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 - December 2024

- *Relevant Courses Taken:* Artificial Intelligence, Machine Learning, Numerical Linear Algebra, and Secure Software Development
- *Advisor:* Prof. Gökhan Kul

University of Massachusetts Dartmouth (UMD)
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 (Privacy-Aware Data Lab) — UMD
September 2021 - Present

Research Assistant

- Developed **vReduce:** Guided Vocabulary for Reduced Compilation-Level Vulnerabilities Detection, **DANCE:** 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 — UMD
May 2020 - September 2021

Research Assistant and Fellow

- 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.

NNPC Limited
May - August 2015

Software Engineering Intern
- Developed the Front-End of NNPC's Engineering and Technical Services Department website

PEER-REVIEWED PUBLICATIONS

- **Chidera Biringa**. 2023. vRAG: Guided Vocabulary for Reduced Compilation-Level Vulnerabilities Detection [In-Progress. [Code]]
- **Chidera Biringa** and Gokhan Kul. 2023. "DANCE: Detecting Embedded Credentials via LLMs." *Proceedings on Privacy Enhancing Technologies (PoPETs)* *[CR: A]* [Paper Currently Under Review . [Code]]
- **Chidera Biringa** and Gokhan Kul. 2023. "PACE: Program Analysis Framework for Continuous Performance Prediction." *ACM Transactions on Software Engineering and Methodology (TOSEM)* *[CR: A*]* [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. "A Practical Guide on Security and Privacy in Cyber-Physical Systems." World Scientific Series in Digital Forensics and Cybersecurity: Volume 3. *Forensics in Cyber-Physical Systems* [Book - Chapter 2]
- **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:	Creativity, Learning, Analytical Reasoning, Communication, Mentoring, Collaboration & Presentation.

SERVICES

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