Personal Statement

During my biology degree at the University of Science and Technology and research experiences, I have developed a real interest in computational neuroscience. I am passionate about furthering my scientific research knowledge and gaining more experience in a professional environment.

I hope to explore neural polarity related proteins, especially those in AIS. The traditional method knocks down a particular gene in mice to observe the phenotype. However, I feel that this method has room for improvement because knockdown mice may self-regulate themselves, thus possibly invalidating the research findings. The reason for this may be if one protein was knocked down, changes may happen via other routes, meaning that the difference may not be solely due to that one protein. To further explore this paradox, I hope to model this "net", using computer simulations. By precisely controlling certain variables, we may draw a more solid conclusion of what a particular protein does.

Wishing to gain more practical experience in labs, I took part in a research program investigating the protective effects of selenium-enriched Spirulina Platensis on chronic alcohol-induced liver injury in mice. My motivation was the fact that many people in China suffered from an alcoholic liver and this research would contribute to their well-being. One area of difficulty during this project was to obtain physiological data of mice. To tackle this, I first extensively reviewed the literature and found different findings, possibly due to different lab conditions, making a pilot-study necessary. In two months, I conducted two pilot tests to find out the minimum alcohol level to cause liver injury in mice and the minimum concentration of spirulina Platensis needed to repair the injury. Spirulina was known for its vulnerability and high mortality rates, so they needed to be treated with extra care; in other words, there was a need to explore their optimal living conditions. Similarly, by comparing different research and multiple pilots, we finally used Zarrouk medium to shake table culture under conditions of 20-22 ℃, PH 9, with the light intensity of 3000 ~ 4000 Lx, and light intensity of 14 hours per day, which worked out very well throughout the experiment. This research experience made me realize the importance of needing a pilot study, as it steers the main research towards a more correct direction.

I carried out another research project which involved expression, purification, and crystallography of neural-related proteins. I needed to search for a protein that could bind with TRIM46. The structure of TRIM46 has not been uncovered, yet it plays a very important role in neural polarity. My study was to explore its binding proteins which will shed light on the reason for its functions so I screened proteins for both its efficiency and accuracy. I intended to provide evidence using two different methods. From a molecular point of view, I employed fluorescence co-localization in the HeLa cell. From a biochemical perspective, I used the Co-IP method in 293T cells. If the two proteins in question both successfully expressed in these two cells, my findings would

prove to be convincing. After these methods were used, the first method was successful, yet the second one was not due to the failure of poor protein expression, making me realize the importance of multiple validation methods. Overall, this research honed my skills in the choice of methodologies that needs to be made. I feel more confident in conducting further research opportunities.