My name is Jui-Kuan Chan, and I am a senior at National Taiwan University (NTU), majoring in physics. This summer, I had the incredible opportunity to participate in the 2024 Caltech Summer Undergraduate Research Fellowships (SURF) program. I was thrilled to be selected for this famous program and eager to start a journey of research and discovery at one of the world's leading institutions.

I learned about the program quite late, so I had to scramble to get my application together. Despite the tight deadline, I applied to several astronomical projects. The application process required detailed proposals and demonstrated my research interests and capabilities. The interview process was particularly challenging. I didn't perform very well, stumbling over some questions and feeling unsure about my responses. However, I remained optimistic, knowing that my passion for research would shine through. In the end, my perseverance paid off. I was thrilled to receive an acceptance letter, confirming my place in the program.

Arriving at Caltech was an unforgettable experience. The campus, though small, was incredibly beautiful, with beautiful gardens and historic buildings. The weather was perfect, with clear blue skies and a gentle breeze that made exploring the campus even more enjoyable. The check-in process was smooth and efficient. One of the first things I did was attend a lab safety talk, which was both informative and essential for ensuring a safe research environment. I also received my student ID card, which made me feel officially part of the Caltech community. The ID card not only granted me access to various facilities but also served as a reminder of the exciting journey ahead. My accommodation was in one of the newest dorms on campus, which was a pleasant surprise. The dorm was modern, well-equipped, and provided a comfortable living space. It was a great place to relax and recharge after a day of research and activities.

The primary goal of the project was to use self-organizing maps (SOM) to characterize photometric redshifts (phot-z) from the SPHEREx mission. This project was particularly exciting for me as it combined my interests in machine learning and cosmology. My role in the project involved several key responsibilities. First, I worked on developing and implementing the SOM algorithm, ensuring it was well-suited for our specific dataset. This required a deep understanding of machine learning principles and the ability to adapt existing methods to our unique needs. One of the most challenging aspects of the project was choosing the best hyperparameters for the SOM. Throughout the project, I also had the opportunity to explore new techniques and methodologies. This included experimenting with different data preprocessing steps, feature selection methods, and evaluation metrics. Overall, the skills and insights I gained during this project will undoubtedly shape my future research endeavors.

One of the highlights of my time at Caltech was the opportunity to engage in various cultural and social experiences. These activities not only enriched my stay but also allowed me to build lasting connections with fellow SURF participants and the broader Caltech community. Throughout the program, I had the chance to have lunch with other SURF students regularly. These informal gatherings were a great way to share our research progress, exchange ideas, and learn from each other's experiences. It was inspiring to hear about the diverse projects my peers were working on and to see the passion and dedication they brought to their research. Caltech also organized many social events specifically for SURF students. These events ranged from casual meet-and-greets to more structured activities like game nights and group outings. These experiences will remain cherished memories and have significantly contributed to my personal and professional growth.

Participating in the 2024 Caltech SURF program has been a transformative experience, enriching my personal and professional growth. From the rigorous application process to engaging in a cutting-edge research project using self-organizing maps to characterize SPHEREx photometric redshifts, every moment was filled with learning and discovery. The cultural and social experiences added a vibrant dimension to my journey. The challenges I faced taught me resilience and the importance of collaboration. I am deeply grateful for the support from my mentors, peers, and the Caltech community. This unforgettable adventure has equipped me with valuable skills and insights, inspiring me to embrace future opportunities with curiosity and confidence.