

## PLENARY SPEAKER

# ADAPTIVE DYNAMICS AND THE EVOLUTION OF DIVERSITY

ÉVA KISDI

eva.kisdi@helsinki.fi

Department of Mathematics and Statistics, University of Helsinki

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### ABSTRACT

Natural selection is usually paraphrased as the survival of the fittest - or the demise of all others. How can natural selection explain the enormous diversity of variants living together in Nature? Adaptive dynamics finds the answer in deriving fitness explicitly from models of population dynamics. This leads to an ever-changing fitness landscape, which facilitates not only the coexistence of multiple species but also the formation of new lineages through a process called evolutionary branching. After a brief introduction to the mathematical framework of adaptive dynamics, I consider three questions relating to diversity. First, is there an upper bound to the number of species, and if so, how does a “saturated” community evolve? Second, can natural selection lead to extinction? Third, when diversity evolves, it may be just variation but not speciation. Will natural selection lead to the origin of new species?