# IEEE International Conference on Wireless for Space and Extreme Environments

Baltimore, MD, November 7 – 9, 2013

## Conference Program

# WiSEE 2013

**IEEE INTERNATIONAL CONFERENCE FOR WIRELESS IN SPACE AND EXTREME ENVIRONMENTS**

### Silver Donor



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*The Registration will be open on Wednesday Evening (5:00 – 9:00)*

# Chairs' Welcome

On behalf of the Organizing Committee of the 2013 IEEE International Conference on Wireless for Space and Extreme Environments, we welcome you all to WiSEE'13, and the beautiful city of Baltimore, Maryland. This conference will provide a forum for space agency, academic, and industry researchers, as well as representatives from funding and other government agencies, to meet and discuss problems related to applications of wireless technology in the space and aerospace arenas as well as related extreme environments.

The conference history dates back to the late 90's with the inauguration of an informal series of NASA workshops called "Fly by Wireless" to address the important topics of wireless communication and sensing in the context of space applications. Later Fly by Wireless Workshops sponsored by CANEUS resulted in meetings with an expanded focus. Finally, beginning in 2010, IEEE brought all these activities under one umbrella with the 2010 Fly by Wireless Workshop in Maine and the 2011 Workshop in Montreal.

Noting the successful series of similar workshops in Europe called WiSense4Space organized by the European Space Agency (ESA) and similar events hosted by the Canadian Space Agency (CSA), space agency, academic, and industry representatives joined forces in 2011 to organize IEEE WiSEE 2013 to bring NASA, CSA, and ESA together with IEEE to create a larger, international conference that brings together all interested parties in the use of wireless in space and related extreme environments.

The interdisciplinary nature of this conference calls for several IEEE technical society sponsorships to assure selection of high quality papers. These include, IEEE APS, COMSOC, UFFC, and CRFID. In addition, creating this conference would have not been possible without generous financial sponsorships by IEEE USA, IEEE Canada, the IEEE Baltimore Section, UFFC Society and our donors.

The conference will include oral presentations of full research papers, keynote speakers, industry panels, poster sessions, and two parallel workshops (WSS: Wireless Sensor Systems and SSP: Space Solar Power). We invite you all to fully participate in this conference to take advantage of all opportunities that it can create for you and your organization.

*General Co-Chairs:*
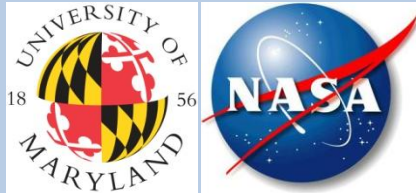*Ali Abedi (UMaine) and Richard Barton (NASA)*

*Executive Co-Chairs:*
*Amir Aghdam (IEEE Canada (Region 7)), Charles Rubenstein (IEEE USA (Regions 1-6))*

# WiSEE

# Keynote Speakers



Anthony Ephremides
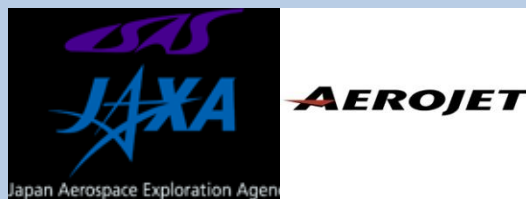University of Maryland

Scott Burleigh
NASA JPL



Paul Werbos
NSF

Nader Moayeri
NIST



Koji Tanaka
JAXA

Mark Kaufman
Aerojet Corp.

# WiSEE Conference and Workshops
# PROGRAM SUMMARY
## November 7 – 9, 2013

| Time | Thursday (Nov 7th) | | Friday (Nov 8th) | | Saturday (Nov 9th) | |
|---|---|---|---|---|---|---|
| 8:15 – 8:30 AM | Welcome & Introductions | | Announcements | | Announcements | |
| 8:30 – 9:15 AM | Keynote 1 Anthony Ephremides (University of Maryland) | | Keynote 3 Paul Werbos (NSF) | | WiSEE Track Industry/ Gov Panel | SSP Track Session 3 |
| 9:15 – 10:15AM | Technical Session 1 (WiSEE Track) | Technical Session 1 (WSS Track) | Technical Session 5 (WiSEE Track) | Technical Session 1A (SSP Track) | | |
| 10:15– 10:45AM | Networking Coffee Break | | | | | |
| 10:45 – 11:45 PM | Technical Session 2 (WiSEE Track) | Technical Session 2 (WSS Track) | Technical Session 6 (WiSEE Track) | Technical Session 1B (SSP Track) | Keynote 6 Mark Kaufman (Aerojet) | |
| 12:00 – 1:00 PM | Lunch Break | | Lunch Break | | END | |
| 1:15 – 2:00 PM | Keynote 2 Scott Burleigh (NASA JPL) | | Keynote 4 Nader Moayeri (NIST) | | Conference will end at 12noon with brief presentation of Best Paper and Best Poster Awards | |
| 2:00 – 3:00 PM | Technical Session 3 (WiSEE Track) | Technical Session 3 ( WSS Track) | Technical Session 7 (WiSEE Track) | Technical Session 2A (SSP Track) | | |
| 3:00 – 3:30 PM | Networking Coffee Break | | | | | |
| 3:30 – 4:30 PM | Technical Session 4 (WiSEE Track) | Technical Session 4 (WSS Track) 3:30-5:00pm | Technical Session 8 (WiSEE Track) | Technical Session 2B (SSP Track) | | |
| 4:45 – 5:30 PM | | | Keynote 5 Koji Tanaka (ISAS, JAXA) | | | |
| | Thursday dinner on your own | | Reception & Poster Session (6:00 – 8:00 PM) | | | |

All networking coffee breaks are intended to promote, enhance, and facilitate technical discussions and professional collaboration
**The NASA GSFC Tour is scheduled on Wed Nov 6th (1:00-3:00 PM) – We will leave hotel at 12noon!**
*The Registration will be open on Wednesday Evening (5:00 – 9:00 PM)*
**WSS and SSP Workshop Programs are posted on the workshop web pages**

# WiSEE Track Program – Day 1

| | Room | Title | Authors | |
|---|---|---|---|---|
| **Thursday, November 7, 2013** | | | | |
| | Room | Title | Authors | |
| 8:15 – 8:30 AM | B & C | **Welcome & Introductions – Marc Apter (IEEE USA President)** | | |
| 8:30 – 9:15 AM | B & C | **Keynote 1: Anthony Ephremides (University of Maryland)** | | |
| | B & C | Title | Authors (Affiliations) | |
| 9:15–9:45 AM | Session 1 – Paper 1.1 | Wireless Sensor and Actuator Networks with Delayed Noisy Feedback (WiSAN) | Lonnie Labonte , Joel Castro, Mojtaba Razfar, Ali Abedi (University of Maine, USA); Ramin Rezaei, Fady Ghabrial, Praveen Shankar, Eric Besnard (California State Univ. Long Beach, USA) | |
| 9:45–10:15AM | Session 1 – Paper 1.2 | Wireless Propagation Measurements for Astronaut Body Area Network | Mohammed Taj-Eldin, Bill Kuhn, Amelia Hodges, Bala Natarajan (Kansas State University, USA) | |
| 10:15–10:45AM | **NETWORKING COFFEE BREAK** | | | |
| 10:45–11:15AM | Session 2 – Paper 2.1 | Wireless Passive Sensors for Remote Sensing of Temperature on Aerospace Platforms | Paolo Gamba, Emanuele Goldoni, Pietro Savazzi (University of Pavia, Italy); Pier Giorgio Arpesi, Claudia Sopranzi (Selex ES, Italy); Jean-Francois Dufour (European Space Agency, The Netherlands) | |
| 11:15–11:45PM | Session 2 – Paper 2.2 | Efficient, Flexible, Scalable Inter-satellite Networking | Ghobad Heidari (GHB Services LLC, USA), Hiep Truong (L-3 Interstate Electronics Corporation, USA) | |
| 12:00–1:00 PM | **LUNCH BREAK** | | | |
| 1:15 – 2:00 PM | B & C | **Keynote 2: Scott Burleigh (NASA JPL)** | | |
| | B & C | Title | Authors | |
| 2:00 – 2:30 PM | Session 3 – Paper 3.1 | Gain Limits of Phase Compensated Conformal Antenna Arrays on Non-Conducting Spherical Surfaces using the Projection Method | Bilal Ijaz, Alarka Sanyal, Alfonso Mendoza-Radal, Sayan Roy, Irfan Ullah, Michael Reich, Debasis Dawn, Benjamin Braaten (North Dakota State University, USA); Neil Chamberlain (NASA Jet Propulsion Laboratory, USA); Dimitris Anagnostou (South Dakota School of Mines and Technology, USA) | |
| 2:30 – 3:00 PM | Session 3 – Paper 3.2 | De Bruijn Sequences as Spreading Codes in Extreme Doppler Conditions: Analysis and Results | Giovanni Pelliccioni, Ennio Gambi, Susanna Spinsante (Università Politecnica delle Marche, Italy) | |
| 3:00– 3:30 PM | **NETWORKING COFFEE BREAK** | | | |
| 3:30 – 4:00 PM | Session 4 – Paper 4.1 | Transparent Microstrip Antennas for CubSat Applications | Nicole Neveu, Mauricio Garcia, Joseph Casana, Richie Dettloff, David R. Jackson, Ji Chen (University of Houston, USA) | |
| 4:00– 4:30 PM | Session 4 – Paper 4.2 | On the Design of Fair Contact Plans in Predictable Delay-Tolerant Networks | Juan Fraire, Pablo Madoery, Jorge Finochietto (National University of Córdoba, Argentina) | |

**POSTER PRESENTATION AND EXHIBITS – Room A**

All networking coffee breaks are intended to promote, enhance, and facilitate technical discussions and professional collaboration

**WSS Track will be in the Kent room.**

# WiSEE Track Program – Day 2

| | Room | Title | Authors | |
|---|---|---|---|---|
| | | **Friday, November 8, 2013** | | |
| | Room | Title | Authors | |
| 8:15 – 8:30 AM | B & C | **Announcements** | | |
| 8:30 – 9:15 AM | B & C | **Keynote 3: Paul Werbos (NSF)** | | |
| 9:15–9:45 AM | B & C | Title | Authors | POSTER PRESENTATION AND EXHIBITS – Room A |
| | Session 5 – Paper 5.1 | Energy-Simplified Doppler-Aided Channel Estimation in Satellite Communication | Chengkai Tang (University of Virginia, USA) | |
| 9:45–10:15AM | Session 5 – Paper 5.2 | An ultra low power RFID sensor platform for launchers applications | Jean-Marc Collignon (Picdi, France); Badr Rmili (CNES, France) | |
| 10:15–10:45AM | | **NETWORKING COFFEE BREAK** | | |
| 10:45–11:15AM | Session 6 – Paper 6.1 | A High Temperature VCO for Extreme Environment Wireless Applications | Jie Yang (Northeastern University, P.R. China) | |
| 11:15–11:45PM | Session 6 – Paper 6.2 | CMOS Phase Shifter for Conformal Phased Array Beamformer Applications | Alarka Sanyal, Alfonso Mendoza-Radal, Bilal Ijaz Debasis Dawn (North Dakota State University, USA) | |
| 12:00–1:00 PM | | **LUNCH BREAK** | | |
| 1:15 – 2:00 PM | B&C | **Keynote 4: Nader Moayeri (NIST)** | | |
| 2:00 – 2:30 PM | B&C | Title | Authors | |
| | Session 7 – Paper 7.1 | Effects of Proximity of Thermal Shields on Tri-band Antenna RF Performance | William N Kefauver, Julie Huffman , Moh'd Hasan (Lockheed Martin, USA) | |
| 2:30 – 3:00 PM | Session 7 – Paper 7.2 | Wireless Sensor Applications in Extreme Aeronautical Environments | William C Wilson (NASA Langley Research Center, USA); Gary Atkinson (VCU, USA) | |
| 3:00– 3:30 PM | | **NETWORKING  COFFEE BREAK** | | |
| 3:30 – 4:00 PM | Session 8 – Paper 8.1 | Closed-Loop Analysis of Soft Decisions for Serial Links | Chatwin Lansdowne, Glen Steele, Adam Schlesinger (NASA Johnson Space Center, USA), Joan Zucha (ITT EXELIS, USA); | |
| 4:00– 4:30 PM | Session 8 – Paper 8.2 | Some Fundamental Limits on SAW RFID Tag Information Capacity and Collision Resolution | Richard J. Barton (NASA Johnson Space Center, USA) | |
| 4:45 – 5:30 PM | Kent | **Keynote 5: Koji Tanaka (ISAS, JAXA)** | | |
| 6:00 – 8:00 PM | | **RECEPTION & POSTER PRESENTATIONS** | | |

All networking coffee breaks are intended to promote, enhance, and facilitate technical discussions and professional collaboration

**SSP Track will be in the Kent room.**

# WiSEE Posters Program

| Room A | Title | Authors | |
|---|---|---|---|
| **Friday, November 8, 2013, 6:00-8:00pm** | | | |
| Poster 1 | QoS Optimized and Energy Efficient Power Control for Deep Space Multimedia Communications in Interplanetary Networks | Chunqiu Wang (South Dakota State University, USA); Wei Wang (South Dakota State University, USA); Kazem Sohraby (South Dakota School of Mines and Technology, USA); James Dudek (Oglala Lakota College, USA) | |
| Poster 2 | Advance of WISDOM GPR Antenna for ExoMars 2018 Mission | Wolf-Stefan Benedix (Technische Universität Dresden, Germany); Dirk Plettemeier (Dresden University of Technology, Germany); André Zanoni (TU Dresden, Germany); Fabian Preller (Invent GmbH, Germany); Valerie Ciarletti (LATMOS/IPSL, France) | |
| Poster 3 | On the Use of Amplitude Tapering for Pattern Correction of Conformal (Curved) Antennas | Sanjay Nariyal (North Dakota State University, USA); Irfan Ullah (North Dakota State University, USA); Syed Naqvi (North Dakota State University, USA); Bilal Ijaz (North Dakota State University, USA); Muhammad Masud (North Dakota State University, USA); Brian Booth (North Dakota State University, USA); Koby Asirvatham (North Dakota State University, USA); Benjamin Braaten (North Dakota State University, USA) | POSTER PRESENTATION AND EXHIBITS – Room A |
| Poster 4 | Wireless Power and Data Transfer to Sensors in Extreme Space Environments | Harbans Dhadwal (Omnitek Partners, LLC, USA); Jahangir Rastegar (Omnitek Partners, LLC, USA); Philip Kwok (Omnitek Partners, LLC, USA) | |
| Poster 5 | Study of X-Band Plasma-Switched Frequency Selective Surfaces for Shielding Applications | Lee Cross (Imaging Systems Technology, USA) | |
| Poster 6 | Distributed 2X2 Space-Time Trellis Code with imperfect Relay | Esam Ali Obiedat (CommScope Inc., USA) | |
| Poster 7 | Determination of Elastic Mode Characteristics Using Wirelessly Networked Sensors for Nanosat Launch Vehicle Control | Ramin Rezaei (California State University Long Beach, USA); Fady Ghabrial (California State University Long Beach, USA); Eric Besnard (California State University Long Beach, USA); Praveen Shankar (California State University Long Beach, USA); Joel Castro (University of Maine, USA); Lonnie Labonte (University of Maine Orono, USA); Mojtaba Razfar (University of Maine-Orono, USA); Ali Abedi (University of Maine, USA) | |
| Poster 8 | Stochastic Modeling of Leak Detection and Localization Using Ultrasonic Sensor Array | Hossein Roufarshbaf (George Mason University, USA); Joel Castro (University of Maine, USA); Ali Abedi (University of Maine, USA) | |
| Poster 9 | Wireless Network Design and Analysis for Real Time Control of Launch Vehicles | Mojtaba Razfar (University of Maine-Orono, USA); Joel Castro (University of Maine, USA); Lonnie Labonte (University of Maine Orono, USA); Ramin Rezaei (California State University Long Beach, USA); Fady Ghabrial (California State University Long Beach, USA); Praveen Shankar (California State University Long Beach, USA); Eric Besnard (California State University Long Beach, USA); Ali Abedi (University of Maine, USA) | |
| Poster 10 | TBD | Mark Kaufman (Aerojet Co., USA) | |

# WiSEE Track Program – Day 3

| Saturday, November 9, 2013 | |
|---|---|
| | **WiSEE Track in Room B&C and SSP Track in Kent Room** |
| 8:15 – 8:30 AM | **Announcements** |
| 8:30 – 10:15 AM | **Gov/Industry Panel**<br>George Studor, NASA JSC<br>Karl Kiefer, Invocon<br>Ed Martinez, Mars 2020 Program |
| 10:15 – 10:45 AM | **COFFEE BREAK** |
| 10:45 – 11:45 PM | **Keynote 6**<br>**Mark Kaufman**<br>**(Aerojet)** |
| 11:45– 12:00PM | **Best Paper and Best Poster Award Presentations** |

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**SSP Track will be in the Kent room.**

# Conference Co-Chairs

General co–chair



Ali Abedi

General co–chair



Richard Barton

Executive co–chair



Charles Rubenstein

Executive co–chair



Amir Aghdam

# Technical Program Co-Chairs

TPC co–chair



Stephen Braham

TPC co–chair



Jackie Hines

TPC co–chair



Jean-Francois Dufour

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Program co–chair



Chirag Warty

Program co–chair



Pascal Nsame

# Keynote/Panels Co-Chairs



Shirley Tseng



Jeff Hayden



George Studor

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Habib Rashvand

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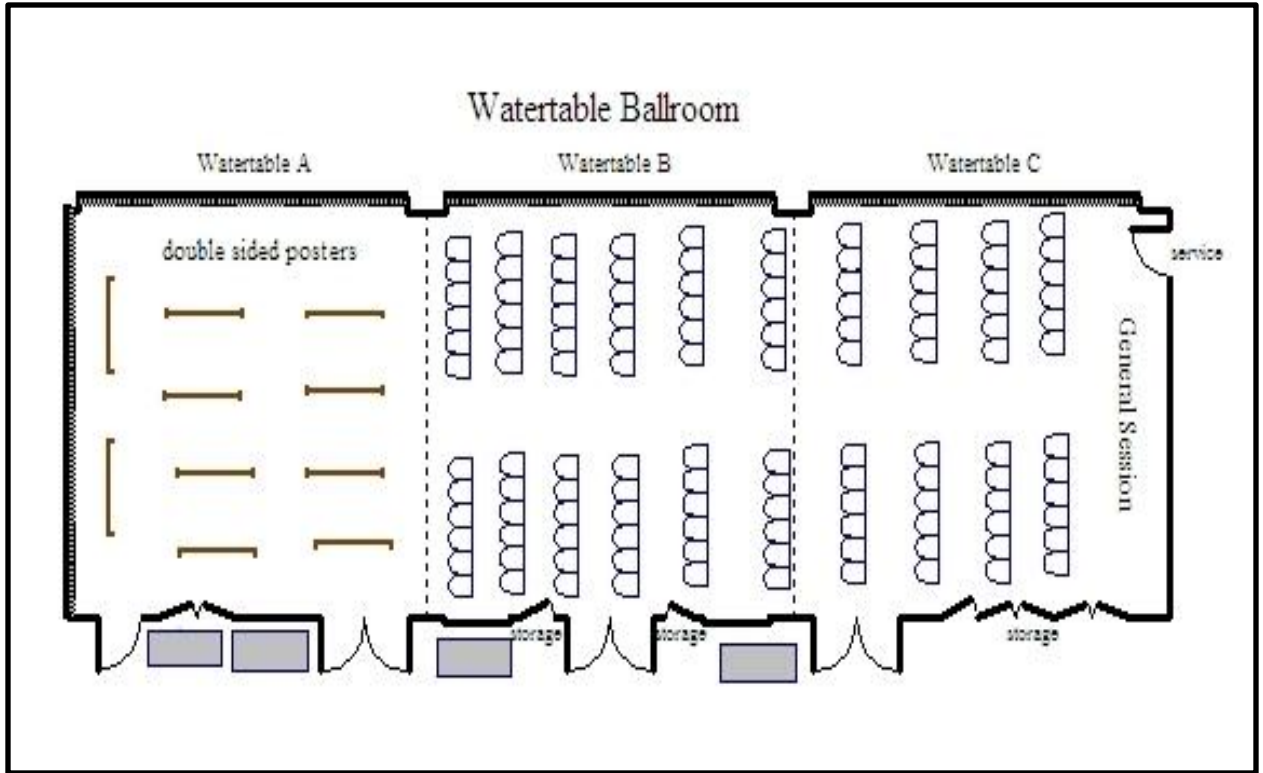### Registration chair



Esam Obiedat

### Venue Chair



Hossein Roufarshbaf

# Venue Map

**Renaissance Baltimore Harbor place Hotel**

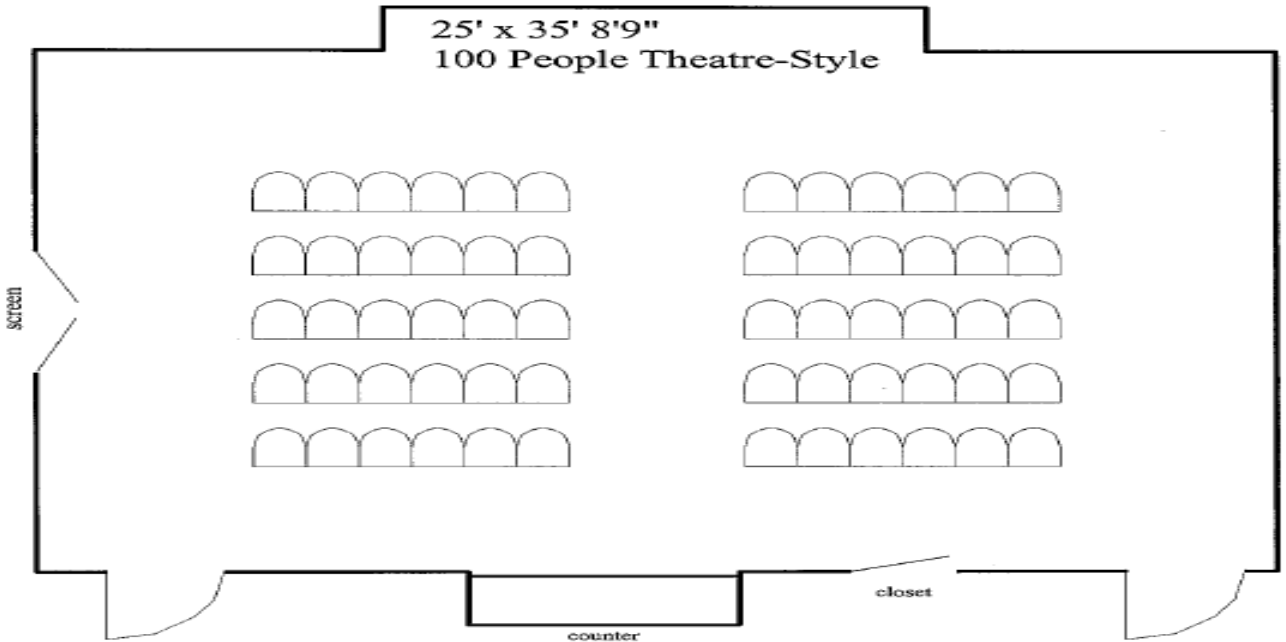202 East Pratt Street · Baltimore, Maryland 21202 USA

## Watertable Ballroom

Watertable A     Watertable B     Watertable C

double sided posters

General Session

service

storage    storage    storage

Room A : 10 posters     Room B : 72 seats     Room C : 48 Seats     Kent : 100 Seats

## Kent

25' x 35' 8'9"
100 People Theatre-Style

screen

closet

counter

# WiSEE 2014

## IEEE International Conference on Wireless for Space and Extreme Environments

European Space Research and Technology Centre (ESA/ESTEC) Noordwijk, The Netherlands

October 30-31, 2014

The conference follows ESA's popular Workshop on Avionics, Data, Control and Software Systems (ADCSS 2014) taking place on October 27-29 http://adcss.esa.int

Organizing Committee:
Jean-François Dufour (European Space Agency)
Stephen Braham (Simon Fraser University, Canada)
Ali Abedi (University of Maine, USA)
Richard Barton (NASA-JSC)
Carl Debono (IEEE Europe/Middle East/Africa (R8))
Amir G. Aghdam (IEEE Canada R7)

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http://sites.ieee.org/wisee

Best Paper Award

Best Poster Award

# Conference Program