

My Summer Research Experience in Taiwan

I would like to express my sincere gratitude to the University of Texas Permian Basin (UTPB) and my mentors, Dr. Chao Dong and Dr. Milka Montes, for giving me the opportunity to travel abroad to Taiwan this summer. This experience allowed me to learn, grow, and experience a new culture while expanding my knowledge of chemistry and material science. I would also like to thank the National Science Foundation for funding this incredible opportunity. Additionally, I am grateful to Professor Yu-Lun Chueh and Chairman Ying-Hao Chu of National Tsing Hua University (NTHU) for welcoming us to their university and giving us the opportunity to learn about a different area of chemistry and material science than what I had previously experienced.

During the summer of 2026, I was given the opportunity to attend National Tsing Hua University in Hsinchu, Taiwan, where I was able to learn about material science and experience new laboratory techniques specifically related to this field. When we first arrived in Taiwan, we were given several days to adjust to the new time zone and explore the city where we would be staying. During our first week, we moved into the women's dormitory, Jing, and began experiencing some of the differences between living in Taiwan and living in the United States.

One of the first differences we noticed was the climate. Coming from Odessa, Texas, we were not accustomed to the high humidity in Taiwan. Because of the humid environment, we experienced some mold growth in our dormitory. Thankfully, with the help of Professor Chueh and his assistant, we were able to have the mold cleaned and were provided with a comfortable place to live for the remainder of our two-month stay. During our first week, we also explored the area around campus and found several local stores where we could purchase the necessities we needed for our stay.

After our introductory week, we met with Professor Chueh and several of his colleagues in the department. We had the opportunity to learn about the different research projects they were currently working on and were eventually able to choose which research group best matched our interests. Each of us was assigned to a different principal investigator, and I chose to work in Professor Chueh's laboratory.

My first mentor in the lab was Kevin, who worked under Professor Chueh. He showed me around the different laboratories and introduced me to research involving graphene, which was an area I immediately became interested in. Throughout my life, I had heard of graphene, but I had never fully understood how it was produced or what made it such a valuable material. Kevin taught me several techniques, including how to grow graphene on copper and how to perform wet transfers of graphene onto different metals. After working with him for about a week, he introduced me to his junior student, Daniel, who would become the person I worked with most closely for the remainder of the summer.

Daniel was researching bismuth telluride (Bi_2Te_3) and graphene and studying how their interaction when encapsulated could potentially affect the thermal properties of graphene. We

worked together for the rest of the summer because Kevin was scheduled to return home before the program ended. I later learned that both Kevin and Daniel were from Sri Lanka, which gave me another opportunity to learn about a culture and country beyond Taiwan.

Working with Daniel allowed me to learn several new techniques and instruments. He introduced me to Raman spectroscopy, thermal annealing of graphene, and plasma removal of graphene. These were techniques I had not previously had the opportunity to work with, and learning how they were used in material science gave me a much better understanding of how chemistry can be applied to advanced materials.

I also had the opportunity to meet Daniel's junior student, Chen Che-Wei, who was an undergraduate student preparing to enter the master's program under Professor Chueh. Later in the summer, I was able to learn more about Chen Che-Wei and his life in Taiwan when we had lunch together and exchanged gifts before we returned home.

Overall, working in the laboratories at NTHU was both enjoyable and eye-opening. I noticed several differences between laboratories in Taiwan and those I have experienced in the United States, including differences in cleanliness, laboratory practices, and the reuse of certain materials that we typically would not reuse in American laboratories. However, despite these differences, the underlying science remained the same. This was one of the most valuable lessons I took away from the experience. It was fascinating to see how scientists from another country approach research and solve problems rather than only experiencing science through the laboratories and methods I had previously known.

Outside of the laboratory, my time in Taiwan was just as memorable. One of the first things that stood out to me was how green and beautiful the country was. Everywhere I went, there were trees, plants, and other forms of nature. With so much vegetation came an incredible variety of insects, birds, and other animals that I do not typically see in my everyday life in the United States. Because Taiwan is an island with a warm and humid climate, I was also surprised by the amount of fruit growing throughout different parts of the cities.

We had the opportunity to visit several places throughout Taiwan, including Hsinchu, Kaohsiung, Taitung, and Taoyuan. Although we did not have the funding to travel as extensively as we would have liked, each place we visited offered something different. One thing that remained consistent, however, was the kindness of the people we met. Everywhere we went, we encountered people who were willing to talk with us, help us, and share their experiences about Taiwan.

One experience that particularly stood out to me happened in Taitung, in southern Taiwan. While waiting for a bus, we met a very kind woman who asked us where we were traveling from. We had a wonderful conversation about Taiwan, her family, and where she was from. Before we parted ways, she offered us fresh mochi that she had made that morning as well as peanuts grown in southern Taiwan. We had recently purchased some fruit and were happy to offer her some in

return. Although this may seem like a small interaction, it was one of the moments that reminded me how meaningful simple connections with other people can be when traveling to a new country.

Another one of my favorite parts of Taiwan was the food. We were able to experience many different types of cuisine, from traditional Taiwanese noodles and dumplings to Indian food, Chinese food, and many other dishes. Some of my favorite foods were purple sweet potatoes, dumplings, and, of course, boba. Trying new foods was another way for me to experience the culture and become more comfortable with life in Taiwan.

During our free weekends, we also had the opportunity to visit several local museums in Hsinchu and a local zoo with members of the laboratory. These experiences allowed us to learn more about the area while also spending time with the people we had met during our research. They shared stories about their lives, their experiences, and what they loved about Taiwan, which helped make the experience feel much more personal.

Although I wish we had had more funding to explore even more of Taiwan during our free time, I am extremely grateful for everything we were able to experience. This trip taught me much more than laboratory techniques. I learned about material science, graphene, research practices, and how scientists from another country approach their work. At the same time, I learned about a new culture, met people from different backgrounds, tried new foods, and experienced a way of life that was very different from my own.

Overall, my summer in Taiwan was an experience that I will always be grateful for and cherish. The knowledge I gained in the laboratory, the relationships I developed, and the cultural experiences I had will stay with me throughout my academic and professional career. I am thankful to UTPB, my mentors Dr. Chao Dong and Dr. Milka Montes, the National Science Foundation, Professor Yu-Lun Chueh, Chairman Ying-Hao Chu, Kevin, Daniel, Chen Che-Wei, and everyone else who helped make this opportunity possible. This experience opened my eyes to the possibilities within material science and showed me how valuable it is to step outside of what is familiar. I will carry the knowledge, memories, and experiences from Taiwan with me for many years to come.