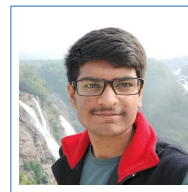


# Prateek P Kulkarni

*BTech(ECE)*

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in pkulkarni2425



## Employment History

- Dec. '24 – **Research Intern, NYU Quantum Technology Lab, NYU Shanghai**  
Present Advised by Prof. Chandrashekhar Radhakrishnan and Prof. Tim Byrnes, I will be working on certain aspects of Jaynes-Cummings Models.
- Oct. '24 – **Visiting Research Intern, Quantum Computing Research @IIT Dharwad**  
Dec. '24 Advised by Prof. Aswath Babu H, work focused towards applications and frameworks of Quantum NLP (using lambeq framework).
- Aug. '24 – **Research Assistant, Photonics and Quantum Tech Lab, PES University**  
Present Working on the foundational aspects and implications of quantum machine learning. Current focus is on VQAs and QNNs. (*Thesis*)
- March '24 – **Visiting Research Student, Indian Institute of Science**  
Present Part of the Future Computing Systems Lab led by Prof. Sumit K. Mandal in the Department of Computer Science and Automation, working in the areas of quantum multicore architecture. (*Manuscript under Preparation*)
- Feb. '24 – **Research Intern, ISFCR, PES University**  
Aug. '24 Worked on various frameworks/protocols in quantum and post-quantum cryptography at the Center for Information Security, Forensics and Cyber Resilience at PES University.
- Oct. '23 – **Research Intern, IIT Tirupati**  
Jan. '24 Worked on aspects of Quantum Causality and implications, with a focus on its applications in Quantum Cryptography frameworks under Prof. S Aravinda, of Department of Physics and CAMOST.

## Education

- 2022–2026 **BTech in Electronics and Communications Engineering (VLSI), PES University**  
(Expected) Thesis title: Photonic FPGA for Variational Quantum Algorithms (Ongoing Work)
- 2021–2022 **Grade 12, Kendriya Vidyalaya, Hebbal**

## Relevant Courses

- Completed: Quantum Mechanics, Analog Circuit Design, Computer – Aided Digital Design, Digital VLSI, Networks Analysis and Synthesis, Signals and Systems, Digital Signal Processing, Control Systems, Digital Communication, Linear Algebra, Calculus
- Ongoing: Computer Organization and Design, Chip – Level Photonics, Electromagnetic Field Theory, Computer Communication Networks, Quantum Computing and Quantum Entanglement

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## Research Publications

### Conferences

1. Prateek Kulkarni. **A Low-Latency Memory Architecture using 3D XPoint and Memristor Technologies**. [Appearing in C2I6-2024].
2. Prateek Kulkarni. **RAPID: Row-Access Pattern-aware In-DRAM Prefetching**. [Appearing in ETIS'25].
3. Prateek Kulkarni. **CacheWeave: Cross-Domain Data Extraction Through Systematic Cache Pattern Manipulation**. [Submitted to HOST'25].
4. Prateek Kulkarni and M. Sivasankar. **Quantum Circuits for Locating and Enumerating the Factors of Morphic Words**. [Submitted to CIAC'25].
5. Prateek Kulkarni and Suhas N Bharadwaj **A Framework for Efficient Conversions of LDPC Codes to Quantum Circuits**. [In Preparation].

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## Skills

Languages	Strong reading, writing and speaking competencies for English, Hindi and Kannada
Coding	Python, R, Julia, Verilog, C++, Haskell, Q#, $\text{\LaTeX}$
Tools	Matlab, Lumerical, Comsol, Cadence, Vivado Design Suite, gem5, Qiskit, Cirq
Misc.	Academic research, teaching, training, consultation, $\text{\LaTeX}$ typesetting and publishing

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## Projects

- (Completed, Find it [here](#).) **PipSim**: PipSim, written in python, offers a basic framework for simulating RISC-V pipelines, visualizing instruction execution, and exploring the effects of data hazards and forwarding.
- (Completed) **Field-Induced Isomorphic Optimization Algorithms**: Developed a new class of optimization algorithms sharing philosophy similar to Nature-Inspired Optimization Algorithms (NIOAs).
- (Ongoing) **TESSCrypt**: Tessellated Encryption is a new, advanced technique of encrypting data securely exploiting the properties of tessellations.
- (Patent Filed) **RegDyno.Ai**: Co-founded a company that offers a robust prediction model, aiming to reduce noise and errors in time-series data plots, using custom distribution and regression model.
- (Preparing for Distribution) **surface2cirqit**: Created a full-fledged package in python for converting any Surface Code to an equivalent, fully-functional Quantum Circuit.

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## Awards and Achievements

- Sept. 2024 **Q-Pragathi, IISc Quantum Technology Initiative**  
Part of the team working on the proposal selected to be funded over a year.  
(*Surface – based Quantum Information Processing*)
- Jan. 2024 **Present and Future Computing Systems, Indian Institute of Science**  
Selected as one of about 80 participants to attend the workshop organized by CSA, IISc.

- Jan. 2024 **ISFCR, Funded Long-Term Internship, PES University**  
Awarded one of the 10 funded long-term internships at the Center for Information Security, Forensics and Cyber Resilience.
- Feb. 2019 **Pravega 2019, Second National Prize, Indian Institute of Science**  
Won the Second prize, nationally, in the Explain The Concept event at the Undergraduate Fest, while in 9th grade.

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## Clubs and Volunteering

- Aug. '24 – **QForest, PES University**  
Present Leading the flagship quantum computing club. Also a core part of the technical domain.
- Sept. '23 – **Research Et. Al., PES University**  
Sept. '24 Content head at the research-oriented club under the Dept. of CSE.
- Aug. '23, **Bootstrap, Dept. of ECE, PES University**  
Aug. '24 Volunteering to demonstrate and briefly explain the main themes of research and focus at the Photonics and Quantum Tech Lab to new cohorts.
- Oct. '23 – **HackeZee, Dept. of ECE, PES University**  
Nov. '23 Part of the Operations Team for the flagship hardware design hackathon.
- Oct. '22 **TedXPESU**  
Part of the Organising Team for the event hosted by TedX chapter.
- Apr. '20 – **Literary Club President, K V Hebbal**  
Feb. '22 President of the Literary Club, responsible for editing, curating, and supervising club magazine publications and organizing events.

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## References

- **Prof. Dr. Kaustav Bhowmick**  
Associate Professor,  
Dept. of ECE, PES University.  
kaustavbhowmick@pes.edu
- **Prof. Dr. R Srikanth**  
Associate Professor,  
Theoretical Sciences Division, Poornaprajna Institute for Scientific Research.  
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- **Prof. Dr. Sumit K Mandal**  
Assistant Professor,  
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