**EASTBIO Research Experience Placement (REP) 2024**

**END OF PROJECT REPORT**

**Project Title: Sources of *Cryptosporidium* infection on a beef/sheep farm**

**Strategic Area: Bioscience for sustainable Livestock and Aquaculture**

During my EastBio Research Experience Placement (REP) at the Moredun Research Institute, I had the privilege of working under the supervision of Dr. Frank Katzer and Dr. Paul Bartley. The primary objective of this project was to map the presence and identify potential sources of a zoonotic parasite called *Cryptosporidium* across selected farms in Wales. These farms, which housed both beef cattle and sheep, were also habitats for various wildlife species. As part of this comprehensive study, faecal samples from cattle, sheep, and wildlife were collected from four different farms, as well as filtered environmental water samples.

My primary goal for this placement was to learn a broad range of both technical and transferable skills relevant to the field of molecular biology. On the technical side, I focused on mastering parasite concentration methods, DNA extraction, and DNA amplification using Polymerase Chain Reaction (PCR), which are critical for the identification of *Cryptosporidium* species.

As an active member of the project team, I was directly involved in processing the samples to concentrate potential parasites, extracting DNA from these samples, and using PCR to amplify *Cryptosporidium* DNA. I also analysed the PCR products through agarose gel electrophoresis and imaging and sent positive samples for sequencing. Due to the limited duration of my internship and the extended timeline of the project, my involvement was confined to specific stages of the research, as the project is ongoing.

From day one, I was provided with a laboratory notebook, which I used to document all the different processing tasks I undertook. The first two weeks of my placement were dedicated to training, during which I learned how to safely handle biological samples that might contain infectious organisms, as well as the intricacies of DNA extraction, PCR, and gel electrophoresis. After this training period, I gained the confidence to carry out these tasks independently, following detailed protocols.

Both of my supervisors were incredibly supportive throughout the internship, offering professional guidance and patiently explaining various procedures, which significantly enhanced my learning experience. Their mentorship was instrumental in helping me overcome initial challenges and become proficient in laboratory techniques.

Participating in this research project provided me with an invaluable opportunity to apply the theoretical knowledge I had acquired during my coursework to practical laboratory work within the field of microbiology. This hands-on experience was crucial in deepening my understanding of the subject and will undoubtedly play a significant role in laying the foundation for my future career in science. The skills and insights I gained are essential for excelling in my chosen field. Moreover, they will assist me in selecting my final year project, as I now have a clearer understanding of what each project entails. The practical skills I've already acquired will also make conducting my final year project more manageable.

One of the most beneficial aspects of the project was experiencing how a laboratory operates in a real-world environment. Unlike my university experience, where there was always a safety net to prevent experiments from going wrong, this placement entrusted me with the responsibility for the success of my experiments and, ultimately, the project. I also gained experience using a variety of laboratory technologies, including centrifuges, water baths, heat blocks, PCR machines, agarose gel electrophoresis equipment, and gel imaging system.

This relevant work experience in molecular biology will be invaluable not only in my ongoing studies but also in future job. During my placement, I learned how to work effectively both as part of a team and autonomously, ensuring that tasks were completed accurately and on time.

I am confident that by the end of the project, I successfully achieved all the goals I set for myself. Initially, I was quite nervous in the lab, which led to several avoidable mistakes. However, with the guidance and support of my supervisors, I became much more proficient, as reflected in the increased speed and accuracy with which I completed my tasks. This experience has significantly boosted my confidence, enabling me to manage a higher workload while maintaining the same high standard of quality.

In conclusion, my EastBio REP project was an invaluable experience that allowed me to work as part of a fantastic and welcoming team of professionals. This opportunity to gain hands-on lab experience has been instrumental in my development and has provided me with a solid foundation for my future career.