

Coop Japan Experiential Report

Internship Dates: 2010/05/16 – 2010/08/13

A summary of my short but amazing experience while living in Japan and working at the National Institute for Materials Science in Tsukuba, Ibaraki, Japan.

<http://www.nims.go.jp/eng/>

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Arrival

Prior to arriving I remember being extremely nervous and worried about my upcoming trip. The training week added another worry: what if I accidentally offend someone by acting improperly? It also added the wish to stay away longer as I realized that three months is almost too short to see a lot of the country and definitely too short to learn the language and adapt completely to the culture. But off I went to Japan anyways, a very stressed out start.

When I got past immigration and customs I had to buy my bus tickets to get to Tsukuba Centre. This was simple enough, but catching the right bus was very confusing. I was not used to buses coming on schedule and leaving exactly when they are supposed to. I was very worried about missing the bus and about missing my stop. My problem was that the bus did not announce the next stop, only the current stop, and only in Japanese and so I almost got off the bus too early.

Upon arrival at Tsukuba Centre I was met by my supervisor who took me to pay for my apartment and to my apartment building. I was exhausted and fell asleep after a meal at the nearby Chinese restaurant.

Work

My first day at work started Monday morning at 8:30. From there I got my internet and work email set up on my computer, submitted my receipt for the apartment to the accounting office, and got paid for my entire work term in one lump sum. In the afternoon my supervisor took me to the grocery store to buy food and let me leave work early because of jet lag.

During the first few days I was shown around the offices and the labs. I met many people who were all very nice and welcoming.

The first two weeks of my work entailed reading papers related to my project and deciding what method to use based on the equipment available. I also learned to operate the indentation machine, the optical microscope, and the scanning electron microscope.

Once I learned to operate the indentation machine I was able to begin testing my samples for Young's modulus. I would have to learn to use a different machine with a higher loading capacity to test for hardness.

In mid-July my company held the NIMS Conference 2010 – Challenges of Material Science: towards the Solution of Environment and Energy Problems, which I attended. The conference spanned 3 full days and many different symposia were held.

During my last week my group held a farewell luncheon for me at was combined with a welcome for some new students that had just arrived. We went for Indian food and they sprung a speech request on me at the end of it. After lunch we took a group photo.



Figure 1 - My work group



Figure 2 - Me at the conference

Near the end of July NIMS held a summer party in the large courtyard of the largest campus. Here many people gathered to eat and drink for the evening. I bought a yukata for the event and my boss' secretary helped me tie it.

Importance of my Project

In 2001, the National Research Institute for Metals (NRIM) and the National Institute for Research in Inorganic Materials (NIRIM) were combined to form the single company, the National Institute for Materials Science (NIMS). Since this merge NIMS has opened the International Centre for Young Scientists, which recruits young scientists from around the world and provides them with research experience. This programme is mainly geared towards post-doctoral placements. In 2006, the Rolls-Royce Centre for Excellence for Aerospace Materials was established. Other research collaborations were set up in the following years.

NIMS is the Japanese research institute concentrating on fundamental, generic, and infrastructural technology research relating to the development of materials. They are located in Tsukuba, Japan and have 3 campuses. My placement was at the Sengen site, the largest facility. My project was relating to aerospace materials and so I often got to work in the Rolls-Royce Centre. In this lab they are able to cast single crystal metals, thermally cycle specimens, and cut specimens, among other things. My group was called the Structural Functions Research Group and is one of the groups in the Hybrid Materials Centre. This group does a lot of work with high pressure torsion on different materials and examining the structure of the material after the deformation.

I was listed as a guest researcher at NIMS and my project involved determining the fracture toughness of the interface between a ceramic coating and a superalloy substrate. This was done by using different indentation and optical techniques followed by fracture toughness calculations.

Initially I reviewed several papers in order to determine my experimental procedure. Once my supervisor and I decided to indent the cross-section of our samples I proceeded to mount the new ones and polish all of them. Once the surfaces were prepared I tested each sample for Young's Modulus by using micro-indentation and then tested each for hardness. These tests were done separately because the hardness testing was done congruently with interfacial cracking and so a much higher load was used. Optical microscopy was used to determine the length of the cracks that were generated during the hardness testing. All of these results were combined to determine the fracture toughness of the interface in question.

The purpose of the work was to determine if the composition of the substrate could affect the interfacial toughness between the ceramic layer and the bond coat and therefore the lifetime of the system. This type of investigation has not been done before. The data reported should be useful to the aerospace industry when designing gas engine turbine blades.

Coworkers

At the beginning I was placed at a small desk in the room for the macromolecules group. These people were very nice and very hard working. I would eat lunch with them most days for the first couple of weeks and we would talk about our home towns, universities, and movies. During my second week at work I was moved to a larger desk in the same room as my boss. At first I missed my little desk because this new one had empty shelves that I didn't have enough books for and they would rattle if I ever accidentally knocked them while putting things away. But it was nice to be in the same room as my group members and since the desk is bigger I could tell myself that I was moving up in the world.

After two weeks my boss returned from a conference at which point we had the first group meeting I went to. The meetings involve an hour-long update by one group member followed by 10-15 minute summaries of recent work by the others. I gave a short presentation to introduce my work to my colleagues.

At one point I was invited to a welcome party for a new employee in the group next door during that first week that my supervisor had returned. During the party I met some new people and received some suggestions for places to visit. That was also the first time I ate sushi in Japan.

The next week my group went to a restaurant for my welcome lunch. It was at a sushi restaurant in Tsukuba. The sushi was very good and it was very nice to get outside the office for a bit during the day and visit with people.

During the rest of my stay I often ate lunch with my colleagues, either in the cafeteria at work or out.

Japanese Language

On my second day at work my supervisor took me to the classroom where the language courses were being taught. Here we were informed that the introductory level class had already filled up and that I would have to wait until September for the next class. Unfortunately my internship was to end mid-

August and so we set about finding me alternate options and finally settling on a language exchange between a Japanese lady who wanted to keep practicing her English, another Chinese lady who also wanted to learn Japanese, and myself. These meetings were every Tuesday evening for an hour. During this time we would ask questions about the language and how to say certain things that we thought might be useful to us within the next week. I found that my language skills did not start to improve until I started studying on my own time.

In mid-June a friend I'd made at work mentioned that someone had dropped out of the introductory language class and that it might be possible for me to join late since I had taken a class previously as required by the Canada-Japan programme. After several emails and discussions I was permitted to join the class.

Travel

Since I was to be in Japan for only 3 months I spent nearly every weekend going somewhere else. During my first month in Japan I saw Tokyo twice, climbed two mountains, visited Nikko, Kyoto, Nara, and Uji. All of these places were amazing for their own reasons. The first weekend I went to Tokyo the group I was with decided to stay in the capsule hostel in Shinjuku. The city really comes alive at night and I found it so amazing to see so many people, so many lights and sights and things to do or to buy. We ended up in a night market where I bought a chocolate covered banana with rainbow sprinkles which was amazing. The other main food delight in Tokyo that I didn't get a chance to try was crepes. They had some of the tastiest, sweetest looking dessert crepes I've ever seen and they were also really big.

Nikko was a significantly more rural area than Tokyo, with mountains all around and clouds covering the tops and trees growing on nearly every spare patch of soil. It was a really beautiful place with very intricately carved shrines, rushing rapids, an amazing waterfall, and many talented craftsmen. So many of the shops there sold beautifully carved, lacquer painted boxes, plates, mirrors, trays, anything you could want related to wood was there. Even carvings of the "See no evil, speak no evil, hear no evil" monkeys could be found for all price ranges in many different sizes.



Figure 3 - Hear no evil, Speak no evil, See no evil

Nara was a very interesting place. I went with another Canada-Japan participant to visit some temples and parks. It was very interesting to see how tame the deer there were. They will follow people who feed them until someone new feeds them or they get bored. I saw one deer rear up and strike out at one girl who was there. The deer are also very small and have wiry fur. We saw some babies that were very cute. I did not feed any because I didn't want them chasing me. On our way back from Nara to Kyoto we stopped at Uji, which is the small town where the temple on the 10 yen coin is located. The temple seemed more like a museum, so we just took pictures of it through the bushes. Uji is well known for the green tea that grows in the area. Every shop we saw was selling every kind of green tea you could possibly want. They also had green tea sweets, green tea omiyage, green tea KitKat bars, tea pots, tea cups, tea whisks, powdered tea, everything tea related was there.

Kyoto was by far my favourite place of the places I saw during that first month. It was like a big small town that had both the traditional Japanese areas as well as the more modern areas. Here we saw the Golden Pavilion which was even more beautiful in real life than in the pictures one can see on posters and postcards. I was following my friend at this point and didn't realize until I saw it that this was the place we were going to see. When I saw it I was shocked back into seventh grade when my class studied Japan and my teacher put up a poster of the Golden Pavilion. It's so amazing to be able to say "I've been there" now. After the Pavilion we met up with some other Canada-Japan students and saw the Torii Gate trail. I was very excited to see this place because it is another one of the places that can be found in pictures of Japan. After the Torii gates we went to another temple on our way back to Gion where we had seen a geisha the night before. We were hoping to see another, but were unsuccessful. They are very elusive and always avoid the main roads. Earlier in the morning before we left the hostel I had asked one of the ladies working there if she knew of a specialty knife shop in town. She directed me to a small street on the other side of the river; this was where we headed after seeing no geishas. This street was so amazing. It lit up the night like Shinjuku in Tokyo and was like a mix between mall shopping and street shopping. It was like a mall because of the bright lights, the sheer number of people, and the glass roof that covered it. At the same time it was like a street because it was on a road with stores full to the brim with stuff that spilled out the front entrance into the road where it could attract customers. We eventually found the little knife store along the right side of the street. The store had every different kind of knife you could want from Swiss army knives and Leathermans to a set of samurai swords. The owner of the store surprised me with his excellent English when he asked me if he would like an explanation of the knives. I went to the store to get a knife for my mother to replace some of the ones in our kitchen at home. I came out with one for her, one for me, and a special ceramic sharpener. We then had a dinner at a parfait restaurant. Parfait in Kyoto is like crepes in Tokyo; they're everywhere.



Figure 4 - Me at the Golden Pavillion

When we climbed Mount Fuji it was the first weekend it was open. We started at the 5th station and climbed overnight to see the sun rise so we started at 7:30 pm. It rained the whole way up and the further you went the windier it got; as a result some of us stopped at a hut for the night and didn't make it to the top while the rest of us got very cold. We all had rain jackets and/or pants and backpack covers and water-resistant spray for shoes but everything still got drenched. Even though the weather was bad it was a great trip since the climb was not too difficult, only long, and the group we had put together was really keen to get to the top and very supportive. The group that got to the top paused for a bit at one of the 8th station huts where there was an hourly rate. We reached the top just before the sun began to rise, around 4:15 am. Unfortunately the clouds were still present and we could barely see 30 feet in front of us let alone the sunrise. Luckily the clouds cleared a bit during our descent so we got some nice photos of the valley from the side of the mountain. All in all I would call it a successful trip and would certainly go again if I were here for longer.



Figure 5 - View from Mount Fuji

The weekend after Fuji-san I stayed in Tsukuba to go shopping at the West Edmonton Mall-rivalling mall on Saturday and then visited Yokohama with some friends on Sunday. In Yokohama we saw the Cosmo World Ferris Wheel, the Red Brick Warehouses, and the Chinatown as well as some nearby attractions. Chinatown was very busy and full of shops with food, clothes, and other household items. It started raining when we were in Chinatown so we decided to leave Yokohama and stop at Ueno on our way back home. There were many shops in the area on Ueno that we went to, all with very cheap prices.

For the long weekend in July (17-19) I went to Hokkaido. I saw a bakery in a small town in the middle of nowhere, the Sapporo Beer Museum, the Sapporo City Jazz Festival, the Date Jida Mura in Noboribetsu, the Noboribetsu sulfur pits and onsen, and the Furano lavender fields. I also got the chance to go to karaoke with some people I met in Noboribetsu.



Figure 6 - The Red Brick Warehouses in Yokohama



Figure 7 - The lavender fields in Furano

On July 31st the Sumida River Fireworks Festival was held in Asakusa, Tokyo. I went with several friends and after a few hectic hours of trying to find each other we were able to sit down and enjoy the show. I didn't travel with my friends because I went to Tokyo early that day to find a square watermelon at Takano in Shinjuku and buy fabric at the Nippori Textile Town. I came to Asakusa via subway and the train was as packed as during rush hour on weekdays. They had people employed to push us into the train. After the fireworks some of us went to ageHa, a popular club in the south-east reaches of Tokyo.



Figure 8 - Square watermelon and co.

For my last weekend in Japan I decided to head down to Osaka with a friend I'd met since coming to Japan to visit some of the other CJCP people. We saw Himeji Castle, a bit of Kobe, had Kobe Beef, met up with the CJCP Kansai group for fireworks in Osaka and dinner in Namba. The second day we were there we saw the Osaka Bay area. This included a ride on the giant Ferris wheel, lunch at the Tempozan marketplace, and Osaka aquarium. We met up again for dinner before my friend and I headed off to see the Umeda Sky building before catching our Shinkansen train back to Tokyo. It was a great last weekend in Japan.

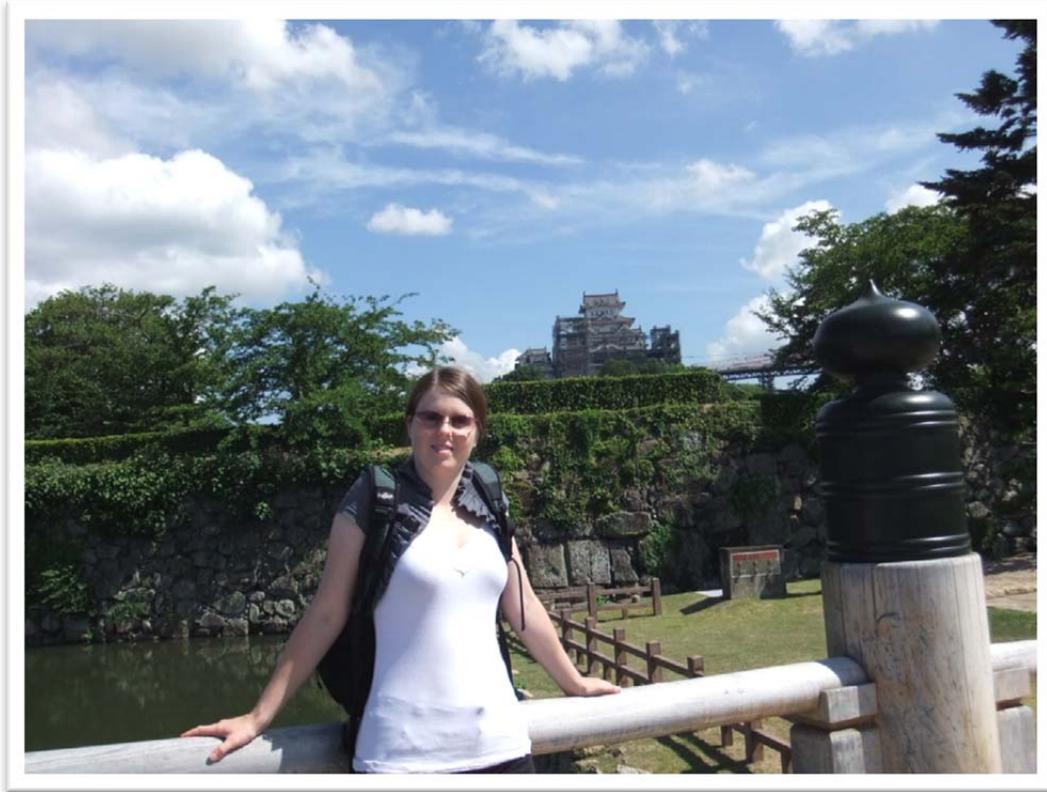


Figure 9 - Me at Himeji Castle

Overall Experience

Even though my stay in Japan was very short, I enjoyed every minute of it. From the interesting project at work to the great times I had traveling to the amazing people I met. I think that this trip has been an amazing experience and I would love the chance to do something similar again. Working in Japan and at NIMS in particular has made me consider another research internship after I graduate. I am also considering a masters degree a little more seriously, though not for several years from now. I believe that this placement has given me a little more confidence and a stronger drive to do something new. For anyone who is considering an international work position: do it. For anyone who is already here: make sure you get out, go places, meet people, and most of all have fun.