1-7 Poster

CONTROLLING THE EVOLUTION OF ANTIMICROBIAL RESISTANCE IN A SINGLE HOST

Rafael Pena-Miller [1], Robert E. Beardmore [1], Martin Ackermann [2]

[1] *Imperial College, Department of Mathematics, London, United Kingdom*
[2] *ETH-Zentrum,Department of Theoretical Biology, Zurich, Switzerland*

r.penamiller07@imperial.ac.uk

The emergence of antibiotic resistance can arise from selective pressures imposed by the use of that antibiotic. For this reason, multidrug combination therapies have been proposed to reduce the evolution and spread of resistant phenotypes. However, a point mutation, or the accumulation of multiple mutations, may confer resistance to several antibiotics upon bacteria. In order to reduce the prevalence of multidrug resistance, we argue that it is important to understand the molecular interactions between antibiotics and to study the effect different combination protocols have on the evolution of antimicrobial resistance. In this presentation we propose an evolutionary model of an experimental microbial system that allows us to study molecular and epistatic interactions between drugs. Furthermore, by controlling the input of different antibiotics in time, using optimal control theory we can design antibiotic deployment protocols that minimise conditions promoting the evolution of antimicrobial resistance in a single host.