

Aulden Jones

An interview with 2022 IRTE participant, Aulden Jones

Aulden, please tell us a bit about yourself.

I am a 3rd-year undergrad at Georgia Tech studying physics. Before my experience at NIMS, I had interned at Sandia National Labs and worked in the Mourigal group researching the spectroscopy of quantum materials at Tech for almost two years. My past research has been on electron spin resonance spectroscopy, focusing on instrumentation and experiments designed to characterize and probe the spin dynamics of material systems of interest to my lab.

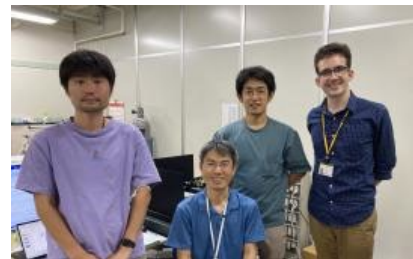


Thanks. Can you tell us a bit about your IRTE research experience?

For my IRTE experience, I had the pleasure of working with Dr. Tokuyuki Teraji at the National Institute of Materials Science (NIMS) in Tsukuba, Japan. Altogether my experience was two months long.

What did your research project entail?

My research focused on decoherence phenomena in nitrogen-vacancy diamonds. NV centers are atom-sized spin defects whose properties allow their use as quantum sensors, detecting weak static magnetic fields in this case. This project allowed me to use and expand upon my experience with magnetic resonance techniques, mainly by using optically detected magnetic resonance (ODMR) to characterize samples of interest. We were particularly interested in investigating the relationship between crystallographic strain and spin coherence time in NV diamonds grown by chemical vapor deposition (CVD). The project aimed to provide feedback for improving diamond growth methods, eventually leading to NV ensembles with higher sensitivities. Longer coherence times and better sensitivities can lead to more applications and new experimental techniques in fields like condensed matter physics, neuroscience, and cellular biophysics.



You lived in Tsukuba for 10 weeks. Can you tell us about the laboratory and your experience living in Tsukuba.

Tsukuba was a wonderful city. There are many excellent restaurants and parks to visit, and the layout is decently simple, so you're unlikely to get too lost. All of my travel was done either by bike or train. I always took the Tsukuba Express (light rail) to get to and from Tokyo, which was only a 45-minute ride one way. Ninomiya House was incredibly clean and beautiful, and the staff there was very friendly. The food in Japan and around Ninomiya was great! The Seven-Elevens and Family Marts have grab-and-go food if you ever need a quick meal. Near Ninomiya House, a yakitori (meat skewers) place called Torikichi ended up being one of my favorite restaurants to go to after work with some of the other interns.

There can be a language barrier, especially if you travel to more rural areas outside Tokyo. Still, if you know a few key phrases, you will be fine in most circumstances (many people can speak English). Google translate is also your friend when it comes to reading. Just take a picture of a sign and it will translate it for you, assuming you have a good internet connection. Grocery stores were accessible by bike and had a lot of good options. You

might want to bring an extra deodorant stick (deodorant in Japan is not as strong, from my experience)!

Please tell us about your weekend travel experiences.

Almost every weekend, I went with friends on overnight trips to different areas around Japan.

Kyoto is worth the trip if you have time. The Shinkansen (bullet train) is about a \$200 round trip, but major temples like Kiyomizu (on a mountain overlooking the city) make it a great place to take in some natural beauty. I also recommend the Nishiki fish market in Kyoto for a good street food experience.

The deer park in Nara was a lot of fun, along with the Todaiji temple. Nikko was great for a fun weekend on the river. I would look at earth hostel: the riverhouse for a great place to stay.

Hakone was by far my favorite place. The combination of the natural hot springs, the art museums, and the overall aesthetic made it one of the most memorable places for a few of my friends and me. Traveling to Hakone was not easy. We took four buses and three trains, but it was worth the extra effort.

Around Tsukuba, we would all go to karaoke or an arcade for a fun night.



Can you share any overall impressions of your experience?

The lab environment I worked in was very warm and accepting, and I became very close with the three mentors I worked with. Overall, I feel going to Japan gave me a better sense of my current field of research in addition to Japanese culture and life. NIMS had a few invited speakers that gave exciting talks on quantum materials. Additionally, I was able to meet researchers from other fields that I was not familiar with before. One of the great things about NIMS is the number of people you meet from all over the world. Some of the other interns and I became excellent friends with a few French students doing their masters at Tsukuba University. I also attended a summer lecture series at the University of Tsukuba after meeting the professor and was invited to participate. Future experiences will differ, but NIMS will continue to have many opportunities and fantastic research. I can't stress enough how transformative this experience was for me, both scientifically and socially.

