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## Education

- 1/2019 – 5/2022 Ph.D. Computer Engineering, University of Central Florida  
Advisor: Dr. Ronald DeMara  
Thesis Topic: “Energy and Area Efficient DBNs Implementation using MTJ-based Stochastic Neurons”
- 8/2016 – 12/2018 M.Sc. Computer Science, University of Mississippi  
Advisor: Dr. Byunghyun Jang  
Thesis Topic: “Performance Evaluation of Concurrent Queues on GPUs”
- 9/2010 – 9/2012 M.Sc. Computer Engineering, Islamic Azad University  
Advisor: Dr. Mehdi Habibi  
Thesis Topic: “Design and Simulation of Fault Tolerant Hybrid CMOS/Nanodevices”
- 9/2005 - 7/2010 B.Sc. Computer Engineering, Islamic Azad University  
Advisor: Mr. Mohammad Shafiee  
Thesis Topic: “Design of Low Energy Set-Associative Cache”

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## Publications

### Conference Publications

- [C1] **H. Pourmeidani**, P. Debashis, Z. Chen, R. F. DeMara, and R. Zand, “Electrically-Tunable Stochasticity for Spin-based Neuromorphic Circuits: Self-Adjusting to Variation,” in Proceedings of *IEEE 63<sup>rd</sup> International Midwest Symposium on Circuits and Systems (MWSCAS)*, Springfield, MA, 2020.
- [C2] P. Wood, **H. Pourmeidani**, and R. F. DeMara, “Modular Simulation Framework for Process Variation Analysis of MRAM-based Deep Belief Networks,” in Proceedings of *IEEE SoutheastCon*, Raleigh, NC, 2020.
- [C3] **H. Pourmeidani** and M. Habibi, “Hierarchical Defect Tolerance Technique for NRAM Repairing with Range Matching CAM,” in Proceedings of *21<sup>st</sup> Iranian Conference on Electrical Engineering (ICEE)*, Mashhad, 2013.
- [C4] **H. Pourmeidani** and M. Habibi, “A Range Matching CAM for Hierarchical Defect Tolerance Technique in NRAM Structures,” *International Conference on Applied Electronics*, Pilsen, 2013.
- [C5] M. Habibi and **H. Pourmeidani**, “Hierarchical TCAM/TMR Defect Tolerance Technique for Nanodevice RAM Repairing,” *International Conference on Applied Electronics*, Pilsen, 2012.
- [C6] **H. Pourmeidani**, “Partial Way-Access Set-Associative Cache for Low Energy Consumption,” *International Conference on Computer and Information Technology*, Amsterdam, 2011.

## STEM Educational Publication

- [STEM1] R. F. DeMara, J. Bech, L. Campbell, R. Hartshorne, S. Spiegel, Z. Chen, M. Dagley, E. Hernandez, T. Tian, J. Donnelly, A. Tatulian, S. Sheikhfaal, **H. Pourmeidani**, H. Esteves, and T. Gibson, "Methods and Outcomes of the NSF Project on Synthesizing Environments for Digitally-Mediated Team Learning," in Proceedings of *American Association for Engineering Education Annual Conference (ASEE-19)*, Tampa, 2019.

## Journal Publications

- [J1] **H. Pourmeidani** and R. F. DeMara, "High Accuracy DBN-Fuzzy Neural Networks using MRAM-based Stochastic Neurons," *IEEE Journal on Exploratory Solid-State Computational Devices and Circuits (JXCDC)*, Vol. 7, No. 2, pp. 125-131, 2021.
- [J2] **H. Pourmeidani**, P. Debashis, Z. Chen, and R. F. DeMara, "Process Variation Sensitivity of Spin Orbit Torque Perpendicular Nanomagnets in DBNs," *IEEE Transactions on Magnetics*, Vol. 57, No. 7, pp. 1-8, 2021.
- [J3] **H. Pourmeidani**, S. Sheikhfaal, R. Zand, and R. F. DeMara, "Probabilistic Interpolation Recoder for Energy-Error-Product Efficient DBNs with p-bit Devices," *IEEE Transactions on Emerging Topics in Computing*, Vol. 9, No. 4, pp. 2146-2157, 2020.
- [J4] **H. Pourmeidani**, A. Sharma, K. Choo, M. Hasan, K. Kim, M. Choi, and B. Jang, "Dynamic Temperature Aware Scheduling for CPU-GPU 3D Multicore Processor with Regression Predictor," *Journal of Semiconductor Technology and Science*, Vol. 18, No. 1, pp. 115-124, 2018.
- [J5] M. Habibi and **H. Pourmeidani**, "A Hierarchical Defect Repair Approach for Hybrid Nano/CMOS Memory Reliability Enhancement," *Microelectronics Reliability*, Vol. 54, Issue 2, pp. 475-484, 2014.

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## Professional Services and Activities

- Computer Hardware Innovation and Design Association (CHIDA) (2020-2021), Vice President.
- Student Laureates of STEM Teaching and Learning (SLSTL) (2020-2021), Member.
- Neural Processing Letters (2020-2021), Reviewer.
- Journal of Circuits, Systems, and Computers (2020-2021), Reviewer.
- SN Computer Science (2020), Sub-Reviewer.
- IEEE International Conference on Computer Design (ICCD 2020), Sub-Reviewer.
- IEEE Transaction on Magnetics (2020), Sub-Reviewer.
- IEEE International Midwest Symposium on Circuits and Systems (MWSCAS 2020), Reviewer.
- International Conference on Sensor Networks and Signal Processing (SNSP 2019), Reviewer.
- 2<sup>nd</sup> Workshop on Energy-Efficient Machine Learning and Big Data Analytics (2019), Sub-Reviewer.
- IEEE Non-Volatile Memory Systems and Applications Symposium (NVMSA 2019), Sub-Reviewer.
- IEEE Computer Society Annual Symposium on VLSI (ISVLSI 2019, 2020, 2021), Sub-Reviewer.
- American Society of Science and Engineering (2015), Reviewer.
- Iranian Microelectronics Association (IMA) (2013), Member.
- Iran's Center for Integrated Circuits (ICIC) (2011), Member.
- Isfahan Mathematics House (2002), Member.

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## Certificates

- System on Chip Design with High-Level Synthesis and TensorFlow Machine Learning, Cadence Design Systems.

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## Experience

- **Senior Research Assistant** at University of Central Florida (2019-2021)
  - Title: Probabilistic Spin Logic for Low-Energy Boolean and Non-Boolean Computing  
Sponsor: National Science Foundation (NSF), Semiconductor Research Corporation (SRC)
- **Graduate Teaching Assistant & Lab Instructor** at University of Central Florida (2019, 2022)
  - Summer 2019, Computer Organization
  - Spring 2022, Computer Organization
- **Graduate Assistant** at University of Central Florida (2019)
  - Spring 2019, NSF Synthesis and Design Workshop on Digitally-Mediated Team Learning
- **Graduate Teaching Assistant** at University of Mississippi (2017-2018)
  - Fall 2017, Computer Organization and Assembly Language
  - Spring 2018, Computer Organization and Assembly Language
  - Fall 2018, Models of Computation
- **Senior Research Assistant** at University of Mississippi (2016-2017)
  - Title: Dynamic Thermal and Reliability Management in 3D IC  
Sponsor: National Science Foundation (NSF)
- **Instructor** at Islamic Azad University (2012-2016)
  - Fall 2012, Computer Programming
  - Spring 2013, Hardware 2, Computer Programming, Graphic Laboratory, Computer Networks, Computer Networks Laboratory
  - Summer 2013, Hardware 2
  - Fall 2013, Visual Basic Programming, Graphic Laboratory, Computer Programming
  - Spring 2014, Hardware 2, Assembly Language, Visual Basic Programming
  - Summer 2014, Hardware 2
  - Fall 2014, Hardware 2, Assembly Language
  - Spring 2015, Hardware 2, Assembly Language,
  - Summer 2015, Hardware 2
  - Fall 2015, Hardware 2
- **Technician** at Sepahan Computer Company (2005- 2012)
  - PC/Laptop Repairing (Both Hardware and Software) and Assembling
- **Instructor** at Narmafzar Computer Institute (2007- 2012)
  - Specialized Software Teaching

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## Related Coursework

Advanced Computer Architecture, GPU Computing, Design of Advanced VLSI Circuits, and Biomedical Nanotechnology

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## Projects

- **Probabilistic Spin Logic for Low-Energy Boolean and Non-Boolean Computing (2019-2021)**
  - **Title:** Research Assistant
  - **Sponsor:** NSF and SRC
  - **Company:** University of Central Florida
  - **Collaborators:** Intel Corporation, Purdue University, University of California Berkeley, and University of Minnesota
  - **Abstract:** Magnetoresistive random access memory (MRAM) technologies with thermally unstable nanomagnets are leveraged to develop an intrinsic stochastic neuron as a building block for deep belief networks (DBNs). This project presents a probabilistic inference network simulator to perform a circuit-level implementation of DBNs using embedded MRAM-based neurons as activation functions.
  - **Accomplishments:** Reduced energy consumption, device count, and area at least 3×, 90×, and 20× respectively with reasonable error rate in DBN implementation relative to the previous energy-efficient CMOS-based implementations by employing embedded MRAM-based neuron. I have published four papers on this project so far.
- **Synthesis and Design Workshop: Digitally-Mediated Team Learning (2019)**
  - **Title:** Graduate Assistant
  - **Sponsor:** NSF
  - **Company:** University of Central Florida
  - **Collaborators:** Worcester Polytechnic Institute, Colorado School of Mines
  - **Abstract:** This workshop convened researchers, educators, and practitioners to advance transformative pedagogical approaches for technology-enhanced team learning within STEM disciplines at the college-level and grades 6-12. Attendees identified research directions towards adaptable digital environments for effective and scalable team-based learning in classroom settings.
  - **Accomplishments:** During the two-and-a-half-day workshop, participants were afforded opportunities to participate in a Poster Session, Keynotes, Panel Sessions, Breakout Technical Sessions, and Action Committees. The workshop resulted in 1, 3, and 5+ year research and development plans organized into tracks for each technical focus. In addition to social and popular media, dissemination activities included a White Paper on the future of the field commissioned by NSF.
- **Cross-layer Thermal Reliability Management in 3D Integrated Heterogeneous Processor for Breaking the Power and Bandwidth Walls (2016-2017)**
  - **Title:** Research Assistant
  - **Sponsor:** NSF
  - **Company:** University of Mississippi
  - **Collaborators:** Missouri University of Science and Technology, and Daegu University
  - **Abstract:** The main objective of this project was to address the thermal reliability issues of the 3D CPU-GPU heterogeneous processor design, while maintaining maximum possible performance, energy efficiency, parallelism and scalability.
  - **Accomplishments:** Reduced the final temperature by more than 50%, peak temperature by 19% on average and performance degradation by 32% on average by implementing a novel dynamic temperature-aware task scheduling approach. I published a paper on this project.
- **Design and Simulation of Fault Tolerant Hybrid CMOS/Nanodevices (2011-2013)**
  - **Title:** Research Assistant
  - **Company:** Islamic Azad University
  - **Collaborators:** University of Isfahan
  - **Abstract:** This project presented a defect tolerance approach for hybrid nano/CMOS memory to repair random and cluster defects by hiring a combination of defect repair and fault tolerant approaches. The concept was to use defect aware information obtained from the tester to decide how each portion of the memory should be repaired.

- **Accomplishments:** Achieved above 99% repair rate for various error rates with a reasonable overhead for several memory sizes by implementing a hierarchical defect repair approach. I published four papers on this project.

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## Presentations

- 2020 Electrically-Tunable Stochasticity for Spin-based Neuromorphic Circuits: Self-Adjusting to Variation, annual review meeting of the CAPSL project, funded by the Semiconductor Research Corporation, Purdue University, West Lafayette, IN, USA.
- 2020 Electrically-Tunable Stochasticity for Spin-based Neuromorphic Circuits: Self-Adjusting to Variation, IEEE International Midwest Symposium on Circuits and Systems (MWSCAS), Springfield, MA, USA.
- 2020 Low-energy DBNs using MTJ-based Neurons, Design and Automation Conference (DAC 2020), San Francisco, USA.
- 2019 Probabilistic Interpolation Recoder for Energy-Error-Product Efficient DBNs with p-bit Devices, annual review meeting of the CAPSL project, funded by the Semiconductor Research Corporation, Purdue University, West Lafayette, IN, USA.

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## Research Interests

Computer Architecture, GPU Computing, Design of VLSI Circuits, Machine Learning, Reliability

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## Academic Honors and Awards

- 2021 Recipient of the Frank M. Hubbard Engineering Endowed Scholarship.
- 2020 Recipient of the 57<sup>th</sup> Design Automation Conference (DAC 2020) Young Fellows program, San Francisco, CA, USA.
- 2018 The first student to be admitted for Spring 2019 in UCF
- 2010 Ranked in Top 2% of Applicants for Entrance to Master of Computer Architecture
- 2005 Ranked in Top 15% of Applicants for Entrance to Bachelor of Computer Engineering
- 2000 Taking Part in the Second Stage of Math Olympiad for Iranian Middle School Students

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## Technical Skills

- Application Programs:
  - HSPICE
  - Cadence Virtuoso
  - MATLAB
  - TensorFlow
  - Design Compiler
  - ModelSim
  - Xilinx ISE
  - Ledit
  - SimpleScalar
  - Simwattch
  - Gem5
  - Flex & Bison
  - Multi2Sim
  - McPAT
  - HotSpot
  - JFLAP
  - MARS
- Programming Languages:
  - C
  - C++
  - Python
  - OpenCL / CUDA
  - Assembly
  - Verilog
  - Haskell
- Op. Systems:
  - Linux (Ubuntu)
  - Windows