

Research Internship Report

Report on my internship at Hitachi, Ltd.

Graduate School of Frontier Sciences,
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2023(D2), ISSP Yoshinobu Lab. 04-7136-3323
Your Supervisor's Name: Jun Yoshinobu

1. Outline of the internship

Client: Hitachi, Ltd.

Hosts: Mr. Yusuke Kaga, Mr. Kaifeng Zhang

Schedule: Aug. 28-Oct. 31 (Aug.-Sept.: 5 days a week on-site, Oct.: 2 days a week both on-site and online)

Theme: Development of high-resolution molecular spectroscopic imaging technique

Background leading to the implementation of the internship:

As I was thinking about my future career path upon completion of the doctoral program, I was interested in "doing research at a company". Therefore, around June, I considered companies through the GMSI office that could offer internships with themes similar to those of my current research in the laboratory. Before applying, I received permission from my supervisor to participate in a long-term internship, which led me to apply for this theme. As stated in the application guideline, the selection process consisted of documents and interviews. After the decision was made, we had a detailed discussion about the internship schedule and labor contract around July, and the internship started around the end of August. This internship was also part of the domestic internship program of the MERIT program in which I am participating.

2. Theme and results

The theme of this internship was "Development of High-Resolution Molecular Spectroscopic Imaging Technology. For the advancement and utilization of cutting-edge electronic devices and functional materials, advanced measurement technology linked to manufacturing is necessary. Therefore, Hitachi, Ltd. is developing high-resolution and high-sensitivity spectroscopic techniques and equipment to meet the above needs. In this internship, I used a high-resolution molecular spectrometer under development at Hitachi, Ltd. to analyze and evaluate functional materials that were considered difficult to measure with existing equipment. In addition, I performed instrument development work, including the design and assembly of the experimental system, for the above equipment. The details and results of the research are confidential and will not be discussed.

3. Comments on the internship

One of my motivations for participating in this internship was to learn what differences there are between academic and industrial research. Particularly, in terms of motivation for research, I was

impressed by the fact that academic research is based on interest and concern, whereas industrial research values social needs. In addition, the need to consider the bridging part of social implementation of research content is probably a major difference from basic research at universities. I had never thought of it this way, so I was able to broaden my perspective in exploring future research themes.

Furthermore, the handling of research results was also very different. In the case of academia, it is common for research results to be presented at academic conferences and published as papers as quickly as possible, and the underlying concept is that the research results themselves are common property. On the other hand, in the case of companies, research results are highly confidential and are often patented at the outset. This is probably due to their emphasis on giving back to society as a "product". We were also able to recognize differences in terms of how research is ultimately returned to society. Even though the process itself of conducting experiments is similar, the start and goal are different, so the difference in research styles was helpful. Being able to learn about these differences in research styles was a major benefit in shaping my own career path.

I also learned a lot about the technical aspects of the experiments. Usually, the spectroscopy experiments that I perform involve controlling the environment of the sample. This time, the main theme was the development of the setup of the instrumentation, and I was able to gain technical knowledge in areas that I had not been exposed to before. I feel that this knowledge will be useful in my own experiments, and I would like to use this experience to consider upgrading my experimental system.

4. Comments from the company

Although you may have had experience in material evaluation using commercially available equipment, this internship allowed you to experience the development and evaluation of spectroscopy equipment. This experimental apparatus is still in the development stage, and while many unforeseen problems occurred in the operation of the apparatus, the interns completed the scheduled evaluation items. In addition, they considered and proposed their own policy for analyzing data and the causes of equipment malfunctions, which provided us with valuable insights into the direction of equipment development. We would like to thank you again.

5. Others

Message for future internship candidates:

This time, I participated in a long-term internship of two months. I think it is difficult to participate in an internship for several months during several years of graduate school research life. However, I believe that you will gain valuable experience that you cannot have in your usual academic research life, so I recommend that you take the plunge and participate if you are at all interested.

Acknowledgements

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