

Professional Experience

- 2024-present **Associate Professor**, Electrical and Computer Engineering, University of Illinois - Chicago, Chicago, IL, USA.
- 2024-current **Adjunct Assistant Professor**, Computer Science, University of Illinois - Chicago, Chicago, IL, USA.
- 2024-current **Adjunct Assistant Professor**, School of Computing, University of Nebraska - Lincoln, Lincoln, NE, USA.
- 2020-2024 **Assistant Professor**, School of Computing, University of Nebraska - Lincoln, Lincoln, NE, USA.
- 2019-2020 **Postdoctoral Research Fellow**, Electrical and Computer Engineering, University of Texas at Austin, Austin, TX, USA.
- 2016-2019 **Graduate Research Assistant**, Electrical and Computer Engineering, University of Central Florida, Orlando, FL, USA.

Education

- 2015–2019 **Ph.D, Computer Engineering**, *University of Central Florida*, Orlando, FL, USA.
- 2009–2011 **M.Sc., Computer Architecture**, *Science and Research Branch, Azad University*, Tehran, Iran.
- 2003–2008 **B.Sc., Computer Engineering, Hardware**, *Shiraz University*, Shiraz, Iran.

Research Interests

- Energy Efficient and High-Performance Processing in-Memory Circuit, Architecture and Algorithm
- Batteryless Processing and Learning Architecture
- Brain-Inspired Computing, Neuromorphic Computing, Machine Learning Acceleration
- Secure Computation including Hardware Security and Security of Artificial Intelligence
- Reconfigurable and Adaptive Computer Architectures

Academic Awards and Honors

- (C60) **Best Paper Award Candidate**: IEEE International Conference on Green and Sustainable Computing (IGSC) 2026.
- **CAREER Award**, National Science Foundation, 2024.
- **Nebraska EPSCoR FIRST Award**, University of Nebraska-Lincoln, 2023.
- **Outstanding Teaching Award - Graduate Level**, School of Computing, University of Nebraska-Lincoln, 2023.
- (C40) **Best Paper Award Candidate**: International Symposium on Low Power Electronics and Design (ISLPED) 2023.
- **Fellow of the Research Development Fellows Program**, Office of Research and Economic Development, University of Nebraska-Lincoln, 2020.
- (C13) **Best Paper Award Candidate**: International Symposium on Quality Electronic Design (ISQED) 2019.
- Student Government Association Registered Student Organization Conference Participation Fellowship, University of Central Florida, 2017 - 2019. (\$14000)
- College of Graduate Studies Conference Presentation Fellowship, University of Central Florida, 2015 - 2018. (\$2000)

- Student Government Association Individual Conference Presentation Fellowship, University of Central Florida, 2016 - 2018. (\$2000)
- (C12) **Best Paper Award Candidate:** ACM Great Lakes Symposium on VLSI (GLSVLSI) 2018.
- (J14) **Paper of the Month:** IEEE Transactions on Emerging Topics in Computing, including free download as sole paper highlighted on that IEEE TETC home webpage 2018.
- (C11) **Best Paper Award Candidate:** International Symposium on Quality Electronic Design (ISQED) 2018.
- Ph.D. Forum at DAC 2018 Scholarship, with an acceptance rate of around 30% (\$1200).
- 2018 Frank Hubbard Engineering Endowed Scholarship for the 2018-2019 academic year (\$1000).
- (J11) **Paper of the Month:** IEEE Transactions on Computers, June 2016, with hosted companion video featured on IEEE Transactions webpage 2016.
- **Invention Disclosure**, UCF Office of Research and Commercialization, “A Parity-Preserving Reversible QCA Gate with Cascadable Resilience,” April 15, 2015.

Publications and Patents

LEGEND

(*) Corresponding Author

Underline: Ph.D./Master students mentored by Dr. Arman Roohi

Jx. (Journal publication numbering)

Cx. (Conference publication numbering)

□ Journal Papers

- J46 S. Gerami, S. Tabrizchi, H. Ding, Sh. Angizi, and **A. Roohi***, “Pixel-Wise Intelligence: Heatmap-Guided Adaptive LBP for In-Sensor Vision Processing,” *IEEE Journal on Emerging and Selected Topics in Circuits and Systems (JETCAS)*, Special Issue on Advances in Analog and Mixed-Signal Computing - Architectures, Theory, and Applications, 2026.
- J45 S. Tabrizchi, S. Gerami, J. Feng, N. Sehatbakhsh, D. Pan, and **A. Roohi***, “BISen: A Robust Framework for Efficient CNN Inference on Battery-Free Intelligent Sensory Nodes,” *IEEE Transactions on Computers (TC)*, Special Issue on Carbon Efficient Computer Architectures and Systems, vol. 75, no. 8, pp. 2730-2744, Aug. 2026.
- J44 D. Vungarala, Md. H. Amin, P. Mercati, A. Ghosh, **A. Roohi**, D. Z. Pan, R. Zand, and Shaahin Angizi*, “LIMCA: LLM for Automating Analog In-Memory Computing Architecture Design Exploration,” *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)*, 2026.
- J43 S. Tabrizchi, R. Gaire, N. Solanki, A. Shafiee Sarvestani, D. Pan, and **A. Roohi***, “ARISE: Adaptive Resource-aware Intelligent SENSing Enabling Intermittent Learning,” *IEEE Transactions on Circuits and Systems for Artificial Intelligence (TCASAI)*, vol. 3, no. 3, pp. 162-175, June 2026.
- J42 T. Razmpour, M. Tabibian, **A. Roohi**, and R. Saha*, “GAN-enhanced machine learning and metabolic modeling identify reprogramming in pancreatic cancer,” *PLOS Computational Biology*, 22, no. 1, 2026.
- J41 D. Najafi, H.E. Barkam, Z. Ghanaatian, M. Morsali, H. Chen, T. Das, **A. Roohi**, P. Mercati, M. Nikdast, M. Imani, and S. Angizi*, “Opto-Aligner: Optical Near-Sensor Architecture for Accelerating DNA Pre-Alignment Filtering,” *IEEE Journal on Emerging and Selected Topics in Circuits and Systems*, vol. 16, no. 1, pp. 124-136, March 2026.
- J40 M. Ashtari Gargari, S. Tabrizchi, and **A. Roohi***, “WinEdge: Low-Power Winograd CNN Execution with Transposed MRAM for Edge Devices,” *Electronics*, 14(12), p.2485, 2025.

- J39 J. Perera, S. Balasubramaniam, S. Somathilaka, Q. Wen, X. Li, D. Kasthurirathna, **A. Roohi**^{*}, and T.S. Nelson, "Wet-Neuromorphic Computing: A New Paradigm for Biological Artificial Intelligence," *IEEE Intelligent Systems*, vol. 40, no. 3, pp. 39-48, May-June 2025.
- J38 S. Tabrizchi, M. Morsali, D. Pan, S. Angizi, and **A. Roohi**^{*}, "PINSim: A Processing In- and Near-Sensor Simulator to Model Intelligent Vision Sensors," *IEEE Computer Architecture Letters*, vol. 24, no. 1, pp. 17-20, Jan.-June 2025.
- J37 D. Najafi, H. E. Barkam, M. Morsali, S. Jeong, T. Das, **A. Roohi**, M. Nikdast, M. Imani, and Sh. Angizi^{*}, "Neuro-Photonix: Enabling Near-Sensor Neuro-Symbolic AI Computing on Silicon Photonics Substrate," *IEEE Transactions on Circuits and Systems for Artificial Intelligence (TCASAI)*, vol. 2, no. 2, pp. 101-113, June 2025.
- J36 S. Tabrizchi, Rebati Gaire, Mehrdad Morsali, Maximilian Liehr, Nathaniel Cady, Shaahin Angizi, and **A. Roohi**^{*}, "APRIS: Approximate Processing ReRAM In-Sensor Architecture Enabling Artificial-Intelligence-Powered Edge," *IEEE Transactions on Emerging Topics in Computing (TETC)*, vol. 13, no. 4, pp. 1356-1366, Oct.-Dec. 2025.
- J35 S. Tabrizchi, B. Reidy, D. Najafi, Sh. Angizi, R. Zand, and **A. Roohi**^{*}, "ViTSen: Bridging Vision Transformers and Edge Computing with Advanced In/Near-Sensor Processing," *IEEE Embedded Systems Letters (ESL)*, vol. 16, no. 4, pp. 341-344, Dec. 2024.
- J34 N. Taheri, S. Tabrizchi, and **A. Roohi**^{*}, "Intermittent-Aware Design Exploration of Systolic Array Using Various Non-Volatile Memory: A Comparative Study," *Micromachines*, 15(3), 343, 2024.
- J33 D. Najafi, M. Morsali, R. Zhou, **A. Roohi**, A. Marshall, D. Misra, and Sh. Angizi^{*}, "Enabling Normally-Off In Situ Computing With a Magneto-Electric FET-Based SRAM Design," *IEEE Transactions on Electron Devices*, 71, no. 4, 2742-2748, 2024.
- J32 **A. Roohi**^{*}, S. Tabrizchi, M. Morsali, D. Pan, and Sh. Angizi, "PiPSim: A Behavior-Level Modeling Tool for CNN Processing-in-Pixel Accelerators," *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, vol. 43, no. 1, pp. 141-150, Jan. 2024.
- J31 Sh. Angizi^{*}, M. Morsali, S. Tabrizchi, and **A. Roohi**^{*}, "A Near-Sensor Processing Accelerator for Approximate Local Binary Pattern Networks," *IEEE Transactions on Emerging Topics in Computing*, vol. 12, no. 1, pp. 73-83, Jan.-March 2024.
- J30 Sh. Angizi^{*}, S. Tabrizchi, D. Pan, and **A. Roohi**^{*}, "PISA: A Non-Volatile Processing-In-Sensor Accelerator for Imaging Systems," *IEEE Transactions on Emerging Topics in Computing*, vol. 11, no. 4, pp. 962-972, Oct.-Dec. 2023.
- J29 M. Morsali, S. Tabrizchi, **A. Roohi**, and Sh. Angizi^{*}, "Design and Evaluation of a Near-Sensor Magneto-Electric FET-based Event Detector," *IEEE Transactions on Electron Devices*, vol. 70, no. 9, pp. 4822-4828, Sept. 2023.
- J28 S. Tabrizchi, A. Nezhadi, Sh. Angizi, and **A. Roohi**^{*}, "AppCiP: Energy-Efficient Approximate Convolution-in-Pixel Scheme for Neural Network Acceleration," *IEEE Journal on Emerging and Selected Topics in Circuits and Systems*, vol. 13, no. 1, pp. 225-236, March 2023.
- J27 R. Zhou, S. Tabrizchi, **A. Roohi**, and Sh. Angizi^{*}, "LT-PIM: An LUT-based Processing-in-DRAM Architecture with RowHammer Self-Tracking," *IEEE Computer Architecture Letters*, vol. 21, no. 2, pp. 141-144, 1 July-Dec. 2022.
- J26 S. Tabrizchi, Sh. Angizi, and **A. Roohi**^{*}, "Ocelli: Efficient Processing-in-Pixel Array Enabling Edge Inference of Ternary Neural Networks," *Journal of Low Power Electronics and Applications*, 12(4), 57, 2022.
- J25 N. Khoshavi^{*}, M. Maghsoudloo, **A. Roohi**, S. Sargolzaei, and B. Yu, "HARDeNN: Hardware-assisted Attack-resilient Deep Neural Network Architectures," *Microprocessors & Microsystems*, 95, p.104710, 2022.
- J24 M. Abedin, **A. Roohi**^{*}, M. Liehr, N. Cady, and Sh. Angizi^{*}, "MR-PIPA: An Integrated Multi-level RRAM (HfO_x) based Processing-In-Pixel Accelerator," *IEEE Journal on Exploratory Solid-State Computational Devices and Circuits*, vol. 8, no. 2, pp. 59-67, Dec. 2022.(Featured Paper)

- J23 M. Alali^{*}, **A. Roohi**^{*}, Sh. Angizi, and J. S. Deogun, "Enabling Intelligent IoTs for Histopathology Image Analysis Using Convolutional Neural Networks," *Micromachines*, 13, no. 8, 2022.
- J22 **A. Roohi**^{*}, Sh. Angizi, Sh. Sheikhfaal, D. Fan, and R. F. DeMara, "ApGAN: Approximate GAN for Robust Low-Energy Learning from Imprecise Components," *IEEE Transactions on Computers*, October 2019.
- J21 **A. Roohi**^{*}, and R. F. DeMara, "PARC: A Novel Design Methodology for Power Analysis Resilient Circuits Using Spintronics," *IEEE Transactions on Nanotechnology*, August 2019.
- J20 **A. Roohi**^{*}, and R. F. DeMara, "NV-Clustering: Normally-Off Computing Using Non-Volatile Datapaths," *IEEE Transactions on Computers*, vol. 67, no. 7, pp. 949-959, July 2018.
- J19 R. Zand^{*}, **A. Roohi**, and R. F. DeMara, "Energy-Efficient and Process-Variation-Resilient Write Circuit Schemes for Spin Hall Effect MRAM Device," *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, vol. 25, no. 9, pp. 2394-2401, Sept. 2017.
- J18 **A. Roohi**^{*}, R. Zand, D. Fan, and R. F. DeMara, "Voltage-based Concatenatable Full Adder using Spin Hall Effect Switching," *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, vol. 36, no. 12, pp. 2134-2138, Dec. 2017.
- J17 M. K. Krishna, **A. Roohi**, R. Zand, D. Fan, and R. F. DeMara^{*}, "Heterogeneous Energy-Sparing Reconfigurable Logic: Spin-based Storage and CNFET-based Multiplexing," *IET Circuits, Devices & Systems*, vol. 11, no. 3, pp. 274-279, 5 2017.
- J16 R. Zand, **A. Roohi**, D. Fan, and R. F. DeMara^{*}, "Energy-Efficient Nonvolatile Reconfigurable Logic using Spin Hall Effect-based Lookup Tables," *IEEE Transactions on Nanotechnology*, vol. 16, no. 1, pp. 32-43, Jan. 2017.
- J15 A.M. Chabi, **A. Roohi**, H. Khademolhosseini, Sh. Sheikhfaal, Sh. Angizi, K. Navi, and R. F. DeMara^{*}, "Towards Ultra-efficient QCA Reversible Circuits," *Microprocessors and Microsystems*, Volume 49, Pages 127-138, 2017.
- J14 **A. Roohi**^{*}, R. Zand, Sh. Angizi, and R. F. DeMara, "A Parity-Preserving Reversible QCA Gate with Self-Checking Cascadable Resiliency," *IEEE Transactions on Emerging Topics in Computing*, Special Issue on Defect and Fault Tolerance in VLSI and Nanotechnology Systems, vol. 6, no. 4, pp. 450-459, 2016. **(December 2018 Featured Paper, paper of the month)**
- J13 **A. Roohi**^{*}, R. Zand, and R. F. DeMara, "A Tunable Majority Gate based Full Adder using Current-Induced Domain Wall Nanomagnets," *IEEE Transactions on Magnetics* 52 (8), 2016.
- J12 R. Zand, **A. Roohi**, S. Salehi, and R. F. DeMara^{*}, "Scalable Adaptive Spintronic Reconfigurable Logic using Area-Matched MTJ Design," *IEEE Transactions on Circuits and Systems II: Express Briefs* 63 (7), 678 - 682, 2016.
- J11 H. Shabani, **A. Roohi**, A. Reza, M. Reshadi, N. Bagherzadeh, and R. F. DeMara^{*}, "Loss-Aware Switch Design and Non-Blocking Detection Algorithm for Intra-Chip Scale Photonic Interconnection Networks," *IEEE Transactions on Computers*, 65 (6), 1789-1801, 2016. **(June 2016 Featured Paper, paper of the month)**
- J10 **A. Roohi**^{*}, H. Thapliyal, and R. F. DeMara, "Wire Crossing Constrained QCA Circuit Design using Bilayer Logic Decomposition," *IET Electronics Letters*, Vol 51, No. 21, P. 1677, 2015.
- J9 Sh. Angizi^{*}, S. Sayedsalehi, **A. Roohi**, N. Bagherzadeh, K. Navi, "Design and verification of new n-bit quantum-dot synchronous counters using majority function-based JK flip-flops," *Journal of Circuits, Systems and Computers*, Vol 24, No. 10, P. 1550153, 2015.
- J8 **A. Roohi**^{*}, R. F. DeMara, and N. Khoshavi, "Design and evaluation of an ultra-area-efficient fault-tolerant QCA full adder," *Microelectronics Journal*, Vol 46, No. 6, P. 531, 2015.
- J7 **A. Roohi**^{*}, H. Khademolhosseini, S. Sayedsalehi, and K. Navi, "A Symmetric Quantum-dot Cellular Automata Design for 5-input Majority Gate," *Journal of Computational Electronics*, Vol 13, No. 3, P. 701, 2014.
- J6 **A. Roohi**^{*}, H. Khademolhosseini, "Quantum-Dot Cellular Automata: Computing in Nanoscale," *Reviews In Theoretical Science (RITS)*, Vol 2, No. 1, P. 46, 2014.

- J5 H. Shabani*, **A. Roohi**, A. Reza, H. Khademolhosseini, and M. Reshadi, “Parallel-XY: a novel loss-aware non-blocking photonic router for silicon nano-photonic networks-on-chip,” *Journal of Computational and Theoretical Nanoscience*, Vol.10, No.6, P. 1510, 2013.
- J4 K. Navi*, **A. Roohi**, and S. Sayedsalehi, “Designing Reconfigurable Quantum-dot Cellular Automata Logic Circuits,” *Journal of Computational and Theoretical Nanoscience*, Vol.10, No.5, P. 1137, 2013.
- J3 **A. Roohi**, S. Sayedsalehi, H. Khademolhosseini, and K. Navi*, “Design and Evaluation of a Reconfigurable Fault Tolerant Quantum-dot Cellular Automata Gate,” *Journal of Computational and Theoretical Nanoscience*, Vol.10, No.2, P. 380, 2013.
- J2 S. Sayedsalehi, **A. Roohi**, and K. Navi*, “A different design approach for high performance in nanostructure using Quantum Cellular Automata,” *Canadian Journal on Electrical and Electronics Engineering*, Vol.2, No.11, P. 526, 2011.
- J1 **A. Roohi**, H. Khademolhosseini, S. Sayedsalehi, and K. Navi*, “A Novel Architecture for Quantum-Dot Cellular Automata Multiplexer,” *International Journal of Computer Science Issues*, Vol.8, No.6, P. 55, 2011.

□ Conference Papers

- C89 O. Kurkutlu, R. Chien, M. Basit, and **A. Roohi***, “HORIZON: Lightweight Mapless Navigation for Resource-Constrained Micro Robots in Dynamic Environments,” *The Second Workshop on Autonomous Drone Computing Systems and Applications*, co-located with SEC, Oct 13-16, 2026.
- C88 J. Schmidt, A. Sarvestani, and **A. Roohi***, “Symbolic Structure for Calibrated Concept Embedding Models: From Semantic-CEM to TRACE-CEM,” *IEEE 22nd International Conference on Machine Learning and Applications (ICMLA)*, Rochester, Michigan, USA, October 5-7, 2026.
- C87 S. Gerami, S. Tabrizchi, Sh. Angizi, and **A. Roohi***, “ROAST: Reverse-training Offset Attack on Spatial Sampling Topologies,” *63rd Design Automation Conference (DAC)*, Los Angeles, CA, USA, July 26-29, 2026.
- C86 X. Chen, D. Najafi, C. Zhou, P. Mercati, **A. Roohi**, M. Imani, M. Nikdast, Sh. Angizi, and G. Datta*, “Light-Bound Transformers: Hardware-Anchored Robustness for Silicon-Photonic Computer Vision Systems,” *63rd Design Automation Conference (DAC)*, Los Angeles, CA, USA, July 26-29, 2026.
- C85 J. Feng, **A. Roohi**, and N. Sehatbakhsh*, “WINNER: A Wireless In-Vivo/Ex-Vivo Runtime Analyzer for Intermittent Computing,” *63rd Design Automation Conference (DAC)*, Los Angeles, CA, USA, July 26-29, 2026.
- C84 S. Tabrizchi, and **A. Roohi***, “Harvesting Intelligence: Intermittent-Aware In-/Near-Sensor Processing for Battery-Free Edge Vision,” *34th IEEE International Symposium on Field-Programmable Custom Computing Machines (FCCM) MADCAP*, Atlanta, GA, USA, 2026.
- C83 H. Ding, S. Tabrizchi, and **A. Roohi***, “A2CD-Gaze: Decoder-Free Compressed-Domain Eye Parsing via In-Sensor Pre-ADC Analog Convolution,” *ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED)*, Evanston, Illinois, USA, 2026.
- C82 Sh. Gerami, S. Tabrizchi, Sh. Angizi, R. Zand and **A. Roohi***, “SENTRY: Spiking Event Reasoning for Selective Deep Inference in Event-Driven Edge Vision,” *36th IEEE edition of Great Lakes Symposium on VLSI (GLSVLSI)*, Canandaigua, NY, USA, 2026.
- C81 A. Shafiee Sarvestani, R. Raman Gaire, and **A. Roohi***, “CONFINE: Confidence-Gated Coarse-to-Fine Neural Inference for Energy-Efficient Edge Classification,” *16th IEEE International Conference on Green and Sustainable Computing (IGSC)*, Canandaigua, NY, USA, 2026.
- C80 A. Shafiee Sarvestani, S. Tabrizchi, and **A. Roohi***, “REACT: Rethinking the Embodied Aging-Aware Carbon of Transient Intermittent Computing Systems,” *16th IEEE International Conference on Green and Sustainable Computing (IGSC)*, Canandaigua, NY, USA, 2026.
- C79 O. Adekola, H. Ding, S. Tabrizchi, and **A. Roohi***, “DART: Dynamic Activity-Aware ROI and Temporal Adaptation for Energy-Efficient Edge Vision,” *16th IEEE International Conference on Green and Sustainable Computing (IGSC)*, Canandaigua, NY, USA, 2026. **(Best Paper Candidate)**

- C78 M. Mohammadi, L. Lamb, A. Juneja, S. Tabrizchi, D. Najafi, S. Angizi, **A. Roohi**, R. Zand*, “The Space Between Sensing and Processing: In-Sensor and Near-Sensor Computing for Embedded Vision Systems,” *9th CVPR Workshop on Efficient Deep Learning for Computer Vision (ECV)*, Denver, CO, USA, 2026.
- C77 S. Pasqual, A. Shafiee Sarvestani, and **A. Roohi***, “RISE: RISC-V Intermittent System Extensions for Batteryless IoT Devices,” *13th IEEE Conference on Technologies for Sustainability (SusTech 2026)*, California, April 19-22, 2026.
- C76 M. Moghadam, S. Tabrizchi, A. Shafiee Sarvestani, S. Aygun, **A. Roohi***, and M. H. Najafi*, “ADC-FIST: ADC-Free In/Near-Sensor Stochastic Object Tracking,” *44th Design, Automation and Test in Europe Conference (DATE)*, Verona, Italy, 20 - 22 April 2026.
- C75 M. H. Alali, S. Tabrizchi, H. A. Almubarak, and **A. Roohi***, “HEART: Hardware-Efficient Analytics for Radiomic Tissue Evaluation Using In-Sensor Processing Scheme,” *The 5th International Conference on Computing and Machine Intelligence*, April 8-10, 2026.
- C74 O. Kurkutlu, and **A. Roohi***, “LiMPNet: Lightweight Multi-sensor Perception and DRL Navigation for Tiny Drones in Mapless Environments,” *The 3rd AAAI Fall Symposium on Unifying Representations for Robot Application Development*, November 6-8, 2025.
- C73 Sh. Gerami, S. Tabrizchi, O. Kurkutlu, R. Gaire, and **A. Roohi***, “SunSift: Solar-Powered Intelligent Sensing through Informative Sample Selection,” *6th IEEE International Conference on Autonomic Computing and Self-Organizing Systems (ACSOS)*, Sep 29 - Oct 3, 2025.
- C72 O. Kurkutlu, and **A. Roohi***, “Lightweight Temporal Consistency for Grid-Based Obstacle Detection in Edge Devices,” *3rd International Workshop on Artificial Intelligence for Autonomous computing Systems (AI4AS 2025)*, Sep 29 - Oct 3, 2025.
- C71 S. Tabrizchi, N. Solanki, A. Shafiee Sarvestani, Sh. Angizi, and **A. Roohi***, “OrganoSense: Neural Biosignal Processing in the Sensor Using Organic Devices,” *IEEE 68th International Midwest Symposium on Circuits and Systems (MWSCAS)*, August 10-13, 2025.
- C70 R. Gaire and **A. Roohi***, “FDAL: Leveraging Feature Distillation for Efficient and Task-Aware Active Learning,” *2nd ICCV Workshop on Efficient Computing under Limited Resources: Visual Computing (ECLR)*, Honolulu, Hawai’i, USA, 2025.
- C69 S. Tabrizchi, M.S. Moghadam, A. Shafiee Sarvestani, S. Aygun, M.H. Najafi, and **A. Roohi***, “STIC: Stochastic Intermittent Computing for Always-On Sensing in Energy-Harvested Systems,” *ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED)*, San Diego, California, USA, 2025.
- C68 N. Solanki, S. Tabrizchi, S. Angizi, and **A. Roohi***, “SenGuard: A Novel Processing In-Sensor Method for Privacy-Enhanced Smart Imaging,” *Great Lakes Symposium on VLSI (GLSVLSI)*, New Orleans, Louisiana, USA, 2025.
- C67 G. Aragonda, D. Najafi, D. Vungarala, S. Tabrizchi, **A. Roohi***, and S. Angizi, “Maximizing Sub-Array Resource Utilization in Digital Processing-in-Memory: A Versatile Hardware-Aware Approach,” *Great Lakes Symposium on VLSI (GLSVLSI)*, New Orleans, Louisiana, USA, 2025.
- C66 M. Morsali, D. Najafi, A. Shafiee, S. Tabrizchi, P. Mercati, M. Imani, **A. Roohi***, N. Khoshavi, M. Nikdast, and S. Angizi, “Event-Driven Spatiotemporal Processing-In-Sensor with Phase Change Memory-based Optical Acceleration,” *Great Lakes Symposium on VLSI (GLSVLSI)*, New Orleans, Louisiana, USA, 2025.
- C65 D. Vungarala, M.H. Amin, A. Ghosh, **A. Roohi***, R. Zand, and S. Angizi, “From Prompt to Accelerator: A Perspective on LLM-Based Analog In-Memory Accelerator Design Automation,” *Great Lakes Symposium on VLSI (GLSVLSI)*, New Orleans, Louisiana, USA, 2025.
- C64 S. Tabrizchi, A. Shafiee Sarvestani, M.H. Amin, D. Najafi, R. Zand, S. Angizi, and **A. Roohi***, “Magnetic In/Near-Sensor Architectures: From Raw Sensing to Smart Processing,” *Great Lakes Symposium on VLSI (GLSVLSI)*, New Orleans, Louisiana, USA, 2025.

- C63 S. Tabrizchi, Sh. Angizi, and **A. Roohi***, “iSEW: in-Sensor Embedded Watermarking for Secure Imaging,” *33rd IEEE International Symposium on Field-Programmable Custom Computing Machines (FCCM) MADCAP*, Fayetteville, Arkansas, USA, 2025.
- C62 D. Vungarala, Md H. Amin, P. Mercati, A. Roohi, R. Zand, and **Sh. Angizi***, “LLM-IMC: Automating Analog In-Memory Computing Architecture Generation with Large Language Models,” *33rd IEEE International Symposium on Field-Programmable Custom Computing Machines (FCCM) MADCAP*, Fayetteville, Arkansas, USA, 2025.
- C61 A. Shafiee Sarvestani, S. Tabrizchi, N. Sehatbakhsh, and **A. Roohi***, “Poster Abstract: RL-SEP: RL -Based Smart Exit Point Selection for Enhancing Energy Harvested System Longevity,” *ACM SenSys 2025*, Irvine, CA, USA, 2025.
- C60 R. Gaire, and **A. Roohi***, “CARN: Complexity-Aware Routing Network for Efficient and Adaptive Inference,” *2nd CVPR Workshop on Efficient Large Vision Models (eLVM)*, Nashville, Tennessee, USA, 2025.
- C59 S. Tabrizchi, S. Sohrabi, M. Mohammadi, R. Zand, Sh. Angizi, and **A. Roohi***, “ResISC: Residue Number System-Based Integrated Sensing and Computing for Efficient Edge AI,” *62nd Design Automation Conference (DAC)*, San Francisco, CA, USA, June 22-25, 2025.
- C58 S. Hossain, O. Kurkutlu, O. Adekola, S. Kumar Pramanik, S. Md Mahmudul Islam, **A. Roohi**, and D. Vital*, “Autonomous Integrated Sensing and Processing for BioRadar: Advancing Non-Invasive Biomedical Monitoring and Signal Analysis,” *IEEE MTT-S International Microwave Biomedical Conference (IMBioC)*, Kaohsiung, Taiwan, 2025.
- C57 A. K. Mohammad Masum, M. Moghadam, L. Kouhalvandi, M. H. Najafi, **A. Roohi**, and Sercan Aygun*, “Pseudo-Random versus Quasi-Random Number Generation using Quantum Circuits,” Workshop on *Architecting Error Corrected Quantum Computers (ARQTEC)* co-located with HPCA 2025, Las Vegas, NV, USA, 2025.
- C56 N. Solanki, S. Tabrizchi, S. Sohrabi, J. Schmidt, and **A. Roohi***, “ATM-Net: Adaptive Termination and Multi-Precision Neural Networks for Energy-Harvested Edge Intelligence,” *EMC2 - Energy Efficient Machine Learning and Cognitive Computing (EMC2)* co-located with HPCA 2025, Las Vegas, NV, USA, 2025.
- C55 S. Tabrizchi, N. Taheri, J. Feng, N. Sehatbakhsh, D. Z. Pan, and **A. Roohi***, “SRC: Sustainable Reactive Computing for Battery-free Edge Intelligence,” *15th IEEE International Conference on Green and Sustainable Computing (IEEE IGSC)*, co-located with MICRO’24, Austin, TX, USA, 2024.
- C54 N. Taheri, S. Tabrizchi, Sh. Angizi, and **A. Roohi***, “ChaoSen: Security Enhancement of Image Sensor through in-Sensor Chaotic Computing,” *42nd IEEE International Conference on Computer Design (ICCD)*, Milan, Italy, 2024.
- C53 R. Gaire, S. Tabrizchi, D. Najafi, Sh. Angizi, and **A. Roohi***, “DECO: Dynamic Energy-aware Compression and Optimization for In-Memory Neural Networks,” *IEEE 67th International Midwest Symposium on Circuits and Systems (MWSCAS)*, August 11-14, 2024.
- C52 R. Gaire, S. Tabrizchi, and **A. Roohi***, “Resource-Efficient Adaptive-Network Inference Framework with Knowledge Distillation-based Unified Learning,” *IEEE Computer Society Annual Symposium on VLSI (ISVLSI)*, Knoxville, Tennessee, USA, July 1-2, 2024.
- C51 M. Morsali, R. Velpula, M. Muthu, H. Nguyen, M. Imani, **A. Roohi**, R. Zand, and Sh. Angizi*, “Energy-Efficient Near-Sensor Event Detector based on Multilevel Ga₂O₃ RRAM,” *IEEE Computer Society Annual Symposium on VLSI (ISVLSI)*, Knoxville, Tennessee, USA, July 1-2, 2024.
- C50 N. Taheri, S. Tabrizchi, D. Najafi, Sh. Angizi, and **A. Roohi***, “ResSen: Imager Privacy Enhancement through Residue Arithmetic Processing in Sensors,” *IEEE Computer Society Annual Symposium on VLSI (ISVLSI)*, Knoxville, Tennessee, USA, July 1-2, 2024.
- C49 D. Najafi, S. Tabrizchi, R. Zhou, M. Solouki, A. Marshal, **A. Roohi**, and Sh. Angizi*, “Hybrid Magneto-electric FET-CMOS Integrated Memory Design for Instant-on Computing,” *ACM Great Lakes Symposium on VLSI (GLSVLSI 2024)*, June 12-14, 2024.

- C48 S. Tabrizchi, N. Taheri, Sh. Angizi, and **A. Roohi**^{*}, “RACSen: Residue Arithmetic and Chaotic Processing in Sensors to Enhance CMOS Imager Security,” *ACM Great Lakes Symposium on VLSI (GLSVLSI 2024)*, June 12-14, 2024.
- C47 B. Reidy, S. Tabrizchi, M. Mohammadi, Sh. Angizi, **A. Roohi**, and R. Zand^{*}, “HiRISE: High-Resolution Image Scaling for Edge ML via In-Sensor Compression and Selective ROI,” *61st Design Automation Conference (DAC)*, San Francisco, CA, USA, July 23-27, 2024.
- C46 M. Morsali, B. Reidy, D. Najafi, S. Tabrizchi, M. Imani, M. Nikdast, **A. Roohi**, R. Zand, and Sh. Angizi^{*}, “Lightator: An Optical Near-Sensor Accelerator with Compressive Acquisition Enabling Versatile Image Processing,” *61st Design Automation Conference (DAC)*, San Francisco, CA, USA, July 23-27, 2024.
- C45 S. Tabrizchi, Sh. Angizi, and **A. Roohi**^{*}, “DIAC: Design Exploration of Intermittent-Aware Computing Realizing Batteryless Systems,” *44th Design, Automation and Test in Europe Conference (DATE)*, Valencia, Spain, 25 - 27 March 2024.
- C44 M. Morsali, S. Tabrizchi, D. Najafi, M. Imani, M. Nikdast, **A. Roohi**, Sh. Angizi^{*}, “OISA: Architecting an Optical In-Sensor Accelerator for Efficient Visual Computing,” *44th Design, Automation and Test in Europe Conference (DATE)*, Valencia, Spain, 25 - 27 March 2024.
- C43 R. Zhou, S. Ahmed, **A. Roohi**, A. Rakin, and Sh. Angizi^{*}, “DRAM-Locker: A General-Purpose DRAM Protection Mechanism against Adversarial DNN Weight Attacks,” *44th Design, Automation and Test in Europe Conference (DATE)*, Valencia, Spain, 25 - 27 March 2024.
- C42 M. Morsali, S. Tabrizchi, M. Liehr, N. Cady, M. Imani, **A. Roohi**, and Sh. Angizi^{*}, “Deep Mapper: A Multi-Channel Single-Cycle Near-Sensor DNN Accelerator,” *IEEE International Conference on Rebooting Computing (ICRC)*, December 5-6, 2023.
- C41 R. Gaire, S. Tabrizchi, and **A. Roohi**^{*}, “EnCoDe: Enhancing Compressed Deep Learning Models through Feature Distillation and Informative Sample Selection,” *IEEE 22nd International Conference on Machine Learning and Applications (ICMLA)*, December 15-17, 2023.
- C40 S. Tabrizchi, Sh. Angizi, and **A. Roohi**^{*}, “Ocellus: Highly Parallel Convolution-in-Pixel Scheme Realizing Power-Delay-Efficient Edge Intelligence,” *ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED)*, August 7-8, 2023. **(Best Paper Candidate)**
- C39 D. Vungarala, M. Morsali, S. Tabrizchi, **A. Roohi**, and Sh. Angizi^{*}, “Comparative Study of Low Bit-width DNN Accelerators: Opportunities and Challenges,” *IEEE 66th International Midwest Symposium on Circuits and Systems (MWSCAS)*, August 6-9, 2023.
- C38 S. Tabrizchi, R. Gaire, Sh. Angizi, and **A. Roohi**^{*}, “SenTer: A Reconfigurable Processing-in-Sensor Architecture Enabling Efficient Ternary MLP,” *33rd ACM Great Lakes Symposium on VLSI (GLSVLSI 2023)*, June 5-7, 2023.
- C37 S. Tabrizchi, M. Morsali, Sh. Angizi, and **A. Roohi**^{*}, “NeSe: Near-Sensor Event-Driven Scheme for Low Power Energy Harvesting Sensors,” *24th IEEE International Symposium on Circuits and Systems (ISCAS)*, Monterey, California, May 21-25, 2023.
- C36 M. Morsali, R. Zhou, S. Tabrizchi, **A. Roohi**^{*}, and Sh. Angizi^{*}, “XOR-CiM: An Efficient Computing-in-SOT-MRAM Design for Binary Neural Network Acceleration,” *24th IEEE International Symposium on Quality Electronic Design (ISQED)*, Santa Clara, CA, April 5-7, 2023.
- C35 R. Zhou, S. Tabrizchi, **A. Roohi**, and Sh. Angizi^{*}, “P-PIM: A Parallel Processing-in-DRAM Framework Enabling RowHammer Protection,” *43rd Design, Automation and Test in Europe Conference (DATE)*, Antwerp, BE, 2023.
- C34 A. Minhaz, **A. Roohi**^{*}, N. Cady, and Sh. Angizi^{*}, “A Processing-in-Pixel Accelerator based on Multi-level HfOx ReRAM,” *International Conference on Compilers, Architecture, and Synthesis for Embedded Systems (ESWEEK CASES)*, 2022.
- C33 S. Tabrizchi, Sh. Angizi, and **A. Roohi**^{*}, “TizBin: A Low-Power Image Sensor with Event and Object Detection Using Efficient Processing-in-Pixel Schemes,” *40th IEEE International Conference on Computer Design (ICCD)*, Lake Tahoe, USA, 2022.

- 32 R. Zhou, S. Tabrizchi, **A. Roohi**^{*}, and Sh. Angizi^{*}, “ReD-LUT: Reconfigurable In-DRAM LUTs Enabling Massive Parallel Computation,” 41st *IEEE/ACM International Conference on Computer-Aided Design (ICCAD)*, San Diego, California, USA, 2022.
- C31 A. Nezhadi, Sh. Angizi, and **A. Roohi**^{*}, “semiMul: Floating-Point Free Implementations for Efficient and Accurate Neural Network Training,” 21st *IEEE International Conference on Machine Learning and Applications (ICMLA)*, 2022.
- C30 S. Tabrizchi, Sh. Angizi, and **A. Roohi**^{*}, “Design and Evaluation of a Robust Power-Efficient Ternary SRAM Cell,” *IEEE 65th International Midwest Symposium on Circuits and Systems (MWSCAS)*, pp. 1-4. IEEE, 2022.
- C29 M. Alali, **A. Roohi**, J. S. Deogun^{*}, “Enabling efficient training of convolutional neural networks for histopathology images,” *International Conference on Image Analysis and Processing*, pp. 533-544. Springer, Cham, 2022.
- C28 R. Zhou, **A. Roohi**, D. Misra, and Sh. Angizi^{*}, “FlexiDRAM: A Flexible in-DRAM Framework to Enable Parallel General-Purpose Computation,” *ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED)*, Boston, USA, 2022.
- C27 **A. Roohi**^{*}, and Sh. Angizi, “Efficient Targeted Bit-Flip Attack Against the Local Binary Pattern Network,” *IEEE International Symposium on Hardware Oriented Security and Trust (HOST)*, Washington DC, USA, 2022.
- C26 S. Tabrizchi, Sh. Angizi, and **A. Roohi**^{*}, “SCiMA: a Generic Single-Cycle Compute-in-Memory Acceleration Scheme for Matrix Computations,” 23rd *IEEE International Symposium on Circuits and Systems (ISCAS)*, Austin, TX, May 28- June 1, 2022.
- C25 A. Nezhadi, Sh. Angizi, and **A. Roohi**^{*}, “EaseMiss: HW/SW Co-Optimization for Efficient Large Matrix-Matrix Multiply Operations,” 15th *IEEE Dallas Circuit And System Conference (DCAS)*, pp. 1-6. IEEE, 2022.
- C24 Sh. Angizi^{*}, and **A. Roohi**^{*}, “Integrated Sensing and Computing using Energy-Efficient Magnetic Synapses,” 23rd *IEEE International Symposium on Quality Electronic Design (ISQED)*, Santa Clara, CA, April 6-8, 2022.
- C23 **A. Roohi**^{*}, Sh. Angizi, P. Navaeilavasani, and M. Taheri, “ReFACE: Efficient Design Methodology for Acceleration of Digital Filter Implementations,” 23rd *IEEE International Symposium on Quality Electronic Design (ISQED)*, Santa Clara, CA, April 6-8, 2022.
- C22 **A. Roohi**^{*}, M. Taheri, Sh. Angizi, D. Fan, “RNSiM: Efficient Deep Neural Network Accelerator Using Residue Number Systems,” 40th *International Conference On Computer-Aided Design (ICCAD)*, 2021, pp. 1-9
- C21 Sh. Angizi^{*}, **A. Roohi**^{*}, M. Taheri, D. Fan, “Processing-in-Memory Acceleration of MAC-based Applications Using Residue Number System: A Comparative Study,” 31st *ACM Great Lakes Symposium on VLSI (GLSVLSI 2021)*, June 22-25, 2021.
- C20 N. Khoshavi, S. Sargolzaei, Y. Bi, **A. Roohi**^{*}, “Entropy-Based Modeling for Estimating Adversarial Bit-flip Attack Impact on Binarized Neural Network,” 26th *Asia and South Pacific Design Automation Conference (ASP-DAC)*, Jan.18-21, 2021.
- C19 **A. Roohi**^{*}, “Normally-Off Computing Design Methodology Using Spintronics: From Devices to Architectures,” *International Green and Sustainable Computing Conference*, October 19-22, 2020
- C18 N. Khoshavi^{*}, C. Broyles, Y. Bi, **A. Roohi**, “Fiji-FIN: A Fault Injection Framework on Quantized Neural Network Inference Accelerator,” *IEEE International Conference on Machine Learning and Applications (ICMLA)*, October 19-22, 2020.
- C17 N. Khoshavi^{*}, **A. Roohi**, Y. Bi, “Hardware-assisted Black-box Adversarial Attack Evaluation Framework on Binarized Neural Network,” 41st *IEEE Symposium on Security and Privacy*, Short Talks, URL: <https://www.ieee-security.org/TC/SP2020/program-shorttalks.html>, 2020.
- C16 N. Khoshavi^{*}, **A. Roohi**^{*}, C. Broyles, S. Sargolzaei, Y. Bi, D. Z. Pan, “SHIELDnN: Online Accelerated Framework for Fault-Tolerant Deep Neural Network Architectures,” 57th *Design Automation Conference (DAC)*, San Francisco, CA, USA, July 19-23, 2020.

- C15 N. Khoshavi*, **A. Roohi**, S. Sargolzaei, C. Broyles, and Y. Bi, "Entropy-Based Modeling for Estimating Soft Errors Impact on Binarized Neural Network Inference," *arXiv preprint arXiv:2004.05089* 2020.
- C14 **A. Roohi***, and R. F. DeMara, "IRC: Cross-layer design exploration of Intermittent Robust Computation units for IoTs," *IEEE Computer Society Annual Symposium on VLSI (ISVLSI)*, Miami, Florida, U.S.A., July 15-17, 2019.
- C13 **A. Roohi***, Sh. Angizi, D. Fan, and R. F. DeMara, "Processing-In-Memory Acceleration of Convolutional Neural Networks for Energy-Efficiency, and Power-Intermittency Resilience," 20th IEEE *International Symposium on Quality Electronic Design (ISQED)*, Santa Clara, CA, March 6-7, 2019. **(Best Paper Candidate)**
- C12 **A. Roohi***, R. Zand, and R. F. DeMara, "Logic-Encrypted Synthesis for Energy-Harvesting-Powered Spintronic-Embedded Datapath Design," *28th ACM Great Lakes Symposium on VLSI (GLSVLSI 2018)*, Chicago, Illinois, USA, May 23-25, 2018. **(Best Paper Candidate)**
- C11 **A. Roohi***, R. Zand, and R. F. DeMara, "Synthesis of Normally-Off Boolean Circuits: An Evolutionary Optimization Approach Utilizing Spintronic Devices," The 19th *International Symposium on Quality Electronic Design*, Santa Clara, CA, USA, ISQED 2018. **(Best Paper Candidate)**
- C10 R. F. DeMara*, **A. Roohi**, R. Zand, and S. D. Pyle, "Heterogeneous Technology Configurable Fabrics for Field Programmable Co-design of CMOS and Spin-based Devices," in *Proceedings of IEEE International Conference on Rebooting Computing (ICRC-2017)*, Washington, DC, USA, November 8 - 9, 2017.
- C9 **A. Roohi***, L. Wang, S. Kose, and R. F. DeMara, "Secure Intermittent-Robust Computation for Energy Harvesting Device Security and Outage Resilience," The 14th *IEEE International Conference on Advanced and Trusted Computing*, San Francisco, CA, USA, ATC 2017.
- C8 A.M.Chabi, **A. Roohi**, H. Khademolhosseini, Sh. Angizi, R. F. DeMara, and K. Navi*, "Cost-Efficient QCA Reversible Combinational Circuits Based on a New Reversible Gate," The 18th *CSI Symposium on Computer Architecture & Digital Systems*, Tehran, Iran, CADs 2015 **(Best Paper Candidate)**.
- C7 R. A. Ashraf, A. Al-Zahrani, N. Khoshavi, R. Zand, S. Salehi, **A. Roohi**, M. Lin, and R. F. DeMara*, "Reactive Rejuvenation of CMOS Logic Paths using Self-Activating Voltage Domains," *IEEE International Symposium on Circuits and Systems*, Lisbon, Portugal, ISCAS 2015.
- C6 **A. Roohi***, R. F. DeMara, and N. Khoshavi, "Dual Computational Layer Based Logic Design for QCA Circuits," 52nd *Design Automation Conference (DAC)*, Work-in-Progress Session, San Francisco, CA, USA, DAC-WIP 2015.
- C5 S. Sayedsalehi*, and **A. Roohi**, "Modeling an Improved Modified Type in Metallic Quantum-dot Fixed Cell for Nano Structure Implementation," 23rd *Euromicro International Conference on Parallel, Distributed and Network-based Processing*, Turku, Finland, PDP 2015.
- C4 S. Sayedsalehi*, **A. Roohi**, H. Khademolhosseini, and M. Kamrani, "Design of Nanoelectronic Circuits Using an Efficient Reversible Gate," 9th *International Nanotechnology Symposium*, Dresden, Germany, Nanofair 2012.
- C3 **A. Roohi***, H. Khademolhosseini, S. Sayedsalehi, and K. Navi, "Implementation of Reversible Logic Design in Nanoelectronics on Basis of Majority Gates," The 16th *CSI Symposium on Computer Architecture & Digital Systems*, Shiraz, Iran, CADs 2012.
- C2 **A. Roohi***, M. Kamrani, S. Sayedsalehi, and K. Navi, "A Combinational Logic Optimization for Majority Gate-Based Nanoelectronic Circuits Based on GA," *International Semiconductor Device Research Symposium*, The University of Maryland, USA, ISDRS 2011.
- C1 H. Khademolhosseini and **A. Roohi***, "A New Redundant Method on Representing Numbers with Moduli Set $\{3^n, 3^n - 1, 3^n - 2\}$ " *Computer, Communication and Electrical Technology (ICCCET 2011)*, IEEE International Conference on, pp. 163-166, 2011.

□ Book Chapter

- Ch3 **A. Roohi***, Sh. Angizi, and D. Fan, “Enabling Edge Computing Using Emerging Memory Technologies: From Device to Architecture,” *In Frontiers of Quality Electronic Design (QED) AI, IoT and Hardware Security*, Cham: Springer International Publishing, pp. 415-464, 2022.
- Ch2 R. Zand*, **A. Roohi***, and R. F. DeMara, “Fundamentals, Modeling, and Application of Magnetic Tunnel Junction,” *Nanoscale Devices: Physics, Modeling, and Their Applications*, CRC Press, pp. 337-368, 2018.
- Ch1 M. Kamrani*, H. Khademolhosseini, **A. Roohi**, and P. Aloustanimirmahalleh, “A Novel Genetic Algorithm Based Method for Efficient QCA Circuit Design,” *Advances in Computer Science, Engineering & Applications*. vol. 166, D. C. Wyld, et al., Eds., ed: Springer Berlin / Heidelberg, pp. 433-442, 2012.

□ Patents

- P5 **A. Roohi***, S. Tabrizchi, and M. H. Najafi “*Adaptive Always-On Battery-Free Sensing*,” UIC-2025-113-01, Pending.
- P4 **A. Roohi***, S. Tabrizchi, and Sh. Angizi “*RNS-Based In-Sensor and Near-Sensor AI Accelerator*,” UIC-2025-111, Pending.
- P3 **A. Roohi***, S. Tabrizchi, N. Solanki, H. Ding, S. Tabrizchi and A. Sh. Sarvestani “*Gaze-Guided Region-of-Interest Object Detection for Wearable Devices*,” UIC-2026-098, Pending.
- P2 **A. Roohi***, S. Tabrizchi, and Sh. Angizi “*Neural network acceleration of image processing*,” U.S. Patent Application 19/004,020, filed July 3, 2025.
- P1 Sh. Angizi and **A. Roohi**, “*A Non-Volatile Processing-In-Sensor Accelerator for Imaging Systems*,” U.S. Patent Application 18/439,267.

■ Funding Experience

□ Awarded at University of Illinois Chicago (UIC)

- 2024-2029 **National Science Foundation (NSF):**, “*CAREER: Elastic Intermittent Computation Enabling Batteryless Edge Intelligence*”, 8/1/2024 - 7/30/2029; Role: **Leading-PI**; total awarded fund: **\$679,831**.
[Abstract](#)
- 2024-2027 **National Science Foundation (NSF): CSR: Small**, “*Cross-Layer Solutions Enabling Instant Computing for Edge Intelligence Devices*”, 1/1/2024 - 12/30/2026; Role: **Leading-PI**; total awarded fund: **\$533,880**, UIC: \$364,960.
[Abstract](#)
- 2024-2027 **National Science Foundation (NSF): SaTC: CORE: Medium**, “*Collaborative Research: Security and Robustness for Intermittent Computing Using Cross-Layer Post-CMOS Approaches*”, 10/1/2023 - 09/30/2026; Role: **Leading-PI**; total awarded fund: **\$1.2M**, UIC: \$399,972.
[Abstract](#)

□ Awarded at University of Nebraska Lincoln (UNL)

- 2023-2025 **Grand Challenges Catalyst (UNL)**, “*Quantum Solutions for Energy Challenges: A Collaborative Leap towards Sustainability*”, 8/2023 - 07/2025; Role: **Co-PI**; total awarded fund: **\$150,000**.
- 2022-2025 **National Science Foundation (NSF): CCSS**, “*Collaborative Research: Integrated Sensing and Normally-off Computing for Edge Imaging Systems*”, 10/1/2023 - 09/30/2026; Role: **Co-PI**; total awarded fund: **\$539,998**, UNL: \$260,664.
[Abstract](#)
- 2023-2024 **National Science Foundation (NSF): CSR**, “*Student Participation Grant for 2022 IEEE International Conference on Green and Sustainable Computing (IEEE IGSC)*”, Role: **Sole-PI**; total awarded fund: \$10,000.
[Abstract](#)
- 2022-2023 **University of Nebraska-Lincoln: Layman Award**, “*Enabling Robust Quantized Neural Network Acceleration in Federated Edge Computing*”, Role: **Sole-PI**; total awarded fund: \$10,000.

2021-2022 **National Science Foundation (NSF): CSR**, “*Student Participation Grant for 2021 IEEE International Conference on Green and Sustainable Computing (IEEE IGSC)*”, Role: **Sole-PI**; total awarded fund: \$10,000.

❑ Awarded at University of Central Florida (UCF)

- 2018-2019 **Graduate Grantsmanship Series: 2018-2019**, learn to search for funding opportunities, plan research proposals and budgets, and manage sponsored research activities.
- 2017-2020 **NSF Energy-Efficient Computing: from Devices to Architectures (E2CDA) Collaborative Proposal**, Contributed to the UCF student contributions to prepare the proposal titled “Probabilistic Spin Logic for Low-Energy Boolean and Non-Boolean Computing”, incl. 3-years REU Supplement: \$2,501,754.
- 2017-2020 **Semiconductor Research Corporation (SRC)**, SRC Center: Probabilistic Spin Logic for Low-Energy Boolean and Non-Boolean Computing, an extra grant as a part of E2CDA: \$1,226,877.
- 2016-2017 **The Florida Center for Cybersecurity (FC2) collaborative Proposal**, Leading the UCF student contributions to prepare the proposal titled “Trusted IoT using Cross-layer Leveraging of Reconfigurable Device Signatures”, \$25,000.
- 2015-2016 **The Florida Center for Cybersecurity (FC2) collaborative Proposal**, Contributed to the UCF student contributions to prepare the proposal titled “Aging-Aware Hardware-Trojan Detection at Runtime”, \$25,000.

Teaching Experience

❑ University of Illinois Chicago (UIC)

- 2025-present **Instructor, ECE 594: HW-SW Co-Design for Machine Learning Systems**, University of Illinois Chicago
- Foundations of ML and DL algorithm
 - Compute and memory behavior of DL workloads
 - HW+ML for the compute-heavy deep neural network (DNN) models of machine learning
 - Co-design of ML algorithms and accelerators
- 2024-present **Instructor, ECE/CS 446/846: Computer Architecture**, University of Illinois Chicago
- Foundations of computer architecture
 - Instruction set architecture
 - Memory hierarchy, and cache design/optimization
 - Pipelining and parallelism

❑ University of Nebraska-Lincoln (UNL)

- 2020-2024 **Instructor, CSCE 431/831: Hardware Acceleration for Machine Learning**, University of Nebraska - Lincoln
- Foundations of ML and DL algorithm
 - Compute and memory behavior of DL workloads
 - HW+ML for the compute-heavy deep neural network (DNN) models of machine learning
 - Co-design of ML algorithms and accelerators
- 2021-2024 **Instructor, CSCE 430/830: Computer Architecture**, University of Nebraska - Lincoln
- Foundations of computer architecture
 - Instruction set architecture
 - Memory hierarchy, and cache design/optimization
 - Pipelining and parallelism
- 2023-2024 **Instructor, CSCE 351: Operating System Kernels**, University of Nebraska - Lincoln
- Foundations of cache and virtual memory
 - Process management (Scheduling)

- Process and thread synchronization
- Handling of interrupts and exceptions and system calls

□ **University of Central Florida (UCF)**

- 2016-2018 **Tutor/Proctor/Coordinator**, Evaluation and Proficiency Center (EPC), University of Central Florida
- Played a pivotal role in the development of infrastructure, procedures, and online question content for secure quiz delivery interwoven with post-testing review.
 - Lead assistant in 120-seat testing center to proctor computer-based examinations for Electrical and Computer Engineering undergraduate courses.
 - Provided review-based tutoring for students.
 - Developed high-quality electronically-delivered question content used in Electrical and Computer Engineering undergraduate courses.
- 2016-2017 **STEM Assessment Assistant**: Advisement of faculty at all levels (Lecturer through Professor) on digitization of engineering assessments, construction of computer-based exams, and remediation methods.
- Sep 2015-
Aug 2016 **Graduate Teaching Assistant**, Electrical and Computer Engineering, University of Central Florida
- Embedded Systems
- Jan 2015-
Aug 2015 **Graduate Assistant**, Electrical and Computer Engineering, University of Central Florida, Orlando, FL, USA.

———— Academic Services & Activities

- 2017-2019 Vice President of STUDENTS LAUREATES OF STEM TEACHING AND LEARNING (SLSTL) Registered Student Organization, University of Central Florida.
- 2016-2017 Treasurer of STUDENTS LAUREATES OF STEM TEACHING AND LEARNING (SLSTL) Registered Student Organization, University of Central Florida.
- 2016 Co-Established STUDENTS LAUREATES OF STEM TEACHING AND LEARNING (SLSTL) as a Registered Student Organization, University of Central Florida.

□ **Memberships in Professional Organizations**

- 2023-present AAAI Lifetime Member
- 2023-present IEEE Senior Member
- 2020-present ACM Lifetime Professional Member
- 2023-present IEEE Circuits and Systems Society
- 2020-present IEEE Systems Council Member
- 2020-present IEEE Computer Society Member
- 2020-present IEEE Council on Electronic Design Automation Member
- 2020-present ACM SIGARCH Member
- 2020-present ACM SIGMICRO Member
- 2020-present ACM SIGDA Member

□ **Editorial Board**

- 2024-present Associate Editor of **Photonic Network Communications**.
- 2024-present Associate Editor of **IEEE Engineering in Medicine and Biology Society**.
- 2021-present Associate Editor of **Micromachines Journal**.
- 2019-present Associate Editor of **Neural Processing Letters**.
- 2014-present International Journal of VLSI Design & Communication Systems (**VLSICS**).
- 2014-2017 International Journal of Advanced Computer Research (**IJACR**).

□ Technical Program Committees

- 2024-present ACM SenSys
- 2023-present tinyML Research Symposium
- 2022-present IEEE/ACM Design Automation Conference (DAC)
- 2020-present Silicon Valley Cybersecurity Conference (SVCC)
- 2019-present IEEE Computer Society Annual Symposium on VLSI (ISVLSI)
- 2019-present ACM Great Lakes Symposium on VLSI (GLSVLSI)
- 2018-present IEEE International Symposium on Quality Electronic Design (ISQED)
 - 2021-2022 IEEE International Conference on Computer Design (ICCD)
 - 2021-2022 IEEE International Midwest Symposium on Circuits and Systems (MWSCAS)
 - 2021-2023 International Conference on VLSI Design (VLSID)
 - 2022 IEEE/ACM International Symposium on Networks-on-Chip (NOCS)
 - 2013 Second International Conference on Soft Computing, Artificial Intelligence and Applications.
 - 2013 International Conference On Emerging Trends, Technology and Research.
 - 2012 First International Conference on Emerging Trends and Technology.

□ Leadership Positions in International and National Organizations

- 2025 Organized “*SMART: Enhancing Sensory IoT with In/Near-Sensor Processing for Advanced Imaging and Visual Sensing*,” workshop, which was co-located with fcm
- 2023 Organized “*DAC Early Career*,” workshop, which was co-located with DAC
- 2023 Session Chair - tinyML Research Symposium (2023)
- 2020–2023 Session Chair - IEEE Computer Society Annual Symposium on VLSI (ISVLSI)
- 2020–2022 Session Chair - ACM Great Lakes Symposium on VLSI (GLSVLSI) Conference
- 2020–2022 Session Chair - IEEE/ACM Design Automation Conference (DAC)
 - 2022 Session Chair - IEEE International Conference on Computer Design (ICCD)
 - 2022 Session Chair - International VLSI Design & Embedded Systems Conference (VLSID)
- 2021–2022 Session Chair - IEEE International Symposium on Quality Electronic Design (ISQED)
- 2021–2022 Travel Grant Chair - IEEE International Green and Sustainable Computing Conference (IGSC)
 - 2021 Organized “*Neuromorphic Computing: from Material to Algorithm (NeuMA)*,” workshop, which was co-located with IGSC
- 2021 Ph.D. Forum Chair - IEEE International Green and Sustainable Computing Conference (IGSC)

□ Technical Reviewer

- IEEE Transactions on Computers (TC)
- IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)
- IEEE Transactions on Circuits and Systems I (TCAS I)
- IEEE Transactions on Circuits and Systems II (TCAS II)
- IEEE Transactions on Very Large Scale Integration Systems (TVLSI)
- IEEE Transactions on Nanotechnology (TNANO)
- IEEE Transactions on Emerging Topics in Computing (TETC)
- IEEE Access
- IET Computers & Digital Techniques
- ACM Journal of Emerging Technologies in Computing Systems
- Journal of Computational Electronics (Springer)
- International Journal of Theoretical Physics (Springer)
- Microelectronics Journal (Elsevier)
- Microprocessors and Microsystems (Elsevier)
- AEU - International Journal of Electronics and Communications (Elsevier)

- Ain Shams Engineering Journal (Elsevier)
- International Journal of Electronics Letters(Taylor & Francis)
- IETE Journal of Research (Taylor & Francis)
- ETRI Journal (Wiley)
- Sub-reviewer for IEEE Asia and South Pacific Design Automation Conference (**ASP-DAC: 2020**)
- Sub-reviewer for IEEE Computer Society Annual Symposium on VLSI (**ISVLSI: 2016 - 2018**)
- International Conference on Semiconductor Devices, Circuits and Systems (**SDCS 2013**)
- IEEE International Conference on Technological Advances in Electrical, Electronics and Computer Engineering (**TAEECE 2013**).
- International Conference on Advance Computing & Communication (**ICACC 2013**).

Selected Invited Talks & Presentations

- 2026 **Harvesting Intelligence: Intermittent-Aware In-/Near-Sensor Processing for Battery-Free Edge Vision**, *Workshop on Mixed Analog-Digital Configurable Adaptable Processing (MAD-CAP) at IEEE FCCM*.
- 2024 **Battery-less Integrated Sensing and Computing Paradigm**, *Workshop on AI integration with Renewable Energy harvesting sources (WAIRE) at IEEE BSN*.
- 2023 **Edge Imaging Systems: The Role of Integrated Sensing and Intermittent Computing**, *National Science Foundation (NSF) Principal Investigator (PI) Meeting of the Computer Systems Research (CSR) Program*.
- 2023 **Edge Imaging Systems: The Role of Integrated Sensing and Normally-off Computing**, *Multicore and Multiprocessor SoCs (MPSoC)*.
- 2023 **MR-PIPA: An Integrated Multilevel RRAM (HfOx)-Based Processing-In-Pixel Accelerator**, *Solid-State Circuits Society (SSCS) Open Journal Webinar Series*.
- 2020 **Normally-Off Computing Design Methodology Using Spintronics: From Devices to Architectures**, *Computing with Unconventional Technologies (CUT) Workshop, IGSC 2020*.
- 2020 **Enabling Efficient and Reliable Edge Computing: From Device to Architecture**, *Nebraska Center for Materials & Nanoscience, UNL*.
- 2019 **Processing In-Memory Architecture: from Non-Volatile Memories to Co-Processor Units**, *University of Texas at Austin, Austin, USA*.
- 2019 **Elastic Intermittent Computation for Energy-Harvesting-Powered Devices**, *Florida International University, Miami, USA*.
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- 2018 **Normally-Off Computing Design Methodology Using Spintronics: from Devices to Architectures**, *University of Central Florida, Orlando, USA*.
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- 2018 **Non-Volatile Logic-In-Memory Computation Using Spin-Hall-Effect-Based Datapaths**, *University of Central Florida, Orlando, USA*.
- 2016 **Review of Spintronics and functionalities of circuit based on Spin Hall Effect MTJ**, *University of Central Florida, Orlando, USA*.
- 2016 **Spin-Based Neuron Model With Domain-Wall Magnets as Synapse**, *Tehran, Iran, University of Central Florida, Orlando, USA*.
- 2015 **Domain Wall LFSR: a Novel Spintronic Circuit for Generating Weakly-Chaotic Signatures**, *University of Central Florida, Orlando, USA*.