

# My Activities in the Leibniz Institute of Polymer Research

## Dresden (IPF) Internship

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### 1. Why did I go Dr. Ulrich Scheler lab?

Dr. Scheler's work focuses on the development of specialized NMR methods for characterization of functionalized polymers and their application to polyelectrolyte and complex polymer systems. Actually, this is the third time I have been to the Dr. Scheler lab for research. The previous two times I studied about the Rheo-NMR, which applies a shear flow in the NMR sample. This leads to a slow formation of amyloid fibrils and allows a measurement of the intermediate states. These experiences lead to my doctoral thesis study. And on my last visit on March 2019, Dr. Scheler told me that there are other



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interesting NMR techniques besides the Rheo-NMR. He is a polymer scientist, and rarely applies his expertise to proteins with more complex structures. I was very interested in the development of research from the convergence of fields and decided to use the JGP program for IPF research.

### 2. The research activity

#### 2.1 About the research

In Dr. Scheler's lab, I studied and measured the Electrophoresis NMR. The combination of diffusion and electrophoresis NMR is applied to determine the effective charge of polymers and proteins. I measured Electrophoresis NMR of proteins to prove that proteins can keep ions on their surface. I thought I was used to measuring NMR. However, at first, I was very surprised that the probe was able to change by measurement, and the sample tube was U-shaped instead of a tube. After measuring the data which I wanted, I had a discussion with the teacher. I was able to consult if it could be applied to my own research in Kyoto, and I could advance my own research.



Electrophoresis NMR

## 2.2 Research environment

The research environment was very different between IPF and Kyoto. First, the people of IPF were very friendly. Everybody greeted everybody, even if unknown, just saying “Hello” and smiling. When I received the greeting, I felt happy, and the day became fun. Second, IPF has so many rooms that there are only 2-3 people per room. (They can even share a room with someone from another lab.) One of the reasons that the number of the personnel at IPF is not so large is probably because IPF is a non-university research institute. Because of this very quiet environment, I was able to concentrate on my work from morning till night. On Friday afternoon, at 3 o'clock, everyone went back home, and it was a culture shock for me.

## 3. My Life in Dresden

My room in the student house was a 25-minute walk from the IPF. There was a cute red and green kitchen. I often bought sausage and tomatoes to cook, because I could get very cheap vegetables and meat at the supermarket. Especially I can recommend “Plattpfirsich” which is a kind of peach and rare in Japan. It is said that Son Goku of Saiyuki ate all “Plattpfirsich”s at the peach orchard because they were so delicious. It is very juicy and delicious.

Dresden is a court city that is praised as "Florence on the Elbe" due to its glamorous prosperity. Although the city was severely damaged by air raids during World War II, historic buildings were rebuilt around 1990 to revive the beautiful old town. The old city has various buildings lined up and it was a spectacular sight. The sunset is especially beautiful and romantic. After research, I usually walked around the city to see the sunset. It was very nice to be able to study in this city.



My room and the colorful kitchen



Old town of Dresden

#### **4. Acknowledgement**

Here I express my thanks to Dr. Ulrich Scheler for hosting me at IPF and having productive discussions. I hope I will devote myself to reflect all of my experiences at Dresden in my research life and in my papers. Finally, I greatly appreciate JGP-CPIER for the financial support.



Group photo from left: Dr. Walinda, Dr. Scheler, me