Statement of Purpose

I am Rakesh Sharma, a seasoned professional deeply entrenched in the confluence of biomedical engineering and data science. My journey, marked by innovative projects and impactful collaborations, has uniquely equipped me with a multidisciplinary skill set that I am eager to bring to the Weldon School of Biomedical Engineering at Purdue University.

One of the key aspects that draws me to the program is the collaborative environment, where students engage closely with faculty mentors from diverse entities such as the College of Engineering, College of Science, School of Pharmacy, and the School of Veterinary Medicine. This interdisciplinary approach aligns seamlessly with my background, providing an opportunity to explore the intersection of technology and healthcare from various perspectives.

The commitment to professional development, exemplified by a dedicated staff member focused on the success of graduate students, is particularly appealing. The emphasis on forging impactful connections with industry partners reflects a forward-thinking approach to education, ensuring that theoretical knowledge is complemented by practical, real-world experience. This resonates strongly with my belief that true innovation arises from a synthesis of academic rigor and hands-on application.

Having been part of the Lilly-Purdue collaboration, I spearheaded projects that bridge the gap between academia and industry. Notably, I led initiatives in CT scan reconstruction, explored novel drug delivery methods, and contributed to the development of a genetic medicine toolkit. These experiences have not only deepened my technical expertise but have also fueled my desire to contribute to advancements in biomedical engineering.

My multidisciplinary journey, spanning electronics, materials science, software development, biomedical engineering, and data science, uniquely prepares me for success in the graduate program at the Weldon School of Biomedical Engineering. For instance, my development of a pressure sensor-embedded contact lens for real-time intraocular pressure measurement during my undergraduate years exemplifies my ability to apply engineering principles to healthcare solutions. This project required a fusion of electronics, materials science, and biomedical engineering—a testament to my comfort navigating diverse disciplines.

Similarly, my role at Wipro in developing Android apps infused with computer vision and audio signal processing not only resulted in a filed patent application but also showcased my adaptability across technology domains. I seamlessly integrated computer vision techniques into mobile applications, demonstrating my ability to bridge the gap between software development and advanced imaging technologies.

Transitioning to Achira Labs, my responsibilities expanded to algorithm development for biosensor data analytics and leading a team in optimizing biosensors and immunoassays for in-vitro diagnostics. This required a deep understanding of both software and biological systems, highlighting my capability to synthesize knowledge from diverse fields to solve complex problems. The recognition received at the MicroTAS international conference is a testament to the impact of our collaborative, multidisciplinary efforts.

As a co-founder of Comofi Medtech, I led the establishment of an assistive surgical robot platform, showcasing my capacity to integrate insights from medical imaging, robotics, and software engineering. The development of advanced image segmentation, analysis, and registration algorithms for pre-operative CT scan images exemplifies my ability to navigate complex, interdisciplinary challenges inherent in biomedical engineering.

My tenure at Eli Lilly as a data scientist expanded my horizons further, engaging in diverse projects such as CT scan reconstruction, genetic medicine toolkit development, and data-driven insights for medical device advancements. Collaborating with esteemed professors and filing a patent underscore my ability to excel in multidisciplinary research environments.

In considering potential mentors, I am particularly drawn to the work of Prof. Charles Bouman, Prof. Young Kim, Prof. Fiona Kolbinger, and Prof. Vitaliy Rayz. Prof. Bouman's expertise in CT scan reconstruction aligns with my firsthand experiences, where I developed advanced algorithms to enhance imaging quality. Prof. Kim's work in medical imaging resonates with my contributions to image processing and artificial intelligence, especially in Android apps infused with computer vision and audio signal processing.

Moreover, the prospect of contributing to Prof. Kolbinger and Prof. Rayz's groups, with a focus on computational biomechanics and medical imaging, aligns perfectly with my goal of making tangible impacts in diagnostics and therapeutics. My past involvement in developing a pressure sensor-embedded contact lens for real-time intraocular pressure measurement and creating a novel bone cement nano-composite for enhanced bone repair positions me well to contribute meaningfully to these research areas.

Furthermore, the strong alumni network, especially with many of my colleagues from Lilly being Purdue BME graduates, adds a personal and professional dimension to my desire to be part of this esteemed community.

In conclusion, my journey in biomedical engineering, combined with my industry experiences and collaborations, has fueled a profound calling to pursue advanced studies. The Weldon School of Biomedical Engineering at Purdue University, with its collaborative ethos, commitment to professional development, and distinguished faculty members, offers the ideal environment for me to contribute, grow, and make a lasting impact in the field.

I am eager to bring my skills, passion, and commitment to your esteemed program and contribute to the vibrant community at the Weldon School of Biomedical Engineering.