

From my previous research experiences I have learned that working on a research project has been the best motivation and also the best learning platform for me. During my undergraduate years at MIT, I have had the opportunity to work in the [redacted] Laboratory and intern at the [redacted] Center. These opportunities inspired me to apply to [redacted] graduate program in Mechanical Engineering in order to pursue a PhD with a focus on robotics, combined with bio-inspired design. I believe that my commitment and passion for my research projects, excitement to learn, and academic rigor make me a good fit for the graduate program at Massachusetts Institute of Technology.

Specific field of interest

Explicit mention of fit, addresses why

During the summer after my sophomore year, I began work at the [redacted] lab as an undergraduate researcher, under the mentorship of PhD student [redacted] and Professor [redacted]. It was then when I started my project with the X toy robotic fish, in order to determine whether they could serve as a validation model for vortex imaging techniques. This would allow to develop new and better fluid dynamics instrumentation techniques for wider range of experiments. Since then, I have been working on analyzing the swimming kinematics of [redacted], and am now continuing the project with a robotic fish from the [redacted] at [redacted] University as my senior thesis. My goal is to design a low-cost and hydrodynamically efficient tail for their robotic fish. While working on this project, not only have I learned exciting MATLAB techniques to create force field videos and 2D and 3D Particle Image Velocimetry (PIV), but I have also learned how to design my own experiments, manage project timing, analyze data and interpret it for determining future steps in a project.

Specific mentions of professors, labs, and universities

Explicit mentions technical skills learned

Mentions softer skills too

Personal component, motivation, meaning

I loved working on every single stage of the project and also got to experience the fascinating feeling of learning something before anyone else.

In November of [redacted], I had the unique opportunity to present my work at the [redacted]th Meeting of American Physical Society Division of Fluid Dynamics (APS DFD). Even though presenting to other researchers as undergraduate student was challenging, it inspired me to learn more and be just as curious.

Specific outcome of research

Before my senior year, I had the chance to shift gears and try out a robotics project as a summer intern at the [redacted] center, under the supervision of Dr. [redacted]. This experience made me realize that I want to pursue the study of bio-inspired robotics as a graduate student. My goal was to characterize a torsional spring in a Series Elastic Actuator robotic knee prosthesis prototype in order to test whether efficient knee design will be efficient for shock tolerance and energy storage. The project required me to use skills from many fields including design of the experimental setup, programming, data analysis, and work presentation.

Personal narrative that led to the field of interest

Highlights skills used

I admire the intense mathematics of robotics integrated with simple and creative mechanical design solutions. This combination fascinates me. I believe that multidisciplinary projects allow researchers to find the best and most effective solutions to problems, and I want to continue learning and gaining this kind of intuition. Another important part of working on this biomedical project was realizing the importance of creative contribution from all of the team, including summer

Expands a point with a personal experience/ connection

interns. In the rehabilitation hospital I met people who one day might benefit from my struggle to set up serial communication between a Raspberry Pi and a rotary encoder on the torsional spring in the prosthetic knee. This fact pushed me to work harder and put in extra time and effort in order to achieve the goal of my project.

Another favorite aspect of research for me is that even though I am working on an individual project, I become a part of the greater scientific field that is pursuing the goal of improving human lives and learning more about the world. During the APS DFD conference I saw how people exchanged their ideas, gave and received feedback, and learned from each other. The questions I got after my presentation showed me my project from a different point of view and gave me more ideas for future work. At the same time learning about other researcher's work was a great source of inspiration and motivation for me. Throughout the summer at [REDACTED] I attended presentations by guest lecturers and most of them made me realize that I want to join the bio-inspired robotics field and work alongside with them.

Gives specific examples from their experience to convey ideas

In addition to research I value teaching. One of the major highlights of my junior year was working as a lab assistant for 2.678: Electronics for Mechanical Systems. I've learned so much more by preparing for labs and explaining the material to someone else than from taking the class myself. Every lab energized me and so in addition to continuing to work with 2.678 this semester, I've also decided to assist with 2.12: Introduction to Robotics. Exploring these opportunities has intensified my dream of becoming a professor of Mechanical Engineering.

Shows a vision that is supported by previous experiences

MIT has truly become a home to me over the past three years. Of course it has been challenging; however, this was all worth the knowledge, the experiences, the opportunities, the friends, and the determination about what I want to do with my future. I have learned how not to be afraid of tackling a problem that is not on paper, to take initiative, and to bring excitement to a project. I am grateful for this knowledge, and with these skills I believe that I can succeed in learning and researching as a graduate student at MIT.

Personal connection to

Mentions explicitly lessons learned