PhD Opportunity

Nutrigenomics

Closing Date: Expressions of interest close at midnight on **Friday 13 January 2017**

A PhD opportunity is available on a project investigating metabolic adaptations using the Queensland fruit fly (*Bactrocera tryoni*; Tephritidae) ('Q-fly') as a model system. The project is part of a significant collaboration between Drs John Oakeshott and Ronald Lee at Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Dr Fleur Ponton at Macquarie University's Department of Biological Sciences (http://bio.mq.edu.au/).

Animals often live in highly variable environments, with available nutrition changing in type and abundance both across space and through time. How animals adapt to changes in their nutritional environment is an important issue in evolutionary ecology, but is surprisingly poorly understood. With the emergence of powerful omics technologies, opportunities now exist for an integrated and comprehensive understanding of the mechanisms underlying adaptations to changing diet. This PhD will investigate the **metabolic adaptations to changes in nutritional environment**. Q-fly is highly polyphagous, infesting a vast diversity of fruit types, including apples, most citrus, peaches, grapes, and guava. In accord with wide host range, the seasonal nature of fruit, and the regional diversity in available host fruits, a high degree of flexibility may be anticipated. Gel-based synthetic diets have recently been developed for this species and these enable **fine-scale manipulation of nutritional conditions**, as well as **selection experiments**. Amongst selection experiments, the domestication process that occurs when insects transition from the field to a laboratory environment provides valuable opportunities to study **experimental evolution under controlled conditions**.

The approaches and methods will be **highly multi-disciplinary**. The PhD candidate will combine behavioural assays to measure feeding choice and reproductive capacity with state-of-the-art omics technologies to profile adaptive responses to diet at the molecular levels, including gene expression (transcriptome), epigenetic modifications (epigenome) and metabolites (metabolome).

The host laboratories at Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) in Canberra and Macquarie University in Sydney provide the ideal environment for such research. The candidate will have access to numerous Q-fly cultures that originate from different regions of Australia and are at various stages of domestication. Macquarie has new $20 million Insect Biosecurity facilities currently under construction and is the host organisation for the recently established $3.7 million Australian Research Council Centre for Fruit Fly Biosecurity Innovation and more that $25 million in fruit fly research funding. The research teams at CSIRO and Macquarie University have deep experience in Q-fly biology, experimental evolution and omics technology that will underpin this research.

The value and tenure of the scholarship is:

- $30,849 pa (2016 rate, subject to annual indexation, tax free) for 3 years. This includes a stipend of $25,849 pa plus a scholarship 'top up' of $5,000 pa.

- For International candidates, scholarships will also cover all tuition fees.

To be eligible for a scholarship, applicants are expected to have a record of excellent academic performance and preferably, additional relevant research experience and/or peer-reviewed research activity, awards and/or prizes in line with the University's scholarship rating guidelines. Refer to the Rating Scholarship Applicants section for more information about these guidelines.

Students on scholarships are not obliged to contribute to teaching, but may do so to supplement their income if desired. In addition to substantial financial resources to draw on for research, several generous schemes are available to fund travel to visit overseas laboratories or to attend overseas conferences.

Interested applicants should email a letter of interest, academic transcripts, curriculum vitae and the names and contact information of three referees to Dr Fleur Ponton (fleur.ponton@mq.edu.au).

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