Mostafizur Rahman

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Title Associate Professor

Department Division of Energy, Matters and Systems, University of Missouri Kansas City

Education

University of Massachusetts Amherst	Electrical & Computer Engineering	PhD	Spring, 2015
North South University, Bangladesh	Computer Engineering	BSc	Spring, 2008

Nationality & Clearance US Citizen, Security Clearance: Secret

Current and Previous Academic Positions

University of Missouri-Kansas City	Associate Professor	08/ 2022- Present
University of Missouri-Kansas City	Assistant Professor	06/2015- 08/2022
University of Massachusetts Amherst	Research Assistant	05/2010-05/ 2015
University of Massachusetts Amherst	Graduate Teaching Assistant	09/2014-05/2015
North South University	Undergraduate Teaching Assistant	05/2007-12/2007

Other Professional Experience

Intel Corporation	Component Research Trainee	05/2013- 08/2013
Aiforce Summer Faculty Fellow	US Airforce Academy	06/2024-08/2024
UMSAEP Faculty Fellow	University of Cape Town, SA	05/2024

Research Area

RF intelligence, Edge Computing, Embedded System Design, hardware security assessment and prevention, hardware-software co-integration for robotics and machine learning acceleration, non Von-Neumann computing with emerging technologies and architectures, modeling and simulation across system layers from device to circuits, and experimental prototyping.

Grants

Agency: ***ICWERX***
Title: Midwest Microelectronics Collective
Amount: $100000, Duration: 2024
Role: PI

Agency: ***National Science Foundation***
Title: II-NEW: Experimental Characterization and CAD Development Testbed for Nanoscale Integrated Circuits
Amount: $772,061.00, Duration: 2016-2019

Role: Co-PI (share $257.3K), PI: Dr. Masud Chowdhury

Agency: ***NSF STTR P I***
Title: Messaging based Intelligent Computing for AI Inference
Amount: $256,000.00, Duration: 2020-2021
Role: Lead (Crosstalk LLC), UMKC Subcontract

Agency: ***National Science Foundation***
Title: ICorps: Seeking Commercialization Potential of a New Computing Paradigm with Interconnect Crosstalk for Future Electronics
Amount: $50,000.00, Duration: 2019
Role: PI

Agency: ***University of Missouri Kansas City***
Title: Prototyping Crosstalk Computing Chip for Future Electronics
Amount: $18,000.00, Duration: 2018-2019
Role: PI

Agency: ***Office of Naval Research***
Title: FPGA Vulnerability Analysis Tools, Phase I
Amount: $250,000.00, Duration: 2019-2020
Role: Subcontract PI (Share $72257 awarded, ~$42K received, $30K withheld due to Phase II program change)

Agency: ***Honeywell***
Title: Senior Design Projects
Amount: $28500.00, Duration: 2019-2020, 2021-2022, 2024-2025
Role: PI

Agency: **Army Labs**
Title: DVIS: A Wearable Deep Vascular ID System
Amount: $389,597.00, Duration: 2021-2023
Role: Co-PI, PI: Dr. Reza Derakhshani

Agency: ***National Science Foundation***
Title: NRT-AI: Interdisciplinary Graduate Training Through Research in Artificial Intelligence and Secure Networked Sensing to Mitigate the Crisis of Alcohol and Drug Abuse
Amount: $3M , Duration: 2022-2027
Role: PI

Agency: ***Office of Naval Research***
Title: Pulse Tactical Effector for Regulated Attack
Amount: $8,000,000.00, Duration: 2024
Role: Project lead (FPGA, share $100K), PI: Dr. Anthony Caruso

Agency: ***National Science Foundation***
Title: Midwest Microelectronics Consortium
Amount: $1,000,000.00, Duration: 2023-2024
Role: Co-PI, PI: Dr. Anthony Caruso

Agency: ***National Science Foundation***
Title: Critical Materials Crossroads Engine
Amount: $160,000,000.00, Duration: 2025-2035
Role: Co-PI, PI: Dr. Anthony Caruso

Other Honors and Awards

- Best Paper Award, IEEE International Conference on RF Communication and Network (RFCoN), India, 2025.
- Best Poster Award, International Conference of the Biometrics Special Interest Group, Germany, 2023.
- Best Paper Award, IEEE/ACM International Symposium on Nanoscale Architectures (NANOARCH), Paris, France, 2014.
- Best Paper Award, IEEE/ACM International Symposium on Nanoscale Architectures (NANOARCH), New York, USA, 2013.
- 2nd Prize, University of Massachusetts Innovation Challenge, 2011
- Co-Authored 2 Best Research Poster Awards: 2011, 2012 at FCRP-DARPA FENA Center Annual Sponsor Reviews, at MIT and UCLA

In the News

- "New Center for Nanotechnology" SCE News Cover Story, https://sce.umkc.edu/2016/09/02/new-center-nanotechnology/
- "4 Strange New Ways to Make a Computer" IEEE Spectrum Feature Story 2018 https://spectrum.ieee.org/nanoclast/computing/hardware/4-strange-new-ways-to-make-a-computer
- Featured article in Advances in Engineering online magazine https://advanceseng.com/possible-solution-next-generation-3-d-ics-thermal-challenge/

Invited Talks

- UMKC Research Collaboration Summit, 2025
- "RF Edge Surveillance", Electromagnetic Warfare Conference, Robins Airforce Base, Georgia, 2025
- "Stacked Horizontal Nanowire based 3-D IC for Future High-Performance Computing", Beyond CMOS Workshop: Interconnect Challenge, 2017, Oak Ridge National Laboratory & Department of Energy
- "Vertical Nanowire based 3-D Integrated Circuits for Beyond CMOS" CSEE Departmental Seminar, University of Missouri Kansas City, 2017
- "Nanotechnology for Future Computing Needs", IEEE Electronics Local Chapter Meeting, 2016

Student Awards

- UMKC Financial Aid & Scholarship, Joshua Banago(S), 2019
- HCA Scholarship for Undergraduate Studies, Joshua Banago(S), 2019
- Ronald A. MacQuarrie Graduate Fellowship, Naveen Kumar Macha(S), 2019
- School of Graduate Studies Research Fellowship award, Naveen Kumar Macha(S), 2018, 2019
- School of Graduate Studies Research Fellowship award, Arif Iqbal(S), 2017
- SGS Travel grant to attend IEEE/ACM International Symposium on Nanoscale Architectures, Naveen Kumar Macha(S), 2017
- SGS Travel grant to attend IEEE/ACM Rebooting Computing Conference, Naveen Kumar Macha(S), 2018
- SGS Travel grant to attend IEEE/ACM Rebooting Computing Conference, Bhavana Tejaswini Repalle(S), 2018

- NSF student Travel grant to attend HOST conference, Naveen Kumar Macha(S), 2018
- SCE 2021 Best MS Student Award, Prerana Samant(S)
- SCE 2021 Best PhD Student Award, Arif Iqbal(S)
- SCE 2021 Best BS Senior Student Award, Joshua Banago(S)
- Balaji publication scholarship, Prerana Samant(S)

Patents

- Darrel Schlom, Mostafizur Rahman, Kelin Kuhn, John Heron, "Low-energy Consumption Quaternary Magnetoelectric Spin Hall Effect Based Logic and Memory Device", WO2017214628A1, 2017
- Mostafizur Rahman, "Messaging based Intelligent Processing Unit", 2025 (Full patent under review)
- Mostafizur Rahman, Naveen Kumar Macha(S), "Cross-Talk Computing Foundation For Digital Logic", 2019, US20190356315A1

Certifications

- UMKC Faculty Certification in Online Teaching and Learning, 2020
- ACUE Effective Online Teaching Practices for Higher Ed (2020-2021)

Membership in Professional Society

Member, IEEE (Institute of Electrical and Electronics Engineers)

University Committee Assignments

- Coordinator, Higher Learning Commission Committee for Bachelor of Computer Science & Electrical Engineering (May 2017- present)
- Member, Undergraduate Degree Program Committee (Sep. 2015- present)
- Member, PhD Degree Committee- ECE Focus (Sep. 2015- present)

Editorship & Services to Professional Society

- Guest Editor, Elsevier Memories - Materials, Devices, Circuits and Systems, Special Issue title: Memory Technologies for HPC/AI Workloads: Device-Level Innovations to System-Level Optimizations, 2025
- Program Committee Member, ISVLSI Conference (2023-present)
- Program Committee Member, International Conference on Networking, Systems and Security (2023-present)
- Publication Chair, IEEE/ACM International Symposium on Nanoscale Architectures (NANOARCH) 2017, New Port, RI, USA
- Guest Editor, Special Issue on 3-D Integrated Circuits in IEEE Transactions on Nanotechnology (July. 2015- 2018)
- Publication Chair, IEEE/ACM International Symposium on Nanoscale Architectures (NANOARCH) 2015, Boston, USA
- Session Chair, "Nano MEMS", IEEE/ACM International Symposium on Nanoscale Architectures (NANOARCH) 2015, Boston, USA
- Session Chair, "All Spin Logic", IEEE/ACM International Symposium on Nanoscale Architectures (NANOARCH) 2016, Beijing, China

- Best Paper Select Committee Member, IEEE/ACM International Symposium on Nanoscale Architectures (NANOARCH) 2016, Beijing, China
- Program Committee Member, IEEE VLSI Design Conference 2016-2019, Calcutta, India

Courses Taught

- Nanoscale Devices and Circuits (ECE 5590), Fall 2015, 2016, 2017
- Nanoscale Manufacturing and Integration (ECE 5590), Spring 2016, 2017
- Computer Design and Organization (ECE 424), Fall & Spring 2017, 2018
- Logic Design (ECE 226), 2018, 2019, 2020, 2021
- Introduction to Computer Organization (ECE 228), Spring 2018- present
- Senior Design I & II (ECE 402, ECE 403), 2019-present
- Undergraduate Research (Comp Sci 499), 2015-present
- Graduate Research (ECE 5599), 2015- present
- Directed Reading (ECE 5597), 2015, 2016, 2017, 2018, 2019
- VLSI Lab (ECE 401VL), Spring 2018-present
- VLSI 2025

Publications

Google Scholar Citations – https://scholar.google.com/citations?user=hiPxuQQAAAAJ&hl=en

Book Chapter

Santosh Khasanvis, Mostafizur Rahman, Prasad Shabadi, Csaba Andras Moritz, "Unconventional Nanocomputing with Physical Wave Interference Functions", in Nanomagnetic and Spintronic Devices for Energy-Efficient Memory and Computing, J. Atulasimha and S. Bandyopadhyay, Eds., Wiley , pp. 291-328, 2015

Journals

1. Rownak H. Chowdhury(S), Mostafizur Rahman. InTuit: A Novel Algorithmic Approach for Neural Network Mapping onto a Data and Instruction Streamable AI Accelerator, IEEE Transactions in Computing, 2025 (In Progress). Impact Factor: ~2.7
2. Rownak H. Chowdhury(S), Mostafizur Rahman. Implications of Memory Embedding and Hierarchy on the Performance of MAVeC AI Accelerators, Materials, Devices, Circuits and Systems, Special Issue: Memory Technologies for HPC/AI Workloads, 2025. Impact Factor: N/A, DOI: https://doi.org/10.1016/j.memori.2025.100131
3. Rownak H. Chowdhury(S), Mostafizur Rahman. Demystifying the 7-D Convolution Loop Nest for Data and Instruction Streaming in Reconfigurable AI Accelerators, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, 2025. Impact Factor: 2.9, Available at: https://arxiv.org/pdf/2507.20420
4. Srinivas Rahul Sapireddy(S), Kazi Asifuzzaman(S), Mostafizur Rahman. Simplifying Activations with Linear Approximations in Neural Networks, Memories - Materials, Devices, Circuits and Systems, 2025. Impact Factor: N/A
5. Arif Iqbal(S), Srinivas Rahul(S), Dasari Sumanth(S), Kazi Asifuzzaman(S), Mostafizur Rahman. A Review of Crosstalk Polymorphic Circuits and their Scalability, Memories - Materials, Devices, Circuits and Systems, 2023. Impact Factor: N/A
6. Srinivas Rahul(S), Wafi Danesh(S), Mostafizur Rahman. Unsupervised Adversarial Intrusion Detection for Securing Internet of Things Networks, Springer Journal of Hardware and Systems Security, 2023. Impact Factor: ~1.2

7. Rownak Chowdhury(S), Mostafizur Rahman. Messaging-based Intelligent Processing Unit (m-IPU) for Next Generation AI Computing, IEEE Transactions on Emerging Topics in Computing (under review). Impact Factor: 4.3
8. Prerana Samant(S), Naveen Kumar Macha(S), Mostafizur Rahman, "A Neoteric Approach for Logic with Embedded Memory Leveraging Crosstalk Computing", ACM Transactions on Computing Systems, 2022 (Impact Factor 1.6)
9. Sehtab Hossain, Md Arif Iqbal, Mahbube Siddiqi, Mostafizur Rahman, "More than a Device: Function Implementation in a Multi-Gate Junctionless FET Structure", Elsevier Integration (Impact Factor 2.1)
10. Naveen Kumar Macha(S), Bhavana T Repalle(S), Mostafizur Rahman, Fine-Grained Polymorphic Circuit Framework in Crosstalk Computing, IEEE Transactions on VLSI. 2022 (Impact Factor 2)
11. Wafi Danesh(S), Joshua Banago(S), Mostafizur Rahman, "Turning the Table: Using Reverse Engineering Techniques to Detect FPGA Trojans", Journal of Hardware and Systems Security, Springer, 2022 (Impact Factor 2)
12. Naveen Kumar Macha(S), Bhavana T Repalle(S), Arif Iqbal(S), Mostafizur Rahman, On the Signal Integrity for Large Scale Design While Computing with Noise, Elsevier Integration, 2022 (Impact Factor 2.1)
13. Arif Iqbal(S), Naveen Kumar Macha(S), Mostafizur Rahman, Thermal Management Challenges and Mitigation Techniques for Transistor-level 3-D Integration, Elsevier Microelectronics Journal,2019 (Impact Factor 1.4)
14. N. K. Macha(S), M. A. Iqbal(S) and M. Rahman, "New 3-D CMOS Fabric with Stacked Horizontal Nanowires," IEEE Transactions on Computer Aided Design, Special Issue on 3-D ICs. 2018 (Impact Factor 2.4)
15. Jiajun Shi, Mingyu Li, Mostafizur Rahman, Santosh Khasanvis, C. Andras Moritz, "NP-Dynamic Skybridge: A Fine-grained 3D IC Technology with NP-Dynamic Logic", Transactions on Emerging Topics in Computing, pp 286-299, March 2017 (Impact Factor 6)
16. Mingyu Li, Jiajun Shi, Mostafizur Rahman, Santosh Khasanvis, C. Andras Moritz, "Skybridge-3D-CMOS: A Fine-Grained 3D CMOS Integrated Circuit Technology", IEEE Transactions on Nanotechnology, Special Issue on 3-D ICs, May 2017 (Impact Factor 2.19)
17. Santosh Khasanvis, Mingyu Li, Mostafizur Rahman, Mohammad Salehi Fashami, Ayan K. Biswas, Jayasimha Atulasimha, Supriyo Bandyopadhyay, Csaba Andras Moritz, "Self-similar Magneto-electric Nanocircuit Technology for Probabilistic Inference Engines", IEEE Transactions on Nanotechnology, Special Issue on Cognitive and Natural Computing with Nanotechnology , Vol. 14 , No. 6 , 980-991 , 2015 (Impact Factor 2.19)
18. Mostafizur Rahman, Santosh Khasanvis, JiaJun Shi, Csaba Andras Moritz, "Wave Interference Functions for Neuromorphic Computing", IEEE Transactions on Nanotechnology , Vol. 14 , No. 4 , pp. 742-750 , 2015 (Impact Factor 2.19)
19. Santosh Khasanvis, Mingyu Li, Mostafizur Rahman, Ayan K. Biswas, Mohammad Salehi Fashami, Jayasimha Atulasimha, Supriyo Bandyopadhyay, Csaba Andras Moritz, "Architecting for Causal Intelligence at Nanoscale", IEEE Computer, Special Issue on Rebooting Computing , Vol. 48 , No. 12 , 54-64 , 2015 (Impact Factor 3.1)
20. Santosh Khasanvis, Masum K Habib, Mostafizur Rahman, Roger Lake, Csaba Andras Moritz, "Low-Power Heterogeneous Graphene Nanoribbon-CMOS Multistate Volatile Memory Circuit", ACM Journal on Emerging Technologies in Computing Systems (JETC) , Special Issue on Advances in Design of Ultra-Low Power Circuits and Systems in Emerging Technologies, Vol. 12 , No. 2 , Article 15 , pp. 15:1-15:18, 2015 (Impact Factor 1.6)

21. Mostafizur Rahman, Santosh Khasanvis, & C. A. Moritz, “Nanowire Volatile RAM as an Alternative to SRAM”. ACM Journal on Emerging Computing, V-12, Issue 3, pp. 30:1-30.13, 2015
22. Mostafizur Rahman, Santosh Khasanvis, Jiajun Shi, Mingyu Li & C. A. Moritz, “SkyBridge: 3-D Integrated Circuit Technology Alternative to CMOS”. Preprint available at- http://arxiv.org/abs/1404.0607
23. S. Khasanvis, M. Rahman, and C. A. Moritz, “Heterogeneous Graphene-CMOS Ternary Content Addressable Memory”, Elsevier Journal of Parallel and Distributed Computing, 71-82, 2013. (Impact Factor 2.2)
24. J. Zhang, M. Rahman, P. Narayanan, S. Khasanvis, and C. A. Moritz, “Parameter Variation Sensing and Estimation in Nanoscale Fabrics”, Elsevier Journal of Parallel and Distributed Computing, 2013. (Impact Factor 2.2)

Peer Reviewed Conference Papers

25. Satya Sai Siva Rama Krishna Akula(S), Rownak Chowdhury(S), Srinivas Rahul Sapireddy(S), Mostafizur Rahman. An Open Source Framework for Offloading Big Data and AI Tasks (OFFLOAD) to Heterogeneous Compute Units, (To be submitted).
26. Prerana Samant(S), Naveen K. Macha(S), Mostafizur Rahman. Crosstalk Logic Circuits with Built-In Memory, IEEE ISVLSI Conference, page length: 6. Acceptance Rate: ~25–30%
27. Rownak H. Chowdhury(S), Mostafizur Rahman. Hardware-Aware Data and Instruction Mapping for AI Tasks: Balancing Parallelism, I/O and Memory Tradeoffs, 40th IEEE International Parallel & Distributed Processing Symposium, 2025 (In Progress). Acceptance Rate: ~20–25%
28. Srinivas Rahul Sapireddy(S), Mostafizur Rahman. Revisiting R: Statistical Envelope Analysis for Lightweight RF Modulation Classification, IEEE International Conference on RF Communication and Network (RFCoN), 2025 (Best Paper Award). Acceptance Rate: New conference
29. Srinivas Rahul Sapireddy(S), Mostafizur Rahman. Lightweight Classification of Spread Spectrum Signals Using Cyclostationary Autocorrelation-Based Binning, IEEE Military Communications Conference (Milcom), 2025 (under review). Acceptance Rate: ~40%
30. Dasari Sumanth(S), Sunil Reddy Aramreddys(S), Mostafizur Rahman, Reza R. Derakhshani. Computational Lighting and Imaging for Secure Deep Vascular Biometrics, IEEE International Joint Conference on Biometrics (IJCB), 2025. Acceptance Rate: ~30%
31. Srinivas Rahul Sapireddy(S), Mostafizur Rahman. On the Effectiveness of Piecewise Activation Approximations for Long-Term Short-Memory Networks, ISVLSI, 2025. Acceptance Rate: ~25–30%
32. Keerti Bajaj(S), Bhuvan Chennoju(S), Mostafizur Rahman, Reza Derakhshani. A Secure and Privacy Preserving Biometric Template Protection Technique, 22nd International Conference of the Biometrics Special Interest Group (BIOSIG 2023) (under review). Acceptance Rate: ~30–40%
33. Satya Sai Siva Rama Krishna Akula(S), Sumanth Desai(S), Keerti Bejaj(S), Bhuvan Chennoju(S), Tejaswi Dhandu(S), Mostafizur Rahman, Reza Derakhshani. A Diffuse Optical Tomography based Wearable System for Lower Wrist, BIOSIG 2023 (Best Poster Award). Acceptance Rate: ~20–25% (poster)
34. Bhuvan Chennoju(S), Keerti Bajaj(S), Mostafizur Rahman, Reza Derakhshani. Analysis of fNIRS as a Biometric Modality, IEEE International Joint Conference on Biometrics (IJCB), 2023. Acceptance Rate: ~30%

35. Rownak Chowdhury(S), Mostafizur Rahman. Accelerating PageRank Algorithmic Tasks with mIPU, Proceedings of the IEEE Rebooting Computing Conference, December 2024. Acceptance Rate: ~35%, DOI: 10.1109/ICRC64395.2024.10937012
36. Rownak H. Chowdhury(S), Mostafizur Rahman. High-Speed Drug Response Modeling from Pharmacogenomic Data via Hardware-Accelerated Matrix Factorization, ASPLOS, 2026 (To be submitted). Acceptance Rate: ~15%
37. Prerana Samant(S), Naveen K. Macha(S), Mostafizur Rahman Crosstalk Logic Circuits with Built-In Memory, IEEE ISVLSI Conference, page length: 6
38. Naveen Kumar Macha(S), Md Arif Iqbal(S), Bhavana Tejaswini Repalle(S), Sehtab Hossain(S), Mostafizur Rahman, Crosstalk Noise based Configurable Computing: A New Paradigm for Digital Electronics, IEEE INTERNATIONAL SYSTEM-ON-CHIP CONFERENCE 2021, page length: 4
39. Sehtab Hossain(S), Md Arif Iqbal(S), Mostafizur Rahman, A New Approach towards Embedded Logic in a Single Device, IEEE Nanotechnology Conference 2020, Montreal, Canada, page length: 4
40. Arif Iqbal(S), Naveen Kumar Macha(S), Bhabhana T Repalle(S), Mostafizur Rahman, Design and Comparison of Crosstalk Circuits at 7nm, IEEE Rebooting Computing Conference,2019, page length: 6
41. Arif Iqbal(S), Naveen Kumar Macha(S), Bhabhana T Repalle(S), Mostafizur Rahman, From 180nm to 7nm: Crosstalk Computing Scalability Study, IEEE Electron Device Society S3S Conference,2019, page length: 6
42. Arif Iqbal(S), Naveen Kumar Macha(S), Bhabhana T Repalle(S), Mostafizur Rahman, A Logic Simplification Approach for Very Large Scale Crosstalk Circuit Designs, IEEE/ACM Symposium on Nanoscale Architectures,2019, page length: 6
43. Naveen Kumar Macha(S), Bhabhana T Repalle(S), Arif Iqbal(S), Mostafizur Rahman, A New Paradigm for Computing for Digital Electronics under Extreme Environments, IEEE Aerospace Conference, 2019, page length: 6
44. Naveen Kumar Macha(S), Bhavana Tejaswini Repalle(S), Sandeep Geedipally(S), Rafael Rios, Mostafizur Rahman, A New Paradigm for Fault-Tolerant Computing with Interconnect Crosstalks, IEEE Conference on Rebooting Computing,2018, page length: 6
45. Naveen Kumar Macha(S), Sandeep Geedipally(S), Bhavana Repalle(S), Md Arif Iqbal(S), Wafi Danesh(S), Mostafizur Rahman, Crosstalk based Fine-Grained Reconfiguration Techniques for Polymorphic Circuits, 2018 IEEE/ACM International Symposium on Nanoscale Architectures,2018, page length: 6
46. Rajanikanth Desh(S), Naveen Kumar Macha(S), Sehtab Hossain(S), Repalle(S) Bhavana Tejaswini, Mostafizur Rahman, A Novel Analog to Digital Conversion Concept with Crosstalk Computing, 2018 IEEE/ACM International Symposium on Nanoscale Architectures,2018, page length: 4
47. Naveen Kumar Macha(S), Sandeep Reddy Geedipally(S) and Mostafizur Rahman, “Ultra High Density 3D SRAM Cell Design in Stacked Horizontal Nanowire (SN3D) Fabric”, IEEE/ACM International Symposium on Nanoscale Architectures. 2017. page length: 6
48. Wafi Danesh(S) and Mostafizur Rahman, “Linear Regression based Multi-State Logic Decomposition Approach for Efficient Hardware Implementation”, IEEE/ACM International Symposium on Nanoscale Architectures. 2017. page length: 6
49. Wafi Danesh(S) and Mostafizur Rahman, “A New Approach for Multi-Valued Computing Using Machine Learning”, IEEE Conference on Rebooting Computing. 2017, page length: 6
50. Naveen Kumar Macha(S), Rakesh Kumar Reddy Vijjapuram(S), Vinay Chitturi(S), Sehtab Hossain(S) and Mostafizur Rahman, “A New Concept for Computing using

Interconnect Crosstalks", IEEE Conference on Rebooting Computing. 2017, page length: 4

51. Arif Iqbal(S) and Mostafizur Rahman, "New Thermal Management Approach for Transistor-level 3-D Integration", IEEE SOI-3D-Subthreshold Microelectronics Technology Unified Conference. 2017, page length: 6
52. Naveen Kumar Macha(S) and Mostafizur Rahman, "Cost Projections and Benefits for Transistor-Level 3-D Integration with Stacked Nanowires", IEEE SOI-3D-Subthreshold Microelectronics Technology Unified Conference. 2017, page length: 6
53. M. Li, S. Khasanvis, J. Shi, S. Bhat, M. Rahman and C. A. Moritz, "Towards automatic thermal network extraction in 3D ICs," 2016 IEEE/ACM International Symposium on Nanoscale Architectures (NANOARCH), Beijing, 2016, pp. 25-30. page length: 6
54. J. Shi, M. Li, S. Khasanvis, M. Rahman and C. A. Moritz, "Routability in 3D IC design: Monolithic 3D vs. Skybridge 3D CMOS," 2016 IEEE/ACM International Symposium on Nanoscale Architectures (NANOARCH), Beijing, 2016, pp. 145-150. page length: 8
55. N. K. Macha(S), M. A. Iqbal(S) and M. Rahman, "Fine-grained 3-D CMOS concept using stacked horizontal nanowire," 2016 IEEE/ACM International Symposium on Nanoscale Architectures (NANOARCH), Beijing, 2016, pp. 151-152. page length: 6
56. JiaJun Shi, Mingyu Li, Mostafizur Rahman, Santosh Khasanvis, Csaba Andras Moritz, "Architecting NP-Dynamic Skybridge", in Proceedings of IEEE/ACM International Symposium on Nanoscale Architectures (NanoArch) , pp. 169-174 , 2015, page length: 6
57. Santosh Khasanvis, Mingyu Li, Mostafizur Rahman, Mohammad Salehi Fashami, Ayan K. Biswas, Jayasimha Atulasimha, Supriyo Bandyopadhyay, Csaba Andras Moritz, "Physically Equivalent Magneto-Electric Nanoarchitecture for Probabilistic Reasoning", in Proceedings of IEEE/ACM International Symposium on Nanoscale Architectures (NanoArch) , pp. 25-26 , 2015, page length: 6
58. Mostafizur Rahman, Santosh Khasanvis, JiaJun Shi, Mingyu Li, Csaba Andras Moritz, "Architecting 3-D Integrated Circuit Fabric with Intrinsic Thermal Management Features", in Proceedings of IEEE/ACM International Symposium on Nanoscale Architectures (NanoArch) , pp. 157-162 , 2015, page length: 6
59. Mostafizur Rahman, JiaJun Shi, Mingyu Li, Santosh Khasanvis, Csaba Andras Moritz, "Manufacturing Pathway and Experimental Demonstration for Nanoscale Fine-Grained 3-D Integrated Circuit Fabric", in Proceedings of IEEE International Conference on Nanotechnology (IEEE NANO) , pp. 1214-1217, 2015, page length: 6
60. Santosh Khasanvis, Mostafizur Rahman, Mingyu Li, JiaJun Shi, Csaba Andras Moritz, "Architecting Connectivity for Fine-grained 3-D Vertically Integrated Circuits", in Proceedings of IEEE/ACM International Symposium on Nanoscale Architectures (NanoArch) , pp. 175-180 , 2015, page length: 6
61. Mostafizur Rahman ; Santosh Khasanvis ; Jiajun Shi ; Mingyu Li ; Csaba Andras Moritz, "Fine-grained 3-D integrated circuit fabric using vertical nanowires", 3D Systems Integration Conference (3-D IC), Page(s):TS9.3.1- TS9.3.7, 2015, page length: 6
62. S. Khasanvis, M. Rahman, & C. A. Moritz, "Spin Wave Fabric for Multi-valued Computations".IEEE/ACM International Symposium on Nanoscale Architectures (2014) (Best Paper Award), page length: 6
63. M. Rahman, S. Khasanvis, & C. A. Moritz, "Novel 6T-TRAM Concept for Ultra-Low Power Applications". IEEE/ACM International Symposium on Nanoscale Architectures (2014), page length: 6
64. M. Rahman, P. Narayanan, S. Khasanvis, J. Nicholson, and C. A. Moritz, "Experimental Prototyping of Beyond-CMOS Nanowire Computing Fabrics", (Best

Paper Award), IEEE/ACM International Symposium on Nanoscale Architectures, 134-139 (2013). page length: 6

65. S. Khasanvis, M. Rahman, P. Shabadi, P. Narayanan, H. S. Yu, C. O. Chui, and C. A. Moritz, "Nanowire Field-Programmable Computing Platform", IEEE/ACM International Symposium on Nanoscale Architectures, 23-25 (2013). page length: 6
66. V. Suresh, A. Shanmugam, L. Krishnan, A. Bijjal, M. Rahman, and C. A. Moritz, "Design of 8T-Nanowire RAM Array", IEEE/ACM International Symposium on Nanoscale Architectures, 152-157 (2013). page length: 6
67. M. Rahman, P. Narayanan and C. A. Moritz, "Integrated Nanowire Systems for Post-CMOS Computing", SRC TECHCON. 2012. page length: 4
68. S. Khasanvis, K. M. M.Habib, M. Rahman, P. Narayanan, R. Lake and C. A. Moritz, "Ternary Volatile Random Access Memory based on Heterogeneous Graphene-CMOS Fabric", IEEE/ACM International Symposium on Nanoscale Architectures, 69-76 (2012). page length: 6
69. M. Rahman, P. Narayanan, and C. A. Moritz,"N3ASIC-based Volatile Nanowire RAM", IEEE Conference on Nanotechnology, 1097-1101 (2011). page length: 8
70. P. Narayanan, J. Kina, P. Panchapakeshan, P. Vijayakumar, K. S. Shin, M. Rahman, M. Leuchtenburg, I. Koren, C. O. Chui and C. A. Moritz, "Nanoscale Application Specific Integrated Circuits," IEEE/ACM International Symposium on Nanoscale Architectures, 99-106 (2011). page length: 6
71. S. Khasanvis, K. M. M. Habib, M. Rahman, P. Narayanan, R. K. Lake and C. Andras Moritz, "Hybrid Graphene Nanoribbon-CMOS Tunneling Volatile Memory Fabric", IEEE/ACM International Symposium on Nanoscale Architectures.189-195 (2011). page length: 6
72. I. Ercan, M. Rahman, and Neal G. Anderson, "Determining Fundamental Lower Bounds on Heat Dissipation for Transistor-Based Nanocomputing Paradigms, IEEE/ACM International Symposium on Nanoscale Architectures.169-174 (2011). page length: 6
73. M. Rahman, "Comparison of Fast Modular Multiplication in FPGAs", IEEE International Conference on Anti-counterfeiting, Security, and Identification in Communication, (2010). page length: 6
74. M. Rahman, I.R. Rokon, Mf. Rahman, "Efficient Hardware Implementation of RSA Cryptography", IEEE International Conference on Anti-counterfeiting, Security, And Identification in Communication, (2009). page length: 6

Selected Presentations (Selected)

- Naveen Kumar Macha(S), Md Arif Iqbal(S), Bhavana Tejaswini Repalle(S), Sehtab Hossain(S), Mostafizur Rahman, Crosstalk Noise based Configurable Computing: A New Paradigm for Digital Electronics, *IEEE INTERNATIONAL SYSTEM-ON-CHIP CONFERENCE 2021,* page length: 4
- Mostafizur Rahman, "3-D Nanotechnology Fabric for Future Integrated Circuits", CSEE Departmental Seminar, University of Missouri Kansas City, 2016
- Mostafizur Rahman, "3-D ICs for Beyond CMOS", IEEE Computer Society Meeting and Dinner with Presentation on the Topic of Nanotechnology Research Advances, Kansas City, 2016
- JiaJun Shi, Mingyu Li, Mostafizur Rahman, Santosh Khasanvis, Csaba Andras Moritz, "Architecting NP-Dynamic Skybridge", IEEE/ACM International Symposium on Nanoscale Architectures (NanoArch) , Boston, USA , 2015
- Santosh Khasanvis, Mingyu Li, Mostafizur Rahman, Mohammad Salehi Fashami, Ayan K. Biswas, Jayasimha Atulasimha, Supriyo Bandyopadhyay, Csaba Andras Moritz,

"Physically Equivalent Magneto-Electric Nanoarchitecture for Probabilistic Reasoning", IEEE/ACM International Symposium on Nanoscale Architectures (NanoArch) , Boston, USA , 2015

- Mostafizur Rahman, Santosh Khasanvis, JiaJun Shi, Mingyu Li, Csaba Andras Moritz, "Architecting 3-D Integrated Circuit Fabric with Intrinsic Thermal Management Features", IEEE/ACM International Symposium on Nanoscale Architectures (NanoArch) , Boston, USA , 2015
- Mostafizur Rahman, JiaJun Shi, Mingyu Li, Santosh Khasanvis, Csaba Andras Moritz, "Manufacturing Pathway and Experimental Demonstration for Nanoscale Fine-Grained 3-D Integrated Circuit Fabric", IEEE International Conference on Nanotechnology (IEEE NANO) , Rome, Italy, 2015
- Santosh Khasanvis, Mostafizur Rahman, Mingyu Li, JiaJun Shi, Csaba Andras Moritz, "Architecting Connectivity for Fine-grained 3-D Vertically Integrated Circuits", IEEE/ACM International Symposium on Nanoscale Architectures (NanoArch) , Boston, USA, 2015
- Mostafizur Rahman, Santosh Khasanvis, Jiajun Shi, Mingyu Li, Csaba Andras Moritz, "Fine-grained 3-D integrated circuit fabric using vertical nanowires", 3D Systems Integration Conference (3-D IC), Sendai, Japan, 2015

*UMKC student authors are designated with (S) after their names

PhD Dissertations

1. Iqbal, Md. Arif (S). *Challenges and Solutions for Large-Scale Integration of Emerging Technologies*. PhD Dissertation, Computer Science & Electrical Engineering, University of Missouri–Kansas City; ProQuest Dissertations & Theses, 2021 (ProQuest ID: 28541801).
2. Naveen Kumar Macha (S). *Crosstalk Computing: Circuit Techniques, Implementation and Potential Applications*. PhD Dissertation, Computer Science & Electrical Engineering, University of Missouri–Kansas City; ProQuest Dissertations & Theses, 2020 (ProQuest ID: 28153644).
3. Wafi Danesh (S). *A Hardware/Software Co-Integration Approach for Securing Network Infrastructure Using Reconfigurable Computing*. PhD Dissertation, Computer Science & Electrical Engineering, University of Missouri–Kansas City; ProQuest Dissertations & Theses, 2022 (ProQuest ID: 29327388).
4. Sehtab Hossain (S). *Function Implementation in a Multi-Gate Junctionless FET Structure*. PhD Dissertation, Computer Science & Electrical Engineering, University of Missouri–Kansas City; ProQuest Dissertations & Theses, 2023 (ProQuest ID: 30633613).
5. Stephan Young (S). *Quantum Sensing Using Nitrogen Vacancy Centers in Diamond: Methods and Instrumentation*. PhD Dissertation, Physics, University of Missouri–Kansas City, April 2021.
6. Jonathan Lee (S). *Photonic Device Simulation and Fabrication for Optical Computing*. PhD Dissertation, Physics, University of Missouri–Kansas City, 2022.
7. Marouf Khan (S). *Reconfigurable Architectures for Secure and Efficient AI Computing*. PhD Dissertation, Computer Science & Electrical Engineering, University of Missouri–Kansas City, Summer 2021.

MS Theses

1. Satya Sai Siva Rama Krishna Akula (S). *An Open Source Framework for Offloading Big Data and AI Tasks (OFFLOAD) to Heterogeneous Compute Units*. MS Thesis, Computer Science & Electrical Engineering, University of Missouri–Kansas City, 2024.

2. Vamsi Krishna (S). *FPGA-Based Data Processing for Heterogeneous Computing Platforms*. MS Thesis, Computer Science & Electrical Engineering, University of Missouri–Kansas City, 2022.
3. Prerana Samant (S). *Crosstalk Logic Circuits with Built-In Memory for Energy-Efficient Computing*. MS Thesis, Computer Science & Electrical Engineering, University of Missouri–Kansas City, Fall 2021.
4. Karthik Reddy (S). *Design and Verification of Low-Power Logic Blocks Using Emerging Device Technologies*. MS Thesis, Computer Science & Electrical Engineering, University of Missouri–Kansas City, 2016.
5. Sandeep Reddy Geedipelly (S). *Design and Implementation of Logic Circuits Using Emerging Polymorphic Elements*. MS Thesis, Computer Science & Electrical Engineering, University of Missouri–Kansas City, 2018.
6. Bhavana Tejaswini Rapalle (S). *Layout Design Techniques for Area-Optimized Polymorphic Circuits*. MS Thesis, Computer Science & Electrical Engineering, University of Missouri–Kansas City, 2019.

Review Activities

Reviewer for Grant Proposals and Scholarships

- University of Missouri Research Board Funding
- 2021 NSF CISE-MSI Panel Reviewer
- Defense Threat Reduction Agency

Reviewer for UMKC Scholarships

- School of Graduate Studies Scholarship
- Muslim Student Association Undergraduate Scholarship
- Islamic Student Services Scholarship
- Mohiuddin Scholarship

Reviewer for Conferences and Journals

- IEEE Transactions on Nanotechnology
- IEEE Transactions on VLSI Circuits
- IEEE Transactions on Devices
- IEEE Transactions on Multiscale Computing
- ACM Transactions of Emerging Technologies
- IEEE/ACM Conference on Nanoscale Architectures
- IEEE Great Lake VLSI Symposium
- IEEE Conference on VLSI Technologies
- IEEE Journal of Exploratory Solid-State Computational Devices and Circuits
- IEEE Transactions on Computer Aided Design
- Neural Networks Journal by Elsevier

Research Supervision

PhD Advising (Primary Advisor)

- Arif Iqbal, Computer Science Electrical Engineering,
  Current status: Technical Lead, Crosstalk LLC, completion date: April, 2021

- Naveen Kumar Macha , Computer Science Electrical Engineering,
  Current status: ASIC Clock Designer (NVIDIA), completion date: 2020
- Srinivas Rahul, Computer Science Electrical Engineering
  Current status: Teaching Professor at UMKC, completion date: 2025
- Wafi Danesh , Computer Science Electrical Engineering,
  Current status: PhD (Post Comprehensive), estimated completion date: Fall, 2021
- Sehtab Hossain , Computer Science Electrical Engineering,
  Current status: PhD (Post Comprehensive), estimated completion date: Fall, 2021

PhD Advising (Co-Advisor)

- Stephan Young, Physics,
  Current status: PhD student (post comprehensive), completion date: April, 2021
- Jonathan Lee, Physics,
  Current status: PhD student, estimated completion date: 2022
- Marouf Khan, Computer Science Electrical Engineering,
  Current status: PhD student (post comprehensive), estimated completion date: Summer, 2021

MS Thesis Advising

- Vamsi Krishna, Computer Science Electrical Engineering,
  Current status: Started MS, completion date: 2022
- Prerana Samant , Computer Science Electrical Engineering,
  Current status: Completing Thesis Work, completion date: Fall, 2021
- Karthik Reddy, Computer Science Electrical Engineering,
  Current status: Verification Engineer (Qualcomm), completion date: 2016
- Sandeep Reddy Geedipelly, Computer Science Electrical Engineering,
  Current status: Process Engineer (Intel), completion date: 2018
- Bhavana Tejaswini Rapalle, Computer Science Electrical Engineering,
  Current status: Layout Design Engineer (Intel), completion date: 2019

MS Student Advising (Project work)

- Rajanikanth Desh , Computer Science Electrical Engineering,
  Current status: Verification Engineer (Intel), completion date: 2018
- Kaimo Li, Computer Science Electrical Engineering,
  Current status: MS, completion date: 2020

Sponsored Undergraduate Research Advising

- Joshua Banago , Computer Science Electrical Engineering,
  Current status: BS, estimated completion date: 2021
- Richard Hunt, Computer Science Electrical Engineering,
  Current status: BS, estimated completion date: 2021
- Logan McPhillips, Computer Science Electrical Engineering,
  Current status: BS, estimated completion date: 2021

Undergraduate Research (Research Project)

- Sacdiya Sayid, Computer Science Electrical Engineering,
  Current status: BS, estimated completion date: 2022
- William Carmosino, Computer Science Electrical Engineering,
  Current status: BS, estimated completion date: 2022
- Darius Williams, Computer Science Electrical Engineering,
  Current status: Design Engineer, Texas Instruments, completion date: 2020

Student Chapter

- Supervisor for Bangladeshi Student Association at UMKC
- Supervisor for Muslim Student Association at UMKC

Volunteering

- Mentorship at Computer Science Teacher Mentor Day, 2020
- UMKC Summer Camp Workshop in Scanning Electron Microscopy (SEM), July 2019
- High School Student Tour of SEM, September 2019
- Art Institute Student Tour of SEM, September, 2019
- Donnelly College Student Visit of SEM, October 2019
- Partnership with NSBE for DIRE program, 2019 (ongoing)
- Volunteer judge for KC STEM Alliance high school senior design contest, 2016 & 2017
- UMKC SCE promotion committee member, 2016, 2020
- Volunteer Treasurer, Islamic Society of Greater Kansas City