

Ahmedullah Aziz


Assistant Professor


Dept. of Electrical Engineering & Computer Science

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Research Interests

- Post-CMOS Technologies
- Neuromorphic/AI Hardware
- Ultra-low Power Digital VLSI Design
- Superconducting Devices/Circuits
- Design Automation for Nanoelectronics
- Non-volatile Memories, Cross-point Array
- Cryogenic/Quantum Computing Hardware
- Correlated/Topological Material Systems

Education

- PhD, Electrical & Computer Engineering Summer '19
Purdue University, West Lafayette, IN, USA
 Dissertation: [Device-Circuit Co-design Employing Phase Transition Materials for Low Power Electronics](#).

ACM SIGDA Outstanding PhD Dissertation Award

EDAA Outstanding PhD Dissertation Award
- Master of Science, Electrical Engineering Summer '16
Pennsylvania State University, University Park, PA, USA
- Bachelor of Science, Electrical & Electronic Engineering Spring '13
Bangladesh Univ. of Engineering & Technology, Dhaka, Bangladesh

Work Experience

- **Assistant Professor (Tenure-track)** Aug '19 - present
Dept. of Electrical Engineering & Computer Science
The University of Tennessee, Knoxville, USA
- **Graduate Research Assistant** Jan '18 - Jul '19
Integrated Circuits & Devices' Lab
Purdue University, West Lafayette, IN, USA
- **Co-Op Engineer (Intern)** May '17 - Oct '17
Technology Research Division
GlobalFoundries, FAB 8, Malta, NY, USA
- **Graduate Research Assistant** Aug '14 - Dec '17
Integrated Circuits & Devices' Lab
Pennsylvania State University, University Park, PA, USA
- **Software Engineer** Apr '13 - Jun '14
Tizen Lab
Samsung R&D Institute, Dhaka, Bangladesh

Research Grant

- [2021] **DOD - Air Force Research Laboratory:** *Co-Principal Investigator* (with Dr. Garrett Rose and Dr. James Plank), "Design of an Adaptable Neuromorphic System for Exploring Nanoelectronic Options," Total Award Amount: \$2,015,194, [Aziz's share: \$671,731]

Awards & Honors

- [2021] **ACM SIGDA Outstanding Ph.D. Dissertation Award:** Monetary award and recognition from the *ACM Special Interest Group on Design Automation (SIGDA)*.
- [2021] **Student/Faculty Research Award:** Monetary award and recognition provided by the Graduate School @ UTK to a student/faculty pair. Student awardee: Nazmul Amin (PhD student)
- [2020] **EDAA Outstanding PhD Dissertation Award:** Monetary award and recognition from the *European Design and Automation Association (EDAA)*.
- [2019] **Outstanding Graduate Student Research Award:** Monetary award and recognition from *College of Engineering, Purdue University* for excellence in graduate level research.
- [2019] **ACM SIGDA Travel Grants:** Sponsor- ACM Special Interest Group on Design Automation
To participate in the PhD forums of (i) DAC '19 in Las Vegas, NV, USA & (ii) DATE '19 in Florence, Italy.
- [2016] **Best Publication Award:** SRC/DARPA sponsored STARnet LEAST Center. Paper Title: Phase-transition-FET Exhibiting Steep Switching Slope of 8mV/decade and 36% Enhanced ON Current.
- [2015] **Best Publication Award:** SRC/DARPA sponsored STARnet LEAST Center. Paper Title: A steep slope transistor based on abrupt electronic phase transition.
- [2013] **Icon Award:** Monetary award with a certificate presented by Samsung R&D Institute, in recognition of excellence in innovation and research progress.
- [2013] **Best Project Award:** Project Exhibition by Center for Natural Science & Engineering Research (CNSER), held as a sub-session of [International Conference on Informatics, Electronics & Vision](#).
- [2013] **Champion:** *Robi- Prothom Alo* Global Robotics Challenge (GRC).
- [2013] **Travel Grant:** To participate in [Techkriti '13](#) (Asia's Largest Technical & Entrepreneurial Festival), held in IIT Kanpur, India.
- [2013] **Runner Up:** National Electronic Project Exhibition & Competition (NEPEC), arranged by East-West University, Dhaka, Bangladesh.
- [2012] **Champion:** EEE Project Show, Organized by Bangladesh Univ. of Engineering & Technology.
- [2011] **Chairman's Award:** Monetary award by *Janata Bank*, Bangladesh for academic excellence.
- [2011] **Runner Up:** *Genius Hunt* (Inter university project competition), Organizer: North South University (NSU), Dhaka, Bangladesh.
- [2011] **Country Topper (Bangladesh) & Top 100 in World Ranking:** Team Name: *Day Dreamers*, [IEEEExtreme Programming Competition 5](#).
- [2009] **Dean's Award:** Monetary award from the office of the Dean, Bangladesh University of Engineering & Technology. Awarded each year based on academic performance.
- [2008] **Education Board Scholarship (Grade A):** Awarded by the ministry of education, Bangladesh to the **top 0.1%** students in the country.
- [2007] **Sunrise Star Award:** For being among the top 10 in a nationwide exam (in Bangladesh) on science.
- [2007] **Gold Medal:** '*Janata Bank Gold Medal*' for outstanding result in Secondary School Certificate exam.

Publications [[Google Scholar](#) : Citations: 1500+ | *h* – index: 17 | *i10* – index: 26]

Book Chapters:

- [B1] A. Aziz, S. K. Thirumala, D. Wang, S. George, X. Li, S. Datta, V. Narayanan and S. K. Gupta, "Sensing in Ferroelectric Memories and Flip-Flops", In: Ghosh S. (eds) 'Sensing of Non-Volatile Memory Demystified'; [Springer Nature](#), 2018.
- [B2] X. Li, M. S. Kim, S. George, A. Aziz, M. Jerry, N. Shukla, J. Sampson, S. Gupta, S. Datta, and V. Narayanan, "Emerging Steep-Slope Devices and Circuits: Opportunities and Challenges", In: Topaloglu, Rasit O., Wong, H.-S. Philip (eds) 'Beyond-CMOS Technologies for Next Generation Computer Design'; [Springer](#), Cham, 2018.

Patents:

- [P1] S. K Gupta, A. Aziz, N. Shukla, S. Datta, X. Li, V. Narayanan, [Patent # US10839880B2](#), Nov. 2020.
- [P2] S. K Gupta, A. Aziz, N. Shukla, S. Datta, X. Li, V. Narayanan, [Patent # US20170352394A1](#), Dec. 2017.

Journal Papers (Reversed Chronological Order):

- [J1] S. Alam, M. M. Islam, M. S. Hossain, A. Jaiswal, and A. Aziz, "CryoCiM: Cryogenic compute-in-memory based on the quantum anomalous Hall effect", [Applied Physics Letters](#), 120, 144102 (2022).
- [J2] A. Zeumault, S. Alam, M. O. Faruk, and A. Aziz, "Memristor compact model with oxygen vacancy concentrations as state variables", [Journal of Applied Physics](#), 131, 124502 (2022).
- [J3] J. Vaidya, R. Kanthi, S. Alam, N. Amin, A. Aziz, N. Shukla, "A three-terminal non-volatile ferroelectric switch with an insulator–metal transition channel," in [Scientific Reports](#), volume 12, 2199, Feb. 2022.
- [J4] S. Alam, M. S. Hossain, and A. Aziz, " A cryogenic memory array based on superconducting memristors," in [Applied Physics Letters](#), vol. 119, issue 8, 082602, Aug 2021. 
- [J5] M. Z. Baten, S. Alam, Z. Wood, B. Sikder, A. Aziz, "III-Nitride Light-Emitting Devices," in [Photonics](#), 8(10):430, Oct 2021.
- [J6] A. Zeumault, S. Alam, Z. Wood, R. J. Weiss, A. Aziz, and G. S. Rose, " TCAD Modeling of Resistive-Switching of HfO₂ Memristors: Efficient Device-Circuit Co-Design for Neuromorphic Systems," in [Frontiers in Nanotechnology](#), 3:734121, Oct 2021.
- [J7] S. Alam, M. S. Hossain, and A. Aziz, " A non-volatile cryogenic random-access memory based on the quantum anomalous Hall effect," in [Scientific Reports](#), 11, 7892, Apr. 2021.  
- [J8] S. Alam, M. A. Jahangir, and A. Aziz, "A Compact Model for Superconductor- Insulator-Superconductor (SIS) Josephson Junctions," in [IEEE Electron Device Letters](#), vol. 41, no. 8, pp. 1249-1252, Aug. 2020.
- [J9] Z. Shen, S. R. Srinivasa, A. Aziz, S. Datta, V. Narayanan and S. K. Gupta, "SRAMs and DRAMs with Separate Read-Write Ports Augmented by Phase Transition Materials", in [IEEE Transactions on Electron Devices](#), vol. 66, no. 2, pp. 929-937, Feb. 2019.
- [J10] A. Aziz and S. K. Gupta, "Threshold Switch Augmented STT MRAM: Design Space Analysis and Device-Circuit Co-Design," in [IEEE Transactions on Electron Devices](#), vol. 65, no. 12, Dec. 2018.
- [J11] X. Li, S. George, Y. Liang, K. Ma, K. Ni, A. Aziz, S. K. Gupta, J. Sampson, M. F. Chang, Y. Liu, H. Yang, S. Datta and V. Narayanan, "Lowering Area Overheads for FeFET-Based Energy-Efficient Nonvolatile Flip-Flops", in [IEEE Transactions on Electron Devices](#), vol. 65, no. 6, June 2018.

- [J12] S. George, X. Li, M. J. Liao, K. Ma, S. Srinivasa, K. Mohan, **A. Aziz**, J. Sampson, S. K. Gupta and V. Narayanan, "Symmetric 2-D-Memory Access to Multidimensional Data", in [IEEE Transactions on Very Large Scale Integration \(VLSI\) Systems](#), vol. 26, no. 6, pp. 1040-1050, June 2018.
- [J13] **A. Aziz**, N. Shukla, S. Datta and S. K. Gupta, "Steep Switching Hybrid Phase Transition FETs (Hyper-FET) for Low Power Applications: A Device-Circuit Co-design Perspective-Part I", in [IEEE Transactions on Electron Devices](#), vol. 64, no. 3, pp. 1350-1357, March 2017.
- [J14] **A. Aziz**, N. Shukla, S. Datta and S. K. Gupta, "Steep Switching Hybrid Phase Transition FETs (Hyper-FET) for Low Power Applications: A Device-Circuit Co-design Perspective-Part II", in [IEEE Transactions on Electron Devices](#), vol. 64, no. 3, pp. 1358-1365, March 2017.
- [J15] S. Gupta, M. Steiner, **A. Aziz**, V. Narayanan, S. Datta and S. K. Gupta, "Device-Circuit Analysis of Ferroelectric FETs for Low-Power Logic", in [IEEE Transactions on Electron Devices](#), vol. 64, no. 8, 2017.
- [J16] X. Li, S. George, K. Ma, W. Y. Tsai, **A. Aziz**, J. Sampson, S. Gupta, M. F. Chang, Y. Liu, S. Datta and V. Narayanan, "Advancing Nonvolatile Computing with Nonvolatile NCFET Latches and Flip-Flops", in [IEEE Transactions on Circuits and Systems I: Regular Papers](#), vol. 64, no. 11, Nov. 2017.
- [J17] X. Li, J. Sampson, A. Khan, K. Ma, S. George, **A. Aziz**, S. Gupta, S. Salahuddin, M. F. Chang, S. Datta and V. Narayanan, "Enabling Energy-Efficient Nonvolatile Computing with Negative Capacitance FET", in [IEEE Transactions on Electron Devices](#), vol. 64, no. 8, pp. 3452-3458, Aug. 2017.
- [J18] **A. Aziz**, N. Jao, S. Datta and S. K. Gupta, "Analysis of Functional Oxide Based Selectors for Cross-Point Memories", in [IEEE Transactions on Circuits and Systems I: Regular Papers](#), vol. 63, no. 12, Dec. 2016.
- [J19] S. Srinivasa, **A. Aziz**, N. Shukla, X. Li, J. Sampson, S. Datta, J.P. Kulkarni, V. Narayanan, S.K. Gupta, "Correlated Material Enhanced SRAMs With Robust Low Power Operation", in [IEEE Transactions on Electron Devices](#), vol. 63, no. 12, pp. 4744-4752, Dec. 2016.
- [J20] **A. Aziz**, S. Ghosh, S. Datta and S. K. Gupta, "Physics-Based Circuit-Compatible SPICE Model for Ferroelectric Transistors", in [IEEE Electron Device Letters](#), vol. 37, no. 6, pp. 805-808, June 2016.
- [J21] **A. Aziz** and S. K. Gupta, "Hybrid Multiplexing (HYM) for Read- and Area-Optimized MRAMs With Separate Read-Write Paths", in [IEEE Transactions on Nanotechnology](#), vol. 15, no. 3, May 2016.
- [J22] N. Shukla, A. V. Thathachary, A. Agrawal, H. Paik, **A. Aziz**, D. G. Schlom, S. K. Gupta, R. E. Herbert and S. Datta, "A steep-slope transistor based on abrupt electronic phase transition", [Nature Communications](#), vol. 6, Article number: 7812, Aug. 2015. 
- [J23] M.S. Hossain, S. Khan, **A. Aziz**, M. Rahman and M. A. Arafat, "Effect of Gate Dielectric on Ballistic Transport of Cylindrical Carbon Nanotube MOSFET", in [ECS Transactions](#), vol. 53, no. 1, 2013.
- [J24] M.S. Hossain, S.U.Z. Khan, **A. Aziz**, M. A. Arafat, Q.D.M. Khosru, "Size Dependent Transport of Surrounding Gate Carbon Nanotube Field Effect Transistor", in [ECS Journal of Solid State Science and Technology](#), vol. 2, no. 9, M23-M27, June 2013.

Conference Papers (Reversed Chronological Order):

- [C1] M. M. Islam, S. Alam, N. Shukla, and **A. Aziz**, "Design Space Analysis of Superconducting Nanowire-based Cryogenic Oscillators," [80th Device Research Conference \(DRC\)](#), OH, USA, 2022.
- [C2] S. Alam, M. M. Islam, M. S. Hossain, K. Ni, V. Narayanan, and **A. Aziz**, "Cryogenic Memory Array based on Ferroelectric SQUID and Heater Cryotron," [80th Device Research Conference \(DRC\)](#), OH, USA, 2022.
- [C3] S. Alam, M. M. Islam, M. S. Hossain, and **A. Aziz**, "Superconducting Josephson Junction FET-based Cryogenic Voltage Sense Amplifier," [80th Device Research Conference \(DRC\)](#), OH, USA, 2022.

- [C4] S. Alam, N. Amin, S. K. Gupta, and **A. Aziz**, "Monte Carlo Variation Analysis of NCFET-based 6-T SRAM: Design Opportunities and Trade-offs," *2021 Great Lakes Symposium on VLSI (GLSVLSI '21)*. Association for Computing Machinery, New York, NY, USA, 467–472.
- [C5] **A. Aziz** and K. Roy, "Insulator-Metal Transition Material Based Artificial Neurons: A Design Perspective," *21st International Symposium on Quality Electronic Design (ISQED)*, CA, USA, 2020.
- [C6] **A. Aziz**, R. Engel-Herbert, S. K. Gupta and N. Shukla, "A Three-Terminal Edge-Triggered Mott Switch", *76th Device Research Conference (DRC)*, Santa Barbara, CA, 2018, pp. 1-2.
- [C7] **A. Aziz**, N. Shukla, A. Seabaugh, S. Datta and S. Gupta, "Cockcroft-Walton Multiplier based on Unipolar Ag/HfO₂/Pt Threshold Switch", *76th Device Research Conference (DRC)*, Santa Barbara, CA, 2018.
- [C8] **A. Aziz**, E. T. Breyer, A. Chen, X. Chen, S. Datta, S. K. Gupta, M. Hoffmann, X. S. Hu, A. Lonescu, M. Jerry, T. Mikolajick, H. Mulaosmanovic, K. Ni, M. Niemier, I. O'Connor, A. Saha, S. Slesazeck, S. K. Thirumala and X. Yin, "Computing with ferroelectric FETs: Devices, models, systems, and applications", *2018 Design, Automation & Test in Europe Conference & Exhibition (DATE)*, Dresden, Germany, 2018, pp. 1289-1298.
- [C9] M. Jerry*, **A. Aziz***, K. Ni, S. Datta, S. K. Gupta and N. Shukla, "A Threshold Switch Augmented Hybrid-FeFET (H-FeFET) with Enhanced Read Distinguishability and Reduced Programming Voltage for Non-Volatile Memory Applications", *IEEE Symposium on VLSI Tech.*, HI, USA, 2018. [**Equal Contribution*]
- [C10] **A. Aziz**, N. Jao, S. Datta, V. Narayanan and S. K. Gupta, "A computationally efficient compact model for leakage in cross-point array", *2017 International Conference on Simulation of Semiconductor Processes and Devices (SISPAD)*, Kamakura, Japan, 2017, pp. 141-144.
- [C11] **A. Aziz** and S. K. Gupta, "Read-enhanced spin memories augmented by phase transition materials", *IEEE 60th Intl. Midwest Symp. on Circuits & Systems (MWSCAS)*, MA, USA, 2017, pp. 993-996.
- [C12] **A. Aziz**, X. Li, N. Shukla, S. Datta, M. F. Chang, V. Narayanan and S. K. Gupta, "Low power current sense amplifier based on phase transition material", *75th Annual Device Research Conference (DRC)*, South Bend, IN, USA, 2017.
- [C13] Z. Krivokapic, **A. Aziz**, D. Song, U. Rana, R. Galatage and S. Banna, "NCFET: Opportunities & challenges for advanced technology nodes," *2017 Fifth Berkeley Symposium on Energy Efficient Electronic Systems & Steep Transistors Workshop (E3S)*, Berkeley, CA, USA, 2017, pp. 1-3.
- [C14] Z. Krivokapic, U. Rana, R. Galatage, A. Razavieh, **A. Aziz**, J. Liu, J. Shi, H. J. Kim, R. Sporer, C. Serrao, A. Busquet, P. Polakowski, J. Muller, W. Kleemeier, A. Jacob, D. Brown, A. Knorr, R. Carter and S. Banna, "14nm Ferroelectric FinFET Technology with Steep Subthreshold Slope for Ultra Low Power Applications", *2017 IEEE Intl. Electron Devices Meeting (IEDM)*, CA, USA, 2017.
- [C15] P. Sharma, K. Tapily, A. K. Saha, J. Zhang, A. Shaughnessy, **A. Aziz**, G. Snider, S. Gupta, R. D. Clark and S. Datta, "Impact of total and partial dipole switching on the switching slope of gate-last negative capacitance FETs with ferroelectric hafnium zirconium oxide gate stack", *2017 Symposium on VLSI Technology*, Kyoto, Japan, 2017, pp. T154-T155.
- [C16] S. K. Gupta, D. Wang, S. George, **A. Aziz**, X. Li, S. Datta and V. Narayanan, "Harnessing Ferroelectrics for Non-volatile Memories and Logic", *International Symposium on Quality Electronic Design*, 2017, Santa Clara, CA, USA.
- [C17] S. George, **A. Aziz**, X. Li, M. S. Kim, J. Sampson, S. Datta, S. K. Gupta, V. Narayanan, "Device –Circuit Co Design of FEFET Based Logic for Low Voltage Processors", *IEEE Computer Society Annual Symposium on VLSI (ISVLSI)*, 2016, USA.

- [C18] **A. Aziz**, S. Ghosh, S. K. Gupta and S. Datta, "Polarization charge and coercive field dependent performance of negative capacitance FETs", [74th Annual Device Research Conference \(DRC\)](#), USA, 2016.
- [C19] J. Frougier, N. Shukla, D. Deng, M. Jerry, **A. Aziz**, L. Liu, G. Lavallee, T. S. Mayer, S. Gupta and S. Datta, "Phase-transition-FET Exhibiting Steep Switching Slope of 8mV/decade and 36% Enhanced ON Current", [2016 IEEE Symposium on VLSI Technology](#), Honolulu, HI, 2016. **Best Publication Award**
- [C20] N. Shukla, B. Grisafe, R. K. Ghosh, N. Jao, **A. Aziz**, J. Frougier, M. Jerry, S. Sonde, S. Rouvimov, T. Orlova, S. Gupta and S. Datta, "Ag/HfO₂ based Threshold Switch with Extreme Non-Linearity for Unipolar Cross-Point Memory and Steep-slope Phase-FETs", [2016 IEEE International Electron Devices Meeting \(IEDM\)](#), San Francisco, CA, 2016, pp. 34.6.1-34.6.4.
- [C21] S. k Gupta, **A. Aziz**, N. Shukla and S. Datta, et al, "On the Potential of Correlated Materials in the Design of Spin-based Cross-point Memories (Invited)", [IEEE International Symposium on Circuits and Systems \(ISCAS\)](#), 2016, Montreal, Canada.
- [C22] X. Yin, **A. Aziz**, J. Nahas, S. Datta, S. Gupta, M. Niemier, and X. S. Hu, "Exploiting ferroelectric FETs for low-power non-volatile logic-in-memory circuits," [2016 IEEE/ACM International Conference on Computer-Aided Design \(ICCAD\)](#), Austin, TX, USA, 2016.
- [C23] S. George, K. Ma, **A. Aziz**, X. Li, A. Khan, S. Salahuddin, M. F. Chang, S. Datta, J. Sampson, S. Gupta and V. Narayanan, "Nonvolatile Memory Design Based on Ferroelectric FETs", [2016 53rd ACM/EDAC/IEEE Design Automation Conference \(DAC\)](#), Austin, TX, 2016, pp. 1-6.
- [C24] D. Wang, S. George, **A. Aziz**, S. Datta, V. Narayanan and S. K. Gupta, "Ferroelectric Transistor Based Non-Volatile Flip-Flop", [International Symposium on Low Power Electronics and Design \(ISLPED\)](#), San Francisco, USA, 2016.
- [C25] **A. Aziz**, N. Shukla, S. Datta and S. K. Gupta, "Implication of hysteretic selector device on the biasing scheme of a cross-point memory array", [2015 International Conference on Simulation of Semiconductor Processes and Devices \(SISPAD\)](#), Washington, DC, 2015, pp. 425-428.
- [C26] **A. Aziz**, N. Shukla, S. Datta and S. K. Gupta, "COAST: Correlated material assisted STT MRAMs for optimized read operation", [Intl. Symposium on Low Power Electronics and Design \(ISLPED\)](#), Italy, 2015.
- [C27] **A. Aziz**, N. Shukla, S. Datta and S. K. Gupta, "Read optimized MRAM with separate read-write paths based on concerted operation of magnetic tunnel junction with correlated material," [73rd Annual Device Research Conference \(DRC\)](#), Columbus, OH, 2015, pp. 43-44.
- [C28] **A. Aziz**, W. Cane-Wissing, M. S. Kim, S. Datta, V. Narayanan and S. K. Gupta, "Single-Ended and Differential MRAMs Based on Spin Hall Effect: A Layout-Aware Design Perspective," [2015 IEEE Computer Society Annual Symposium on VLSI \(ISVLSI\)](#), Montpellier, 2015, pp. 333-338.
- [C29] M. Rahman, M. Uddin, **A. Aziz**, T. Mustofa, Z. H. Mahmood, T. Soga and S. M. Mominuzzaman, "Characterization of electrodeposited multiwall carbon nanotube films on silicon substrates," [8th International Conference on Electrical and Computer Engineering](#), Dhaka, 2014, pp. 373-376.
- [C30] M. W. Rahman, M. S. Hossain, **A. Aziz** and F. M. Mohammedy, "Prospect of decentralized hybrid power generation in Bangladesh using biomass, solar PV & wind," [3rd International Conference on the Developments in Renewable Energy Technology \(ICDRET\)](#), Dhaka, 2014, pp. 1-6.
- [C31] M. Hossain, S. Khan, **A. Aziz** and M. W. Rahman, "Effect of temperature on ballistic transport of cylindrical (10, 0) CNTFET," [2013 IEEE International Conference of Electron Devices and Solid-state Circuits](#), Hong Kong, 2013, pp. 1-2.

- [C32] M. S. Hossain, A. M. Kabir, P. Mazumder, **A. Aziz**, M. Hassan and M. Z. Baten, "Long distance appliance control using mobile Short Messaging Service and internet in parallel," [2012 International Conference on Informatics, Electronics & Vision \(ICIEV\)](#), Dhaka, 2012, pp. 281-285.
- [C33] M. Shafayat Hossain, Mohammad Wahidur Rahman, **A. Aziz** and F. M. Mohammedy, "Prospect of biogas & biomass as potential sources of renewable energy in Bangladesh," [2012 International Conference on Informatics, Electronics & Vision \(ICIEV\)](#), Dhaka, 2012, pp. 1101-1106.
- [C34] M. S. Hossain, A. M. Kabir, P. Mazumder, **A. Aziz**, M. Hassan, M. A. Islam and P. K. Saha, "Design and Development of an Y4 Copter Control System," [2012 UKSim 14th International Conference on Computer Modelling and Simulation](#), Cambridge, UK, 2012, pp. 251-256.
- [C35] **A. Aziz** and M. S. Hossain, "Inherent Inter-vehicle Signaling Using Radio Frequency and Infra-red Communication", [2012 UKSim 14th International Conference on Computer Modelling and Simulation](#), Cambridge, UK, 2012, pp. 211-215.

Contributed Talks & Presentations

- [2022] **NSF IUCRC (Industry–University Cooperative Research Centers)**, Florida Intl. University, USA.
Title: *Physics-Informed ML-based Compact Modeling of 2D Van der Waals Devices for 5G/6G Applications.*
- [2021] **2021 Great Lakes Symposium on VLSI (GLSVLSI '21)**, Virtual Conference, USA.
Title: *Monte Carlo Variation Analysis of NCFET-based 6-T SRAM: Design Opportunities and Trade-offs.*
- [2020] **21st International Symposium on Quality Electronic Design (ISQED)**, Santa Clara, CA, USA.
Title: *Insulator-Metal Transition Material Based Artificial Neurons: A Design Perspective.*
- [2019] **Design Automation Conference (DAC) - Ph.D. Forum**, Las Vegas, NV, USA.
Title: *Device-Circuit Co-design Employing Phase Transition Materials for Low Power Applications*
- [2019] **Design, Automation and Test in Europe (DATE) Conference- Ph.D. Forum**, Florence, Italy.
Title: *Device-Circuit Co-design Employing Phase Transition Materials for Low Power Applications*
- [2019] **SRC nCORE (Nanoelectronic Computing Research) Review**, University of Notre Dame, IN, USA.
Title: *Modeling and Benchmarking of TMD FETs and RRAMs.*
- [2018] **76th Device Research Conference (DRC)**, University of California, Santa Barbara, CA, USA.
Title: *A Three Terminal Edge-Triggered Mott Switch.*
- [2018] **Student Research Symposium**, Purdue University, IN, USA.
Title: *Harnessing Unipolar Threshold Switches for Enhanced Rectification.*
- [2018] **76th Device Research Conference (DRC)**, University of California, Santa Barbara, CA, USA.
Title: *Cockcroft-Walton Multiplier based on Unipolar Ag/HfO₂/Pt Threshold Switch.*
- [2017] **75th Device Research Conference (DRC)**, University of Notre Dame, IN, USA.
Title: *Low Power Current Sense Amplifier Based on Phase Transition Material.*
- [2017] **GLOBALFOUNDRIES Capstone Event, Fab8**, Malta, NY, USA.
Title: *NCFET for Ultra Low Power Applications: Device-Circuit Co-design Perspective.*
- [2017] **SRC (Semiconductor Research Corporation) TECHCON**, Austin, TX, USA.
Title: *Exploiting Phase Transition Materials for Power- & Area-efficient Sense Amplifier.*
- [2017] **Intl. Conf. on Simulation of Semiconductor Processes & Devices (SISPAD)**, Kamakura, Japan.
Title: *A Computationally Efficient Compact Model for Leakage in Cross-point Array.*
- [2017] **SRC (Semiconductor Research Corporation) TECHCON**, Austin, TX, USA.

- Title: *Exploiting Phase Transition Materials for Power- & Area-efficient Sense Amplifier.*
- [2017] **60th Intl. Midwest Symp. on Circuits and Systems (MWSCAS)**, Boston, MA, USA.
Title: *Read-Enhanced Spin Memories Augmented by Phase Transition Materials.*
- [2016] **Intl. Symposium on Low Power Electronics and Design (ISLPED)**, San Francisco, CA, USA.
Title: *Ferroelectric Transistor Based Non-Volatile Flip-Flop.*
- [2016] **75th Device Research Conference (DRC)**, University of Delaware, DE, USA.
Title: *Polarization Charge and Coercive Field Dependent Performance of Negative Capacitance FETs.*
- [2016] **SRC GRC (Global Research Collaboration) Annual Review**, West Lafayette, IN, USA.
Title: *Physics-Based Circuit-Compatible SPICE Model for Ferroelectric Transistors.*
- [2016] **SRC LEAST (Low Energy System Technology) Annual Review**, West Lafayette, IN, USA.
Title: *Phase Transition Material Based Selector Design for Cross-point memories.*
- [2015] **74th Device Research Conference (DRC)**, Ohio State University, OH, USA.
Title: *Read Optimized MRAM with Separate Read-Write Paths based on Concerted Operation of Magnetic Tunnel Junction with Correlated Material.*
- [2015] **NSF IUCRC (Industry–University Cooperative Research Centers)**, University of Virginia, USA.
Title: *Correlated Material Enhanced Non-Volatile Memories.*

Invited Talks

- [2020] **AIRES Workshop**, Oak Ridge National Lab (ORNL), TN, USA.
Title: *Reliability Concerns in Emerging Neuromorphic Hardware.*
- [2020] **IEEE Young Professionals Webinar**, Virtual Talk.
Title: *Emerging Nanoelectronics: Opportunities & Challenges.*
- [2020] **Center for Global Engagement: Faculty Lecture**, UT Knoxville, TN, USA
Title: *Beautiful Bangladesh.*
- [2020] **University of Tennessee - Haslam Scholars Program**, UT Knoxville, TN, USA
Title: *Emerging Nanoelectronics: Challenges & Opportunities.*
- [2019] **University of Virginia**, Charlottesville, VA, USA.
Title: *Energy-Efficient Devices & Circuits Augmented by Phase Transition Materials for Next-gen Electronics.*
- [2019] **IEEE Electron Device/Solid State Circuit Society**, Dhaka, Bangladesh
Title: *Device-Circuit Co-Design for Exploratory Nanoelectronics.*
- [2019] **Idaho State University**, Pocatello, ID, USA
Title: *Energy-efficient Devices & Circuits Augmented by Phase Transition Materials.*
- [2019] **Oklahoma State University**, Stillwater, OK, USA.
Title: *Energy-efficient Devices & Circuits Augmented by Phase Transition Materials.*

Teaching/Mentoring Experience

- **Primary Instructor**

[Spring 2022]	ECE 433/533	Introduction to VLSI Systems	UT Knoxville
[Fall 2021]	ECE 651	CAD of VLSI Systems	UT Knoxville
[Spring 2021]	ECE 433/533	Introduction to VLSI Systems	UT Knoxville
[Fall 2020]	ECE 335	Electronic Devices	UT Knoxville

[Spring 2020]	ECE 433/533	Intro to VLSI/ Advanced MOS Concepts	UT Knoxville
[Fall 2019]	ECE 651	CAD of VLSI Systems	UT Knoxville

- **Guest Lectures**

[Fall 2021]	COSC/ECE 395	Junior Seminar	UT Knoxville
[Fall 2021]	ECE 531	Adv. Semiconductor Devices	UT Knoxville
[Spring 2021]	COSC/ECE 395	Junior Seminar	UT Knoxville
[Fall 2020]	COSC/ECE 395	Junior Seminar	UT Knoxville
[Fall 2018]	ECE 55900	MOS VLSI Design	Purdue Univ.
[Fall 2019]	ECE 651	Digital Integrated Circuits	Penn State Univ.

- **Supervision**

Graduate Students:

- Shamiul Alam [PhD student], Dept. of EECS, UT Knoxville
- Md Mazharul Islam [PhD student], Dept. of EECS, UT Knoxville
- Rahat Islam Uday [PhD student], Dept. of EECS, UT Knoxville [will start in Fall '22]
- Jack Hutchins [MS student], Dept. of EECS, UT Knoxville [will start in Fall '22]

Undergraduate Students:

- Jack Hutchins, Dept. of EECS, UT Knoxville [Summer '20 - present]
- Dawson Smith, Dept. of EECS, UT Knoxville [Summer '21 - present]
- Riya Patel, Dept. of EECS, UT Knoxville [Spring '22 - present]
- Joshua Patrick Gallardo, Dept. of EECS, UT Knoxville [Summer '20 - present]
- Karan Pankaj Patel, Dept. of EECS, UT Knoxville [Fall '20 – Spring '21]
- William Mitchell Hunter, Dept. of EECS, UT Knoxville [Fall '20 – Spring '21]

- **M.S./Ph.D. Committee Membership**

- Shaghayegh Aslanzadeh, *Ph.D.*, [Advisor: Dr. Nicole McFarlane]
- Md Musabbir Adnan, *Ph.D.*, [Advisor: Dr. Garrett Rose]
- Ryan J. Weiss, *Ph.D.*, [Advisor: Dr. Garrett Rose]
- Su-Ann Chong, *M.S.*, [Advisor: Dr. Nicole McFarlane]

Professional Activities, Leadership & Services

Grant Reviewer ▪ **DOE Panel review:** 2022 Department of Energy (DOE) SBIR/STTR (Phase I), Advanced Scientific Computing Research (ASCR) program office

Journal Reviewer ▪ **IEEE:** Electron Device Letters (EDL) | Transactions on Very Large Scale Integration Systems (TVLSI) | Transactions on Circuits and Systems-I (TCAS-I) | Transactions on Electron Devices (TED) | Transactions on Nanotechnology (TNANO) | Transactions on Computer-Aided Design of ICs & Systems (TCAD) | Access | Journal on Exploratory Solid-State Comp. Devices & Circuits (JxCDC) | Journal of the Electron Devices Society (JEDS)

▪ **AIP Publishing:** Journal of Applied Physics (JAP)

	<ul style="list-style-type: none"> ▪ Springer Nature: Journal of Computational Electronics (JCE) Journal of Materials Research (JCE) ▪ Elsevier: International Journal of Electronics & Communications ▪ MDPI: Technologies Electronics Sensors ▪ Frontiers: Frontiers in Neuroscience Frontiers in Nanotechnology ▪ IOP Science: Physica Scripta
Guest Editor	<ul style="list-style-type: none"> ▪ Frontiers in Neuroscience Nanotechnology (Frontiers) [2021- present] Topic: <i>Ferroelectric Devices and Circuits for Neuromorphic Computing</i> ▪ Micromachines (MDPI) [2021 - present] Special Issue: <i>Non-Volatile Memory Tech. for Neuromorphic Computing</i> ▪ Photonics (MDPI) [2020 - 2021] Special Issue: <i>Emerging Photonic Devices, Circuits & Systems</i>
Conference Reviewer & TPC Member	<ul style="list-style-type: none"> ▪ Design Automation Conference (DAC), 2021, 2022 ▪ IEEE International Symposium on Quality Electronic Design (ISQED), 2022 ▪ International Symposium on Quantum Computing (QC-CSAA), 2022 ▪ Great Lakes Symposium on VLSI (GLSVLSI), 2022 ▪ 35th International Conference on VLSI Design (VLSID), 2022 ▪ International Conference on Machine Learning, Control, and Robotics, 2022 ▪ IEEE International Symposium on Circuits and Systems (ISCAS), 2021, 2022 ▪ IEEE Intl. Conference on AI Circuits & Systems (AICAS), 2021, 2022 ▪ IEEE International Conference on Nanotechnology (NANO), 2021, 2022 ▪ International Conference on Neuromorphic Systems (ICONS), 2020, 2021, 2022 ▪ ASEE Annual Conference & Exposition, 2021 ▪ Intl. Conference on Electrical and Computer Engineering (ICECE), 2020 ▪ IEEE Intl. WIE Conference on ECE (WIECON-ECE), 2020 ▪ IEEE Region 10 Symposium (TENSYPMP), 2020
Session Chair	<ul style="list-style-type: none"> ▪ 58th Design Automation Conference (DAC) – [2021] <i>Session Title: An Approximate World from Neurons to Genomes</i> ▪ 21st International Symposium on Quality Electronic Design (ISQED) – [2020] <i>Session Title: Energy Efficient Designs for Future Computing</i>
Professional Membership	<ul style="list-style-type: none"> ▪ Institute of Electrical and Electronics Engineers (IEEE) <ul style="list-style-type: none"> • IEEE Electron Device Society • IEEE Nanotechnology Council • IEEE Solid-State Circuits Society • IEEE Council on Electronic Design Automation ▪ Intel Neuromorphic Research Community (INRC) ▪ American Association for the Advancement of Science (AAAS) ▪ American Society for Engineering Education (ASEE)
Leadership	<ul style="list-style-type: none"> ▪ Regional Lead Ambassador (R4), <i>IEEEExtreme '19 Programming Competition</i>

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- Team Lead, CNSER Project Exhibition, 2013
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- Other Services**
- Member of the [*Nanoelectronics and Gigascale Systems Technical Committee \(NanoGiga TC\)*](#), IEEE Circuits and Systems Society (2020-present)
 - Faculty Judge, [*Exhibition of Undergraduate Research and Creative Achievement \(EURēCA\)*](#), University of Tennessee Knoxville, 2021, 2022
 - Member of the Center for Global Engagement (CGE) [*Campus Partners Committee*](#), University of Tennessee Knoxville, 2021-2022
 - Advisor, [*Bangladeshi Students Association \(BSA\)*](#), University of Tennessee, Knoxville, 2019 - Present
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