Lightning Introductions

Leadership in Embedded Security

August 13th, 2018

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Computing Community Consortium

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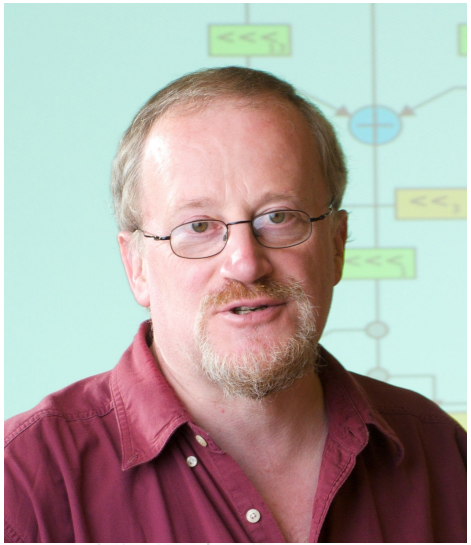
Ross Anderson/University of Cambridge



UNIVERSITY OF CAMBRIDGE

I've been thinking about what happens as we start to get software and connectivity in durable goods such as cars, medical devices and electricity substations. Safety and security will converge; certification will be continuous rather than relying on pre-market testing; and we'll have some big challenges patching software for 30 years!

Denise Anthony / University of Michigan

SCHOOL OF PUBLIC HEALTH
UNIVERSITY OF MICHIGAN

My work in the sociology of privacy helps to shed light on how users' perceptions of and behavior with technology in embedded system environments create (or minimize) privacy and security risks in those environments. It is also important to understand how embedded systems affect user behavior and social interaction, with potential to exacerbate (or minimize) security/privacy risks.

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Reza Azarderakhsh/Florida Atlantic University

FAU
FLORIDA ATLANTIC UNIVERSITY

How do you hope to influence the future of embedded security?

Wayne Burleson/University of Massachusetts Amherst

University of Massachusetts Amherst

A new approach to the design and use of integrated circuits which intrinsically tags hardware, software and data with unique identifiers.

George Burrus/University of South Florida

Picture

Untangle the interaction between behavior, motivations, and technology to prevent cybercrime.

USF UNIVERSITY OF SOUTH FLORIDA

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Kevin Bush/MIT Lincoln Laboratory

LINCOLN LABORATORY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

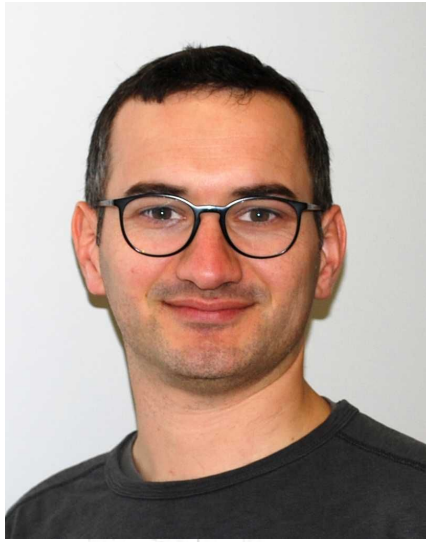
Addressing critical national security problems through mindful application of fundamental research.

Ryan Burchfield/NSA

Picture

How do you hope to influence the future of embedded security?

Srdjan Capkun/ETH Zurich



ETH zürich

How do you hope to influence the future of embedded security?

Todd Carpenter/Adventium Lab

Adventium® LABS

Engineering safe and secure technologies for

- Real-world use cases
- Life- and mission-critical embedded systems
- Medical devices, industrial IoT, and automotive

Charles Clancy/Virginia Tech

VIRGINIA TECH™

How do you hope to influence the future of embedded security?

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Sauvik Das/Georgia Tech

Georgia Tech

I want embedded security to be holistic — not just technical interventions, but technical interventions that understand and adapt to human social behaviors.

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Robert Dick/University of Michigan

EECS ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
UNIVERSITY OF MICHIGAN

Area: Networked sensing and actuation systems

Goals:

- Automate vulnerability identification
- Consider implications of interaction with physical and social systems
- Minimize designer burden
- Minimize cost and energy overheads

Idea: automated on-line monitoring and ML based vulnerability prioritization in IoT systems

Khari Douglas/CCC

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Ann Drobnis/CCC

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Ensure that the work done here on behalf of the community continues to have impact on the policies created.

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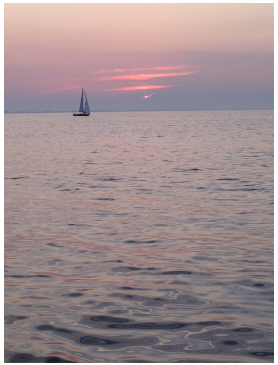
Michael Dunaway/*University of Louisiana Lafayette*



NIMSAT
NATIONAL INCIDENT MANAGEMENT SYSTEMS AND ADVANCED TECHNOLOGIES
UNIVERSITY OF LOUISIANA AT LAFAYETTE

How do you hope to influence the future of embedded security?

- Improve Cybersecurity and Public Safety within Smart & Connected Communities
- Improve Cybersecurity among Private Sector entities of Louisiana Cybersecurity Commission

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Brian Fitzgerald/FDA

U.S. FOOD & DRUG ADMINISTRATION

How do you hope to influence the future of embedded security?

Kevin Fu/University of Michigan

Physics of cybersecurity

Basic research to ensure
good science and engineering
for the next 100 years of trustworthy
autonomous vehicles, medical devices, and IoT

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Sam Fuller/Analog Devices

ANALOG DEVICES

How do you hope to influence the future of embedded security?

Daniel Genkin / University of Michigan

How do you hope to influence the future of embedded security?

By obtaining a better understanding of information leakage, side channel analysis, and real-world adversarial capabilities

CSE COMPUTER SCIENCE AND ENGINEERING UNIVERSITY OF MICHIGAN

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Jorge Guajardo/Robert Bosch LLC

BOSCH

Research and development of technologies to enable secure IoT deployment: from the hardware to the cloud

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Carl Gunter/University of Illinois

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

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Dan Holcomb/University of Massachusetts Amherst

UMass Amherst

How do you hope to influence the future of embedded security?

Research and development on methods for securing hardware of embedded systems:

Design; Supply Chain; Reverse Engineering

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Ken Hoyme/Boston Scientific

Boston Scientific

Advancing science for life™

- Develop methods to deploy safe and secure medical devices into intelligent networks
  - Blend Safety/Security/Usability
- Bridge the gap between researchers and industry to ensure solutions are built to meet real needs

Kyle Ingols/MIT Lincoln Laboratory

LINCOLN LABORATORY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Minimizing and hardening the pieces of a system that are expensive or impossible to recover if compromised.

Fighting the good fight against feature creep.

Jean-Baptiste Jeannin/University of Michigan

COLLEGE OF ENGINEERING
AEROSPACE ENGI
UNIVERSITY OF MICHIGAN

Security of Aerospace Applications,
from Airliners to Drones:

- Secure Unmanned Aerial Systems
- Secure System-Wide Communications
- Sensor/Actuator Security (e.g. GPS spoofing)

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Benjamin Justus/Siemens Corporation

Picture

SIEMENS
Ingenuity for life

Protect U.S. Critical Infrastructure, i.e. Digital Grid against Cyber Attacks

Help migration of legacy devices that still exist in power automation systems

Yongdae Kim/Korea Advanced Institute of Science and Technology

KAIST

Secure Sensor Design

How to authenticate environment?
Maintaining safety-critical under adversarial environment?
Security requirements for self-driving cars?

Farinaz Koushanafar/UC San Diego

UC San Diego

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Sandip Kundu/National Science Foundation

How to delineate permissible actions, enforce compliance and establish security defaults in system components to compose secure systems with provable security and data privacy?

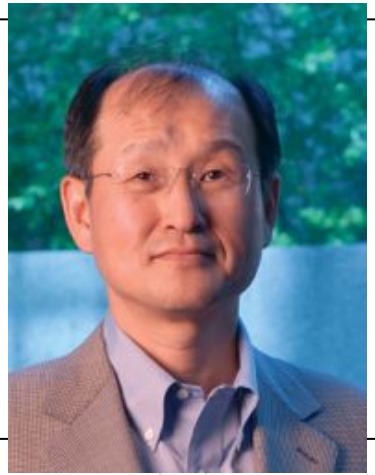
Carl Landwehr/George Washington University

THE GEORGE WASHINGTON UNIVERSITY
WASHINGTON, DC

How do you hope to influence the future of embedded security?

Through the development and adoption of "building codes" to assure appropriate system dependability engineering

Insup Lee/University of Pennsylvania



Penn Engineering PRECISE

How do you hope to influence the future of embedded security?

- Develope security techniques using the physical properties and dynamics of CPS
- Provide techniques to assure the safety of CPS under security attacks

Dan Massey/University of Colorado Boulder

University of Colorado Boulder

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Douglas Maughan/DHS

Homeland Security

How do you hope to influence the future of embedded security?

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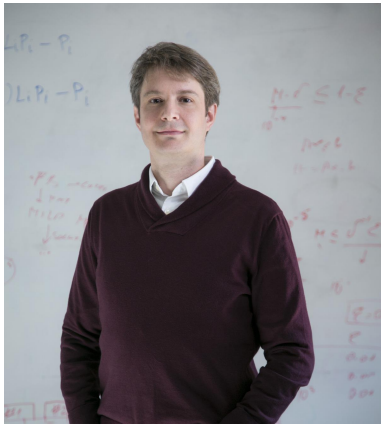
Howard Meyer/DoD

How do you hope to influence the future of embedded security?

Miroslav Pajic/Duke University



Duke UNIVERSITY | PRATT SCHOOL of ENGINEERING

Advocate for and develop techniques for ***security-aware*** modeling, analysis and design of safety-critical embedded and cyber-physical systems with varying levels of autonomy and human interaction

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Brad Reaves/North Carolina State University

NC STATE UNIVERSITY

Security and privacy of voice and multimedia should be a key research area for embedded devices.

Key challenges include media confidentiality, content privacy, content integrity, and better voice authentication.

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Mastooreh Salajegheh/Visa Research

VISA Research

How do you hope to influence the future of embedded security?

Hassan Salmani/Howard University

HOWARD UNIVERSITY
1867

Hardware Security and Trust in
Distributed Embedded Systems

Fundamental research
to enhance education and engineering
in hardware trustworthiness

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Armin Sarabi/University of Michigan

EECS ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
UNIVERSITY OF MICHIGAN

Combine internal/external monitoring with machine learning and stochastic models to build automated systems for intrusion and failure detection.

Patrick Schaumont/Virginia Tech

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Sean Smith/Dartmouth College

- How do we avoid a future of physical infrastructure riddled with unpatchable and unmanageable forever-days?
- How will all these things authenticate each other, particularly wrt real-world context?

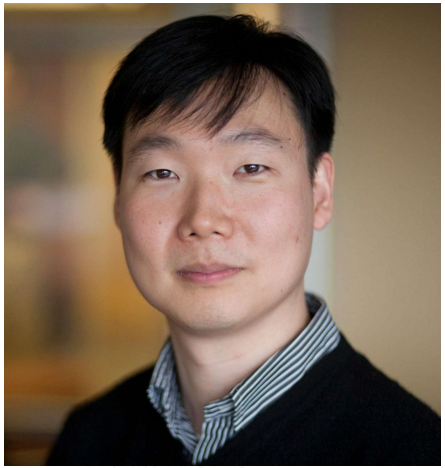
Background: trusted computing, power grid, embedded systems, HCISEC

Susan Squires/University of North Texas

UNT
UNIVERSITY OF
NORTH·TEXAS

Leverage social networks to provide new "grassroots" alternatives to top down interventions

Edward Suh / Cornell University



What should be the roles of hardware and software in securing embedded systems with limited resources and long lifetime?

Use static information flow analysis to provide strong security assurance for security-critical components

Cornell University

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Tomas Vagoun/NITRD

NITRD
The Networking and Information Technology Research and Development Program

What is the R&D strategy to be able to utilize state of the art microelectronics design and fabrication capabilities wherever they are, while achieving trustworthiness?

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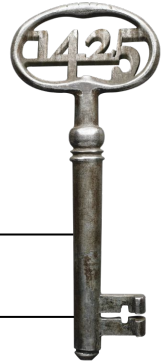
Ingrid Verbauwhede/KU Leuven - COSIC & UCLA



KU LEUVEN

How do you hope to influence the future of embedded security?

By basic research to provide fundamental hardware roots of trust upon which secure cyberphysical systems can grow.

Dongyan Xu/Purdue University

PURDUE UNIVERSITY

CERIAS

Advocate and initiate **multidisciplinary** research agenda and methodology to study embedded security holistically, across key aspects such as cyber, control, domain "physics", policy, and usability.

Wenyuan Xu/Zhejiang University

浙江大学 ZHEJIANG UNIVERSITY

How do you hope to influence the future of embedded security?

By diving into the analog world of smart devices and perform system analysis.

- Are sensors/actuator trustworthy?
- Can we infer the system status with its analog representation?

Yuval Yarom/University of Adelaide

THE UNIVERSITY of ADELAIDE

DATA 61

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