

JAMES RENNIE BEQUEST

REPORT ON EXPEDITION / PROJECT / CONFERENCE

Expedition/Project/

Conference Title: Annual Meeting of the Society for Molecular Biology and Evolution (SMBE 2026)

Travel Dates: 28th June to 2nd July 2026

Location: Copenhagen, Denmark

Group member(s): Cei Abreu-Goodger, Sofia Irene García Bautista

Aims: Travel grant to attend the SMBE 2026 conference, where I presented a poster with what I have done so far in the first year of my PhD

Photography consent form attached: ☐ Yes
(please refer to your award letter) ☒ No

OUTCOME (a minimum of 500 words):-

Overview

I attended the 2026 annual meeting of the Society for Molecular Biology and Evolution (SMBE 2026), held in Copenhagen, Denmark, where I presented a poster with what I have done so far in the first year of my PhD. Before travelling I had defined three objectives for the meeting: (i) obtaining scientific feedback on my project, (ii) broadening my methodological exposure, and (iii) networking. All three were met, and I consider the attendance to have been a productive use of the first year of my doctoral training.

Work presented

The poster introduced the conceptual and methodological framework of my project on the evolutionary co-option of transposable elements (TEs). TEs are DNA/RNA sequences capable of moving or copying themselves to new genomic locations, and they are classified by replication mechanism into DNA transposons, which move directly as DNA, and retrotransposons, which mobilise through an RNA intermediate. Within the latter, autonomous elements encode the enzymatic machinery required for their own mobilisation, whereas non-autonomous elements hijack the machinery encoded by autonomous long interspersed nuclear elements (LINEs).

Most insertions fall within intergenic regions or introns and are slightly deleterious to nearly neutral; nevertheless, TEs have persisted to the point of constituting approximately half of the genome and of residing within most coding genes. Because selection purges strongly deleterious insertions, the elements that persist are considered mostly neutral or slightly deleterious passengers. Only a small number of insertions have indeed introduced major evolutionary innovations, becoming part of the host cell machinery.

The central question addressed by the poster is therefore which insertions have been co-opted into function — as enhancers, exons or functional lncRNAs — and what features predict

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such co-option. Separating genuine co-option from neutral persistence is difficult, as it requires several independent layers of evidence and careful control of confounders. The main goal of the project is consequently to build a simple model of co-option in model organisms and then to test how well it transfers to non-model organisms, where available data are limited, which would indicate whether co-option signatures are universal or lineage-specific.

Objective 1 — Scientific feedback

The poster session brought up a valuable exchange of ideas. Several attendees raised points that I had not fully considered, particularly regarding the choice of omics data that I could use, for example. These comments will feed directly into the design of the next stage of the analysis. Visiting other poster sessions was useful: discussing the work of colleagues facing similar problems suggested alternative ways of framing the question.

Objective 2 — Methodological exposure

Several talks provided creative ideas for future analyses. Two limitations should be pointed out. First, SMBE is a large meeting with many parallel sessions, so choices between simultaneous talks were unavoidable. Second, and by comparison with other conferences I have attended, the programme was not specifically targeted at my field: topics were broad enough that most attendees would find something relevant, but the fit was less direct than at more specialised meetings. Even so, the general methodological approaches presented — in my case, those specially involving artificial intelligence and mathematical modelling — are transferable.

Objective 3 — Networking

Networking was the most valuable outcome of the conference. I met and exchanged contact details with several colleagues working on questions closely related. Attending during the first year of the PhD was particularly helpful: it gave me a broad overview of the latest advances in molecular biology and evolution and it opened the door to connections that may develop into collaborations later in the project. I consider building on these contacts when arranging the mandatory internship needed in my PhD programme.

Overall assessment and follow-up

SMBE 2026 met the three objectives set beforehand, with networking and methodological inspiration as the strongest returns. My follow-up actions are to (i) incorporate the feedback received into the design of the co-option model, (ii) explore the AI and modelling approaches spotted during the sessions, and (iii) contact in future the researchers met in Copenhagen regarding a possible internship placement.