

Evolutionary strategies to combat antibiotic resistance

Antibiotics are among the most important tools in medicine, but today their efficacy is threatened by the evolution of resistance. While resistance continues to spread, the development of new antibiotics is slowing. We need new strategies to delay or reverse the course of resistance evolution. In this talk I will describe several approaches to studying and manipulating resistance evolution in detail. Using a new experimental device, we have been able to study previously elusive aspects of the evolution of antibiotic resistance in spatial environments. Second, I will show how increasing the scale of experiments allows both the discovery of new avenues of attack and potential failure modes of evolutionary interventions. I will conclude with the algorithmic and biological challenges in the practical application of these approaches.