

Internship Report

My study programme is the MEME (Erasmus Mundus Master Programme in Evolutionary Biology), a two-year research-oriented master programme for students who are interested in understanding biological evolution in all its facets. For my 3rd exchange semester, I participated in a research internship at the University of Montpellier (Montpellier, France), particularly with the Institute of Evolution Sciences of Montpellier (ISEM).

Before arriving in Montpellier, there were some expectations of my internship and life in this region. The intensity of the project work was expected given its scope and brevity of the timeframe relatively. My supervising professor, F. D. provided sufficient preparatory materials such as scientific articles and tutorials, giving me a clear idea of the topic and tools to carry out my analyses. Less expected was the usage of English in Montpellier which is an international 'student town', as most of the general public and students speak little to no English. To communicate with the locals, shopkeepers and to use everyday facilities, I benefitted from beginner French lessons upon arriving. Thus, if given the opportunity during or before studying in France, I recommend incoming exchange students to obtain or have some basic level of the language, which also helps in the integration with the locals for a holistic exchange experience.

During my internship, I worked on my project named the "Meta-analysis of the Phylosymbiosis of Mammalian Gut, Oral and Skin Microbiomes". Phylosymbiosis refers to the biological concept in which the microorganisms (microbiomes) of host organisms infer the biological relatedness between host organisms. I presented phylosymbiosis analyses addressing questions which have never been explored before. My analyses had the largest

assembled dataset with mammals to date containing 3701 microbiome samples. With gene sequence data from previous microbiome studies, I utilised a bioinformatics platform for microbiome studies (QIIME 2) to filter the quality of sequence data and carry out diversity analyses, comparing phylosymbiosis amongst intestinal, mouth, and skin microbiome regions of mammalian species.

From my internship, I developed many skills applicable in my research career. I became more familiar with concepts and research methodologies of phylosymbiosis in evolutionary biology. This familiarity is a big step in my preparation to joining a PhD Programme. I gained research experience by identifying appropriate questions, formulating research hypotheses, experimental design, data collection and analyses, and presenting my results. I also discussed with my supervisor about publishing my research results to contribute to the international scientific community. I learnt to become an independent scientific researcher familiar with the standards of research. I acquired communication skills to be part of an international scientific network. For the particular location of my project, I learnt a new language and experienced different cultures.

In terms of social life throughout the semester, it was amazing to participate in the social events organised by my institute. These enjoyable events included a pre-Christmas holiday lunch at the ISEM building, and an ISEM weekend getaway in a cottage in Graissessac. Participating in these events helped me to know my colleagues better and establish contact with them. I also met other students in the student accommodation I stayed at and still keep in touch with them.



Picture: Pre-Christmas holiday lunch at the ISEM. My colleagues and I prepared various dishes and drinks for this 'potluck' style event.

Overall, my internship abroad was by far the most challenging experience of my life, but also the most rewarding which I am grateful for. Within the internship period, I completed all the planned research work of my group and necessary assessments for my programme. As part of my first internship, this project was also my first of its level and scale. It was a proud moment to successfully defend my first thesis project at the end of the semester. Based on my conversations with my supervisor, Frédéric is pleased with the quality and scope of my work as I started without any experience with such a project. Frédéric remains interested in accepting more interns in the future for semester-long projects. Hence, I strongly recommend this position to exchange students, and getting in touch with Frédéric and other researchers doing interesting work with the ISEM.



Picture: My thesis defense in a lecture hall with the MEME coordinators as the jury members. The audience were junior MEME cohort (1 year after my cohort), my supervisor, and some of my colleagues.

I thank my supervisor, Frédéric D. who organised this project with me and was always reachable for any form of assistance. It was great to have lab technicians like Marie-Ka T. and Amandine M., who organised the microbiome samples and gene sequence data used in my project. I also thank Jon S. at the University of California San Diego (California, USA) who works closely with Frédéric and provided the details for my analyses. My colleagues, Arthur W. and Rémi A. also helped me to understand and work with the computer programmes used in my analyses. It was beneficial to have a good relationship with my colleagues who have many years of experience in the field and an extensive range of skills. Besides the people in my professional environment, friends outside of the university, and family members abroad provided crucial morale and emotional support throughout my project.