

**Report on the short-term overseas study program  
for KU Engineering students  
Graduate School of Engineering, Kyoto University**

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### **My research interest and motivation of studying abroad.**

My research interest is how to manage water, including flood control and water resource management. This field is broad, and I am especially motivated to manage water in an environmentally-friendly way, which is called green infrastructure (GI) in our field. I applied to this program to study about GI for water management since this research field is progressed in the U.S. I chose Hassan Davani's laboratory for my study, which is in San Diego State University (SDSU). The duration of my experience was from October 7<sup>th</sup> to November 6<sup>th</sup>.

### **My work in Dr. Davani's Laboratory**

During this program, I got involved in three different researches; evaluating the effect of green infrastructure (GI), using machine learning for detecting the crack of sewer system, and streamflow modeling for evaluating the amount of trash that flows into rivers. I discussed with professor twice to three times a week, and worked with a PhD student in the lab rest of the week.



**Figure 1. The location of Imperial Beach**

I spent more time for the research about GI than other research. The research aims at evaluating the effect of GI in Imperial Beach (Figure.1). It is located in the west coast and close to the Mexican border. The local government of Imperial Beach is actively working on implementing GI. Dr.Davani's lab is working with the local government and evaluates the effect of existing GI by using a hydrological simulation tool called PCSWMM. During my research visiting, I helped to identify the location of the existing bioretention, which is one of GI for stormwater management. After making a map to show the location (fig. 2), I imported the data to PCSWMM, adjusted the parameter, and ran a simulation as a trial. It showed that the simulation results with bioretention reduced the peak flow by a certain amount compared to the results without bioretention. Since this study is still in progress, detailed results cannot be presented here.

In helping with this research, I was first surprised to find that PCSWMM, a hydrological modeling tool, can handle GI functions since the hydrological modeling tool used in my laboratory in Japan cannot. Moreover, the stormwater management manual in San Diego county describes the standard for installing or evaluating GI. In Japan, GI has been gaining more attention in recent years. However, most of the GI in Japan seem to be conventional rice field and detention basin, that are redefined as GI . In Japan,

where flood risk is higher due to heavier rainfall and steeper river, the GI such as that being implemented in the U.S might not adequately contribute to flood control. However, I thought it would be very meaningful to learn how local governments and research institutes are collaborating in planning GI in areas like the Imperial Beach, where GI is already being actively implemented and planned.

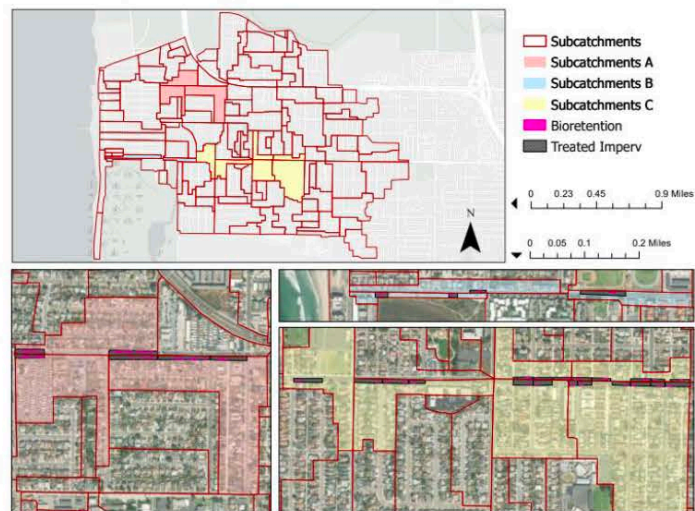


Figure 2. Distribution of a type of GI called bioretention

### Experience outside the laboratory

Although I stayed at the laboratory most of the weekdays, I also experienced a lot in my free time and the weekends. One of my greatest experience was to join social survey in a weekend, and asked local residents about their awareness of flood risk. In this activity, I explained the purpose of our survey concisely and hand out the flyers, which include a QR code to go to online survey, to the local residents. At first, I could not talk to people on the street because I worried that I fail to explain about the survey with the lack of my English proficiency.

Once I started talking to a local woman, my fears were gone. She tried to understand what I talked, and filled out the survey on the spot. After that, I continued asking local peoples, and was able to distribute flyers to about 20 people.

One of the people I talked to at that time was a Japanese American woman. When I told her I was from Japan, she was impressed and took me out to dinner another day (Figure 4) . I think it rarely



Figure 3. Social survey to local residents

happens in Japan that one can become friends with participants while conducting a survey. I felt the difference of American and Japanese from this experience.

On the other weekends, one of the PhD students took me to the beach and showed me the beautiful scenery in San Diego. One master students also took me to the San Diego Zoo with his kids. I could enjoyed and experienced new things all of my free time thanks to a lot of kind people. I will never forget all of the experience there, and would like to make the best of the knowledge of research and communication skills that I gained for my future life.



Figure 4. A family I met during the social survey