
Education

- 2015 – Present **Ph.D.**, *Computer Engineering*, ECE Department, University of Central Florida, Orlando, FL.
Advisor: Dr. Ronald F. DeMara
- **Dissertation Title:** *Leveraging the Intrinsic Switching Behaviors of Spintronic Devices for Von Neumann and Neuromorphic Architectures.*
- 2014 – 2015 **MSc**, *Electrical Engineering*, EECS Department, University of Central Florida, Orlando, FL.
Advisor: Dr. Ronald F. DeMara
- **Thesis Title:** *Self-Scaling Evolution of Analog Computation Circuits.*
- 2011 – 2014 **BSc**, *Electrical Engineering*, ECE Department, University of Central Florida, Orlando, FL.
- 2008 – 2011 **AA**, *Electrical Engineering Track*, Valencia Community College, Orlando, FL.

Awards and Recognitions

- 2018 **Best Paper Candidate**, 27th IEEE/ACM Great Lakes Symposium on VLSI (GLSVLSI-2018), 2nd place technical contribution.
- 2018 **Featured article showcased on the journal's front cover having a full-page 'teaser' image from the manuscript**, IEEE Transactions on Magnetics.
- 2016 **Featured Paper and Interview**, IET Electronics Letters.
- 2015 **Best Paper Award**, NASA/ESA Conference on Adaptive Hardware and Systems, Best design paper of conference.

Research Interests

- Biologically-Inspired Neuromorphic Algorithm and Hardware Co-Design
- Intelligent, Reconfigurable, and Adaptive Computer Architectures
- Emerging Nanoscale Electronics, particularly Spintronic Devices
- In-Memory Computing

Research Experience

- 2016 - 2017 **Publication Coordinator**, "COMPUTER ARCHITECTURE LAB (CAL)", Electrical Engineering and Computer Science Department, University of Central Florida, Orlando, Florida, USA.
- Responsibilities: In-depth editing and review of group publications. Maintenance of group publication schedule.
- 2014 - Present **Graduate Research Assistant**, "COMPUTER ARCHITECTURE LAB (CAL)", Electrical Engineering and Computer Science Department, University of Central Florida, Orlando, Florida, USA.
- Lead the architectural portion of a successfully funded multi-million dollar collaborative NSF-SRC Proposal (E2CDA). Developed novel circuit, architecture, and algorithm research towards future computational hardware, such as neuromorphic, utilizing spintronic devices.

Work Experience

- 2014-2018 **Graduate Assistant**, "EVALUATION AND PROFICIENCY CENTER (EPC)", University of Central Florida, Orlando, FL.

- 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.

Publications

Journal Publications

- **S. D. Pyle**, J. D. Sapp, and R. F. DeMara, "Leveraging Stochasticity for On-Chip Learning in Binarized Deep Neural Networks," submitted to *IEEE Computer* on 1 September 2018, under review for Special Issue on Cognitive Computing Systems and Applications.
- **S. D. Pyle**, K. Y. Camsari, and R. F. DeMara, "Hybrid Spin-CMOS Stochastic Spiking Neuron for High-Speed Emulation of In-Vivo Neuron Dynamics," in *IET Computers and Digital Techniques SI: Bio-Inspired Hardware and Evolvable Systems*, Vol. 12, No. 4, pp. 122-129, July 2018.
- **S. D. Pyle**, D. Fan, and R. F. DeMara, "Compact Spintronic Muller C-Element with Near-Zero Standby Energy," *IEEE Transactions on Magnetics*, Vol. 54, No. 2, pp. 1-7, Feb. 2018.
Featured article showcased on the journal's front cover having a full-page 'teaser' image from the manuscript.
- **S. D. Pyle**, H. Li, and R. F. DeMara, "Compact Low-Power Instant Store and Restore D Flip-Flop using a Self-Complementing Spintronic Device," *IET Electronics Letters (IEEE indexed)*, Vol. 52, No. 14, pp. 1238 - 1240, June 2016. DOI: 10.1049/el.2015.4114.
Featured Paper of the Issue, including author interview of topic area and field outlook.

Conference Publications

- **S. D. Pyle** and R. F. DeMara, "A High-Speed Ultra-Low-Power Subthreshold Spintronic Stochastic Spiking Neuron," in *IEEE International Symposium on Circuits and Systems (ISCAS 2019)*, Sapporo, Japan, May 26-29, 2019. Under Review.
- R. Zand, K. Y. Camsari, **S. D. Pyle**, I. Ahmed, C. H. Kim, and R. F. DeMara, "Low-Energy Deep Belief Networks using Intrinsic Sigmoidal Spintronic-based Probabilistic Neurons," in *Proceedings of 8th ACM Great Lakes Symposium on VLSI (GLSVLSI 2018)*, Chicago, Illinois, USA, May 23-25, 2018.
Best paper candidate, 2nd place technical contribution.
- 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.
- **S. D. Pyle** and P. K. Douglas, "Evolution of Biologically-Inspired Ion Channel Neural Networks for Simple Brain Behaviours," in *Cognitive Computational Neuroscience (CCN 2017)*, Poster with abstract. New York, NY, USA, September 6 - 8, 2017.
- **S. D. Pyle**, V. Thangavel, S. M. Williams, and R. F. DeMara, "Self-Scaling Evolution of Analog Computation Circuits with Digital Accuracy Refinement," in *IEEE Proceedings of NASA/ESA Conference on Adaptive Hardware and Systems (AHS 2015)*, pp. 1 - 8, Montreal, QC, Canada, June 15 - 18, 2015.
Best paper award, Citation: "Best Design Paper."

STEM Educational Publications

- R. F. DeMara, N. Khoshavi, **S. Pyle**, J. Edison, R. Hartshorne, B. Chen, M. Georgiopoulos, "Redesigning Computer Engineering Gateway Courses using a novel Remediation Hierarchy," in *Proceedings of American Association for Engineering Education National Conference (ASEE-16)*, New Orleans, LA, USA, June 26 - 29, 2016.

Professional Services

IEEE Transactions on Computers, Reviewer.

IEEE Transactions on Emerging Topics in Computing, Reviewer.

ASEE Annual Conference 2016 & 2017, Reviewer.

- Summer 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.
- Spring 2017 **NSF-SRC Energy-Efficient Computing: from Devices to Architectures (E2CDA) Collaborative Proposal**, Lead the circuit and architectural contributions to prepare the proposal titled "Probabilistic Spin Logic for Low-Energy Boolean and Non-Boolean Computing". Developed a novel Boltzmann Machine architecture utilizing probabilistic spintronic logic devices, generated preliminary results, and wrote a significant fraction of the final proposal submission.
- Fall 2016 **NSF Software and Hardware Foundations (SHF-medium) collaborative Proposal**, Provided significant contributions to prepare the proposal titled "Ultra-Low Energy Computing using Magnetoelectric-based Concatenable Switching Elements".
- Spring 2016 **NSF-SRC Energy-Efficient Computing: from Devices to Architectures(E2CDA) Collaborative Proposal**, Lead the circuit and architectural contributions to prepare the proposal titled "Belief Networks with Voltage Controlled Switches".
- Fall 2014 **2014 IEEE International Symposium Series on Computational Intelligence (SSCI)**, Volunteer work for attendee registration and distribution of conference materials. Ensured that the services provided by the hosting hotel were of highest quality. Resolved any issues that arose with participants.

Invited Talk and Technical Presentations

- 2016, 2017 **Panelist**, STEM GRADUATE SCHOLAR ASSISTANT ROLES OF THE FUTURE., *University of Central Florida*, Orlando.

Coursework

- o Neuromorphic Computing Architectures
- o Special Topics in Emerging Computing Architectures
- o Full-Custom VLSI Design
- o Fabrication of Solid-State Devices
- o Current Topics in Parallel Processing
- o Modeling Neuronal Systems
- o Complex Adaptive Systems

Technical Skills

- o **Hardware Description and Behavioral Languages:** Verilog, Verilog-A, VHDL.
- o **Programming Languages:** C, C++, Assembly, Matlab, Python, Javascript.
- o **Design and Verification Tools:** HSPICE, Cadence Virtuoso, Xilinx-ISE, EAGLE.
- o **Micromagnetic Simulation:** MuMax3, OOMMF.

Additional Works

- 2017 **Narrator**, EVALUATION AND PROFICIENCY CENTER, University of Central Florida, Orlando, FL. Video of Procedures for Digitized STEM Assessments in the Evaluation and Proficiency Center

References

- Ronald F. DeMara, Ph.D**, *Professor*, EECS Department, University of Central Florida.
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- Hai "Helen" Li, Ph.D**, *Professor*, ECE Department, Duke University.
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