QSB SEMINAR SERIES 291

Fitness Landscapes and the Predictability of Evolution

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ABSTRACT

The analogy of a fitness landscape, which links a genotype or phenotype to the fitness of its carrier, has inspired scientists for almost a decade. Work in the Evolutionary Dynamics lab revolves around the study of both theoretical and empirical fitness landscapes, with the aim to address various questions: What is the role of epistasis (i.e., genetic interactions for fitness) in adaptation and speciation? Can we predict evolution based on our knowledge of fitness landscapes? How much information do we need to infer the shape of a fitness landscape? I will elucidate our approach to these questions using examples from recent and ongoing work in the lab, in which we make use of experimental data from yeast and influenza virus.
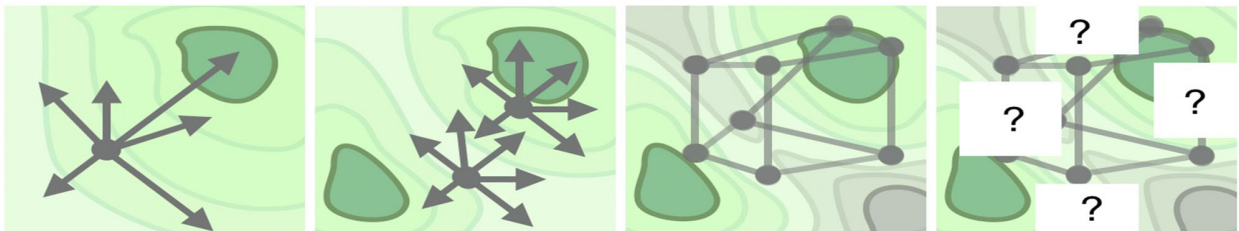
BIO:

I study evolution – and in particular, the population genetics of adaptation and speciation – at the interface between theoretical and empirical biology. The approaches I use involve theoretical modeling, computational methods, and statistical data analysis.
Coming from an undergraduate (combined Bachelor and Master's) background in mathematics and physics, I discovered my passion for evolution through biophysics and biomathematics classes, which led me to do a PhD in the framework of the "Vienna Graduate School of Population Genetics" under the supervision of Joachim Hermisson, working on speciation models. As part of my PhD studies, I spent a semester abroad in Mark Kirkpatrick's lab at UT Austin. To continue my transition into biology after my PhD, I decided that it was time to get my hands on empirical data, which is why I chose to join Jeff Jensen's lab at the EPFL as a postdoc. In particular, this gave me the chance to apply my modeling expertise to experimental-evolution data collected in Dan Bolon's lab at UMass. In 2014, I spent one semester at UC Berkeley as a Simons fellow in the program "Evolutionary Biology and the Theory of Computing". Since January 2016, I am heading the Evolutionary Dynamics lab at the Gulbenkian Institute.