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Biomedical Engineering Department
Columbia University
Graduate School of Arts and Sciences
500 W. 120th St
New York, NY, USA, 10027

Dear Admissions Committee,

I am keenly interested in joining the Biomedical Engineering Ph.D. program at your respected institution. My combined interests in mechanical and biomedical engineering align well with the research conducted by some of your faculties, such as Professor Sunil K. Agrawal, who trains robots to aid humans in regaining or improving functional movements. Given my academic and research background, I am eager to pursue a Ph.D. that prioritizes in-depth study and creative problem-solving. I am particularly excited about the chance to contribute to the field of robotics for biomedical purposes at your distinguished institution. The blend of cutting-edge research, respected faculty, and vibrant academic community there provides an ideal environment for achieving academic and research excellence.

Ever since I was young, I've been fascinated by biology, mathematics, and physics. This led me to the field of biomedical engineering, which beautifully combines these subjects, ensuring ongoing learning and innovative work. Biomedical engineering is ever-changing, keeping things fresh and offering the rewarding potential of enhancing people's health. I've grown to love both prototyping and software development because of the field's interdisciplinary nature.

My academic journey has been driven by a strong enthusiasm for interdisciplinary research. The focus of my current master’s degree has been on fiber optic sensors used in minimally invasive procedures, especially for diagnosing and treating occlusive arterial disease and prostate cancer.

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Under the supervision of Professors Samuel Kadoury and Raman Kashyap, I designed a fiber optic sensor with the aim of integrating it into medical tools and robotic systems for multimodal sensing, like flexible needles and catheters. This work highlights my expertise in fiber optics and various detection methods, while also drawing connections between my research interests and the work of Prof. Sunil K. Agrawal, for instance.

I'm driven by a profound passion for research, motivating me to pursue a Ph.D. in your program with an emphasis on medical robotics. This degree is not just another qualification for me; it represents a foundational step in my career. Undertaking it will not only deepen my expertise in the field but also expand my career prospects in both academia and the industry, perfectly aligning with my long-term aspirations. While I cherish my Canadian roots, the unparalleled academic and research opportunities in the U.S. make relocating a compelling choice. The U.S. is particularly appealing because of its robust support for biomedical research, fostering a vibrant atmosphere for innovation. I am particularly attracted to industry roles in biomedical engineering due to their structured environments, allowing me to concentrate on research and innovation without the administrative burdens often found in academia. Ultimately, earning a Ph.D. from a prestigious institution like yours would set the stage for a rewarding career that balances professional achievements with personal well-being.

During my academic journey, I've been lucky to win many scholarships. Some notable ones came from the Natural Sciences and Engineering Research Council of Canada (NSERC) and Fonds de recherche du Québec Nature et technologies (FRQNT). Among these, the Fayolle Canada United States' Prestige scholarship really stands out. Only two students from Polytechnique Montreal get

this each year. With this scholarship, I got to do a five-month internship at Johns Hopkins University. There, I worked closely with Prof. Iulian Iordachita at the Laboratory for Computational Sensing and Robotics (LCSR). We created a special needle with fiber Bragg grating strain sensors for certain prostate procedures. We then shared our findings in a paper for the International Conference on Robotics and Automation (ICRA) in 2024.

Furthermore, one of the standout moments in my academic journey was my participation on a project closely tied to my master's research with Boston Scientific. This collaboration led to several achievements: a presentation at the Optical Sensors and Sensing Congress 2022, a poster at COPL 2022 Annual Day, and a special edition publication in Optics Express in 2023. This project and the related articles show both my success and my strong commitment to making advances in biomedical engineering. Together, my work with Boston Scientific and Johns Hopkins University has made me excited to pursue further studies as a Ph.D. student in medical robotics in the United States.

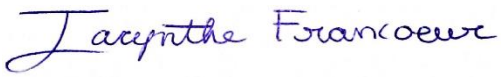
During my undergraduate years, I was deeply involved in numerous research projects, supported by scholarships that enabled me to intern at various labs at Polytechnique Montreal. Here, I delved into diverse topics such as data science, ultrasonic imaging, nanoparticles, and lasers. A highlight of my experiences was designing a robot for scoliosis correction, which not only solidified my interest in robotics but also equipped me with invaluable hands-on knowledge. Moreover, as part of my academic endeavors, I developed tools integral to robotics and other fields. These included a pulse oximeter, motion sensor, heartbeat monitoring system, and a visual testing station for mouse vision. Another standout project was one I contributed to for a 3rd year engineering physics

course. These multifaceted experiences underscore my adaptability, versatility, and potent problem-solving capabilities, laying a robust groundwork for advanced research in the future.

To sum up, my broad academic background and dedication to varied research, combined with my love for hands-on tasks like prototyping and software development, make me a good fit for your Ph.D. program. I am particularly inspired by the potential applications of robotics in improving the diagnosis and treatment of diseases. I'm truly grateful for the chance to apply and am excited about possibly joining your academic community. I feel that your program's supportive environment will help grow my research interests. My goal is to use my skills and passion to improve healthcare technology and create better health results.

Thank you for considering my application.

Sincerely,



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