iomE · Faculty of Biology
Organismic and Molecular Evolution

Invitation to the Seminar series in Evolutionary Biology

Tuesday, 19.05.2026

Dr. Mirjam Borger

(Bielefeld University)

Diverse environments and individuals shape cooperative habitat construction

Abstract:
Habitat construction is a behaviour where the local environment is changed by an individual. This process often improves the phenotype-environment match, and thus can improve survival and reproductive success. In many species, the habitat construction behaviour of an individual also changes the local environment of others. In such cases, individuals could cheat and not contribute to habitat construction, but instead exploit the efforts of others. Here, we studied whether habitat construction would evolve in species with shared local environments, or if instead cheating would spread. To this end, we used an individual-based simulation and an adaptive dynamics approach. We find that habitat construction evolves in a structured population, even when individuals disperse randomly so that kin do not interact more frequently than unrelated individuals. While cheating might result in higher fitness compared to others within the group, individuals from groups without cheaters ended up with even higher global relative fitness. This type of multi-level selection consequently limits the spread of cheaters and allows for the evolution of habitat construction. Moreover, we show that habitat construction also evolves in heterogeneous environments and when individuals differ in their environmental optima. Interestingly, habitat construction efforts vary the least among individuals in a heterogeneous environment and population, as opposed to a homogeneous population and environment.

Host: Prof. Hanna Kokko

The colloquium takes place on Tuesdays at 12:15 pm until approx. 1:15 pm in the BZ 1 lecture hall (HS 00.187). Talks are given in English. Everyone interested is welcome!