IEEE computer society

Welcome to HOST 2016

IEEE International Symposium on Hardware-Oriented Security and Trust

http://www.hostsymposium.org/

McLean, VA

May 3 – 5, 2016

William H. Robinson (Vanderbilt), General Chair

Swarup Bhunia (University of Florida), Program Chair

Ryan Kastner (University of California, San Diego), Vice Program Chair

Symposium Logistics

- **All technical sessions are in this room**
  - Salon III, 5th floor
- **Breakfast, lunch, and breaks**
  - Served in Pre-function area of Salon III, 5th floor
- **Wednesday reception and award announcements**
  - Salon II, 5th floor
  - Light hors d'oeuvres
  - Cash bar
- **Wireless access**
  - Network: Ritz-Carlton_CONFERENCE
  - Password: IEEE2016

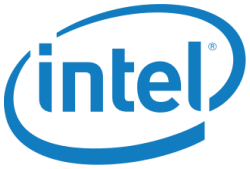
HOST Overview

- **HOST aims to facilitate the rapid growth of hardware-based security research and development.**
  - Grown from a 1-day workshop to a 2.5-day symposium
- **Attendees represent academic, industrial, and government organizations.**
- **Attendance includes representation from**
  - Embedded systems community
  - Microprocessor community
  - Application-specific integrated circuit (ASIC) design community
  - ASIC test community

Industrial Sponsors

- **Platinum**

- **Gold**



- **Silver**

Additional Sponsors

- **Student Travel Grant**

- **Organizations**

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TRUST
Team for Research in Ubiquitous Secure Technology

Organizing Committee

Position	Name	Organizational Affiliation
General Chair	**William H. Robinson**	Vanderbilt University
Program Chair	**Swarup Bhunia**	University of Florida
Vice Program Chair	**Ryan Kastner**	University of California, San Diego
Finance Chair	**Ankur Srivastava**	University of Maryland College Park
Publicity Chair	**Domenic Forte**	University of Connecticut
Local Arrangements Chair	**Hassan Salmani**	Howard University
Registration Chair	**Yier Jin**	University of Central Florida
Panel Tutorial Chairs	**Saverio Fazzari**	Booz Allen Hamilton
Industrial Liaisons	**Mark Tehranipoor** **Gang Qu**	University of Florida University of Maryland College Park
Publications Chair	**Ted Huffmire**	Naval Postgraduate School
Webmaster	**Anirudh Mallem**	University of Florida

Organizing Committee

Position	Name	Organizational Affiliation
Asia-Pacific Liaison	**Rajat Subhra Chakraborty**	IIT Kharagpur, India
Hardware Demo Chair	**Jim Plusquellic**	University of New Mexico
Student Travel Grant Program Chair	**Mingze Gao**	University of Maryland College Park
Poster Session Chair	**Qiaoyan Yu**	University of New Hampshire
A/V chair	**Ioannis Savidis**	Drexel University
Program Brochure	**Lesly Galiana**	University of Florida

Program Committee (1 of 5)

- **Divya Arora,** Intel Corporation
- **Mark Tehranipoor,** University of Florida
- **Mainak Banga,** Virginia Tech
- **Lejla Batina,** Radboud University Nijmegen
- **Guido Bertoni,** ST
- **Olivier Benoit,** Qualcomm Inc.
- **Jay Bhadra,** Freescale Semiconductors Inc.
- **Koushik Chakraborty,** Utah State University
- **Rajat Subhra Chakraborty,** IIT Kharagpur, India
- **Chip Hong Chang,** Nanyang Technological University
- **Srini Devadas,** MIT
- **Saverio Fazzari,** Booz Allen Hamilton
- **Domenic Forte,** University of Florida
- **Chris Francis,** Raytheon
- **Swaroop Ghosh,** University of South Florida

Program Committee (2 of 5)

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- **Brett Hamilton,** NSWC Crane
- **Jason Hamlet,** Sandia National Laboratories
- **Ian Harris,** University of California Irvine
- **Michael Hsiao,** Virginia Tech
- **Ted Huffmire,** Naval Postgraduate School
- **Yier Jin,** The University of Central Florida
- **Ramesh Karri,** New York University
- **Farinaz Koushanfar,** University of California, San Diego
- **Ken Mai,** Carnegie Mellon University
- **Yiorgos Makris,** University of Texas, Dallas
- **Dominik Merli,** Siemens AG
- **Ahmad Muhanna,** Huawei
- **Debdeep Mukhopadhyay,** IIT Kharagpur, India
- **Saibal Mukhopadhyay,** Georgia Institute of Technology

Program Committee (3 of 5)

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- **Seetharam Narasimhan,** Intel
- **Giorgio Di Natale,** LIRMM
- **Christof Paar,** Ruhr University Bochum
- **Keshab Parhi,** University of Minnesota
- **Jongsun Park,** Korea University
- **Eric Peeters,** Texas Instruments
- **Youngok Pino,** NAVSEA
- **Jim Plusquellic,** University of New Mexico
- **Miodrag Potkonjak,** UCLA
- **Gang Qu,** University of Maryland College Park
- **Jeyavijayan Rajendran,** University of Texas, Dallas
- **Sandip Ray,** Intel
- **Francesco Regazzoni,** ALaRI - USI (Switzerland)
- **Garrett Rose,** University of Tennessee

Program Committee (4 of 5)

- **Ulrich Rührmair,** Ruhr University Bochum
- **Ahmad-Reza Sadeghi,** TU Darmstadt
- **Kazuo Sakiyama,** The University of Electro-Communications
- **Hassan Salmani,** Howard University
- **Fareena Saqib,** Florida Institute of Technology
- **Patrick Schaumont,** Virginia Tech
- **Georg Sigl,** Technische Universität München
- **Sergei Skorobogatov,** University of Cambridge, Computer Laboratory
- **Mani Soma,** University of Washington
- **Ankur Srivastava,** University of Maryland College Park
- **Francois-Xavier Standaert,** UCL Crypto Group
- **Susmita Sur-Kolay,** ISI Kolkata, India
- **Mohit Tiwari,** University of Texas, Austin
- **Steve Trimberger,** Xilinx
- **Michael Vai,** MIT Lincoln Lab

Program Committee (5 of 5)

- **Marten van Dijk,** University of Connecticut
- **Apostol Vassilev,** NIST
- **Ingrid Verbauwhede,** KU Leuven, ESAT/COSIC
- **Michel Wang,** Beihang University, Beijing, China
- **Sheng Wei,** University of Nebraska-Lincoln
- **James B Wendt,** Google
- **Marilyn Wolf,** Georgia Institute of Technology
- **Amir Khatib Zadeh,** Intel
- **Joseph Zambreno,** Iowa State University

Steering Committee

- **Mark Tehranipoor, University of Florida**
  - HOST Co-Founder and Steering Committee Chair
- **Jim Plusquellic, University of New Mexico**
  - HOST Co-Founder
- **Farinaz Koushanfar, Rice University**
- **Miodrag Potkonjak, University of California, Los Angeles**

History of HOST

Co-located with Design Automation Conference (DAC)

- **HOST 2008: Anaheim, CA**
- **HOST 2009: San Francisco, CA**
- **HOST 2010: Anaheim, CA**
- **HOST 2011: San Diego, CA**
- **HOST 2012: San Francisco, CA**
- **HOST 2013: Austin, TX**

Independent symposium

- **HOST 2014: Arlington, VA**
- **HOST 2015: McLean, VA**
- **HOST 2016: McLean, VA**

Thank you for making HOST 2016 the largest ever!

Symposium Venue

- **The Ritz-Carlton, Tysons Corner**
  - Loretta Awuor, Meetings and Special Events Manager
- **PSAV**
  - Jerina Ordono, Senior Sales Manager
- **Student volunteers**
  - Howard University
  - University of Central Florida
  - University of Maryland College Park
  - University of New Mexico
- **Nancy Bishop, Accommodations Unlimited**
  - http://www.WeDoTheLegwork.com

HOST 2016 Technical Program

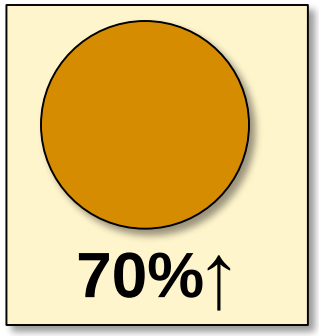
Program Chair:

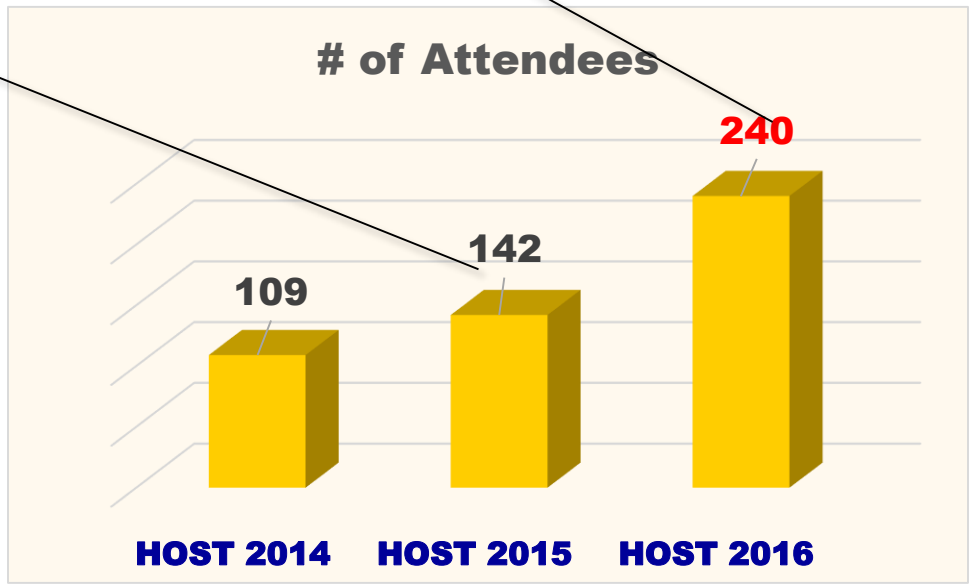
Swarup Bhunia, U. of Florida

Vice-Program Chair:

Ryan Kastner, UCSD

HOST Trends





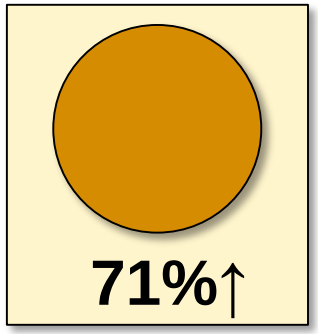
Reflects the growing significance of the field

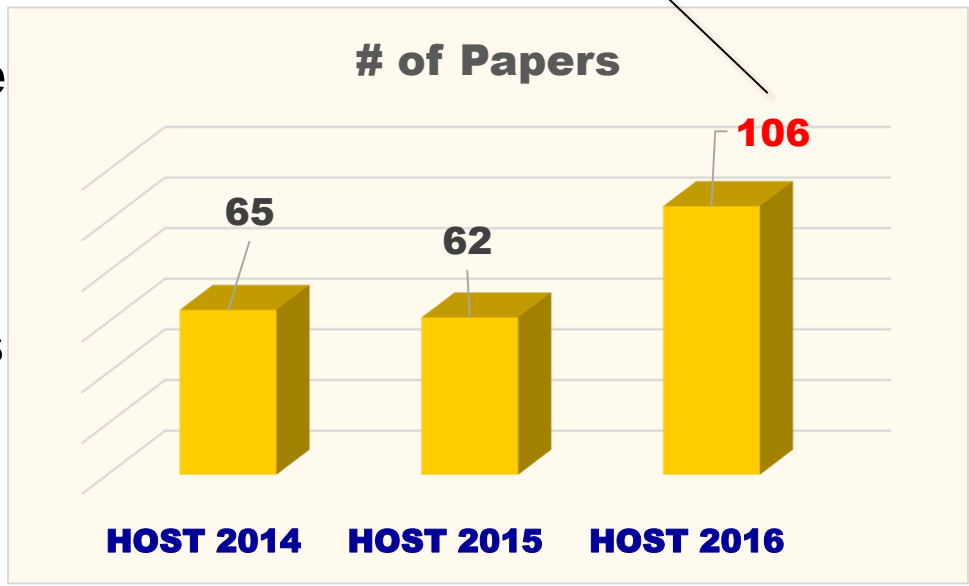
& commitment of the OC!

HOST Trends

Almost obeying **Moore's law!**

- We received 123 abstracts & 106 full papers
- We followed a blind review process considering all COIs; papers randomly assigned by Easychair
- Each of 73 TPC members were assigned 7-8 papers and 106 external reviewers submitted 146 reviews
- All papers received >3 reviews (avg. 4.7 reviews)
- TPC selected 26 full papers (24.5%*) & 18 posters (41.5%)





* Last year's acceptance rate for full paper was 27.4%

Papers by Topic

Topic	Submissions	Accepted	PC Members
Hardware IP trust (watermarking, metering, trust verification)	13	2	6
Secure and efficient implementation of crypto algorithms	15	4	6
Reverse engineering and hardware obfuscation	16	2	10
Secure system-on-chip (SoC) architecture	16	2	11
Hardware techniques that ensure system security	20	3	8
Hardware Trojan attacks and detection techniques	22	1	12
Side-channel attacks and protection	25	3	10
Hardware-based security primitives (PUFs, RNGs)	29	5	12

- **16 Topics to choose from – top 8 shown**
- **Hot topics: Security primitives, followed by SCA, Trojan, HW assisted system security**

Papers by Country

Country	Authors	Submitted	Accepted	Acceptance Rate	PC members
Australia	3	1	1	1	0
Belgium	10	3.25	1	0.31	2
Brazil	8	1.85	0.25	0.14	0
Canada	3	0.75	0	0	0
China	9	2.27	0.6	0.26	1
Denmark	2	1	0.33	0.33	0
Egypt	1	0.33	0	0	0
France	31	7.1	0	0	2
Germany	40	11.58	2.75	0.24	5
India	13	4.67	1	0.21	3
Iran, Islamic Republic of	3	1.17	0	0	0
Israel	6	2.5	0	0	0
Italy	0	0	0	0	1
Japan	14	2.23	0.5	0.22	1
Korea, Republic of	1	0.25	0	0	1
Mexico	2	1	0	0	0
Netherlands	4	1.5	1	0.67	1
Pakistan	2	0.5	0	0	0
Portugal	1	0.25	0	0	0
Singapore	9	2.5	1	0.4	1
Spain	2	1	0	0	0
Switzerland	2	1.92	0.17	0.09	1
Turkey	2	1.25	0.25	0.2	0
United Arab Emirates	4	0.92	0.5	0.55	0
United Kingdom	3	1	0	0	1
United States	194	71.22	15.65	0.22	54

- **Papers from 27 countries**
- **US 71%, Germany 12%, France (7%), India (5%) and Belgium (3%)**

Program Highlights

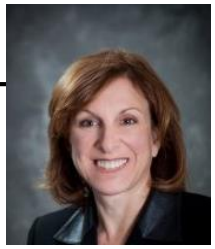
- **26 Technical Paper and 18 Poster Presentations**
  - Best paper competition & poster competition
- **4 Keynote Talks**
- **3 Visionary Talks**
- **Invited industry session with 3 talks**
  - Session 5 (Tuesday): New Directions in Hardware Security
  - **Speakers:** Michael Schuldenfrei (Optimal+), Brian Murray (Zf TRW), & Mark Marson (Cryptography Research)
- **Two Panels**
  - Session 11 (Wednesday): Hardware-Enabled System Security
  - Session 14 (Thursday): Hardware IP Protection Through Invasive and Non-Invasive Analysis
- **Hardware Demo Competition**

First in HOST 2016

- **Hardware Demo Competition**
  - First time for the HOST Symposium
  - **15 demos** on varied topics from robotic arm to PUF, SCA, Trojan, and spectroscopy based medicine authentication and more!
  - Wednesday at 10 am
- **Industry Exhibit Tables**
  - Visit the tables

Keynote Talks

- **Donna F. Dodson, NIST**
  - Building Trust from the Bottom Up – A NIST perspective (Tuesday, May 3)



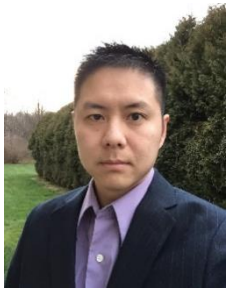
- **Frank McKeen, Intel**
  - Protecting Enterprise Data while in Use (Tuesday, May 3)

- **Allan Steinhardt, Booz Allen Hamilton**
  - Technical Means to Detect Counterfeiting in the Real World: What the Government is Thinking, and How it is Driving Industry (Wednesday, May 4)

- **Carl E. McCants, IARPA**
  - From Star Trek to Star Wars: The Force Awakens - The Importance of Hardware and IP Security (Thursday, May 5)

Visionary Talks

- **Kerry Bernstein, DARPA**
  - Gazing into the Hardware Security Crystal Ball (Tuesday, May 3)



- **Lok Yan, Air Force Research Lab**
  - HOST: HOST Oriented Security and Trust (Wednesday, May 4)
- **Apostol Vassilev, NIST**
  - Cybersecurity Today and Tomorrow: Assurance or Insurance? (Thursday, May 5)

Oral and Poster Presentations

- **The program features 26 oral presentations**

  Tuesday

  - Session 2: Hardware Authentication & PUF
  - Session 3: Efficient Implementation of Secure Systems

  Wednesday

  - Session 8: Attacks & Forensics
  - Session 9: System Security: Risk Analysis & Solutions
  - Session 10: Side Channels: The Good and the Bad

  Thursday

  - Session 13: Attack-Resistant Design and Protocols

- **The program features 18 poster presentations**
  - Session 4: Poster Session is this afternoon
- **Three lunch plenary talks**

Acknowledgement

- **Mark Tehranipoor and Saverio Fazzari for help with all special sessions**
- **All OC Members**
- **All TPC Members**
- **All External Reviewers**

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