

Final report

Internship abroad

Personal data and general information on the internship

Subject of studies: Statistics and Data Science

Bachelor/Master/State exam: Master

Time of internship: 01.04.2025 – 31.07.2025

Place of internship: Jouy-En-Josas France

Internship institution: Research Center of Jouy-En-Josas and Antony, INRAE

Guidelines:

- The report should have a length of at least **4 DIN A4 pages** (Times New Roman, 12pt, 1.5 line spacing)
- If you want to give names, please do not give the full name of the person. Use only the first name or abbreviations such as "L."
- When integrating photos, please note that your report requires the consent of the person(s) photographed when published and distributed.
- Please save your report as a word document (max. file size: 8 MB) and upload it to MoveON.
- If you are looking for a little inspiration for your own report or would like to compare your experiences with those of other students, please feel free to have a look at our [website](#).

You may structure your report as follows:

1. Planning and preparation (e.g. application process, finding accommodation, language course)
2. Internship (tasks, typical workday, workload)
3. Social contacts
4. Everyday life and leisure
5. Financing (cost of living, shopping tips)
6. Internship and studies (Were you able to apply what you learned during your studies, How has the internship changed your motivation to study and/or your attitude towards your future profession)
7. Conclusion (were your expectations met, challenges, particularly defining experiences, tips for future interns)

1. Planning and preparation

When I started planning my internship, I already knew that I wanted to gain research experience in statistical methodology, ideally linked to applications in life sciences. Through my Master's programme in Statistics and Data Science at LMU Munich, I came into contact with researchers at INRAE Versailles, one of the leading French institutes for agricultural and environmental research. After exchanging emails and research ideas, I was accepted to complete a six-month traineeship under the supervision of G. and K.

Before this internship, I had already completed a six-month Erasmus semester at ENSAI in Rennes, a French engineering school specialized in statistics. This was part of the last year of their engineering programme, which requires students to complete an internship before obtaining the diploma. While searching for suitable opportunities, I found a topic that was also of interest to a professor in my department at LMU, which allowed me to conduct my Master's thesis within the lab at INRAE.

The application process required some administrative steps, especially because it was partly financed by Erasmus. I had to coordinate between LMU, the host institution (INRAE), and Erasmus offices. The paperwork was sometimes time-consuming, but in the end everything worked out well.

Finding accommodation in Versailles was a challenge, since housing in the Paris region is expensive and competitive. At the beginning, I rented a private room but later moved into INRAE's own on-site accommodation in Jouy-en-Josas, which made my everyday life much easier. Living close to the laboratory allowed me to focus on my research without long commutes.

I did not take a formal language course before the internship, but I had already studied French for several years. During the stay, I used French in everyday life and in some work interactions, which improved my level significantly. This was an important additional benefit of the traineeship.

2. Internship

The core of my internship consisted of developing and implementing Bayesian statistical methods for Hawkes processes with covariates, with an application to plant epidemiology. My project was titled "*Hawkes process: Bayesian inference, variable selection and application to plant epidemiology*".

My tasks progressed step by step:

- In the beginning, I learned to simulate Hawkes processes with covariates and visualise the effect of different parameters.
- I studied Stan, a probabilistic programming language for Bayesian inference, and became familiar with Hamiltonian Monte Carlo.
- I first carried out inference using standard priors on simulated data to validate the methodology.
- Then I implemented variable selection priors such as Spike-and-Slab and Horseshoe, and compared their behaviour in terms of recovering true parameters.
- I applied model comparison methods (WAIC, DIC) adapted for temporal data.
- Finally, I worked on real epidemiological data: apple scab spore release. I fitted models with and without covariates, tested their fit, and studied the effect of lagged covariates and interactions.

A typical workday combined coding in R/Stan, running simulations on my computer, analysing results, and writing my internship report in LaTeX. I also had regular meetings with my supervisors to discuss progress and receive feedback. The workload was manageable but required discipline and persistence, especially when debugging Stan models or handling divergent transitions.

3. Social contacts

Within the laboratory, my main interactions were with my two supervisors, who provided continuous scientific guidance and constructive feedback. Their availability and support created a motivating environment for progressing with my project. Although the research unit itself was not very large, the atmosphere was collegial and welcoming. Informal exchanges during coffee breaks and lunches gave me the opportunity to get to know several PhD students and fellow interns, which helped me to feel integrated into the team and to better understand the broader research activities of the unit.

Outside of work, I occasionally met other Erasmus students and young researchers in Versailles and Paris. These encounters were valuable for building a small international network and sharing experiences about studying and working abroad. While communication in English was often possible, I made a conscious effort to speak French as much as I could. This not only facilitated smoother interactions but also significantly improved my confidence and fluency in the language. Overall, both the professional and social contacts I developed during the internship contributed positively to my integration and made the experience more enriching.

4. Everyday life and leisure

Jouy-en-Josas is located right next to Versailles, a beautiful city known for its world-famous palace, gardens, and many parks. Living there was pleasant and inspiring, and the proximity to Paris offered countless opportunities for cultural activities, such as visiting museums, exhibitions, and concerts. In my free time, I especially enjoyed cycling around the forests of Jouy-en-Josas and Versailles, exploring scenic routes through nature, and discovering small villages nearby. On weekends, I occasionally went to Paris, which provided a refreshing contrast between the calm of Versailles and the vibrant atmosphere of the capital.

A highlight of my daily routine was having lunch at the INRAE canteen, where meals were diverse, tasty, and very affordable. Thanks to the generous student subsidy, a fresh and complete lunch cost only €2.73, which made it both economical and enjoyable. These lunches quickly became an important part of my internship experience. Beyond the food itself, I valued the social aspect: sharing meals with colleagues and other interns provided opportunities to exchange ideas, learn about different scientific fields, and discuss cultural differences in a relaxed and friendly environment.

Outside of work, I also enjoyed cooking at home. I often compared French supermarket prices with those in Germany and China, and I discovered many new ingredients, especially different varieties of French cheese, pastries, and fresh vegetables. I experimented with both

local dishes, such as quiches and gratins, and simple home-style meals, like stir-fries or tomato-and-egg dishes. Cooking and eating well helped me balance the intensity of my research work and maintain a healthy lifestyle.

In addition, I tried to stay active through cycling, walking, and occasionally playing sports with friends. These activities, together with cultural exploration and culinary discoveries, made my stay in Jouy-en-Josas and Versailles not only scientifically productive but also personally enriching.

5. Financing

My internship was financially supported through a combination of Erasmus funding and a salary from the host laboratory. The Erasmus grant provided a solid basis to cover living costs in France, while the additional salary from INRAE (4.35 euros per hour) offered a helpful supplement to my monthly budget. This dual support ensured that I could focus fully on my research without being overly constrained by financial concerns.

That said, living in Versailles and the wider Paris region is relatively expensive, particularly with regard to accommodation and food. Fortunately, INRAE offered on-site housing for interns, which significantly reduced my expenses compared to renting privately in the area. This housing option not only eased my budget but also made daily commuting more practical.

In terms of daily life, I quickly learned to adapt by comparing prices and shopping strategically. Supermarkets such as Lidl and Auchan provided more affordable options than smaller local shops, while Picard offered convenient frozen meals that were both practical and economical. Another way to reduce costs was to cycle instead of relying on public transport, which was feasible thanks to Versailles' relatively accessible size and its cycling infrastructure.

Overall, the combination of Erasmus funding, the laboratory salary, and conscious efforts to manage expenses made the internship financially sustainable. Beyond the financial aspect, this experience also taught me valuable lessons in budgeting, prioritizing, and adapting to the cost of living in a new country.

6. Internship and studies

The internship was closely connected to my Master's programme in *Statistics and Data Science* at LMU Munich. It offered me the opportunity to put into practice the theoretical knowledge I had acquired in courses such as Bayesian statistics, stochastic processes, statistical modeling, and computational methods. Concepts that I had previously only encountered in lectures or exercises became much more tangible when applied to real-world data. In particular, I was able to deepen my understanding of Hawkes processes, Bayesian inference, and variable selection techniques, and to see how they can contribute to research questions in plant epidemiology. This strengthened the link between abstract theory and concrete applications in biology.

The project also enhanced my methodological and technical skills. I learned to code more efficiently in R and Stan, to develop reproducible pipelines, and to document my work clearly. Using GitLab for version control helped me structure the different stages of my project, maintain clean code, and ensure reproducibility. Preparing figures, simulation studies, and final reports in LaTeX further improved my scientific writing and presentation skills. These experiences gave me a better appreciation of best practices in research, including transparency, reproducibility, and collaboration.

Beyond technical knowledge, the internship was also valuable for my personal development as a researcher. It required me to work independently, manage time and tasks effectively, and adapt my approaches when simulations or models did not behave as expected. The constructive feedback from my supervisors encouraged me to critically assess my results and to refine both the methodology and the communication of my findings.

This experience has confirmed my motivation to pursue further research in statistics, possibly through a PhD in Bayesian statistics or biostatistics. I feel better prepared for doctoral-level work, not only in terms of theoretical competence but also regarding practical aspects of data analysis, coding, and scientific communication.

Finally, the internship also contributed to my intercultural and linguistic development. Working in France and participating in a bilingual research environment allowed me to improve my French significantly. This is an important asset for future academic and professional opportunities in Europe, and it also gave me more confidence in collaborating internationally.

7. Conclusion

Overall, this internship fully met—and in many respects exceeded—my expectations. It provided valuable experiences on both an academic and a personal level. From a scientific perspective, I was able to deepen my knowledge of Hawkes processes, Bayesian inference, and variable selection techniques, and to apply these methods to real plant epidemiology data. This practical application demonstrated the relevance of my studies in Statistics and Data Science to pressing questions in biology and agriculture, and gave me a clearer vision of how advanced statistical models can support interdisciplinary research. Successfully bridging theory and practice was one of the most rewarding aspects of the internship.

On a personal level, the traineeship represented an enriching cultural and linguistic experience. Working in a French research environment allowed me to improve my French language skills considerably, and to gain confidence in using the language in professional contexts. Living in Versailles also gave me the opportunity to experience French culture more broadly, to interact with local colleagues as well as other international students, and to adapt to a new working and living environment. These experiences helped me develop flexibility, resilience, and intercultural competence, all of which are essential qualities for an international research career.

The main challenges I encountered were administrative (paperwork, deadlines, and formalities) and practical (housing in the countryside and adapting to local logistics). However, with the support of my supervisors, colleagues, and Erasmus funding, I was able to

overcome these obstacles. Facing and resolving these challenges strengthened my problem-solving abilities and my capacity to remain focused under less-than-ideal circumstances.

For future interns, I would recommend starting the search for accommodation well in advance, making full use of Erasmus support schemes, and embracing the cultural and language learning opportunities as part of the overall experience. Engaging actively with colleagues, even informally, is also very beneficial for integration into the research environment.

This traineeship has confirmed my motivation to pursue research, possibly through a PhD in Bayesian statistics or biostatistics. It has enriched both my academic trajectory and my personal development, and it has given me valuable insight into the daily realities of research work in an international environment. I would therefore strongly recommend this internship to future students who are seeking to combine advanced statistical training with interdisciplinary applications and intercultural experience.