HABEEB DIPO OLUFOWOBI

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EDUCATION

Howard University, Washington, DC **May 2019**

- **Ph.D. Computer Science**
- **Concentration:** Automotive Systems Security
- **Dissertation Topic:** Fail-Operational Intrusion Detection Systems (FO-IDS): A Mechanism for Securing Automotive In-Vehicle Networks

California State Polytechnic University, Pomona: **Dec. 2014**

- **Master of Science in Electrical Engineering:** Computer Systems Emphasis

Fountain University Osogbo, Nigeria **July 2011**

- **Bachelor of Science in Computer Science**

RESEARCH INTEREST

System Security, Security in IoT, Cloud Computing, Blockchain, Machine Learning and Data Provenance.

PUBLICATIONS

- **Journals**
  - Olufowobi, Habeeb, Young, Clinton, Zambreno, Joseph, and Bloom, Gedare. "SAIDuCANT: Specification-based Automotive Intrusion Detection using Controller Area Network (CAN) Timing." *IEEE Transactions on Vehicular Technology (TVT)*.
  - Young, Clinton, Olufowobi, Habeeb, Zambreno, Joseph, and Bloom, Gedare. "Survey of Automotive Controller Area Network Intrusion Detection Systems." *IEEE Design & Test* (2019).
- **Conference and Workshop Articles**
  - Ebelechukwu Nwafor and Olufowobi, Habeeb. "Towards an Interactive Visualization Framework for IoT Device Data Flow." *IEEE Workshop on Internet of Things Data Analytics (IoTDA) 2019.*
  - Olufowobi, Habeeb, Sena Hounsinou and Bloom, Gedare. "Controller Area Network Intrusion Prevention System Leveraging Fault Recovery." *ACM Workshop on Cyber-Physical Systems Security & Privacy (CPS-SPC'19).*
  - Olufowobi, Habeeb, Ezeobi, Uchenna, Muhati, Eric, Young, Clinton, Zambreno, Joseph, and Bloom, Gedare. "Anomaly Detection Approach Using Adaptive Cumulative Sum Algorithm for Controller Area Network". *Proceedings of the ACM Workshop on Automotive Cybersecurity. ACM, 2019.*
  - Young, Clinton, Olufowobi, Habeeb, Zambreno, Joseph, and Bloom, Gedare. "Automotive Intrusion Detection Based on Constant CAN Message Frequencies Across Vehicle Driving Modes". *Proceedings of the ACM Workshop on Automotive Cybersecurity. ACM, 2019.*
  - Olufowobi, Habeeb, Young, Clinton, Zambreno, Joseph, and Bloom, Gedare. "WiP: Real-Time Modeling for Intrusion Detection in Automotive Controller Area Network." *Real-Time Systems Symposium (RTSS), 2018 IEEE*. IEEE, 2018.
  - Parwez, Md Salik, and Olufowobi, Habeeb. "Cost-constrained Handoff in Next Generation Heterogeneous Wireless Networks". *Ubiquitous Computing, Electronics and Mobile Communication Conference (UEMCON), 2018 IEEE 9th Annual*. IEEE.
  - Olufowobi, Habeeb, Engel, Robert, Baracaldo, Nathalie, Bathen, Luis Angel D., Tata, Samir, and Ludwig, Heiko. "Data Provenance Model for Internet of Things (IoT) Systems." *International Conference on Service-Oriented Computing*. Springer, Cham, 2016.

- **Book Chapter**
  - Olufowobi, Habeeb and Gedare Bloom. "Connected Cars: Automotive Cybersecurity and Privacy for Smart Cities." In *Smart Cities Cybersecurity and Privacy*, pp. 227-240. Elsevier, 2019.

TEACHING EXPERIENCE

- **University of Texas at Arlington**
  - Cloud Computing — Fall '20
- **Howard University, Washington, DC**

  Lectured computer science courses and participate in academic curriculum development. Courses includes:
  - Computer Science II – Introduction to Data Structure & Algorithm — Spring '20
  - Cloud Computing — Fall '19
  - Computer Science III - Data structures & algorithms — Fall '19, Spring '20
  - Math I Laboratory — Spring '18
  - Teaching Assistant for Operating Systems Concept — Fall '16, Spring '17
  - Teaching Assistant for Computer Organization I, II — Fall '17, Spring '16, '17
  - Teaching Assistant for Modelling and Simulation — Fall '16
- **California State Polytechnic University, Pomona**
  - Teaching Assistant for Electromagnetic Fields — Spring '14
  - Teaching Assistant for Software Engineering — Winter '14

RESEARCH EXPERIENCE

Embedded System and Security Lab, Howard University, Washington, DC

Graduate Research Assistant/Project Lead — **Jan. 2016 – Aug. 2019**

- **CARS** - "Cars Assuring Resilient Security"

  Involved in research that explores the security issues arising out of the growing use of electrical components that creates access points to vehicular distributed systems, that a potential hacker can exploit. Inherent security challenges such as distributed denial of service attacks, impersonation and fuzzy attacks are investigated to:
  - Establish theoretical foundations of fail-operational intrusion detection systems (FO-IDS),
  - Explore design space in the context of defending against attacks in automotive in-vehicle networks
  - Devise response and recovery protocols to ensure resilient operation, and
  - Evaluate the performance of the FO-IDS using actual vehicular test beds and data.
- Security and Data Provenance in Internet of Things (IoT)
  - This project is aimed at developing a framework that can be used to securely collect data provenance on memory constrained embedded systems device.

Oak Ridge National Lab: Research Intern — **June 2017 – Aug. 2017**

In-vehicle network security research and development for the in-vehicle network (CAN bus) to:

- Detect when an attack is imminent or when anomalous events occur on the vehicular bus systems.
- Investigates on ways to mitigate such anomalies and attack as they occur.
- Demonstrates injection attacks on real vehicles to take control of critical functions.
- Evaluate the performance of the proposed detection strategies and how it impedes the performance of the vehicular operations.

IBM Research Lab, Almaden: Research Intern — **June 2016 – Aug. 2016**

Developed a data provenance model for the Internet of Things (IoT) systems enabling:

- The verification of systems correctness, integrity, and transparency of information shared across IoT platform.
- Providing mechanisms to ensure secure code and data provenance management on IoT platform.
- Investigate how provenance graphs can be used to detect anomalies in shared information on the IoT platform.

Cal Poly Pomona ECE Dept.: Graduate Research Assistant **August 2013 – Dec. 2014**

- Worked on project involving creating a Smart Monitoring and Response Tool "SMART" to enable real-time energy management of a DC-based distributed micro grid.
- Studied concepts such as moving target defense, message authentication codes and AES encryption
- Created an Android application that provides a way to help people share rides and carpool that implements RSA encryption messages

WORK EXPERIENCE

Infoway Solution: Quality Assurance Engineer **June 2015 – Dec. 2015**

- Responsible for testing data transmission website. This includes end to end validation of customer connectivity, data validation between users and the application
- Reviewed Business Requirement documents (BRD) and Functional Specifications Documents (FSD) to prepare Test Cases and identify test scenario
- Designed, executed and maintained Automation Test Script in Selenium WEBDRIVER using JAVA Framework – JUNIT, TestNG for regression test cases

Synaptics: HISD Project Management Intern **June 2014 – Sept. 2014**

- Provide DFT (Design for Test) feedback to design hardware and firmware team
- Design and document electrical/electronic aspects of functional test systems.
- Create test specification to ensure appropriate product test coverage.
- Work with mechanical engineering and 3rd party system builders to build mechanical fixturing and enclosures.
- Manage and report on test development project deliverables including schedule and cost.
- Create, manage and maintained the system BOMs for projects in Agile

Etisalat Nigeria (EMTS): Analyst, IT Service Desk and Incident Management **Dec. 2011 – Jan. 2013**

- Served as a member of the project team that designed and delivered the SAP-e-procurement (Supplier Relationship Management, Contract Lifecycle Management, Spend Performance Management, and Master Data)
- Served as a member of O2D project team, developing strategies to ensure compliance with new industry standards for electronic exchange.
- Providing first and second level support in the event of incidents/downtimes to application and hardware.
- Design, implement, and manage network server software and hardware.

AWARDS, HONORS AND PROFESSIONAL AFFILIATIONS

- HBCU Blockchain Course Development Proposal Award, 2019
- Real-Time System Symposium Travel Award,, 2018
- Trans-Atlantic Symposium on Technology and Policy Travel Award, $1500, 2017
- CPS Week Student Travel Award, $800, Carnegie Melon University 2017
- IEEE Security Development Conference Travel Award, 2016
- Dean's List – California State Polytechnic University, Pomona, 2014

- Chancellor's Prize - Best Graduating Student in the University, Fountain University, 2011
- College Prize - Best Graduating Student in Sciences, Fountain University, 2011
- Fountain University Scholar Award, in recognition of excellence in academic performance, 2008 - 2011

CERTIFICATIONS

- **PMI Project Management Professional (PMP)**
- **ITIL, SSYB and SFC Certified**

PROFESSIONAL DEVELOPMENT

- **Reviewer:** IEEE Transaction on Vehicular Technology
- **Reviewer:** ACM SIGCSE
- Presenter, ACM Workshop on Cyber-Physical Systems Security & Privacy, London UK, Nov. 2019
- Attendee, HBCU Blockchain Curriculum Development Institute in New Orleans, LA, Oct. 2019
- Presenter, ACM Conference on Data and Application Security and Privacy, Dallas, TX, March 2019
- Presenter, IEEE Real-Time Systems Symposium (RTSS) Nashville, TN, Dec. 2018
- Attendee, IEEE Ubiquitous Computing, Electronic & Mobile Communication Conference, New York, NY, Nov. 2018
- Participant, SAE CyberAuto Challenge, Detroit MI, July 2018
- Participant, CyberTruck Challenge, Warren, MI, June 2018
- Attendee, PICASSO Trans-Atlantic Symposium on Technology and Policy for a Smart Society, Minneapolis MN, June 2017
- Attendee, IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), Pittsburgh, PA, April 2017
- Attendee, IEEE Secure Development (SecDev), Cambridge, MA, Nov. 2016
- Presenter, IoT Systems Provisioning & Management in Cloud Computing, Banff, Alberta, CA, Oct. 2016
- Attendee, International Conference on Service Oriented Computing, Banff, Alberta, Canada, Oct. 2016

RELATED PROJECTS

Google Summer of Code (GSoC 2016): RTEMS Port to ARM Cortex-M4F core-based MCUs

- This project adds processor support and a board support package (BSP) for the ARM Cortex-M4F microcontrollers on RTEMS. I ported RTEMS to ARM Cortex-M4F and provide a board support package for TI TM4C129E. TM4C129E is a low cost, simple IoT demonstrator with high-performance onboard emulation.

Performance analysis of GPUs on Matrix Scientific applications using OpenACC programming model (C++, OpenACC)

- The project evaluates the applicability of OpenACC, OpenCL directive and programming model designed to manage data or program transfer between the host and accelerator and provide an analysis of the performance tuning mechanism used in tuning OpenACC parameters to adapt to the execution environment on a given system.

Design and implement a static analysis tool using Crystal Framework (Java)

- Implement a constant propagation program to notify users if they use loop statement where expression being evaluated is constant. Also, wrote multiple tests with respect to each quality assurance technique.