

4 PhD- and postdoc positions are available at the University of Bern, to study the

Evolution of cooperation based on relatedness, negotiation and trading

All major transitions in the evolution of life are characterized by the necessity of cooperation and sacrifice of constituent parts transforming into higher complexity. Conceptually, the evolution of cooperation seems to be well understood. However, critical tests of the predictions from alternative mechanisms responsible for the establishment of evolutionarily stable levels of cooperation hardly exist. For instance, the seemingly overwhelming evidence for the importance of kin selection to the evolution of altruism is almost entirely correlational. Few studies have manipulated relatedness and measured behavioural responses and corresponding fitness effects, and several have found that relatedness in fact *hampers* cooperative behaviour instead of promoting it, opposite to predictions from kin selection theory. The relative significance of alternative mechanisms in addition to kin selection, such as negotiation and reciprocal trading, to explain cooperation in nature is as yet unclear. In this project we aim to develop and experimentally test predictions regarding the relative and interactive influence of relatedness and negotiation/trading on cooperation between social partners.

Our previous work has suggested that mutual help and trading of service and commodities are important and widespread variants of cooperative interactions among animals, which can elicit high levels of evolutionary stable cooperation. A crucial parameter in reciprocal trading is the potential **time delay** between subsequent interactions among social partners, because this affects the perceived or true probability to receive returns for provided help. One aim of this project will be to vary the time axis of social decisions between concurrency and delays of different magnitude to span the entire range from coercion to long-term reciprocity. Another important issue is that in nature most social interactions involve some sort of asymmetry between concerned individuals, regardless whether this is sex, age, dominance status, body condition, individual quality, need, resource holding potential, reproductive status, residual reproductive value, etc. Consequently, in virtually any social interaction the involved individuals have different abilities and expectations about potential pay-offs from the interaction. The current project aims to experimentally scrutinize the **significance of asymmetries** for the negotiation process between social partners about their respective cooperative effort.

Hitherto, effects of experimental manipulation of cooperation on direct and indirect components of fitness have hardly been scrutinized. We aim at estimating **fitness effects** of experimentally controlled cooperative behaviour in natural and semi-natural settings by manipulating at the same time relatedness and the negotiation rules applied by all involved parties. Our model organisms will be wild-type Norway rats and cooperatively breeding Lake Tanganyika cichlids.

Within the framework of this SNF-funded project, we offer **one post-doc and three PhD-positions**. We seek highly-motivated and well organised candidates who can work independently as well as drive collaborative projects. Scientific curiosity is a must and good English language skills are important. Previous experience with studying animal behaviour is mandatory. The PhD-applicants will need an MSc-degree (or equivalent) in biology. Applications must include a letter of motivation, CV, list of publications, copy of degree certificates, and two names of referees who should have sent their recommendation letter separately before the mentioned deadline. Applications should be submitted before

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by e-mail (all documents merged into one PDF file) to Claudia.Leiser@iee.unibe.ch.

Late applications will be considered until all positions are filled. Starting date of all positions is as soon as possible. Duration of contracts is up to 3 years.

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