

# Paschal Amusuo

*Ph.D. Student*  
*Elmore Family School of Electrical and Computer Engineering*  
*Purdue University*  
*West Lafayette, IN 47906*

*pamusuo@purdue.edu*  
*765-746-9312*  
*<https://ampaschal.github.io>*

## RESEARCH THEME

---

I am a PhD student interested in improving the security of software systems. I study prevalent security vulnerabilities and develop novel and practical systems to aid their detection and prevent their exploitation.

## EDUCATION

---

**Ph.D, Electrical and Computer Engineering**, *GPA: 3.98/4.0* 2021–2026  
*Purdue University, West Lafayette, IN*

**B.Eng. Electrical and Electronics Engineering**, *GPA: 4.88/5.00* 2013–2018  
*Federal University of Technology, Owerri, Nigeria*  
*2018 Best Graduating Engineering Student (Rank: 1/1000+ engineering students)*

## RESEARCH AND PROFESSIONAL EXPERIENCE

---

**Graduate Research Assistant** Aug 2021–present  
*Purdue University — Advised by James C. Davis*

- Studied the characteristics of vulnerabilities in embedded network protocol implementations.
- Developed *EmNetTest*, a dynamic analysis technique capable of detecting protocol vulnerabilities.
- Evaluated *EmNetTest* on 4 protocol implementations and discovered 7 zero-day vulnerabilities.

**Student Researcher** Summer 2023  
*Google*

- Developed *Next-JSM*, a fine-grained package-level Permission Manager for Java Application Dependencies.
- Used Bytecode Rewriting techniques to instrument Java applications and enforce specified permissions.
- Implemented a Runtime Monitoring component that automatically generates package-level permission sets.

**Graduate Cybersecurity Researcher** Aug 2022 - Dec 2022  
*Purdue Data Mine × Boeing*

- Implemented a digital twin of a Boeing aircraft, comprising its flight control and navigation components.
- Conducted a *security analysis* of the Boeing aircraft's digital twin using the *STRIDE* framework.

**Software Engineer** Apr 2020 - Jul 2021  
*Seamfix Ltd., Nigeria*

- Built web services for the Seamfix revenue management, payments, and wallet management applications.
- Developed a device management Android app that enables the remote management of mobile devices.

## TECHNICAL COURSE PROJECTS

---

**Static Analysis:** An *LLVM-based dataflow analysis* tool to detect simple vulnerabilities in C programs.  
**Compilers:** A lightweight *C compiler*, with dataflow and liveness analysis for optimized register allocation.  
**Artificial Intelligence:** Re-implementation of the "Text Summarization with Pretrained Encoders" paper.

## REFEREED CONFERENCE PUBLICATIONS

---

- [1] **Amusuo**, Méndez, Xu, Machiry, and Davis. *Systematically Detecting Packet Validation Vulnerabilities in Embedded Network Stacks*. Proceedings of the ACM/IEEE 38th International Conference on Automated Software Engineering (**ASE'23**).
- [2] Srinivasan, Tanksalkar, **Amusuo**, Davis, and Machiry. *Towards Rehosting Embedded Applications as Linux Applications*. Proceedings of the 53rd Annual IEEE/IFIP International Conference on Dependable Systems and Networks (**DSN'23**).
- [3] **Amusuo**, Sharma, Rao, Vincent, and Davis. *Reflections on Software Failure Analysis*. Proceedings of the 30th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering — deas, Visions, and Reflections track (**ESEC/FSE-IVR'23**).

## UNDER SUBMISSION

---

- [1] **Amusuo**, Robinson, Torres-Arias, Simon, and Davis. *Preventing Supply Chain Vulnerabilities in Java with a Fine-Grained Permission Manager*. <https://arxiv.org/pdf/2310.14117>. October 2023.

## POSTERS

---

- [1] **Amusuo**, Machiry, and Davis. *A Preliminary Study on the Characteristic and Detectability of Vulnerabilities in Real-Time Operating Systems*. 2022 Purdue CERIAS Symposium (**CERIAS'22**).

## SKILLS

---

**Programming Languages:** C/C++, Java, Python, Javascript

**Vulnerability Detection:** Static Analysis (LLVM Passes, Bytecode Analysis), Dynamic Analysis (Fuzzers), Symbolic Execution (KLEE)

**Understanding Complex Software:** Operating Systems, Real-time Operating Systems, Network Protocol Implementations, Compilers.