

# Final report

(Erasmus+ Internships – SMP)

## General information on the internship

Subject of studies: [Evolutionary Biology](#)

Course of studies (Bachelor/Master/Staatsex.): [Master](#)

Time of internship: [from 01/09/2021](#) to [19/01/2022](#)

Place of internship: [Uppsala University](#)

„Research internship in the field of evolutionary genomics“ at Uppsala University, department of organismal biology



## **Planning and preparation**

One year before the start of the internship, I had met and conducted a 5-month project with the host lab. However, because of the pandemic, the nature of the work I had conducted was online. Despite the situation, I had very much enjoyed the lab and the project, which is why I decided to submit an application to Erasmus+ to undertake another 6-month project with the host lab. Fortunately, my project was accepted, and I spent the last 6 months working on a very exciting project in the field of evolutionary genomics.

As the project was fully computational, applying for access to the bioinformatic resources (e.g., high-performance cluster UPPMAX) together with the registration at the human resource department of Uppsala University was an important part of the preparation. My supervisor helped me to walk through those procedures. Finding an accommodation was surprisingly simple as I was allocated a room shortly after contacting the housing office of the university.

Besides the administrative duties, I also spent time preparing for the research project itself. Starting a month before my departure, I had weekly meeting with both my supervisor and my mentor to discuss the main goals and specifics of my project, which culminated with the writing of a 2-page project plan. The latter included minimum goals and bonus goals, which was very helpful to define priorities and plan accordingly. As the plan was highly dependent on the results that I would obtain in the middle of my internship, the project did not go exactly as planned, but writing the project plan was still really helpful as it allowed me to dive into the relevant literature and identify the key questions for my project early on.

Overall, I found the preparation for the internship really good, with both my supervisor and my mentor helping me for the administrative tasks and the academic preparations.

## **Internship**

The traineeship was a 20-weeks (6 months) Master's thesis to conduct basic research of population genetics and evolution of the mysterious germline-restricted chromosome (GRC) in zebra finches. The GRC is an intriguing chromosome found only in the songbird germline (sperm cells and egg) but absent from the rest of the body, which raises very interesting questions regarding its origin and evolution.

I had access to the raw data and many bioinformatic facilities through UPPMAX, the main computer cluster of the host university. I was able to experiment with new ways of analyzing the data, conduct extensive testing and validation, and implement a bespoke pipeline that worked on my data and should be useful for future analyses. I was also entrusted with presenting my results



at international meetings and conferences, as well as contributing to the writing of a scientific review on the latest findings on the songbird GRC.

During this internship, I was given the freedom to direct my research project towards the direction that I wanted. This was associated with an important responsibility to work in autonomy, and carry out a successful project within a limited timeframe. Frequent discussions with my supervisor, my mentor, colleagues, and collaborators played a key role in guiding my efforts towards ambitious yet achievable goals. In addition to day-to-day interactions with my mentor, weekly meetings with both my mentor and my supervisor were organized to get feedback on my results, as well as weekly drop-in problem solving sessions with the whole research group and other colleagues, fortnightly lab meetings with the whole research group, and monthly milestone meetings with both my supervisor and my mentor to summarize the findings and plan the next steps.

The workload was important and kept me busy for 40 hours/week (8 hours/day) through the entire length of the project. I was sometimes spending more time at the office to complete tasks unrelated to the mobility project such as PhD applications. In a typical day, I would start at 08:00 and finish at 17:00, spending 4 hours coding, 1 hour brainstorming with my supervisor and/or my mentor, 1 hour in a lab meeting/journal club/department meeting, and 2 hours writing/reviewing manuscripts. The order and proportion of each task was variable depending on the priorities updated each month. Both the work time and place were flexible and adjusted to the pandemic situation and seasonal changes. In fact, we were encouraged to take longer lunch breaks (~2 hours) during the winter, when the daytime period is significantly reduced.

I have learned a lot during my internship, through brainstorming sessions, but also by trying out things myself. I learned how to approach complex bioinformatical questions, customize a pipeline to the specific needs of my dataset, and present my results at an international conference.

### **Social life and free time**

Having met some of my department colleagues before, socializing within and outside the lab was particularly fruitful. Milestone social events were organized by the host department such as a mushroom picking contest, a costume party for Halloween, a murder mystery party for Christmas, and the defense party of a PhD from the host lab. Regular lab lunches, virtual game evenings, virtual fika (coffee breaks), and outdoor activities were organized within the host group.

At home, I was living in a corridor with 11 other international students with a shared kitchen and a shared living room. I quickly bonded with my corridor mates, and we soon formed a local



international community. Besides, I was also attending a weekly ballroom dancing course for 3 months. The rest of my free time was then spent working out from home, on hikes before the winter started, and occasional travels. I visited Stockholm 3 times and spent Christmas in Abisko, the northernmost point of Sweden, and best place to witness the auroras. The retreat was organized by 1<sup>st</sup> year Master's students and was particularly successful.

In brief, I would advise future students going to Uppsala to rent a room at the housing office of their host institute and prioritize accommodations with shared rooms (e.g., Flogsta) as this facilitates socializing a lot. I didn't try it myself but joining a so-called student "nation" in Uppsala is also an excellent way to meet people. Another advice to students planning a mobility in winter would be to be aware of a potential lack of sunshine in winter due to the very short days, which can lead to depression. A common preventive means is to take vitamin D complements every day, starting before the beginning of the mobility. I would also very much encourage traveling in Sweden and enjoying the various outdoor activities.

### **Practicalities**

Life in Sweden can be significantly more expensive than German standards. My monthly rent for a 19 m<sup>2</sup> room with private bathroom and shared kitchen in a student housing was 4461 SEK (~420 €), which is the average price in Uppsala. A monthly minimum of 450 € can be expected for food only, and 100-200 € for extra expenses (transport, activities, etc.). So, my monthly expenses in Uppsala were ~1000 € / month. Beware of potential charges from paying with a credit card in a different currency (discuss details with your bank). The food budget can be significantly reduced by participating at events organized by associations acting against food waste such as the Bruised Food Club. For extra clothes and furniture, the Facebook market place is quite developed, though it is important to try out the product (especially bikes) before buying them. Second-hand stores are also very much advisable such as Helping Hand in Uppsala. A tradeoff between riding a bike and taking the bus exists in Uppsala. In fact, commuting with the bike is easy in spring/summer/autumn, but becomes harder in the winter. To enjoy the good weather before winter started, I first bought a second-hand bike, but then switched to public transports when the air became too cold and the streets too icy. Standard supermarkets (e.g., ICA, Willys) provide products for a good price, but beware of differences in price within the same brand at different locations.

### **Career and Conclusion**



In this internship, I was able to use further improve my bioinformatic skills (analysis of genetic data using bash scripts and R), which I had already trained during a 10 ECTS mini-project at the LMU department of Evolutionary Biology the semester before my mobility. I feel now more confident in doing research, on the relevance of my work, and how much I can achieve in a limited amount of time. This experience was also insightful regarding how to interact with colleagues in a constructive manner and what it is like to work with international collaborators. I really enjoyed my experience, which comforts me in my choice to conduct a career in evolutionary genomics.

### **Conclusion**

At the beginning of the internship, I was expecting to obtain results that can advance our understanding of germline-restricted chromosomes in songbirds. My experience exceeded my expectations, as I not only obtained results relevant for the field, but was also offered the opportunity to present them at an international conference. Moreover, the code used to generate my results is being actively used by a PhD student from the host lab for her own analyses. Due to bioinformatic complications, I was not able to carry out all the analyses that we initially planned, but this was actually a good opportunity for me to learn how to tackle such challenging problems.

I would recommend Sweden as a destination country for an Erasmus+ mobility, especially in the summer when the days are very long. Sweden also has a very strong culture of work-life balance, which in combination with a strong international community, makes it a very good destination to meet new people. Finally, living in Sweden is being very close to nature, with deep forest in the neighborhood and many outdoor activities (e.g., hiking, cross country skiing).