# JAMES RENNIE BEQUEST

## REPORT ON EXPEDITION / PROJECT / CONFERENCE

**Expedition/Project/ Conference Title:** Two month work placement at IFIBYNE laboratory

**Travel Dates:** 30/05/2025 – 30/07/2025

**Location:** Buenos Aires, Argentina

**Group member(s):** Rafael Hermans

**Aims:** To gain hands-on experience working in a lab setting and develop skills such as confocal microscopy, experimental design and data analysis

**Photography consent form attached:** *(please refer to your award letter)*

☐ Yes
☒ No

**OUTCOME (a minimum of 500 words):-**

I chose Argentina for my work placement because it offered the opportunity to conduct research in a multicultural environment and experience the differences that come with working in a country distinct from the UK. After researching various institutions in Buenos Aires, I identified IFIBYNE-CONICET, an institute affiliated with the University of Buenos Aires, focused on physiology, molecular biology, and neuroscience, as an ideal host. Following outreach to several laboratories, I received a positive response from Dr. Esteban Beckwith, whose group studies sleep and disease in *Drosophila melanogaster*, an area I had recently been exploring. I immediately accepted the offer to join his lab.

During my two-month placement, I undertook a short research project that expanded on the thesis of a recently graduated PhD student. The project examined the relationship between intestinal cancer and sleep quality, a link that has also been observed in humans. Specifically, previous work in the lab had shown that inducing intestinal tumours in female fruit flies increased sleep quantity. My aim was to test whether a more aggressive, temperature-induced oncogene (with increased copy number) would produce similar effects in males. I also sought to apply a Python-based Hidden Markov Model to both my data and previous datasets to infer hidden behavioural states such as deep sleep, light sleep, and partial wakefulness, thereby providing a more detailed understanding of how tumour formation alters sleep architecture.

Fly activity was recorded using Ethoscopes, racks that house up to 24 individual flies per camera unit, where immobility exceeding five minutes was classified as sleep. Tumour induction was confirmed via confocal microscopy, using GFP-linked oncogenes to visualise intestinal fluorescence.
At the end of my placement, I presented my findings at a weekly seminar attended by the *Drosophila* and honeybee research groups. My presentation introduced the use of Hidden Markov Models, a novel analytical approach for these teams, which they expressed interest in adopting for future work. My results showed an increased amount of sleep in females, particularly through reduced periods of full wakefulness and longer durations of deep sleep, but no significant change in males.

# JAMES RENNIE BEQUEST

The experience of conducting a semi-independent research project within a short timeframe was immensely valuable. I developed technical skills in microscopy, dissection, and *Drosophila* genetics, as well as broader competencies in experimental design, data analysis, and scientific communication. Presenting to an audience of experienced researchers deepened my understanding of my results and strengthened my confidence in articulating scientific findings.

I am very grateful to Dr. Esteban Beckwith and to the James Rennie Bequest Committee for making this experience possible. I would wholeheartedly recommend undertaking an international research placement to any student seeking to broaden their scientific and cultural horizons.