducting Human Body Equivalent Liquid**
#Hiroyasu Sato, Yang Li and Qiang Chen, *Tohoku University, Japan*
 - 2: 11:20 **FDTD Analysis of Capsule Dipole Antenna In Digestive System of Human Body**
#Yang Li, Hiroyasu Sato and Qiang Chen, *Tohoku University, Japan*
 - 3: 11:40 **Compact 24-GHz Doppler Radar Module for Non-Contact Human Vital-Sign Detection**
Tzu-Wei Hsu and #Chao-Hsiung Tseng, *National Taiwan University of Science and Technology, Taiwan*
 - 4: 12:00 **RF Stretchable Sensor Using Flexible Substrate and Eutectic Gallium-Indium**
#Seung-Hyun Eom and Sungjoon Lim, *Chung-Ang University, Korea*
- 12:20 Break Time

4B3: RFID Antennas and Systems 14:00 - 15:40 (Room B)

Co-Chairs: Hisao Iwasaki (Shibaura Institute of Technology, Japan)
Ikmo Park (Ajou University, Korea)

- 1: 14:00 **Closely Located RFID Tag Antennas on High Dielectric Objects**
Kuan-hua Chen, #Qiang Chen and Kunio Sawaya, *Tohoku University, Japan*
- 2: 14:20 **Dual-Loop NFC Chip Antenna Based on Z-Shaped Coil**
#Anping Zhao, Fuqiang Ai and Yu Xu, *Shenzhen Sunway Communication, China*
- 3: 14:40 **RFID Based Solution for the Sensing of Home Electrical Devices Activity**
#Ali Louzir, Rupesh Kumar and Jean-Yves Le Naour, *Technicolor, France*
- 4: 15:00 **Dual-band Chipless RFID Sensor for A Material Quality Monitoring Application**
#Rattapong Suwalak⁽¹⁾, Kittima Lertsakwimarn⁽²⁾, Chuwong Phongcharoenpanich⁽¹⁾ and Danai Torrungrueng⁽³⁾, ⁽¹⁾*King Mongkut's Institute of Technology Ladkrabang, Thailand*, ⁽²⁾*Rambhai Barni Rajabhat University, Thailand*, ⁽³⁾*Asian University, Thailand*
- 5: 15:20 **On the Decoding of Equiprobable UWB Chipless RFID Tags Using a Minimum Distance Detector**
#Marvin Barahona, Diego Betancourt and Frank Ellinger, *Technische Universität Dresden, Germany*

October 28 (Fri)

4C1: Sparsity-aware Array Antenna Technologies 9:00 - 10:40 (Room C)

Co-Chairs: Wen-Qin Wang (University of Electronic Science and Technology of China, China)
Koichi Ichige (Yokohama National University, Japan)

- 1: 9:00 **Suppression of Scattering Waves from the Outside of a Search Area Using a Gating Technique in Compressed Sensing Based Scatterer Detection**
#Daisuke Abe, Yasutaka Ogawa, Toshihiko Nishimura and Takeo Ohgane, *Hokkaido University, Japan*
- 2: 9:20 **Study on Digital Beamforming for Spaceborne SAR Based on Sparse DOA Estimation**
#Taoli Yang⁽¹⁾ and Yong Wang^(1,2), ⁽¹⁾*University of Electronic Science and Technology of China, China*, ⁽²⁾*East Carolina University, United States*
- 3: 9:40 **Underdetermined DOA Estimation for Uniform Circular Array Based on Sparse Signal Reconstruction**
#Thomas Basikolo, Koichi Ichige and Hiroyuki Arai, *Yokohama National University, Japan*
- 4: 10:00 **2-D DOA Estimation of Multiple Signals Based on Sparse L-shaped Array**
#Zhi Zheng, Yuxuan Yang, Wen-qin Wang, Jiao Yang and Yan Ge, *University of Electronic Science and Technology of China, China*
- 5: 10:20 **On Direction-of-Arrival Estimation with Khatri-Rao Transform Virtual-Array by Using Sparse Signal Reconstruction**
#Suguru Ohashi, Hiroyoshi Yamada and Yoshio Yamaguchi, *Niigata University, Japan*

4C2: DOA Estimation I 11:00 - 12:40 (Room C)

Co-Chairs: Hiroyoshi Yamada (Niigata University, Japan)
Taoli Yang (University of Electronic Science and Technology of China, China)

- 1: 11:00 **Direction-of-Arrival Estimation with Lüneburg Lens and Metamaterial Absorber**
#Aya Ohmae^(1,2), Wen Li⁽¹⁾, Isao Hoda⁽¹⁾, Takashi Suga⁽¹⁾ and Satoshi Yagitani⁽²⁾, ⁽¹⁾*Hitachi Ltd., Japan*, ⁽²⁾*Kanazawa University, Japan*
- 2: 11:20 **Simultaneous Estimation of Azimuth DOA and Angular Spread of Incident Radio Waves by DOA-Matrix Method Using Planar Array**
#Makoto Jomoto, Nobuyoshi Kikuma and Kunio Sakakibara, *Nagoya Institute of Technology, Japan*
- 3: 11:40 **Extension of a Received Signal Estimation Method at a Remote Location to a 3-Dimensional Space**
#Shunsuke Abe, Hisato Iwai and Hideichi Sasaoka, *Doshisha University, Japan*
- 4: 12:00 **Influence of Mutual Coupling between Array Elements in Location Estimation of Radio Sources Using Near-Field DOA-Matrix Method**
#Kensuke Tanaka, Nobuyoshi Kikuma and Kunio Sakakibara, *Nagoya Institute of Technology, Japan*
- 5: 12:20 **Lagrange Multiplier Setting for Lp-CS Based DOA Estimation**
#Takeshi Amishima and Nobuhiro Suzuki, *Mitsubishi Electric Corporation, Japan*

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4C3: DOA Estimation II 14:00 - 15:40 (Room C)

Co-Chairs: Mitoshi Fujimoto (University of Fukui, Japan)
Minseok Kim (Niigata University, Japan)

- 1: 14:00 **DOA Estimation of Desired Signals Using In-Phase Combining of Multiple Cyclic Correlations and Spatial Smoothing Processing**
#Yuta Kamiya, Nobuyoshi Kikuma and Kunio Sakakibara, *Nagoya Institute of Technology, Japan*
- 2: 14:20 **DOA Measurements Using Synthetic Aperture Method in Outdoor Environments**
#Kazuma Tomimoto, Masayuki Miyashita, Hideki Omote and Ryo Yamaguchi, *Softbank Corp., Japan*
- 3: 14:40 **Effect of Redundancy of Element Placement on DOA Estimation with Circular Array**
#Rikako Yamano, Nobuyoshi Kikuma and Kunio Sakakibara, *Nagoya Institute of Technology, Japan*
- 4: 15:00 **Estimation of Received Signals at Arbitrary Remote Locations based on Estimation of Arriving Waves by Compressed Sensing**
#Tomoya Sugimoto, Hisato Iwai and Hideichi Sasaoka, *Doshisha University, Japan*
- 5: 15:20 **Target Direction Estimation by MIMO Radar Using Root-MUSIC with Minimum Redundancy Array**
#Masatada Hokiguchi, Nobuyoshi Kikuma and Kunio Sakakibara, *Nagoya Institute of Technology, Japan*

4D1: Millimeter-Wave Antennas and Modules 9:00 - 10:40 (Room D)

Co-Chairs: Noriharu Suematsu (Tohoku University, Japan)
Vladimir Veremey (Qualcomm Inc., United States)

- 1: 9:00 **BGA Organic Module for 60 GHz LOS communications**
Aimeric Bisognin^(1,2), #Diane Titz⁽¹⁾, Frederic Giancesello⁽²⁾, Pierinno Calascibetta⁽²⁾, Jean-Michel Riviere⁽²⁾, Didier Campos⁽²⁾, Daniel Gloria⁽²⁾, Frederic Devillers⁽³⁾ and Cyril Luxey⁽¹⁾, ⁽¹⁾*Université Nice Sophia Antipolis, France*, ⁽²⁾*ST Microelectronics, France*, ⁽³⁾*Orange Labs-CREMAN, France*
- 2: 9:20 **Operational Frequencies of In-Body/Out-Body Dual Use Antenna for Tablet/Pill Implementation**
#Takuto Saito, Mizuki Motoyoshi, Suguru Kameda and Noriharu Suematsu, *Tohoku University, Japan*
- 3: 9:40 **5G Antenna in Inverted Microstrip Gap Waveguide Technology Including a Transition to Microstrip**
Eva Rajo-Iglesias⁽¹⁾ and #Astrid Algaba Brazález⁽²⁾, ⁽¹⁾*University Carlos III, Spain*, ⁽²⁾*Ericsson Research, Sweden*
- 4: 10:00 **UHF-Band Meander Line Antenna and 60-GHz-Band Patch Antenna with Single Feed Structure for 5G Terminal Application**
#Satoshi Yoshida, Keishi Maruyama, Daisuke Matsushita and Kenjiro Nishikawa, *Kagoshima University, Japan*
- 5: 10:20 **Side Coaxial Connector Feed Design for a Millimeter-Wave Patch Antenna Measurement**
#Mizuki Motoyoshi, Wenying Ye, Suguru Kameda and Noriharu Suematsu, *Tohoku University, Japan*

October 28 (Fri)

4D2: Base Station Antennas for Mobile Communications 11:00 - 12:40 (Room D)

Co-Chairs: Ryo Yamaguchi (Softbank Corporation, Japan)
Hao Wang (Nanjing University of Science and Technology, China)

- 1: 11:00 **Design of a Dual-Band MIMO Antenna with Orthogonal Bi-directional Radiation Patterns**
#Ho-Yu Lin and Masayuki Nakano, *KDDI R&D Labs Inc., Japan*
- 2: 11:20 **Broadband Dual-Polarized Antenna Array For Base Station Applications**
Wei-Ji Chen⁽¹⁾, #Joseph Poujiong Wang⁽¹⁾, Li-Ruei Kuo⁽²⁾ and Tai-Hung Lin⁽²⁾, ⁽¹⁾*Industrial Technology Research Institute, Taiwan*, ⁽²⁾*Wha Yu Industrial Co. Ltd, Taiwan*
- 3: 11:40 **Design of A Dual-Band Verre de Champagne Fractal CPW Antenna for LTE and Aircraft Altimeter Application**
#Tanupat Phasithjirakul⁽¹⁾, Teerapat Wannasirimongkol⁽¹⁾, Apirada Namsang⁽¹⁾, Reungyot Lerdwanittip⁽¹⁾ and Pongsathorn Chomthong⁽²⁾, ⁽¹⁾*Civil Aviation Training Center, Thailand*, ⁽²⁾*King Mongkut's University of Technology North Bangkok, Thailand*
- 4: 12:00 **Radiation Analysis of Antenna Located on Mobile Phone Cylindrical Tower by Using UTD Method**
#Kittisak Phaebua⁽¹⁾, Titipong Lertwiriayaprapa⁽¹⁾, Rattapong Suwalak⁽²⁾ and Chuwong Phongcharoenpanicha⁽²⁾, ⁽¹⁾*King Mongkut's University of Technology North Bangkok, Thailand*, ⁽²⁾*King Mongkut Institute of Technology Ladkrabang, Thailand*

4D3: Adaptive and Phased Array 14:00 - 15:40 (Room D)

Co-Chairs: Eisuke Nishiyama (Saga University, Japan)
Hervé Legay (Thales Alenia Space, France)

- 1: 14:00 **Incoming Waves Separating Adaptive Array for ISDB-T Mobile Reception**
#Takanobu Tabata^(1,2), Mitoshi Fujimoto⁽²⁾, Satoshi Hori⁽¹⁾, Tomohisa Wada^(3,4) and Hirokazu Asato⁽⁴⁾, ⁽¹⁾*Kojima Industries Corporation, Japan*, ⁽²⁾*University of Fukui, Japan*, ⁽³⁾*University of the Ryukyus, Japan*, ⁽⁴⁾*Magna Design Net, Inc., Japan*
- 2: 14:20 **Compact Phased Array Design with Beamforming Network for 5G MIMO System at 60-GHz**
#Anil Kumar Pandey, *Keysight Technologies, India*
- 3: 14:40 **Feasibility Study on Delay Difference Estimation through Space for Phased Array Antennas**
#Takashi Maruyama⁽¹⁾, Hiroyuki Matsumura⁽²⁾, Satoshi Yamaguchi⁽¹⁾, Masataka Otsuka⁽¹⁾ and Hiroaki Miyashita⁽¹⁾, ⁽¹⁾*Mitsubishi Electric Corporation, Japan*, ⁽²⁾*Mitsubishi Electric Engineering Company Limited, Japan*
- 4: 15:00 **The Planar Array Antenna with Two-Dimensional Radiation Pattern Reconfigurable Elements**
#Takashi Uesaka, Takashi Maruyama, Satoshi Yamaguchi, Naoyuki Yamamoto, Masataka Otsuka and Hiroaki Miyashita, *Mitsubishi Electric Corporation, Japan*
- 5: 15:20 **Beam Switched Antenna Using Inverted F Antenna for Mobile Terminal**
#Shun Yonezawa⁽¹⁾, Rohani Bakar⁽¹⁾, Hiroyuki Arai⁽¹⁾, Amane Miura⁽²⁾ and Hiroyuki Tsuji⁽²⁾, ⁽¹⁾*Yokohama National University, Japan*, ⁽²⁾*NICT, Japan*

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4E1: Antennas for MIMO Applications 9:00 - 10:40 (Room E)

Co-Chairs: RongLin Li (South China University of Technology, China)
Takashi Yanagi (Mitsubishi Electric Corporation, Japan)

- 1: 9:00 **Planar Triple-band MIMO Dipole Antenna for LTE / WLAN Access Points**
Jui-Han Lu, #Yong-Yong Zhang and Ming-Tsung Hung, *National Kaohsiung Marine University, Taiwan*
- 2: 9:20 **MIMO Dipole Antenna with Triple-band Operation for LTE Femtocell Access Points**
Jui-Han Lu, #Chia-Hao Cheng and Ming-Tsung Hung, *National Kaohsiung Marine University, Taiwan*
- 3: 9:40 **A Wideband 4-Port MIMO Antenna Using Leaf-Shaped Notch Antennas**
#Jumpei Motohashi and Manabu Yamamoto, *Hokkaido University, Japan*
- 4: 10:00 **A Dual-Band Star Chain Fractal CPW Antenna for LTE and RF Altimeter Systems**
#Raviroj Somvadee⁽¹⁾, Apirad Namsang⁽¹⁾, Reungyot Lerdwanittip⁽¹⁾ and Pongsatorn Chomtung⁽²⁾, ⁽¹⁾*Civil Aviation Training Center, Thailand*, ⁽²⁾*King Mongkut's University of Technology North Bangkok, Thailand*
- 5: 10:20 **Omnidirectional Dual Polarized Low-profile Antenna for 4G MIMO Indoor Applications**
#Xia Bai, Ming Su, Yuanan Liu and Shulan Li, *Beijing University of Posts and Telecommunications, China*

4E2: Broadband Antennas 11:00 - 12:40 (Room E)

Co-Chairs: Danai Torrungrueng (Asian University, Thailand)
Nobuyasu Takemura (Nippon Institute of Technology, Japan)

- 1: 11:00 **Compact LTE/WWAN Antenna with Reduced Ground Effects for Tablet/Laptop Applications**
#Chow-Yen-Desmond Sim, Zhe-Yu Li and Chih-Yang Chiang, *Feng Chia University, Taiwan*
- 2: 11:20 **Study of Dual Band RFID Near field Antenna for 0.92 GHz/2.45GHz**
#Zijian Xing, Kun Wei, Ling Wang and Jianying Li, *Northwestern Polytechnical University, China*
- 3: 11:40 **Potential Causes of PIM Problems in the LTE Outdoor Base Station Multi-Band Antennas**
Sheng-Ju Chou^(1,3), #Hsi-Tseng Chou⁽²⁾ and Li-Ruei Kuo⁽³⁾, ⁽¹⁾*Yuan Ze University, Taiwan*, ⁽²⁾*National Taiwan University, Taiwan*, ⁽³⁾*Wayu Industrial Corp. Inc., Taiwan*
- 4: 12:00 **A Novel Broadband Rectenna for Energy Harvesting**
#Shenyi Song, Ming Su, Yuanan Liu, Shulan Li and Bihua Tang, *Beijing University of Posts and Telecommunications, China*
- 5: 12:20 **Design and Analysis of Through Dielectric Copper Posts Based 3D Antenna**
#Madhav Rao and Sowmya N, *International Institute of Information Technology Bangalore, India*

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4E3: UWB Antennas 14:00 - 15:40 (Room E)

Co-Chairs: Yasuhiro Nishioka (Mitsubishi Electric Corporation, Japan)
Pornanong Pongpaibool (National Electronics and Computer Technology Center, Thailand)

- 1: 14:00 **A Printed UWB Antenna using Embedded Slits for 3.5/5.5 GHz Band Notching**
#Pichet Moeikham⁽¹⁾, Nonchanutt Chudpooti⁽²⁾ and Prayoot Akkaraekthalin⁽²⁾, ⁽¹⁾*Rajamangala University of Technology Lanna Chiang-Rai, Thailand*, ⁽²⁾*King Mongkuts University of Technology North Bangkok, Thailand*
- 2: 14:20 **A Study on Broadband Slot Antenna Employing a Short Strip.**
#Kenji Matsushita⁽¹⁾, Shingo Tanaka⁽¹⁾, Tatsuo Toba⁽¹⁾, Yuta Nakagawa⁽¹⁾, Kenji Shirasu⁽¹⁾, Naoto Nishiyama⁽²⁾ and Hisashi Morishita⁽²⁾, ⁽¹⁾*Yazaki Corporation, Japan*, ⁽²⁾*National Defence Academy, Japan*
- 3: 14:40 **Ultra Wideband Antenna with Quad Band Rejection Characteristics**
#Asim Qudus⁽¹⁾, Rashid Saleem⁽¹⁾, Sabih ur Rehman⁽²⁾ and M. Farhan Shafique⁽³⁾, ⁽¹⁾*University of Engineering and Technology, Pakistan*, ⁽²⁾*Charles Sturt University, Australia*, ⁽³⁾*COMSATS Institute of Information Technology, Pakistan*
- 4: 15:00 **Cross Bow-Tie Antenna for Multistatic Ground Penetrating Radar**
#Motoyuki Sato and Yasushi Iizuka, *Tohoku University, Japan*
- 5: 15:20 **Ultra Wideband Stacked Z-shaped Dielectric Resonator Antenna**
#Kedar Trivedi and Dhaval Pujara, *Nirma University, India*