

TO: Nakatani Foundation

Nakatani RIES 2025 Final Report

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Host Lab in Japan: 東京大学、Biohybrid Systems Lab

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Meaning of Nakatani RIES Fellowship:

The Nakatani RIES Fellowship truly brings together a great group of unique people who all have a common interest in research. Going into the program this year, I didn't know anyone, but I knew of one or two of the other BME students also in the cohort and no one else. During our first meeting as a cohort, we got to hear about the wide variety of amazing research we all were conducting in our labs here at Georgia Tech. On top of that, the feeling the passion everyone has for research and the work they do at Tech and would bring to our labs in Japan was infectious. Even though I barely knew anyone in the program outside of fellows from the 2024 cohort, by the end of the summer, thanks to the foundation and Ogawa-san, we all became close friends. One of the Kyoto fellows and I took less than two weeks to become close friends and, without the fellowship, I very likely would've never had the chance to meet him. On the other side, the fellowship also drastically expanded my connections and friendships to several of the Japanese fellows and my fellow lab members. Also, having the Japanese fellows and Ogawa-san to help us travel around Japan and experience/adjust to the culture was incredibly useful and helped make the experience so much more rewarding.

For Future Applicants

I can't really narrow down my favorite experience to just one. My favorite experiences were when a group of US fellows and I hiked up 富士山 and when I went on a hike in Tsukuba with my friend from the 2024 cohort, 松原優依. I went to Tsukuba to visit Yui early in summer and had a wonderful time catching up and talking about everything that had happened since we last saw each other last Fall. Later into the exchange, several of the US fellows hiked 富士山, so we spent a lot of the hike catching up since it had been a few weeks since we last saw each other. Unfortunately, some clouds rolled in and blocked most of the view at the peak, but going up, the views were incredible. We would stop at each station and spend a few minutes sitting and watching the landscape. I also thoroughly enjoyed the ending week where we got to explore a lot of Japan that we wouldn't have been able to explore on our own.

Before leaving for Japan, I wish I had gotten to meet and do activities with the other US fellows during the Spring semester outside of the first info meeting so that we could have gotten to know each other earlier and also tried planning trips we wanted to go on earlier sooner.

I really wish I had gotten to know the JP fellows outside of Tokyo better while I was in Japan. We didn't have a whole lot of time during the first week since we got split into our respective cities early on. I also wish I had more time to spend in Kyoto, Osaka, and the Kansai region and visit the fellows there. I also

would've loved to do more with the other lab members. We went out to dinner a few times over the summer and every time was so enjoyable.

Research Internship Overview:

My main project for the summer was working on the project to fabricate innervated *in vitro* skin equivalent models. Our goal is to improve the fabrication of the dermis layer, fabricated using NHDFs in a collagen and cell matrix solution, to reduce the shrinkage of the tissue due to cell reorganization during fabrication while also incorporating an open channel to culture neurite spheroids through. After the fabrication of the dermis layer, we also fabricated an epidermal layer on top to verify that the creation of the epidermis would completely cover the channel so that a full barrier would be between the dermis and any open-air environment. With more time, we would've continued with the planting of the spheroids, composed of DRG and Schwann cells, which would be planted on top of the channel and allowed to extend through to the side where the epidermis would later be fabricated. Towards the end of the program, I was able to do an additional project with another member of the lab who was working on vascularizing *in vitro* skin equivalents. The project was short, but we tested how seeding endothelial cells into a dermis matrix with and without collagen affected the interconnection between the endothelial cells.

The overall work experience was very similar to my current lab, but with way more people and sometimes longer hours. I would occasionally glance or walk by and see what a other lab members were working on and ask them about their work. If they had time, they would show me a little about their project and talk me through the background and what they're working on which was so interesting to hear about since everyone was doing something different with their research.

At Georgia Tech, my lab focuses on researching ways to improve wound healing. One way is through the promotion of angiogenesis, but my research has been primarily using a 2D structure. These projects relate to my research interests, and I want to use my project experience from the TLab to help me start working and testing with 3D structures more.

Lab Environment Overview:

The lab environment was amazing. Everyone in the lab was super friendly, although a bit quiet when first getting to know everyone. Everyone spoke good English, so communication wasn't an issue. This did make it difficult for me to try practicing my Japanese because my vocabulary was just so limited. I tried to practice listening from what others were saying around me and would try to figure out words from that. I also would ask if the word I was thinking of was correct and whoever I asked was always so nice and help me figure out the right word or a more normal way of saying it in a sentence. When it came to research, everyone was incredibly hardworking but also not so focused on work that they couldn't have fun or go out for dinner occasionally. One thing I noticed, was that there tended to be not much non-work related interactions between students of different grades. For example, B4's tended to mainly talk with other B4's and not much of M1's or higher.

Daily Life in Japan:

During the work week, there wasn't a whole lot that I got to do outside of lab. I would usually get up and go to lab, start any experiment for the day, get lunch with my mentor and the other

international student when we had a break before going back to finish up the experiments. After the experiments were done for the day, I would sometimes stay a while longer to work on some other 3D model projects that I was doing for fun or get dinner with some of the lab members. Other times, I would go back to my apartment and play games with friends in the US. Commuting to lab ended up being ~45 minutes each way, which in the evenings was very relaxing but I dreaded making the commute after the sun came up. The apartments weren't made for someone my height or taller and many days when I wasn't careful and smacked my head on the door frame when going through the door. We US Tokyo fellows would also semi-regularly go out for dinner or do something together as a group. One week we did an escape room with several of the JP fellows. During the weekends, I always went on a trip of some kind. About half of the weekends, I went on a day trip somewhere near Tokyo. Some places I went to were Hakone, Tsukuba, Yokohama, Disney Sea, Nikko, and Kamakura. On the other weekends, I went on larger trips to places like: Okinawa, Hokkaido, Sendai and Shizuoka/富士山. The food nearly everywhere was really good and usually for a good price too. But, for the life of me, I could not find spicy food at all. But, this ultimately, was an incredible opportunity and experience that not many can say they did and I wouldn't trade it for anything.

Experiences with Japanese Culture:

The most meaningful part of the exchange wasn't necessarily the places I got to visit nor the sites I got to see. It was the people that I did it all with. Japan is a wonderful place, but if I was traveling all alone and didn't have the Tokyo JP fellows or the other US fellows to go see these places with, it wouldn't have been anywhere close to the same. The events that we did with the JP fellows were some of my favorites because it wasn't always necessarily the doing the Japanese activities or restaurants people may normally think of, but it was going to those places with the JP fellows and developing friendships. Other incredibly valuable experiences were those I got to do with my lab members. We went to play basketball at the gym once, got dinner a few times, and have events in the lounge which were all fun and helped me get to know everyone and realize that not everyone was all about hard focus on working.