York Cross-Disciplinary Centre for Systems Analysis

Evolution, Evolvability, and Change Workshop

Professor Guillaume Beslon

Evolvability and rearrangements drive innovation in a virtual virus

Abstract:

I will present an in silico evolution experiment in which virtual viruses are let evolve for thousands of generations. After a brief introduction to the "in silico experimental evolution" method and a presentation of the aevol model used in the experiment, I will show that in the model the viruses evolve by evolutionary bursts and that these bursts are triggered by specific events, generally (but not exclusively) chromosomal rearrangements. By analysing the lineages of the virus we then show that these events strongly increase the evolvability of the organisms the affect, hence opening the path for subsequence mutation fixation. We then analyse these results in terms of connection combinatorics on the fitness landscape. Our results open the door to a possible prediction of evolutionary bursts in viruses.