MUHAMMAD RASHED

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SUMMARY

I am an incoming tenure-track assistant professor in the Department of Computer Science and Engineering (CSE) at the University of Texas at Arlington. My research interests include EDA for emerging computing paradigms and architectures, computer-aided design, and artificial intelligence. On these topics, I have **published 18 top-tier journals and conference papers**. I have a total of **10 publications on the prestigious CSRanking list**. My ICCAD paper in 2022 was nominated for the **IEEE/ACM William J. McCalla ICCAD Best Paper Award** and, my DAC paper in 2022 was recognized as a **Publicity Paper** at the conference.

EDUCATION

University of Central Florida, Orlando *2024*
PhD in Computer Engineering, Department of ECE
Thesis: *Towards Energy-Efficient In-Memory Computing Systems using Electronic Design Automation*
Supervisor: Prof. Rickard Ewetz

Bangladesh University of Engineering and Technology *2015*
Bachelor of Science, Department of Electrical and Electronics Engineering

SELECTED AWARDS AND HONORS

- IEEE/ACM William J. McCalla **ICCAD Best Paper Award Nomination** 2022
- **Best Research Video Award** at the Design Automation Conference (DAC) 2021
- Acknowledgment of the XORG Paper as a **Publicity Paper at DAC** 2022
- Dr. Alireza Seyedi Doctoral Research Innovation Scholarship 2024
- David T. and Jane M. Donaldson Memorial Graduate Scholarship 2022
- NSF Travel Grant (2021−2024), DATE Travel Grant (2023), UCF SGA Travel Grant (2023−2024), ACM Travel Grant (2022)
- The Presentation Fellowship by UCF Graduate Studies 2021−2023

RESEARCH PAPER PUBLICATIONS

Major Research Topics:

- Electronic Design Automation (EDA) for Emerging Computing Paradigms
- Artificial Intelligence (AI) and Machine Learning (ML)
- Computer-aided Design (CAD) for Very Large-Scale Integration (VLSI)
- Computer Architecture

Peer-Reviewed Publications:

[P22] **[DAC'24]** **M Rashed**, S Thijssen, D. Simon, SK Jha, and R Ewetz, "Execution Sequence Optimization for Processing In-Memory using Parallel Data Preparation", in 61st Design Automation Conference (DAC), 2024. (accepted) **[CSRanking]**

[P21] **[DAC'24]** S Thijssen, **M Rashed**, SK Jha, and R Ewetz, "Synthesis of Compact Flow-based Computing Circuits from Boolean Expressions", in 61st Design Automation Conference (DAC), 2024. (accepted) **[CSRanking]**

[P20] **[ASP-DAC'24]** S Thijssen, **M Rashed**, SK Jha, and R Ewetz, "READ-based In-Memory Computing using Sentential Decision Diagrams", 29th Asia and South Pacific Design Automation Conference (ASP-DAC), 2024.

[P19] **[ASP-DAC'24]** S Thijssen, **M Rashed**, SK Jha, and R Ewetz, "Towards Area-Efficient Path-Based In-Memory Computing using Graph Isomorphisms", 29th Asia and South Pacific Design Automation Conference (ASP-DAC), 2024.

[P18] **[ICCAD'23]** **M Rashed**, S Thijssen, SK Jha, and R Ewetz, "Automated Synthesis for In-Memory Computing", 42nd International Conference On Computer Aided Design (ICCAD), 2023. **[CSRanking]**

[P17] **[ICCAD'23]** **M Rashed**, S Thijssen, SK Jha, H Zheng, and R Ewetz, "Path-based Processing using In-Memory Systolic Arrays for Accelerating Data-Intensive Applications", 42nd International Conference On Computer Aided Design (ICCAD), 2023. **[CSRanking]**

[P16] **[ICCAD'23]** S Thijssen, S. Singireddy, **M Rashed**, SK Jha, and R Ewetz, "Verification of Flow-Based Computing Systems using Bounded Model Checking", 42nd International Conference On Computer Aided Design (ICCAD), 2023. **[CSRanking]**

[P15] **[TCAD'23]** **M Rashed**, S Thijssen, F Yao, SK Jha, and R Ewetz, "STREAM: Towards READ-based In-Memory Computing for Streaming Based Processing for Data-Intensive Applications", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 2023

[P14] **[TCAD'23]** S Thijssen, **M Rashed**, SK Jha, and R Ewetz, "PATH: Evaluation of Boolean Logic using Path-based In-Memory Computing Systems", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 2023.

[P13] **[ICCD'23]** S. Singireddy, **M Rashed**, S Thijssen, SK Jha, and R Ewetz, "Input-Aware Flow-Based In-Memory Computing", 41st International Conference on Computer Design (ICCD), 2023.

[P12] **[DAC'23]** S Thijssen, **M Rashed**, SK Jha, and R Ewetz, "UpTime: Towards Flow-based In-Memory Computing with High Fault-Tolerance", in 60th Design Automation Conference (DAC), 2023. **[CSRanking]**

[P11] **[ASP-DAC'23]** **M Rashed**, SK Jha, and R Ewetz, "Discovering the In-Memory Kernels of 3D Dot-Product Engines", 28th Asia and South Pacific Design Automation Conference (ASP-DAC), 2023.

[P10] **[ICCAD'22]** **M Rashed**, SK Jha, and R Ewetz, "Logic Synthesis for Digital In-Memory Computing", 41st International Conference On Computer Aided Design (ICCAD), 2022. **(Best paper nomination)** **[CSRanking]**

[P9] **[DAC'22]** **M Rashed**, A Awad, SK Jha, and R Ewetz, "Towards Resilient Analog In-Memory Deep Learning via Data Layout Re-Organization", 59th Design Automation Conference (DAC), 2022. **(Publicity Paper)** **[CSRanking]**

[P8] **[DATE'22]** **M Rashed**, SK Jha, F Yao and R Ewetz, "Hybrid Digital-Digital In-Memory Computing", 25th Design Automation and Test in Europe Conference (DATE), 2022.

[P7] **[ASP-DAC'22]** **M Rashed**, S Thijssen, F Yao, SK Jha, and R Ewetz, "STREAM: Towards READ-based In-Memory Computing for Streaming based Data Processing", 27th Asia and South Pacific Design Automation Conference (ASP-DAC), 2022.

[P6] **[ICCAD'21]** **M Rashed**, SK Jha, and R Ewetz, "Hybrid Analog-Digital In-Memory Computing", 40th International Conference On Computer Aided Design (ICCAD), 2021. **[CSRanking]**

[P5] **[MICRO'21]** M Chowdhuryy, **M Rashed**, A Awad, R Ewetz, and F Yao, "LADDER: Architecting Content and Location-aware Writes for Crossbar Resistive Memories", 54th International Symposium on Microarchitecture (MICRO), 2021. **[CSRanking]**

***Prior to PhD*:**

[P4] **[ICAEE'17]** **M Rashed**, M Zaman, M Islam and M Raihan, "An analysis on the required reinforcement for embedding a nuclear power plant in a generic power system", 4th International Conference on Advances in Electrical Engineering (ICAEE), 2017.

[P3] **[EICT'17]** S Saha, S Ukil and **M Rashed**, "Numerical investigation on the performance of new ultra-thin CZTS solar cell using SCAPS", 3rd International Conference on Electrical Information and Communication Technology (EICT), 2017.

[P2] **[ICAEE'17]** A Dewanjee, N Dey, **M Rashed**, A Muhury and J Dhar, "High performance cost effective formalin detector using conductivity property", 4th International Conference on Advances in Electrical Engineering (ICAEE), 2017.

[P1] **[ICECE'16]** M Nadim, **M Rashed**, A Muhury and S Mominuzzaman, "Estimation of optimum tilt angle for PV cell: A study in perspective of Bangladesh", 9th International Conference on Electrical and Computer Engineering (ICECE), 2016.

Under Review/Submission Publications:

[U4] **M Rashed**, S Thijssen, SK Jha, and R Ewetz, "LOGIC: Logic Synthesis for Digital In-Memory Computing". (under review)

[U3] S Thijssen, **M Rashed**, SK Jha, and R Ewetz, "Efficient Runtime Management of Crossbars for Path-based In-Memory Computing". (under submission)

[U2] S Thijssen, **M Rashed**, SK Jha, and R Ewetz, "Efficient Runtime Management of Crossbars for Path-based In-Memory Computing". (under submission)

[U1] H. Chugh, **M Rashed**, F. Yao, and R Ewetz, "Side Channel Attack in ReRAM Crossbar". (under submission)

TALKS/POSTER PRESENTATIONS

[T3] **[DATE'22]** PhD Forum, in 26th Design Automation and Test in Europe Conference (DATE) 2023
[T2] **[DAC'22]** PhD Forum, in 59th Design Automation Conference (DAC) 2022
[T1] **[DAC'21]** Young Fellow Program, in 58th Design Automation Conference (DAC) 2021

TEACHING EXPERIENCE

- **C++ and Data Structures** (UTSA)
  Object-oriented programming including data abstraction, inheritance, operator overloading, and polymorphism. Application of OOP to study various data structures including stacks, queues, linked lists, trees, binary trees, and graphs.
- **Engineering Analysis and Computation** (UCF)
  Engineering analysis and computation with structured constructs. Subscripted variables, functions, input/output. Applications in embedded systems and examples in numerical methods.
- ***Guest Lecture/ Course Development:*** **Computer-Aided Design of VLSI** (UCF)
  An introduction to computer-aided design (CAD) for very large scale integration (VLSI). The focus is on algorithms and data structures that are used within logic synthesis.

PROFESSIONAL SERVICE

- Session Chair, Design Automation Conference (DAC) 2022
- Technical Reviewer, IEEE Internet of Things Journal 2023
- Technical Reviewer, IEEE Transactions on Emerging Topics in Computing 2022
- Technical Reviewer, International Symposium on Quality Electronic Design (ISQED) 2024
- Technical Reviewer, International Conference on Computer Design (ICCD) 2021, 2022
- Technical Reviewer, The Great Lakes Symposium on VLSI (GLSVLSI) 2021, 2022
- Technical Reviewer, International Conference on AI Circuits and Systems (AICAS) 2022, 2023

SKILLS

- *Programming Language*: C++, Python, MATLAB and Verilog.
- *EDA Tools*: Design Compiler, ABC, YOSYS, SIS, Vivado Design Suite, CACTI 7, ARM Forge
- *Operating Systems and Software*: Linux, Windows, Office Software, Latex, AutoCad.

TRAINING

- Information Security Awareness Training (UCF) 2024
- Responsible Conduct of Research for Engineers- Stage 2 (CITI) 2023
- Authorship, Credit and Collaborative Scholarship (UCF) 2022
- Doing the Right Thing: Know About Research Misconduct (UCF) 2022
- at-risk for University and College Faculty and Stuff (UCF) 2020
- at-risk Friends in College (UCF) 2020
- Employee Code of Conduct & Speak Up Whistleblower Training (UCF) 2020
- Academic Integrity Module (UCF) 2020
- Responsible Conduct of Research for Engineers- Stage 1 (CITI) 2020
- Teaching Assistant Training (UTSA) 2019