

KELECHI GABRIEL KALU

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Summary

I specialize in software and system security. My research emphasizes empirical measurements of engineering workflows, software artifacts, and usage contexts to enhance security and reliability. By leveraging both qualitative and quantitative methods, I analyze how systems are used, identify vulnerabilities, and apply security and systems principles to mitigate risks. My goal is to improve the security and correctness of computing systems through rigorous analysis and practical solutions.

Education

Purdue University — **West Lafayette, Indiana** 2023 – 2027
Ph.D, in Electrical and Computer Engineering

Nnamdi Azikiwe University — **Awka, Nigeria** 2012 - 2017
B.Eng, Electronics and Computer Engineering

Experience

Research Assistant West Lafayette, IN
Duality Lab — **Advisor: Dr. James Davis** Jan 2023 – Present

- Conducted an interview study to qualitatively evaluate the use of software signing in Software Engineering practices – designed research tools and questions based on a comprehensive literature review.
- Developed research methodologies, conducted pilot studies, and performed experimental and empirical analyses of software signing across major software ecosystems and registries.
- Created research tools and questions from literature reviews and conducted an empirical study to explore the relationship between software processes and software products in Software Engineering research.
- Published findings through conferences, workshop papers, and Presentations.

Intern Redmond, WA
Microsoft Research — **Mentors: Dr. Betul Durak and Dr. Kim Laine** June 2024 – Aug 2024

- Designed and developed research concepts for Actor reputation systems in Software Supply chain research.
- Developed security metrics from Software supply chain security standards for Github actors, which could be used to predict malicious contributors/actors.
- Conducted a preliminary study on open software supply chain actors on internally owned Github repositories.
- Developed technical writing for findings.

Software Engineer Enugu, Nigeria
Enugu Electricity Distribution Company(EEDC) Oct 2019 – Dec 2022

- Designed, developed, and scaled business-critical applications serving millions of EEDC's electricity customers in Southeast Nigeria, including:
 1. EEDC ICT and Administration Support Web Application.
 2. EEDC's Arrears Onetime-Settlement (OTS) Platform & EEDC Customer Feedback Web Application.
 3. Attendance Management System & Meter Installation Application.

Software Engineer, Remote Enugu, Nigeria
Afrivelle Technologies Ltd. Jun 2019 – Sept 2019

- Developed the administrative backend for the real estate website neneakintanrealestate.com (now rebranded as [Oakville Living with Nene](#) [🔗](#)).

Software Engineer, Remote Enugu, Nigeria
Playjoor Technologies Ltd. May 2018 – April 2019

- Deployed a Lichess (Chess) server to the playjoor.com web application, and managed test Server Adminis-

tration (AWS EC2 cloud server).

Research Intern — Mentor: Dr. Ekene Mbonu
Electronics Development Institute

Awka, Nigeria
May – Oct 2016

- Developed research tools and questions from reviewed Research on fuzzy logic MATLAB simulation (representation), and fuzzy logic microcontroller implementation.

Publications

- [1] **Kalu**, Singla, Okafor, Torres-Arias, Davis. *An Industry Interview Study of Software Signing for Supply Chain Security*. [USENIX 2025](#) [🔗](#) [Technical Report 2025](#) [🔗](#).
- [2] **Kalu**, Schorlemmer, Chen, Robinson, Kocinaire, Davis. *Reflecting on the Use of the Policy-Process-Product Theory in Empirical Software Engineering*. [ESEC/FSE 2023](#) [🔗](#).
- [3] **Kalu**, Okorafor, Singla, Torres-Arias, Davis. *Why Johnny Signs with Next-Generation Tools: A Usability Case Study of Sigstore*. [Technical Report 2025](#) [🔗](#) Under Review.
- [4] **Kalu**, Okorafor, Durak, Laine, Moreno, Torres-Arias, Davis. *ARMS: A Vision for Actor Reputation Metric Systems in the Open-Source Software Supply Chain*. [Technical Report 2025](#) [🔗](#) Under Review.
- [5] Schorlemmer, **Kalu**, Chigges, Ko, Ishgair, Bagchi, Torres-Arias, Davis. *Signing in Four Public Software Package Registries: Quantity, Quality, and Influencing Factors*. [IEEE S&P 2024](#) [🔗](#).
- [6] Singla, Anandayuvraj, **Kalu**, Schorlemmer, Davis. *An Empirical Analysis of Large Language Models to Analyze Software Supply Chain Security Failures*. [SCORED 2023](#) [🔗](#).
- [7] Patil, Jiang ..., **Kalu**, ..., Davis. *Recommending Pre-Trained Models for IoT Devices*. [SERP4IoT 2025](#) [🔗](#).
- [8] Schorlemmer, Burmane, **Kalu**, Torres-Arias, Davis. *Establishing Provenance Before Coding: Traditional and Next-Gen Signing*. [IEEE Security & Privacy, 2025](#) [🔗](#) [Technical Report 2024](#) [🔗](#).
- [9] **Kalu**. *Fuzzy Logic: A modern approach to Control System Architecture*. [Technical Report 2020](#) [🔗](#).

Posters

1. **Kalu**, Torres-Arias, Davis. *Software Signing: Practical Adoption, Challenges, and Tooling Usability*. Center for Education and Research in Information Assurance and Security (CERIAS) Purdue Poster session 2025 – **Best Poster Award - 1st Position** [🔗](#).
2. **Kalu**, Davis. *Navigating Software Supply Chain Risks: Practitioner Perspectives on Software Signing*. Center for Education and Research in Information Assurance and Security (CERIAS) Purdue Poster session 2024 [🔗](#).

Service

1. Student Volunteer ESEC/FSE Conference 2023
2. Sub-Reviewer: FSE'25, USENIX Security'25, ICSE'23 & '25, ISSTA'24, IEE S&P '23, ESEC/FSE'23, ASE(2023 - 2024)
3. Panelist at 2025 Purdue ECE Spring Grad Open House
3. Volunteer at ACE Food Pantry
4. Nigeria National Youth Service Corps (NYSC) – (2018 - 2019)
 - Served as the Public Relations Officer of the Enugu State ICT Community Development Service group.

Awards

CERIAS Research Poster Competition – 1st Position	2025
NSF Student Travel Award	2023
SIGSOFT Student Travel Award	2023

Technologies

Languages: JavaScript (ReactJs, NodeJs), PHP (Code Igniter and Laravel), Python, SQL (MySQL, PostgreSQL), NO-SQL (MongoDB), C.

Technologies: AWS(EC2), Arduino, Microcontrollers (8051 and PIC), HTML and CSS, GIT, Docker, MATLAB, Google data studio.

Relevant Courseworks

Software Engineering, Computational Methods, Artificial Intelligence, Fault-tolerant computer systems Design, Operating Systems, Applied Cryptography.