The Spatial Interaction Ecology research group of Prof. Tiffany Knight at the UFZ offers the following Master thesis topic:

“The prevalence and duration of lagged climate effects across different plant life histories”

Project background and thesis subject:

The effect of climate on plant and animal populations is a central question in ecology. With current and projected climate change, answering this question has gained additional impetus. Long-term data on populations provide opportunities to investigate how populations responded to historical climate, as well as forecast their fate into the future. New “sliding window” methods allow investigating how the time scale in which vital rates of populations (survival, growth, fecundity) respond to climate. These new methods have shown that, for long lived perennial plant populations, certain vital rates are actually best predicted by climate of up to 4 years ago (Evers et al. 2021).

The aim of this project is to investigate if the occurrence of such lagged responses to climate drivers depends on the longevity of species (generation time). This project will identify open access long-term datasets of plant species that will cover a range of generation times. Then, the demographic data in these datasets will be modeled based on a sliding window analysis, a model selection method that identifies the best time windows of the climate drivers (as done in Evers et al. 2021). Finally, the project will verify whether there are correlations between the climatic time windows found in the sliding window analysis and the generation time of species.

The project will be stationed in Leipzig, but a certain degree of remote communication can be accommodated.

Your tasks:

- Find suitable datasets
- Use model selection to identify species specific vital rate regression forms
- Modify existing R code to apply the sliding window analysis to the selected vital rates
- Documenting and presenting your results to our team
- Writing a Master thesis

Your profile:

- Master student in Ecology, Biology, Mathematics, or similar;
- Proficient in R;
- Familiar with regression and model selection methods;
- Familiar with (plant) vital rates and population models would be an asset;
- Highly motivated to work in an international team of scientists.

Reference:

Evers, S. M., Knight, T. M., Inouye, D. W., Miller, T. E., Salguero-Gómez, R., Iler, A. M., & Compagnoni, A. (2021). Lagged and dormant season climate better predict plant vital rates than climate during the growing season. *Global Change Biology*.