Abhishek Tyagi

Personal Website

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Education

University of Rochester — Rochester, NY
Ph.D. in Computer Science (Advisor: Dr Yuhao Zhu) — *Jan 2021 - May 2026 (Expected)*

Delhi Technological University — Delhi, DL
Bachelor of Technology in Electrical Engineering — *Aug 2013 - June 2017*

Research & Work Experience

ARM Inc — Austin, TX, USA
Research Intern (Machine Learning and Architecture Team) — *May 2022 - Dec 2022*

- Worked on developing fault characterization methodology for ARM's Ethos U55, an ML inference accelerator, deployed in safety-critical areas.
- Advisors : Dr. Reiley Jeyapaul, Dr. Paul Whatmough

Samsung Research & Development Institute — Bengaluru, KA, IND
Senior Engineer (Device & Systems Group, SAIT-India) — *July 2019 - Dec 2020*

- Carried out the RTL design and verification of Samsung's ML inference accelerator for Samsung's handheld devices.
- Manager: Sharad Sharma

Indian Institute of Science — Bengaluru, KA, IND
Research Assistant (CAD Laboratory) — *July 2017 - June 2019*

- Worked on designing, implementing, and verifying a Software Defined, Hardware Customizable Tensor Core written in Chisel HDL.
- Advisor : Dr. S.K Nandy

INRIA — Nancy, FR
Visiting Research Scholar (Team CAMUS) — *June - August 2016*

- Enhanced APOLLO, a dynamic and speculative Polyhedral loop optimizer by incorporating random memory access patterns in the polyhedral optimization model
- Advisor : Dr. Philippe Clauss

Publications

- Anna Penzkofer, Karim Habashy, **Abhishek Tyagi**, Andreas Bulling, Chris Eliasmith, Yuhao Zhu
  SSPictR: Spatial Semantic Pointer Picture Representation
  ICLR 2025 (Under Submission)

- **Abhishek Tyagi**, Reiley Jeyapaul, Chu Zhou, Paul Whatmough, Yuhao Zhu
  Characterizing Soft-Error Resiliency in Arm's Ethos-U55 Embedded Machine Learning Accelerator
  ISPASS 2024

- **Abhishek Tyagi**, Yiming Gan, Shaoshan Liu, Bo Yu, Paul Whatmough, Yuhao Zhu
  Thales: Formulating and Estimating Architectural Vulnerability Factors for DNN Accelerators
  HPCA 2023

- Kenneth Chen, Budmonde Duinkharjav, Nisarg Ujjainkar, Ethan Shahan, **Abhishek Tyagi**, Jiayi He, Yuhao Zhu, Qi Sun
  Imperceptible Color Modulation for Power Saving in VR/AR
  SIGGRAPH 2023

- Budmonde Duinkharjav*, Kenny Chen*, **Abhishek Tyagi**, Jiayi He, Yuhao Zhu, Qi Sun
  Color-Perception-Guided Display Power Reduction for Virtual Reality
  SIGGRAPH Asia 2022

- Kavitha Madhu, Saptarsi Das, **Abhishek Tyagi**, Ankur Deshwal, Joonho Song, Seungwon Lee
  Transport Triggered Near Memory Accelerator for Deep Learning
  ISCAS 2021

- **Abhishek Tyagi**, Neeta Pandey, Keerti Gupta
  PFSCL Based Linear Feedback Shift Register
  ICCTICT 2016

Patent

- Yuhao Zhu, **Abhishek Tyagi**, Jiayi He
  Power Reduction of Displays Using Human Color Discrimination
  US Patent App. 63/83,034

Teaching Experience

Hajim School of Engineering & Applied Sciences Rochester, NY
Graduate Teaching Assistant *August 2021 - May 2022*

• Assistant to the Instructor for CSC 252/452 - **Computer Organization**, and CSC 292/572 **Mobile Visual Computing**
• Head weekly discussion section & office hours reinforcing lecture topics, help students with homework setups and debugging.

Achievements

Selected for Nengo Summer School-2024
University of Waterloo *2024*

Recipient of Prime Minister's Fellowship
Delhi Technological University *2013-2017*

INRIA Research Scholar
INRIA Nancy *2016*

Runner's Up & People's Choice Award (NASA SpaceApp Challenge)
IIT Delhi *2016*

Projects

Power Performance improvement in MPSoC: Implemented a method to predict the critical thread using information on different types of cache misses encountered and using DVFS to scale the voltage & frequency of the cores accordingly

Miniaturised Potentiostat: Designed an Arduino-based electronic system to perform electrochemical deposition of Polyaniline (PANI) on ITO glass electrode and glucose sensing.

Programming Skills

Languages: Verilog/System-Verilog, Python, C++, Chisel, CUDA

Design Technologies: Verdi, Design Compiler, SpyGlass, PrimeTime, Pytorch, orCAD PSpice, orCAD Capture, ModelSim, Integrated Synthesis Environment (Xilinx)

Relevant Courses

Computer Science: Software Analysis and Improvement [aka Advanced Compilers], Programming Language Design and Implementation, Machine Vision, Design & Analysis of Algorithms, Parallel & Distributed Systems, Mobile Visual Computing, Analytical Methods in Computer Science

Professional Services and Activities

Cientifico Latino: Working as a member of the Graduate Student Mentorship Initiative (GSMI) program to help increase the pool of minority scientists and professionals. If you want to know more about how to reach out to prospective advisors for graduate school, check out a piece I wrote here!

Artifact Reviewer PPoPP'24: Served on the artifact reviewer committee for PPoPP 2024.

Mentor for Fatima Scholarship Program: Mentoring students through the Fatima Fellowship program while working on research projects to gain research experience before applying for grad school.