



Open position for the LSM call of applications

Department/Institute: Faculty of Biology, Zoomorphology

Subject areas/Research fields:

please find an overview of the research fields in the PDF attached to this email

Keywords: biodiversity, extinction, fossils, quantitative morphology, microscopy

Name of supervisor: Prof. Dr. Joachim T. Haug

Funding:

LSM-CSC /DAAD-GSSP (LSM)

Project title:

Quantitative exploration of biodiversity through space and time: lacewings as an example

Project description:

Neuroptera, the group of lacewings, is a prime subject of study for biodiversity losses in deep time. With only about 6000 species in the modern fauna, this group of Insecta is a mere relic of a much larger diversity back in the Mesozoic (252–66 million years ago), having undergone massive radiation in co-evolution with flowering plants, but seeing a drastic decline after the end-Cretaceous mass extinction, as indicated based on qualitative comparisons. Studies in recent years have demonstrated that quantitative morphology is so far the only measure to show this decline of biodiversity in deep time, while other methods fail to catch this signal reliably.

So far the data sets for lacewings are not saturated and have not yet resolved the loss on a geographic frame, remaining currently on a global comparison only. The project aims at:

- 1) Increasing the data set size to reach saturation. This will be achieved with the help of existing collections that host enormous amounts of specimens so far not considered (no fieldwork with unpredictable outcome will be required).

2) Resolving diversity comparison to specific regions for recognising losses in certain regions, which may be concealed in global comparisons due to diversifications in other regions. This aspect has so far not been applied in deep time comparisons of quantitative morphology and will boost the resolution drastically.

Methods to be applied include high-end imaging (synchrotron μ -CT scanning, digital composite microscopy, fluorescence microscopy) of extant and fossil specimens, geometric morphometrics, and statistical analysis of the latter. The project will contribute significantly to the improvement of biodiversity assessment over longer time periods, which is a crucial tool that needs to be developed further given the ongoing biodiversity crises.

References:

Haug, C., Braig, F. & Haug, J.T. 2023. Quantitative analysis of lacewing larvae over more than 100 million years reveals a complex pattern of loss of morphological diversity. *Scientific Reports* 13, 6127.

<https://doi.org/10.1038/s41598-023-32103-8>

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