Horizontal gene transfer in the evolution of insects: a genomic approach

Background
Horizontal gene transfer is important for bacterial evolution, however, its role in animals is less clear. Recent evidence suggests that insects have repeatedly acquired genes from symbiotic bacteria that have provided them with key adaptation that has led to their incredible success. Examples of this include, the horizontal acquisition of genes for lignocellulose digestion that has led to herbivory in beetles, and toxin encoding genes that may underlie protection from natural enemies in aphids and vinegar flies. However, it is currently unclear how common the horizontal transfer of symbiont genes is across insect species, and in most cases whether the newly acquired genes actually provide insects with adaptive functions. It is crucial to understand the dynamics of horizontal gene transfer in insects as the acquisition of novel traits from microbes is transforming our view of how arthropods evolve. This is of particular important for insect pests as it may underlie their capacity to colonise new environments and resist efforts to control them.

The successful applicant will use several insect families as models to rigorously test hypotheses on horizontal gene transfer in the evolution of insects. This may include: using whole genome sequence data to explore horizontally acquired genes involved in nutrition and defence across phylogenetically diverse insect species; investigating gene expression profiles to determine gene activity; and performing functional assays to reveal whether horizontally acquired genes provide insects with novel adaptive functions.

- You will have access to large genetic databases, insect collections, in-house live organisms and cutting-edge research facilities to fuel your investigation.
- You will gain experience in bioinformatics, comparative/metagenomics, molecular/experimental biology, and statistics (e.g. comparative phylogenetics).
- You will be encouraged to develop your own ideas and hypotheses.

The studentship is fully funded and available to international, EU and UK citizens. It will cover tuition fees as well as provide an annual tax-free maintenance allowance for 3 years at Research Councils UK rates (£17,009 in 2019/20).

Research environment
The School of Biological and Chemical Sciences at Queen Mary is one of the UK’s elite research centres. We offer a multi-disciplinary research environment and have approximately 160 PhD students. Our students have access to a variety of research facilities supported by experienced staff, as well as a range of student support services.

The successful applicant will enter a vibrant research environment, under the supervision of Dr Lee Henry. The lab is well equipped to carry out the proposed research with world-class facilities in genomics and molecular biology. The student will also have access to ample funds to facilitate the research through Dr. Henry's external funding (~1Million pounds in the past ten years). Dr. Henry has an outstanding record with student supervision with a focus on students generating high impact first authorship publications.

Dr Lee Henry is an Associate Professor in Biology. For details see: https://www.qmul.ac.uk/sbcs/staff/leehenry.html
Eligibility

Applications are open to international students, as well as those in the EU and UK who have been awarded, or expecting to be awarded, at an upper-class bachelor's degree, or equivalent qualification, in biological or computational sciences (or similar). A master's degree is desirable, but not essential.

Students with a background in bioinformatics are particularly encouraged to apply.

For informal questions, contact Lee Henry
l.henry@qmul.ac.uk

Applications have to be submitted to:
https://www.qmul.ac.uk/sbcs/postgraduate/phd-programmes/projects/display-title-762150-en.html

****Application deadline is Friday, January 31, 2020****