

**2017 IEEE NORTH ATLANTIC TEST WORKSHOP**  
**MAY 8-10, CROWNE PLAZA HOTEL PROVIDENCE-WARWICK, RHODE ISLAND**

The IEEE North Atlantic Test Workshop provides a forum for discussions on the latest issues relating to high quality, economical, and efficient test methodologies and designs. In addition to traditional topics, the 26<sup>th</sup> NATW features a general theme of vehicle electronics.

This year's NATW includes 14 peer reviewed research papers co-authored by researchers from 6 companies and 7 universities, including 7 student papers, which are competing for the **Jake Karrfalt Best Student Paper Award**. In addition, the workshop includes a tutorial by Al Czamara from Test Evolution, one Keynote Address by Justin Ray from Edge Case Research, and two Invited Talks from Levente Klein from IBM and Sandip Kundu from University of Massachusetts at Amherst. The 2017 workshop is being held at the Crowne Plaza Hotel Providence-Warwick, Rhode Island, and is sponsored by the IEEE Providence Section in cooperation with the IEEE Green Mountain Section.

**Monday, May 8**

**12:00 - 5:00 pm Registration**

**12:00 - 1:00 pm Lunch**

**1:00 - 2:20 pm Tutorial:** "System Level Validation of SoCs: Power and Performance Testing With Use Cases"

*Al Czamara, Test Evolution, US*

*Introduction by  
Nicola Nicolici  
Program Chair*

**Abstract:** The modern electronic systems we use today are predominantly a combination of hardware and software. Typically, System on a Chip (SoC) devices are at the heart of these products, running embedded software across multiple processor cores, and communicating with the rest of the product and the user through a multitude of input/output protocols. Developing and validating these SoC's is a challenging task due to the sheer complexity of the hardware, software, and their overall interaction. System validation of the SoC is required to insure that the overall product requirements have been met before general release to manufacturing. Use case testing in both pre-silicon and post-silicon validation is becoming a key activity in SoC validation. This tutorial will focus on methods and examples of performance and power as part of use-case testing, and will include portable stimulus and leveraging content across platforms between pre-silicon and post-silicon.

**2:20 - 2:30 pm Coffee Break**

**2:30 - 3:50 pm Tutorial:** "System Level Validation of SoCs: Power and Performance Testing With Use Cases"

*Al Czamara, Test Evolution, US*  
(continued)

**3:50 - 4:00 pm Opening Remarks:** *Brion Keller, General Chair*

**4:00 - 4:50 pm Invited Talk:** "Edge Computing and Contextual Information for the Internet of Things Sensors"

*Levente Klein, IBM, US*

*Introduction by  
Brion Keller  
General Chair*

**Abstract:** Interpreting sensor data require knowledge about sensor placement and the surrounding environment. For a single sensor measurement, it is easy to document the context by visual observation, however for millions of sensors reporting data back to a server, the contextual information needs to be automatically extracted from either data analysis or leveraging complimentary data sources. Data layers that overlap spatially or temporally with sensor locations, can be used to extract the context and to validate the measurement. To minimize the amount of data transmitted through the internet, while preserving signal information content, two methods are explored; computation at the edge and compressed sensing. We validate the above methods on wind and chemical sensing data (1) eliminate redundant sensing data reporting and (2) extract peak value of a chemical sensor. A general cloud based framework is proposed for sensor data validation based on statistical and physical modeling and leveraging contextual data extracted from geospatial data.

**4:50 - 5:00 pm Break**

**5:00 - 6:00 pm Embedded Tutorial Session**

**Session Chair:** *Iris Bahar (Brown University, US)*

**Presenter:** *Ujjwal Guin (Auburn Univ, US): Efficient Strategies for Detection and Avoidance of Counterfeit ICs*

**6:00 - 7:30 pm Welcome Reception**

**7:30 - 9:00 pm Panel Session:** "Automobile Reliability"

**Panel Description:** [http://sites.ieee.org/gm-natw/files/2016/12/natw17\\_panel.pdf](http://sites.ieee.org/gm-natw/files/2016/12/natw17_panel.pdf)

**Panel Chair:** *Gene Atwood (IBM, US)* **Moderator:** *Malinky Ghosh (GlobalFoundries, US)*

**Panelists:** *Al Czamara (Test Evolution, US), Levente Klein (IBM, US), Pascal Nsame (Kardinal Microsystems, US), Andy Laidler (ON Semiconductor, US), Justin Ray (Edge Case Research, US)*

**2017 IEEE NORTH ATLANTIC TEST WORKSHOP**  
**MAY 8-10, CROWNE PLAZA HOTEL PROVIDENCE-WARWICK, RHODE ISLAND**

**Tuesday, May 9**

**7:30 - 12:00 pm Registration**

**7:30 - 8:15 am Breakfast**

**8:15 - 9:15 am Keynote Address:** “Breaking New Ground: Testing Challenges for Autonomy and Robotics”  
*Justin Ray, Edge Case Research, US*

*Introduction by* **Abstract:** Within the last two years, every major automobile manufacturer and many startups have announced *Nicola Nicolici* autonomy programs and partnerships, some with aggressive deadlines for public release. As autonomy and robotics *Program Chair* applications push into consumer domains, they bring new levels of complexity, risk, and exposure that raise important concerns about our ability to validate and verify complex applications. In this presentation, Dr. Ray will discuss the strategies and trends that are emerging around these applications, as well as give some suggestions for the VLSI test community to address these needs in their own research.

**9:15 - 9:20 am Break**

**9:20 - 10:20 am Student Session 1: Validation, Test and Reliability**  
**Session Chair:** *Ted Cooley (Cooley & Company, US)*

- 9:20 - 09:40 am *Christopher Harris (Brown University, US):* Towards the Simulation Based Design and Validation of Mobile Robotic Cyber-physical Systems
- 9:40 - 10:00 am *Konstantinos Poulos (Southern Illinois University, US):* An Enhanced Approach to Reduce Test Application Time through Limited Shift Operations in Scan Chains\*
- 10:00 - 10:20 am *Yu Zhang (University of Vermont, US):* Adaptive RF Interference Canceller for High Dynamic Range Doppler Radar Measurement

**10:20 - 10:40 am Coffee Break**

**10:40 - 12:00 pm Student Session 2: Test and Security**  
**Session Chair:** *Elizabeth Galligan (ON Semiconductor, US)*

- 10:40 - 11:00 am *Vinay C Patil (University of Massachusetts at Amherst, US):* Manufacturer turned Attacker: Dangers of Stealthy Trojans via Threshold Voltage Manipulation\*
- 11:00 - 11:20 am *Saurabh Gupta (Southern Methodist University, US):* Mitigating Simple Power Analysis Attacks on LSIB Key Logic\*
- 11:20 - 11:40 am *Vinay C Patil (University of Massachusetts at Amherst, US):* On Requirements for Disambiguating PUFs in Noisy Environment\*
- 11:40 - 12:00 pm *Kundan Nepal (University of St Thomas, US):* Detecting a Trojan Die in 3D Stacked Integrated Circuits\*

**12:00 - 1:00 pm Lunch**

**1:00 - 6:00 pm Social Event:** Visit to Battleship Cove, the world’s largest exhibit of historic naval ships and maritime museum.  
<http://battleshipcove.org>.

**6:00 - 7:00 pm Break**

**7:00 - 9:00 pm Social Event:** Banquet at Crowne Plaza Hotel including

- The announcements of the **Jake Karrfalt Best Student Paper Award**
- James Monzel Service Award**

Papers for the talks marked with \* are published in IEEEXplore

**2017 IEEE NORTH ATLANTIC TEST WORKSHOP**  
**MAY 8-10, CROWNE PLAZA HOTEL PROVIDENCE-WARWICK, RHODE ISLAND**

**Wednesday, May 10**

**7:30 - 12:00 pm Registration**

**7:30 - 8:15 am Breakfast**

**8:15 - 9:15 am Invited Address: "Securing Physically Unclonable Functions"**  
*Sandip Kundu, University of Massachusetts at Amherst, US*

*Introduction by* **Abstract:** Proliferation of mobile computing hardware and emergence of Internet-of-Things have created a need for low-cost solutions for cryptographic functions such as authentication, encryption and digital signatures. *Kelly Ockunzzi* Vice Program Chair Current best practices involve storing a secret key in a nonvolatile memory or battery backed SRAM which are vulnerable to invasive attacks. Physically Unclonable Functions (PUF) have been touted as an alternative for authentication and low-cost key generation. Due to the nature of applications, a PUF may operate in an untrusted environment where an adversary has the capability to eavesdrop on communications or even have physical possession of the PUF with the ability to apply any input and observe outputs. Securing PUF in this environment is challenging. While the actual threat model varies from application to application, there are some common security challenges for a PUF. In this talk, we will describe two such challenges: (i) ensuring uniqueness (ii) and thwarting modeling attacks. We will then present novel solutions to address those problems. Finally, we will conclude this talk with some open challenges.

**9:15 - 9:20 am Break**

**9:20 - 10:20 am Industry Session 1: Analog/Digital Test and Diagnosis**  
**Session Chair:** *J.C. Lo (University of Rhode Island, US)*

9:20 - 9:40 am *Bin Wang (Advantest, US):* Affordable High Performance Testing Practice on New Generation ATE  
 9:40 - 10:00 am *Rohan Deshpande (GlobalFoundries, US):* An Intelligent Engine for Systematic Defect Identification through Scan Diagnosis  
 10:00 - 10:20 am *Paul Reuter (Mentor Graphics, US):* DFT Pattern Acceleration using emulation and STIL patterns

**10:20 - 10:40 am Coffee Break**

**10:40 - 12:00 pm Industry Session 2: SOC Test Strategies**  
**Session Chair:** *Tian Xia (University of Vermont, US)*

10:40 - 11:00 am *Kelly Ockunzzi (GlobalFoundries, US):* Applications of Hierarchical Test  
 11:00 - 11:20 am *Carl Wisnesky II (Cadence, US):* On-Demand BIST Using Data Streams  
 11:20 - 11:40 am *Yu Huang (Mentor Graphics, US):* Case Study of Bandwidth Management in SoC Testing \*

**11:40 - 12:00 pm Closing Remarks**

**12:00 - 1:00 pm Lunch**

**Papers for the talks marked with \* are published in IEEEExplore**