Prateek Jain

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Education

PhD in Computer Science, GPA: 4.0/4.0 — Boston University, MA
Transport-layer protocols, QUIC, network reliability, and recursive communication architectures — *Jan 2024 – Present*

MS in Computer Science, GPA: 3.96/4.0 — Boston University, MA
Specialization: Cybersecurity — *Sep 2022 – Dec 2023*

BE in Information Technology, 73.45% — Delhi College of Engineering (DTU), India
Aug 2006 – Jul 2010

Selected Publications

- **POMACS 2025**: *Design and Modeling of a New File Transfer Architecture to Reduce Undetected Errors Evaluated in the FABRIC Testbed.* doi:10.1145/3727111
- **SIGMETRICS Abstracts 2025**: *Design and Modeling of a New File Transfer Architecture to Reduce Undetected Errors Evaluated in the FABRIC Testbed.* doi:10.1145/3726854.3727281

Patents

- **Patent Pending**: *Systems and Methods for a New Recursive File Transfer Architecture to Reduce Undetected Errors.* U.S. Provisional Patent Application Serial No. 63/864,142, filed Aug. 14, 2025.

Skills

Languages: C/C++, Python, Go, Java, JavaScript, SQL **Systems/Net:** QUIC/QUICHE, RINA, Apache Flink, ns-3, Linux, iperf3 **Platforms/Tools:** Docker, Git, Wireshark, FABRIC, Chameleon

Experience

Doctoral Researcher — *Boston University* — *Jan 2024 – Present*

- Conducting research on **recursive communication architectures**, **space networking**, and **QUIC** for reliability under dynamic network conditions.
- Exploring **heterogeneity-aware adaptive routing** in hybrid edge–cloud stream-processing systems, studying dynamic operator placement and low-disruption execution under changing bandwidth and workload conditions.
- Implemented and evaluated reliability-oriented systems including the **MLED** framework for large-scale file transfer; mentored a senior undergraduate to build a **React**-based GUI for generating MLED configurations (**link**).

Research Intern — *Google* — *May 2025 – Oct 2025*

- Performed an **end-to-end WAN study** of **QUIC** over the Internet, analyzing how **PTO changes**, **4-tuple variation**, and **IPv6 flow-label-based ECMP route manipulation** affect latency and connection stability; contributed a **QUICHE** safeguard against invalid ACK frames (**commit**).

Assistant Commandant (Technical) — *Central Reserve Police Force* — *Feb 2014 – Mar 2022*

- Led development of **Android** and **web** applications for operational data collection and analysis, reducing turnaround time from **days to hours**.

Selected Projects

Multi-Layer Error Detection (MLED) — *Jul 2023 – Apr 2025*
NSF-Funded Project

- Built a configurable **recursive error-detection architecture** for large-scale file transfer using **in-network computation**; implemented a high-performance **C++** prototype and demonstrated **100% goodput gain** under adversarial-error conditions with **800+ Mbps** goodput on **FABRIC** testbed.

Heterogeneity-Aware Adaptive Event Routing — *2025 – Present*
Research Project

- Built an **Apache Flink**-based hybrid edge–cloud stream-processing framework with **query rewriting** and **adaptive routing** to shift stateless operators between **Raspberry Pi** edge devices and the cloud with **near-zero downtime** under variable bandwidth and compute conditions.

ReSpaN: Recursive Space Networking Architecture — *2025 – Present*
Research Project

- Developing a **recursive space-networking architecture** using scoped **Distributed IPC Facilities**, **service intent**, and structured **control/service/data-plane** separation for challenged interplanetary communication environments.

Achievements

- **Golden Stitch Award – Best Paper**, KNIT12 (2026), for the paper *Design and Modeling of a New File Transfer Architecture to Reduce Undetected Errors Evaluated in the FABRIC Testbed.*
- **Best Presentation/Demonstration Award**, KNIT7 (2023), NSF Workshop, for MLED implementation on **FABRIC**.
- **Best Trainee Officer**, CRPF basic training; awarded the **Home Minister's Cup** for all-round excellence.