

The ins and outs of bacterial evolution: Gene gain and gene loss in bacterial genomes

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Project description:

Bacterial genomes are prone to random loss-of-function mutations in protein coding genes, as well as an underlying bias for the deletion of DNA. In some pathogenic or symbiotic bacteria, these forces combine to result in rapid gene loss and a decrease in genome size over evolutionary time. However, in other species there are forces that can counter this, and thus maintain bacterial genome size and functionality. Most commonly, gene gain is mostly driven either by the duplication of existing genes, or by the horizontal transfer of genes, by recombination, from other bacteria. This project will use two approaches to understand how selection and genetic drift drive the gain and loss of genes in bacteria. First, tens of thousands of whole genome sequences of key bacterial species will be analysed using established and novel bioinformatics. Second, we will run evolution experiments on model species. By considering different ecological conditions, we will aim to find the universal rules driving the ins and outs of bacterial genomes.

Candidate:

Applicants should hold, or expect to receive, a First Class or high Upper Second Class UK Honours degree (or the equivalent qualification gained outside the UK) in a relevant subject. A master's level qualification would also be advantageous.

Applications:

Informal enquiries should be directed to Prof Edward Feil, e.feil@bath.ac.uk.

Formal applications should be made via the University of Bath's [online application form](#).

On the application form, please ensure that you quote 'Evolution Education Trust' in the Finance section and the supervisor's name and project title in the 'Your research interests' section. Should you wish to be considered for more than project, quote the projects in order of preference and upload a separate personal statement relevant to each one.

Please see our Doctoral College website for [more information on how to apply](#) for a PhD at Bath.

Application deadline: 30 April 2019.

Interviews will take place in Bath on 14 June 2019.

Anticipated start date: 30 September 2019.