

# Gedare Bloom, Ph.D.

CV: 04/26/25

Computer Science

University of Colorado Colorado Springs

(UCCS)

1420 Austin Bluffs Pkwy

Colorado Springs, CO, 80918

tel:719-255-3050

gbloom@uccs.edu

<https://gedare.github.io>

<https://scholar.google.com/citations?user=8ZBnSl4AAAAJ>

## 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

Associate Professor, UCCS, June 2022 –

Assistant Professor, UCCS, August 2019 – June 2022

Assistant Professor, Howard University, August 2015 – May 2019

Research Scientist, GW, October 2014 – August 2015

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

## Grants

### Awarded

#### National Science Foundation

**Title:** CAREER: Foundations for Real-Time System Security

Role: PI

Amount: \$599,896

Period: 07/01/2021-06/30/2026

#### National Science Foundation

**Title:** POSE: Phase I: Open-Source Ecosystem (OSE) for Open-Source Software Safety Pre-qualification

Role: PI, with Yanyan Zhuang (Co-PI)

Amount: \$154,664

Period: 06/15/2024-05/31/2026

#### National Science Foundation via Wichita State University

**Title:** ERI: ECCS: Concealing Side-Channels in Real-Time Schedulers

Role: PI, with Yanyan Zhuang (Co-PI)

Amount: \$149,887

Period: 7/19/2023-02/28/2026

#### National Security Agency

**Title:** University of Colorado Colorado Springs CAE Grant

Role: PI, with Philip Brown (Co-PI) and Shouhuai Xu (Co-PI)  
Amount: \$244,969  
Period: 08/16/2021-12/31/2024

**State of Colorado via University of Colorado Colorado Springs**

**Title:** Malware Analysis and Classification using Operational Similarity  
Role: PI, with Yanyan Zhuang (Co-PI)  
Amount: \$53,466  
Period: 07/1/2023-06/30/2024

**National Science Foundation**

**Title:** CICI: SSC: Real-Time Operating System and Network Security for Scientific Middleware  
Role: PI  
Amount: \$1,073,413  
Period: 10/01/2018-03/31/2024

**Department of Energy via Argonne National Laboratory**

**Title:** RTEMs Subcontract  
Role: PI  
Amount: \$45,178  
Period: 05/15/2023-08/18/2023

**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: \$266,551  
Period: 10/1/2016-09/30/2021

**Rebellion, Inc.**

**Title:** UCCS Sub-Proposal to Rebellion  
Role: PI, with Shouhuai Xu (Co-PI) and Jugal Kalita (Co-PI)  
Amount: \$15,000  
Period: 4/22/2021-09/15/2021

**Department of Homeland Security**

**Title:** Security Engineering for Resilient Networked Critical Infrastructure  
Role: PI, with Danda Rawat (Co-PI)  
Amount: \$1,198,627  
Period: 8/9/2017-07/31/2022

**National Science Foundation**

**Title:** HDR DSC: Collaborative Research: Transforming Data Science Education through a Portable and Sustainable Anthropocentric Data Analytics for Community Enrichment Program  
Role: Co-PI, with Jiang Li (PI), Yayin Fang, Shaolei Teng, Jae Eun Chung  
Amount: \$499,955  
Period: 10/01/2019-09/30/2022

**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

## 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, RTAS, 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. Undergraduate student names are underlined.

### Books

1. G. Bloom, J. Sherrill, T. Hu, I. C. Bertolotti, “Real-Time Systems Development with RTEMS and Multicore Processors,” CRC Press, 534 pages, 1st ed., Nov 2020.

### Refereed Journal Papers

1. P. Agbaje, H. Olufowobi, S. Hounsinnou, **G. Bloom**, “From Weeping to Wailing: A Transitive Stealthy Bus-Off Attack,” in IEEE Transactions on Intelligent Transportation Systems, March 2024.
2. O. Ikumapayi, H. Olufowobi, J. Daily, T. Hu, I. C. Bertolotti, **G. Bloom**, “CANASTA: Controller Area Network Authentication Schedulability Timing Analysis,” in IEEE Transactions on Vehicular Technology, vol. 72, iss. 8, pp 10024-10036, March 2023.
3. P. Agbaje, A. Anjum, A. Mitra, E. Oseghale, **G. Bloom**, H. Olufowobi, “Survey of Interoperability Challenges in the Internet of Vehicles,” in IEEE Transactions on Intelligent Transportation Systems, vol. 23, iss. 12, pp. 22838-22861, Aug. 2022.
4. \*H. Lawrence, U. Ezeobi, O. Tauil, J. Nosal, O. Redwood, Y. Zhuang, **G. Bloom**, “CUPID: A Labeled Dataset with Pentesting for Evaluation of Network Intrusion Detection,” in Journal of Systems Architecture, vol. 129, Elsevier, pp. 1-12, Aug. 2022.
5. J. Marshall, R. Gifford, **G. Bloom**, G. Parmer, R. Simha, “Precise Cache Profiling for Studying Radiation Effects,” in ACM Transactions on Embedded Computing Systems (TECS), vol. 20, no. 3, pp. 1-25, Mar. 2021.
6. \*U. Ezeobi, H. Olufowobi, C. Young, J. Zambreno, **G. Bloom**, “Reverse Engineering Controller Area Network Messages using Unsupervised Machine Learning,” accepted to appear in IEEE Consumer Electronics Magazine (MCE), Sep. 2020.
7. H. Olufowobi, C. Young, J. Zambreno, **G. Bloom**, “SAIDuCANT: Specification-based Automotive Intrusion Detection using Controller Area

Network (CAN) Timing,” in IEEE Transactions on Vehicular Technology (TVT), vol. 69, no. 2, pp. 1484-1494, Dec. 2020.

8. \*C. Young, J. Zambreno, H. Olufowobi, and **G. Bloom**, “Survey of Automotive Controller Area Network Intrusion Detection Systems,” in IEEE Design & Test, vol. 36, no. 6, pp 48-55, Dec. 2019.

9. \*U. K. Agarwal, V. P. Ashokbai, **G. Bloom**, C. Mauderer, and J. Sherrill, “Comparison of File Systems in RTEMS,” SIGBED Rev., vol. 16, no. 3, pp. 39–44, Oct. 2019.

10. **G. Bloom**, G. Cena, I. Cibrario Bertolotti, T. Hu, A. Valenzano, “Event Notification in CAN-based Sensor Networks,” in IEEE Transactions on Industrial Informatics, vol. 15, no. 10, pp 5613-5625, Oct. 2019.

11. **G. Bloom**, J. Sherrill, and G. Gilliland, “Aligning Deos and RTEMS with the FACE Safety Base Operating System Profile,” SIGBED Rev., vol. 15, no. 1, pp. 15–21, Mar. 2018.

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

13. 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.

14. **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. C.D. Hendrix and **G. Bloom**, “Resiliency of Vehicle Platoon Network Topologies under Physical Attack,” in IECON 2024-50th Annual Conference of the IEEE Industrial Electronics Society, November 2024.

2. U. Ezeobi, S. Hounsinnou, H. Olufowobi, Y. Zhuang, and **G. Bloom**, “MCFICS: Model-based Coverage-guided Fuzzing for Industrial Control System Protocol Implementations,” in IECON 2024-50th Annual Conference of the IEEE Industrial Electronics Society, November 2024.

3. C.D. Hendrix and **G. Bloom**, “Quantized Constant Time Headway Policy for Vehicle Platoons,” in 2024 IEEE 27th International Conference on Intelligent Transportation Systems (ITSC), September 2024.

4. O. Ikumapayi, P. Agbaje, Y. Zhuang, H. Olufowobi, and **G. Bloom**, “Deadline-Based Class Assignment for Time-Sensitive Network Frame Preemption,” in 2024 IEEE International Conference on Industrial Technology (ICIT), March 2024.

5. F. Mofidi, S.G. Hounsinnou, and **G. Bloom**, “L-IDS: A Multi-Layered Approach to Ransomware Detection in IoT,” in 2024 IEEE 14th Annual Computing and Communication Workshop and Conference, January 2024.

6. M.A. Rahat, V. Banerjee, **G. Bloom**, and Y. Zhuang, "Cimalir: Cross-Platform IoT Malware Clustering using Intermediate Representation," in 2024 IEEE 14th Annual Computing and Communication Workshop and Conference, January 2024.
7. A. Knapp, E. Wamuo, M.A. Rahat, S. Torres-Arias, **G. Bloom**, and Y. Zhuang, "Should Smart Homes Be Afraid of Evil Maids?: Identifying Vulnerabilities in IoT Device Firmware," in 2024 IEEE 14th Annual Computing and Communication Workshop and Conference, January 2024.
8. C. Hendrix and **G. Bloom**, "Platoon Vulnerability due to Network Topology and Targeted Vehicle," in IEEE Consumer Communications and Networking Conference (CCNC), IEEE CCNC 2024, January 2024.
9. J. Seaton, S. Hounsinnou, **G. Bloom**, and P. N. Brown, "Competitive Information Provision Among Internet Routing Nodes," in 2023 American Control Conference (ACC), May 2023.
10. A. Duby, T. Teryl, **G. Bloom**, Y. Zhuang, "Evaluating Feature Robustness for Windows Malware Family Classification," in 2022 International Conference on Computer Communications and Networks (ICCCN), July 2022/
11. A. Duby, T. Teryl, **G. Bloom**, and Y. Zhuang, "Detecting and Classifying Self-Deleting Windows Malware Using Prefetch Files," in 2022 IEEE 12th Annual Computing and Communication Workshop and Conference (CCWC), January 2022.
12. \*V. Banerjee, R. Rabinowitz, M. Stidd, R. Lewis, P. Brown, and **G. Bloom**, "The Tragedy of the Miners," in IEEE Consumer Communications and Networking Conference (CCNC), IEEE CCNC 2022, January 2022.
13. H. Lawrence, U. Ezeobi, **G. Bloom**, and Y. Zhuang, "Shining New Light on Useful Features for Network Intrusion Detection Algorithms," in IEEE Consumer Communications and Networking Conference (CCNC), IEEE CCNC 2022, January 2022.
14. S. Hounsinnou, M. Stidd, U. Ezeobi, H. Olufowobi, M. Nasri, and **G. Bloom**, "Vulnerability of Controller Area Network to Schedule-Based Attacks," 42nd IEEE Real-Time Systems Symposium (RTSS'21), December 2021.
15. **G. Bloom** and J. Sherrill, "Harmonizing ARINC 653 and Realtime POSIX for Conformance to the FACE Technical Standard," in 2020 IEEE 23rd International Symposium on Real-Time Distributed Computing (ISORC), pp. 98-105, May 2020.
16. M. Nasri, T. Chantem, **G. Bloom**, and R. Gerdes, "On the Pitfalls and Vulnerabilities of Schedule Randomization against Schedule-Based Attacks," 25th IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS'19), April 2019.
17. **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.

18. 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.

19. \*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.

20. \*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.

21. 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.

22. **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.

23. 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.

24. **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.

25. 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.

26. **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.

27. 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.

28. **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

1. C. Meadows, S. Hounsinnou, T. Wood, **G. Bloom**, “Sidecar-based Path-aware

## Workshop and Short Papers

- Security for Microservices,” in 28th ACM Symposium on Access Control Models and Technologies (SACMAT), May 2023.
2. O. Ikumapayi, H. Olufowobi, J. Daily, T. Hu, I. C. Bertolotti, **G. Bloom**, “Work in Progress: Schedulability Analysis of CAN and CAN FD Authentication,” in 2023 IEEE 29th Real-Time and Embedded Technology and Applications Symposium (RTAS), May 2023.
  3. F. Mofidi, S. Hounsinnou, **G. Bloom**, “L-IDS: A lightweight hardware-assisted IDS for IoT systems to detect ransomware attacks,” in 8th ACM/IEEE Internet of Things Design and Implementation (IoTDI), May 2023.
  4. J. Seaton, S. Hounsinnou, T. Wood, S. Xu, P. N. Brown, **G. Bloom**, “Poster: Toward Zero-Trust Path-Aware Access Control,” in 27th ACM Symposium on Access Control Models and Technologies (SACMAT), June 2022.
  5. P. Agbaje, A. Anjum, A. Mitra, **G. Bloom**, H. Olufowobi, “A Framework for Consistent and Repeatable Controller Area Network IDS Evaluation,” in Workshop on Automotive and Autonomous Vehicle Security (AutoSec), Apr. 2022.
  6. S. Hounsinnou, V. Banerjee, C. Peng, M. Hasan, and **G. Bloom**, “Work-in-Progress: Enabling Secure Boot for Real-Time Restart-Based Cyber-Physical Systems,” in Real-Time Systems Symposium, Dortmund, Germany, Dec 2021.
  7. \*R. Dubey, V. Banerjee, S. Hounsinnou, and **G. Bloom**, “Work-in-Progress: Strong APA Scheduling in a Real-Time Operating System,” in Embedded Systems Week (ESWEEK), 2021.
  8. **G. Bloom**, “WeepingCAN: A Stealthy CAN Bus-off Attack,” in 3rd International Workshop on Automotive and Autonomous Vehicle Security (AutoSec), February 2021.
  9. \*P. Dangal and **G. Bloom**, “Towards Industrial Security Through Real-time Analytics,” in 2020 IEEE 23rd International Symposium on Real-Time Distributed Computing (ISORC), pp. 156-157, May 2020.
  10. H. Olufowobi, S. Hounsinnou, and **G. Bloom**, “Controller Area Network Intrusion Prevention System Leveraging Fault Recovery,” ACM Workshop on Cyber-Physical Systems Security & Privacy (CPS-SPC), London, UK, November 2019.
  11. \*H. Olufowobi, U. Ezeobi, E. Muhati, G. Robinson, C. Young, J. Zambreno, and **G. Bloom**, “Anomaly Detection Approach Using Adaptive Cumulative Sum Algorithm for Controller Area Network,” ACM Workshop on Automotive Cybersecurity (AutoSec), Dallas, TX, March 2019.
  12. \*C. Young, H. Olufowobi, **G. Bloom**, and J. Zambreno, “Automotive Intrusion Detection Based on Constant CAN Message Frequencies Across Vehicle Driving Modes,” ACM Workshop on Automotive Cybersecurity (AutoSec), Dallas, TX, March 2019.

13. \*H. Olufowobi, **G. Bloom**, C. Young, and J. Zambreno, “Work-in-Progress: Real-Time Modeling for Intrusion Detection in Automotive Controller Area Network,” 2018 IEEE Real-Time Systems Symposium (RTSS), Nashville, TN, December 2018.
14. \*U. K. Agarwal, V. P. Ashokbai, **G. Bloom**, C. Mauderer, and J. Sherrill, “Comparison of File Systems in RTEMS,” 2018 Embedded Operating Systems Workshop (EWiLi 2018), Turin, Italy, October 2018.
15. **G. Bloom**, B. Alsulami, E. Nwafor, and I. C. Bertolotti, “Design Patterns for the Industrial Internet of Things,” 14th IEEE International Workshop on Factory Communication Systems (WFCS), Imperia, Italy, June 2018.
16. \*E. Nwafor, A. Campbell, and **G. Bloom**, “Anomaly-based Intrusion Detection of IoT Device Sensor Data using Provenance Graphs,” 1st International Workshop on Security and Privacy for the Internet-of-Things (IoTSec), Orlando, April 2018.
17. \*E. Nwafor, A. Campbell, D. Hill, and **G. Bloom**, “Towards a Provenance Collection Framework for Internet of Things Devices,” 14th IEEE International Conference on Ubiquitous Intelligence and Computing (UIC), San Francisco, August 2017.
18. **G. Bloom**, G. Cena, I. C. Bertolotti, T. Hu and A. Valenzano, "Optimized event notification in CAN through in-frame replies and Bloom filters," 2017 IEEE 13th International Workshop on Factory Communication Systems (WFCS), Trondheim, June 2017.
19. C. Tessler, **G. Bloom**, and N. Fisher, “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.
20. 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.
21. **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.
22. \*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.
23. **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.
24. \*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.



25. **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.
26. \*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.
27. 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.
28. \*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.
29. 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.
30. **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.
31. 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.
32. **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. \*H. Olufowobi and **G. Bloom**, “Chapter 16 - Connected Cars: Automotive Cybersecurity and Privacy for Smart Cities,” Smart Cities Cybersecurity and Privacy, Elsevier, 2019, pp 227-240.
2. **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.
3. **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

S. Mohan, M. Asplund, **G. Bloom**, A. Sadeghi, A. Ibrahim, N. Salajageh, P. Griffioen, and B. Sinopoli, “Special Session: The Future of IoT Security”, ESWeek 2018, October 2018.

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

# University Teaching

**University of  
Colorado Colorado  
Springs**

**Assistant Professor ('19-'22), Associate Professor ('22-)**

Course	Semester	Students	Mean Instructor Rating
Computer Architecture (UG)	Fall '24	16	6.71 / 7.0 (44% responses)
Computer Architecture (G)	Fall '24	14	5.83 / 7.0 (86% responses)
Computer Organization and Assembly Language (UG)	Spring '24	26	6.1 / 7.0 (62% responses)
Computer Architecture (UG)	Fall '23	27	4.8 / 7.0 (81% responses)
Computer Architecture (G)	Fall '23	7	6.43 / 7.0 (100% responses)
System Security (G)	Spring '23	9	6.4 / 7.0 (78% responses)
Computer Architecture (UG)	Fall '22	38	4.8 / 7.0 (79% responses)
Computer Architecture (G)	Fall '22	17	5.4 / 7.0 (71% responses)
Cybersecurity for All	Spring '22	16	4.5 / 7.0 (63% responses)
Computer Architecture (UG)	Fall '21	38	3.9 / 7.0 (79% responses)
Computer Architecture (G)	Fall '21	13	6.2 / 7.0 (100% responses)
System Security (G/UG)	Spring '21	9	5.3 / 7.0 (89% responses)
Computer Architecture (UG)	Fall '20	24	4.0 / 7.0 (96% responses)
Computer Architecture (G)	Fall '20	8	5.0 / 7.0 (88% responses)
System Security (G/UG)	Spring '20	8	6.3 / 7.0 (85% responses)
Computer Architecture (UG)	Fall '19	55	3.6 / 7.0 (85% responses)
Computer Architecture (G)	Fall '19	9	3.7 / 7.0 (75% responses)

- Developed new course, CS 1910 Cybersecurity for All, 2022.
- Developed new course, CS 4980/5980 System Security, 2020.

**Howard University Assistant Professor**

Course	Semester	Students	Mean Instructor Rating
Real-Time Systems	Spring '19	25	4.2 / 5.0 (36% responses)
Computer Organization II	Spring '19	75	3.6 / 5.0 (16% responses)
Applied Data Science	Fall '18	45	Unknown
Operating Systems	Fall '18	22	Unknown
Computer Organization I	Spring '18	27	Unknown
Computer Organization II	Spring '18	44	Unknown
CS Undergraduate Research	Spring '18	2	Insufficient Sample Size
Operating Systems	Fall '17	64	Unknown
Computer Architecture	Fall '17	14	Unknown
Computer Organization II	Spring '17	50	4.1 / 5.0 (87% responses)
Advanced Operating Systems	Spring '17	10	Unknown
CS Undergraduate Research	Spring '17	2	Insufficient Sample Size
Computer Organization I	Fall '16	60	4.1 / 5.0 (20% responses)
Operating Systems	Fall '16	40	4.3 / 5.0 (13% responses)
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 new course CSCI/EECE 484 Real-Time Systems, 2019.
- Developed new course CSCI 473 Applied Data Science, 2018-2019.
- 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.

## 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.

## Grader

C++ as a Second Language, Fall '04.

## Mentoring and Supervising

### PhD Alumni

### University of Colorado Colorado Springs

Vijay Banerjee, Ph.D. *Timing Side-Channels in Real-Time Embedded Systems*, Defended 04/08/2025, Graduate 05/2025.

Uchenna Ezeobi, Ph.D. *Vulnerability Discovery for Industrial Control System (ICS) Network Protocols Using Fuzzing*, Defended 07/22/2024, Graduated 12/2024.

First Job: Software Engineer at Meta.

### **Howard University**

Ebelechukwu Nwafor, Ph.D. *Trace-Based Data Provenance for Cyber-Physical Systems*, Defended 04/20/2018, Graduated 05/2018.

First Job: Assistant Professor at Villanova University.

Habeeb Olufowobi, Ph.D. *Fail-Operational Intrusion Detection Systems (FOIDS): A Mechanism for Securing Automotive In-Vehicle Networks*, Graduated 05/2019.

First Job: Assistant Professor at University of Texas at Arlington.

## **University of Colorado Colorado Springs**

### **Postdoctoral Scholars**

Sena Hounsinnou, Real-Time Operating System and Network Security for Scientific Middleware, 2020-2022.

First Job: Assistant Professor at Metro State University, St. Paul MN.

### **Current Ph.D. Student Advisees**

Omolade Ikumapayi, *TBD (Real-Time Security)*, Ph.D. Student

Constance Hendrix, *TBD (Cybersecurity)*, Ph.D. Student

Douglas Healy, *TBD (Cybersecurity)*, Ph.D. Student

Farhad Mofidi, *TBD (Cybersecurity)*, Ph.D. Student

Katrina Rosemond, *TBD (Cybersecurity)*, Ph.D. Student

Jordan Scott, *TBD (MTD Security)*, Ph.D. Student

Joseph Bedzra, *TBD (Real-Time Systems)*, Ph.D. Student

### **M.S. Student Advisees**

Justis Hsieh, M.S. (12/21)

Mark Pizzolatto, M.E. (12/21)

Prajwal Dangal, M.E. (12/21)

Abiola Ogundeko, M.S. (5/21)

### **Undergraduate Student Researchers**

Elise Clark, *Fuzzing Embedded Systems* (NSF REU '24)

Samuel Adamson, *Fuzzing Embedded Systems* (NSF REU '23-'24)

Connor Gurule, *Fuzzing Embedded Systems* (NSF REU '22-'23)

Harrison Gerber, *RTEMS on Qemu for m68k/uC5282* (NSF REU '21)

Alexander Urquhart, *Fuzzing Industrial Control Systems* (NSF REU '21)

Seamus Downey, *Automotive Security* (NSF REU '20)

John Henry Clark, *Automotive Security* (NSF REU '20)

### **Graduate Committees**

Committee Member, Mong Sim, PhD Dissertation, Fall 2023.

Committee Member, Austin Knapp, MS Thesis, Fall 2022.

Committee Member, Adam Duby, PhD Dissertation, Spring 2022.

Committee Member, Khalid Abahussain, MS Thesis, Fall 2019.

### **Howard University Graduate Students**

Co-Supervised with Dr. Gloria Washington:

Katrina Rosemond, M.S. Student

### **Undergraduate Student Researchers**

Keenah Mays, *Block Programming for the IoT*, B.S. '19 (est.)

Andriana Burgess, *Block Programming for the IoT*, B.S. '19 (est.)

Cynthia Jules, *Block Programming for the IoT*, B.S. '19 (est.)

Gaylon Robinson, *Medical Robot Assistant*, B.S. '19 (est.)

India Burse, *Medical Robot Assistant*, B.S. '19 (est.)

David Hill, *IoT-in-a-Rack*, B.S. '19 (est.)

Andre Campbell, *Tracing Provenance for IoT*, B.S. '19 (est.)

Pratyush Thapa, *Automotive Security*, B.S. '19 (est.)

Saurav Aryal, *Automotive Security*, B.S. '18 (est.)

Spencer Goodwin, *IoT-in-a-Rack*, B.S. '18 (est.)

Samman Thapa, *Architectural Support for RTOS*, B.S. '18 (est.)

Dwight Thomas, *Offensive Cybersecurity Tools for IoT*, B.S. '18 (est.)

Elise Blackmon, *Cybersecurity for Satellite Middleware*, B.S. EE '17

**George Washington University**

Portia Herndon, *Cybersecurity for Satellite Middleware*, B.S. CS '17

Co-supervised with Gabriel Parmer:

Yuxin Ren, *TBD (Memory Management)*, Ph.D. Student.

Teo Georgiev, *System Security*, M.S. 2017. (est.)

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.

Muhammad Sulthan Mazaya, *Add Support for renode.io Simulator*, '23

Prashanth S, *CAN and ADC Peripheral Support for BBB*, '22

Ida Mbeh Mbeh Delphine, *Code Formatting and Style Checking*, '21

Utkarsh Rai, *Memory Protection*, '20

Richi Dubey, *Improve the SMP scheduler with arbitrary processor affinity support*, '20

Ravindra Kumar Meena, *Basic Support for Trace Compass*, '19

Vidushi Vashishth, *Enhancement of RTEMS runtime tracing*, '18

Spencer Goodwin, *CTF Integration*, '17

Nikolay Komashinskiy, *Tying reliable hardware, reliable software and environment: RTEMS BSP development for TMS570 processors*, '17

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.

Mikail Yayla, *Software-based Fault Tolerance*, '17.

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

Faculty Award for Excellence in Research, University of Colorado Colorado Springs, '22-'23.

Pre-Tenure Researcher of the Year, Engineering and Applied Science, University of Colorado Colorado Springs, '20-'21.

Best Paper Award, 3rd International Workshop on Automotive and Autonomous Vehicle Security, '21.

Daniels Fund Ethics Initiative Collegiate Program at UCCS College of



Business Ethics Fellow (Ethics Fellow), University of Colorado Colorado Springs, '20-'21.

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, '18, '19, '20, '21, '22, '23, '24, '25.

DOE: '23, '24.

ASEE/SMART: '16.

NDSEG: '19.

### Professional Organizations

Member, Executive Committee of the IEEE Technical Committee on Real-Time Systems (TCRTS), TCRTS Industry Outreach Subcommittee, '22-'25.

### Conference and Workshop Organization

Deputy Track Chair, IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), '24.

Artifact Evaluation Chair, IEEE Real-Time Systems Symposium (RTSS), '21, '22.

Organizer and Program Chair, The Embedded Operating Systems Workshop (EWiLi), '19.

	Organizer and Program Chair, 2nd International Workshop on Security and Privacy for the Internet-of-Things (IoTSec), '19.
<b>Journal Editor</b>	Associate Editor, IEEE Transactions on Vehicular Technology (TVT), '21 - current
<b>Conference Technical Program Committees (TPC)</b>	<p>Program Committee Member, ACM SIGBED International Conference on Embedded Software (EMSOFT), '24.</p> <p>Program Committee Member, IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), '17, '19, '22, '23, '24.</p> <p>Program Committee Member, IEEE Real-Time Systems Symposium (RTSS), '18, '21, '25.</p> <p>Program Committee Member, European Conference on Real-Time Systems (ECRTS), '23, '24, '25.</p> <p>Program Committee Member, IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCISA), '23, '24, '25.</p> <p>Program Committee Member, ISOC Symposium on Vehicle Security (VehicleSec), '23, '24, '25.</p> <p>Program Committee Member, Design and Test Europe (DATE), '22, '23, '24.</p> <p>Program Committee Member, IEEE Conference on Dependable and Security Computing (DSC), '18.</p> <p>Artifact Evaluation Committee Member, IEEE Real-Time Systems Symposium (RTSS), '16, '19</p> <p>Program Committee Member, Euromicro Conference on Digital System Design (DSD) Special Session on Mixed-Criticality System Design, Implementation and Analysis (MCSDIA), '14, '15, '16, '17, '18</p>
<b>Workshop Program Committees</b>	<p>Program Committee Member, Annual Workshop on Operating Systems Platforms for Embedded Real-Time Applications (OSPRT), '23, '24, '25.</p> <p>Program Committee Member, The Joint Workshop on CPS &amp; IoT Security and Privacy, '20, '21, '22, '23, '24.</p> <p>Program Committee Member, IEEE Workshop on the Internet of Safe Things (SafeThings), '19, '20.</p> <p>Program Committee Member, ACM Workshop on Automotive Cybersecurity (AutoSec), '19, '20, '21, '22.</p> <p>Program Committee Member, 14th IEEE International Workshop on Factory Communication Systems (WFCS), '18</p> <p>Program Committee Member, 1st IEEE Workshop on 5G Wireless Security</p>

(5G-Security), '18

Program Committee Member, 1st International Workshop on Security and Privacy for the Internet-of-Things (IoTSec), '18

Program Committee Member, The Embedded Operating Systems Workshop (EWiLi), '14, '15, '16, '17, '18

## **Reviewer**

### **Journals Refereed**

ACM Transactions on Embedded Computing Systems, '21, '22, '23, '24

IEEE Transactions on Information Forensics and Security (TIFS), '09, '25.

Real-Time Systems Journal, '19, '20, '21, '22, '23.

IEEE Internet of Things Journal, '18, '19, '20, '21, '22, '23, '24, '25

IEEE Transactions on Industrial Informatics, '16, '18, '20, '21, '22, '23, '24

IEEE Transactions on Intelligent Transportation Systems, '24.

IEEE Transactions on Vehicular Technology, '23, '24.

IEEE Transactions on Dependable and Secure Computing, '24.

IEEE Transactions on Green Communications and Networking, '23.

IEEE Systems Journal, '20.

ACM Transactions on Cyber-Physical Systems, '25.

IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, '18, '19, '23.

IEEE Transactions on Network Science and Engineering, '23.

IEEE Transactions on Computers, '22, '24

ACM Transactions on Design Automation of Electronic Systems, '22.

IEEE Transactions on Mobile Computing, '25.

IEEE Transactions on Services Computing, '18.

IEEE Transactions on Very Large Scale Integration Systems, '18.

IEEE Transactions on Parallel and Distributed Systems, '18.

IEEE Communications Magazine, '23.

IEEE Consumer Electronics Magazine, '22.

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

### **Conferences and Workshops Reviewed**

EWiLi, RTAS, DSD, RTSS, DSC, WFCS, IoTSec, 5G-Security, RESPECT

### **Conference Volunteer**

Session Chair, RTSS '18

Session Char, RTAS '17, '23

Session Chair, EWiLi '16, '18

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 University of Colorado Colorado Springs**

Committee Member (Faculty Assembly Representative), Intellectual Property Policy Committee, 2025.

Faculty Adviser, Open Source Club, 2024-2025

Co-organizer, UCCS – NUARI Cyber Exercise for Power Utilities, July 18, 2023.

Participant, UCCS Cybersecurity across the Federal Government, March 1, 2023.

Participant, UCCS Cybersecurity Faculty Luncheon, October 24, 2019.

### **Howard University**

Member, Howard University and Greater Washington Partnership – Northrop Grumman, August 2018 – May 2019.

Faculty Adviser, HU, '15. Cyber Club.

### **George Washington University**

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**

### **University of Colorado Colorado Springs College of Engineering and Applied Science**

Member, ME Cybersecurity Online Committee, Spring '20

**Howard University**  
**College of Engineering, Architecture and Computer Sciences**

Member, Ad Hoc Undergraduate Advising Committee, September '18

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**

**University of Colorado Colorado Springs**  
**Department of Computer Science**

Committee Chair, CS Department Chair Search Committee, 2025

ABET Coordinator, 2025

Committee Chair, CS Department Bylaws Committee, AY 24-25

Program Director, Masters of Engineering in Cybersecurity, AY24-25

Committee Member, Primary Unit Committee (PUC), AY22-23, AY23-24, AY24-25

Committee Chair, TT Cybersecurity Faculty Search Committee, AY23-24

Committee Chair, CS Academic Ethics Code Committee, AY20-21

Committee Chair, Instructional Cybersecurity Faculty Search Committee, AY21-22

Committee Member, TT Cybersecurity Faculty Search Committee, AY21-22

Committee Member, Gallogly Chair Faculty Search Committee, AY19-20

Committee Member, TT Cybersecurity Faculty Search Committee, AY19-20

Undergraduate Academic Advisor, August '20 – current

**Howard University**  
**Department of Computer Science**

Committee Member, Undergraduate Student Affairs Committee, September '18 – May '19

Committee Member, Undergraduate Curriculum Committee, January '17 – May '19.

Undergraduate Academic Advisor, October '16 – May '19

Committee Member, Assessment (ABET) Committee, August '16 – May '19

Acting Program Director of Computer Science, August '18.

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.

### **George Washington University Department of Computer Science**

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**

Embedded World 2025, Nuremberg, Germany, March 2025.

50th Annual Conference of the IEEE Industrial Electronics Society (IECON), Chicago, IL, November 2024.

27th IEEE International Conference on Intelligent Transportation Systems (ITSC), Edmonton, Canada, September 2024.

IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), San Antonio, TX, May 2023.

NSF Cyber-Physical Systems (CPS) Principal Investigator Meeting, Virtual, June 2021.

NDSS 2021/AutoSec, Virtual Conference/Workshop, February 2021.

ISORC 2020, Virtual Conference, May 2020.

EWiLi 2018, The Embedded Operating System Workshop, Turin, Italy, October 2018.

Embedded Systems Week, Turin, Italy, October 2018.

NSF CC\*/CICI Principal Investigator Meeting, College Park, MD, September 2018.

Workshop on Modeling, Measuring, and Managing Uncertainty in Cyber-Physical Systems, York University, July 2018.

ISACA Greater Washington DC Annual Meeting, Rosslyn, VA, June 2018.

Workshop on Spacecraft Flight Software, Johns Hopkins University Applied Physics Lab, December 2017.

NSF Cyber-Physical Systems (CPS) Principal Investigator Meeting, Alexandria, VA, November 2017.

IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), Pittsburgh, PA, April 2017.

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**   **Howard University**

Howard University Customer Service Training, August 2018.

## Participant

Howard University NSF CAREER Program Workshop, May 2018.

College of Engineering and Architecture ABET Training. December 2016, September 2017.

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

*WeepingCAN: A Stealthy CAN Bus-off Attack*, AutoSec, Online, Feb '21.

*Harmonizing ARINC 653 and Realtime POSIX for Conformance to the FACE Technical Standard*, ISORC, Online, May '20.

*Comparison of File Systems in RTEMS*, EWiLi, Turin, Italy, September '18.

*Trustworthy Sensor Data*, ESWEEK IoT Day, Turin, Italy, September '18.

*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

“Quantized Constant Time Headway Policy for Vehicle Platoons”, IEEE International Conference on Intelligent Transportation Systems (ITSC), Edmonton, Canada, September 2024.

“L-IDS: A lightweight hardware-assisted IDS for IoT systems to detect ransomware attacks”, 8th ACM/IEEE Conference on Internet of Things Design and Implementation, San Antonio, TX, May 2023.

“Track and Fallback: Intrusion Detection to Counteract Carjack Hacks with Fail-Operational Feedback”, NSF CPS PI Meeting, Alexandria, VA, November '17.

“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**

*Breakout Session: Cybersecurity in Transportation*, Drive Clean Summit and Expo 2025, Englewood Civic Center, Feb '25.

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

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

## **Invited Talks and Guest Lectures**

*The Bridge Between Cybersecurity and AI/ML: Addressing the Knowledge Gap*, Colorado Cooperation Conference, December '23.

*Ground Vehicle Security: Trends, Problems, Solutions, and Future Work*, IEEE Pikes Peak Chapter, February '23.

*Improving the Security of Open-Source Software Infrastructure*, Trusted CI Webinar, January '23.

*Ground Vehicle Security*, UCCS Lions Cybersecurity Club, October '22.

*UCCS-CCTI Cybersecurity Research Exchange*, Catalyst Campus for Technology and Innovation, April '22.

*Ground Vehicle Research of the Embedded Systems Security Lab (ESSL@UCCS)*, Paving the Road to Future Automotive Research Datasets: Challenges and Opportunities, November '21.

*Research Overview of the Embedded Systems Security Lab (ESSL@UCCS)*, NREL-UCCS Cybersecurity Showcase, September '21.

*Long-term Benefits of Sustained Open-Source Participation*, Google, August '21.

*Automotive Security*, UCCS Lions Cybersecurity Club, May '21.

*Automotive Security: Trends, Problems, Solutions, and Future Work*, CAE Tech Talk, March '21.

*Automotive Security: Trends, Problems, Solutions, and Future Work*, I-A-I, Inc., March '21.

*Security Hardening for EPICS/RTEMS*, EPICS Collaboration Fall 2020 Meeting, Virtual, October '20.

*Automotive Intrusion Detection Systems: A Fail-Operational Perspective*, Colorado State University, Fort Collins, CO, October '19.

*CICI: SSC: Real-Time Operating System and Network Security for Scientific Middleware*, NSF CC\*/CICI PI Meeting, College Park, MD, September 2018.

*Resilience in Automotive Intrusion Detection Systems*, University of Illinois at Champaign-Urbana (UIUC) Critical Infrastructure Resilience Institute Seminar, August '18.

*Automotive Cybersecurity in the Connected World*, ISACA GWDC Annual

Meeting, Rosslyn, VA, June '18.

*Track and Fallback: Intrusion Detection to Counteract Carjack Hacks with Fail-Operational Feedback*, Lightning Talk, NSF CPS PI Meeting, Alexandria, VA, November '17.

*Automotive Intrusion Detection Systems*, Virginia Tech NVC, October '17.

*Cyber-Physical System (CPS) and Internet of Things (IoT) Research in the Embedded Systems Security Lab (ESSL)*, AT&T Public Sector Solutions, May '17.

*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

CEO, Bloom Cyber LLC, '22-current

Consulting (Software Engineering, Healthcare IT), Independent, '13-'22

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

RTEMS Project contributor and core developer, '09-current

Google Summer of Code Student '10, Mentor '11-'20, Org. Admin. '12-'20

Google Code-In Mentor and Org. Admin. ('12, '13, '15, '16, '18)

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 Senior Member (M'09, SM'19)  
SIGARCH, SIGBED, SIGCSE, SIGOPS, SIGSAC  
IEEE Senior Member (M '09, SM '19)  
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.