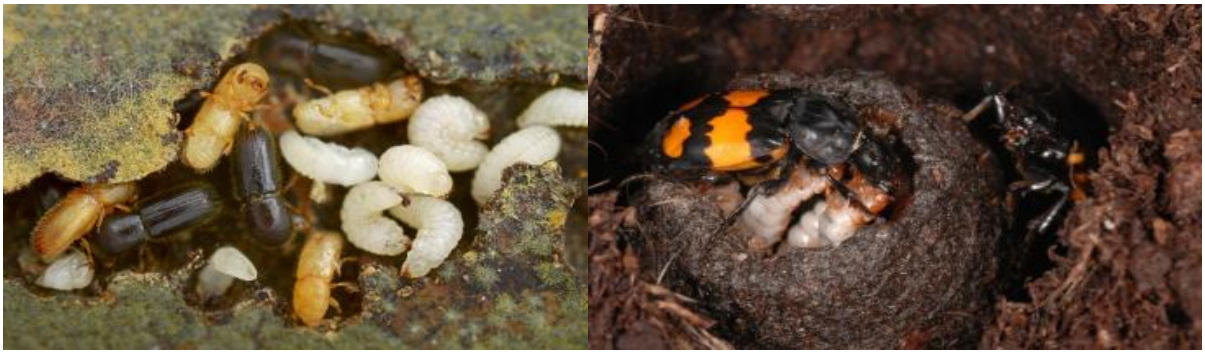
PhD Position: "Transcriptional Regulation in Beetle Sociality"

The position is fixed term (65% according to TV-L 13, for 36 months), starting as soon as possible, at Senckenberg Biodiversity and Climate Research Institute, Frankfurt, Germany.

Collaboration with Bayreuth University, Freiburg University, LMU München and Coventry University.



Subsociality is widely considered a prerequisite for the evolution of eusociality, as it introduces key behaviours, such as parental care and prolonged parent-offspring interactions, that can be co-opted and elaborated upon to form more complex social systems.

Recently, we have been investigating the genomic basis of subsociality in 20 species of two distantly related beetle families, the weevils (Curculionidae) and carrion beetles (Staphylinidae: Silphinae), with varying degrees of sociality. Our comparative genomics analyses revealed convergent gene losses and a relaxation of selection with the onset of offspring attendance. Gene expression analyses reveal that the switch from the non-caring phase to pre-hatching care behaviour results in the strongest change in gene expression across species. Interestingly, both the genomic and transcriptomic analyses identifed gene regulatory mechanisms as being most strongly associated with social behaviour. We now plan to identify **gene regulatory mechanisms** involved in the differences and changes in gene expression associated with **parental care** and thus the onset of sociality.

The accompanying project in München and Coventry will conduct a **genome-wide screen** for patterns associated with sociality using state-of-the-art **machine learning** approaches, and develop stochastic models to infer the importance of regulatory mechanisms. This project will thus shed light on the evolution of mechanisms involved in the transition from solitary to social life in insects.

We are looking for a highly motivated PhD candidate with interest in molecular evolution, genomics, epigenetics, and behavior to identify key regulators and epigenetic modifications shaping the evolution of social behavior using a multi-omics approach.

Your tasks

- **Conduct experimental work** to collect samples from eight beetle species across three parental-care phases from carrion and ambrosia beetles.
- **Perform essential laboratory work** (e.g. RNA extraction, library preparation
- **Carry out bioinformatic analyses** to integrate gene-expression data with epigenetic regulatory states.
- **Publish** results in internationally peer-reviewed journals, and **present** those at international conferences.
- Closely **collaborate** with the modelling counterpart

Your profile

- Master's degree (by start date) in Biology, Evolutionary Biology, Molecular Biology, Bioinformatics or related field
- Strong interest in behavior, evolution, and genomics
- Prior experience with NGS data, R, another programming language is a plus
- Experience with formulating scientific questions, planning and executing a research project
- Very good English communication skills; curiosity, independence, and interest to collaboratively work in an interdisciplinary team

Desirable skills

- Experience in conducting experiments
- Experience in dissection of specific tissues
- Experience in molecular laboratory procedures, including RNA extraction, preparation of Enzyme-seq and CUT&Tag libraries
- Experience in the bioinformatic analyses of transcriptome, methylation and/or histone modification data

We Offer

- Access to an international network of scientists, policymakers, and research organizations
- Integration in an interdisciplinary consortium studying the "GEvol: Genomic Basis of Evolutionary Innovations (GEvol)" with additional training opportunities and collaborations across Germany.
- A dynamic working environment in Frankfurt, a diverse and vibrant city offering a high quality of life.

How to apply?

Please upload your application (letter of motivation with a short description of your previous and current research foci, a CV, certificates of academic achievements, list of publications as well as letter(s) of recommendation, if available) **(as a single PDF file) on our website by March 29, 2026**.

If you have any specific questions about the position, please contact Dr. Barbara Feldmeyer at barbara.feldmeyer@senckenberg.de.