Prateek P Kulkarni

BTech(ECE)

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Employment History

Oct. '24 – Jul. '25 (exp) **Visiting Research Intern**, *Quantum Computing Research @IIIT Dharwad*
Advised by Prof. Aswath Babu H, work will be focused towards applications and frameworks of Quantum NLP.

Aug. '24 – Present **Research Assistant**, *Photonics and Quantum Tech Lab, PES University*
Working on the foundational aspects and implications of quantum machine learning. Current focus is on VQAs and QNNs.

March '24 – Present **Visiting Research Student**, *Indian Institute of Science*
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 in Preparation)

Feb. '24 – Jul. '25 **Long-Term Intern**, *ISFCR*
Working in the areas of quantum and post-quantum cryptography at the Center for Information Security, Forensics and Cyber Resilience at PES University. (Funded)

Oct. '23 – Jan. '24 **Research Intern**, *IIT Tirupati*
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 (Expected) **BTech in Electronics and Communications Engineering (VLSI)**, *PES University*
Thesis title: Photonic FPGA for Variational Quantum Algorithms (Ongoing Work)

2010–2022 **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

Ongoing: Computer Organization and Design, Chip – Level Photonics, Electromagnetic Field Theory, Computer Communication Networks, Quantum Computing and Quantum Entanglement

Research Publications

Conferences

1. Prateek Kulkarni and S. K. Mandal, "Fully–quantum communication for quantum multicore processors," 2024, [In Preparation].

2. Prateek Kulkarni and M. Sivasankar, "Locating and enumerating the factors of morphic words – the quantum way," 2024, [In Preparation].

Recreational

1. P. Kulkarni, "A non-rigorous proof of Fermat's last theorem for some special cases," 2023, [DOI:10.13140/RG.2.2.28449.38242].

2. P. Kulkarni, "Investigating factorial sums and their connection with the Laplace transform," 2023, [DOI:10.13140/RG.2.2.19396.40329].

Skills

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

Projects

(Ongoing) **MILO** (Memory – Informed Latency Optimization): Project aimed at enhancing processor performance by optimizing cache usage through predictive instruction reordering.

(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.

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.

Feb. 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.

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.

Clubs and Volunteering

Aug. '24 – Present **QForest**, *PES University*
Leading the flagship quantum computing club. Also a core part of the technical domain.

Sept. '23 – Sept. '24 **Research Et. Al.**, *PES University*
Content head at the research-oriented club under the Dept. of CSE.

Aug. '23, Aug. '24 **Bootstrap, Dept. of ECE** , *PES University*
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 – Nov. '23 **HackeZee, Dept. of ECE**, *PES University*
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 – Feb. '22 **Literary Club President**, *K V Hebbal*
President of the Literary Club, responsible for editing, curating, and supervising club magazine publications and organizing events.

References

- **Prof. Dr. Kaustav Bhowmick**
  Associate Professor,
  Dept. of ECE, PES University.
  kaustavbhowmick@pes.edu

- **Prof. Dr. Sumit K Mandal**
  Assistant Professor,
  Dept. of Computer Science and Automation, IISc.
  skmandal@iisc.ac.in

Hobbies

Out of the many things I enjoy in my pastime, I usually incline towards: Writing, Trekking, Sports (Basketball and Chess), Classical Music (Vocal and Instrumental)