Personal Statement

Research and STEM Accessibility. While my graduate studies will focus on advancing deep learning (DL), quantum machine learning (QML), explainable AI, and uncertainty quantification, I am equally committed to fostering STEM accessibility for marginalized students—a value I deeply resonate with USC Viterbi CS. Graduate school, for me, represents a dual opportunity: rigorous interdisciplinary research and a platform to foster STEM inclusion.

In addition to conducting my individual research, I have embraced the role of a research mentor since 2023, guiding students from three of Bangladesh's top universities. Most of my mentees are in their 3rd or 4th year of study, and my role spans teaching scientific research methodologies, article writing, research ethics, and journal formatting. I also assist them in securing funding to support their research endeavors. I take immense pride in having mentored two talented undergraduate admission aspirants to the USA, one of whom has already earned a fully funded scholarship. At the Advanced Machine Intelligence Research Lab (AMIRL), I took the initiative to mentor two student groups in quantum machine learning and graph learning research. Each group, comprising four members from the American International University-Bangladesh, has shown great enthusiasm for conducting scientific research in these advanced fields under my guidance.

Recognizing the absence of a research culture at my university, I co-founded the **KUET Research Society** in my senior year, where I led interdisciplinary teams, taught students about scientific ethics and methodologies, and secured funding for their projects. These efforts earned me the **Student Researcher of the Year Award 2024** at KUET, recognizing my research contributions and leadership. Recognizing the challenges faced by my peers, I developed Bengali-language tutorials in *Operations Research* to address the lack of video resources aligned with the reference book, which improved the grades of junior students. At OIST, I extended this mission by teaching "Introduction to Programming with Python," fostering inclusivity for learners from all backgrounds. My dedication to research excellence and community impact was recognized when I became the *junior-most finalist* for the **Honda Young Engineer and Scientist's (Y-E-S) Award 2022**, awarded to Bangladesh's top 15 young engineering undergraduates for potential leadership in sustainable innovations. Similarly, I was honored as a *junior-most finalist* for the **SPARRSO Junior Research Fellowship**, presenting my project on disaster damage mitigation using multispectral satellite imaging. I also contributed to the academic community as a referee for 10 Q1 and Q2 journals, providing reviews to ensure research quality and rigor.

Navigating Academic Challenges During COVID-19. In March 2020, our university was declared closed due to COVID-19 for an unknown time. The authority was not optimistic about holding classes or exams online. It took almost 3-4 months to hold the first online class. My undergraduate university, KUET authority, was not interested in arranging online exams. So, they decided to take 2 semesters of 2nd year online without having any exams for 2 years. Since the COVID situation was not improving even after finishing the 2nd, both semester finals were taken online at once: first 2nd term followed by 1st term. These arbitrary, uncertain decisions impacted my overall academic performance due to my strong shift of focus to AI/ML research within these 2 years. Nevertheless, I maintained to be among the top 3 among 65 students in my department.

Balancing Prestigious Opportunities and Academic Obligations During COVID-19. During COVID-19, as the first Bangladeshi undergraduate student, I got a fully-funded research internship offer at OIST (Japan). However, my undergraduate university, KUET, does not allow such visits without academic influence. Specifically, since I was the department first at that time and had the best CGPA among all 7 departments of mechanical faculty, my professors suggested me not to drop the semester as it might cause problems in getting a teaching offer from my university. This dilemma put extra mental stress on my academic life, and I negotiated with OIST to continue my full-time research remotely; at the same time, I appeared in online classes and exams at KUET, both continuing simultaneously. Nevertheless, I managed to excel both in my academics and research with a strategic mindset, and I have been recently offered a teaching position as a Lecturer at KUET.

Where I See Myself. Coming from a third-world country, access to frontier and blue-sky research seemed out of reach, especially as my degree was in industrial & production engineering, whereas my research focused on ML and DL. Determined to bridge this gap, I actively connected with leading AI researchers in academia throughout my undergrad life, allowing me to keep updated with cutting-edge research in my field and publish impactful work but requiring a demanding balance between coursework and research. My senior year at KUET was particularly challenging as I managed BBA-related memorization-heavy courses while deepening my AI knowledge, leading to a slight dip in grades—a trade-off I accepted for high-impact research. Completing full-time research at OIST alongside my studies, despite the lack of flexibility in my undergraduate program, taught me resilience and reinforced my commitment to impactful research. I bring a systems-oriented, optimization-driven mindset developed through my undergraduate background to tackle computational challenges practically. USC Viterbi CS, with its collaborative and interdisciplinary research ecosystem, is the perfect environment for me to bring my unique multidisciplinary background and fully realize my potential. I believe what sets me apart is my dedication to giving back to society, especially to those less fortunate. Making a difference takes time and effort, but I see it as an integral part of my journey. USC Viterbi offers a platform to amplify this impact, providing the tools and audience necessary to create meaningful change for a larger portion of humanity and providing me intellectual freedom to challenge the dogma, figuring out and solving the unresolved problems.