

Technical Program

Tuesday July 31, 09:00-12:00 hrs

Room: Venus II/III

09:00–09:20

Opening Ceremony

09:20–10:00

Keynote I Recent Advancements in RFID/NFC/WLAN Antenna Designs and Applications

(Prof. Chow-Yen-Desmond Sim, Feng Chia University, Taiwan)

10:00–10:40

Break

10:40–11:20

Keynote II Urban Mobility Made Easy - Continental's Contribution to the Smart City of the Future

(Mr. Demetrio Aiello, Continental Automotive GmbH, Germany)

11:20–12:00

Distinguished Lecture Advanced Antennas for RFID Tags and Readers

(Prof. Zhi Ning Chen, National University of Singapore, Singapore)

Tuesday, July 31, 13:20-15:20 hrs

Session: S1A

Smart Antenna Systems and Circuits

Chairs: Mei Yang, Nanjing University of Posts and Telecommunications, China; Yu Luo, National University of Singapore, Singapore

Room: Venus II

13:20–13:40

S1A-1 Ultra-Wideband Pulse Radiation Characteristics of the Step Discontinuity in Microstrip Line (Invited)

Mei Yang^{1,2}, Shunli Li², Xiaoxing Yin², Hongxin Zhao², ¹Nanjing University of Posts and Telecommunications, China, ²Southeast University, China

13:40–14:00

S1A-2 Wireless Light Delivery for Photodynamic Therapy (Invited)

John S. Ho, National University of Singapore, Singapore

14:00–14:20

S1A-3 Theoretical Analysis on the Characterization of Imaging Systems Using Euclid Distance (Invited)

Qiuyi Zhang¹, Shunli Li¹, Mei Yang^{1,2}, Xiaoxing Yin¹, Hongxin Zhao¹, ¹Southeast University, China, ²Nanjing University of Posts and Telecommunications, China

14:20–14:40

S1A-4 Wideband Differentially-Fed Substrate Integrated Waveguide (SIW) Back Cavity Antenna

Teng Li, Zhi Ning Chen, National University of Singapore, Singapore

14:40–15:00

S1A-5 Millimeter Wave Planar Full-range Switched Beam Grid Array Antenna and its Smart Car Radar Applications

Mei Sun¹, Xianming Qing¹, Nasimuddin¹, Xiaoming Peng¹, Zhi Ning Chen², ¹Institute for Infocomm Research, Singapore, ²National University of Singapore, Singapore

15:00–15:20

S1A-6 A Scanning Angle Range Enhanced Phased Array Antenna Using Concave-Convex Lens

Yu Luo, Zhi Ning Chen, National University of Singapore, Singapore

Tuesday July 31, 13:20-15:20 hrs

Session: S1B

Student Paper Contest I

Chair: Kam-Weng Tam, University of Macau, China

Room: Venus III

13:20–13:40

S1B-1 Video Analytics for Indoor Crowd Estimation

Ryan Tan¹, Indriyati Atmosukarto², Wee Han Lim², ¹University of Glasgow, Singapore, ²Singapore Institute of Technology, Singapore

13:40–14:00

S1B-2 Faster Number Theoretic Transform on Graphics Processors for Ring Learning with Errors Based Cryptography

Ahmad Al Badawi¹, Bharadwaj Veeravalli¹, Khin Mi Mi Aung², ¹National University of Singapore, Singapore, ²Data Storage Institute, Singapore

14:00–14:20

S1B-3 Blockchain-Base Structures for a Secure and Operate Network of Semi-Autonomous Unmanned Aerial Vehicles

Alexander Kuzmin¹, Evgeny Znak², ¹ITMO University, Russia, ²Mikhailovskaya Academy, Russia

14:20–14:40

S1B-4 High-Isolated Coplanar-Fed Circularly Polarized 2×2 Curl Antenna for MIMO Applications

Yuanyan Su, Zhi Ning Chen, National University of Singapore, Singapore

14:40–15:00

S1B-5 Automated Multi-Plant Scheduling of Ready-Mixed Concrete Trucks

Biman D. Hettiarachchi, H.M.N. Dilum Bandara, Nishal A. Samarasekera, University of Moratuwa, Sri Lanka

15:00–15:20

S1B-6 An Advanced Firewall Rule Matching Algorithm

Elvira Febiani¹, Huaqun Guo², Wang Ling Goh¹, ¹Nanyang Technological University, Singapore, ²Institute for Infocomm Research, Singapore

Tuesday, July 31, 16:00-17:40 hrs

Session: S2A

Communication and Sensing Networks for Smart City

Chairs: Francois Chin, Institute for Infocomm Research, Singapore;
Terry Tao Ye, Southern University of Science and Technology, China

Room: Venus II

16:00–16:20

S2A-1 Cross-Correlation Based Efficient Technique for Vehicle Occupancy Detection Using Magnetoresistive Sensors

Tengku Khalaf¹, Woei Seng How¹, Neelakantam Venkatarayalu¹, Khiam Beng Ow², ¹Singapore Institute of Technology, Singapore, ²Kenetics Innovations Pte., Ltd., Singapore, Singapore

16:20–16:40

S2A-2 Analysis of Pure Collective Aloha MAC Protocol with Multilevel Powers

David Tung Chong Wong, Qian Chen, Xiaoming Peng, Francois Chin, Institute for Infocomm Research, Singapore

16:40–17:00

S2A-3 An Automatic Survey System for Paved and Unpaved Road Classification and Road Anomaly Detection using Smartphone Sensor

Frederico Soares Cabral¹, Mateus Pinto², Fernao A. L. N. Mouzinho², Hidekazu Fukai¹, Satoshi Tamura¹, ¹Gifu University, Japan, ²National University of Timor Lorosae, Timor-Leste

17:00–17:20

S2A-4 G/T Study for Conformal Antenna Array

Yijun Zhou, Xianming Qing, Nasimuddin, Terence Shie Ping See, Chan Kuen Sim, Yunjia Zeng, Institute for Infocomm Research, Singapore

17:20–17:40

S2A-5 Satellite Spot Beam and Decollision Algorithm for Pure Collective Aloha MAC Protocol

David Tung Chong Wong, Qian Chen, Xiaoming Peng, Francois Chin, Institute for Infocomm Research, Singapore

Tuesday, July 31, 16:00-17:40 hrs

Session: S2B

Student Paper Contest II

Chair: Justin Dauwels, Nanyang Technological University, Singapore

Room: Venus III

16:00–16:20

S2B-1 The Study for Refurbishing Process of Packaging Material in E-Commerce Logistics

Hsin Chen, Su-Chuan Liu, Teng-Sheng Su, Chaoyang University of Technology, Taiwan

16:20–16:40

S2B-2 Sustainable Value Stream Mapping and Technologies of Industry 4.0 in Manufacturing Process Re-configuration: A Case Study in an Apparel Company

Ngo Anh Phuong¹, Thomas Guidat², ¹Vietnamese German University, Vietnam, ²Technical University of Berlin, Germany

16:40–17:00

S2B-3 Optimization of Truck and Driver Scheduling Using Simulated Annealing

N.A.C.M. Keerthisinghe, H.M.N.D Bandara, N.A. Samarasekera, University of Moratuwa, Sri Lanka

17:00–17:20

S2B-4 Ranking of Influential Users Based on User-Tweet Bipartite Graph

Radia El Bacha, Thi Thi Zin, University of Miyazaki, Japan

17:20–17:40

S2B-5 UN SDGs Shaping Sustainable Supply Chains: The Case of Apparel Manufacturers in Developing Countries

Jayani Ishara Sudusinghe, R Pradeepa Jayaratne, Amal S Kumara, University of Moratuwa, Sri Lanka

Wednesday, August 1, 09:00-12:00 hrs

Room: Venus II/III

09:00–09:40

Keynote III Micro-Antennas for Ubiquitous IOT Devices
(Prof. Terry Ye, Southern University of Science and Technology, China)

09:40–10:00

Industry Talk Smart Solutions Beyond Rubber for Smart Cities
(Mr. Christoph A. Seeger, Continental ContiTech, Germany)

10:00–10:40

Break

10:40–11:20

Keynote IV Cognitive Industrial Internet of Things and 5G MTC's Role
(Dr. Sumei Sun, Institute for Infocomm Research, Singapore)

11:20–12:00

Keynote V Smart Services and Their Implementation Using Compact UHF
RFID Reader
(Prof. Kam-Weng Tam, University of Macau, China)

Wednesday, August 1, 13:20-15:20 hrs

Session: S3A

RFID Technology and Applications

Chairs: Pui Yi Lau, Laxcen Technology Limited, China;
Hua Zhu, University of Posts and Telecommunications, China

Room: Venus II

13:20–13:40

S3A-1 Beam Scanning UHF RFID Reader Antenna Design for Metal Environment Application (Invited)

Xiuping Li, Hua Zhu, Quanping Li, Weiwei Feng, Beijing University of Posts and Telecommunications, China

13:40–14:00

S3A-2 Understanding the Sensitivity of UHF RFID Readers (Invited)

Debangana Mukherjee, CISC Semiconductor Corp., USA

14:00–14:20

S3A-3 Sensor Data Collection Using RFID Technologies (Invited)

Frank Deicke¹, Donald E. Ray², ¹Fraunhofer Institute for Phontonic Microsystems, Germany, ²Don Ray Consulting RFID, USA

14:20–14:40

S3A-4 Design and Fabrication of Embroidered RFID Antenna for Wearable Applications (Invited)

Lulu Xu¹, Yulong Liu², Yi Li¹, Pui Yi Lau³, Haitao Si^{3,4}, Terry Tao Ye², ¹University of Manchester, United Kingdom, ²Southern University of Science and Technology, China, ³Zhejiang Laxcen Info-Tech Inc., Ltd, China, ⁴City University of Hong Kong, China

14:40–15:00

S3A-5 An Inductive Perforated Ground Backed Thin Electrically Large Zero-Phase-Shift Line Loop Antenna for UHF Near-Field RFID Reader

Wei Liu¹, Zhi Ning Chen¹, Edna Ng Kai Yin¹, Yunjia Zeng², Xianming Qing², ¹National University of Singapore, Singapore, ²Institute for Infocomm Research, Singapore

15:00–15:20

S3A-6 Wideband Circularly Polarized UHF RFID Reader Antenna

Nasimuddin, Xianming Qing, Institute for Infocomm Research, Singapore

Wednesday, August 1, 13:20-15:20 hrs

Session: S3B

Smart Scheduling, Planning and Knowledge Management

Chairs: Renuga Kanagavelu, Institute for High Performance Computing,
Singapore;

Joseph Liu, Monash University, Australia

Room: Venus III

13:20–13:40

S3B-1 A Solution for Internet of Things Based on Blockchain Technology
(Invited)

Bing Mo^{1,2,3}, Kuiren Su^{1,3}, Songjie Wei^{2,3}, Cai Liu³, Jianping Guo^{1,3}, ¹Sun Yat-sen University, China, ²Nanjing University of Science & Technology, China, ³Silictec Co. Ltd., China

13:40–14:00

S3B-2 TOSS: Traffic-Aware Distributed Object-Based Storage Using
Software-Defined Networks

Renuga Kanagavelu, Zhu Yongqing, Khin Mi Mi Aung, Institute for High Performance Computing,
Singapore

14:00–14:20

S3B-3 Inter-organizational Knowledge Flow and R&D Portfolio of Patent
Citation Network - The Case of the Socket Wrench Industry

Hwa-Nan Chang¹, Su-Chuan Liu¹, Charlie Zhen-Wei Chiang², Kei-Kei Lai¹, Chin-Lung
Tsai¹, ¹Chaoyang University of Technology, Taiwan, ²Economic Development Bureau Taichung
City Government, Taiwan

14:20–14:40

S3B-4 NFC-Based Smart Notification System for Hospital Discharge Process
and Bed Management

Wei Jie Phua¹, Malcolm Yoke Hean Low², Neelakantam Venkatarayalu², Jared Koh³, ¹University
of Glasgow, Singapore, ²Singapore Institute of Technology, Singapore, ³Mount Alvernia Hospital,
Singapore

14:40–15:00

S3B-5 Real-Time Electric Vehicle Load Forecast to Meet Timely Energy
Dispatch

Thomas Ho Chee Tat¹, Pasi Fränti², ¹Institute for Infocomm Research, Singapore, ²University of
Eastern Finland, Finland

15:00–15:20

S3B-6 A Flexible Printed Sensor Tag for Cold-Chain Applications

Pui Yi Lau¹, Terry Tao Ye², Haitao Si^{1,3}, ¹Zhejiang Laxcen Info-Tech Inc. Ltd, China, ²Southern
University of Science and Technology, China, ³City University of Hong Kong, China

Wednesday, August 1, 16:00-17:20 hrs

Session: S4A

Intelligent Transportation Systems

Chairs: Ta-Yin Hu, National Cheng Kung University, Taiwan;
Indriyati Atmosukarto, Singapore Institute of Technology, Singapore

Room: Venus II

16:00–16:20

S4A-1 Automatic Conversion of Road Networks from OpenDRIVE to Lanelets
Matthias Althoff, Stefan Urban, Markus Koschi, Technical University of Munich, Germany

16:20–16:40

S4A-2 An ϵ -Constraint Multi-Objective Algorithm for Transit Route Design with Subsidy Consideration
Ta-Yin Hu¹, Le-Chi Shih¹, Tsai-Yun Liao², ¹National Cheng Kung University, Taiwan, ²National Chiayi University, Taiwan

16:40–17:00

S4A-3 Integrated Systems Analysis Software for Interdependency Analysis of Railway Systems
Muhd Sharil Reiza Ismail¹, Andrew Keong Ng², Sin Hin Oh¹, Chuan Heng Tan¹, ¹Land Transport Authority, Singapore, ²Singapore Institute of Technology, Singapore

17:00–17:20

S4A-4 A Routing Model for Emergency Vehicles Using the Real Time Traffic Data
Nikki Rathore, Pramod Kumar Jain, Manoranjan Parida, Indian Institute of Technology Roorkee, India

Wednesday, August 1, 16:00-17:40 hrs

Session: S4B

Supply Chain Management

Chairs: Frank Y. Chen, City University of Hong Kong, China;
Su-Chuan Liu, Chaoyang University of Technology, Taiwan

Room: Venus III

16:00–16:20

S4B-1 Heuristics and Bounds for an Inventory System with an All-or-Nothing Yield Pattern and Lead-Times

Frank Y. Chen¹, Candace Arai Yano², Quan Yuan³, Fei Hu¹, ¹City University of Hong Kong, China, ²University of California at Berkeley, USA, ³Zhejiang University, China

16:20–16:40

S4B-2 Distribution Center Location Decision Model for Ship Maintenance Supply Chain

Oalumali H. Sirisena, Nishal A. Samarasekera, University of Moratuwa, Sri Lanka

16:40–17:00

S4B-3 Analysis of Key Dimension and Sub-Dimension Framework for Supply Chain of Food Industry to Fourth Industrial Performance Measurement

Banthita Methavitakul, Salinee Santiteerakul, Chiang Mai University, Thailand

17:00–17:20

S4B-4 Effect of Governance and Policy on the Management of a Sustainable Agri-Supply Supply Network: An Example from the Sri Lankan Tea Industry

Pradeepa Jayaratne, University of Moratuwa, Sri Lanka

17:20–17:40

S4B-5 Economic Impacts of Applying Green Supply Chain Management Practices in Organizations in Sri Lanka

G.A.D.T. Lakmali, Pradeepa Jayaratne, University of Moratuwa, Sri Lanka

Thursday, August 2, 09:00-10:20 hrs

Session: S5A

Cyber Security and Data Privacy

Chairs: Luying Zhou, Institute for Infocomm Research, Singapore;
Huaqun Guo, Institute for Infocomm Research, Singapore

Room: Venus II

09:00–09:20

S5A-1 Privacy-Preserving Techniques to Blockchain: The Ring Signature Approach (Invited)

Joseph Liu, Monash University, Australia

09:20–09:40

S5A-2 Anomaly Detection Methods for IIoT Networks

Luying Zhou, Huaqun Guo, Institute for Infocomm Research, Singapore

09:40–10:00

S5A-3 Predicting Vulnerability Discovery Rate Using Past Versions of a Software

Fok Kar Wai, Lim Wee Yong, Dinil Mon Divakaran, Vrizlynn L. L. Thing, Institute for Infocomm Research, Singapore

10:00–10:20

S5A-4 Method for Enforcing Access Control Policies on NCMS

Zhigang Zhao, Huaqun Guo, Institute for Infocomm Research, Singapore

Thursday, August 2, 09:00-10:40 hrs

Session: S5B

Sustainable Logistics

Chairs: Yaqiong Lv, Wuhan University of Technology, China;
Wolfgang Echelmeyer, Hochschule Reutlingen, Holland

Room: Venus III

09:00–09:20

S5B-1 An Overview of Warehousing Applications Based on Cable Robot Technology in Logistics

Cyril Alias, Eduardo Garduño Correa Magallanes, Iliia Nikolaev, Bernd Noche, University of Duisburg-Essen, Germany

09:20–09:40

S5B-2 IoT based Omni-Channel Logistics Service in Industry 4.0

Yaqiong Lv^{1,2}, Lei Tu³, C.K.M. Lee⁴, Xin Tang¹, ¹Wuhan University of Technology, China, ²Research Center for China Disability Research, China, ³Nanyang Technological University, Singapore, ⁴The Hong Kong Polytechnic University, China

09:40–10:00

S5B-3 Fleet-Sizing of Multi-Load Autonomous Robots for Material Supply

Augusto Urru, Marco Bonini, Wolfgang Echelmeyer, Reutlingen University, Germany

10:00–10:20

S5B-4 Automated Guided Vehicle: The Direction of Intelligent Logistics

Shihua Li¹, Jing Yan², Lingxi Li³, ¹Wuhan Textile University, China, ²Wuhan University of Technology, China, ³Indiana University-Purdue, USA

10:20–10:40

S5B-5 Ensuring Performance Measurement Integrity in Logistics Using Blockchain

Kristjan Kuhi, Kati Kaare, Ott Koppel, Tallinn University of Technology, Estonia

Thursday, August 2, 11:20-12:40 hrs

Session: S6A

Big Data Analytics for Smart City

Chairs: Ho Song Guang, Nanyang Technological University, Singapore;
Rahul Singh, Continental Automotive Singapore Pte Ltd, Singapore

Room: Venus II

11:20–11:40

S6A-1 Anonymization and Analysis of Horizontally and Vertically Divided User Profile Databases with Multiple Sensitive Attributes

Yuki Ina, Yuichi Sei, Yasuyuki Tahara, Akihiko Ohsuga, University of Electro-Communications, Japan

11:40–12:00

S6A-2 Multi-Atomic Annealing Heuristic for the Dial-A-Ride Problem

Song Guang Ho, Ramesh Ramasamy Pandi, Sarat Chandra Nagavarapu, Justin Dauwels, Nanyang Technological University, Singapore

12:00–12:20

S6A-3 Unstructured Big Data Analytics for Air Cargo Logistics Management

Pei-Ju Wu, Chun-Kai Yang, Feng Chia University, Taiwan

12:20–12:40

S6A-4 A Deep Learning-Based Approach for Road Pothole Detection in Timor Leste

Vosco Pereira, Satoshi Tamura, Satoru Hayamizu, Hidekazu Fukai, Gifu University, Japan

Thursday, August 2, 11:20-12:40 hrs

Session: S6B

Service Design, Engineering, Operations and Innovations

Chairs: Neelakantam Venkatarayalu, Singapore Institute of Technology,
Singapore;

Nasimuddin, Institute for Infocomm Research, Singapore

Room: Venus III

11:20–11:40

S6B-1 A Blockchain Aided Metric for Predictive Delivery Performance in Supply Chain Management

Mark H. Meng¹, Yaou Qian², ¹National University of Singapore, Singapore, ²Monash University, Australia

11:40–12:00

S6B-2 Servitization as a Key Driver for Digital Transformation of Manufacturing Companies' Spare Parts Service

Uwe Dombrowski, Simon Fochler, Technische Universität Braunschweig, Germany

12:00–12:20

S6B-3 Real-time Pallet Localization with 3D Camera Technology for Forklifts in Logistic Environments

Benjamin Molter, Johannes Fottner, Technical University of Munich, Germany

12:20–12:40

S6B-4 Enhancement of the Demand Planning Accuracy in the Retail Industry in Sri Lanka

S P. T. Amarathe¹, Kaushalya Herath^{1,2}, ¹University of Moratuwa, Sri Lanka, ²Ball State University, USA