IEEE RFID 2011

5th Annual IEEE International Conference on RFID

Orange County Convention Center
Orlando, Florida (USA)
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www.ieee-rfid.org/2011

IEEE

CRFID
IEEE Technical Committee on RFID

2011 IEEE TUTORIAL/WORKSHOP DAY: APRIL 12, 2011

The tutorial and workshops at IEEE RFID provide an opportunity to learn about RFID in more detail and discuss and explore emerging areas of RFID research with a group of like-minded researchers and practitioners. This year at IEEE RFID 2011 we are happy to announce a strong workshop/ tutorial program, with a tutorial that addresses core RFID topics, as well as new exciting workshops picking up on two specific topics. The tutorial and both workshops, which are organized by true experts in their field, will be held on Tuesday, April 12, 2011, the day before the main conference.

WORKSHOP:
READER ESSENTIALS
8:30 A.M. - NOON

Workshop Organizer: Matt Reynolds, *Assistant Professor, Duke University and former CTO of the RFID reader vendor Thingmagic*

Design and Characterization of Passive and Semi-Passive UHF RFID Readers - this workshop will cover the design and characterization of passive and semi-passive UHF RFID readers, with an emphasis on advanced laboratory and measurement techniques. The goal of this workshop is to enable participants to build their own high quality RFID laboratory setups and make well calibrated measurements at modest cost. Participants will interact with working test setups and observe live signals from both passive and semi-passive tags.

TOPICS INCLUDE:

- Review of UHF RFID link budgets in passive, semi-passive, and near-field modes
- Metrics of interest for UHF RFID systems
- System modeling using Agilent ADS
- Signal sources, modulators, demodulators, and antenna systems
- DSP software using MATLAB
- Emulator tags and WiSPs
- Monostatic readers and BAP tags
- Reader test setups that can be built at modest cost
- Live demos of test setups and measurements

WORKSHOP:
LOCALIZATION IN UHF RFID
1:00 P.M. - 4:30 P.M.

Workshop Organizers: Daniel Arnitz & **Klaus Witrisal** *(Graz University of Technology)*
Pavel Nikitin *(Intermec Technologies)*

This workshop covers various localization methods in UHF RFID and the challenges they face in real life scenarios, such as the multipath backscatter channel and limitations enforced by system design and application scenarios.

- **Introduction and Basics** (15 min)
- **UHF RFID Channel Analysis & Simulation Recommendations** (45 min)
  Daniel Arnitz, Graz University of Technology
- **Ranging Methods Overview** (45 min)
  Pavel Nikitin, Intermec Technologies
- **Market Requirements, Applications, and Use Cases** (30 min)
  Justin Patton, RFID Research Center, University of Arkansas
- **Working UHF RFID Localization Systems** (60 min)
  Zhuo Zou, Royal Institute of Technology, Sweden
  Lyazid Aberbour, University of Louvain, Belgium
  Chris Hook, RF Controls, USA
  Joe Leone, SAIC, USA

TUTORIAL
THE BASICS OF UHF RFID OR RADIATING WITHOUT A LICENSE
8:30 A.M. - 4:30 P.M.

Tutorial Presenter: Dan Dobkin, *Principal, Enigmatics Consulting, Author of "The RF in RFID"*

This tutorial will cover a brief history of RFID and applications of RFID technology including the basic types of passive, semi-passive/active, active; systems operating at low frequency, high frequency, and ultra-highfrequency; and live demonstrations.

Other topics to be covered are: RFID technology essentials such as signals, voltage and power, information and modulation, path loss for an isotropic transmitter, link budgets for passive and semi-passive (BAT) tags, antenna directivity, polarization, and patterns, link budget, forward- and reverse link-limited range readers, LLRP, protocols in general, Gen 2 / ISO 18000-6C standard, ISO 18000-6:2010 extensions, transmitters and RF spectrum, receiver design challenges, and antenna configurations. Topics on RFID tags include: packaging, passive tag antennas, power harvesting, active tags, and tag IC challenges.

Intended audience: this 7-hour primer on the basics of UHF RFID is ideal for conference attendees, students, researchers, and engineers just starting to investigate RFID technologies, devices, and systems, as well as technicians, project managers, and less-technical marketing, sales, and executives wishing to enhance their theoretical knowledge and understanding of core RFID elements. It is recommended that attendees be comfortable with logarithmic quantities, electric fields, modulation, and demodulation.