

International Internship at Cornell University

Ikuya Fujii

Department of Material Chemistry, Graduate School of Engineering, Kyoto University

28th March 2022 – 3rd July 2022 (3 months)

under supervision of Prof. Tristan Lambert

Department of Chemistry and Chemical Biology, Cornell University

Ithaca, New York, the United States

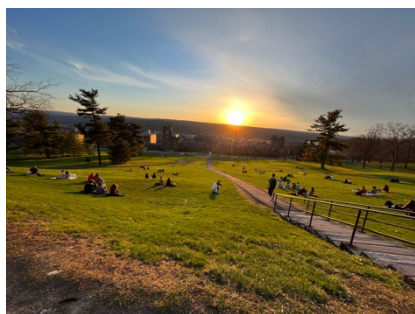
1. Research

1-1. Cornell University

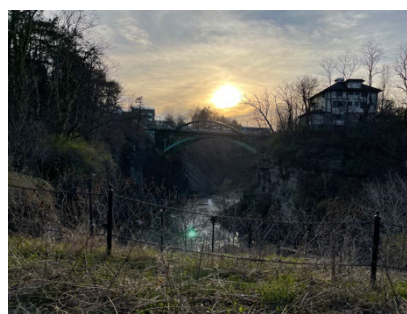
Cornell University is located in Ithaca (5 hours by car from New York city), New York, the United States and is one of the Ivy League universities. It is a private university with various departments and is well known for Hotel Administration as well as STEM fields. The university has a lot of cafeterias and restaurants on campus. Notably, the campus is surrounded by a valley, which was created by glacial erosion. I was able to devote myself to my research in the beautiful and historic campus in relax mood. I was really surprised that there were waterfalls in the campus. In addition, professors from the United States and abroad frequently visited the university and gave lectures in person. Fortunately, the reception in the Department of Chemistry and Chemical Bioplogy was held immediately after my arrival (the Westy Night), where we were able to get to know people from other groups. There were also many other events during my stay, such as the Slope Day at the end of the semester and a student-led LGBTQIA+ event held on campus.



Arts Quad



Libe Slope towards Downtown



Valley in the Campus

1-2. Lambert Group

Lambert group focuses on synthetic organic chemistry and has two major projects underway: the development of electrophoto catalysis and carbonyl-olefin metathesis. In both projects, they have designed and synthesized unique organocatalysts themselves to achieve new catalytic reactions. At the weekly group meetings, students and post-doctoral fellows were encouraged by Prof. Lambert to speak up and engage in lively discussions. Interestingly, students' discussions often took place everywhere in the laboratory. I was able to learn their research in detail through discussions with each student. Group parties were held with Prof. Lambert on the birthdays of lab

mates, acceptance of papers, and when the second-year students successfully passed their doctoral candidacy qualification, and the atmosphere was very lively.



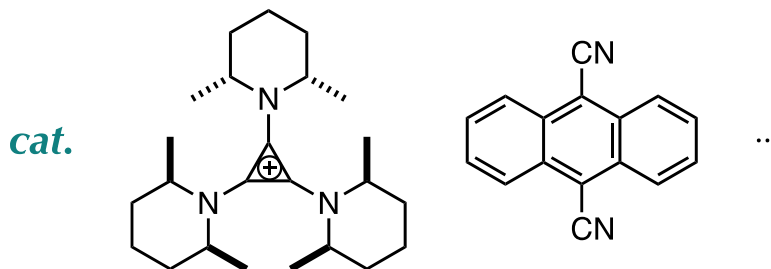
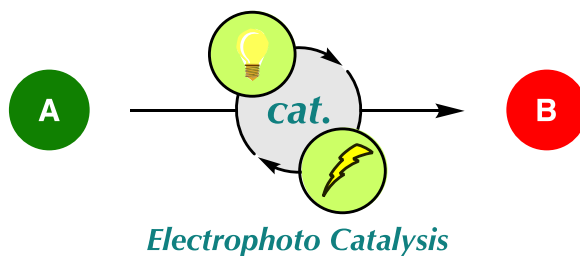
Friday Lunch



Group Photo

1-3. Research Project

I belonged to the electrophoto catalysis subgroup and worked on "development of novel electrophoto catalysis based on multi-oxidized/reduced species". I synthesized new organocatalysts and investigated the catalytic activity. In the first month, I set up target molecules and synthesized them through a series of literature surveys and discussions with Prof. Lambert. In addition, cyclic voltammetry measurements were performed to elucidate their electrochemical behavior. Finally, oxidative and reductive reactions were investigated using a variety of synthesized organocatalysts, leading to the discovery of catalysts with higher activity than the conventional catalysts developed in Lambert's group.



My Research Theme

2. Life in Ithaca

Ithaca is a quiet town centered around Cornell University. The town is rich in nature, with waterfalls, lakes, and plenty of trail trails. On weekends, I went around with a bicycle, walked the trails, or relaxed in the parks around the lake. There was also a farmer's market around the lake where we could get a variety of local products. When I arrived, there were still days of snowstorms, but as summer approached, the temperature quickly rose, and the area became lush and green. It was beautiful to see the campus take on a different look each season. It was also relatively easy to get to major cities such as Syracuse, New York, and Boston, and my lab mates would drive or fly there on the weekends.



Farmer's Market

Festival in Downtown

Group BBQ

3. Acknowledgement

I appreciate Japan Gateway: Kyoto University Top Global Program and JSPS Research Fellowships for Young Scientists for the financial support. Here I also would like to say thank you to Prof. Tristan Lambert for his kind acceptance and supervision and members of the group, especially Mr. Jose De La Rosa, Dr. He Huang, and Dr. Taehoon Kim, for pleasant time.