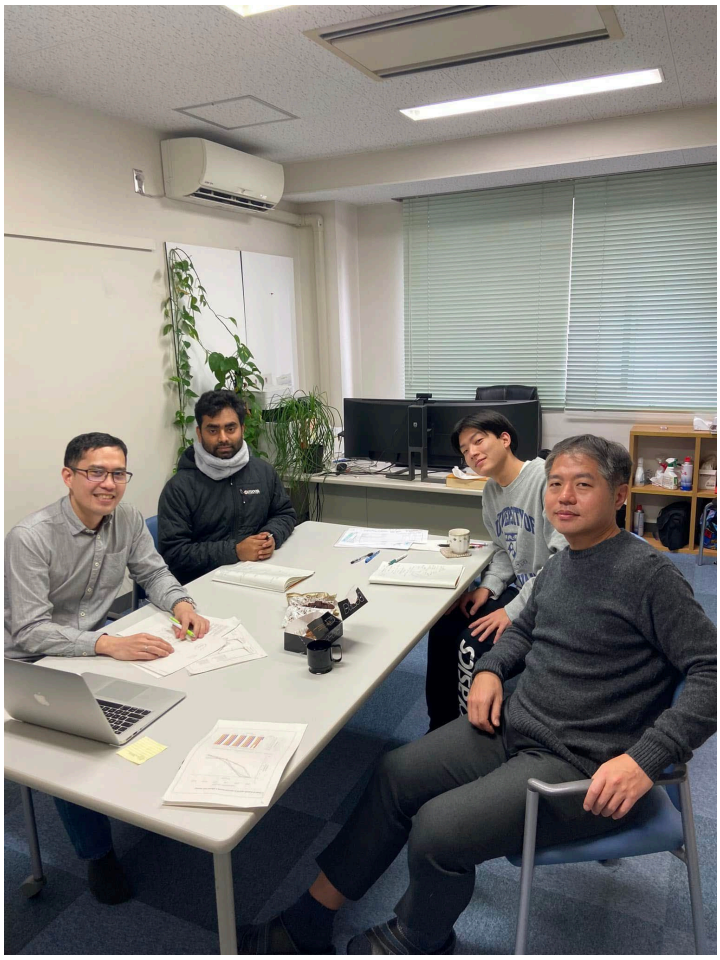
The research visit funded by LaMer led to the conceptualization of the following project proposal.

Research meeting: antibiotics degradation analysis

Participants: Prof. Kozo Watanabe, Dr. Anwar Hossain (PD), Md Shaffiujjaman (Research student), Yuma Hayashi (B3), Prof. Jose Isagani Janairo

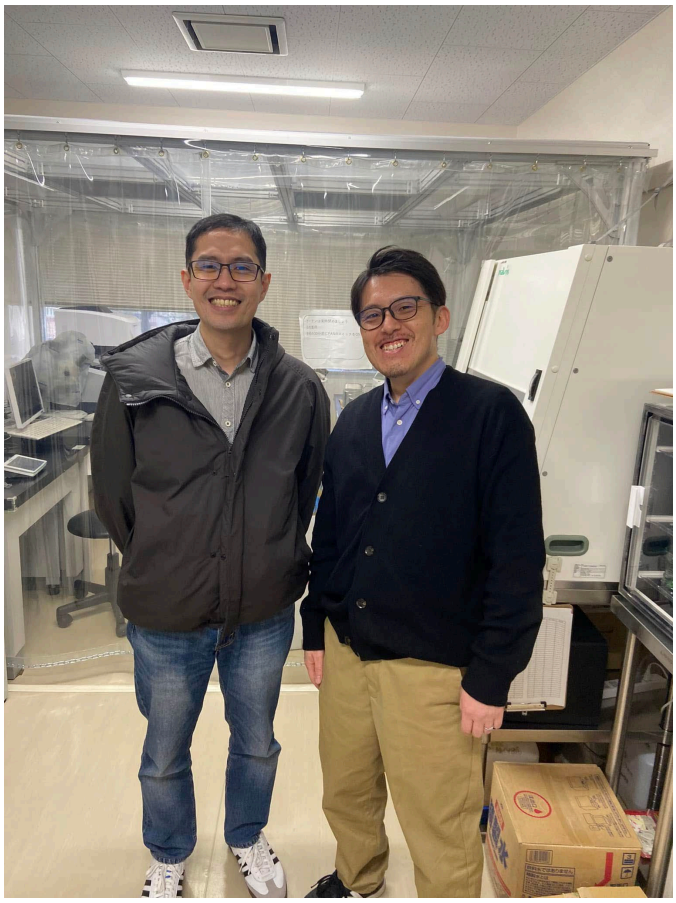


The meeting was held to discuss how to analyze and characterize degradation products of antibiotics from wastewater. The discussion led to the conceptualization of a protocol involving both experimental and computational approaches. It was suggested to isolate the stable antibiotic degradation products using chromatographic methods which can be extended to analyze the bioactivity of the degradation products to bacteria. In order to better understand how antibiotics are degraded, it was suggested to use density functional theory calculations based on LC-MS/MS data to calculate relative stability of the degradation products. Through this method, a plausible degradation pathway can be proposed, and the energy required to initiate degradation can be estimated. Finally, it was also proposed to apply machine learning methods to determine important parameters that can be adjusted to enhance degradation of antibiotics in wastewater.

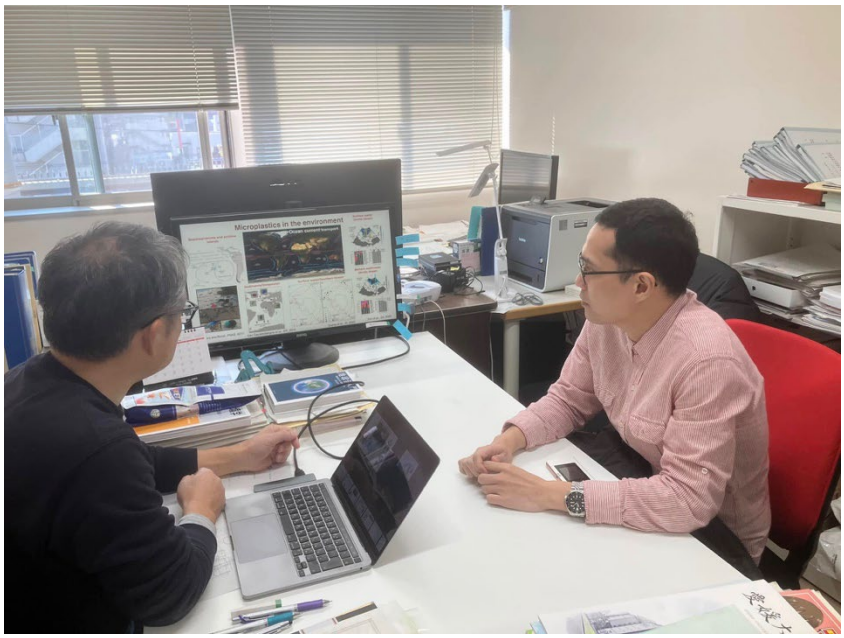
Research meeting: microplastics

Participants: Prof. Tomoya Kataoka, Prof. Hirofumi Hinata, Prof. Kozo Watanabe, Prof. Kohei Hamamoto, Prof. Jose Isagani Janairo

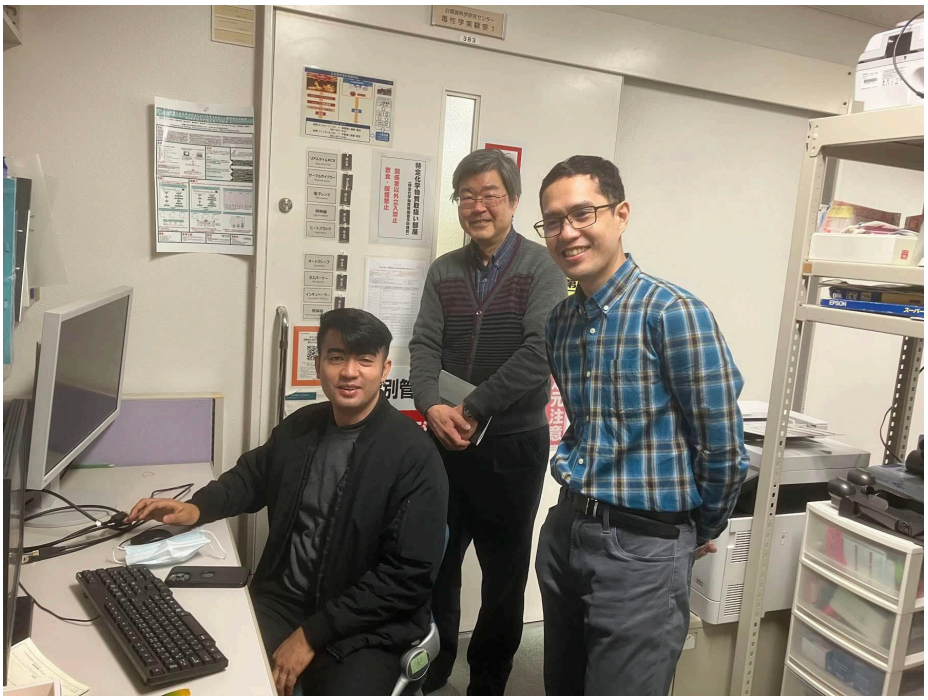
In separate meetings, the microplastic researches of Prof. Kataoka and Prof. Hinata were presented. In both meetings, possible areas of collaboration were discussed. Prof. Kataoka presented his research on freshwater microplastic analysis, as well as method development for the enhanced characterization of microplastics. Prof. Kataoka also gave a tour of his lab and explained the different instruments available and shared best practices on how to keep samples.



In another meeting, Prof. Hinata shared his oceanography-centered analysis of microplastics. He presented his work on developing numerical models to simulate microplastic movement in the ocean. Prof. Hinata also gave a tour of his lab where he showed various facilities his team uses that are relevant to the study of microplastics in the ocean.



Research meeting: toxicity analysis via in silico methods
Participants: Prof. Hisato Iwata, Prof. Kozo Watanabe, Dave Robredo (D2), Prof. Jose Isagani Janairo



Prof. Iwata gave a general overview of the research being conducted in his lab. His D2 student, Dave Robredo provided detailed explanation on how he combines experimental and computational approaches to study the impact of environmental pollutants to marine mammals. Prof. Iwata gave a tour of his lab where he showed the various instruments they use for research. Dave Robredo showed the molecular modelling software they use to study biomolecular interactions.