

學海築夢學生出國實習心得報告

獲補助年度	114 年度
薦送學校、系所、年級	臺灣大學生命科學系四年級
中文姓名	劉芷好
國外實習國家（含城市）	美國德州休士頓
國外實習機構	萊斯大學
國外實習考評成績或評語	無
短片時間及標題	無

I. Background and Motivation

This journey began during the summer before high school. My leader at an orientation camp later became one of the pioneers of the MACHI program from NTU Physics. I vividly remember reading about her achievements on my tablet when sitting in the corner of my room. At that time, crossing the globe and engaging in professional dialogues in a foreign language felt like an impossible dream, something I only dared to imagine through news reports.

For years, this dream was sidelined by self-doubt and perfectionism. As a Life Sciences major with concerns about my English speaking skills—especially considering that most previous participants were from EE or CS backgrounds—I often opened the application guidelines only to close them immediately. The turning point came last summer, amidst graduation anxiety and uncertainty about my research focus. While discussing credit transfers with the college staff, I impulsively expressed my intent to apply. What felt like a "boast" at the time was, in fact, a necessary push to break free from my hesitation and finally pursue this long-held aspiration.

II. Introduction to the Host Institution

Rice University

A prestigious private institution known for its high faculty-to-student ratio, Rice is located near the Texas Medical Center and NASA. With a legacy that includes JFK's "Moon Speech" and the discovery of C60, it offers exceptional opportunities for industry-academic collaboration.

MACHI International Program

Modeled after the Tomodachi-STEM program, MACHI provides a five-week research internship for female STEM students. Since 2021, the program has expanded its partnership to multiple Taiwanese universities. It also features pre-departure online sessions, a peer mentorship system, professional workshops, and local exploration.

Although managed by the Smalley-Curl Institute, research placements are

tailored to student interests. This year marked a significant increase in participants from biomedical fields. Interns are expected to proactively manage their research projects and present their findings at a final Capstone Poster Presentation.

III. Research and Learning Insights

Lab Internship and Project Description

I joined Professor Matthew Bennett's lab, focusing on Synthetic Developmental Biology. As the Director of the SSPB program, Matt encourages high autonomy. During lab meetings, I was inspired by the lab's ambitious ideas, such as engineering bacteria for Martian environments or integrating living cells into electronic networks. As for my project, it involved creating a Double gene KO strain of *E. coli* as a chassis to facilitate further achievements of spontaneous multicellularity, including differentiation, self-adhesion, communication, and cross-feeding. Although we hit a bottleneck during the second gene knockout—likely due to DNA quality issues—the process provided invaluable hands-on experience in gene engineering.

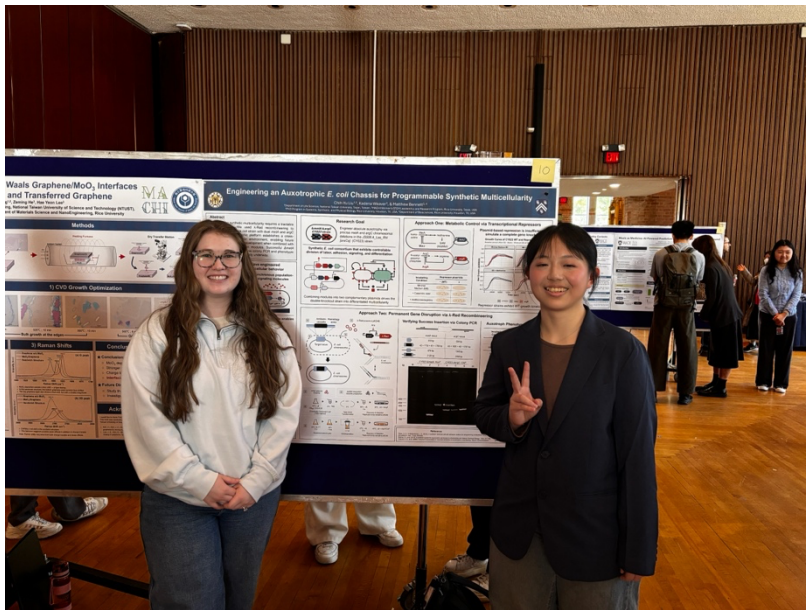
Mentorship and Networking

My mentor, Kadena, provided exceptional guidance using visual aids to bridge communication gaps. Discussing her career path helped me realize I had been overthinking my future, teaching me to embrace a more "chill" yet focused attitude toward research. Similarly, another lab member Aadarsh's journey from a computational background to synthetic biology highlighted the benefits of the "rotation system," which allows students to explore diverse interests before committing to a lab.

I also interviewed Xiao, a senior PhD student, who emphasized that being "talkative" and proactive is vital in Western STEM environments. Her reflections on the gender ratio in interdisciplinary fields and the subtle challenges faced by international scholars provided me with a profound understanding of the global academic landscape.



My place in the lab's office



My mentor and I during the Capstone Poster Presentation

Collaboration and Interdisciplinary Culture

The research environment at Rice facilitates interdisciplinary collaboration through its physical layout. Buildings like Keck Hall, where my lab located, house diverse labs that share equipment and even keys, fostering a culture of openness. This infrastructure leads to frequent, spontaneous intellectual collisions.

Valhalla, the on-campus volunteer-run bar, perfectly encapsulates this culture. Attending a post-seminar Happy Hour allowed me to engage in casual yet insightful scientific discussions with my lab members and connect with Taiwanese alumni. This experience reinforced the idea that "science stems from casual talks," a stark contrast to the more formal academic structures I was accustomed to in Taiwan.



School's bar Valhalla

IV. Life and Safety Observations

While the program provided excellent support (accommodation at Double Tree and a meal stipend), navigation and safety remained concerns. The car-dependent culture and occasional encounters with street-level racism required a significant lifestyle adjustment compared to my experience in Taipei. Nevertheless, excursions to NASA, the Houston Livestock Show and Rodeo, and George Ranch were highlights that deepened my appreciation for American history and southern culture.



Meal at student's servery

V. Specific Benefits of the Internship

International Peer Networking and Continued Collaboration

Living with my Tomo-dachi program roommate allowed for deep cultural exchanges and a strong support regarding lab life and career aspirations. These connections have yielded immediate benefits: as I transition to a three-month internship at Osaka University following this program, she will assist in my integration, demonstrating the sustained impact of this international network.



Birthday party for my roommate Nozomi!

Multi-dimensional Professional Networking

The program offered unparalleled networking opportunities across various sectors, which also helped me identify and address communication gaps, fostering a more mature approach to international collaboration:

- **Academic:** Engaging with the Rice Taiwanese Graduate Student Association (RTGSA), the Applied Physics Program (APP), and other seniors met during the capstone presentation provided direct insights into the US graduate school experience.
- **Industry:** Attending the private dinner hosted by Ms. Donna Cole (Founder of Cole Chemical) facilitated dialogues with industry leaders from companies like Dow Chemical.
- **Institutional:** Meetings with the Taipei Economic and Cultural Office (TECO) in Houston and E&M Foundation highlighted the support systems available for Taiwanese scholars abroad.

Research Proficiency and Problem-Solving Skills

Despite being in the early stages of the whole research grant, I maintained a highly productive research schedule. I gained hands-on expertise in gene engineering, specifically in creating Gene KO strains. While troubleshooting challenges during the second knockout, I successfully validated the first gene knockout through Colony PCR and Growth Assays, honing my experimental design and rigorous validation skills in a wet lab setting.

Inspiration in Women in STEM

Through the Women in STEM panel featuring distinguished professors, I gained profound insights into the challenges and opportunities for women in academia. These dialogues were instrumental in shaping my professional identity and inspiring my future aspirations as a leader in the STEM field.

Career Mapping and Global Readiness

The internship served as a critical feasibility study for my future PhD plans in the US. With the administrative support provided, I navigated complex logistical and

financial aspects of international research, which is invaluable preparation for my career. Supported by the Ministry of Education's scholarship, I was able to fully immerse myself in the Texan research culture, solidifying my commitment to pursuing advanced degrees abroad.