2016 IEEE International Conference on RFID (RFID 2016)

Orlando, Florida, USA
3-5 May 2016

IEEE Catalog Number: CFP16RFI-POD
ISBN: 978-1-4673-8808-5

Copyright © 2016 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 publication is a representation of what appears in the IEEE Digital Libraries. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number: CFP16RFI-POD
ISBN (Print-On-Demand): 978-1-4673-8808-5
ISBN (Online): 978-1-4673-8807-8

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

2016 IEEE International Conference on RFID (RFID)

Hot Topics in RFID

Millimeter Scale Computing Platform for Next Generation of Internet of Things
Taekwang Jang (University of Michigan, USA), Myungjoon Choi (University of Michigan, USA), Yao Shi (University of Michigan, USA), Inhee Lee (University of Michigan, USA), Dennis Sylvester (University of Michigan, USA), David Blaauw (University of Michigan, USA) 1
The Future of Ultra-Wideband Localization in RFID
Davide Dardari (University of Bologna, Italy), Nicolò Decarli (University of Bologna, Italy), Anna Guerra (CNIT - University of Bologna, Italy), Francesco Guidi (CEA LETI, France) 5
High-accuracy Positioning for Indoor Applications: RFID, UWB, 5G, and beyond
Klaus Witrisal (Graz University of Technology, Austria), Stefan Hinteregger (Graz University of Technology, Austria), Josef Kulmer (Graz University of Technology, Austria), Erik Leitinger (Graz University of Technology, Austria), Paul Meissner (Graz University of Technology, Austria) 12
Reliability and Longer Range for Low Power Transmitters with On Demand Network MIMO
Mary Ann Weitnauer (Georgia Tech, USA), Qiongjie Lin (Georgia Institute of Technology, USA), HuanYu Zhang (Peking University, P.R. China), Hongxian Tian (Beijing Jiaotong University, P.R. China), Sean M Nowlan (Cognosos, Inc., USA), Gedeon Nyengele (Georgia Institute of Technology, USA), Sajith Mohan (Georgia Institute of Technology, USA), Jim Stratigos (Cognosos, Inc., USA) 19

Sensors

Chipless Near Field Resistive Element Sensor using Phase Processing
Somnath Mukherjee (Thin Film Electronics Inc., USA) 29
Activity Recognition for Medical Teamwork Based on Passive RFID
Xinyu Li (Rutgers University, USA), Dongyang Yao (Rutgers University, USA), Xuechao Pan (Rutgers University, USA), Jonathan Johannemann (Rutgers University, USA), JaeWon Yang (Children's National Medical Center, USA), Rachel Webman (Children's National Medical Center, USA), Aleksandra Sarcevic (Drexel University, USA), Ivan Marsic (Rutgers University, USA), Randall Burd (Children's National Medical Center, USA) 34

Applications & Software

Exploring Cloud Elasticity on Developing an EPCGlobal-Compliant Middleware
Rodrigo Righi (Universidade do Vale do Rio dos Sinos (Unisinos), Brazil), Gustavo Rostirolla (Unisinos, Brazil), Cristiano A Costa (Universidade do Vale do Rio dos Sinos, Brazil), Antonio M Alberti (National Institute of Telecommunications, Brazil), Eduardo Souza (Unisinos, Brazil) 43
Over-the-Air Reprogramming on Computational RFIDs
Die Wu (University of Electronic Science and Technology of China & School of Computer Science and Technology, P.R. China), Muhammad Jawad Hussain (University of Electronic Science and Technology of China (UESTC), P.R. China), Li Songfan (University of Electronic Science and Technology of China, P.R. China), Li Lu (University of Electronic Science and Technology of China, P.R. China) 47

Antennas & Propagation and Internet of Things & Next-Generation Physical Layer

Use of Slits of Defined Width in Metal Layers Within ID-1 Cards, as Reactive Couplers for Near-field Passive RFID at 13.56 MHz

Karl Ackland (Trinity College Dublin, Ireland), Mustafa Lotya (AmaTech Group Ltd Unit 7 Baile an tSagairt Spiddal Co. Galway, Ireland), David Finn (AmaTech Group Ltd. Unit 7 Baile an tSagairt, Spiddal, Co. Galway, Ireland), Plamen Stamenov (School of Physics, CRANN-AMBER, Trinity College, Dublin 2, Ireland) 55

Low Profile Separable RFID Tag Antenna Design for Variable Range Applications

Chi-Lun Mak (Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies, Hong Kong), Jingtian Xi (Hong Kong R&D Centre for Logistics and Supply Chain Management, Hong Kong) 59

Evaluation and deployment of an industrial spring-based RFID reader antenna

Raúl Parada (Universitat Pompeu Fabra, Spain), Joan Melià-Seguí (Universitat Oberta de Catalunya, Spain), Rafael Pous (Universitat Pompeu Fabra, Spain) 63

Application of Low Scattering Antennas to RFID Networks

Shadi Ebrahimi Asl (Missouri University of Science and Technology, USA), Mohammad Tayeb Ghasr (Missouri University of Science and Technology, USA), Maciej Zawodniok (Missouri University of Science and Technology, USA) 67

Towards Unobtrusive Real-time Fluid Intake Monitoring Using Passive UHF RFID

Asangi Jayatilaka (The University of Adelaide, Australia), Damith C. Ranasinghe (The University of Adelaide, Australia) 74

Circuits, Devices & Readers

BLISP: Enhancing Backscatter Radio with Active Radio for Computational RFIDs

Ivar in 't Veen (Delft University of Technology, The Netherlands), Qingzhi Liu (Delft University of Technology, The Netherlands), Przemyslaw Pawelczak (Delft University of Technology, The Netherlands), Aaron N Parks (University of Washington, USA), Smith Joshua (University of Washington, USA) 78

UHF RFID Chip measurement

Emmanuel Bergeret (IM2NP, France), Dino Michelon (IM2NP Laboratory - Aix Marseille Université & STMicroelectronics, France), Rita Saba (IM2NP, France), Philippe Seurre (RHODE & SCHWARZ, France) 82

A Low Cost 10.0-11.1 GHz X-Band Microwave Backscatter Communication Testbed with Integrated Planar Wideband Antennas

Xiaojie Fu (University of Washington, USA), Apoorva Sharma (University of Washington, USA), Eleftherios Kampianakis (University of Washington, USA), Andreas Pedross-Engel (University of Washington, USA), Daniel Arnitz (University of Washington, USA), Matthew Reynolds (University of Washington, USA) 89

Design of a Rectifier-Free UHF Gen-2 Compatible RFID Tag using RF-Only Logic

Wenxu Zhao (North Carolina State University, USA), Kirti Bhanushali (North Carolina State University, USA), Paul Franzon (North Carolina State University, USA) 93

EM-ID: Tag-less Identification of Electrical Devices via Electromagnetic Emissions

Chouchang Yang (Disney Research, USA), Alanson Sample (Disney Research Pittsburgh, USA) 99

Energy Harvesting & Wireless Power 1

Theoretical Energy-conversion Efficiency for Multi-Stage RF Energy Harvesters

Christopher Valenta (Georgia Tech Research Institute & Electro-optical Systems Laboratory, USA), Christopher Peterson (Georgia Institute of Technlogy, USA) 107

High-Q, Over-Coupled Tuning for Near-Field RFID Systems
Mohsen Shahmohammadi (Disney Research & The Walt Disney Imagineering, USA), Matthew Chabalko (Disney Research, USA), Alanson Sample (Disney Research Pittsburgh, USA) 115
uMonitor: In-situ Energy Monitoring with Microwatt Power Consumption
Saman Naderiparizi (University of Washington, USA), Aaron N Parks (University of Washington, USA), Farshid Salemi Parizi (University of Washington, USA), Joshua R. Smith (University of Washington, USA) 123
RF Energy Harvester with Sub-threshold Step-up Converter
Dino Michelon (IM2NP Laboratory - Aix Marseille Université & STMicroelectronics, France), Emmanuel Bergeret (IM2NP, France), Antonio Di Giacomo (STMicroelectronics, France), Philippe Pannier (IM2NP, France) 131

Protocols & Security 1

Multi-Reader RFID Tag Identification using Bit Tracking (MRTI-BT)
Abdulrahman Fahim (Nile University, Egypt), Tamer ElBatt (Faculty of Engineering, Cairo University & WINC, Nile University, Egypt) 139
An Anonymous RFID Grouping-Proof with Missing Tag Identification
Mike Burmester (Florida State University, USA), Jorge Munilla (University of Malaga, Spain) 146
Improving UHF RFID Read Rates by Juggling Selected Bits
Alexander Bothe (University of Osnabrück, Germany), Nils Aschenbruck (University of Osnabrück, Germany) 153
Provably Two Rounds RFID Grouping-Proof Protocol
Sarah Abughazalah (Royal Holloway, University of London & University of London, United Kingdom), Konstantinos Markantonakis (Royal Holloway, University of London, United Kingdom) 161

Protocols & Security 2 and Energy Harvesting & Wireless Power 2

A CDMA-based RFID Inventory System
Harold Stern (Texas State University, USA), Ramsey Doany (Texas State University, USA), Cody Lovejoy (Texas State University, USA), Kyle Jones (Texas State University, USA) 175
A Flexible Setup to Determine RFID Tag Requirements for Multiple-Response Scenarios
Martin Mayer (Vienna University of Technology, Austria), Blanca Ramos Elbal (Vienna University of Technology, Austria), Wolfgang Gartner (Vienna University of Technology, Austria), Robert Langwieser (Vienna University of Technology, Austria), Jelena Kaitovic (Vienna University of Technology, Austria) 179
RF Thermoelectric Generation for Passive RFID
Gregory Durgin (Georgia Tech, USA) 183

Localization

3DinSAR:Object 3D Localization for Indoor RFID Applications
Lanxin Qiu (Beijing University of Technology, P.R. China), Niklas Johan Wirström (SICS, Sweden), Thiemo Voigt (Swedish Institute of Computer Science & Uppsala University, Sweden), Zhangqin Huang (Beijing University of Technology, P.R. China) 191
MIMO Gain and Bandwidth Scaling for RFID Positioning in Dense Multipath Channels
Stefan Hinteregger (Graz University of Technology, Austria), Erik Leitinger (Graz University of Technology, Austria), Paul Meissner (Graz University of Technology, Austria), Klaus Witrisal (Graz University of Technology, Austria) 199

Orientation Sensing Using Backscattered Phase from Multi-Antenna Tag at 5.8 GHz
Muhammad Bashir Akbar (Georgia Institute of Technology, USA), Cheng Qi (Georgia Institute of Technology, USA), Mohammad Alhassoun (Georgia Institute of Technology, USA), Gregory Durgin (Georgia Tech, USA) 205