

Garwin Family Foundation Final Report: UChicago Immersion Program - Explorations in Neuroscience

by Zoya Chowdhury

“A brain was only capable of what it could conceive, and it couldn’t conceive what it had never experienced.”

— Graham Greene

This summer at UChicago’s Immersion Program for Explorations in Neuroscience gave me exactly those new experiences I needed to imagine more. In the lab, I observed the glow of fluorescence in tiny *C. elegans* neurons, traced the paths of action potentials and motor circuits, and connected diet to behavior in living organisms. Outside the lab, I explored Chicago’s gardens, music, and architecture with new friends, moments that enriched the experience in their own way. Each lecture, experiment, and adventure offered something unfamiliar, and together they expanded not just my understanding of neuroscience, but also the possibilities I can now see for my future.

Reasons for Attending the Program

I applied to this program to immerse myself in the study of neuroscience, a field that has long fascinated me but which I had only experienced through independent research. I wanted to understand how the brain interprets the world, how small molecular signals produce complex behaviors, and how modern research techniques reveal these hidden processes. Equally, I wanted a preview of the rigor and rhythm of collegiate science courses—long lectures, detailed readings,

and hands-on labs that demand curiosity and persistence. Thanks to the Garwin Family Foundation, I was able to embark on this journey of scientific and personal discovery.

Academic Experience and Learning

The academic experience was as rigorous as it was rewarding. Over three weeks, we explored neuroanatomy, membrane potentials, synaptic transmission, motor control, circadian rhythms, emotion, stress, and memory. Each day began with an engaging lecture and was often followed by a hands-on lab or discussion that reinforced the topic in a tangible way.

The labs were a highlight for me. Early in the program, we used microscopy to examine nervous systems from hydra to chick embryos, bridging the gap between textbook diagrams and the reality of living tissue. Later, we progressed to molecular techniques: PCR and gel electrophoresis to study the *npr-1* gene in *C. elegans*, a model organism for understanding social versus solitary feeding behaviors. My favorite lab, however, was our gut-brain axis behavioral study, where my partner and I fed worms two different bacterial diets and analyzed locomotion patterns, specifically comparing omega loops and reverse movements. Seeing such a small organism respond so clearly to subtle environmental changes gave me a new appreciation for how diet and microbiota can influence the brain and behavior.

The program also emphasized scientific communication. We were tasked with reading and analyzing complex journal articles on topics like the mouse connectome, optogenetics, and hippocampal memory consolidation. By the final week, my group had synthesized our research on how sleep and dreaming influence memory consolidation and cognitive function. We focused on the neural circuits, brain regions, and genes that regulate sleep and shape the mind during rest, and we transformed our findings into a professional poster, which we presented at the program's

culminating symposium. Presenting and discussing our research with peers and faculty was an inspiring experience that deepened my confidence.

Hands-On Learning and Research Enrichment

Beyond the labs, the program immersed us in the culture of research. Weekly seminars introduced us to cutting-edge work at UChicago. Additionally, we experienced a memorable session with Dr. Jason MacLean, Professor of Neurobiology, who shared insights into pursuing neuroscience as an undergraduate and a career. His discussion about connecting fundamental research to real-world medical applications was especially inspiring to me as someone interested in medicine.

Working through the rhythm of intensive reading, data collection, analysis, and scientific presentation taught me what authentic research feels like. I left with stronger skills in experimental design, critical thinking, and scientific communication—skills I know will serve me throughout my academic journey.

Adventures in Chicago

The immersive academic experience was balanced by unforgettable experiences exploring Chicago. After long days of lectures and labs, our weekends offered the perfect mental reset. One Saturday, we started with lattes and pastries at a local café, then visited the iconic Bean downtown before strolling along the Riverwalk. We grabbed lunch at Salt Burger near Navy Pier (which I would highly recommend) and even stopped at Muah Cotton Candy for a whimsical panda-shaped treat.

Another highlight was our visit to the Lincoln Park Conservatory, where we admired lush greenery and exotic plants, followed by a peaceful break in the flower gardens outside. The

evening at the Grant Park Music Festival was magical—listening to Tchaikovsky’s Violin Concerto and Prokofiev’s Symphony No. 5 under the summer sky, with the city skyline as a backdrop, felt surreal.

Even quieter moments—laying out a blanket with friends in a shaded garden or huddling in the dorm lounge to prepare for our next quiz—are memories I will treasure. These experiences gave the program a sense of balance and reminded me that life is enriched by our connections.

Reflections and Takeaways

Looking back on these three weeks, I am struck by how transformative this experience has been; not only in deepening my knowledge of neuroscience, but in shaping the way I approach learning itself. Before arriving at UChicago, my understanding of the brain was largely conceptual, limited to diagrams in textbooks. This program gave those concepts life. I watched neurons glow under fluorescent microscopy, traced how electrical signals became movement through motor circuits, and saw a simple change in diet alter the looping and reversing patterns of *C. elegans*. Those moments reminded me that science is not just something to be memorized; it is something to be observed, questioned, and experienced.

What surprised me most was how much I enjoyed the challenge. The workload was heavy, and yet I found myself engaged because the material felt meaningful. Each quiz, reading, and lab pushed me to think in new ways. And outside of class, whether I was lying on a blanket at the Grant Park Music Festival or laughing with friends while exploring Chicago, I felt the same sense of curiosity and wonder that the program inspired in the classroom.

My biggest takeaway from this experience is perspective. I leave UChicago with a clearer understanding of how I want to engage with science moving forward—by continuing to learn, to ask questions, and to connect scientific knowledge to the world around me. This program

reminded me that the brain, like life, is full of patterns waiting to be understood and moments waiting to be experienced. Walking away on that final rainy afternoon, I felt a mix of gratitude and excitement—grateful for the opportunities and memories, and excited for all the ways this experience has expanded what I can now imagine for myself.