Statement of Purpose

I am Rakesh Sharma, a seasoned professional deeply entrenched in the confluence of biomedical engineering and data science. My journey commenced at the esteemed Indian Institute of Technology (IIT), where my fascination for innovative solutions at the nexus of technology and healthcare took root.

During my undergraduate years at IIT, I delved into projects that challenged conventional approaches. Notably, I developed a pressure sensor-embedded contact lens for real-time measurement of intraocular pressure variation, a breakthrough in glaucoma detection. This early exposure to intricate problem statements fueled my passion for leveraging technology to address critical healthcare challenges. This enthusiasm carried through to my master's thesis, where I crafted a novel bone cement (Poly-methyl methacrylate) nano-composite, resulting in a significant enhancement in bone repair and a subsequent journal publication.

My journey continued at Wipro, where I played a pivotal role in developing Android apps infused with computer vision and audio signal processing. These efforts not only led to a patent application but also laid the foundation for my immersion into cutting-edge technological applications across diverse fields.

Transitioning to Achira Labs added depth to my journey. I developed algorithms for biosensor data analytics and subsequently led a team of scientists in optimizing biosensors and immunoassays for in-vitro diagnostics. Our impactful work was shared as a keynote speech at the esteemed MicroTAS international conference, reinforcing my belief in the transformative power of collaborative research.

The entrepreneurial venture that followed marked a new chapter. Venturing into assistive surgical robotics, we analyzed pre-operative CT scan images with advanced image segmentation, analysis, and registration algorithms. This groundbreaking approach not only showcased technical prowess but underscored the profound impact technology can have on surgical precision. A filed patent application for this novel system encapsulated the challenging problem statements we encountered, fueling my determination to delve deeper into research.

Amid the challenges of the COVID-19 pandemic, our startup seamlessly expanded its operations, manufacturing masks and surgical gowns to address critical shortages. This adaptive response showcased agility and adaptability, quick learning to solve problems while addressing pressing societal needs. During this time, I co-developed a statistical model to significantly boost COVID testing capacity, contributing to global efforts against the pandemic.

My inclination toward graduate studies crystallized during my tenure at Eli Lilly. As a data scientist, I immersed myself in challenging problem statements, contributing to projects spanning CT scan reconstruction, genetic medicine toolkit development, and data-driven insights for medical device development and manufacturing. Actively engaging in collaborations with Prof. Bouman’s lab and Prof. Pavlos Vlachos and Prof. Arezoo Ardekani, the synergy between data science and biomedical engineering evolved from a professional interest into a profound calling. During this period, I filed a patent, contributing to the intellectual property landscape in healthcare, and our work is poised for multiple publications in peer-reviewed journals.

In parallel, fueled by a desire to delve deep into the mathematics of machine learning and to interact with leading scientists, I undertook a certification in Artificial Intelligence from Stanford University. This transformative academic pursuit, coupled with my industry experiences, fortified my technical skills and instilled a holistic understanding of the intersection between artificial intelligence and biomedical applications.

Motivated by a desire to delve even deeper into these dynamic domains, I am now poised to undertake graduate studies. [University Name] beckons as the ideal institution, offering the perfect amalgamation of theoretical rigor and hands-on application. The distinguished faculty and cutting-edge facilities create an ecosystem primed for cultivating innovative researchers. In the realm of biomedical signal and image processing, my goal is clear – to unravel solutions that transcend current limitations in healthcare. Leveraging signal processing, image analysis, and artificial intelligence, I aspire to pioneer advancements that redefine diagnostics and therapeutics.

My ultimate career goal extends beyond personal success. It is a commitment to contributing substantively to the field, leading transformative projects that impact global healthcare. Graduate studies are not just the next academic step; they are a deliberate choice to immerse myself in a culture of research, innovation, and collaboration.

In essence, my pursuit is a convergence of passion, experience, and an unwavering commitment to drive positive change. I am confident that [University Name] will be the crucible where these aspirations take shape, propelling me toward a future where technology catalyzes profound advancements in biomedical sciences.