

KAZI ABU ZUBAIR

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PROFESSIONAL AND RESEARCH SUMMARY

- Strong research background in Computer Architecture, Emerging Memory Systems, Security and Reliability.
- Multiple publications in top computer architecture conferences.

EDUCATION

North Carolina State University

Doctor of Philosophy

Computer Engineering

Research Focus: Secure Processors; Performance, Security and Reliability for Non-Volatile Memory.

Advisor: Dr. Amro Awad

NC, USA

2022 (expected)

University of Chittagong

Bachelor of Science

Applied Physics, Electronics & Communication Engineering.

Chittagong, Bangladesh

2016

PUBLICATIONS

1. **Kazi Abu Zubair**, Aziz Mohaisen, Amro Awad, “*Filesystem Encryption or Direct-Access for NVM Filesystems? Let’s Have Both!*,” in 28th IEEE International Symposium on High-Performance Computer Architecture, **HPCA-2022**.
2. **Kazi Abu Zubair**, Sudhanva Gurumurthi, Villas Sridharan, Amro Awad, “*Soteria: Towards Resilient Integrity-Protected and Encrypted Non-Volatile Memories*,” in 54th IEEE/ACM International Symposium on Microarchitecture, **MICRO-2021**.
3. Yu Zou, **Kazi Abu Zubair**, Mazen Alwadi, Rakin Mohammad Shadab, Sanjay Gandham, Amro Awad, Minjie Lin, “*ARES: Persistently Secure Non-Volatile Memory with Processor-Transparent And Hardware-Friendly Integrity Verification And Metadata Recovery*,” ACM Transactions on Embedded Computing Systems, 2021.
4. Mazen Alwadi, **Kazi Abu Zubair**, Aziz Mohaisen, and Amro Awad, “*Phoenix: Towards Ultra-Low Overhead, Recoverable, and Persistently Secure NVM*,” IEEE Transactions on Dependable and Secure Computing, 2020.
5. **Kazi Abu Zubair** and Amro Awad, “*Ensuring Fast Crash Recovery for Secure NVMs*,” in 11th Annual Non-Volatile Memories Workshop, **NVMW - 2020**.
6. **Kazi Abu Zubair** and Amro Awad, “*Anubis: Ultra-Low Overhead and Practical Recovery Time for Secure Non-Volatile Memories*,” in 46th International Symposium on Computer Architecture, **ISCA - 2019**.
7. Mao Ye, **Kazi Abu Zubair**, Aziz Mohaisen, and Amro Awad, “*Towards low-cost mechanisms to enable restoration of encrypted non-volatile memories*,” IEEE Transactions on Dependable and Secure Computing, 2019.
8. Amro Awad, Mao Ye, Yan Solihin, Laurent Njilla and **Kazi Abu Zubair**, “*Triad-NVM: Persistency for Integrity-Protected and Encrypted Non-Volatile Memories*,” in 46th International Symposium on Computer Architecture, **ISCA - 2019**.

9. Amro Awad, Suboh Suboh, **Kazi Abu Zubair**, Mao Ye and Mazen Al-Wadi, “*Persistently-Secure Processors: Challenges and Opportunities for Securing Non-Volatile Memories*,” in IEEE Computer Society Annual Symposium on VLSI, **ISVLSI - 2019**.

PATENTS

1. **Kazi Abu Zubair** and Amro Awad, “*System and method for ultra-low overhead and recovery time for secure non-volatile memories*,” US Patent App. 16/892,019, 2020.

PRESENTATION/POSTERS

1. (*Presentation*) Soteria: owardsResilient Integrity-Protected and Encrypted Non-Volatile Memories (MICRO 2021).
2. (*Presentation*) Persistently-Secure Processors: Challenges and Opportunities for Securing Non-Volatile Memories (ISVLSI 2019).
3. (*Presentation*) Anubis: Ultra-Low Overhead and Practical Recovery Time for Secure Non-Volatile Memories (ISCA 2019).
4. (*Poster*) Anubis: Ultra-Low Overhead and Practical Recovery Time for Secure Non-Volatile Memories (ISCA 2019).

RESEARCH EXPERIENCE

Graduate Research Assistant

2020 - Current

Secure and Advance Computing Architecture (SACA), NCSU

- Conducted research on Non-Volatile Memory (NVM) security and reliability.
- Explored encrypted and integrity protected DAX file system.
- Explored reliability for hybrid memory.

Graduate Research Assistant

2018 - 2020

Secure and Advance Computing Architecture (SACA), UCF

- Conducted research on Non-Volatile Memory (NVM) security and reliability.
- Explored crash consistent and recoverable NVM system.

Research Intern

2014 - 2015

Research Group to Aid Child Development (RGACD), University of Chittagong

- Developed training and learning devices for children with special needs.

WORKING EXPERIENCE

Senior Assistant Engineer

2017 - 2018

IBSL, Dhaka Bangladesh

- Worked to develop access control and security software.

Embedded Systems Engineer

2016 - 2017

StellarBD, Chittagong Bangladesh

- Worked in the R&D to develop firmware for Texas Instrument CC25xx processors.
- Designed PCB and hardware prototypes.

TEACHING EXPERIENCE

Graduate Teaching Assistant

2018 - 2019

University of Central Florida

- Worked as a Teaching Assistant for Engineering Analysis & Computation course (EGN3211).

RESEARCH INTERESTS

- Secure Memory Architecture
- Memory Reliability
- Hardware Support for Homomorphic Encryption
- Cloud Computing Security
- Internet of Things
- In-memory Computing

TEACHING INTERESTS

- Introductory Programming Courses
 - Data Structures
 - Computer Architecture
 - Memory Systems
 - Operating Systems
 - Embedded Systems
 - Compiler Construction
- and related courses.

PROJECTS

Crash Recovery Support for Secure NVMs

- Architectural support for fast crash recovery of NVM memories.
- Novel MAC recovery schemes in crash-consistent secure NVMs.

Performance Enhancement of Secure Memories

- Low-cost encryption and integrity protection support.
- Optimized MAC calculation latency in secure memories.

Reliability support in confidential and integrity supported NVM

- Metadata cloning schemes for enhanced reliability of secure NVMs.
- Low-cost reliability support in hybrid Memories.

FPGA-based hardware support for NVM security

- Collaborated in developing an FPGA prototype for a secure NVM controller.
- Explored implementation of different memory encryption and secure hashing schemes in FPGA.

Memory Encryption and Integrity Protection in Low-Power Intermittent Power Systems

- Collaborated in implementing secure memory support in intermittent power devices.

AWARDS

- NCSU Computer Engineering Summer Graduate Merit Award 2021
- ISCA-2019 Student Travel Grant
- NSF Student Travel Grant for HPCA-2019

RESEARCH COLLABORATIONS

- Secure and crash consistent intermittent computing architecture (*Purdue University*)
- Secure and Reliable Hybrid Memory Systems (*Sandia National Labs*)
- Non-Volatile Memory Reliability (*AMD RAS Architecture*)
- FPGA-Assisted Secure Memory (*DARPA, UCF*)

REFERENCES

Amro Awad, North Carolina State University

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Sudhanva Gurumurthi, AMD

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David Mohaisen, University of Central Florida

david.mohaisen@ucf.edu