BEYOND THE PAIRWISE: MODELLING HIGHER-ORDER SPECIES INTERACTIONS

SUPERVISORS

Prof. dr. Bernard De Baets

Prof. dr. ir. Jan Baetens

TUTOR

Dr. Aisling Daly

BACKGROUND

All

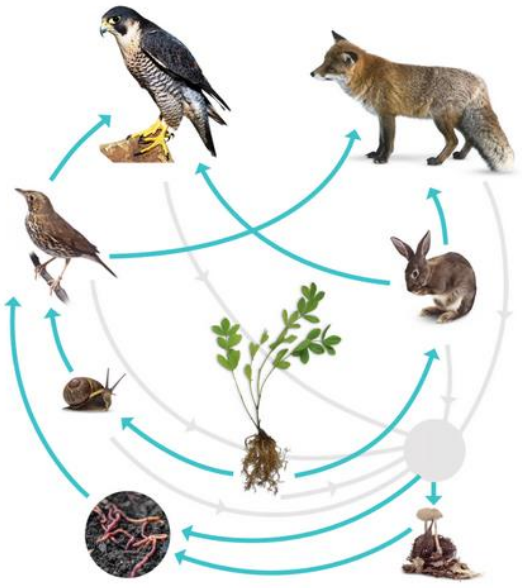
MORE INFO

aisling.daly@ugent.be

Background

Species extinctions are taking place at an unprecedented and alarming rate, driving an ongoing biodiversity crisis. To address this crisis, scientists have been compelled to delve further into understanding how to maintain and protect biodiversity. This leads to a deep and ancient question at the very heart of ecology: how is it possible for many species to coexist?

Species interactions are key to understanding how diverse communities are able to coexist. However, so far the overwhelming focus has been on strictly pairwise interactions between species, and how these can affect coexistence. This overlooks interactions that are modified by other species – so-called higher-order interactions – which have been shown to significantly affect coexistence either positively or negatively.



Scope of the thesis

The student will study higher-order interactions by developing and analyzing mathematical models of interaction networks. Using a combination of network theory and population models, the goal is to understand how and when higher-order interactions emerge, and above all how they affect coexistence. Determining coexistence conditions will allow us to understand how these communities can persist in the face of perturbations due to either biotic or abiotic pressures. Simulation studies will be used to investigate these different scenarios, for which the UGent supercomputer can be used.