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Welcome Message

On behalf of the Warren B. Nelms Institute for the Connected World, it is our great pleasure to welcome you to the inaugural Internet of Things (IoT) conference at the University of Florida. The institute remains at the forefront of IoT research, education and outreach activities with specific emphasis on developing ground-breaking IoT technologies and their exciting applications in solving global problems - a core mission for the institute. The conference brings together our diverse and talented students, postdocs and faculty, our academic collaborators from various universities, industry and government sponsors, and inspiring leaders from different sectors, who're pushing the frontiers of IoT in a myriad of ways.

Through collective and devoted efforts of the members of our Institute, we have put together an outstanding technical program. We sincerely thank all members of the institute, our sponsors (Discover, FLARE, UF Office of Research, UF Herbert Wertheim College of Engineering, Electrical and Computer Engineering Department, and Department of Computer Science and Information Science and Engineering), and our collaborators and the research sponsors. We hope you will enjoy attending the conference and learning about our research/education activities, which our students and faculty are showcasing.

Swarup Bhunia

Director

My T. Thai

Associate Director

Welcome Message

On behalf of the Organizing Committee, we would like to invite you to the 1st Warren B. Nelms Annual IoT Conference (IoT 2019). IoT 2019 will be held from December 3-4, 2019 at the Hilton University of Florida Conference Center, Gainesville, Florida. The theme of the conference is innovation in IoT security, safety, intelligence, and interoperability for solving global problems. The program committee has put together an excellent technical program consisting of nine keynotes, six visionary talks, and multiple invited lectures by world-renowned experts. It also include 64 posters and 25 demos at the time this program book in your hand sent for printing. IoT 2019 offers an ideal opportunity to explore the recent technologies and discuss with a lot of researchers and visionaries in this field. Finally, we would like to express our sincere appreciation to sponsors, speakers and volunteers. We hope that you will enjoy the program and your stay in Gainesville, Florida.

Prabhat Mishra
Co-General Chair

My T. Thai
Co-General Chair

Joel Harley
Co-Program Chair

Christophe Bobda
Co-Program Chair

Technical Program

DECEMBER 3-4, 2019

Hilton University of Florida Conference Center
Gainesville, FL, USA

Program Highlights

- **14 Featured Invited Speakers showcasing some of the world's most innovative thinkers in Internet of Things (IoT)**
- **66 Student Poster Presentations and 22 Student Hardware Demos**
- **One Panel on the Topic of Emerging Importance in IoT**
- **5 Signature Series Talks on Research Advances in IoT Technology**

Tuesday, DECEMBER 3

7:30 – 8:15 AM	**Registration and Continental Breakfast**
SESSION 1: Moderator:	PLENARY SESSION [8:15 – 9:45 AM] Prabhat Mishra, Computer and Information Sc. and Eng., U. of Florida
8:15 – 8:30 AM	**Welcome:** General and Program Chairs
8:30 – 8:40 AM	**Opening Remarks:** Cammy Abernathy, Dean, Herbert Wertheim College of Engineering, U. of Florida
8:40 – 9:10 AM	**KEYNOTE TALK** **Speaker: Dhinesh Manoharan** Senior Director, Offensive Security Research, Intel
9:15 – 9:45 AM	**KEYNOTE TALK** **Speaker: Sanjay Bajekal** Discipline Leader, United Technology Research Center
SESSION 2: Moderator:	INVITED TALKS [9:50 – 10:35 AM] Roozbeh Tabrizian, Electrical and Computer Eng., U. of Florida
9:50 – 10:10 AM	**VISIONARY TALK** **Speaker: Doug Gardner** Chief Technologist, Analog Devices
10:15 – 10:35 AM	**VISIONARY TALK** **Speaker: Sam Wanis** Program Manager, Northrop Grumman Corporation

Technical Program

10:35 – 11:00 AM **BREAK**

SESSION 3:	INVITED TALKS [11:00 – 12:10 PM]
Moderator:	Robert Karam, Computer Sc. and Eng., U. of South Florida

11:00 – 11:30 AM **KEYNOTE TALK**
Speaker: David Hardin
Principal Researcher, Collins Aerospace

11:35 – 11:55 AM **VISIONARY TALK**
Speaker: Jon Mellot
Expert Chief Technologist, Mercury Systems

12:00 – 12:10 PM **SIGNATURE SERIES TALK**
Speaker: Shreyas Sen
Electrical and Computer Eng., Purdue University

12:10 – 1:05 PM **LUNCH (Poster Setup)**

1:05 – 1:20 PM **GROUP PHOTO SESSION**

SESSION 4:	INVITED TALKS [1:20 – 2:40 PM]
Moderator:	My T. Thai, Computer and Information Sc. and Eng., U. of Florida

1:20 – 1:50 PM **KEYNOTE TALK**
Speaker: David Nelms
Retired CEO, Discover Financial Services

1:55 – 2:15 PM **VISIONARY TALK**
Speaker: Adam Langdon
Director of Research and Development, Edaptive Computing

2:20 – 2:40 PM **VISIONARY TALK**
Speaker: BaekGyu Kim
Principal Researcher, Toyota, North America, Infotech Labs

2:40 – 4:20 PM **BREAK & STUDENT POSTER COMPETITION**

Session Chairs:

- **Sharon Lynn Chu,** Computer and Information Sc. and Eng., U. of Florida
- **Tuba Yavuz,** Electrical and Computer Eng., U. of Florida

List of student's poster presentations are on page no. 12

Technical Program

SESSION 5:	PANEL: *Technology Solutions for IoT: Are We There Yet?* [4:20 – 5:50 PM]
Moderator:	Sandip Ray, Electrical and Computer Eng., U. of Florida

Panelist

- **Alok Agarwal**, Director (Business Services), ATS (A KGPCo Company)
- **Chris Taylor,** Electronics Research Engineer, Air Force Research Lab (AFRL)
- **Eric Buffkin**, Senior VP, EtectRX
- **Massimiliano Corba,** Principal Member of Technical Staff, Draper Lab
- **Seetharam Narasimhan**, Senior Hardware Security Architect, Microsoft
- **Shane Wiggins,** Director (IoT), Teezle

Wednesday, DECEMBER 4

7:30 – 8:15 AM **Registration and Continental Breakfast (Demo Setup)**

SESSION 6:	PLENARY SESSION [8:15 – 9:30 AM]
Moderator:	Karla Shelnutt, College of Agriculture and Life Sciences, U. of Florida

8:15 – 8:35 AM **Welcome & Opening Remarks:**

- **Juan Gilbert,** Chair, Computer and Information Sc. and Eng., U. of Florida
- **John Harris,** Chair, Electrical and Computer Eng., U. of Florida
- **Richard Vigeant**, Director, Florida Applied Research in Eng.

8:40 – 9:10 AM **KEYNOTE TALK**
Speaker: Steven J. Thomson
National Program Leader, USDA/NIFA

9:15 – 9:30 AM **SIGNATURE SERIES TALK**
Speaker: Sanjay Ranka
Computer and Information Sc. and Eng., U. of Florida

9:30 – 11:15 AM **BREAK & STUDENT IoT DEMO COMPETITION**

Session Chairs:

- **Kemal Akkaya**, Electrical and Computer Eng., Florida International U.
- **Shuo Wang**, Electrical and Computer Eng., U. of Florida

List of student's hardware demos are on page no. 18

SESSION 7:	INVITED TALKS [11:15 – 12:10 PM]
Moderator:	Christine Angelini, Environmental Eng. Sciences, University of Florida

11:15 – 11:45 AM **KEYNOTE TALK**
Speaker: Susan Maley
Program Manager, Electric Power Research Institute (EPRI)

Technical Program

11:50 – 12:10 PM **VISIONARY TALK**
Speaker: David C. Stuart
Associate Technical Director, Information Technology Laboratory, U.S. Army

12:10 – 1:05 AM **LUNCH**

SESSION 8:	INVITED TALKS [1:05 – 2:05 PM]
Moderator:	Joel Harley, Electrical and Computer Eng., U. of Florida

1:05 – 1:35 PM **KEYNOTE TALK**
Speakers:

Michael Hansen
Head of Innovation, Discover Financial Services
Kyong Ro,
Innovation Office Project Manager, Discover Financial Services

1:40 – 1:50 PM **SIGNATURE SERIES TALK**
Speaker: Toshikazu Nishida
Director, MIST Center, U. of Florida

1:55 – 2:05 PM **SIGNATURE SERIES TALK**
Speaker: Alina Zare
Electrical and Computer Eng., U. of Florida

2:05 – 2:25 PM **COFFEE BREAK**

SESSION 9:	KEYNOTE & SIGNATURE TALKS [2:25 – 3:30 PM]
Moderator:	Kemal Akkaya, Electrical and Computer Eng., Florida International U.

2:25 – 2:55 PM **KEYNOTE TALK**
Speaker: Hariharan Krishnaswami
Technology Manager, Solar Energy Technologies Office,
US Department of Energy

3:00 – 3:10 PM **SIGNATURE SERIES TALK**
Speaker: Sharon Lynn Chu
Computer and Information Sc. and Eng., U. of Florida

3:10 – 3:25 PM **STUDENT POSTER/DEMO AWARD CEREMONY**

3:25 – 3:30 PM **CONCLUDING REMARKS**
Warren B. Nelms Annual IoT Conference 2019 General and Program Chairs

Speakers

Sanjay Bajekal

Discipline Leader
United Technology Research Center

Massimiliano Corba

Principal Member of Technical Staff
The Charles Stark Draper Laboratory

Dough Gardner

Trust and Security Solutions
Analog Devices

David Hardin

Program Manager
Rockwell Collins Advanced Technology Center

Michael Hansen

Head of Innovation
Discover Financial Services

Hariharan Krishnaswami

Technology Manager
Solar Energy Technology Office
U.S. Department of Energy

Speakers

BaekGyu Kim

Principal Researcher
Infotec Labs
Toyota Motor North America (TMNA) R&D

Adam Langdon

Director of Research and Development
Edaptive Computing, Inc

Susan Maley

Program Manager
Electric Power Research Institute (EPRI)

Sharon Lynn Chu

Computer and Information Science and Engineering,
University of Florida

Dhinesh Manoharan

Senior Director
Offensive Security Research

Jon Mellott

Executive Chief Technologist
Mercury Systems

Speakers

Seetharam Narasimhan

Security Architect
Microsoft

David Nelms

Former CEO, Discover Financial Services
Board of Director
Federal Reserve Board of Chicago and CDW Corporation

Toshikazu Nishida

Director
MIST Center, University of Florida

Sanjay Ranka

Computer and Information Science and Engineering,
University of Florida

Shreyas Sen

Electric and Computer Engineering
Purdue University

David C. Stuart

Associate Technical Director
Information Technology Laboratory
U.S. Army

Speakers

Christopher Taylor

Research Electronics Engineer
U.S. Air Force Research Laboratory

Steven J. Thomson

National Program Leader
USDA/NIFA

Sam Wanis

Program Manager
Northrop Grumman

Alina Zare

Electrical and Computer Engineering
University of Florida

Student Posters

1. The Scanning Plant IoT (SPOT) Facility
   - **Stephen Lantin –** U. of Florida
2. From Fundus Image To The Brain: A Machine Learning Powered Alzheimer's Disease Screening Tool
   - **Jianqiao "J.Q." Tian –** U. of Florida
3. IoT Weather Stations for Haiti
   - **Robert Corso –** U. of Florida
4. Memristor Based In-memory Computing to Enable Internet-of-Things
   - **Md Adnan Zaman –** U. of South Florida
5. Architectural Support for Detecting Software Attacks on IoT Edge Processors
   - **Love Kumar Sah –** U. of South Florida
6. Synthesis of Secure IoT Hardware Design
   - **Sheikh Ariful Islam –** U. of South Florida
7. Smart Water Quality Sensing — Spectroscopy
   - **J. Barrett Carter –** U. of Florida
8. Efficient Hardware Constructions for Error Detection of Key Generation in McEliece Cryptosystem
   - **Alvaro C. Canto –** U. of South Florida
9. GATORBYTE – An Open-Source Platform for Low Cost, Real-Time Water Resource Monitoring
   - **Piyush Agade –** U. of Florida
10. SoC Security Validation
    - **Yangdi Lyu –** U. of Florida
11. Message Flow Mining for SoC Validation for Safe and Secure IoT Edge Node Design
    - **Md Rubel Ahmed –** U. of South Florida
12. Fast Approximation of Convolutional Neural Network Robustness
    - **Miranda Overstreet** – U. of Florida

Student Posters

13. Smart and highly sensitive non-contact sensors for life monitoring
    - **Mohammad S. Islam** – Case Western Reserve University
14. Wireless Acoustic Surface Power and Data Link
    - **Sameer Mohammed Shaik** – Case Western Reserve University
15. IoT-Wet-Farm, An Agricultural IoT Network for Rainfall Monitoring
    - **Thiago Borba Onofre** – U. of Florida
16. An internet of Smart Ultrasonic Sensors for Structural Health Monitoring
    - **Xinyao Tang** – Case Western Reserve University
17. Dynamic Voltage comparator
    - **Peyman Dehghanzadeh** – U. of Florida
18. "The Echo", A Bluetooth Connected NMR Spectrometer in the Footprint of an Amazon Echo
    - **Mason Greer** – Case Western Reserve University
19. Market analysis for integration of ridesharing and public transit
    - **Jiahua Qiu** – U. of Florida
20. A Highly-Digital Multi-Antenna Ground-Penetrating Radar (GPR) System
    - **Phong Nguyen** – Case Western Reserve University
21. Clandestine Nano Electro Mechanical Tags for Identification and Authentication
    - **Sushant Rassay** – U. of Florida
22. RF-over-fiber transmission based on continuous-time delta sigma modulator
    - **Xi Gao** – Case Western Reserve University
23. Interactive Image Segmentation in Agriculture
    - **Xiaolei Guo** and **Guohao Yu** – U. of Florida
24. Target Detection given Uncertain Training Data
    - **Sheng Zou** and **Connor McCurley** – U. of Florida

Student Posters

25. Conformal Ultrasound Probe for Image-Guided Neuromodulation
    - **Vida Pashaei** – Case Western Reserve University
26. Methodology for coordination group formation for coordinated routing mechanisms
    - **Wang Peng** – U. of Florida
27. Smart Mouthguard for Biomedical Applications
    - **Michael Olvera** – U. of Florida
28. A Temperature-Compensated MEMS-Referenced Oscillator with a Feedback ASIC
    - **Jaesung Lee** – Case Western Reserve University
29. Security of autonomous vehicle sensors
    - **Raj Gautam Dutta** – U. of Florida
30. LAHEL: Lightweight Attestation Hardening Embedded Devices using Macrocells
    - **Orlando Arias** – U. of Florida
32. mm-Scale and MEMS Piezoelectric Energy Harvesters Powering On-Chip CMOS Temperature Sensing for IoT Applications
    - **Xu-Qian Zheng** – U. of Florida
33. Distributed Smart Camera Apparatus for Real-time Image Stitching
    - **Erman Nghonda** – U. of Florida
34. Puppet System for classroom enactment
    - **Nanjie Rao** – U. of Florida
35. Wearables for better learning
    - **Neha Rani** – U. of Florida
36. ENCIDER: Detecting Time and Cache Side Channels
    - **Farhaan Fowze** – U. of Florida
37. Security Assurance of Connected and Autonomous Vehicle Communication
    - **Srivalli Boddupalli** – U. of Florida

Student Posters

38. Acoustically Coupled Wideband RF Filters with Bandwidth Reconfigurability Using Ferroelectric Aluminum Scandium Nitride Film
    - **Sushant Rassay** – U. of Florida
39. A High-Q 30nm-thick MFM Resonator Using Ferroelectric Hafnium Zirconium Oxide
    - **Mayur Ghatge** – U. of Florida
40. Non-Reciprocal Acoustoelectric Amplification in Germanium-Based Lamb Wave Delay Lines
    - **Faysal Hakim** – U. of Florida
41. An Obfuscation-based Countermeasure against FPGA Bitstream Tampering Attacks
    - **Tamzidul Hoque** – U. of Florida
42. The Metric Matters: The Art of Measuring Trust in Electronics
    - **Jonathan Cruz** – U. of Florida
43. Leveraging System-on-Chip Architectures for Optimizing Robotic Applications
    - **Taylor JL Whitaker** – U. of Florida
44. Reconfigurable Hybrid Virtual Platform for hardware and software security
    - **Tashfia Alam** – U. of Florida
45. Quantum Computing
    - **Daniel Volya** – U. of Florida
46. Network-on-Chip Security
    - **Subodha Charles** – U. of Florida
47. Scalable Validation Framework for BIOS Security
    - **Aditi Tripathi** – U. of Florida
48. TROY: Trojan resilience based obfuscated transparency
    - **Naren Vikram Raj Masna** – U. of Florida
49. Vulnerability Analysis of Post-Silicon Debug
    - **Zhixin Pan –** U. of Florida

Student Posters

50. NETROSPECTION: Neural Introspection for Speculative Side-Channel Detection
    - **Akash Someshwar Rao** and **Maneesh Merugu** – U. of Florida
51. Real-Time Scheduling for WirelessHART Networks using formal modeling
    - **Nur Imtiazul Haque** – Florida International University
52. HASTE: Hardware Aware Software Timing Attack Evaluation
    - **Prabuddha Chakraborty** – U. of Florida
53. Cultivating Elementary Students' Interest in Cryptography and Cybersecurity
    - **Zhen Xu** – U. of Florida
54. UAV-assisted authentication for Millimeter Wave Wireless Mesh Networks
    - **Mai Abdelmalek** – Florida International University
55. A Novel Routing Metric for IEEE 802.11s-based Swarm-of-Drones Applications
    - **Oscar Bautista Chia** – Florida International University
56. A Decentralized Privacy-preserving Framework for Authenticating EVs and Scheduling Service
    - **David Gabay** – Florida International University
57. Assuring the Integrity of Videos from Wireless-based IoT Devices using Blockchain
    - **Suat Mercan** – Florida International University
58. CASTLE: Centralized Architecture for Systematic Firmware Load and Firmware Patch
    - **Atul Prasad Deb Nath** – U. of Florida
60. Current based Remote PCB authentication
    - **Shubhra Deb Paul** – U. of Florida
61. Hierarchical Bloom Filter Framework for Security, Space-efficiency, and Rapid Query Handling in Biometric Systems
    - **Sumaiya Shomaji** – U. of Florida

Student Posters

62. Provably Secure State Space Obfuscation for Hardware IP Protection
    - **Md Moshiur Rahman** – U. of Florida
64. Programming Model Guided Symbolic Execution
    - **Yihang Bai** – U. of Florida
65. ProXray: Protocol Model Learning and Guided Firmware Analysis
    - **Farhaan Fowze** – U. of Florida
66. Gate-level Steganography
    - **Abdulrahman Alaql** – U. of Florida
67. Remote Detection of Structural Damage with Deep Learning
    - **Ishan Khurjekar** – U. of Florida
68. Faster edge detection using memristor based in-memory computing for Iot edge node
    - **Rajeev Joshi** – U. of South Florida
69. Visual Cortex Inspired Pixel-Level Re-configurable Processors for Smart Image Sensors
    - **Pankaj Bhowmik** and **Md Jubaer Hossain Pantho Joshi** – U. of Florida
70. A Robust Hardware-based Authentication Scheme to Enable Trust in IoT-based Systems
    - **Mohammad Farhan** – Eastern Michigan U.
71. FPGA Accelerated Embedded System Security with Domain Isolation
    - **Sujan Kumar Saha** – U. of Florida

Student Hardware Demos

1. Personal Comfort Node (PCN): an open platform to enable participatory sensing for intelligent building control
   - **Ninad Kiran Gaikwad** – U. of Florida
2. Real-time Image Processing at the Edge
   - **Brooks Olney** and **Shakil Mahmud** – U. of South Florida
3. VIPR: Verification of IP trust using Machine Learning
   - **Pravin Gaikwad** – U. of Florida
4. HoneyIoT
   - **Haoqi Shan** – U. of Florida
5. Self-Powered Wireless Sensors and Sensor Network for IoT Applications
   - **Ran Wei** – Case Western Reserve University
6. Embedded AI in IoT
   - **Jacob Crain** – U. of Florida
7. Potential Cybersecurity Vulnerabilities in IoT using Smart Vehicles Bluetooth Technology
   - **Mohammad Farhan** – Eastern Michigan U.
8. Side-channel based remote PCB Authentication using JTAG Protocol
   - **Shubhra Deb Paul** – U. of Florida
9. Detection and Mitigation of Communication Attacks on Cooperative Adaptive Cruise Control
   - **Srivalli Boddupalli** – U. of Florida
10. Leveraging System-on-Chip Architectures for Optimizing Robotic Applications
    - **Taylor JL Whitaker** – U. of Florida
11. Autonomous, Remote Fault Detection in Arrays of Solar Panels
    - **Cody LaFlamme** – U. of Florida
13. Electrodynamic Wireless Power Transfer for IoT
    - **Abdul Halim Miah** – U. of Florida

Student Hardware Demos

14. Secure and Efficient Storage of Large-scale Biometric Data
    - **Sumaiya Shomaji** – U. of Florida
15. TReC: Trojan Resilient COTS Components
    - **Tamzidul Hoque** – U. of Florida
17. P2C2: Peer-To-Peer Car Charging
    - **Prabuddha Chakraborty** – U. of Florida
19. TRIT: A Framework for Automated Trojan Insertion
    - **Jonathan Cruz** – U. of Florida
20. Secure SoC Compiler (SoCComp)
    - **Atul Prasad Deb Nath** and **Kshitij Raj** – U. of Florida
21. Robust authentication of Food and Materials
    - **Naren Vikram Raj Masna** – U. of Florida
23. Trojan Insertion Tool for PCB
    - **Aritra Bhattacharyay** – U. of Florida
24. SAINT: Self-Aware Infrastructure with Intelligent Technologies
    - **Reiner Dizon** – U. of Florida
25. Hardware Hacking Board
    - **Shuo Yang** – U. of Florida
27. A Match-Making Mobile App for Efficient Distribution of Food Donations
    - **Divy Chhibber** – U. of Florida

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