

Canada Japan Coop Program (CJCP) Internship Experiential Report

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Robotics Co-Research Lab, Minami-Aoyama, Minato-ku, Tokyo, Japan
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HONDA
The Power of Dreams

Company Background

Honda is a Japanese Automobile manufacturer founded in 1946, with headquarters based in Aoyama, Minato-ku, Tokyo. Although there are many automobile companies in Japan, Honda is renowned for its dedication to taking risks and developing innovative technologies under its company slogan “The power of dreams”. Notable examples of its innovation includes Japan’s first entry to international motorcycle racing with the Isle of Man TT in 1959, Japan’s first entry to Formula 1 racing in 1964, the release of the Honda NSX in 1990 which is often considered to be Japan’s first supercar, the HondaJet airplane released in 2012, and its long history of developing cutting-edge experimental robots.

Robot development at Honda started out in secret in 1986 with the first public announcement of the P2 humanoid robot stunning world in 1996, and its direct line of research continuing up to the third generation ASIMO released in 2011. More recent developments in robotics include the disaster response humanoid robot E2DR announced in 2017, and more socially-oriented robots such as those showcased at the CES conference in 2017 and 2018.

The company is composed of three parts: Honda Motor Company overlooks business, Honda R&D does technical research and development, and Honda Engineering facilitates production. Honda Research Institute (HRI) is a subsidiary of Honda R&D, and it is designed for international collaborative research, with locations in Japan, Europe, and the US.

I originally worked at HRI Japan (HRI-JP) headquarters in Wako, Saitama, but I moved to the Robotics Co-Research Lab in Aoyama, Tokyo after it was newly created during the third month of my internship. During the last month of my internship, the ownership of the office and the company I was working for changed from HRI-JP to Honda R&D, but no significant difference in working conditions arose from the change.

The Robotics Co-Research Lab, at which I spent the majority of my internship, had a very relaxed and open working atmosphere much unlike a traditional Japanese company. The official language was English, and although the majority of the employees were Japanese, it welcomed many research collaborators, internship students, and new team members coming from an international background. Social events were fairly common, and provided opportunities for everybody to get to know each other, which was possible because of the small size of the office.

Work Experience

The purpose of my internship was to perform fundamental theoretical research on robot bipedal locomotion using nonlinear control theory. My personal work environment was somewhat similar to what a graduate school student might experience while doing research at a University. I worked very closely with my supervisor, from whom I received all of my tasks and feedback from. Similarly to graduate school research, my internship started with a several month period of reading and understanding background theory. After gaining necessary knowledge, I was given a research problem, for which I read additional papers, implemented and tested ideas, and presented my progress to my supervisor to receive feedback and research direction.

I was incredibly fortunate to have been given the opportunity to pursue a long term research project, and through the incredible support of my supervisor, we managed to develop a method effective enough to write on a paper submitted to an international conference. Having a paper published is the most visibly obvious output of a research project, so getting this result as an undergraduate student will undoubtedly help me immensely in my future career development.

Apart from having visible results, this internship has taught me many skills crucial for a researcher, and generally useful for any engineer. This includes teaching myself very complicated theoretical topics, explaining them to other people concisely and intuitively, working through difficult problems with no known solution, driving a long term project to the end, and presenting results in a way that convinces people of the importance of my work. In addition to these soft skills, I also gained a deep understanding of differential geometry and nonlinear control theory, mathematical proof, modern control theory, many different methods of robot bipedal locomotion control, physical modelling and simulation, and MATLAB programming.

Although this was my third internship experience, it was undoubtedly my favourite one so far, and it convinced me to pursue a robotics research career as a result. In fact, I hope someday that I will be able to come back to the same office to work, this time as a professional researcher and not an internship student.

Finally, as an enthusiast of robots and of Honda, I was very pleased to see that robotics research is still going strong in the company. I believe that the founder Soichiro Honda's

spirit of innovation is still very much alive in the company, and the company is continuing to take risks and take in new ideas.

Living Experience

The company was kind enough to provide me with a very nice apartment complete with living essentials (cutlery, rice cooker, air conditioner, internet router, etc.), and with all electricity and utility bills covered by the company. The apartment was very conveniently located, as it was directly across a large supermarket, and a 5 minute walk away from Wako-shi station. The station was an incredibly good one to live close to, as I could access most stations in Tokyo with no more than 1 train transfer, and most notably Ikebukuro (2nd busiest station in Tokyo) could be reached directly in 13 minutes on the fastest train. If I ever come back to live in Japan, I would try to live in Wako.

Since my working location moved during my internship from Saitama to Tokyo while my apartment stayed the same, my commute went from being a 10 minute walk to a 1 hour train ride. Although I had mixed feelings about this at first, I quickly became very glad about the change because it encouraged me to enjoy and explore Tokyo.

The company paid for a monthly commuter pass that allowed me to board and get off at any station between my home station (Wako-shi) and my workplace station (Omotesando), which meant that it was completely free for me to go to Ikebukuro, Shinjuku or Shibuya at any time. For example, I could stop by Shibuya on Friday night on the way home to have dinner with fellow interns, go shopping in Ikebukuro on the weekends, and have a much cheaper fare to visit anywhere in Tokyo.

This was very convenient for me, as my favourite hobby in Japan was going on walks and exploring various neighborhoods in Tokyo. Each neighborhood in Tokyo has its own distinct characteristic and personality, with some of my favourite places including Ikebukuro, Odaiba, Ginza/Yurakucho/Hibiya, Shibuya, Akihabara, and Yokohama (not in Tokyo).

Cultural Experience

The cultural experience for me in Japan was probably quite different from that of other interns, as I am first generation Japanese who grew up outside of Japan but speaks fluent (albeit sometimes a little awkward) Japanese. In addition, I have many relatives around

Tokyo with my aunt's family located an hour train ride away from my apartment. I also visited Japan many times as a child, although I usually did not stay for more than two months and these visits generally happened about once every three to five years.

For this reason, my cultural experience in Japan was less of experiencing something completely new and foreign, but more of fully experiencing Japanese culture that I know from childhood memory and Japanese media for the first time. In addition to knowing the language from talking to my family only in Japanese, I was also aware of many of its social characteristics from watching Japanese variety shows every day with my family, and through my hobby of Japanese movies, books, and music.

My favourite aspect of Japanese culture is the overall personality of the people and the character traits that are highly regarded by its society: sincerity, respect, discipline, and taking pride in one's own work. These same traits are those that I strive for myself, and I really enjoyed talking to the Japanese employees in my office, many of whom I felt were embodiments of these principles of living.

Something I like equally as much (possibly more!) as the serious cultural traits however, is Japan's culture of social drinking. Being someone that is sometimes too shy or too serious about work related matters, the ability to drink with coworkers once in a while to talk more openly and casually is very appealing to me. In particular, the frequent drinking parties held by my office gave me opportunities to get to know the Japanese employees, and these parties were actually my favourite cultural experiences in Japan.

Because of my hobby of exploring Tokyo, I only went to three trips that were two or three days long. My first was a business trip to Nagoya to attend a technical conference, so I did not do too much exploring. After that, I went to weekend trips to Kyoto, once to see the autumn leaves and another to catch an early glimpse of cherry blossoms.

Overall Reflections

My time spent doing this internship in Japan was undoubtedly the best experience in my life. Prior to coming to Japan, I worked very hard to accomplish the things that I had access to, but I had too little experience and exposure to life outside of university classes to make important life decisions about whether I wanted to pursue robotics engineering, a research career, and working in Japan. Through this internship program, I was able to try out all of

those things at once, and I now know that I love robotics research, I definitely love Japan, and that I would like to live here someday. I can now go back to university with a clear mind and focus on my studies with the confidence of knowing what the end goal of my hard work looks like.

Although my Japanese background makes my experience different from what a lot of potential CJCP students might experience so it makes it somewhat difficult for me to give general recommendations, I can at least say for myself that, applying for a Japanese internship through the CJCP program was one of the best decisions of my life, and something that will have greatly shaped my professional and personal life moving forward.

For this reason, I truly have to thank the people who have made this possible. This includes the staff of the CJCP program, my university co-op program (UBC Science Co-op), all of my coworkers at Honda and especially my supervisor. Thank you for everything.

Picture Gallery

Ramen!



Top Left: Nakiryu, Michelin Star winning spicy tan-tan-men.



Top Right: Tsuta, Michelin star winning salt broth ramen.



Bottom Right: Tori-no-Ana, my personal favourite. Thick chicken based broth that doesn't require hours of waiting to eat.

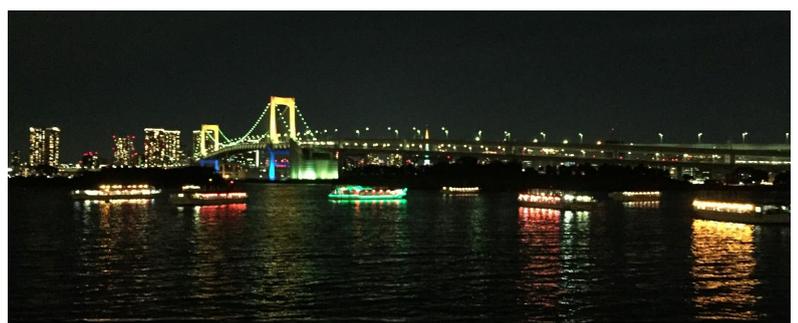
My Favourite Places to Visit



Yokohama, located outside of Tokyo in Kanagawa Prefecture, provides beautiful seaside walkways and parks, lots of good food in Chinatown (Peking duck crepe and pork bun shown below, left and right respectively), high-class western style shopping street and an incredible night view (shown left). I also happened to go to preschool there.



Odaiba has many shopping malls, and it also features a nice beach (shown right), a life-sized Gundam (robot from an anime series) statue (shown below, left), and also a beautiful night view (shown below, right).



The Four Seasons



All four seasons were quite noticeable in Japan, both through the changes in nature and through seasonal cultural events.

Top Left: Summer dance performance near Yoyogi Park and Harajuku.

Middle Left: Autumn leaves in Arashiyama, Kyoto.

Middle Right: Winter illumination near Yoyogi Park and Shibuya

Bottom Left: Spring cherry blossoms in Aoyama Cemetery, close to my workplace.

Bottom Right: Night cherry blossoms in Kiyamachi, Kyoto's drinking alley (even the drinking alley is beautiful in Kyoto!)



Drinking Parties

Since my workplace was in a nice neighborhood, I had lots of very good food for company drinking parties. Examples included fresh sashimi at Uo-shin (top right), premium beef at Bistro Vin Brule (middle left), beautifully prepared seafood at Hachibe (middle right), and craft beer at Yona Yona Beer Works (bottom left). When it was just the interns getting together, we enjoyed chicken skewers at Tori-Kizoku, a chain restaurant more friendly for our student wallets (bottom right).



Other Special Events



Watching a sumo event from only a few seats away from the front seats was a very impressive experience. Shown in the picture is former Yokozuna (highest ranking wrestler) Kisenosato. He retired only a few months after this photo was taken.

Since I had a week off from work, I spent the New Years with my relative's family. Shown in picture are some traditional dishes served during New Years.



As a big fan of Japanese rock music, I really enjoyed going to my first Japanese rock festival, Countdown Japan. I saw artists I really liked, as well as unfamiliar artists that I started following after the event.

Some of my coworkers and I went to a Honda Formula 1 event, where we saw a real F1 car drive in front of us. Shown in the picture are some historical Honda F1 cars displayed at the event, most notably the car that won the 1965 Mexico GP only a year after Honda's debut in F1.

