MD HASIBUL AMIN

Ph.D. Student | University of South Carolina | Columbia, SC

☎ +1(803)201-2011 ✉ ma77@email.sc.edu in LinkedIn ⑂ Google Scholar

EDUCATION

- **University of South Carolina** *Jan 2021-present*
  PhD in Computer Engineering
  Current CGPA: 3.54 out of 4.00
  Research topic: Processing-in-Memory (PIM), Approximate Computing

- **University of South Carolina** *Aug 2022-May 2024*
  MS in Computer Engineering
  CGPA: 3.54 out of 4.00
  Selected Courseworks: Advanced Digital Design, Computer Architecture,
  Pattern Recognition, Robotics, Analysis of Algorithms

- **Bangladesh University of Engineering and Technology (BUET),** *Feb 2015-Apr 2019*
  Dhaka, Bangladesh
  Bachelor of Science in Electrical and Electronic Engineering (EEE)
  CGPA: 3.29 out of 4.00
  Research topic: Ab initio study of Carbon Nanotubes
  Thesis title: Ab initio investigation of dopants for ultrahigh conductivities in single wall carbon nanotubes

RESEARCH EXPERIENCE

- **Graduate Research Student** *Jan 2021-present*
  Intelligent Circuits, Architectures, and Systems Lab, University of South Carolina
  Supervisor: Dr. Ramtin Zand, Assistant Professor, University of South Carolina

  - Designed and implemented a hybrid TPU-PIM architecture for 1-bit LLMs, improving computational efficiency and reducing memory bottlenecks
    [Heterogeneous Integration] [LLM Accelerator] [Efficient LLM]

  - Extended the ISA of the RISC-V microarchitecture to support PIM devices as a co-processor using the gem5 simulator system
    [Computer Architecture] [ISA Extension] [PIM co-processor]

  - Developed software-hardware co-design framework for PIM systems based on weight sharing and mixed-precision quantization along with evolutionary search
    [Software-hardware co-design] [NAS for PIM] [weight-sharing] [mixed-precision quantization for NN]

  - Implemented Verilog RTL and HLS designs for approximate TPU circuits; automated benchmarking with Python and TCL scripts
    [Digital Design] [Approximate TPU] [Verilog RTL] [HLS Design]

  - Optimized crossbar circuit performance by modeling interconnect parasitics and analog partitioning
    [Crossbar modeling] [Interconnect parasitics] [Partitioning] [Reliability analysis]

  - Built a Python-based SPICE simulation framework for in-memory accelerator circuit analysis
    [Analog PIM] [Simulation Framework] [Python scripting] [SPICE circuit design]

- **Undergraduate Research Student** *May 2018-Dec 2019*
  Nanoscale Simulation, Characterization and Fabrication Lab, BUET
  Supervisor: Dr. Ahmed Zubair, Professor, Department of EEE, BUET

  - Investigated the effect of various dopants such as I_2, $AuCl_3$ on various carbon nanotube molecules using Density functional theory (DFT)
    [Density Functional Theory] [Carbon nanotubes] [Conductivity analysis] [Dopants]

PROFESSIONAL EXPERIENCE

- **Graduate Research/Teaching Assistant** *Jan 2021-present*
  Department of Computer Science and Engineering, University of South Carolina

- **Lecturer, Department of Electrical and Electronic Engineering** *Jan 2020-May 2020*
  Daffodil International University, Dhaka, Bangladesh

Technical Skills

- **Hardware Design:** Verilog, SystemVerilog, HLS
- **Architectural Simulation:** gem5, MNSIM, NeuroSim
- **Programming Languages:** C, C++, Java, Python, MATLAB, TCL
- **EDA Tools:** Cadence Virtuoso, Synopsys Design Compiler, HSPICE
- **Machine Learning:** PyTorch, TensorFlow, Quantization Techniques

Awards and Certifications

- IEEE ISCAS 2022 Student Participation Grant — *May 2022*
- Deep Learning Specialization Coursera Certificate — *Aug 2020*

Selected Academic Projects

- Training a transformer-based language model for novel antimicrobial peptide generation — *Spring 2024*
- RTL design and FPGA implementation of a 3-stage pipelined RISC-V microarchitecture — *Fall 2021*
- RTL design of a 32-bit single-cycle MIPS microarchitecture — *Fall 2021*
- Circuit design for a Leaky Integrate-and-Fire (LIF) spiking neuron — *Spring 2021*

Peer Review Service

- ISCAS-2023, GLSVLSI-2023, MWSCAS-2023, JETCAS — *2023*
- ISVLSI-2024, GLSVLSI-2024 — *2024*
- ISCAS-2025 — *2025*

Publications

- M. H. Amin, M. Mohammadi, and R. Zand. Multi-objective Neural Architecture Search for In-memory Computing. IEEE Computer Society Annual Symposium on VLSI (ISVLSI '24) — *2024*
- M. H. Amin, M. E. Elbtity, and R. Zand. IMAC-Sim: A Circuit-level Simulator For In-Memory Analog Computing Architectures. In Proceedings of the Great Lakes Symposium on VLSI 2023 (GLSVLSI '23) — *2023*
- M. E. Elbtity, B. Reidy, M. H. Amin, and R. Zand. Heterogeneous Integration of In-Memory Analog Computing Architectures with Tensor Processing Units. GLSVLSI '23. — *2023*
- M. H. Amin, M. E. Elbtity and R. Zand. Xbar-Partitioning: A Practical Way for Parasitics and Noise Tolerance in Analog IMC Circuits. IEEE Journal on Emerging and Selected Topics in Circuits and Systems (JETCAS) — *2022*
- M. H. Amin, M. Elbtity, M. Mohammadi, R. Zand. MRAM-based Analog Sigmoid Function for In-memory Computing. GLSVLSI '22. — *2022*
- M. H. Amin, M. Elbtity and R. Zand. Interconnect Parasitics and Partitioning in Fully-Analog In-Memory Computing Architectures. IEEE International Symposium on Circuits and Systems (ISCAS). — *2022*
- M. L. Rahman, M. H. Amin and A. Zubair. Ab initio Theoretical Investigation of Dopants for Ultrahigh Conductivities in Single Wall Carbon Nanotubes. IEEE Region 10 Conference (TENCON). — *2019*

Poster Presentations

- A Python Framework for SPICE Circuit Simulation of In-Memory Analog Computing Circuits. *IBM-IEEE CAS/EDS - AI Compute Symposium 2022*, IBM Think Lab, NY — *2022*
- Reliability-Aware Deployment of DNNs on In-Memory Analog Computing Architectures. *IBM-IEEE CAS/EDS - AI Compute Symposium 2022*, IBM Think Lab, NY — *2022*
- Electronic Structure Study of Halogen and Gold Halide Doped Carbon Nanotubes. *APS March Meeting 2020*, Denver, Colorado — *2020*