



UPPSALA UNIVERSITET

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Postdoc position 'Multilevel selection in filamentous fungi: a clue to the evolution of multicellularity'

A fully-funded 1-year postdoctoral research position (with the high probability for a second year) is currently available at the Department of Evolutionary Biology, Uppsala University, Sweden.

The theory of evolution by natural selection is one of the cornerstones in modern biology. There is, however, considerable debate about which entities (ranging from genes, cells and individuals, to populations, species and species groups) are the units of selection. Natural selection acting at different levels is expected to drive the aggregation of smaller independent units to form new, more complex, layers of biological organization. For example, this process is expected to have driven the evolution of multicellularity, whereby the interaction between genes and cells resulted in a fitness increase in multicellular organisms compared to unicellular organisms. This post-doc project involves the study of multilevel selection in filamentous ascomycetes. These organisms may be considered intermediates between unicellular and multicellular organisms because of their totipotent and free ranging heterogeneous nuclei within a mycelium, all of which contributes to the phenotype of the mycelium. The candidate will perform artificial selection experiments combined with genomics and transcriptomics of the model system *Neurospora* to investigate whether the mycelium represents a case of cooperation or conflict between the haploid nuclei it contains. Under the scenario of cooperation we expect to observe inter-nucleus dynamics that are typical of those observed within diploid nuclei, such as sheltering of *de novo* deleterious mutations and dosage compensation, and the combination of adaptive mutations of the heterogeneous nuclei should be beneficial for the mycelium. A next step is to test for kin selection by investigating the outcome of interactions between nuclei exhibiting different degrees of relatedness. On the other hand, under the conflict scenario, heterogeneous mycelia would be at a fitness disadvantage due to antagonism among nuclei. The results of the evolutionary interactions occurring at subcellular and higher levels emerging from this project have the potential to contribute significantly to our understanding of one of the major evolutionary transitions - the evolution of multicellularity.

Applicants should have a PhD in biology/ecology and a strong interest in biology and evolution. Experience in experimental lab skills as well as some knowledge in bioinformatics are advantageous. Mathematical skills and an interest to develop theoretical models are welcome but entirely optional. The candidate will join the research group of Simone Immler (see <http://www.ebc.uu.se/forskning/IEG/evbiol/forskning/Immler/>) located at EBC. The current research focus of the Immler lab lies on the evolutionary consequences of sex, in particular the evolution of gametes and the consequences of differential selection between the haploid and diploid phases of the eukaryotic life cycle using experimental and mathematical tools. This project will be in close collaboration with the group of Hanna Johannesson, (http://www.ebc.uu.se/forskning/IEG/evbiol/personal/sidor/Hanna_Johannesson/) also located at EBC.

The Johannesson lab has its research focus on the evolution of mating systems and the underlying genetics in filamentous fungi. The project is announced in combination with a PhD position on sexual dimorphism, and there are ample opportunities to work closely with postdocs and PhD students in the Immler and Johannesson lab that focus on related projects. The working atmosphere is international with English as working language. EBC constitutes an exciting arena for multidisciplinary research in evolutionary biology in a broad sense, with research programs including ecology, systematics, genetics, genomics, and developmental biology. Uppsala University is the oldest university in Scandinavia and the city of Uppsala is a vibrant student town with beautiful surroundings conveniently situated 40 minutes by train from Stockholm.

Important dates: The application deadline for the position is the 28th of February 2013, and the starting date as soon as possible thereafter or as agreed upon.

Applications should include: 1) letter of interest / background (2 pages max); 2) complete CV; 3) the names and e-mail addresses of three referees.

Applications should be sent by e-mail to Simone.Immler@ebc.uu.se. Alternatively, send hardcopies to the following address: Simone Immler, Evolutionary Biology, EBC, Norbyvägen 18D, Uppsala University, SE-752 36 Uppsala, Sweden. Please feel free to contact me by email or by phone (+46-18-471 2827) for more information.