

My Journey @ Caltech

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#How It All Began

Hi there! I'm Yun Shan, a final year undergraduate majoring in Biochemical Science & Technology. I'm broadly interested in molecular and cell biology, and I secured an internship at a proteomic lab via Caltech SURF under the supervision of Prof. Tsui-Fen Chou and Dr. Chia Yen Liew in the summer of 2025.

Caltech SURF is a 10-week, paid summer program that offers undergraduate students from around the world the chance to gain practical research experience and get a feel for the reality of grad school life. As a biochemistry major, my primary research focus lies in exploring protein phosphorylation and its downstream signaling pathways. A fun fact about me: I love cell culture. I always find it engaging and rewarding when the cells grow successfully. Culturing cells provides hands-on application of theories and experiments within living biological systems. Given my enthusiasm for cell biology and a passion for diverse research experience, I decided to apply to the SURF program, hoping to conduct a research project that involves cell culture while also expanding my laboratory skill set.

I looked into the Division of Biology and Biological Engineering and soon discovered Prof. Tsui-Fen Chou, whose research focuses on the enzyme p97. She also manages the Proteome Exploration Laboratory (PEL) at Caltech, where state-of-the-art mass spectrometers are equipped. That was something I'd only learned in the analytical chemistry course. To actually get the opportunity to interpret information obtained from a mass spectrometer has always been on my research bucket list. Inspired by these resources, I reached out to Prof. Chou, highlighting my prior research experience and my strong interest in Caltech SURF. She responded immediately and connected me with one of the postdocs in her lab, Dr. Chia Yen Liew.

~For future applicants, I recommend planning out the entire application process as soon as possible.

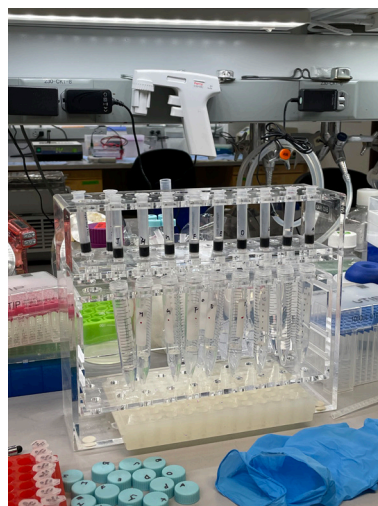
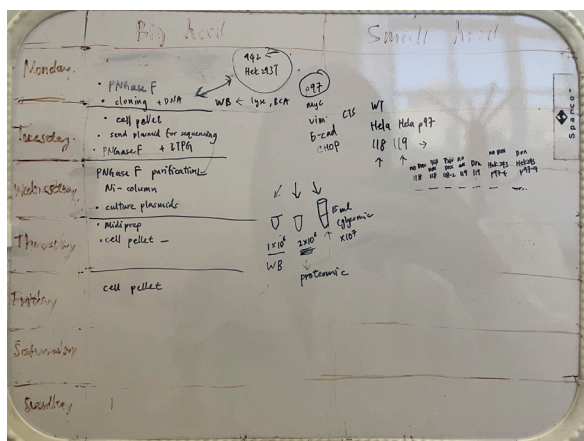
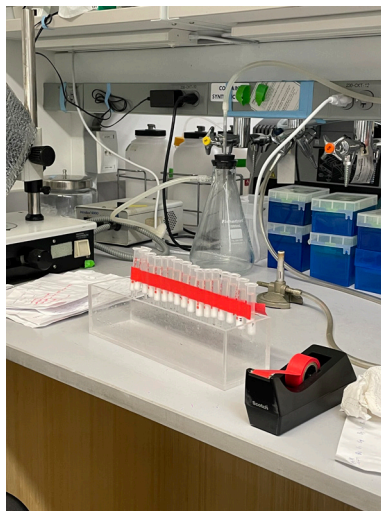
First, you wouldn't want to rush your SURF proposal; second, many opportunities are given to early birds who contact the faculty sooner. If possible, just start looking for potential mentors and drafting emails now. Don't postpone until the last minute!

#Life in Chou Lab

My previous experience in a cell biology lab allowed me to quickly familiarize myself with the project, and I could work smoothly without constant guidance from my mentor. I employed the technique of mass spectrometry to explore how disease-associated mutations on p97 disrupt glycan biosynthesis and affect the global proteomic profile of HEK293 cells. The ultimate goal of this research project was to gain a better understanding of the underlying disease mechanisms.

My day-to-day schedule was very busy and often packed with experiments, as well as individual meetings with Prof. Chou once every one or two weeks. I learned that staying motivated is crucial during SURF, as it's easy to feel wiped out after 8~10 hours of daily experiments. Over the course of the ten weeks, I encountered numerous challenges, as is typical for a biology research project. However, I was still able to troubleshoot each obstacle that arose, and this lesson taught me that the true essence of research lies in the process of problem-solving, not just in achieving successful outcomes.

The most striking difference I observed during my internship was the interactive lab culture at Caltech. In Taiwan, my peers and I tend to work independently without engaging with each other. In Chou Lab, however, everyone was open to discussion and willing to help. This interactive environment fundamentally changed my perspective on how a lab can operate.



#Beyond the Bench

My life at Caltech outside the lab was equally fulfilling to my daily lab routine. Team members in the Student-Faculty Programs (SFP) are experts in providing resources and organizing events to enrich our experiences, including the Ph.D. application workshops, Wednesday seminar series, and student-faculty dinner, which connected me with one faculty member and other aspiring students.

In addition to the academic support, there were plenty of activities designed to build a strong community. There was never a dull moment. I attended the *Astronomy on Tap*, where informal talks were given in local bars and dining places by astrophysicists. We also had monthly student-mentor coffee breaks and fun social gatherings like movie nights and weekend tours. The student ambassadors, who lived in the dorms with us, were instrumental in making sure we socialized. They hosted parties and creative activities that brought all of us together, ensuring we had the best possible summer. The vibrant cultural experience gave me a lasting appreciation for the welcoming atmosphere of the Caltech community, which I truly enjoyed. (I even had a wonderful birthday there at Cali!)

To conclude, the time at Caltech was highly valuable. My research project not only expanded my technical skills in proteomics and my knowledge in glycobiology, but also reinforced my commitment to scientific research. I now have a much clearer understanding of what a Ph.D. career entails, and I am more confident in my decision to continue this journey. The unique blend of rigorous research, academic support, and dynamic culture has made this summer outstandingly amazing, and I am incredibly grateful for this experience.

