

Daniella Jimenez

I was first introduced to biomedical engineering as a rising senior in high school as I participated in a six-week intensive summer program where I learned about applying engineering principles for clinical translation. Since this experience, I have felt an inclination towards the field and sought out opportunities such as internships to exercise biomedical engineering work. During my undergraduate career, I chose to achieve an understanding of the physical sciences and majored in biochemistry while minoring in mathematics; however, I always maintained biomedical engineering in sight. Thus, pursuing a Master's degree seemed to be the most natural next step in my academic career.

Upon enrolling at Columbia University for my Master of Science in biomedical engineering, I recalled my greatest learning experience at the Ultrasound & Elasticity Imaging Laboratory where I interned for almost two years as an undergraduate student. Here, I dabbled in both wet and dry laboratory skills as I executed experiments to assess the acoustic stability of lipid-shelled microbubbles under therapeutic ultrasound which are typically used for focused mediated blood-brain barrier opening. Specifically, I learned how to make microbubbles and prepare tissue mimicking phantoms to characterize the acoustic cavitation occurring within safe focused ultrasound parameters. Within this work, I was also exposed to coding as we used MATLAB to analyze the data acquired. This experience allowed me to learn beyond attaining a skill set. Among the life lessons I received, I recognized the importance of mentorship. I had the privilege to work with a postdoctoral mentor who, from the beginning, established his trust in me as a young researcher. As a result, I felt confident in my own thought processes and abilities to execute an experimental design and was more likely to ask questions and express concerns due to his approachability. Consequently, the following summer I was successfully able to lead nine interns in conducting their own individual projects as I channeled the mentorship that was

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provided to me. I credit this experience for highlighting teaching as an unequivocal skill. I understood that the ability to simplify advanced concepts such that others can comprehend was necessary to impart knowledge and keep students encouraged and motivated. This was one of the most important skills I learned as an intern and that which I continue to embody as an instructor at the CCNY Stem Institute, as a tutor, and now as a mentor once more upon my return to UEIL.

UEIL has taught me invaluable skills. In addition to the significance of mentorship, troubleshooting and optimization have also been emphasized. Upon my return to the lab, I have had the incredible opportunity to perform research as a Master's student and grew to be independent rather rapidly. As my lab mentor graduated, I was given the rare opportunity to inherit her work and undertake work to be presented at one of the lab's most prestigious ultrasound conferences. While this was an exciting experience, it was also quite daunting as I was tasked to design experiments and optimize factors such as staining and imaging protocols and perform *in vivo* murine research. I was entrusted to investigate the effects of focused ultrasound-mediated blood-brain barrier opening on the blood-cerebrospinal fluid barrier which has never been studied before. Here, it was inevitable to become overwhelmed as the research and the skills were incredibly novel, let alone with the anticipation of deadlines. Fortunately, I relied on my thought processes as well as the expertise of my colleagues whose collaboration facilitated the progress of the research. Through this experience, I recognized the difficulty of leading a project at first hand. However, I became confident in my ability to optimize factors in the workflow of an experiment. Moreover, I further emphasized the need for collaboration and teamwork in order to produce a fruitful outcome.

At this point in my academic career, I am confident that the work I have executed and the experiences I have undergone have prepared me to take on the next step - to enroll in a doctoral

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program for biomedical engineering. I envision myself practicing the skills I have attained thus far and building upon them such that I will continue to make advancements in the field. I look forward to mentorship opportunities where I can share what I have learned and inspire others, especially those resonating with my background, to conquer trailblazing experiences, including pursuing graduate studies. Specifically, I am excited to continue to explore the potential of ultrasound applications, promising potential for noninvasive resolutions to our most critical medical needs, including the treatment of Alzheimer's disease. I am confident that I will be successful in achieving my goals within this endeavor as I strive toward becoming a doctoral student in Professor Elisa Konofagou's Ultrasound & Elasticity Imaging Laboratory.