

PRATEEK P. KULKARNI

BTech (Electronics and Communications Engineering)

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EDUCATION

PES University

2022–2026 (Expected)

BTech in Electronics and Communications Engineering (VLSI)

Thesis: Photonic FPGA for Variational Quantum Algorithms

Kendriya Vidyalaya, Hebbal

2021–2022

Grade 12

RESEARCH INTERESTS

Quantum Computing, VLSI Design, Electronic Design Automation, Systems Architecture

SELECTED COURSEWORK

Analog Circuit Design, Computer - Aided Digital Design, Digital VLSI, Computer Organization and Design, High Performance Computing, Chip – Level Photonics, Quantum Computing and Quantum Entanglement, Quantum Transport and Logic Gates, Non-Linear Optics and Quantum Technology

RESEARCH EXPERIENCE

Research Assistant

Aug 2024–Present

Photonics and Quantum Tech Lab, PES University

Advisor: Prof. Kaustav Bhowmick

Foundational aspects and implications of quantum machine learning (Undergraduate Thesis)

Visiting Research Student

Mar 2024–Present

Future Computing Systems Lab, Indian Institute of Science

Advisor: Prof. Sumit K. Mandal, Department of Computer Science and Automation

Distributed Quantum Computing and Quantum Complexity Theory

PUBLICATIONS

1. Prateek Kulkarni. **A Low-Latency Memory Architecture using 3D XPoint and Memristor Technologies**. C2I6-2024.
2. Prateek Kulkarni. **RAPID: Row-Access Pattern-aware In-DRAM Prefetching**. ETIS'25.

TECHNICAL SKILLS

Programming Languages: Python, R, Julia, Verilog, C++, Haskell, Q#, LaTeX
Software Tools: Matlab, Lumerical, Cadence, Vivado Design Suite, gem5, Qiskit, Cirq

SELECTED PROJECTS

PipSim: RISC-V pipeline simulation framework in Python with visualization capabilities for instruction flow and hazard detection. Educational tool implementing 5-stage pipeline architecture with data forwarding and branch prediction mechanisms.

RegDyno.Ai: Time-series prediction model for noise reduction using custom distribution modeling and regression techniques. Machine learning framework deployed for forecasting with demonstrated improvements over traditional ARIMA models. (Patent published)

surface2cirqit: Python package for Surface Code to Quantum Circuit conversion with automated syndrome extraction protocols and circuit optimization for gate count reduction.

AWARDS AND RECOGNITION

Q-Pragathi Funding IISc Quantum Technology Initiative - Surface-based Quantum Information Processing	Sept 2024
Workshop Selection Present and Future Computing Systems, IISc (80 participants selected)	Jan 2024
Funded Internship ISFCR Long-Term Internship, PES University (10 recipients)	Jan 2024
National Second Prize Pravega 2019, Indian Institute of Science	Feb 2019

TEACHING EXPERIENCE

Teaching Assistant: Quantum Transport and Logic Gates	Spring 2025
Teaching Assistant: Quantum Entanglement and Quantum Computation	Fall 2025

PROFESSIONAL SERVICE

Reviewer: IEEE CONECCT 2025, IEEE Transactions on Quantum Engineering

REFERENCES

Prof. Sumit K. Mandal
Assistant Professor, Department of CSA, Indian Institute of Science
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Prof. Kaustav Bhowmick
Associate Professor, Department of ECE, PES University
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