

変革を駆動する先端物理・数学プログラム (FoPM)

国外連携機関長期研修 報告書

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日程	西暦 2025 年 1 月 6 日 ~ 西暦 2025 年 3 月 4 日

I had the honour, thanks to the financial support from FoPM, to stay in NYC for two months and do fruitful collaborative work with the group led by Prof. Colin P. Nuckolls at Columbia University, which locates at the center of New York. His research fields include, but are not limited to, nanocarbon materials, and he has been one of the top researchers in various fields. I have been doing collaborative work with his group and was impressed by the productive work they are doing, which made me want to visit the lab in person. I was also curious about the research system in the US, as it is one of the leading countries in the world in many ways. I thought I could gain insight into why they can show such a big presence in the world by visiting there, which would be useful for my future career.

My stay in the Nuckolls lab began with learning cutting-edge experiments performed there. One member, who I once had a discussion with, kindly showed me various instruments, as well as unique reactions. The group had published an interesting paper just before my visit, and it was very exciting and stimulating to learn how to set up the reaction. After that, I began working on the synthesis of the new π -conjugated material. The synthesis turned out to be very difficult, but the formation of the target compound was confirmed using analytical techniques. I tried the isolation by examining various separation techniques, but the isolation was not complete yet. I will continue working on the separation using some other techniques available in our group.

During the visit, I also took part in the regular meetings held in a small group. There were a lot of active discussions about the research projects, and I was so stimulated by their unique ideas and beautiful molecular structures. At first, I struggled with the language barrier, but I tried my best to take part in the active discussion. These meetings were also good opportunities to think deeply and reconsider the aim of my research.

What I found impressive during the stay was the system of the group. A lot of members were "joint students", where one student can join more than one research group. Because of this system, every member has their own background/speciality, which facilitates a lot of interesting discussions in the group, leading to collaborative work. This system seems to be also educative in that one student can experience a lot of experiments, from synthesis to device fabrications. This open culture was further supported by the presence of many postdocs, which allowed casual discussion among staff/students. This culture taught me (a part of) the reason why the group is so productive in various fields, and I recognised the importance of active discussion with people from diverse backgrounds.

During my stay, I also enjoyed visiting famous places in Manhattan. One of the most impressive places was the Metropolitan Museum of Art, or the MET. It showcases numerous works from all over the world, including Roman sculptures and modern artworks in Europe/America. One of the magnificent works was the "Portrait of Antoine-Laurent Lavoisier and his Wife" by Jacques-Louis David, which illustrates a great chemist Lavoisier, also known as "the father of modern chemistry", and his wife. I have known this art for a while, but when I stood just in front of this portrait, I was so impressed and overwhelmed by the greatness of this artwork, feeling proud to be working on the same subject he pioneered.

On the other hand, I also realized how blessed life in Japan is. In New York, a lot of things in everyday

life – such as bathrooms or lockers – often did not work well, and everything was so expensive. People have to be careful about where to live or walk, or they will get in trouble. Here in Japan, we live in a relatively safe environment, and we have access to most things at reasonable prices. The stay was also an opportunity to learn both the good points and bad points of each country.

On the whole, the visit to the Nuckolls group had a great impact on my career. The unique chemistry they are working on, active discussions we had, everyday life in Manhattan... Everything was amazing for me and stimulated my active interest in research. I would like to express my sincere gratitude to Prof. Nuckolls for kindly accepting me to his group, and Prof. Isobe for generous support during the preparation of the visit. I am also grateful for the FoPM program because the visit would not be possible without their generous financial support. Finally, I would like to thank every person I met during the stay, as the discussion about the research, as well as casual conversations with them, made my stay an unforgettable experience.



Figure 1. The picture of Columbia University, with the sculpture of Alma Mater.