

International Internship at the University of Washington

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Period: 6th January, 2020 – 25th March, 2020 (3 months)

Country: United States of America

Supervisor: Prof. Christine K. Luscombe

Institute: Material Science and Engineering Department, University of Washington

Research

I visited Prof. Christine K. Luscombe's laboratory at the University of Washington. Her research is directed towards the design, synthesis and application of macromolecules. Especially, current topic of her research is the precise synthesis of semiconducting polymer and its application for photovoltaics and flexible electronics. She came to Kyoto University in 2019 and gave a lecture, "JGP Seminar", about her works. Since I aim small molecules in my research, her talk was fresh and interesting for me.



Building where Luscombe's lab is located

My work in Luscombe's group was synthesis of block copolymer using 100% regioregular polythiophene and polymethyl methacrylate, and controlling the self-assembly behavior. The nanoscale structure of polymer is important for achieving high performance organic photovoltaic device. To control self-assembly behavior, the optimization of polymer length and solubility of polythiophene unit is needed, so I tried to synthesize various poly(3-alkyl)thiophene (P3AT) based block copolymers. First, I learned precise synthesis of polymer using Ni catalyst from Dr. Jon Onorato and Mr. Lorenzo Guio, and then I started synthesis of P3AT. The synthetic technique was different from that for small molecules, and I was excited to learn a new technique. I finished the synthesis of polymers at the beginning of March, but unfortunately, Luscombe's group started working remotely due to the COVID-19. I



Zoom meeting (coffee break time)

couldn't advance my research any more. It was regrettable for me. When working remotely, we used Zoom to hold seminars as well as to enjoy conversation from home.

My life in Seattle

I stayed in Seattle for three months from January to March, so I felt the change of seasons. The temperature is almost same as that in Kyoto and they don't have much snow in Seattle, but it rains a lot during winter. I hardly saw a bright cloudless sky until the end of February. The people in Seattle don't use umbrellas and they only wear hoods. It was surprising for me. In March, there are much more sunny days and I enjoyed beautiful cherry blossoms.

My apartment is located to the west of university and it took 20 minutes from home to the campus on foot. There was a wide variety of restaurants (Korean, Thai Mexican and others) and I went there every Friday for a group lunch. Korean food was particularly preferred by my colleagues.

The city centre of Seattle was within 20 min by bus from my apartment, where so many companies such as Amazon, Microsoft and Boeing are located. The most impressive place is "Amazon go", which is an automatic convenience store. There is no cash register and items picked up there are automatically recognized.

Acknowledgement

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Beautiful cherry blossoms in the campus



My room