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JSPS Summer Programme Research Report

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Location: Data Assimilation Research Team, RIKEN Advanced Institute for Computational Science, Kobe

Host: Dr. Takemasa Miyoshi

I spent two months working in the Data Assimilation Research Team at the RIKEN Advanced Institute for Computational Science (AICS) under Dr. Takemasa Miyoshi from June to August 2017, funded by the JSPS Summer Programme. Presently, I am studying and conducting research in the Atmospheric, Oceanic and Planetary Physics department at the University of Oxford in order to gain a PhD. I applied for this programme in order to spend some time in a dedicated data assimilation research team, and learn more about the computational aspects of my research.

My research concerns a statistical technique known as “data assimilation”. This technique is commonly used in the atmospheric sciences in order to estimate the state of the atmosphere by combining observations with atmospheric models. It is used by all numerical weather prediction centres in order to initialize their weather forecasts. However, it is a computationally expensive process, requiring some of the world’s largest supercomputers. For my research, I am considering a novel way to improve the efficiency of the data assimilation process, by lowering the precision of the computations.

Over the summer, I demonstrated that the lowest possible level of precision is related to the quality of the model: when the model is a poorer representation of reality, intuitively, precision can be lowered further. Furthermore, I found that one particular algorithm used in data assimilation can be made around 50% faster by lowering precision, without affecting the quality of its performance. I hope to publish this result over the next year, and I hope it will lead to further collaboration with my host, Dr. Miyoshi.

Living in Japan for two months has been a truly wonderful experience. Over the two months, I made some local friends, and tried many new things. The JSPS stipend was incredibly generous and allowed me to travel to other places on the weekend.

I have just a few tips for future scholars on this programme. Firstly, be prepared to put in extra hours. I worked an extra 90 mins to 2 hours per day while in Japan. This is in order to fit in better with the rest of your team, who will work long hours, but also to make the most of the two months. Secondly, try to learn some Japanese both before you come and during the trip. I would advise taking a tutor in Japan, if you can. The locals are always very happy to hear foreigners try their language. Lastly, if you are vegetarian, you will find it very difficult to eat in restaurants.

Enjoy your time, and say yes to everything!

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Above: Kobe.

Middle: five JSPS Summer Programme scholars in yukata, in Kyoto (me on far right).

Left: me with my home stay family, the Nakamuras.