

2019 IEEE International Conference on RFID (RFID 2019)

**Phoenix, Arizona, USA
2 – 4 April 2019**



**IEEE Catalog Number: CFP19RFI-POD
ISBN: 978-1-7281-1211-4**

**Copyright © 2019 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

| | |
|-------------------------|-------------------|
| IEEE Catalog Number: | CFP19RFI-POD |
| ISBN (Print-On-Demand): | 978-1-7281-1211-4 |
| ISBN (Online): | 978-1-7281-1210-7 |
| ISSN: | 2374-0221 |

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

Wednesday, April 3

Wednesday, April 3 1:00 - 2:30

S1: Antennas and Propagation

Room: 222A

Chair: Mohammad Alhassoun (Georgia Institute of Technology, USA)

1:00 *Textile Based Embroidery-Friendly RFID Antenna Design Techniques.....1*

[Yulong Liu](#) (Southern University of Science and Technology, P.R. China); Lulu Xu and Yi Li (University of Manchester, United Kingdom (Great Britain)); Terry Ye (Southern University of Science and Technology, P.R. China)

1:22 *A versatile, automated, cost-effective testing platform for hands-on UHF RFID measurements.....7*

[Niklas Beuster](#) (Technische Universität Ilmenau, Germany); Alexander Ihlow (Ilmenau University of Technology, Germany); Johannes Trabert (MetraLabs GmbH, Germany); Kurt Gerd Blau and Carsten Andrich (Technische Universität Ilmenau, Germany); Giovanni Del Galdo (Fraunhofer Institute for Integrated Circuits IIS & Technische Universität Ilmenau, Germany)

1:45 *Scalable Near-field fed Far-field UHF RFID Reader Antenna for Retail Checkout Counters.....14*

Prabakar Parthiban (Auckland University of Technology & Times-7 Research Ltd, New Zealand); Boon-Chong Seet and Xue Jun Li (Auckland University of Technology, New Zealand)

2:07 *L-Shaped Chipless Tag Design Analysis and Optimization for Fully Inkjet Printing.....20*

[Vinicius Ferro](#) (Flextronics Institute of Technology - FIT, Brazil); Pedro Rebello (FIT - Flextronics Institute of Technology, Brazil); Matheus Quadros (FIT - Flex Instituto de Tecnologia, Brazil); [Wagston Staehler](#) (HP, Brazil)

S2: Applications and Software

Room: 222B

Chair: Francesco Amato (University of Roma Tor Vergata, Italy)

1:00 *Adopting Hyperledger Fabric Blockchain for EPCglobal Network.....28*

Pamela Hui Ting Chua and Yingjiu Li (Singapore Management University, Singapore); Wei He (Singapore Institute of Manufacturing Technology, Singapore)

1:22 *IDCam: Precise Item Identification for AR Enhanced Object Interactions.....36*

[Hanchuan Li](#) (University of Washington, Microsoft Corporation, USA); Eric Whitmire and Alex Mariakakis (University of Washington, USA); Victor Chan (Qualcomm, USA); Alanson Sample (University of Michigan, USA); Shwetak N. Patel (University of Washington, USA)

1:45 *IDAct: Towards Unobtrusive Recognition of User Presence and Daily Activities.....43*

[Hanchuan Li](#) (University of Washington, Microsoft Corporation, USA); Chieh-Yih Wan (Intel Corporation, USA); Rahul Shah (Intel Corp, USA); Alanson Sample (University of Michigan, USA); Shwetak N. Patel (University of Washington, USA)

2:07 *RFID for Everyone: Design of an Easily-Accessible, Experimental UHF RFID Platform.....51*

Stewart Thomas (Bucknell University, USA)

Wednesday, April 3 2:30 - 4:15

P1: Poster Session

2:30 *RAIN RFID Reader Antenna Selection Guide.....N/A*

[Prabakar Parthiban](#) (Auckland University of Technology & Times-7 Research Ltd, New Zealand); Giuliana Gilges-Richards (Times-7 Research Ltd, New Zealand)

2:36 *A 24-GHz Tag for Next-Generation RFID Systems.....N/A*

Jesse Jiang, Siddharth Kotapati and Kibeom Kim (Georgia Institute of Technology, USA); Baris V Gurses and Mohammad Alhassoun (Georgia Institute of Technology, USA); Gregory Durgin (Georgia Tech, USA)

2:42 *Beam Scanning UHF RFID Reader Antenna with High Gain and Wide Axial Ratio Beamwidth.....N/A*

Rui Chen, Shuai Yang and Michael J Crisp (University of Cambridge, United Kingdom (Great Britain)); Richard Penty (Cambridge University, United Kingdom (Great Britain)); Ian White (University of Cambridge, United Kingdom (Great Britain))

2:48 RFID-based MEMS sensor.....N/A

Marin Marinov (Technical University - Sofia, Bulgaria); Gorin Goranov (University of Chemistry and Metallurgy, Bulgaria)

2:54 The Deployment of RFID Technology on Small Farms in Holopaw, FL: A Community-Centered Effort.....N/A

[Fitzroy Nembhard](#), Marco M Carvalho and Kleanthis Zisis Tegos (Florida Institute of Technology, USA)

3:01 Case study of deploying RFID solution for waste disposal: Next step to Internet of Trashed Things achieving.....N/A

Pavel Stasa, Jiri Svub, Filip Benes and [Jakub Unucka](#) (VSB - Technical University of Ostrava, Czech Republic); Lukas Vojtech (Czech Technical University in Prague, Czech Republic)

3:07 RF signal autonomous measurement tool.....N/A

Pavel Stasa, Jiri Svub and Filip Benes (VSB - Technical University of Ostrava, Czech Republic); [Lukas Vojtech](#) (Czech Technical University in Prague, Czech Republic); Jakub Unucka (VSB - Technical University of Ostrava, Czech Republic); Marek Neruda (Czech Technical University in Prague, Czech Republic)

3:13 Non-Vital Privacy Compromise for Improved Services in Pilgrimage Seasons.....N/A

Mohamed Mohandes (King Fahd University of Petroleum & Minerals, Saudi Arabia)

3:19 2.4 GHz Passive Gen2 RFID System.....N/A

Pavel Nikitin, [Joshua Ensworth](#), Kvs Rao, Alberto Pesavento and John Kim (Impinj, USA)

3:25 A Flexible, Low Temperature Poly-Silicon TFT-based RFID Tag with HF-stabilized Timing.....N/A

[Sin Jie Wang](#), Chung-Hung Chen, Yu Chih Wang, Yi Cheng Lai, Jen Pei Tseng, Yu Chieh Lin and Min Feng Chiang (AUO, Taiwan); Tung-Tsun Lin (au Vista, USA); Regina Mao (AUO, USA); Yu Jung Liu, Carla Lin, Hsiangchi Chen, Yu Da Chen and Wen Bin Hsu (AUO, Taiwan)

3:32 Wi-Fi Approach for Indoor Localization.....N/A

Jiri Svub, Filip Benes, Pavel Stasa and [Jakub Unucka](#) (VSB - Technical University of Ostrava, Czech Republic); Lukas Vojtech (Czech Technical University in Prague, Czech Republic)

3:38 Neural Network-Based State Estimation of HIMR RFID System.....N/A

Qian Yang and David Taylor (Georgia Institute of Technology, USA); Gregory Durgin (Georgia Tech, USA)

3:44 Breaking the Range Localization Limit of RFIDs: Phase-based Positioning with Tunneling Tags.....N/A

Cheng Qi and Mohammad Alhassoun (Georgia Institute of Technology, USA); Francesco Amato (University of Roma Tor Vergata, Italy); Gregory Durgin (Georgia Tech, USA)

3:50 Wi-Fi Based Temperature Sensor.....N/A

Filip Benes, Jiri Svub, Pavel Stasa and Jakub Unucka (VSB - Technical University of Ostrava, Czech Republic); [Lukas Vojtech](#) (Czech Technical University in Prague, Czech Republic)

3:56 Dynamic Monitoring with RFID Tag Sensor to Use in Personal Protective Equipment (PPE).....N/A

[Flávia C Costa](#), Renato Kanno and Ricardo T. Yoshioka (Eldorado Research Institute, Brazil); Emerson Canuto (Eldorado Institute Research, Brazil); José Roberto Martins da Silva and Jean Marcos A. Baracat (Eldorado Research Institute, Brazil)

4:03 Viability of RF-triggered Embedded Sensors for Infrastructure-to-Vehicular Communication.....N/A

Owen Pochettino (Washington University in St. Louis, USA); [Sri Harsha Kondapalli](#) (Washington University in St Louis, USA); [Kenji Aono](#) (Washington University in St. Louis & Michigan State University, USA); Shantanu Chakrabartty (Washington University, USA)

4:09 TDMA Protocol for Dual Mode Operation of Passive RFID Tags: Identification and Sensing.....N/A

[Laura Arjona](#) (University of Washington & Paul G. Allen Center for Computer Science and Engineering, USA); Joshua R. Smith (University of Washington, USA); Florian Muralter (University of Deusto, Spain)

Thursday, April 4

Thursday, April 4 1:30 - 3:00

S3: Circuits, Devices and Readers & Energy Harvesting

Room: 222A

Chair: Jukka Voutilainen (Voyantic, Finland)

1:30 A 1 Mbps 158 pJ/bit Bluetooth Low Energy (BLE) Compatible Backscatter Communication Uplink for Wireless Neural Recording in an Animal Cage Environment.....57

James Rosenthal and Matthew Reynolds (University of Washington, USA); Alexandra Pike (Juanita High School, USA)

2:00 5.8 GHz Near Field Power Harvesting Circuitry Implemented in 14 nm CMOS Technology.....63

[Scott Suko](#), Parrish Ralston and Darnell Lane (Northrop Grumman Corporation, USA); Jamin McCue (Ohio State University, USA); Shuai Zhou, David Fry, Chris Kalaigian, David Cross and Bryce Winters (Northrop Grumman, USA)

2:30 Battery-Free Wireless Video Streaming Camera System.....69

Ali Saffari, Mehrdad Hesar, Saman Naderiparizi and Joshua R. Smith (University of Washington, USA)

S4: Sensors

Room: 222B

Chair: Stewart Thomas (Bucknell University, USA)

1:30 An RFID to I2C Bridge IC with Supply Interference Reduction for Flexible RFID Sensor Applications.....77

Jun Tan (IMMS Institut für Mikroelektronik- und Mechatronik-Systeme Gemeinnützige GmbH, Germany); Muralikrishna Sathyamurthy (Institute for Microelectronic and Mechatronics Systems GmbH, Germany); Alexander Rolapp, Jonathan Gamez and Moataz Elkharaishi (IMMS, Germany); Benjamin Saft (Scientific Associate, Germany); Sylvo Jäger (Microsensys GmbH, Germany); Ralf Sommer (Ilmenau University of Technology, Germany)

2:00 Electromagnetic characterization of a food safe, organic smart material for customizable temperature threshold sensing in cold chain applications.....83

Tharindu Athauda (Monash University, Australia); [Rahul Bhattacharyya](#) (Massachusetts Institute of Technology, USA); Nemai Karmakar (MONASH University, Australia); Sanjay Sarma (MIT Auto-ID Center, USA)

2:30 Ubiquitous moisture sensing in automaker industry based on standard UHF RFID tags.....89

Joan Melià-Seguí and Xavier Vilajosana (Universitat Oberta de Catalunya, Spain)

Thursday, April 4 3:15 - 4:45

S5: Localization

Room: 222A

Chair: Joshua Ensworth (Impinj, USA)

3:15 Estimating Relative Tag Locations based on Time-Differences in Read Events.....97

Thomas Hasler, Matthias Wölbitsch, Michael Goller and Simon Walk (Detego GmbH, Austria)

3:45 Harmonic UHF RFID Ranging with 50-Micron Accuracy and 1-kHz Sampling Rate.....105

[Xiaonan Hui](#) and Edwin Kan (Cornell University, USA)

4:15 Breaking the Range Limit of RFID Localization: Phase-based Positioning with Tunneling Tags.....113

Cheng Qi (Georgia Institute of Technology, USA); Francesco Amato (University of Roma Tor Vergata, Italy); Mohammad Alhassoun (Georgia Institute of Technology, USA); Gregory Durgin (Georgia Tech, USA)

S6: Protocols and Security

Room: 222B

Chair: Brian Degnan (White River Technologies, USA)

3:15 Configurable Anonymous Authentication Schemes For The Internet of Things (IoT).....121

Amar A Rasheed (Georgia Southern University, USA); Ray R Hashemi (Georgia Southern University-Armstrong Campus, USA); Ayman Bagabas, Jeffrey Young and Chanukya Badri (Georgia Southern University, USA); Keyur Patel (GSU, USA)

4:00 A Secure and Efficient Parallel-Dependency RFID Grouping-Proof Protocol.....129

Vanya Cherneva (LSU, United States, USA); Jerry Trahan (Louisiana State University, USA)