To: Nakatani Foundation

Nakatani RIES 2026 Final Report

Your name: Daniel Ng

Your university: University of Tokyo

Host lab in Japan: Takai Laboratory

Research mentor(s): Yinan Luan

Meaning and Impact of the Nakatani RIES Fellowship: How would you describe the meaning and impact of the Nakatani RIES Fellowship on you?

The Nakatani RIES Fellowship has been profoundly impactful, both as a researcher and as a person. Few undergraduates get the chance to conduct research abroad and learn alongside people from an entirely different culture, and it is an experience I will cherish for the rest of my life. Scientifically, I learned a range of new techniques for cell experiments, and my mentor taught me how to refine them to work more precisely and reliably at the bench. It was fascinating to see how Japanese researchers operate within a different lab environment and set of resources—how they think, how they plan protocols, and how they balance their research, academic, and social lives. Those lessons will stay with me as I finish my studies back at Georgia Tech. Beyond the science, the fellowship helped me build a network I expect to keep for life. I formed close friendships with both the current JP fellows and many program alumni, and their inclusiveness and hospitality were genuinely inspiring. The program also let me travel across Japan and learn from the traditions unique to each region. The friends I made throughout these travels have all told me that I'll always have a place to stay if I ever return; likewise, if they ever visit me in the US, they'll always have a place to stay.

Please complete the following sentences with potential applicants to the Nakatani RIES Fellowship as the intended audience.

- My favorite experience(s) in Japan were, without a doubt, the onsen experience. Throughout the 10 week program, I had the pleasure of bathing in 8 different onsens across 5 different cities (Kyoto, Osaka, Kamakura, Gotemba, and Hokkaido).
- Before I left for Japan, I wish I had connected more with my lab earlier on. My labmates were incredibly hardworking and often kept irregular hours, and I wish I had stayed for more late-night dinners with them and built the same deep connections that I did with the JP fellows.
- While I was in Japan, I wish I had made a more deliberate effort to learn Japanese. I'm happy with my travels, the friends I made, and the adventures I shared with the US and JP fellows, however, I'm returning to Georgia Tech with only "arigato" and "sumimasen" in Japanese vocabulary.

Research Internship Overview: Provide an overview of your research project and your experience during the internship. How did the project relate to your current or future academic interests? What was it like to work in an international research setting?

What did you learn from your research experience this summer, and how has it influenced, or

how do you expect it to influence, your future academic path or research interests?

In my time at the Takai Laboratory, I compared the cellular uptake of several different nanogel formulations. Nanogels are thin polymer gels that coat the surface of a single protein or molecule that is small enough to cross the cellular membrane through endocytosis. Our goal was to develop an acetylcholine-mimetic nanogel that cells would readily take up and that could bypass the blood–brain barrier (BBB) to deliver therapies to the central nervous system (CNS). The BBB blocks almost all macromolecules from passing out of the bloodstream and into the brain; while this protects the CNS, it also makes it very difficult to design drugs capable of reaching it to treat conditions such as Alzheimer's, Parkinson's, and brain tumors. To model a drug, we crosslinked an acetylcholine-mimic monomer around bovine serum albumin (BSA), then measured how readily different formulations were taken up by neuron-like cells and by endothelial cells, which served as our proxy for the BBB. This work connects directly to my research interests in drug delivery and biomaterials. My ongoing research at Georgia Tech centers on an injectable hydrogel system for glaucoma therapy (which is a macroscale approach) whereas my project in Japan worked at the nanoscale. It was interesting to work at and compare two very different scales and evaluate the drug delivery potential of these strategies. The experience sharpened my cell-culture skills, from maintaining cultures to designing protocols and troubleshooting them when they failed, and it taught me practical ways to make my experiments more efficient. I'm returning to Georgia Tech with a renewed motivation for biomaterials and drug delivery, inspired by the work ethic of the Japanese researchers I worked alongside.

Lab Environment Overview: Describe the lab environment and the personality and working style of your research group. What was it like to work with your research mentor(s)? How would you describe the overall group dynamic in the lab?

Compared with some of my fellow US fellows, my lab was less collaborative, but I received a great deal of guidance from my mentor. The environment was highly structured: everyone kept to a 10 am–6 pm schedule, and we had a weekly journal club, regular lab-cleaning sessions, and chances to talk with the professor over informal group lunches and small-group discussions. There was a language barrier, but my mentor's English was excellent, which made a real difference. The two of us grew close over the summer, comparing and laughing about our high school and college years while staying late to troubleshoot experiments neither of us had tried before. I feel fortunate to have been matched with this lab and this mentor. He went out of his way to explain complex topics and scientific reasoning from the ground up so that I understood the logic behind every protocol decision, and together they made my time in Tokyo both productive and inspiring.

Daily Life in Japan: Describe your daily life in Japan. You may include the people you interacted with outside the lab, food, your housing and living experience, travel around Japan, challenges you faced, and rewarding experiences you had over the summer.

Life in Japan was equal parts structured and spontaneous. I lived with another US fellow at Sakura House in Tokyo, and because our lab schedules lined up, we would leave the apartment around 8:50 am and reach the University of Tokyo after a 45-minute commute. We hit our mandatory coffee run (usually Doutor, a cheap and popular café chain, or konbini coffee) before heading to lab by 10 am. Lunch was around noon and I typically shared a quick bite from the food truck beneath the engineering buildings with the other US fellow. We were occasionally joined by JP fellows or students from other programs, which always made the meal more fun.

After lab, we would sidequest: some days we explored Shibuya and Shinjuku, and others we hit an izakaya for good food, browsed the malls for clothes and shoes, shopped for souvenirs, went to festivals, or let the JP fellows introduce us to new foods and experiences. The days stayed consistent, but the sidequests after lab were almost always spontaneous.

Experiences with Japanese Culture: Describe your most meaningful experiences with Japanese culture. These could include program activities, interactions with people in your lab, or experiences from daily life that you feel illustrate aspects of Japanese culture or values. What did these experiences teach you about Japan? What did they teach you about yourself?

There were too many meaningful experiences to pick just one, so I'll share a few. One of my favorites experiences was a guys' trip to Hokkaido alongside three JP fellows. We wandered the fish markets and explored the island, but the highlight was an all-you-can-eat lamb dinner beside the Sapporo Beer Museum. Frantically grilling and shoving down lamb while racing the clock before last order is an experience none of us will ever forget.

Another was climbing Mt. Fuji. We set off at 6:30 pm planning for a 3 am summit and, ignoring the advice of the fellows who had climbed two weeks earlier, badly underestimated the cold; a couple of us were genuinely miserable at the top. We had also under-packed, which forced us to ration ten granola bars and five onigiri among the five of us for the entire hike. It was difficult, but unforgettable.

Sightseeing in Kyoto, Osaka, Kamakura, and Okinawa was fun too, but what's most memorable to me were the copious amounts of grape soju, karaoke, and clubbing/partying. Through it all, I came to admire the Japanese work-hard, play-hard mentality. Somehow they could have an incredible night with us and still make it to their lab meetings the next morning.

That spirit of generosity peaked in Sendai where one JP fellow invited me into his home, took me to the best food in the city, and even arranged a dinner with local alumni for my arrival. He truly treated me like a king. Together, these moments gave me a deep appreciation for Japanese culture and the values that show up in everyday life.

Returning to Japan: Do you plan or hope to return to Japan in the future? If so, what would you like to do? What would you need to make that happen?

I absolutely plan to return to Japan. My favorite memories were spent exploring the country with the US and JP fellows; the friendships I made are reason enough to go back. To make this happen, I'll reach out to Akinari (for Sendai adventures), Taichi or Mayu (for Kyoto clubbing), and Nori or Anju (for Tokyo exploration).