

PRIYESH SHUKLA

1155 West Roosevelt Road, Chicago, IL, USA 60608

(+1)7736800492 ◊ pshukl23@uic.edu

RESEARCH INTERESTS

Probabilistic machine learning (ML) and artificial intelligence (AI), On-device AI acceleration (Emerging devices, circuits, architectures and algorithms for efficient AI), and Robotics/IoT-and-AI.

EDUCATION

University of Illinois at Chicago, United States

August 2018 - Present

Doctor of Philosophy in Electrical and Computer Engineering

Relevant courses: *Deep Learning, Reinforcement Learning and Graphical Models; Computer Architectures; VLSI Design; Parallel processing; Quantum effects in Nano-scale Semiconductor structures*

Birla Institute of Technology and Science, Pilani, India

August 2015 - May 2017

Master of Engineering in Microelectronics

Birla Institute of Technology and Science, Pilani, India

August 2011 - May 2015

Bachelor of Engineering (Hons.) in Electrical and Electronics

RESEARCH EXPERIENCE

ARGONNE National Laboratory, Lemont, Illinois

November 2019 - Present

Visiting Graduate Researcher (Long term)

Mentor: *Prasanna Balaprakash - MCS division*

- Designing neuromorphic computing systems with co-optimized algorithms and emerging hardware for learning and inference.
- Exploiting leadership class super-computing infrastructure at Argonne for high-dimensional data processing in neuromorphic computing.

AEON Lab, UIC, Chicago, Illinois

August 2018 - Present

Mentors: *Amit Ranjan Trivedi, Theja Tulabandhula*

- Design of efficient accelerator for Bayesian Inference to predict uncertainties in decision making targeting critical applications such as autonomous driving and surgical robots.
- Hardware-software cooperation to perform energy efficient and high-speed sampling of probability densities useful in Bayesian learning and inference
- Uncertainty estimation in Reinforcement learning based object detection, and Robotics.
- Characterization and application of emerging memristive devices for ML and AI.
- Exploring newer techniques to enhance learning and decision making.

Oyster Lab, BITS-Pilani, India

August 2013 - May 2017

Mentors: *Anu Gupta, Subhash Chandra Bose, Navneet Gupta, Abhijit Asati*

- Designed and implemented various analog and digital circuits as well as processor architectures with focus on co-optimizing power, area and throughput.
- Worked on electromagnetic characterization of MEMS switches and interfaces for accelerometers.

PROFESSIONAL EXPERIENCE

QUALCOMM Inc., San Diego, CA, United States
(Incoming) Engineering Intern, SoC IP

May 2020 - Aug 2020

- Mining IP library data with advanced data analysis/learning techniques.
- Contribution to ongoing IP and physical design projects at sub-10 nm technology nodes that involves ramping up on various ASIC and custom design flows.

QUALCOMM Inc., Bengaluru, India
Engineer, IP Library Division

July 2017 - June 2018

- Modeled and characterized Standard Cells IP libraries at sub-10nm technology nodes for high density, high power and gated architectures targeting Snapdragon SoCs.
- Explored and tested Machine Learning techniques to predict timing, power and noise characterization of Standard Cells IP libraries.
- Automated in-house flows for Standard Cells IP library production.

CSIR-CEERI, Pilani, India
Research Intern, Cyber Physical Systems Group

July 2014 - December 2014

- Implemented reconfigurable interface between wireless sensor network (WSN) nodes and centralized monitoring station for the project Structural Health Monitoring.
- Involved in FPGA based architecture implementation to enhance non-linear images for face detection in complex lighting environment.

PUBLICATIONS AND SELECTED PRESENTATIONS

Priyesh Shukla, Ahish Shylendra, Amit Ranjan Trivedi, Theja Tulabandhula, *MC²RAM: High Performance Markov Chain Monte Carlo Sampling In-SRAM for Fast Bayesian Inference*, 2020 IEEE International Symposium on Circuits and Systems (ISCAS), Seville, Spain, Oct, 2020

Priyesh Shukla, Amit Ranjan Trivedi, *MC²RAM: Markov Chain Monte Carlo Sampling In-SRAM for Fast Bayesian Inference*, IBM IEEE CAS EDS AI Compute Symposium, NY, Oct. 2019 (poster).

Shamma Nasrin, Justine Drobitch, **Priyesh Shukla**, Theja Tulabandhula, Supriyo Bandyopadhyay, and Amit Ranjan Trivedi, *Bayesian Reasoning Machine on a Magneto-tunneling Junction Network*, IoP Science, 2020 (invited journal under review)

Ahish Shylendra, **Priyesh Shukla**, Saibal Mukhopadhyay, Swarup Bhunia, Amit Ranjan Trivedi, *AEGIS: A Mixed-Signal Framework for Real-time Anomaly Detection by Examining Sensor Statistics*, IEEE Transactions on Very Large Scale Integration Systems (TVLSI), 2020

(Old publications - prior to M.E.)

Priyesh Shukla, Anu Gupta, *Quad-NMOS cross-coupling for linearity enhancement in high frequency continuous-time OTA-C filters with IM3 below -70 dB*, 2017 IEEE International Conference on Frontiers of Sensors Technologies, Shenzhen, China, 2017.

Priyesh Shukla, Anu Gupta, *Current-Mode PMOS capacitance multiplier*, 2017 IEEE International Conference on Inventive Systems and Controls, Coimbatore, India, 2017.

TECHNICAL SKILLS

Programming	Python, C/C++, Verilog/VHDL, Perl, Matlab, CUDA and MPI (in progress)
Tools	Synopsys, Cadence, Xilinx EDK, Nvidia developer's toolkit, SimpleScalar
ML Platforms	PyTorch, Keras, TensorFlow

HONORS AND AWARDS

Peter and Deborah Wexler Award worth USD 5000 for being among the top entry level researchers granted by The University of Illinois System, **2018-19**

Graduate Tuition Scholarship, The University of Illinois System, **2018-present**

BITSAA Research Scholarship travel grants by BITS-Pilani, **2016-17**

Award for outstanding merit in 10+2 by Krishna Group of Institutions and Chhattisgarh State Government of India, **2010**

REFERENCES

Dr. Amit Ranjan Trivedi

*Assistant Professor, Department of Electrical and Computer Engineering
University of Illinois at Chicago, United States
(PhD - Georgia Institute of Technology, USA) (Email: amitrt@uic.edu)*

Dr. Theja Tulabandhula

*Assistant Professor, Department of Information and Decision Sciences
Liautaud Graduate School of Business, University of Illinois at Chicago, United States
(PhD - Massachusetts Institute of Technology, USA) (Email: theja@uic.edu)*

Dr. Prasanna Balaprakash

*Computer Scientist, Mathematics and Computer Science Division and Leadership Computing Facility
Argonne National Laboratory, Lemont, Illinois, United States
(Email: pbalapra@anl.gov)*

Dr. Animesh Datta

*Principal Engineer/Manager
Qualcomm Inc., San Diego, CA, United States
(PhD - Purdue University, USA) (Email: anidatta@gmail.com)*