

TITLE OF REPORT : Building collaboration for environmental research in Japan and California

NAME : Daniel Nover

AFFILIATION : University of California, Merced

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Background

My research at the University of California, Merced focuses on improving water resources planning and management in the USA and various international settings. Proff. Yamashiki and his colleagues at Kyoto University focus on disaster risk management and communication as it relates to water resources. The BRIDGE fellowship offered the opportunity to build on our current collaboration to focus on incorporating disaster risk analysis into efforts at UCM to better communicate disaster risk to vulnerable communities. This collaboration builds on my JSPS Summer Fellowship, during which worked with Dr. Michio Kumagai at the Lake Biwa Environmental Research Center in Otsu, Shiga-ken. At that time, I met researchers from Kyoto University DPRI, including Professor Yamashiki, with whom I have been working on and off for the 8 years since.

I proposed a set of activities focused on learning more about the research activities of the Yamashiki Lab and exploring opportunities to link researchers at UC Merced and Kyoto University. The BRIDGE Fellowship allowed me to spend Nov. 1 – Nov. 24, 2017 with researchers at Kyoto University and participate in several graduate seminars, meetings and symposia, through which I identified areas of common interests (described below). I was also able to conduct a monitoring trip of Kyushu, which experienced devastating flood damage during Typhoon Nanmadol in July 2017.



In front of Kyoto University GSAIS (Left) and with the Yamashiki Lab (Right).

Activities**Research exchange and Networking Opportunities**

During my time in Kyoto, I was able to attend the weekly graduate seminar of the Yamashiki Lab (see group photo above) to learn about the current research interests of the group and to share my current research interests. I presented background information about the UC Merced as well as current research focuses. We discussed management of river water resources for human and environmental needs, UC Merced efforts focused on drone-based environmental

monitoring, technologies for environmental research and hydro-informatics. Professor Yamashiki presented his current work, including many modeling tools and several student and post-doc projects focused on modeling and monitoring of environmental systems and disaster risk, notably floods and debris flows. Finally, I was able to report my activities in Kyushu to the group during our final meeting. I also interacted with graduate students and post-docs to discuss research and identify common interests.

Participation in other seminars, workshops and activities

Several special events occurred during my stay in Kyoto. I attended a day-long meeting of Kyoto University's administration and the reception that followed, allowing me to interact with faculty and administrative personnel. Additionally, I met the liaison of the UN FAO to Japan, and several days later I attended his lecture at Kyoto University where he presented FAO's agricultural development work to an international group of graduate students, faculty and guest. Finally, I spoke at a meeting of the Japan/Brazil organization hosted by Kyoto University, focused on environmental disasters and urban planning.

Formalizing Research Collaborations and Student Exchanges

Professor Yamashiki and I discussed the potential to develop a formal MOU between Kyoto University and the University of California, Merced. This MOU is currently being negotiated per the formats of the two institutions. Additionally, we discussed the possibility of student exchanges and agreed to them in principle. We also discussed the potential for collaborative research activities along the themes outlined below.

Areas of Common Interest and Potential for Future Collaborative Projects:

Flood Risk Management

Flood risk is a major concern in both California and Japan. Additionally, river management infrastructure in both places has developed to address flood risk as well as other human and environmental uses of water. The Yamashiki group and our group at the University of California focus on different aspects of flood risk management and this represents a potential area of collaboration.

Comparative Analysis of River Management Infrastructure and Impact on Flood Risk

A major focus of my work is how river management strategies and infrastructure develop in different contexts, cultures and societies. Adding a Japanese dimension to this work is extremely important and builds on our understanding of how governance, culture and history combine to generate specific approaches to river management.

Remote Sensing of Environmental Systems

Both of our research groups employ remote sensing to inform management strategies for multiple uses of environmental resources. I am in the process of identifying opportunities to use tools developed by Kyoto University for application to Californian water bodies and environmental systems.

Research Trip to Kyushu:

I conducted a one-day trip to view flood damage in Shiga-ken, along the Ane River, a location I am familiar with from my JSPS summer fellowship in Shiga-ken. This trip gave me the opportunity to see river infrastructure along the Ane River and to develop my approach to touring flood damage in remote parts of Kyushu. I then traveled from Kyoto to



Map showing the route of the flood damage assessment (far Left), a road closed following the historic rainfall in Kyushu (middle), and an example of a debris flow adjacent to Hikko-san-gawa, Kyushu (far Right)

Kyushu to assess flood damage in central Kyushu during July 2017. The region experienced ~550mm of rainfall in about 12 hours during the typhoon. Interestingly, I worked with Kyoto University researchers on a paper that chronicled historic rainfall during Kyushu typhoon in 2012. It was the most severe rainfall Kyushu had experienced until the precipitation was exceeded by the 2017 typhoon. Beginning in Hita, central Kyushu, I traveled along Hikko-san-gawa, location of the most severe rainfall during the 2017 typhoon. I also traveled to Haki and Asakura City, which saw the most severe flooding and damage. During the last day of the assessment, Professor Yamashiki joined me and we were able to tour extremely remote areas. Finally, I was able to view river infrastructure in many locations in Kyushu, which will help inform my understanding of Japanese river infrastructure for ongoing research into river infrastructure around the world.

Conclusion

I had an excellent experience in Japan and the interaction with Kyoto University continues to be incredibly fruitful. I am extremely grateful to JSPS for giving me this opportunity and I am optimistic about the continued potential for the research collaboration between the research groups discussed in this report.