

José Lages

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Master internship
Exploring the Key Links in Trophic Networks

In the context of the current biodiversity crisis, it is crucial to complement field studies with theoretical research to better understand the interdependencies between species. In this framework, a recent study [1], conducted jointly by the theoretical physics group at the Institut UTINAM and a researcher from the German Centre for Integrative Biodiversity Research (iDiv, Leipzig), proposes a method to quantify the importance of species (nodes in the network) within a trophic network (prey-predator network).

This internship aims to extend this method to quantify the importance of trophic links within the network.

Intern's responsibilities:

- **Understand the foundational algorithm:** Acquire a solid understanding of the algorithm used to quantify the importance of links in a network. This algorithm is based on the use of a Markov chain and produces an eigenvector centrality.
- **Develop a sensitivity algorithm:** Implement, in a compiled language (Fortran/C++) and/or an interpreted language (Python), an algorithm to measure the influence of a link modification on the network nodes.
- **Explore prey-predator dynamics** (optional, depending on progress): Study the dynamic aspects of trophic relationships, particularly the stability of fixed points in the dynamics.
- **Broaden disciplinary knowledge:** Develop an understanding of fundamental concepts in theoretical ecology.

Practical information:

- **Compensation:** approximately €660/month.
- **Duration:** two to six months, depending on the alignment between the structure of the Master's program pursued by the candidate and the internship requirements.

Supervisors:

José Lages <http://perso.utinam.cnrs.fr/~lages>

Guillaume Rollin <https://g-rollin.hebfree.org>

Benoit Gauzens <https://www.researchgate.net/profile/Benoit-Gauzens>

Application process:

Your application must be submitted as **a single pdf document** at the following address: <https://sdrive.cnrs.fr/s/dps8Gq7EXMNBXcM>

The document must include:

- a motivation letter,
- a detailed curriculum vitae,
- grade transcripts for the past three years,
- and the name and email address of a referee.

Important: Failure to comply with this guideline will result in the automatic rejection of your application. Please note that the submission site does not provide any confirmation beyond the one displayed on the screen.

Reference:

[1] Identifying important species in meta-communities G. Rollin, S. Kortsch, J. Lages, B. Gauzens, Methods in Ecology and Evolution 15, 1601-1703 (2024) <https://doi.org/10.1111/2041-210X.14384>