ON-SITE BIOLOGY COLLOQUIUM

Friday, 11 Apr 2025 | 4 pm | LT32

Hosted by Assoc Prof Ryan Chisholm

Map to Block S1A

A Comprehensive Representation of Multiallelic Selection

By **David Waxman**
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About the Speaker

David Waxman originally worked in the UK in theoretical physics at the University of Sussex. A long-term interest in biology crystallised into research and collaboration in biology and in 1998 he moved to the Department of Biology at Sussex. In 2011 he joined the Centre for Computational Systems Biology at Fudan University. His main interests are in evolution and population genetics, with particular emphasis on dynamics and the underlying theoretical aspects of these subjects.

This talk presents a framework for studying selection at loci with multiple alleles. Starting with the observation that both selection and genetic drift depend on the same measure of variation in biallelic loci, the presentation extends this insight to cases with any number of alleles. The key result is a compact formula for the force of selection, depending on genetic diversity, fitness effects, and the set of allele frequencies. The formula provides a unified perspective for different types of selection (additive, multiplicative, heterozygote advantage, frequency-dependent, fluctuating, …) and reveals the common mathematical structure underlying selection and drift. The framework can be used to estimate fitness effects from allele frequency trajectories. This is illustrated by its application to experimental evolution data from yeast.