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 Suite, gem5, Qiskit, Cirq, Pennylane

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. (Github Repository)

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. (Github Repository)

AWARDS AND RECOGNITION

Q-Pragathi Funding Sept 2024
IISc Quantum Technology Initiative - Surface-based Quantum Information Processing

Workshop Selection Jan 2024
Present and Future Computing Systems, IISc (80 participants selected)

Funded Internship Jan 2024
ISFCR Long-Term Internship, PES University (10 recipients)

National Second Prize Feb 2019
Pravega 2019, Indian Institute of Science

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
Email: skmandal@iisc.ac.in

Prof. Kaustav Bhowmick
Associate Professor, Department of ECE, PES University
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