

2021 IEEE International Conference on RFID Technology and Applications (RFID-TA 2021)

**Delhi, India
6 – 8 October 2021**



**IEEE Catalog Number: CFP21RFT-POD
ISBN: 978-1-6654-2658-9**

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IEEE Catalog Number:	CFP21RFT-POD
ISBN (Print-On-Demand):	978-1-6654-2658-9
ISBN (Online):	978-1-6654-2657-2

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Wednesday, October 6

Wednesday, October 6 12:30 - 14:00

IEEE RFID-TA 2021 Challenge [zoom](#)

Chair: Malay Ranjan Tripathy (Room No. 214 (A) E-1 Block, India & Amity University
Uttar Pradesh, unknown)

Panel Discussion with Indian Companies [zoom](#)

Chair: Lt. Gen. Anil Kapoor Professor and HOI, AIDT, Amity University, Noida, India

1. "Session introduction" - Lt. Gen. Anil Kapoor Professor and HOI, AIDT, Amity University, Noida, India
2. "Introduction of the AIDC Technologies Association of INDIA and RFID" - Mr. A.S. Shekhawat, Past President, AIDC Technologies Association of India
3. "Use of RFID in the Retail sector" - Mr. Nainan M. Kurian, Technowave ID systems
4. "Truck Traceability" - Mr. Samir Vora, Qodenext
5. "KIA MOTORS Automobile service" - Sreenesh Shenoy, Stallion One Byte
6. "RFID in the warehouse" - Mr. Sanjive Meheta, RS Barcoders

Wednesday, October 6 14:00 - 14:30

Break

Wednesday, October 6 14:30 - 16:00

Opening Ceremony [zoom](#)

Chairs: Alice Buffi (University of Pisa, Italy), Malay Ranjan Tripathy (Room No. 214 (A)
E-1 Block, India & Amity University Uttar Pradesh, unknown)

- Prof. Malay Tripathy, eneral Chair, IEEE RFID TA 2021
- Prof. Nazanin Bassiri-Gharb, President, IEEE CRFID
- Dr. K.R.Suresh Nair, Chair, IEEE India Council
- Prof. Rachna Garg, Chair, IEEE Delhi Section
- Dr. Klaus Krohne, SIMULIA APAC Sales Director, Dassualt Systemes (Gold Sponsor)

- Prof. Shahriar Mirabbasi, VP of Publications, IEEE CRFID
- Prof. Alice Buffi, TPC Chair, IEEE RFID TA 2021
- Dr. Kamlesh Patel, Secretary, IEEE Jt. Chapter APS and CRFID, Delhi

Wednesday, October 6 16:00 - 17:00

Gold Sponsor Talk [zoom](#)

Chair: Malay Ranjan Tripathy (Amity University, India)

Electromagnetic Performance and Safety Analysis of RFID Antennas

Dr. Kranti Tantwai, SIMULIA Industry Process Consultant Specialist, Dassault Systemes

- Short Biography: Kranti TANTWAI is presently working as an EMAG Industry Process Consultant in Dassault Systèmes India. He has more than 15 years of work experience in the field of Electromagnetics and circuit simulation. Currently, he is handling EMAG technical sales, support, and training activities in India. Previously, Kranti has worked in the Automotive and Semiconductor Industry. He has authored many technical papers in international conferences and holds a US Patent for the Design of Multilayer RF Filter and Balun. Kranti carries a Master of Electrical Engineering from the University of Notre Dame, Indiana, the USA, and B.Tech from Indian Institute of Technology - Bombay.*

S6.1: WOMEN Engineers in RFID [zoom](#)

Chairs: Smriti Agarwal (Motilal Nehru National Institute of Technology Allahabad (MNNITA), India), Pui Yi Lau (Laxcen Technology Limited, Singapore), Cecilia Occhiuzzi (University of Roma Tor Vergata, Italy)

Readout portable system for wireless chipless biosensing

Victor Toral (University of Granada, Spain); Jose F Salmeron (Technical University Munich, Germany); Diego P Morales, Noel Rodríguez, Encarnación Castillo and Almudena Rivadeneyra (University of Granada, Spain)

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An RFID-Based BCI System for Emotion Detection Using EEG patterns

Anju Mishra and Archana Singh (Amity University, India); Amit Ujlayan (Gautam Buddha University, India)

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A Flower shaped Printed wideband monopole antenna for RFID applications

Ishita Aggarwal (Amity University Uttar Pradesh, India); Malay Ranjan Tripathy (Amity

University, India); Sujata Pandey (AMITY University, Noida, India); Ashok Mittal (Ambedkar Institute of Advanced Communication Technologies and Research, India)
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Passive UHF RFID Yarn For Temperature Sensing Applications

Sofia Benouakta (Université Claude Bernard Lyon 1, France); Florin Hutu (Univ Lyon, INSA Lyon, Inria, CITI, France); Yvan Duroc (University Claude-Bernard Lyon 1, France)
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Wednesday, October 6 17:00 - 17:30

Break

Wednesday, October 6 17:30 - 20:00

MoCap: IEEE Workshop on Motion Capture & Localization [zoom](#)

Chairs: Christian Carlowitz (University of Erlangen-Nuremberg, Germany), Antonis G Dimitriou (Aristotle University of Thessaloniki, Greece)

A Wireless Motion Capture System for Shoulder Rehabilitation based on RFID Passive Tag Antenna Array

Chao yu Jiang, Chon In Wong and Chi Hou Chio (University of Macau, Macao); Kam Weng Tam (University of Macau, China); Wai Wa Choi and Cheng Teng (University of Macau, Macao); Pui Yi Lau (Laxcen Technology Limited, Singapore)
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A SLAM algorithm based on range and bearing estimation of passive UHF-RFID tags

Francesco Martinelli (Università di Roma Tor Vergata, Italy); Fabrizio Romanelli (Università degli Studi di Roma Tor Vergata, Italy)
pp. 20-23

Gradient Iteration Regularization to Solve Radio Tomographic Imaging Model in UHF RFID Scenarios

Bobo Wang, Yongtao Ma and Xiuyan Liang (Tianjin University, China)
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An RFID tracking system for Agricultural Safety

Andrea Motroni, Francesca Rosati, Paolo Nepa and Alice Buffi (University of Pisa, Italy); Marco Pirozzi, Luciano Di Donato, Laura Tomassini and Alessandra Ferraro (INAIL, Italy)
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Localization, Tracking and Following a Moving Target by an RFID Equipped Robot

George Mylonopoulos, Aristidis Raptopoulos Chatzistefanou, Alexandros Filotheou, Anastasios Tzitzis, Stavroula Siachalou and Antonis G Dimitriou (Aristotle University of Thessaloniki, Greece)

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Power and Phase Variation of Backscattered RFID Signal with Respect to the Incident Power at the Tag

Spyros Megalou (Aristotle University of Thessaloniki, Greece); Aggelos Bletsas (Technical University of Crete, Greece); Traianos Yioultsis and Antonis G Dimitriou (Aristotle University of Thessaloniki, Greece)

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Elliptical DoA Estimation & Localization

Konstantinos Skyvalakis, Evangelos Giannelos, Emmanouil Andrianakis and Aggelos Bletsas (Technical University of Crete, Greece)

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RFID-Based Tracking for Worker Safety in Industrial Scenario

Fabio Bernardini, Alice Buffi, Paolo Nepa, Mirko Marracci and Bernardo Tellini (University of Pisa, Italy); Luciano Di Donato, Marco Pirozzi, Laura Tomassini and Alessandra Ferraro (INAIL, Italy)

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A fast phase and RSSI-based localization method using Passive RFID System with Mobile Platform

Zheng Liu, Zhe Fu, Tongyun Li and Ian White (University of Cambridge, United Kingdom (Great Britain)); Richard Penty (Cambridge University, United Kingdom (Great Britain)); Michael J Crisp (University of Cambridge, United Kingdom (Great Britain))

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Orientation-Aware RFID-Based Sensing

Wei Sun (Ohio State University, USA)

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Wednesday, October 6 20:00 - 20:30

Break

Wednesday, October 6 20:30 - 21:30

Keynote Speech "RFID Readers and Tags: When Antennas Matter" [zoom](#)

Prof. Paolo Nepa, University of Pisa, Pisa, Italy

Chairs: Paolo Nepa (University of Pisa, Italy), Malay Ranjan Tripathy (Room No. 214 (A)
E-1 Block, India & Amity University Uttar Pradesh, unknown)

Abstract: In the last decades, many scientific papers and book chapters have been devoted to present different layouts and technologies for RFID antennas, for both tags and readers. Also, plenty of tags with different shape and size can be found in the market, including inlay tags, textile tags and platform-tolerant tags, to mention a few. A large choice of COTS reader antennas is available as well. Then, the arising question is as follows: what is the actual need for novel antennas in current standardized RFID systems? While keeping above question in mind, this talk starts with a synthetic overview of the requirements and design criteria for antennas of RFID tags and readers, as well as of the main challenges that have been faced and solved by antenna designers from both academia and industry. Then, the attention is focused on some specific RFID applications where ad-hoc antennas are mandatory for the exploitation of RFID technology in emergent scenarios. As an example, the talk will address the advantages of near-field focused antennas for warehouse portals, the issues arising when looking for an RFID printer-encoder antenna, the tests on tag antennas that are expected to work properly even when attached on hot items, the design of reader antennas suitable for integration into industrial machines, the arising challenges when trying to shape and bound the electromagnetic field in the reactive near-field region of a reader antenna for item-level RFIDs. Finally, it is also worth mentioning that antennas improving the effectiveness and reliability of RFID systems may provide a key contribution towards the massive application of this automatic identification technology in Industry 4.0 and IoT scenarios.

Short biography: Paolo Nepa received the Laurea (Doctor) degree in electronics engineering from the University of Pisa, Italy, in 1990. Since 1990, he has been with the Department of Information Engineering of the University of Pisa, where he is currently a Full Professor. He co-authored more than 300 international journal papers and international conference contributions. His main research interests are in the design of antennas for wireless communication systems, as well as in the design of antennas optimized for near-field coupling and focusing. In the context of UHF-RFID systems, he is working on techniques for radiolocalization of either tagged objects or readers. He has been a member of the local organizing committee of the 2004 URSI EMTS, Pisa, Italy. He serves as a member of the Technical Advisory Board of URSI Commission B - Fields and Waves. Since 2016, he serves as an Associate Editor for the IEEE Antennas and Wireless Propagation Letter. He has been the General Chair of the international conference IEEE RFID-TA 2019, Pisa, Italy.

Thursday, October 7

Thursday, October 7 12:30 - 14:00

S7.1: Multiband and Wideband Antennas for RFID Applications - Pt 1

[zoom](#)

Chairs: Binod Kanaujia (JNU Delhi, India), Mukesh Kumar Khandelwal (Jawaharlal Nehru University, India)

A High Gain, UWB Vivaldi Antenna Loaded With Unit Cells for Imaging/ RFID Applications

Vibhor Binzlekar and Saurabh Singh (Motilal Nehru National Institute of Technology Allahabad, India); Smriti Agarwal (Motilal Nehru National Institute of Technology Allahabad (MNNITA), India)

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Compact Dual-Band Circularly-Polarized Cross-Dipole Antenna for Portable RFID Readers

Chandni Bajaj (University of Delhi & Faculty of Technology, India); Dharmendra Kumar Upadhyay (Netaji Subhas University of Technology, India); Sachin Kumar (Kyungpook National University, Korea (South)); Binod Kumar Kanaujia (Jawaharlal Nehru University, India)

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Compact Circularly Polarized 2.45/5.8-GHz Antenna for RFID Readers

Chandni Bajaj (University of Delhi & Faculty of Technology, India); Dharmendra Kumar Upadhyay (Netaji Subhas University of Technology, India); Sachin Kumar (Kyungpook National University, Korea (South)); Binod Kumar Kanaujia (Jawaharlal Nehru University, India)

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A Dual band Monopole Antenna For RFID applications

Ishita Aggarwal (Amity University Uttar Pradesh, India); Malay Ranjan Tripathy (Amity University, India); Sujata Pandey (AMITY University, Noida, India); Ashok Mittal (Ambedkar Institute of Advanced Communication Technologies and Research, India)

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Compact Fractal Reader Antenna for RFID Applications

Ravi Kumar Arya (National Institute of Technology Delhi, India); Abhishek Anand (NIT, Delhi, India); Ayush Yadav (National Institute of Technology, Delhi, India);

Akshat Gururani (NIT, Delhi, India); Maxon Okramcha (Amity University, Noida, India); Malay Ranjan Tripathy (Amity University, India)
pp. 71-73

A Compact and Broadband Circularly Polarized Printed Monopole Antenna for UHF RFID

Takafumi Fujimoto, Naoto Otsuka and Chai-Eu Guan (Nagasaki University, Japan)
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S7.2: Backscattering-based communications in the 5G era and beyond: devices, applications, and evidence [zoom](#)

Chairs: Riku Jäntti (Aalto University, Finland), Cecilia Occhiuzzi (University of Roma Tor Vergata, Italy)

5G/mm-Wave Next Generation RFID Systems for Future IoT Applications

Charles A Lynch III, Ajibayo Adeyeye and Aline Eid (Georgia Institute of Technology, USA); Jimmy Hester (Atheraxon, USA); Manos M. Tentzeris (Georgia Institute of Technology, USA)
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Ambient Backscatter Communications in Mobile Networks: Crowd-Detectable Zero-Energy-Devices

Dinh-Thuy Phan-Huy (Orange, France); Dominique Barthel (Orange Labs & France Telecom, France); Philippe Ratajczak (Orange Innovation, France); Romain Fara (Orange Labs, France); Marco Di Renzo (CentraleSupélec-University, France); Julien de Rosny (CNRS, ESPCI Paris, PSL Research University, France)
pp. 81-84

Interference Analysis of Bi-static Backscatter Communication System: Two Backscatter Devices

Ritayan Biswas (Tampere University, Finland); Muhammad Usman Sheikh and Huseyin Yigitler (Aalto University, Finland); Jukka Lempiäinen (Tampere University of Technology, Finland); Riku Jäntti (Aalto University, Finland)
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Digital Spectrum Twinning and the Role of RFID and Backscatter Communications in Spectral Sensing

Gregory Durgin (Georgia Tech, USA); Michael Varner, Mary Ann Weitnauer, John Cressler, Manos M. Tentzeris and Alenka Zajic (Georgia Institute of Technology, USA); Saeed Zeinolabedinzadeh (Arizona State University, USA); Seyed (Reza)

Zekavat (Worcester Polytechnic Institute, USA); Kaveh Pahlavan (WPI, USA); Ulkuhan Guler (Worcester Polytechnic Institute, USA); Jacobus Van der Merwe (University of Utah, USA)
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RF Harvesting at 2.4 GHz for Scattering between Battery-less Transponder and Mobile Telephones

Matthias Schütz (IDP INVENT AG, Switzerland)
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Backscattering-based Communication links for Body Area Network in the 5G S-band

Cecilia Occhiuzzi (University of Roma Tor Vergata, Italy); Francesco Romoli Venturi (University of Roma "Tor Vergata", Italy); Pierpaolo Loreti (University of Rome "Tor Vergata", Italy); Gaetano Marrocco (University of Rome Tor Vergata, Italy)
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Thursday, October 7 14:00 - 14:30

Break

Thursday, October 7 14:30 - 15:30

S7.3: Multiband and Wideband Antennas for RFID Applications - Pt 2

[zoom](#)

Chairs: Binod Kanaujia (JNU Delhi, India), Mukesh Kumar Khandelwal (Jawaharlal Nehru University, India)

Ultrathin Dual-Band Metasurface for UHF-RFID and WLAN Applications

Sayan Sarkar and Bhaskar Gupta (Jadavpur University, India)
pp. 101-104

Ring-shaped Tri-band Defective Ground Reader Antenna for RFID Applications

Maxon Okramcha (Amity University, Noida, India); Malay Ranjan Tripathy (Amity University, India); Ravi Kumar Arya (National Institute of Technology Delhi, India)
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Circularly Polarized Broadband Co-Planar Wave-guide fed Antenna for 2.45 GHz RFID Reader

Amit Birwal (University of Delhi, India); Vipul Kaushal and Kamlesh Patel (University of Delhi South Campus, India)
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A Quad-Band Monopole Antenna for GPS and RFID Applications

Nihar Kanta Sahoo (Research Engineer, Numeregion, India); Swapnil Narhari Gaul (Numeregion, India); Kuldip Singh (SLIET, India); Malay Ranjan Tripathy (Amity University, India)
pp. 113-115

S7.4: New capabilities in RFID based on the direct interaction between tags [zoom](#)

Chairs: Yvan Duroc (University Claude-Bernard Lyon 1, France), Florin Hutu (Univ Lyon, INSA Lyon, Inria, CITI, France), Guillaume Villemaud (Université de Lyon, INRIA, INSA-Lyon, CITI, France)

Modulation Depth Enhancement for Randomly Arranged Tags in Passive RFID Tag to Tag Communications

Tarik Lassouaoui (INSAVALOR (INSA Lyon CITI), France); Florin Hutu (Univ Lyon, INSA Lyon, Inria, CITI, France); Guillaume Villemaud (Université de Lyon, INRIA, INSA-Lyon, CITI, France); Yvan Duroc (University Claude-Bernard Lyon 1, France)
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Path Loss of Two-Port Circular-Ring Slot Antenna For RFID Applications

Vipul Kaushal (University of Delhi South Campus, India); Amit Birwal (University of Delhi, India); Sandhya Malikar Patel (CSIR-National Physical Laboratory, India); Kamlesh Patel (University of Delhi South Campus, India)
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Wireless Power Transfer of Passive UHF RFID Uplink in the Case of Tags Network

Demba Ba, Sénégal (Cheikh Anta Diop University, Senegal); Dioum Ibra (Ecole Supérieure Polytechnique - Université Cheikh Anta Diop, Senegal); Yvan Duroc (University Claude-Bernard Lyon 1, France)
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Collaborative Backscatter Based on Phase Channel Estimation in Passive RF Tag Networks

Abeer Ahmad (Stony Brook University, USA); Xiao Sha (Stonybrook University, USA); Akshay Athalye (Research Foundation SUNY, USA); Samir R. Das and Petar M. Djurić (Stony Brook University, USA); Milutin Stanacevic (SUNY Stony Brook, USA)
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Thursday, October 7 15:30 - 17:00

S7.5: Chipless RFID and wireless sensors [zoom](#)

Chairs: Ravi Kumar Arya (National Institute of Technology Delhi, India), Nicolas Barbot (University Grenoble Alpes, Grenoble INP, LCIS, France)

Reprogrammable Chipless Tags with Enhanced Bit Capacity Using Dynamic Range Rotational Structures

Vaishnavi Bhope and A. r. Harish (Indian Institute of Technology Kanpur, India)
pp. 132-135

12-Bit Multiresonator Based Chipless RFID System for Low-Cost Item Tracking

Mohammad Abdul Shukoor, Shah Sparsh Mukeshbhai and Sukomal Dey (Indian Institute of Technology Palakkad, India)
pp. 136-138

Impact of the Polarization over the Read Range in Chipless RFID

Nicolas Barbot (University Grenoble Alpes, Grenoble INP, LCIS, France); Etienne Perret (Grenoble INP - LCIS, France)
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Array of chipless RFID sensor tag for wireless detection of crack on large metallic surface

Chitturi Suneel Kumar and Situ Rani Patre (National Institute of Technology Rourkela, India)
pp. 142-144

Exploring Van-Atta UWB cross-pol chipless tag

Alessandro Di Carlofelice, Emidio Di Giampaolo and Piero Tognolatti (University of L'Aquila, Italy)
pp. 145-148

UHF-RFID-Sensors for online Measurements in Washing Machines

Felix Essingholt (Fraunhofer IMS, Germany); Yixiong Zhao (Fraunhofer-Institut für Mikroelektronische Schaltungen und Systeme IMS, Germany); Andreas Hennig (Fraunhofer, Germany); Anton Grabmaier (University of Duisburg-Essen, Germany)
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S7.6: Modelling, implementation and characterization of RFID systems

[zoom](#)

Chairs: Andrea Motroni (University of Pisa, Italy), Ingrid Ullmann (Institute of Microwaves and Photonics, Germany)

Interferences and Shadowing in Multi-Lane UHF RFID-Based Vehicle Identification Systems

Alexander R. Unterhuber (Kathrein Solutions GmbH & Technical University of Munich, Germany); Stoyan Iliev (KATHREIN Solutions GMBH, Germany); Erwin Biebl (Technische Universität München, Germany)
pp. 153-156

UHF-RFID Power Distance Profiles for Analysis of Propagation Absorbing Effect

Hadi El hajj chehade (University of Rennes 1 & IETR UMR CNRS 6164, France); Bernard Uguen (University of Rennes I, France); Sylvain Collardey (University of Rennes 1, France)
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Characterization of Harmonic Signals Backscattered by Conventional UHF RFID Tags

Allane Dahmane (University Grenoble-Alpes, France); Yvan Duroc (University Claude-Bernard Lyon 1, France); Smail Tedjini (University Grenoble Alpes, France)
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A Waveform Design Methodology for UHF RFID Systems: A Hybrid Simulation Approach

Hussein Ezzeddine and Julien Huillery (Ecole Centrale de Lyon & Laboratoire Ampère, France); Arnaud Breard (Ecole Centrale Lyon, France); Yvan Duroc (University Claude-Bernard Lyon 1, France)
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Analysis of Phase Noise Performance in Spatially Separated Backscatter Systems

Sicheng Yu (University of Cambridge, United Kingdom (Great Britain)); Richard Penty (Cambridge University, United Kingdom (Great Britain)); Michael J Crisp (University of Cambridge, United Kingdom (Great Britain))
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Thursday, October 7 17:00 - 17:30

Break

Thursday, October 7 17:30 - 20:00

IS: Industry Session "IOT: the promise, the reality, and the gaps that remain" [zoom](#)

Chairs: Megan Brewster (Impinj, USA), Alice Buffi (University of Pisa, Italy)

Session Organizer/Chair: Megan Brewster, Impinj, Inc., Seattle, WA, USA

1. "Session Motivation and Overview" - Megan Brewster, Vice President, Advanced Technology, Impinj
2. "Identity, Ownership and Privacy in an IoT World" - Sanjay Sarma, Professor, MIT
3. "GS1 Digital Link: a different mindset" - Phil Archer, Web Solutions Director, GS1
4. "How a Digital Identity enables Connected Products: Cutting edge connected product use cases made possible by atma.io" - Michael Goller, atma.io Technical Director, Avery Dennison
5. "LoRaWAN security: low power and scalable" - Olivier Seller, Technical Fellow - Wireless IP, Semtech
6. "Global, Resolvable Research Persistent Identifiers - DOI as an Analog to IOT Resolvers" - Carly Robinson, Assistant Director for Information Products and Services, Office of Scientific and Technical Information, U.S. Department of Energy
7. "Secure RFID for Toll Collection: The Brazilian case" - Rafael Laufer Schmidt, Technical Fellow, Impinj (formerly CEITEC)
8. "Resolution of Many RFID Tags Using Physical Layer Techniques" - Gregory D. Durgin, Professor of Electrical and Computer Engineering, Georgia Tech
9. "Competition Launch: Resolving the Internet of Every Thing" - Gregory D. Durgin, Professor of Electrical and Computer Engineering, Georgia Tech

Thursday, October 7 20:30 - 21:30

Keynote Speech "On RFID-based Human Activity Sensing" [zoom](#)

Prof. Shiwen Mao, Auburn University, Auburn, AL, USA

Chairs: Shiwen Mao (Auburn University, USA), Malay Ranjan Tripathy (Room No. 214 (A) E-1 Block, India & Amity University Uttar Pradesh, unknown)

Abstract: With the rapid development of radio frequency (RF) sensing in the Internet of Things (IoT), human activity sensing, detection and tracking have attracted increasing attention. Among the various RF sensing techniques, radio-frequency identification (RFID) has its unique advantages of low-cost, small form factor, battery-free, and robustness to surrounding interference. Beyond its original use of responding with the stored Electronic Product Code (EPC) data when interrogated by a reader, RFID tags can be used as wearable sensors on the human body for vital sign and activity sensing applications. In this talk, we will investigate the various technical challenges on fully exploiting RFID for human activity recognition and tracking, such as frequency hopping and noisy and sparse RFID data, and examine potential solutions. We will then review several our recently works on RFID based

human vital sign monitoring, drowsy driving detection, and 3D human pose monitoring and tracking.

Short Biography: SHIWEN MAO received his Ph.D. in electrical engineering from Polytechnic University, Brooklyn, NY. He held the McWane Endowed Professorship from 2012 to 2015 and the Samuel Ginn Endowed Professorship from 2015 to 2020 in the Department of Electrical and Computer Engineering at Auburn University, Auburn, AL. Currently, he is a professor and Earle C. Williams Eminent Scholar Chair, and Director of the Wireless Engineering Research and Education Center (WEREC) at Auburn University. His research interest includes wireless networks, multimedia communications, and smart grid. He is a Distinguished Lecturer of IEEE Communications Society and the IEEE Council of RFID, and is on the Editorial Board of IEEE TWC, IEEE TNSE, IEEE TMC, IEEE IoT, IEEE OJ-ComSoc, IEEE/CIC China Communications, IEEE Multimedia, IEEE Network, IEEE Networking Letters, and ACM GetMobile. He received the IEEE ComSoc TC-CSR Distinguished Technical Achievement Award in 2019 and NSF CAREER Award in 2010. He is a co-recipient of the 2021 IEEE Communications Society Outstanding Paper Award, the IEEE Vehicular Technology Society 2020 Jack Neubauer Memorial Award, the 2004 IEEE Communications Society Leonard G. Abraham Prize in the Field of Communications Systems, and several conference best paper awards. He is a Fellow of the IEEE.

Friday, October 8

Friday, October 8 12:30 - 14:00

S8.1: Research and experience on RFID projects [zoom](#)

Chairs: Luca Catarinucci (University of Salento, Italy), Arnaud Vena (University of Montpellier & Institut d'Electronique Et Des Systemes (IES), France)

SECONDSKIN Project: BioIntegrated Wireless Sensors for the Epidermal Monitoring and Restoring of Sensorial Injuries

Nicoletta Panunzio and Gaetano Marrocco (University of Rome Tor Vergata, Italy)
pp. 173-176

RFID Labeling of Police Equipment

Giulio M. Bianco (University of Roma Tor Vergata, Italy); Nicoletta Panunzio (University of Rome Tor Vergata, Italy); Antonio Pintaudi, Salvatore Santamaria and Francesco Faustino (Polizia di Stato, Italy); Cecilia Occhiuzzi (University of Roma Tor Vergata, Italy); Gaetano Marrocco (University of Rome Tor Vergata, Italy)
pp. 177-180

Passive RFID-based Music Player Textile

Asif Shaikh, Shiva Jabari, Ruowei Xiao, Adnan Mehmood, Juho Hamari, Oguz Buruk and Johanna Virkki (Tampere University, Finland)

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RFID based Indoor Localisation System to Analyse Visitor Behavior in a Museum

Arnaud Vena (University of Montpellier & Institut d'Electronique Et Des Systèmes (IES), France); Isabelle Illanes and Lucie Alidieres (Paul-Valéry University, France); Brice Sorli (University of Montpellier & IES, France); François Perea (Paul-Valéry University, France)

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Automatic Monitoring of Fruit Ripening Rooms by UHF RFID Sensors and Machine Learning

Cecilia Occhiuzzi (University of Roma Tor Vergata, Italy); Francesca Camera (University of Rome Tor Vergata, Italy); Nicola D'Uva (RADIO6ENSE srl, Italy); Sara Amendola (University of Rome Tor Vergata & Radio6ense srl, Italy); Luigi Garavaglia (ILPA Group SpA, Italy); Gaetano Marrocco (University of Rome Tor Vergata, Italy)

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Design and Technology Transfer of RFID-Based Medical Sensing Devices

Riccardo Colella and Luigi Spedicato (University of Salento, Italy); Carlo Giacomo Leo and Saverio Sabina (Institute of Clinical Physiology, Italy); Velimir Congradac (University of Novi Sad, Serbia); Ognjen Bagatin (Bagatin Clinic - Management Board, Owner, Croatia); Luca Catarinucci (University of Salento, Italy)

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S8.2: Advances in Wearable Antennas and RFID-enabled Smart Systems

zoom

Chairs: Ravi Kumar Arya (National Institute of Technology Delhi, India), Chao Li (Shandong Normal University, China)

Dual-band circularly polarized wearable patch antenna for RFID Reader

Shivani Sharma (NOIDA); Ajay Kumar Sharma (BEL, India); Malay Ranjan Tripathy (Room No. 214 (A) E-1 Block, India & Amity University Uttar Pradesh, unknown)

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RFID-Band Integrated UWB MIMO Antenna for Wearable Applications

Thennarasi Govindan (SRM Institute of Science and Technology, India); Sandeep Palaniswamy (SRMIST, Chennai, India); Malathi Kanaga sabai (Ana University, India); Sachin Kumar (Kyungpook National University, Korea (South)); T Rama Rao and Lekha Kannappan (SRM Institute of Science and Technology, India)

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COVID-SAFE: IoT Based Health Monitoring System using RFID in Pandemic Life

Krishna Veni Sahukara (Gayatri Vidya Parishad College for Degree and PG Courses(A) & Andhra University, India); Mahesh Babu Ammisetty (Gayatri Vidya Parishad College for Degree and PG Courses(A), India); G s k Gayatri Devi (Mallareddy Engineering College, India); Surisetty Pranathi Prathyusha and T Sneha Nikhita (Gayatri Vidya Parishad College for Degree and PG Courses(A), India)
pp. 203-206

FSS supported longer read range passive UHF RFID reader antenna

Shivani Sharma (Amity University, India); Malay Ranjan Tripathy (Room No. 214 (A) E-1 Block, India & Amity University Uttar Pradesh, unknown); Ajay Kumar Sharma (BEL, India)
pp. 207-210

Cyber-Tooth: Antennified Dental Implant for RFID Wireless Temperature Monitoring

Nicoletta Panunzio (University of Rome Tor Vergata, Italy); Gianluca Ligresti (University of Rome "Tor Vergata", Italy); Margherita Losardo, Donato Masi, Alessio Mostaccio, Francesca Nanni, Giulia Tartaglia and Gaetano Marrocco (University of Rome Tor Vergata, Italy)
pp. 211-214

Fully 3D-printed UHF RFID Antennas: Technological Comparison to Realize Conductive Elements

Francesco P. Chietera and Riccardo Colella (University of Salento, Italy); Akash Verma (KU Leuven & Manufacturing Processes and Systems, Belgium); Eleonora Ferraris (KU Leuven, Belgium); Carola Esposito Corcione and Luca Catarinucci (University of Salento, Italy)
pp. 215-218

Friday, October 8 14:00 - 14:30

Break

Friday, October 8 14:30 - 16:00

S8.3: MIMO, UWB and Small Antennas for Next Generation RFID [zoom](#)

Chairs: Maifuz Ali (DSPM IIIT Naya Raipur, India), Ashwani Kumar (School of Engineering, Jawaharlal Nehru University, India)

Meander Line based Two Port MIMO small Antenna for UHF RFID and Sub-6 GHz Applications

Monika Kaushik and Jasdeep Dhanoa (Indira Gandhi Delhi Technical University for Women, Delhi, India); Mukesh Kumar Khandelwal (Jawaharlal Nehru University, India)
pp. 219-222

Small MIMO Antenna with Circular Polarization for UHF-RFID, PCS and 5G Applications

Usha Sharma (GGSIPIU, India); Garima Srivastava (AIACT&R, India); Mukesh Kumar Khandelwal (Jawaharlal Nehru University, India)
pp. 223-226

Ring with Rectangular Stub MIMO Antenna for RFID Applications

Prashant Chaudhary and Avanish Yadav (University of Delhi, India); Ashwani Kumar (School of Engineering, Jawaharlal Nehru University, India); Kamlesh Patel (University of Delhi South Campus, India); Ravi Kumar Arya (National Institute of Technology Delhi, India); Maifuz Ali (Tokyo Institute of Technology, Japan)
pp. 227-230

Design and CM Analysis of Fractal Inspired Frequency Reconfigurable Antenna for RFID Application

Kapil Saraswat (Central University of Rajasthan Ajmer & Indian Institute of Technology Kanpur, India); Trivesh Kumar (Indian Institute of Information Technology, Design and Manufacturing, Jabalpur, India)
pp. 231-234

Multiband Antenna For RFID Application

Avanish Yadav and Prashant Chaudhary (University of Delhi, India); Ashwani Kumar (School of Engineering, Jawaharlal Nehru University, India); Praduman Singh (University of Delhi, India)
pp. 235-237

S8.4: From Italy '19 to India '21: activities on RFIDs during the last two years [zoom](#)

Chairs: Giovanni Andrea Casula (Università di Cagliari, Italy), Andrea Michel (University of Pisa, Italy)

Recent Developments of RFID and WPT Technologies for Biomedical and Industrial Applications at the University of Bologna

Giacomo Paolini, Francesca Benassi and Diego Masotti (University of Bologna, Italy);

Alessandra Costanzo (DEI, University of Bologna, Italy)

pp. 238-240

RFID Research Against COVID-19 - Sensorized Face Masks

Giulio M. Bianco (University of Roma Tor Vergata, Italy); Nicoletta Panunzio and Gaetano Marrocco (University of Rome Tor Vergata, Italy)

pp. 241-243

Recent Activities in Rfid Applications Empowered by 3D Printing at UniSalento

Luca Catarinucci, Francesco P. Chietera and Riccardo Colella (University of Salento, Italy)

pp. 244-247

Recent Developments in RFID activities at UniCa

Giovanni Andrea Casula (Università di Cagliari, Italy)

pp. 248-251

Past, Present and Future RFID Activities at the University of Pisa

Paolo Nepa, Alice Buffi, Andrea Michel, Andrea Motroni, Fabio Bernardini, Rajesh K Singh and Giuliano Manara (University of Pisa, Italy)

pp. 252-255

Friday, October 8 16:00 - 17:00

S8.5: Building Smarter IoT ecosystem with RFID / LORA / SigFox / Bluetooth Technologies [zoom](#)

Chair: Priya Ranjan (SRM University, Amaravathi, India)

GPS and LoRa module Based Safety Alert system

Parshal Chitrakar (India & SRM University, India); Yoganand Biradavolu (SRM University, India); Siva Yellampalli (SRM University AP-Andhra Pradesh, India)

pp. 256-259

Received Signal Strength based Indoor Positioning with RFID

Sasikala M and J. Athena (PSGR Krishnammal College for Women, India); A. Sheela Rini (PSGR Krishnammal College for Women, Italy)

pp. 260-263

RFID Aided Intelligent Shopping Trolley with Childcare Unit

Parameswaran Ramesh (Madras Institute of Technology & Anna University, India); Bhuvana P.T.V.Bhuvaneshwari (Anna University, India)

pp. 264-266

UHF-RFID Tag Design for Improved Traceability Solution for workers' safety at Risky Job sites

Aarti Bansal (India & Thapar University, India); Rajesh Khanna and Surbhi Sharma (Thapar University, India)

pp. 267-270

S8.6: Advanced Circuit and RF Radio Front-ends for RFID Sensing - Pt 1

zoom

Chairs: Riccardo Colella (University of Salento, Italy), Kam-weng Tam (University of Macau, Macao)

CMOS UHF RFID Rectifier Design and Matching: an Analysis of Process and Temperature Variations

Mahmoud Wagih (University of Southampton, United Kingdom (Great Britain)); Anand Savanth and Sahan Gamage (Arm, United Kingdom (Great Britain)); Alex S Weddell and Stephen Beeby (University of Southampton, United Kingdom (Great Britain))

pp. 271-274

Self-Decoupling Antennas for MIMO UHF RFID Systems

Huawei Lin (University of Macau, China); Xujun Yang, Lei Ge, Yin Li and Sai-Wai Wong (Shenzhen University, China); Kam Weng Tam (University of Macau, China)

pp. 275-277

Planar Endfire CP Antenna with Enhanced Gain and Beamwidth for RFID Applications

Wenhai Zhang and Quan Xue (South China University of Technology, China); Wenjun Lu (Nanjing University of Posts and Telecommunications, China); Kam Weng Tam (University of Macau, China); Wenquan Che and Shaowei Liao (South China University of Technology, China)

pp. 278-280

Design of passive beam-scanning monopulse leaky-wave antennas for direction finding in UHF RFID

Alejandro Gil Martinez (Technical University of Cartagena Cartagena, Spain); Jose-Luis Gómez-Tornero (Polytechnic University of Cartagena, Spain); Miguel Poveda-García (Technical University of Cartagena, Spain); David Cañete Rebenaque (Polytechnic University of Cartagena, Spain)

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Friday, October 8 17:00 - 17:30

Break

Friday, October 8 17:30 - 18:15

S8.7: Near Field Communications and HF Systems [zoom](#)

Chairs: Andrey S Andrenko (National Institute of Information and Communications Technology, Japan), Eng Hock Lim (Faculty of Engineering and Science, UTAR, Malaysia)

Towards Trustworthy NFC-based Sensor Readout for Battery Packs in Battery Management Systems

Fikret Basic, Martin Gaertner and Christian Steger (Graz University of Technology, Austria)
pp. 285-288

Performance of PIN diode RF switches within HF RFID reader designs

Ian Pratt (Hangzhou Scientia-IoT Ltd., China); Mike Oliver (DeMontfort University, United Kingdom (Great Britain))
pp. 289-292

BER reduction of UPMC for 1024-QAM

Balwant Singh (AMITY, India); Malay Ranjan Tripathy (Room No. 214 (A) E-1 Block, India & Amity University Uttar Pradesh, unknown); Rishi Asthana (GITM Lucknow, India)
pp. 293-296

S8.8: Advanced Circuit and RF Radio Front-ends for RFID Sensing - Pt 2
[zoom](#)

Chairs: Giovanni Andrea Casula (Università di Cagliari, Italy), Riccardo Colella (University of Salento, Italy)

Wirelessly Retrieving Phase and RSSI of UHF RFID using Commodity SDR Sniffer

Shuai Yang (University of Cambridge, United Kingdom (Great Britain)); Richard Penty (Cambridge University, United Kingdom (Great Britain)); Michael J Crisp (University of Cambridge, United Kingdom (Great Britain))
pp. 297-300

A UHF RFID to I2C Bridge IC with Configurable Power Storage Unit for Flexible RFID Sensor Applications

Jun Tan (IMMS GmbH, Germany); Muralikrishna Sathyamurthy (Institute for Microelectronic and Mechatronics Systems GmbH, Germany); Hani Abdullah and Jonathan Gamez (IMMS, Germany); Bjoern Bieske (IMMS GmbH, Germany); Benjamin Saft (Scientific Associate, Germany); Martin Grabmann (IMMS, Germany); Jacek Nowak (Micro-Sensys GmbH, Germany); Sylvo Jäger (Microsensys GmbH, Germany); Eric Schäfer (IMMS GmbH, Germany)

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Two-Stage Class-A Power Amplifier with RF Frontend for Transmitter Wireless Applications

Wen Cheng Lai (National Taiwan University of Science and Technology, Taiwan)

pp. 305-308

Friday, October 8 18:15 - 19:00

RFID Special Guests - Keynote Speech "The history and evolution of RAIN RFID tag antennas" [zoom](#)

KVS Rao, Pavel Nikitin, John Kim - Impinj, Inc., Seattle, WA, USA

Chairs: Pavel Nikitin (Impinj, USA), Malay Ranjan Tripathy (Room No. 214 (A) E-1 Block, India & Amity University Uttar Pradesh, unknown)

Abstract: RAIN (UHF) RFID is a popular technology based on passive modulated backscatter, with applications ranging from supply chain and retail to vehicle identification and healthcare. In this talk, we will cover the history of RFID tag antennas and their evolution, from simpler designs that maximize read range on specific material to wideband tags designed to operate on various items and meet ARC requirements, which are industry tag certification specifications. We will also discuss tag antenna modeling and simulation approaches and discuss the latest research developments in tag antenna design.

Friday, October 8 19:00 - 19:30

Closing Ceremony [zoom](#)

Chairs: Alice Buffi (University of Pisa, Italy), Malay Ranjan Tripathy (Room No. 214 (A) E-1 Block, India & Amity University Uttar Pradesh, unknown)