"Take Mol Bio. I dare you."

My science-oriented magnet high school offered a series of electives called Molecular Biology, or "Mol Bio", that had a reputation for rigorous assignments and exams. My friend did not realize, however, that I had registered for Mol Bio 1 even before he challenged me, for I found it a perfect opportunity to explore my budding interest in the biological sciences.

Mol Bio 2's unit on neurotransmitter biochemistry introduced me to neuroscience. I realized that while enough knowledge existed on neurotransmitters for me to be able to write 10 pages on the subject (single-spaced, with figures), multiple questions remain unanswered in this young scientific field. A unit on Oliver Sacks' *Awakenings* in Mol Bio 2 inspired me to study the biochemistry of a memory disorder outside of the classroom. As a high school intern in Dr. Giulio Pasinetti's lab at Mount Sinai, I used a mouse model of Alzheimer's disease (AD) to explore conditions that influence the formation of β-amyloid peptide implicated in the disorder. Not only did I gain experience in wet lab techniques and data analysis, but I also co-presented a poster on my project at a major neuroscience conference. To effectively communicate my findings, I tailored my talk to suit my audience, who ranged from the casual attendee curious about recent advances in AD research to professors well versed in the field. I also presented my results to a proteolytic neuroscience lab at the RIKEN Brain Science Institute in Japan, and pleasantly found that my results complemented the lab's work on β-amyloid formation in AD.

I continued my project in the Pasinetti lab through my first semester as an undergraduate at Columbia. Because of the impact my first research experience had on me, I wanted to encourage younger students to develop a curiosity for science. Every fall in college I participated in Girls' Science Day, a day of science experiments for New York City middle school girls run by the student organization Women in Science at Columbia. As I led groups of girls at each experimental station, I sensed in them the same excitement I felt when I first extracted DNA in a high school biology lab. Between experiments and demonstrations, I answered their questions about life as a science major and encouraged them to pursue science.

Over time, my interest in memory evolved from studying its dysfunction to its function. Since I specifically wanted to understand the molecular changes occurring in neurons when a memory is maintained, I joined Dr. Eric Kandel's lab during my freshman year at Columbia to pursue this on both a team and an independent project. My mentor, postdoctoral fellow Dr. Luana Fioriti, studied the function of a neuronal RNA binding protein called CPEB3 in long-term memory maintenance. While she researched the effect of neuronal activity on the mRNA targets of CPEB3, and her technician studied the behavior of transgenic mice that overexpress CPEB3, I tried to obtain a more comprehensive list of CPEB3's mRNA targets. I regularly discussed my results with them at group meetings and described how they fit within the overall aims of our research. On the other hand, proposing and implementing my own project on CPEB3's functional localization in cytoplasmic compartments was equally valuable. I curiously watched my project develop over two years as one experiment after another led me to update my hypothesis. To continue my project beyond the academic year, I also secured my own funding for two summers. Since graduate school involves the extended, detailed study of a research topic, my work gave me further insight into the challenges and rewards of long-term research.

After coauthoring a review paper and contributing to several research articles and abstracts, I joined the Columbia Undergraduate Science Journal (CUSJ) in my freshman year to help other undergraduates share their research results with the Columbia community. As an Associate Editor of CUSJ during my last two years of college, I trained Editorial Review Board (ERB) members on how to critically review manuscripts for both quality and clarity. Once we

accepted papers for publication, I worked closely with ERB members and manuscript authors to ensure that non-specialists and non-science majors could appreciate the value of the research in the paper. I also judged posters at Columbia's annual Undergraduate Science Research Symposium for northeastern college students. Through CUSJ I was also able to mentor freshmen and sophomores in my ERB group, providing them with advice on courses and gaining research experience. At the end of my senior year, I happily watched as some of my own ERB members were elected Associate Editors and became mentors themselves to a new group of students.

To enhance scientific understanding outside the campus gates, I became part of the Cell Motion BioBus, a mobile teaching lab outfitted with microscopes that primarily reaches out to disadvantaged students in New York City. Together with two graduate students, I founded the BioBus's neuroscience team of volunteers and helped develop a pilot middle school-level curriculum. Students would first learn about neuron anatomy by observing GFP-expressing neurons under epifluorescence microscopes. Next, since the five senses are an easily comprehensible neuroscience topic, students would use toothpicks and eyelashes to study the touch sensitivity of wild-type and mutant *C. elegans*. Throughout the entire process, I drew upon my own experiences in learning about neuroscience and considered how teachers could integrate our labs into their lesson plans. Although I had to leave for graduate school before we could begin teaching, I am looking forward to hearing about our team's impact on the community when they implement the curriculum this upcoming spring.

After graduating from Columbia, I entered the Biological and Biomedical Sciences (BBS) graduate program at Harvard to pursue my research interests in synapse development and plasticity. By immersing myself in the diverse literature of the biomedical research community here, I hope to gain novel insights into the molecular and cellular neurobiology of cognition.

Between classes and lab rotations, outreach activities give me a refreshing perspective on research and enrich my life as a graduate student. I currently tutor students in math and chemistry at Cambridge Rindge and Latin School, one of the most diverse public schools in Massachusetts. I am also a member of Science in the News (SITN), a graduate student organization promoting the public's scientific understanding through student-run seminars and events (see Proposed Research). Through SITN, I am leading a "Model Organism Zoo" exhibit as part of the Cambridge Science Festival's opening carnival this upcoming spring. By having students of all ages peer at yeast, *C. elegans*, *Drosophila*, zebrafish, and mammalian cultured cells under microscopes and compare wild-types with mutants, I plan to teach them about phenotype and genotype. I will explain why we use model organisms in scientific research; also, as an aspiring neurobiologist, I hope to emphasize the valuable contributions that some of the model organisms, such as fruit flies, have specifically made to neuroscience research.

Neuroscience permeates our society, even more so today than ever before. Whether one watches a science fiction movie about selective memory erasure or copes with a relative with a psychiatric illness, aspects of everyday life inspire curiosity about our minds. With the NSF Fellowship, I would like to encourage more people to join the large and vibrant community of neuroscientists by continuing my outreach efforts to students from underprivileged and underrepresented backgrounds. The thriving neuroscience community at Harvard, within reach of multiple elementary and secondary schools, is the perfect place for me to begin this endeavor; during my time as a graduate student, I hope to initiate a weekly neuroscience outreach program that will culminate with the celebration of National Brain Awareness Week in March. It is crucial that as I continue my training to become a professor, I regularly communicate my research to a broad, diverse audience. This is another challenge I am eager to accept.