




MERON ZERIHUN DEMISSIE

PH.D. STUDENT | COMPUTER SCIENCE & ENGINEERING

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PROFILE

My research focuses on identifying vulnerabilities in secure systems and designing computer architecture for private and verifiable computing. I am passionate about developing solutions for impervious next generation computing. I aspire to raise awareness on the importance of incorporating security in design to realize secure and robust systems.

EDUCATION

Ph.D. | Computer Science and Engineering | University of Michigan | Ann Arbor, Michigan

January 2022 – Present

Advisor: Professor Todd Austin, Area: Computer Architecture, Privacy and Security

B.Sc. | Software Engineering | Addis Ababa Institute of Technology (AAiT) | Addis Ababa, Ethiopia

September 2016 – October 2021

Graduated with high honors, 3.81 GPA

High School Diploma, Applied Science Division | Gibson School Systems (GSS) | Addis Ababa, Ethiopia

September 2002 – July 2016

Graduated with high honors, Class Valedictorian

EMPLOYMENT HISTORY

Graduate Student Instructor, University of Michigan

August 2023 – Present

- Instructed a course on Advanced Topics in Computer Architecture alongside the lead instructor, Prof. Todd Austin

Graduate Student Research Assistant, University of Michigan

May 2022 – July 2023

- Designed, developed, and modified research experiments alongside teams of researchers.

- Performed thorough research and analysis on data, and created reports on research activities.

PUBLICATIONS

ISPASS 2023 | Exploring the Efficiency of Data-Oblivious Programs | L. Biernacki, B. Mengist Tiruye, **M. Zerihun Demissie**, F. Assamnew Andargie, B. Reagen, T. Austin.

This work explores the costs of data-oblivious transformations and shows how algorithm redesign can help address these large costs, making such programs practically feasible.

SEED 2022 | Sequestered Encryption: A Hardware Technique for Comprehensive Data Privacy | L. Biernacki, **M. Zerihun Demissie**, K. Birkayehu Workneh, F. Assamnew Andargie, T. Austin.

This work explores how trusted hardware can be leveraged to provide data confidentiality in the presence of vulnerable software while achieving practical performance overheads.

SEED 2021 | VIP-Bench: A Benchmark Suite for Evaluating Privacy-Enhanced Computation Frameworks | L. Biernacki, **M. Zerihun Demissie**, K. Birkayehu Workneh, G. Basha Namomsa, P. Gebremedhin, F. Assamnew Andargie, B. Reagen, T. Austin.

This work proposes VIP-Bench, a benchmark suite designed with varying operational complexity and computational depth to evaluate competing privacy frameworks fairly and directly.

WORKSHOPS AND PRESENTATIONS

GREPSEC 2023, USENIX | Leaky Operators in Languages | **M. Zerihun Demissie**, T. Austin.

This presentation shows how the semantics of some operators in general-purpose imperative languages can leak sensitive information.

DAC 2023 | Going beyond Hacking with Encrypted and Tamper-proof Computation | **M. Zerihun Demissie**, T. Austin.

This presentation shows how hardware can be designed to achieve a practical and confidential computing framework that also allows users to check how a result is produced.

WISE 2022 | Verifying Computation In Sequestered Encryption | **M. Zerihun Demissie**, L. Biernacki, T. Austin.

This presentation proposes extending Sequestered Encryption to enable verifiable computation.

ACADEMIC TRAININGS

Gem5 Bootcamp | University of California, Davis

July 2022

Google Android Development | Andela Learning Community (ALC), and Pluralsight

September 2020 – February 2021

Intermediate Machine Learning | Kaggle

April 2021

Web Backend Development | Gebeya Inc.

April 2019 – November 2019

SERVICE

Research Mentor | University of Michigan African Presidential Scholars (UMAPS)

January 2022 – May 2023

- Collaborated on a project that enhances privacy computation with integrity and safe disclosure capabilities.

Research Mentor | African Undergraduate Research Adventures (AURA), University of Michigan

May 2022 – July 2022

- Assisted a student working on a project of building an interface for the [PALISADE](#) homomorphic encryption library to [VIP-Bench](#)
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K-12 OUTREACH ACTIVITIES

Primary Instructor | Discover Engineering, University of Michigan

June 2022

- Coordinated a workshop on Computer Science & Engineering for 8th-10th grade students, exploring how a computer works, basic algorithmic concepts, and touring Michigan research labs.

Student Mentor | Technovation Challenge, and Ministry of Innovation and Technology

March 2020 – April 2020

- Mentored female high school students in understanding the basics of programming and developing solutions for outstanding problems within our community
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EXTRACURRICULAR ACTIVITIES

Member, VoiCSEs, University of Michigan

May 2023 – May 2023

VoiCSEs is a group that advocates for graduate students in Computer Science and Engineering, and supports activities and workshops that help students work on their skills.

Board Member, Ensemble of CSE Ladies+ (ECSEL+), University of Michigan

September 2022 – May 2023

ECSEL+, the Ensemble of CSE Ladies+, is a group to support graduate women and gender minorities in CSE at the University of Michigan.

Member, Computer Science and Engineering Graduates (CSEG), University of Michigan

January 2022 – Present

CSEG is a group that collectively represents graduate students in Computer Science and Engineering students.

Member, ITSC-INSPIRE, Addis Ababa Institute of Technology

September 2018 – September 2021

ITSC-INSPIRE is a student group that organizes ICT-related events to keep students informed about the growth and impact of today's technology.

Member, Drop of Life, Addis Ababa Institute of Technology

September 2017 – September 2021

Drop of life is a club that provides volunteer work on spreading health awareness among students. It also organizes blood donations twice a year at AAiT, AAU.

HONORS AND AWARDS

Certificate of Great Achievement, AAiT

2021

Award of appreciation of Top 5 Female Students in AAiT

2017

Certificate of Valedictorian, GSS

2016

SKILLS

Programming Languages

C/C++, Python, Java, Javascript, C#, Go, Kotlin

Other Software Skills

Bash Scripting, Database (SQL, MongoDB, Firebase), DBMS (MySQL, Oracle), Libraries (jQuery, NodeJS), Frameworks (Spring, ASP.Net, Ruby On Rails), Platforms (Android Studio, Visual Studio)

Architectural Simulations

PIN

Compiler Extensions

Clang, LLVM

Interpersonal Skills

Effective written and verbal communication, Adaptability, Teamwork, Responsibility, Positive Attitude

LANGUAGES

Amharic (Native), English (Highly Proficient)