# Gedare Bloom, Ph.D.

*CV: 02/23/17*

Electrical Engineering and Computer Science
Howard University
2300 6th St NW, Room 1016
Washington, DC 20059

3050 Silent Valley Dr, Fairfax, VA, 22031
tel:615-260-5165
gedare.bloom@howard.edu

## Research and Teaching

Embedded Systems, Computer Security, Cyber-Physical Systems, Computer Architecture, Operating Systems, Real-time Systems.

## Education

Ph.D., The George Washington University, Computer Science, 2013

M.S., The George Washington University, Computer Science, 2012

B.S., Michigan Technological University, Computer Science, Mathematical Sciences (double major), 2005

## Academic Employment

Assistant Professor, Howard University, August 2015 – current

Research Scientist, GW, October 2014 – August 2015

Post-doctoral Scientist, GW, January 2013 – September 2014

## Grants

### Awarded

**National Science Foundation**
Title: CPS: Breakthrough: Collaborative Research: Track and Fallback: Intrusion Detection to Counteract Carjack Hacks with Fail-Operational Feedback
Role: PI, with Joseph Zambreno (Iowa State)
Amount: $234,551
Period: 10/1/2016-09/30/2019.

**Office of Naval Research**
Title: LockdownOS: a Component-Based Foundation for System Monitoring, Quarantine, and Recovery
Role: Co-PI, with Gabriel Parmer (PI) and Rahul Simha (co-PI)
Amount: $600,000
Period: 2014-2017

### Submitted (unfunded)

**National Science Foundation**
Title: CPS: Breakthrough: Collaborative Research: Track and Fallback: Intrusion Detection to Counteract Carjack Hacks with Fail-Operational Feedback
Role: PI
Amount: $16,000
Period: 5/1/2017-09/30/2017

**Department of Homeland Security**
"Security Engineering for Resilient Networked Critical Infrastructure", PI, with Danda Rawat. Pending, 2016.

**National Science Foundation**
"CRII: SaTC: Security without Privilege for Hard Real-Time Systems", PI. 2016.

**Thurgood Marshall College Fund – Apple**
"SUCCESSES: Successes in Undergraduate Collaborations for Computer and Engineering Student Stimulation with Embedded Systems", PI. 2016.

**National Science Foundation**
"A Hardware-based User-centric Real Time Security and Trust Paradigm for IoT", PI, with Legand Burge. Preliminary proposal. 2016.

**Air Force**
"FPGA-based Security Enhanced Embedded Systems for the Internet of Things", PI, subcontract. 2016.

**National Science Foundation**
"Expository and Interdisciplinary Cybersecurity", PI, with Gloria Washington, Jiang Li, Wayne Patterson, Rajni Goel, and Robert Palmer. 2016.

**National Science Foundation**
"CRII: CPS: Cross-Connecting Safety and Security in Cyber-Physical Systems", PI, 2016.

**National Science Foundation**
"SHF:Medium:Collaborative Research: Active Data Structures (ADS): Hardware-Software Interfaces for Data Structures and Events", PI, with Gabriel Parmer and Rahul Simha. 2016.

**Office of the Secretary of Defense**
"Mutable Obfuscating Redundant Processor HAL – MORPH", subcontract from Intelligent Automation, Inc. (Prime Contractor), 2014.

**National Science Foundation**
"CSR:Medium:Active Data Structures (ADS): Systems Support for Multi-core OS and Service Applications", co-PI with Gabriel Parmer, Rahul Simha, and Guru Venkataramani, 2013.

**U.S. Department of State**
"StegoBridge: Connecting Users to Popular Websites without Detection", co-PI with Rahul Simha and Nasir Memon (NYU-Poly), 2013.

**National Reconnaissance Office**
"Real-Time Memory Protection for On-Board Satellite Software", PI with Rahul Simha and On-line Applications Research Corp. (Subcontractor), 2013.

# Dissertation

G. Bloom, "Operating System Support for Shared Hardware Data Structures," The George Washington University, Washington, DC. November, 2012. Advised by Bhagirath Narahari and Rahul Simha.

# Publications

Note: In computer science, selective conferences with acceptance rates below 30% (such as EMSOFT, SACMAT, DSN) are used to disseminate research—see "Evaluating Computer Scientists for Promotion and Tenure" from the Computing Research Association, and "Research Evaluation for Computer Science" in Communications of the ACM (April '09).

* Indicates a student lead author whom I supervised.

**Refereed Journal Papers**

1. **G. Bloom** and J. Sherrill, "Scheduling and Thread Management with RTEMS", ACM SIGBED Review, vol. 11, no. 1, pp. 20-25, February 2014.

2. E. Leontie, **G. Bloom**, O. Gelbart, B. Narahari, and R. Simha. "A compiler-hardware technique for protecting against buffer overflow attacks," Journal of Information Assurance and Security, vol. 5, no.1, pp. 1-8, 2010.

3. **G. Bloom**, B. Narahari, R. Simha, and J. Zambreno. "Providing secure execution environments with a last line of defense against Trojan circuit attacks," Computers & Security, vol. 28, no. 7, pp. 660-669, October 2009.

**Peer-Reviewed Conference Papers**

1. **G. Bloom**, G. Cena, I. Cibrario Bertolotti, T. Hu, and A. Valenzano, "Supporting Security Protocols on CAN-Based Networks", 18th Annual IEEE International Conference on Industrial Technology (IEEE ICIT '17), March 2017.

2. S. Gadia, C. Artho, and **G. Bloom**, "Verifying Nested Lock Priority Inheritance in RTEMS with Java Pathfinder", In: Ogata K., Lawford M., Liu S. (eds) Formal Engineering Methods. ICFEM '16. Lecture Notes in Computer Science, vol 10009. Springer, Cham.

3. *Y. Ren, G. Parmer, T. Georgiev, and **G. Bloom**, "CBufs: Efficient, System-wide Memory Management and Sharing", 2016 ACM SIGPLAN International Symposium on Memory Management (ISMM'16), June 2016.

4. *J. Song, **G. Bloom**, and G. Parmer. "SuperGlue: IDL-Based, System-Level Fault Tolerance for Embedded Systems", 46th IEEE/IFIP International Conference on Dependable Systems and Networks (DSN 2016), June 2016.

5. D. Cederman, D. Hellström, J. Sherrill, **G. Bloom**, M. Patte, and M. Zulianello. "RTEMS SMP and MTAPI for Efficient Multi-Core Space Applications on LEON3/LEON4 Processors", Data Systems In Aerospace, DASIA, May 2015.

6. **G. Bloom** and R. Simha, "Hardware-Enhanced Distributed Access Enforcement for Role-Based Access Control", 19th ACM Symposium on Access Control Models and Technologies, SACMAT, June 2014.

7. D. Cederman, D. Hellström, J. Sherrill, **G. Bloom**, M. Patte, and M. Zulianello. "RTEMS SMP for LEON3/LEON4 Multi-Processor Devices", Data Systems In Aerospace, DASIA, June 2014.

8. **G. Bloom**, G. Parmer, B. Narahari, and R. Simha, "Shared Hardware Data Structures for Hard Real-Time Systems," 12th International Conference on Embedded Software. EMSOFT. October 2012.

9. E. Leontie, **G. Bloom**, B. Narahari, and R. Simha, "No Principal Too Small:

Memory Access Control for Fine-Grained Protection Domains," 15th Euromicro Conference on Digital System Design. DSD. September 2012.

10. **G. Bloom**, B. Narahari, and R. Simha. "Fab Forensics: Increasing Trust in IC Fabrication," IEEE International Conference on Technologies for Homeland Security. HST. November 2010.

11. E. Leontie, **G. Bloom**, B. Narahari, R. Simha, and J. Zambreno. "Hardware Containers for Software Components: A Trusted Platform for COTS-Based Systems," 2009 IEEE/IFIP International Symposium on Trusted Computing and Communications. TRUSTCOM. August 2009.

12. **G. Bloom** and S. Popoveniuc, "Information leakage in mix networks with randomized partial checking," 2009 International Conference on Information Security and Privacy. ISP-09. July 2009.

**Peer-Reviewed Workshop and Short Papers**

1. C. Tessler, N. Fisher, and **G. Bloom**, "Work-In-Progress: Reducing Cache Conflicts via Interrupts and BUNDLE Scheduling," 2017 IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS '17), April 2017.

2. C. Young, J. Zambreno, and **G. Bloom**, "Towards a Fail-Operational Intrusion Detection System for In-Vehicle Networks," 1st Workshop on Security and Dependability of Critical Embedded Real-Time Systems (CERTS '16), November 2016.

3. **G. Bloom**, J. Sherrill, G. Gilliland, "Aligning Deos and RTEMS with the FACE Safety Base Operating System Profile," 6th Embedded Operating System Workshop (EWiLi'16), October 2016.

4. *J. Marshall, **G. Bloom**, G. Parmer, and R. Simha. "n-Modular Redundant Real-Time Middleware: Design and Implementation," 6th Embedded Operating System Workshop (EWiLi'16), October 2016.

5. **G. Bloom**, G. Parmer, and R. Simha. "LockDown: an operating system for achieving service continuity by quarantining principals", 9th European Workshop on System Security (EuroSec '16), April 2016.

6. *H. Felbinger, J. Sherrill, **G. Bloom**, and F. Wotawa, "Test Suite Coverage Measurement and Reporting for Testing an Operating System without Instrumentation", 17th Real-Time Linux Workshop, RTLWS17, October 2015.

7. **G. Bloom**, B. Narahari, R. Simha, A. Namazi, and R. Levy, "FPGA SoC Architecture and Runtime to Prevent Hardware Trojans from Leaking Secrets", IEEE International Symposium on Hardware-Oriented Security and Trust, HOST 2015, May 2015.

8. *E. Armbrust, J. Song, **G. Bloom**, and G. Parmer, "On Spatial Isolation for Mixed Criticality, Embedded Systems", 2nd International Workshop on Mixed Criticality Systems, WMC, December 2014.

9. E. Leontie, **G. Bloom**, R. Simha, "Hardware and Software Support for Fine-Grained Memory Access Control and Encapsulation in C++," ACM SIGPLAN Systems, Programming, Languages and Applications: Software for Humanity, SPLASH, October 2013.

10. *S. Smith, **G. Bloom**, R. Simha, "PyLOM: A Language and Run-Time System for Planning Applications," ACM SIGPLAN Systems, Programming, Languages and Applications: Software for Humanity, SPLASH, October 2013.

11. E. Leontie, **G. Bloom**, R. Simha, "Automation for Creating and Configuring Security Manifests for Hardware Containers," 4th Symposium on Configuration Analytics and Automation. SafeConfig. October 2011.

12. **G. Bloom**, G. Parmer, B. Narahari, and R. Simha. "Real-Time Scheduling with Hardware Data Structures," Work in Progress, IEEE Real-Time Systems Symposium, 2010. RTSS. December 2010.

13. E. Leontie, **G. Bloom**, B. Narahari, R. Simha, and J. Zambreno. "Hardware-enforced Fine-grained Isolation of Untrusted Code," Proceedings of the First ACM Workshop on Secure Execution of Untrusted Code. SecuCode. November 2009.

14. **G. Bloom**, B. Narahari, and R.Simha. "OS Support for Detecting Trojan Circuit Attacks," 2nd IEEE International Workshop on Hardware-Oriented Security and Trust. HOST, July 2009.

**Book Chapters**

1. **G. Bloom** and J. Sherrill, "Scheduling and Thread Management with RTEMS" (Invited Paper), 3rd Embedded Operating Systems Workshop, EWiLi, August 2013.**G. Bloom**, J. Sherrill, S. Huber, and C. Johns, "Structure of the RTEMS Real-Time Operating System", to appear in *Handbook on Electrical Engineering Technology and Systems*, CRC Press, Taylor & Francis, to appear 2017 (est).

2. **G. Bloom**, E. Leontie, B. Narahari, and R. Simha, "Chapter 12 - Hardware and Security: Vulnerabilities and Solutions," in *Handbook on Securing Cyber-Physical Critical Infrastructure*, Boston: Morgan Kaufmann, 2012, pp. 305–331. ISBN: 978-0-12-415815-3.

**Non-Refereed Publications**

**G. Bloom** and J. Sherrill, "Scheduling and Thread Management with RTEMS" (Invited Paper), 3rd Embedded Operating Systems Workshop, EWiLi, August 2013.

# University Teaching

**Howard University**    **Assistant Professor**

| Course | Semester | Students | Mean Instructor Rating |
|---|---|---|---|
| Computer Organization II | Spring '17 | 50 | T.B.D. |
| Advanced Operating Systems | Spring '17 | 10 | T.B.D. |
| CS Undergraduate Research | Spring '17 | 2 | Insufficient Sample Size |
| Computer Organization I | Fall '16 | 60 | T.B.D. |
| Operating Systems | Fall '16 | 40 | T.B.D. |

| Computer Organization II | Spring '16 | 52 | 4.1 / 5.0 (19% responses) |
|---|---|---|---|
| Advanced Operating Systems | Spring '16 | 1 | Insufficient Sample Size |
| CS Undergraduate Research | Spring '16 | 3 | Insufficient Sample Size |
| Computer Organization I | Fall '15 | 49 | Unknown |

- Developed an award-winning CSCI 201 and CSCI 202 sequence focusing on team-based projects and emphasizing soft skills development, 2015-2016.
- Re-developed CSCI 401 to focus on team-based projects, 2016.
- Re-developed CSCI 680 to cover multiple real-world operating systems, 2016.

**George Washington University**

**Teaching Assistant**

| Course | Semester | Students | Mean Instructor Rating |
|---|---|---|---|
| Computer Security | Fall '11 | 33 | N/A |
| Intro to Operating Systems | Fall '08 | 32 | **4.2 / 5.0 (66% responses)** |
| Computer Architecture 2 | Spring '08 | 14 | 4.2 / 5.0 (26% responses) |
| Intro to Operating Systems | Fall '07 | 19 | 3.0 / 5.0 (36% responses) |
| Software Engineering 1 | Spring '07 | 9 | **4.83 / 5.0 (74% responses)** |
| Software Engineering 1 | Fall '06 | 16 | 3.63 / 5.0 (50% responses) |

**Computer Security** (Fall '11). Advised student teams and conducted security code reviews for team-based term projects with both undergraduate and graduate students. Graded.

**Intro. to Operating Systems** (Fall '08, Fall '07). Developed and delivered lectures and  interactive labs studying and modifying the Linux kernel for CS and Computer Engineering undergraduates. Devised new homework assignments, quizzes, lectures, and active learning modules writing system calls and kernel modules. Formed student teams, supervised and evaluated team projects. Graded.

**Computer Architecture 2 Lab** (Spring '08). Developed and delivered weekly recitation lectures with active learning modules (C and Verilog) for CS and Computer Engineering undergraduates. Graded.

**Software Engineering 1 Lab** (Spring '07, Fall '06). Clarified course materials and delivered impromptu at-the-board lectures for diverse majors. Graded.

| | **Grader** |
| --- | --- |
| | Algorithms and Data Structures I, Spring '11. |
| **Michigan Technological University** | **Grader** |
| | C++ as a Second Language, Fall '04. |

# Mentoring and Supervising

| | |
| --- | --- |
| **Howard University** | Ebelechukwu Nwafor, *Towards a Provenance-Aware Internet of Things (IoT) System*, Ph.D. candidate. |
| | Habeeb Olofuwobi, *TBD (Automotive Security)*, Ph.D. Student |
| | Johnny Carter, Jr., *TBD (Hardware-based Security)*, Ph.D. Student |
| | Bassma Saleh, *TBD (IoT Security)*, Ph.D. Student |
| | Elise Blackmon, *Cybersecurity for Satellite Middleware*, B.S. '17 (EE, est..) |
| | Portia Herndon, *Cybersecurity for Satellite Middleware*, B.S. '17 (est.) |
| | Angel Mitchell, *Block Programming for the IoT*, B.S. '18 (est.) |
| | Abiola Oke, *Block Programming for the IoT*, B.S. '18 (est.) |
| | Safiyyah Mitchell, *Block Programming for the IoT*, B.S. '18 (est.) |
| | Sam Raymond, *Block Programming for the IoT*, B.S. '18 (est.) |
| | David Hill, *IoT-in-a-Rack*, B.S. '19 (est.) |
| | Andre Carter, Tracing Provenance, B.S. '19 (est.) |
| **George Washington University** | Co-supervised with Gabriel Parmer: |
| | Teo Georgiev, *TBD (System Security)*, Ph.D. Student. |
| | Yuxin Ren, *TBD (Memory Management)*, Ph.D. Student. |
| | Eric Armbrust, *Dynamic TCB in a component-based OS*, B.S. '17 (est.) |
| | Jiguo Song, *System Support for Predictable, Efficient Fault Recovery*, Ph.D. '16. |
| | Co-supervised with Rahul Simha: |
| | James Marshall, *Software-Based nMR for Cyber-Physical Systems*, Ph.D. candidate. |
| | Pablo Frank Bolton, *Interactive Prototyping of Complex Objects for Robotic Tasks*, Ph.D. candidate. |
| | Jennifer Hill, *CAPITAL Passages*, part of the *CAPITAL: Comprehension and Pronunciation Instructional Tools for Adult Learners* project, Ph.D. |

candidate.

Christopher Scotty Smith, *Language Development for Robotic Planning Applications*, M.S. May '13, now Visiting Instructor at Roanoke College.

James Pizzurro, *CAPITAL Words*, part of the *CAPITAL: Comprehension and Pronunciation Instructional Tools for Adult Learners* project, B.S. '14.

**Google Code-In *(High School Students)***

Guided high school students through software development projects that I designed as month-long efforts sub-divided into one to three day sprints.

Ethan Ordentlich, *Getting Started on MS Windows*, '15, Winner.

Aun-Ali Zaidi, *Investigate/ Fix Bug Tickets*, '15, Winner.

Daniel Ramirez, *Port Rhealstone to RTEMS*, '13, Winner.

Chirayu Desai, *Replace Make with Waf*, '13, Winner.

Bryan Dunsmore, *Replace Make with Waf*, '13, Reserve Winner.

Radu Toma, *Video Tutorial:Getting Start with RTEMS Using a Virtual Machine*, '13.

**Google Summer of Code**

Mentored college students during summer-long software development cycles.

Habeeb Olufowobi, *Porting RTEMS to ARM Cortex M4F*, '16

Sambeet Panigrahi, *Porting ROCK on RTEMS*, '16

Rohini Kulkarni, *Raspberry Pi 2 Support*, '15.

Přemysl Houdek, *RTEMS port to Cortex – R4f*, '14.

Hesham Moustafa Almatary, *Porting RTEMS to OpenRISC*, '14. *Enhance low-level API of libmm (Memory Protection & Caches),* '13. *RTEMS MMU/MPU support for ARM architecture,* '12.

Sree Harsha Konduri, *Global EDF Scheduler*, '13.

Petr Benes, *Porting of resource reservation framework to RTEMS,* '11.

**European Space Agency Summer of Code in Space**

Mentored college students during summer-long software development.

Hermann Felbinger, *Improve Code Coverage Analysis Meeting Aviation and Automotive Standards*, '15.

Saeed Ehteshamifar, RTEMS Fault tolerance: *Get a fault injection tool to work with RTEMS*, '15.

## Honors and Awards

Most Valuable Professor, Howard University Department of Computer Science, '16.

Summer Dissertation Fellowship, $2000, George Washington University, '12

SAFECONFIG Student Travel Award, $415, UNC Charlotte, '11.

CS Department Student Travel Award, $1000, George Washington University, '10, awarded to travel to RTSS.

CCS Travel Grant Award, $405, ACM Conference on Computer and Communications Security, '09.

SecuCode Travel Grant Award, $560, ACM workshop on Secure execution of untrusted code, '09.

Honorable Mention, Philip Amsterdam Graduate Teaching Assistant Awards for Outstanding Teaching, George Washington University, 2008-2009. Awarded for excellence in teaching, 3 winners and 2 honorable mentions were chosen university-wide.

CS Department Student Travel Award, $1000, George Washington University, '09, awarded to travel to HOST.

George B. Robbe Scholarship, $300, Michigan Technological University, Fall '04, awarded for academic excellence.

# Service

## National Panelist Reviewer

**NSF**: '15, '16, '17.

**ASEE/SMART**: '16.

## Conference Organization and Committees

Program Committee Member, IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), '17

Artifact Evaluation Committee Member, IEEE Real-Time Systems Symposium (RTSS), '16

Program Committee Member, Euromicro Conference on Digital System Design (DSD) Special Session on Mixed-Criticality System Design, Implementation and Analysis (MCSDIA), '14, '15, '16

Program Committee Member, The 4th Embedded Operating Systems Workshop (EWiLi), '14, '15, '16

## Reviewer

**Journals Refereed**

IEEE Transactions on Industrial Informatics, '16.

Elsevier Science of Computer Programming: Special Issue on Formal Techniques for Safety-Critical Systems, '15.

IEEE Transactions on Information Forensics and Security (TIFS): Special Issue on Electronic Voting, '09

**Conferences and Workshops Reviewed**

EWiLi, RTAS, DSD

| | |
|---|---|
| **Conference Volunteer** | Session Chair, EWiLi '16 |
| | Track chair and PhD Colloquium co-host, 6th International Conference on Information Warfare and Security (ICIW 2011), '11. |
| | Staff, ACM ASPLOS XIV, '09. |
| **University Service** | Faculty Adviser, HU, '15. Cyber Club. |
| | Graduate Adviser, GW, '10-'11. ACM Student Group Executive Board. Advised the E-Board as an ex officio member. Recommended ACM Student Group take responsibility for an unused CS department compute cluster. |
| | Graduate Student Representative, Research and Instructional Technology Committee (RITC), GW '09-'10. Articulated graduate student perspectives for university-wide committee on technology use. |
| **College Service** | Member, Google-Howard Partnership Initiative, January 2017. |
| | Committee Member, Faculty Search Committee, Civil Engineering Department, October '16 – February '17. |
| | Committee Member, External Communications Task Force, March '16 – April '16. |
| | Member, Industry Outreach Initiative, presented "Building a Strategic Partnership between Texas Instruments and Howard University" delivered to representatives of Texas Instruments, 11/12/2015. |
| **Department Service** | Committee Member, Undegraduate Curriculum Committee, January '17 -- |
| | Committee Member, Assessment (ABET) Committee, August '16 – |
| | Coordinating Requests for Equipment and Supplies from Texas Instruments, November 2015 – January 2017. |
| | Secretary, EECS Inauguration Meeting, 08/18/2016. |
| | Industry Partnerships, HU, '15. Met with industry representatives and secured or accepted gift donations. |
| | Interviewer, GW, '08-'14. Attended over 30 job talks, asked questions, led small group discussions between students and faculty candidates, and submitted notes to the search committees. |
| | Interviewer, GW, '13. Reviewed application packets and interviewed 3 students for a funded position in the CS department. |
| | Community Leader, GW, '10. Organized a graduate student group to discuss the Ph.D. program, and submitted minutes and requests to the CS chair. |
| | Department Representative, GW, '10. Discussed the direction of the School of Engineering & Applied Science (SEAS) with members of the SEAS National |

Advisory Council.

Department Representative, GW, '09. Represented the department at the DC Council of Engineering & Architectural Societies Awards Banquet as a guest of keynote speaker Dr. Dolling, Dean of SEAS at GW.

Department Representative, MTU, '05. Promoted the CS department to high school students who were visiting Michigan Tech.

# Professional Development

**Workshop and Conference Participant**

Computing Community Consortium Symposium on Computing Research Addressing National Priorities and Societal Needs. Washington, DC, May 2016.

CISE CAREER Proposal Writing Workshop, National Science Foundation, Arlington, VA. March 2016.

Exploring Cybersecurity Challenges in Electrified Transportation: A Focused Workshop. Washington, DC, February 2016.

Women of Color in STEM Conference. Detroit, MI, October 2015.

cFE/CFS Tutorial Day, Johns Hopkins University Applied Physics Lab, October, 2015.

Workshop on Spacecraft Flight Software, Johns Hopkins University Applied Physics Lab, October, 2015.

**University Faculty Development Participant**

College of Engineering and Architecture ABET Training. December 2016.

Unconscious Bias Training. November 2016.

Junior Faculty Forum. November 2015, December 2015.

Teaching at Howard, December 2015, CETLA.

SR06 Getting Started with the Epson 1410wi Certification on November 2015, CETLA.

SR05 Getting Started with the 1410wi Epson BrightLink Pro Projector, October 2015, CETLA.

ILSI Information Literacy Seminar, August 2015, CETLA.

New Faculty Orientation, Howard University, August 2015.

# Presentations

**Conference and Workshop Talks**

*Towards a Fail-Operational Intrusion Detection System for In-Vehicle Networks*, CERTS, Porto, Portugal, November '16.

*Aligning Deos and RTEMS with the FACE Safety Base Operating System Profile*, EWiLi, Pittsburgh, PA, October '16.

*Hardware-Enhanced Distributed Access Enforcement for Role-Based Access Control*, SACMAT, London, Ontario, June '14.

*Real-Time Scheduling with Hardware Data Structures*, Work in Progress, RTSS, San Diego, CA, December '10.

*Fab Forensics: Increasing Trust in IC Fabrication*, HST, Waltham, MA. November '10.

*Hardware-enforced Fine-grained Isolation of Untrusted Code*, SecuCode, Chicago, IL, November '09.

*Information leakage in mix networks with randomized partial checking*, ISP-09, Orlando, FL, July '09.

**Posters**

"Security and Provenance in the Internet of Things", Computing Community Consortium (CCC) Symposium on Computing Research Addressing National Priorities and Societal Needs, Washington, DC, May '16.

"Secure Data Provenance for Internet of Things (IOT)", HU Research Week, April '16.

"Cybersecurity for Satellite Middleware", HU Research Week, April '16.

"FPGA SoC Architecture and Runtime to Prevent Hardware Trojans from Leaking Secrets", IEEE International Symposium on Hardware-Oriented Security and Trust, HOST 2015, McLean, VA, May '15

"Hardware and Software Support for Fine-Grained Memory Access Control and Encapsulation in C++," ACM SIGPLAN Systems, Programming, Languages and Applications: Software for Humanity, SPLASH, Indianapolis, IN, October '13

"Automation for Creating and Configuring Security Manifests for Hardware Containers," 4th Symposium on Configuration Analytics and Automation. SafeConfig, Arlington, VA, October '11.

"Hardware Data Structures," Fifth Annual SEAS Student Research and Development Showcase, GW '11.

"Real-Time Scheduling with Hardware Data Structures," IEEE Real-Time Systems Symposium, 2010. RTSS,. San Diego, CA, December '10.

"Hardware-enforced Fine-grained Isolation of Untrusted Code," Fourth Annual SEAS Student Research and Development Showcase, GW '10.

"OS Support for Detecting Trojan Circuit Attacks," 2nd IEEE International Workshop on Hardware-Oriented Security and Trust. HOST, San Francisco, CA, July '09.

"SHADE: Secure Heartbeat And Dual-Encryption," Third Annual SEAS Student Research and Development Showcase, GW '09.

"Secure Bulletin Boards," First Annual SEAS Student Research and Development Showcase, GW '07.

**Panel Presentations**

*Senior Design Career Panel*, George Washington University, Nov '16.

*Senior Design Career Panel*, George Washington University, Dec '15.

**Invited Talks and Guest Lectures**

*Security and Privacy in the Internet of Things*, T.C. Williams High School, July '16.

*Google Code-In,* T.C. Williams Minnie Howard Campus, Nov '15.

*MORPH: an FPGA SoC to Defend Against Hardware Trojans*, Cryptography Reading Club, National Institute of Standards and Technology, NIST, Dec '14.

*RTEMS in Google Code-In*, presentation given to Google Code-In grand prize winners and Open Source Programs Office, Google San Francisco, April '14.

*RTEMS Kickstart*, 3-day training for flight software engineers, Johns Hopkins University Applied Physics Laboratory, May '13.

*Introduction to Google Summer of Code*, seminar talk given to GW ACM Student group, Spring '11.

*C Review, Part 2: Structures and Buffer Overflows*, guest lecture given to Computer Architecture I, GW, Fall '10.

*C Review, Part 1: Pointers and The Program Stack*, guest lecture given to Computer Architecture I, GW, Fall '10.

*IO Streams*, guest lecture, Intro. to OS, GW, Fall '08.

*Distributed File Systems*, guest lecture, Intro. to OS, GW, Fall '08.

*Concurrency: Semaphores"* guest lecture, Intro. to OS, GW, Fall '08.

*Game Console Platforms*, guest lecture, Intro. to OS, GW, Fall '07

# Other Work Experience

Consulting (Software Engineering, Healthcare IT), Independent, '13-'14

Research Assistant, George Washington University, '08-'13

RTEMS Project contributor and core developer , 09-current
Google Summer of Code Student '10, Mentor '11-'16, Org. Admin. '12-'16
Google Code-In Mentor ('12, '13, '15, '16), Org. Admin. ('12, '13, '15, '16)

Teaching Assistant (TA), George Washington University, '06-'08, '11

Consultant, Bloom Road Consulting Group LLC, Brentwood TN, '04-'06

Grader, Michigan Technological University, '04

Restaurant and service industry, various locations, 1995-2003

## Association Membership

ACM (2009-): Professional Member
SIGARCH, SIGBED, SIGCSE, SIGOPS, SIGSAC

IEEE (2009-): Member
IEEE Computer Society, Member.
IEEE Computer Society Technical Committee on Real-Time Systems, Member.

## Languages

English, native

Spanish, conversational

Finnish, novice

## References

Intentionally blank for web version.