Chidera Biringa

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Education

University of Massachusetts Dartmouth — MA, US

College of Engineering — Ph.D. in Engineering and Applied Sciences - Computer Science — September 2021 - 2024

- ***Advisor:*** *Prof. Gökhan Kul*
- ***Research Interest:*** *Software Security and Performance, Machine Learning, Side-Channel Vulnerabilities, and Secure Software Design*

University of Massachusetts Dartmouth — MA, US

College of Engineering — M.S. in Computer and Information Science — September 2019 - May 2021

- ***Advisor:*** *Prof. Ming Shao* ● ***Award:*** *Graduate Research Award Recipient*

Bells University of Technology — Ota, Nigeria

College of Natural and Applied Sciences — B.Tech. in Computer Science and Information Technology — November 2013 - May 2017

Professional Experience

College of Engineering — University of Massachusetts Dartmouth — September 2020 - Present

Research Assistant

- Developed **CEED:** Cost-Efficient Vulnerability Detection, **CADE:** Detecting Embedded Credentials via Large Language Models, **PACE:** Program Analysis Framework for Continuous Performance Prediction, **SPECDET:** Detecting Spectre Vulnerabilities and Attacks, **SEAL:** Secure Design Pattern Approach Toward Tackling Lateral-Injection Attacks, **MPSS:** Predictive User Experience Testing.

NSA/DHS CAE-R — University of Massachusetts Dartmouth — May 2020 - Present

Research Assistant

- Conducted research on software security, machine learning, software performance, user experience testing and secure software design.
- Mentored 3 students participating in the National Science Foundation-Undergraduate Research program from the University of Massachusetts Dartmouth, University of Maryland College Park, and Arizona State University in software vulnerability and user experience testing research.

National Youth Service Corps. Lagos, Nigeria — May 2017 - April 2018

Computer Science and Mathematics Teacher

NNPC Limited Software Engineering Intern — May - August 2015

Software Engineering Intern

Peer-Reviewed Publications

- **Chidera Biringa**. 2023. "CEED: Cost-Efficient Vulnerability Detection." **[In-Progress. [Code]]**
- **Chidera Biringa** and Gokhan Kul.. 2023. "DANCE: Detecting Embedded Credentials via LLMs." **[Preprint. [Code]]**
- **Chidera Biringa** and Gokhan Kul. 2023. "PACE: Program Analysis Framework for Continuous Performance Prediction." *ACM Transactions on Software Engineering and Methodology* ***[SJR: Q1]*** **[Major Revisions. [Preprint]]**
- **Chidera Biringa**, Gaspard Baye and Gokhan Kul. 2022. "Static and Microarchitectural ML-Based Approaches For Detecting Spectre Vulnerabilities and Attacks." HASP'22 in conjunction with the 55th IEEE/ACM MICRO'22. **[Paper]**
- **Chidera Biringa** and Gokhan Kul. 2022. "A Secure Design Pattern Approach Toward Tackling Lateral-Injection Attacks." The 15th IEEE International Conference on Security of Information and Networks (SIN). **[Paper]**
- Gokhan Kul, **Chidera Biringa**. 2022. "Forensics in Cyber-Physical Systems." Springer Cyber Forensics for Cyber-Physical Systems.
- **Chidera Biringa**, Gokhan Kul. 2021. "Automated User Experience Testing through Multi-Dimensional Performance Impact Analysis." ACM/IEEE 2nd International Conference on AST co-located with the International Conference on Software Engineering (ICSE'21). **[Paper]**

Selected Projects

- **iFuzz: Fuzzing using Deep Reinforcement Learning** ***[2 PJ]*** **— (Novembeer 2021 - Present):** Developing an actor-critic multi-agent to identify bugs via mutation and software coverage. Agents maximize rewards by generating quality mutations that cause rapid crashes. **[Code]**
- **PIF: Predictive Frame Inference using Generative Adversarial Network (GAN)** ***[3 PJ]*** **— (April - May 2020):** Developed a GAN model that interpolates in-between frames of a given video, thus increasing the frame rate. A high-definition 25 FPS video was increased to 50 FPS without loss in resolution, reduced video length, or noticeable distortion. Generated frames were stitched to create a full synthetic video. **[Code]**
- **Database Engine** ***[5 PJ]*** **— (February - April 2020):** Developed an SQL query evaluator with operational support for select, project, join, union, aggregate, and standard optimization techniques such as projection and selection pushdown and cross-product to join conversion. **[Code]**
- **Authorship Attribution** ***[2 PJ]*** **— (November 2019):** Developed ML classifiers to detect Victorian Era (VE) authors using statistical features of authored novels. Conducted an exhaustive text mining and sentiment analysis. Best-performing classifier achieved 99% accuracy. **[Code]**
- **Chatbot** ***[1 PJ]*** **— (December 2019):** Developed a customer response chatbot to classify responses to customer inquiries. **[Code]**

Technical Skill

Research: Code Performance, Natural Language Processing, Threat Modeling, Vulnerability Assessment & Machine Learning.

Programming Languages: C/C++/C#, Java, Python, R, SQL, MATLAB, PHP, Swift, Bash, HTML/CSS & JavaScript.

Transferable Skill

Creativity, Learning, Analytical Reasoning, Communication, Evaluation, Mentoring, Management, Collaboration & Presentation.

Services

- *Very Large Data Base Conference Reproducibility Reviewer. 2021* ● *Startup Weekend UMD Technical Mentor. 2023, 2022 & 2021*