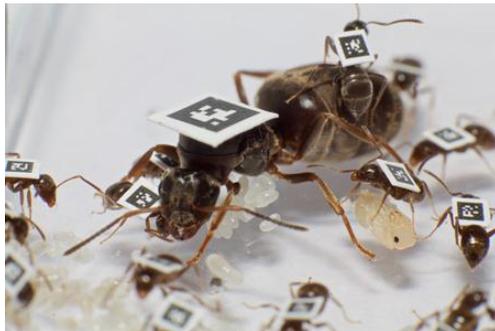


PhD position in collective behaviour and social immunity at the University of Fribourg (Switzerland)

A 4-year PhD position is available in the research group of Professor Nathalie Stroeymeyt in the Department of Biology, University of Fribourg, to study the **effect of group composition on disease transmission and relative investment in personal vs. social immunity in ants**.

Background



Group living offers favourable conditions for the spread of infectious diseases, because high population densities and frequent social contacts facilitate pathogen transmission. To mitigate that risk, social animals have evolved a variety of defence mechanisms to prevent the entry and propagation of pathogens within the group, ranging from a raised investment in personal immunity to highly coordinated collective sanitary actions ('social immunity'). Recent studies have shown that social groups can also adopt organizational features, such as the subdivision into well-separated subgroups, which reduce epidemic risk through transmission bottleneck effects. However, the importance of organizational immunity features in disease risk management by real animal groups is still poorly understood. Our research adopts an empirical approach based on the experimental manipulations of garden ant colonies (*Lasius niger*) to (i) quantify the effect of social organization on disease transmission and test key predictions from network epidemiology, and (ii) evaluate the relative of importance of personal immunity, collective sanitary actions and organizational features under different environmental conditions and at different stages of development (for more detail see <https://stroeymeyt-lab.ch/research>).

The project

The goal of this PhD project will be to investigate how group composition (in particular colony size) influences the social network topology of ant colonies, and how this in turn affects disease transmission risk and the need for individuals to invest in personal immunity. The project will rely on automated behavioural tracking, social network analysis, simulation of disease transmission, monitoring of the transmission of pathogenic and non-pathogenic agents, fitness measurements, physiological assays and immune gene expression analysis. Among others, the project will address general hypotheses about the effect of group size on social organisation ('size-complexity' hypothesis) and immune investment ('density-dependent prophylaxis').

Desired profile

We are looking for candidates with experience in quantitative behavioural analysis and programming, a good working knowledge in statistics and experimental design, and a willingness to apply a variety of approaches (behavioural tracking, writing own code to analyse the data, and lab work). Experience with social insects, insect immunity and/or molecular biology would be a plus. Candidates must be creative, motivated and passionate about science, have excellent oral and written communication skills, and be at ease working both independently and as part of a team. A Master's degree (or equivalent) will be required prior to taking up the position.

The position

The position will be part of an overall project team consisting of two PhD students and two post-doctoral researchers (<https://stroeymeyt-lab.ch/open-positions/>) and will be fully funded for four years by an ERC Starting Grant. The salary will be set according to the guidelines of the University of Fribourg (c. 47'000 CHF per year).

Location

The Department of Biology at the University of Fribourg is a highly dynamic, international and interdisciplinary environment, spanning a wide range of research in evolution and ecology, behaviour, population genomics, and bioinformatics, developmental genetics, neurobiology, biochemistry and proteomics, across 27 groups (<https://www3.unifr.ch/bio/en/>).

Expected starting date

The starting date is flexible; the earliest possible start will be May 1st, 2019.

How to apply

Please send your application by email to Nathalie.Stroeymeyt@gmail.com. Your application should consist of a single merged pdf file including: (i) a full CV and publication list, (ii) a 1-2 page research statement describing your main research interests and your relevant skillsets, how they developed, and how they relate to the proposed research project, (iii) the names and contact details of at least two referees, and (iv) copies of (or links to) your publications and/or your PhD thesis (if available). Evaluation of candidates will begin on **February 15th, 2019**, and continue until the position is filled.

References

- Stroeymeyt *et al.* (2014). Organisational immunity in social insects. *Current Opinion in Insect Science* 5, 1.
Stroeymeyt *et al.* (2018). Social network plasticity decreases disease transmission in a eusocial insect. *Science* 362, 941.