



## BiRC seminar– open to all

**Speaker:** Paul Joyce, Professor of Mathematics, Statistics and Bioinformatics, Univ. of Idaho  
**Title:** Stickbreaking: A Novel Fitness Landscape Model that Harbors Epistasis and is Consistent with Commonly Observed Patterns of Adaptive Evolution  
**Time:** Friday 4 April, 14:15 - 15:00  
**Venue:** Bioinformatics Research Centre, Build. 1110-223, C.F. Møllers Allé 8, 8000 Aarhus

### Abstract:

In relating genotypes to fitness, models of adaptation need to both be computationally tractable and qualitatively match observed data. One reason that tractability is not a trivial problem comes from a combinatoric problem whereby no matter in what order a set of mutations occurs, it must yield the same fitness. We refer to this as the bookkeeping problem. Because of their commutative property, the simple additive and multiplicative models naturally solve the bookkeeping problem. However, the fitness trajectories and epistatic patterns they predict are inconsistent with the patterns commonly observed in experimental evolution. This motivates us to propose a new and equally simple model that we call stickbreaking. Under the stickbreaking model, the intrinsic fitness effects of mutations scale by the distance of the current background to a hypothesized boundary. We use simulations and theoretical analyses to explore the basic properties of the stickbreaking model such as fitness trajectories, the distribution of fitness achieved, and epistasis. Stickbreaking is compared to the additive and multiplicative models. We conclude that the stickbreaking model is qualitatively consistent with several commonly observed patterns of adaptive evolution.

After the seminar there will be beer/soda/coffee and chips in the coffee room on the 4<sup>th</sup> floor.

<http://birc.au.dk/activities/seminar-series/>



