

Abhronil Sengupta

Research Interests

The ultimate goal of my research is to bridge the gap between *Nanoelectronics*, *Neuroscience* and *Machine Learning*. I am pursuing a multi-disciplinary research agenda at the intersection of hardware and software across the stack of sensors, devices, circuits, systems and algorithms for providing an end-to-end solution to enable low-power event-driven cognitive intelligence.

Education

- Fall **PhD**, *Electrical and Computer Engineering*, **Purdue University**, USA.
2013-Summer *Advisor*: Prof. Kaushik Roy
2018 *Thesis Title*: Efficient Neuromorphic Computing Enabled by Spin-Transfer Torque: Devices, Circuits and Systems
2009–2013 **B.E.**, *Electronics & Telecommunication Engineering*, **Jadavpur University**, India.

Experience

- July **Joseph R. and Janice M. Monkowski Career Development Professorship**, *School of Electrical Engineering and Computer Science*, **Penn State University**, USA.
2022-Present
Fall **Assistant Professor**, *School of Electrical Engineering and Computer Science*, **Penn State University**, USA.
2018-Present
Graduate Faculty, *Department of Materials Science and Engineering*, **Penn State University**, USA.
Summer 2017 **Graduate Research Intern**, *Facebook Reality Labs*, **Facebook Research**, USA.
Summer 2016 **Graduate Research Intern**, *Circuit Research Lab*, **Intel Labs**, USA.
Summer 2012 **Undergraduate Intern**, *Knowledge Technology Research Group*, **University of Hamburg**, Germany.

Awards & Honors

- 2024 Army Research Office (ARO) Early Career Award
2023 National Science Foundation (NSF) CAREER Award
2023 IEEE Electron Devices Society (EDS) Early Career Award for contributions in the field of Neuromorphic Computing and AI Hardware
2022 Joseph R. and Janice M. Monkowski Early Career Professorship from Penn State University
2019 IEEE Circuits and Systems (CAS) Society Outstanding Young Author Award
2018 Facebook Faculty Award
2018 Best Paper Award at the 2018 IEEE Workshop on Signal Processing Systems (SiPS)
2017 Selected as the Schmidt Science Fellows Award nominee from Purdue University
2017 Bilsland Dissertation Fellowship from Purdue University
2015 Student Presenter Award for Workshop Presentation on "Spintronic Devices for Non-Boolean Logic" at SRC Center for Spintronic Materials, Interfaces, and Novel Architectures (C-SPIN)
2013 Michael and Katherine Birck Fellowship from Purdue University for pursuing doctoral studies
2013 T.P. Saha Memorial Gold Medal, D.Mukhopadhyay Memorial and S.Deb Memorial Gold Medals from Jadavpur University for scholarly achievements
2012 Awarded the prestigious WISE (Working Internships in Science and Engineering) Fellowship by the DAAD (German Academic Exchange Service)

Journal Papers

- [J55] Sen Lu, **Abhronil Sengupta**, "Deep Unsupervised Learning Using Spike-Timing-Dependent Plasticity", Neuromorphic Computing and Engineering, In Press.
- [J54] Bibhas Manna, Arnob Saha, Zhouhang Jiang, Kai Ni, **Abhronil Sengupta**, "Variation-Resilient FeFET-Based In-Memory Computing Leveraging Probabilistic Deep Learning", IEEE Transactions on Electron Devices, In Press.
- [J53] A. N. M. Nafiul Islam, Kezhou Yang, Amit K. Shukla, Pravin Khanal, Bowei Zhou, Wei-Gang Wang, **Abhronil Sengupta**, "Hardware in Loop Learning with Spin Stochastic Neurons", Advanced Intelligent Systems, In Press.
- [J52] Tao Zhang, Mingjie Hu, Md Zesun Ahmed Mia, Hao Zhang, Wei Mao, Katsuyuki Fukutani, Hiroyuki Matsuzaki, Lingzhi Wen, Cong Wang, Hongbo Zhao, Xuegang Chen, Yakun Yuan, Fanqi Meng, Ke Yang, Lili Zhang, Juan Wang, Aiguo Li, Weiwei Zhao, Shiming Lei, Jikun Chen, Pu Yu, **Abhronil Sengupta**, Hai-Tian Zhang, "Self-sensitizable neuromorphic device based on adaptive hydrogen gradient", Matter, In Press.
- [J51] Tae Joon Park, Sunbin Deng, Sukriti Manna, A. N. M. Nafiul Islam, Haoming Yu, Yifan Yuan, Dillon D Fong, Alexander A Chubykin, **Abhronil Sengupta**, Subramanian KRS Sankaranarayanan, Shriram Ramanathan, "Complex oxides for brain-inspired computing: A review", Advanced Materials, Vol. 35, Iss. 37, pp. 2203352, 2023.
- [J50] Sunbin Deng, Tae Joon Park, Haoming Yu, Arnob Saha, A. N. M. Nafiul Islam, Qi Wang, **Abhronil Sengupta**, Shriram Ramanathan, "Hydrogenated VO_2 Bits for Probabilistic Computing", IEEE Electron Device Letters, Vol. 44, Iss. 10, pp. 1776-1779, 2023.
- [J49] A. N. M. Nafiul Islam, Arnob Saha, Zhouhang Jiang, Kai Ni, **Abhronil Sengupta**, "Hybrid stochastic synapses enabled by scaled ferroelectric field-effect transistors", Applied Physics Letters, Vol. 122, Iss. 12, pp. 123701, 2023.
- [J48] Sunbin Deng, Haoming Yu, Tae Joon Park, A. N. M. Nafiul Islam, Sukriti Manna, Alexandre Pofelski, Qi Wang, Yimei Zhu, Subramanian K. R. S. Sankaranarayanan, **Abhronil Sengupta**, Shriram Ramanathan, "Selective area doping for Mott neuromorphic electronics", Science Advances, Vol. 9, Iss. 11, pp. 1-9, 2023.
- [J47] Kezhou Yang, **Abhronil Sengupta**, "Leveraging Voltage-Controlled Magnetic Anisotropy to Solve Sneak Path Issues in Crossbar Arrays", IEEE Transactions on Electron Devices, Vol. 70, Iss. 4, pp. 2021 - 2027, 2023.
- [J46] Kezhou Yang, Dhuruva Priyan G M, **Abhronil Sengupta**, "Leveraging Probabilistic Switching in Superparamagnets for Temporal Information Encoding in Neuromorphic Systems", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, Vol. 42, Iss. 10, pp. 3464-3468, 2023.
- [J45] Nitin Rathi, Indranil Chakraborty, Adarsh Kosta, **Abhronil Sengupta**, Aayush Ankit, Priyadarshini Panda, Kaushik Roy, "Exploring Neuromorphic Computing Based on Spiking Neural Networks: Algorithms to Hardware", ACM Computing Surveys, Vol. 55, Iss. 12, No. 243, pp. 1-49, 2023.
- [J44] Sandip Mondal, Zhen Zhang, A. N. M. Nafiul Islam, Robert Andrawis, Sampath Gamage, Neda Alsadat Aghamiri, Qi Wang, Hua Zhou, Fanny Rodolakis, Richard Tran, Jasleen Kaur, Chi Chen, Shyue Ping Ong, **Abhronil Sengupta**, Yohannes Abate, Kaushik Roy, Shriram Ramanathan, "All-Electric Nonassociative Learning in Nickel Oxide", Advanced Intelligent Systems, Vol. 4, Iss. 10, No. 2200069, 2022. (Featured in **Advanced Science News**)
- [J43] Chengyang Zhang, Ravindra Singh Bisht, Amin Nozariasbmarz, Arnob Saha, Chan Su Han, Qi Wang, Yifan Yuan, **Abhronil Sengupta**, Shashank Priya, Shriram Ramanathan, "Synthesis and electrical behavior of VO_2 thin films grown on $SrRuO_3$ electrode layers ", Journal of Vacuum Science and Technology A, Vol. 40, Iss. 4, pp. 043405, 2022.
- [J42] Haoming Yu, A. N. M. Nafiul Islam, Sandip Mondal, **Abhronil Sengupta**, Shriram Ramanathan, "Switching Dynamics in Vanadium Dioxide-Based Stochastic Thermal Neurons ", IEEE Transactions on Electron Devices, Vol. 69, Iss. 6, pp. 3135 - 3141, 2022.
- [J41] Sen Lu, **Abhronil Sengupta**, "Neuroevolution Guided Hybrid Spiking Neural Network Training", Frontiers in Neuroscience, Vol. 16, No. 838523, 2022.

- [J40] Hai-Tian Zhang*, Tae Joon Park*, A. N. M. Nafiul Islam*, Dat S. J. Tran*, Sukriti Manna*, Qi Wang, Sandip Mondal, Haoming Yu, Suvo Banik, Shaobo Cheng, Hua Zhou, Sampath Gamage, Sayantan Mahapatra, Yimei Zhu, Yohannes Abate, Nan Jiang, Subramanian K. R. S. Sankaranarayanan, **Abhronil Sengupta**, Christof Teuscher, Shriram Ramanathan, "*Reconfigurable perovskite nickelate electronics for artificial intelligence*", *Science*, Vol. 375, Iss. 6580, pp. 533-539, 2022. (Featured in **News & Views of Nature Materials, IEEE Spectrum**, * denotes equal first author contribution)
- [J39] Wilson Yanez, Yongxi Ou, Run Xiao, Jahyun Koo, Jacob T. Held, Supriya Ghosh, Jeffrey Rable, Timothy Pillsbury, Enrique Gonzalez Delgado, Kezhou Yang, Juan Chamorro, Alexander J. Grutter, Patrick Quarterman, Anthony Richardella, **Abhronil Sengupta**, Tyrel McQueen, Julie A. Borchers, K. Andre Mkhoyan, Binghai Yan, and Nitin Samarth, "*Spin and charge interconversion in Dirac semimetal thin films*", *Physical Review Applied*, Vol. 16, Iss. 5, pp. 054031, 2021. (**Editor's Suggestion**)
- [J38] Umang Garg, Kezhou Yang, **Abhronil Sengupta**, "*Emulation of Astrocyte Induced Neural Phase Synchrony in Spin-Orbit Torque Oscillator Neurons*", *Frontiers in Neuroscience*, Vol. 15, No. 699632, 2021.
- [J37] Arnob Saha*, A. N. M. Nafiul Islam*, Zijian Zhao, Shan Deng, Kai Ni, **Abhronil Sengupta**, "*Intrinsic synaptic plasticity of ferroelectric field effect transistors for online learning*", *Applied Physics Letters*, Vol. 119, Iss. 13, pp. 133701, 2021. (**DOE EFRC 3DFeM Highlight**, * denotes equal first author contribution)
- [J36] Mehul Rastogi, Sen Lu, Nafiul Islam, **Abhronil Sengupta**, "*On the Self-Repair Role of Astrocytes in STDP Enabled Unsupervised SNNs*", *Frontiers in Neuroscience*, Vol. 14, No. 603796, 2021.
- [J35] Kaveri Mahapatra, Sen Lu, **Abhronil Sengupta**, Nilanjan Ray Chaudhuri, "*Power System Disturbance Classification with Online Event-Driven Neuromorphic Computing*", *IEEE Transactions on Smart Grid*, Vol. 12, Iss. 3, pp. 2343 - 2354, 2021.
- [J34] Shubham Jain, **Abhronil Sengupta**, Kaushik Roy, Anand Raghunathan, "*RxNN: A Framework for Evaluating Deep Neural Networks on Resistive Crossbars*", *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, Vol. 40, Iss. 2, 2021.
- [J33] Sen Lu, **Abhronil Sengupta**, "*Exploring the Connection Between Binary and Spiking Neural Networks*", *Frontiers in Neuroscience*, Vol. 14, No. 535, 2020.
- [J32] Kezhou Yang, Akul Malhotra, Sen Lu, **Abhronil Sengupta**, "*All-Spin Bayesian Neural Networks*", *IEEE Transactions on Electron Devices*, Vol. 67, Iss. 3, pp. 1340 - 1347, 2020.
- [J31] Kezhou Yang, **Abhronil Sengupta**, "*Stochastic magnetoelectric neuron for temporal information encoding*", *Applied Physics Letters*, Vol. 116, Iss. 4, pp. 043701, 2020.
- [J30] Akul Malhotra, Sen Lu, Kezhou Yang, **Abhronil Sengupta**, "*Exploiting Oxide Based Resistive RAM Variability for Bayesian Neural Network Hardware Design*", *IEEE Transactions on Nanotechnology*, Vol. 19, pp. 328 - 331, 2020.
- [J29] Aayush Ankit, Timur Ibrayev, **Abhronil Sengupta**, Kaushik Roy, "*TraNNsformer: Clustered Pruning on Crossbar-based Architectures for Energy Efficient Neural Networks*", *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, Vol. 39, Iss. 10, pp. 2361 - 2374, 2020.
- [J28] Amogh Agrawal, Indranil Chakraborty, Deboleena Roy, Utkarsh Saxena, Saima Sharmin, Yong Shim, Gopalakrishnan Srinivasan, Chamika Liyanagedera, **Abhronil Sengupta**, Kaushik Roy, "*Revisiting Stochastic Computing in the Era of Nano-scale Non-volatile Technologies*", *IEEE Transactions on Very Large Scale Integration Systems*, Vol. 28, Iss. 12, pp. 2481 - 2494, 2020. (**Invited Keynote Paper**)
- [J27] **Abhronil Sengupta**, Yuting Ye, Robert Wang, Chiao Liu, Kaushik Roy, "*Going Deeper in Spiking Neural Networks: VGG and Residual Architectures*", *Frontiers in Neuroscience*, Vol. 13, No. 95, 2019. (**One of the Top 3 Cited Articles in Frontiers in Neuroscience (Neuromorphic Engineering section)**)
- [J26] **Abhronil Sengupta**, Kaushik Roy, "*Neuromorphic computing enabled by physics of electron spins: Prospects and perspectives*", *Applied Physics Express*, Vol. 11, Iss. 3, 2018. (**Invited by The Japan Society of Applied Physics to be the inaugural review article published by Applied Physics Express to celebrate its 10th anniversary**)
- [J25] Yong Shim, **Abhronil Sengupta**, Kaushik Roy, "*Biased Random-Walk Using Stochastic Switching of Nano-magnets: Application to SAT Solver*", *IEEE Transactions on Electron Devices*, Vol. 65, No. 4, pp. 1617-1624, 2018.
- [J24] Kaushik Roy, **Abhronil Sengupta**, Yong Shim, "*Perspective: Stochastic magnetic devices for cognitive computing*", *Journal of Applied Physics*, Vol. 123, pp. 210901, 2018. (**Invited Perspective Article**)
- [J23] Mei-Chin Chen, **Abhronil Sengupta**, Kaushik Roy, "*Magnetic Skyrmion as a Spintronic Deep Learning Spiking Neuron Processor*", *IEEE Transactions on Magnetics*, Vol. 54, No. 8, pp. 1500207, 2018.

- [J22] Parami Wijesinghe, Aayush Ankit, **Abhronil Sengupta**, Kaushik Roy, "An All-Memristor Deep Spiking Neural System: A Step Towards Realizing the Low Power, Stochastic Brain", IEEE Transactions on Emerging Topics in Computational Intelligence, Vol. 2, No. 5, pp. 345-358, 2018. **(One of the Top 5 Popular Articles in IEEE TETCI and highlighted as an Open Access selected Paper)**
- [J21] Indranil Chakraborty, Gobinda Saha, **Abhronil Sengupta**, Kaushik Roy, "Toward Fast Neural Computing using All-Photonic Phase Change Spiking Neurons", Scientific Reports, Vol. 8, pp. 12980, 2018.
- [J20] **Abhronil Sengupta**, Chamika Mihiranga Liyanagedera, Byunghoo Jung, Kaushik Roy, "Magnetic Tunnel Junction as an On-Chip Temperature Sensor", Scientific Reports, Vol. 7, pp. 11764, 2017.
- [J19] **Abhronil Sengupta**, Kaushik Roy, "Encoding Neural and Synaptic Functionalities in Electron Spin: A Pathway to Efficient Neuromorphic Computing", Applied Physics Reviews, Vol. 4, Iss. 4, 2017. **(Featured in the journal's top 6 Must Read Papers in Spintronics)**
- [J18] Priyadarshini Panda, **Abhronil Sengupta**, Kaushik Roy, "Energy-efficient object detection using semantic decomposition", IEEE Transactions on Very Large Scale Integration (VLSI) Systems, Vol. 25, No. 9, pp. 2673-2677, 2017.
- [J17] Priyadarshini Panda, **Abhronil Sengupta**, Kaushik Roy, "Energy-Efficient and Improved Image Recognition with Conditional Deep Learning", ACM Journal on Emerging Technologies in Computing Systems, Vol. 13, No. 3, pp. 33, 2017.
- [J16] Chamika Mihiranga Liyanagedera, **Abhronil Sengupta**, Akhilesh Jaiswal, Kaushik Roy, "Stochastic Spiking Neural Networks Enabled by Magnetic Tunnel Junctions: From Nontelegraphic to Telegraphic Switching Regimes", Physical Review Applied, Vol. 8, Iss. 6, pp. 064017, 2017.
- [J15] Bing Han, Aayush Ankit, **Abhronil Sengupta**, Kaushik Roy, "Cross-Layer Design Exploration for Energy-Quality Tradeoffs in Spiking and Non-Spiking Deep Artificial Neural Networks", IEEE Transactions on Multi-Scale Computing Systems, Vol. 4, Iss. 4, pp. 613 - 623, 2018.
- [J14] Yong Shim, Shuhan Chen, **Abhronil Sengupta**, Kaushik Roy, "Stochastic Spin-Orbit Torque Devices as Elements for Bayesian Inference", Scientific Reports, Vol. 7, pp. 14101, 2017.
- [J13] **Abhronil Sengupta**, Yong Shim, Kaushik Roy, "Proposal for an All-Spin Artificial Neural Network: Emulating Neural and Synaptic Functionalities Through Domain Wall Motion in Ferromagnets", IEEE Transactions on Biomedical Circuits and Systems, Vol. 10, No. 6, pp. 1152-1160, 2016.
- [J12] **Abhronil Sengupta**, Kaushik Roy, "Short-Term Plasticity and Long-Term Potentiation in Magnetic Tunnel Junctions: Towards Volatile Synapses", Physical Review Applied, Vol. 5, Iss. 2, pp. 024012, 2016.
- [J11] **Abhronil Sengupta**, Priyadarshini Panda, Parami Wijesinghe, Yusung Kim, Kaushik Roy, "Magnetic Tunnel Junction Mimics Stochastic Cortical Spiking Neurons", Scientific Reports, Vol. 6, pp. 30039, 2016.
- [J10] **Abhronil Sengupta**, Maryam Parsa, Bing Han, Kaushik Roy, "Probabilistic Deep Spiking Neural Systems Enabled by Magnetic Tunnel Junction", IEEE Transactions on Electron Devices, Vol. 63, No. 7, pp. 2963-2970, 2016.
- [J9] **Abhronil Sengupta**, Kaushik Roy, "A Vision for All-Spin Neural Networks: A Device to System Perspective", IEEE Transactions on Circuits and Systems I: Regular Papers, Vol. 63, No. 12, pp. 2267-2277, 2016. **(One of the Top 5 Popular Articles in IEEE TCAS)**
- [J8] **Abhronil Sengupta**, Aparajita Banerjee, Kaushik Roy, "Hybrid Spintronic-CMOS Spiking Neural Network With On-Chip Learning: Devices, Circuits and Systems", Physical Review Applied, Vol. 6, Iss. 6, pp. 064003, 2016. **(Featured in MIT Technology Review, DoD Research and Engineering Enterprise Science & Technology News Bulletin, DoD Science and Technology In-Depth Focus Topic: Spintronics)**
- [J7] Zubair Al Azim, **Abhronil Sengupta**, Syed Sarwar, Kaushik Roy, "Spin-Torque Sensors for Energy Efficient High Speed Long Interconnects", IEEE Transactions on Electron Devices, Vol. 63, No. 2, pp. 800-808, 2016.
- [J6] Gopalakrishnan Srinivasan, **Abhronil Sengupta**, Kaushik Roy, "Magnetic Tunnel Junction Based Long-Term Short-Term Stochastic Synapse for a Spiking Neural Network with On-Chip STDP Learning", Scientific Reports, Vol. 6, pp. 29545, 2016.
- [J5] Deliang Fan, Mrigank Sharad, **Abhronil Sengupta**, Kaushik Roy, "Hierarchical Temporal Memory Based on Spin-Neurons and Resistive Memory for Energy-Efficient Brain-Inspired Computing", IEEE Transactions on Neural Networks and Learning Systems, Vol. 27, No. 9, pp. 1907-1919, 2016.
- [J4] Xuanyao Fong, Yusung Kim, Karthik Yogendra, Deliang Fan, **Abhronil Sengupta**, Anand Raghunathan, Kaushik Roy, "Spin-Transfer Torque Devices for Logic and Memory: Prospects and Perspectives", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, Vol. 35, No. 1, pp. 1-22, 2016. **(Invited Keynote Paper & one of the Top 5 Popular Articles in IEEE TCAD)**

- [J3] **Abhronil Sengupta**, Zubair Al Azim, Xuanyao Fong, Kaushik Roy, "Spin-Orbit Torque Induced Spike Timing Dependent Plasticity", Applied Physics Letters, Vol. 106, Iss. 9, pp. 093704, 2015. (**Chosen as Editor's Picks for the month of March: only 5 papers selected out of over 80 papers and selected as one of the top papers published by all AIP journals in the field of Bioscience during the years 2014-2016. The paper was made open-access by AIP.**)
- [J2] **Abhronil Sengupta**, Sri Harsha Choday, Yusung Kim, Kaushik Roy, "Spin Orbit Torque Based Electronic Neuron", Applied Physics Letters, Vol. 106, Iss. 14, pp. 143701, 2015.
- [J1] Saugat Bhattacharyya, **Abhronil Sengupta**, Tathagatha Chakraborti, Amit Konar, DN Tibarewala, "Automatic Feature Selection of Motor Imagery EEG Signals Using Differential Evolution and Learning Automata", Medical & Biological Engineering & Computing, Vol. 52, Iss. 2, pp.131-139, 2014.

Conference Papers

- [C36] Arnob Saha, Bibhas Manna, Sen Lu, Zhouhang Jiang, Kai Ni, **Abhronil Sengupta**, "Device Feasibility Analysis of Multi-level FeFETs for Neuromorphic Computing", IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS), 2024.
- [C35] Malyaban Bal, **Abhronil Sengupta**, "Equilibrium-Based Learning Dynamics in Spiking Architectures", IEEE International Symposium on Circuits and Systems (ISCAS), 2024. (**Invited Special Session Paper**)
- [C34] Malyaban Bal, **Abhronil Sengupta**, "SpikingBERT: Distilling BERT to Train Spiking Language Models Using Implicit Differentiation", AAAI Conference on Artificial Intelligence (AAAI), 2024. (**Acceptance rate ~ 23%**)
- [C33] Malyaban Bal, George M. Nishibuchi, Suhas Chelian, Sridhar Vasani, **Abhronil Sengupta**, "Bio-plausible Hierarchical Semi-Supervised Learning for Intrusion Detection", ACM International Conference on Neuromorphic Systems (ICONS), 2023.
- [C32] A N M Nafiul Islam, Kai Ni, **Abhronil Sengupta**, "Cross-Layer Optimizations for Ferroelectric Neuromorphic Computing", IEEE International Midwest Symposium on Circuits and Systems (MWSCAS), 2023. (**Invited Special Session Paper**)
- [C31] Malyaban Bal, **Abhronil Sengupta**, "Sequence Learning using Equilibrium Propagation", International Joint Conference on Artificial Intelligence (IJCAI), 2023. (**Oral presentation, Acceptance rate ~ 15%**)
- [C30] Zhuangyu Han, A. N. M. Nafiul Islam, **Abhronil Sengupta**, "Astromorphic Self-Repair of Neuromorphic Hardware Systems", AAAI Conference on Artificial Intelligence (AAAI), 2023. (**Oral presentation, Acceptance rate ~ 19%**)
- [C29] Wyler Zahm, Tyler Stern, Malyaban Bal, **Abhronil Sengupta**, Aswin Jose, Suhas Chelian, Sridhar Vasani, "Cyber-Neuro RT: Real-time Neuromorphic Cybersecurity", Procedia Computer Science, Vol. 213, pp. 536-545, 2022.
- [C28] Sonali Singh, Anup Sarma, Sen Lu, **Abhronil Sengupta**, Mahmut T. Kandemir, Emre Neftci, Vijaykrishnan Narayanan, Chita R. Das, "Skipper: Enabling efficient SNN training through activation-checkpointing and time-skipping", IEEE/ACM International Symposium on Microarchitecture (MICRO), 2022.
- [C27] Sen Lu, **Abhronil Sengupta**, "Hybrid Neuromorphic Systems: An Algorithm-Application-Hardware-Neuroscience Co-Design Perspective", IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS), 2022. (**Invited Special Session Paper**)
- [C26] Sonali Singh, Anup Sarma, Sen Lu, **Abhronil Sengupta**, Vijaykrishnan Narayanan, Chita Das, "Gesture-SNN: Co-optimizing accuracy, latency and energy of SNNs for neuromorphic vision sensors", ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED), 2021.
- [C25] Sonali Singh, Anup Sarma, Nicholas Jao, Ashutosh Pattnaik, Sen Lu, Kezhou Yang, **Abhronil Sengupta**, Vijaykrishnan Narayanan, Chita Das, "NEBULA: A Neuromorphic Spin-Based Ultra-Low Power Architecture for SNNs and ANNs", IEEE/ACM International Symposium on Computer Architecture (ISCA), 2020.
- [C24] Gopalakrishnan Srinivasan, Chankyu Lee, **Abhronil Sengupta**, Priyadarshini Panda, Syed Shakib Sarwar, Kaushik Roy, "Training Deep Spiking Neural Networks for Energy Efficient Neuromorphic Computing", International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2020.
- [C23] Nicholas Jao, Akshay Krishna Ramanathan, **Abhronil Sengupta**, John Sampson, Vijaykrishnan Narayanan, "Programmable Non-Volatile Memory Design Featuring Reconfigurable in-Memory Operations", International Symposium on Circuits and Systems (ISCAS), 2019.

- [C22] **Abhronil Sengupta**, Yong Shim, Kaushik Roy, "*Stochastic Switching of Nanomagnets for Post-CMOS Computing*", American Physical Society (APS) March Meeting, 2018. (**Invited in the "Post Moore Computing" session**)
- [C21] **Abhronil Sengupta**, Gopalakrishnan Srinivasan, Deboleena Roy, Kaushik Roy, "*Stochastic Inference and Learning Enabled by Magnetic Tunnel Junctions*", IEEE International Electron Devices Meeting (IEDM), 2018. (**Invited Paper**)
- [C20] Aayush Ankit, **Abhronil Sengupta**, Kaushik Roy, "*Neuromorphic Computing Across the Stack: Devices, Circuits and Architectures*", IEEE Workshop on Signal Processing Systems (SiPS), 2018. (**Best Paper Award**)
- [C19] **Abhronil Sengupta**, Aayush Ankit, Kaushik Roy, "*Performance Analysis and Benchmarking of All-Spin Spiking Neural Networks*", International Joint Conference on Neural Networks (IJCNN), 2017.
- [C18] Gopalakrishnan Srinivasan, **Abhronil Sengupta**, Kaushik Roy, "*Magnetic Tunnel Junction Enabled All-Spin Stochastic Spiking Neural Network*", Design, Automation and Test in Europe (DATE), 2017. (**Invited Special Session Paper**)
- [C17] Aayush Ankit, **Abhronil Sengupta**, Priyadarshini Panda, Kaushik Roy, "*RESPARC: A Reconfigurable and Energy-Efficient Architecture with Memristive Crossbars for Deep Spiking Neural Networks*", Design Automation Conference (DAC), 2017.
- [C16] Aayush Ankit, **Abhronil Sengupta**, Kaushik Roy, "*TraNNsformer: Neural Network Transformation for memristive crossbar based neuromorphic system design*", International Conference on Computer-Aided Design (ICCAD), 2017.
- [C15] **Abhronil Sengupta**, Karthik Yogendra, Deliang Fan, Kaushik Roy, "*Prospects of Efficient Neural Computing with Arrays of Magneto-metallic Neurons and Synapses*", Asia and South Pacific Design Automation Conference (ASP-DAC), 2016. (**Invited Special Session Paper**)
- [C14] **Abhronil Sengupta**, Priyadarshini Panda, Anand Raghunathan, Kaushik Roy, "*Neuromorphic Computing Enabled by Spin-Transfer Torque Devices*", International Conference on VLSI Design (VLSID), 2016. (**Embedded Tutorial Paper**)
- [C13] **Abhronil Sengupta**, Karthik Yogendra, Kaushik Roy, "*Spintronic Devices for Ultra-low Power Neuromorphic Computation*", International Symposium on Circuits and Systems (ISCAS), 2016. (**Selected as one of the top 3% papers in ISCAS 2016**)
- [C12] **Abhronil Sengupta**, Kaushik Roy, "*A New Spin on Neuromorphic Computing: Devices to Systems*", Design Automation Conference (DAC), 2016. (**PhD Forum Presentation**)
- [C11] **Abhronil Sengupta**, Akhilesh Jaiswal, Kaushik Roy, "*True Random Number Generation Using Voltage Controlled Spin-Dice*", Device Research Conference (DRC), 2016.
- [C10] **Abhronil Sengupta**, Bing Han, Kaushik Roy, "*Toward a Spintronic Deep Learning Spiking Neural Processor*", BioMedical Circuits and Systems Conference (BioCAS), 2016.
- [C9] **Abhronil Sengupta**, Aparajita Banerjee, Kaushik Roy, "*Spike-Timing Dependent Plasticity in Magnetic Tunnel Junctions*", BrainCAS Workshop, BioMedical Circuits and Systems Conference (BioCAS), 2016.
- [C8] **Abhronil Sengupta**, Bing Han, Kaushik Roy, "*Spin-Based Neuromimetic Computing: Deep Spiking Neural Systems*", SRC TECHCON, 2016.
- [C7] Priyadarshini Panda, **Abhronil Sengupta**, Kaushik Roy, "*Conditional Deep Learning for Energy-Efficient and Enhanced Pattern Recognition*", Design, Automation and Test in Europe (DATE), 2016.
- [C6] Yong Shim, **Abhronil Sengupta**, Kaushik Roy, "*Low-Power Approximate Convolution Computing Unit with Domain-Wall Motion Based "Spin-Memristor" for Image Processing Applications*", Design Automation Conference (DAC), 2016.
- [C5] Priyadarshini Panda, **Abhronil Sengupta**, Syed Shakib Sarwar, Gopalakrishnan Srinivasan, Swagath Venkataramani, Anand Raghunathan, Kaushik Roy, "*Cross-Layer Approximations for Neuromorphic Computing: From Devices to Circuits and Systems*", Design Automation Conference (DAC), 2016. (**Invited Special Session Paper**)
- [C4] Bing Han, **Abhronil Sengupta**, Kaushik Roy, "*On the Energy Benefits of Spiking Deep Neural Networks: A Case Study*", International Joint Conference on Neural Networks (IJCNN), 2016.
- [C3] **Abhronil Sengupta**, Aparajita Banerjee, Kaushik Roy, "*Neural Learning through Spike-Timing Dependent Plasticity of Dzyaloshinskii Domain Walls*", Hardware and Algorithms for Learning On-a-chip Workshop, International Conference On Computer Aided Design (ICCAD), 2015.

- [C2] **Abhronil Sengupta**, Kaushik Roy, "*Spin-Transfer Torque Magnetic Neuron for Low Power Neuromorphic Computing*", International Joint Conference on Neural Networks (IJCNN), 2015.
- [C1] Tathagata Chakraborti, **Abhronil Sengupta**, Abhisekh Midya, Amit Konar, Somnath Sengupta, "*3-D Model Assisted Facial Error Concealment Technique Using Regenerative Particle Filter Based Tracking*", International Conference on Multimedia and Expo (ICME) Workshops, 2013.

Book Chapters

- [B2] **Abhronil Sengupta**, Aayush Ankit, Kaushik Roy, "*Efficient Neuromorphic Systems and Emerging Technologies - Prospects and Perspectives*", Emerging Technology and Architecture for Big-data Analytics, Springer Publishers, 2017.
- [B1] **Abhronil Sengupta**, Tathagata Chakraborti, Amit Konar, "*A Metaheuristic Approach to Two Dimensional Recursive Digital Filter Design*", Advances in Heuristic Signal Processing and Applications, Springer Publishers, Chapter 8, pp. 167-182, 2013.

Invited Talks, Panels & Interviews

- [T31] Neuromorphic Computing Meets Quantum Mechanics Workshop, 2024
- [T30] NSF IUCRC Center for Advanced Electronics Through Machine Learning, 2024
- [T29] IEEE International Symposium on Circuits and Systems (ISCAS), 2024
- [T28] IEEE Electron Devices Technology and Manufacturing (EDTM) Conference, 2024
- [T27] Pioneers session for "Advanced Microelectronics", Electronic Materials and Applications (EMA) 2024: Basic Science and Electronics Division Meeting
- [T26] Lockheed Martin, 2023
- [T25] Department of Energy, Office of Science sponsored COINFLIPS (CO-designed Improved Neural Foundations Leveraging Inherent Physics Stochasticity) Seminar Series, 2023
- [T24] Seminar in Advances in Computing Series, University of South Carolina (USC), 2023
- [T23] Global Initiative of Academic Networks (GIAN) course on "Neuromorphic Computing with Nanoscale Spintronic Devices" (a Higher Education program organised by Govt. of India), IIT Roorkee, 2022
- [T22] National University of Singapore, 2022
- [T21] Mid-Atlantic Quantum Alliance (MQA) Spintronics Co-Design Workshop, 2022
- [T20] Oracle for Research Blog article on "*Researchers using OCI and artificial intelligence for a better future*"
- [T19] Pacific Northwest National Laboratory (PNNL), 2022
- [T18] Computer Society of India (CSI), Kolkata Chapter, 2022
- [T17] US Army Workshop on Artificial Intelligence: Projected Scientific Breakthroughs in 2026-2031, 2021
- [T16] DOE BES EFRC Meeting, 3DFeM Center Highlight, 2021
- [T15] Rutgers Efficient AI (REFAI) seminar, Rutgers University, 2021
- [T14] IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS), 2021
- [T13] Physics Department Colloquium, University of Arizona, 2021
- [T12] ZDNet article on "*Neuromorphic computing could solve the tech industry's looming crisis*"
- [T11] IEEE International System-on-Chip Conference (SOCC), 2020
- [T10] IEEE International Green and Sustainable Computing Conference (IGSC) Workshop on Computing with Unconventional Technologies (CUT): from Processing to Interconnects, and Beyond, 2020
- [T9] Design Automation Conference (DAC) Workshop on Neuromorphic Computing, 2020
- [T8] Materials Science & Technology (MS&T) Nanomaterials Symposium, 2020
- [T7] International Symposium on Quality Electronic Design (ISQED), 2020
- [T6] Center for Neural Engineering, Penn State University, 2019
- [T5] EE Colloquium, Penn State University, 2019
- [T4] Theoretical Biology Seminar, Department of Mathematics, Penn State University, 2018
- [T3] Workshop on Spintronics and Nanomagnetism for Neuromorphic Computing, University of Leeds, 2018

- [T2] "*Magnetic Tunnel Junction (MTJ) as Stochastic Neurons and Synapses: Stochastic Binary Neural Networks, Bayesian Inferencing, Optimization Problems*", nanoHUB Online Presentation, 2018.
- [T1] Big Ten+ Graduate School Exposition, Purdue University, 2015

Patents

- [P3] **Abhronil Sengupta**, Gregory Chen, Kumar Raghavan, Huseyin Ekin Sumbul, Phil Knag, "*Event driven and time hopping neural network*", US Patent Number 10,922,607 (Filed with Intel Corporation).
- [P2] **Abhronil Sengupta**, Sri Harsha Choday, Yusung Kim, Kaushik Roy, "*Spin Orbit Torque Based Electronic Neuron*", US Patent Application Number 16/999,049.
- [P1] **Abhronil Sengupta**, Zubair Al Azim, Xuanyao Fong, Kaushik Roy, "*Electronic Synapse Having Spin-Orbit Torque Induced Spike Timing Dependent Plasticity*", US Patent Number 10,592,802.

Advisees

- Post-Doctoral Amit Shukla (**Next Employment - Global Foundries**, Spring 2022 - Fall 2022)
Bibhas Manna (Spring 2023 - Present)
- Doctoral Kezhou Yang (**First Employment - Faculty@HKUST (Guangzhou)**, Internship - Seagate, 2019 - 2023)
Sen Lu (Post-Comprehensive, Internship - Shell, Fall 2019 - Present)
Nafiul Islam (Post-Comprehensive, NSF-CISE MWSCAS Participation Award, Internship - Skyworks, Fall 2020 - Present)
Arnob Saha (Post-Qualifying, Spring 2021 - Present)
Malyaban Bal (Post-Comprehensive, Internship - SRI International, Fall 2021 - Present)
Zhuangyu Han (Post-Comprehensive, Fall 2021 - Present)
Md Zesun Ahmed Mia (Post-Qualifying, Melvin P. Bloom Memorial Graduate Fellowship, Fall 2022 - Present)
Yi Jiang (Post-Qualifying, Fall 2022 - Present)
Jiaqi (Jacky) Lin (Post-Qualifying, Fall 2022 - Present)
- MS Shakya Chakrabarti (Co-advised, Fall 2021 - Fall 2022)
- Undergraduate Vennila Pugazhenthii (Equity REU Scholar, Fall 2019 - Spring 2020)
Alex Cini (Equity REU Scholar, Fall 2019 - Spring 2020)
Anna Leon (WISER Scholar, Spring 2020 - Summer 2020)
Josiah Eugene (Lachlan) Sneff (Internship - SpaceX, Fall 2021 - Spring 2023)
Naqiyah Peatiwala (WISER Scholar, Spring 2022 - Fall 2022)
Andre Mitrik (Schreyer Honors Scholar, Internship - Philips Respironics, Spring 2022 - Spring 2023)
- Visiting Akul Malhotra (Fall 2019)
Mehul Rastogi (Spring 2020)
Umang Garg (Spring 2020)
Dhuruva Priyan (Spring 2020)

Professional Activities

- Member Senior Member of Institute of Electrical and Electronics Engineers (IEEE) including Electron Devices Society (EDS), Magnetics Society, Circuits and Systems (CAS) Society and Computer Society Technical Committee on VLSI (TCVLSI), Association for Computing Machinery (ACM), American Physical Society (APS), Association for the Advancement of Artificial Intelligence (AAAI)
- Reviewer Nature Electronics, Nature Communications, Applied Physics Reviews, IEEE Transactions on VLSI Systems (TVLSI), IEEE Transactions on Neural Networks and Learning Systems (TNNLS), IEEE Journal on Emerging and Selected Topics in Circuits and Systems (JETCAS), Applied Physics Letters (APL), Electron Device Letters (EDL), International Joint Conference on Neural Networks (IJCNN), Nanophotonics, IEEE Transactions on Electron Devices (TED), IEEE Transactions on Computers (TC), IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), IEEE Transactions on Circuits and Systems (TCAS), IEEE Transactions on Biomedical Circuits and Systems (TBioCAS), IEEE Transactions on Nanotechnology (TNANO), Journal of Applied Physics (JAP), Japanese Journal of Applied Physics (JJAP), ACM Journal of Emerging Technologies in Computing Systems (JETC), IEEE Access, IEEE Sensors

Reviewer ACM Transactions on Design Automation of Electronic Systems (TODAES), IEEE Signal Processing Magazine, IEEE Transactions on Emerging Topics in Computing (TETC), IEEE Journal of Exploratory Solid-State Computational Devices and Circuits (JXCDC), Neural Networks, ACS Applied Materials & Interfaces, International Conference on Artificial Intelligence Circuits and Systems (AICAS), Frontiers in Neuroscience, Scientific Reports, iScience, Neuromorphic Computing and Engineering, IEEE International Symposium on Circuits & Systems (ISCAS), IEEE Transactions on Cognitive and Developmental Systems

Teaching Activities

Fall 2023 Digital Integrated Circuits (EE/CMPEN 416), Enrollment: 33
Spring 2023 Electronic Circuit Design I (EE 310), Enrollment: 67
Fall 2022 Electronic Circuit Design I (EE 310), Enrollment: 73
Spring 2022 Neuromorphic Computing (EE 597, New Developed Course), Enrollment: 25
Fall 2021 Digital Integrated Circuits (EE/CMPEN 416), Enrollment: 53
Circuits and Devices (EE 210), Enrollment: 42
Spring 2021 Electronic Circuit Design I (EE 310), Enrollment: 76
Fall 2020 Circuits and Devices (EE 210), Enrollment: 68
Spring 2020 Neuromorphic Computing (EE 597, New Developed Course), Enrollment: 21
Fall 2019 Digital Integrated Circuits (EE/CMPEN 416), Enrollment: 42
Spring 2019 Electronic Circuit Design I (EE 310), Enrollment: 51

Service Activities

Program Committee ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED 2022-2024)
International Conference On Computer Aided Design (ICCAD 2019-2021, 2024)
International Symposium on Quality Electronic Design (ISQED 2019-2024)
IEEE Computer Society Annual Symposium on VLSI (ISVLSI 2023-2024)
ACM Great Lakes Symposium on VLSI (GLSVLSI 2019-2023)
VLSI Design Conference (VLSID 2022-2023)
IEEE International System-on-Chip Conference (SOCC 2023)
IEEE International Midwest Symposium on Circuits and Systems (MWSCAS 2023)
Design Automation Conference (DAC 2019-2022)
International Conference on Artificial Intelligence Circuits and Systems (AICAS 2022)
International Conference on Neuromorphic Systems (ICONS 2022)
IEEE International Conference on Emerging Electronics (ICEE 2022)
Design Automation Conference Late Breaking Results (DAC LBR 2020)

Conference Track Chair International Symposium on Quality Electronic Design (ISQED 2024) - "Circuit Design, 3D Integration and Advanced Packaging"
International Symposium on Quality Electronic Design (ISQED 2023) - "Circuit Design, 3D Integration and Advanced Packaging"
Design Automation Conference (DAC 2022) - "In-memory and Near-memory Computing"
Design Automation Conference (DAC 2021) - "Approximate Computing for AI/ML: II"
International Conference On Computer Aided Design (ICCAD 2021) - "Bio-inspired and Neuromorphic Computing, Biological Systems and Electronics, and New Computing Paradigms"

Proposal Reviewer US Army Research Office - Information Processing and Fusion (2024)
Swiss National Science Foundation (SNSF) - Advanced Grants (2024)
European Research Council - ERC-PE7: Systems and Communication Engineering panel (2024)
Swiss National Science Foundation (SNSF) - Division Projects (2023)
NSF Science of Learning and Augmented Intelligence Program (2023)
Dutch Research Council - KIC Emerging Key Enabling Technologies (2023)
US Army Research Office - Complex Dynamics and Systems (2023)
NSF ECCS Panel on Spintronics, Logic and Memories (2021)
Swiss National Science Foundation (SNSF) Div. Mathematics, Physical and Engineering Sciences (2021)

Technical Committee IEEE Circuits and Systems Society Technical Committee on Neural Systems and Applications

Session Chair Design Automation Conference (DAC 2022)
ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED 2021)
International Symposium on Quality Electronic Design (ISQED 2020)
ACM Great Lakes Symposium on VLSI (GLSVLSI 2019)

Session Organizer IEEE International System-on-Chip Conference (SOCC), 2020 - Special Session on "Neuromorphic Computing - Opportunities and Challenges"

Editor IEEE Transactions on Cognitive and Developmental Systems (2023 - Present)
Scientific Reports (2023 - Present)
Frontiers in Electronics (Integrated Circuits and VLSI) (2022 - Present)
Frontiers in Neuroscience (Neuromorphic Engineering) (2021 - Present)
Neuromorphic Computing and Engineering (2020 - Present)

Special Topic Editor IC Design to Tapeout: AI and Open Source Tools - IEEE Open Journal of Circuits and Systems (2024)
Quantum Materials for Neuromorphic Computing - Neuromorphic Computing and Engineering (2021)
Ferroelectric Devices and Circuits for Neuromorphic Computing - Frontiers in Neuroscience (2021)
Solid-State Devices and Their Applications in Neuromorphic Computing - Micromachines (2021)
Emerging Photonic Devices, Circuits and Systems - MDPI Photonics (2020)

PhD Committee Ahmed Ibrahim (Advisor: Prof. Mehdi Kiani)
Wilson Yanez (Advisor: Prof. Nitin Samarth)
Srivatsa Rangachar Srinivasa (Advisor: Prof. Vijaykrishnan Narayanan)
Yu-Sheng Huang (Advisor: Prof. Nitin Samarth)
Abdullah Ash Saki (Advisor: Prof. Swaroop Ghosh)
Karthikeyan Nagarajan (Advisor: Prof. Swaroop Ghosh)
Mohammadamin Shafaat (Advisor: Prof. Sahin Ozdemir)
Shekoofeh Hedayati (Advisor: Prof. Brad Wyble)
Sarbashis Das (Advisor: Prof. Saptarshi Das)
Sina Sayyah Ensan (Advisor: Prof. Swaroop Ghosh)
Kamyar Akbari Roshan (Advisor: Prof. David Miller)
Kareem Metwaly (Advisor: Prof. Vishal Monga)
Akshay Wali (Advisor: Prof. Saptarshi Das)
Nicholas Jao (Advisor: Prof. Vijaykrishnan Narayanan)
Nagadastagiri Challapalle (Advisor: Prof. Vijaykrishnan Narayanan)
Akshay Krishna Ramanathan (Advisor: Prof. Vijaykrishnan Narayanan)
Kevin Sargent (Advisor: Prof. Dezhe Jin)
Sonali Singh (Advisor: Prof. Chita Das)
Shiva Subbulakshmi Radhakrishnan (Advisor: Prof. Saptarshi Das)
Zeinab Kashani (Advisor: Prof. Mehdi Kiani)
Faysal Khan (Advisor: Prof. Vijaykrishnan Narayanan)
Yilin Liu (Advisor: Prof. Mahanth Gowda)
Sujay Hosur (Advisor: Prof. Mehdi Kiani)
Yikai Zheng (Advisor: Prof. Saptarshi Das)
Andrew Pannone (Advisor: Prof. Saptarshi Das)
Ardavan Javid (Advisor: Prof. Mehdi Kiani)
Yi Xiao (Advisor: Prof. Vijaykrishnan Narayanan)
Yixin Xu (Advisor: Prof. Vijaykrishnan Narayanan)
Koustubh Phalak (Advisor: Prof. Swaroop Ghosh)
Zheyu Li (Advisor: Prof. Vijaykrishnan Narayanan)
Subir Ghosh (Advisor: Prof. Saptarshi Das)
Emmanuel Afolayan (Advisor: Prof. Chris Giebink)
Avimita Chatterjee (Advisor: Prof. Swaroop Ghosh)
Dipanjan Sen (Advisor: Prof. Saptarshi Das)
Collin Beaudoin (Advisor: Prof. Swaroop Ghosh)
Subrata Das (Advisor: Prof. Swaroop Ghosh)
Nicholas Armendarez (Advisor: Prof. Joseph Najem)
Ahmed Mohamed (Advisor: Prof. Joseph Najem)
Satwik Kundu (Advisor: Prof. Swaroop Ghosh)
Sadia Anjum Tumpa (Advisor: Prof. Vijaykrishnan Narayanan)
Prapti Panigrahi (Advisor: Prof. Vijaykrishnan Narayanan)

MS Thesis Nasim Imtiaz Khan (Advisor: Prof. Swaroop Ghosh)
Committee Srivatsa Rangachar Srinivasa (Advisor: Prof. Vijaykrishnan Narayanan)
Navyata Gattu (Advisor: Prof. Swaroop Ghosh)
Tanya Dhaka (Chair: Prof. David Jenkins)
Abdullah Ash Saki (Advisor: Prof. Swaroop Ghosh)
Shakya Chakrabarti (Advisor: Prof. Saptarshi Das)
Chris Wible (Advisor: Prof. Mehdi Kiani)
Shashank Sagar Mamidi (Advisor: Prof. Mehdi Kiani)
Krishna Keshav Kodandapani (Advisor: Prof. Mehdi Kiani)
Nandinee Kaushik (Advisor: Prof. Saptarshi Das)
Adithya Kambat Shankar (Advisor: Prof. Saptarshi Das)

University Electronics and Optical Materials and Devices Area Committee Member (Fall 2018 - Present)
Service Undergraduate Committee Member in EE Department (Fall 2018 - Spring 2021)
Graduate Committee Member in EE Department (Fall 2021 - Spring 2023)
Graduate Student Recruitment Committee in EE Department (Fall 2023 - Present)
College Of Engineering Academic Integrity Committee Member (Fall 2021 - Present)
Judge of 2022 Penn State University Graduate Exhibition
College of Engineering - 2022 Multidisciplinary Research Seed Grants Reviewer