



How do ectomycorrhizal fungi interact with soils communities in Neotropical forests? Using ecological networks and roots symbioses to study fungal interactions in the Neotropics

Location: Paulo R. Guimarães Jr's lab at the Department of Ecology at the University of São Paulo funded by FAPESP and FRB – CESAB.

Salary: R\$ 4100.00-4400.00 per month (depending of the postdoc profile, no taxes to be deducted); 734-788 € gross per month (exempt of any local taxes).

Contract: 1 year fixed term, full time + 1 additional year depending on the evaluation of first year progress report.

Closing date: 14/08/2022

Starting date: from the 01/10/2022

Job information

- **Host structure**

About the CNPq: CNPq is the national funding agency, Brazil. CNPq has a unique tradition of supporting cutting-edge science in the country.

About the University of São Paulo: University of São Paulo is the top-ranked university of the country. USP is one of the best universities of Ibero-America (Latin America, Portugal, and Spain) and is constantly ranked among the main universities of the world (e.g., Times Higher Education Ranks). Almost 100,000 students are distributed across eleven campi in different cities of Sao Paulo State.

Guimarães Lab: Guimarães Lab is a lab focusing mostly on the study of ecological networks. Currently, two research lines are developed at Guimarães Lab: (1) theoretical work using mathematical modelling of evolution and coevolution in ecological networks, (2) data-analysis work on the natural history of empirical ecological networks. The lab currently is formed by three postdoc researchers, six grad students, two undergrad students, and a technician. The lab is located at USP's main campus (Butantã) at São Paulo city. Additional information at www.guimaraes.bio.br

About FRB: The **Foundation for research on biodiversity (FRB)** was created in 2008. It gathers public research institutions, environmental NGOs, land and genetic resources managers and the private sector. It provides a forum where science meets society in order to address the current challenges related to biodiversity research.

About CESAB: The Centre for Synthesis and Analysis of Biodiversity (CESAB) is FRB's main programme and a leading research organization in Europe, with an international reputation. Launched in 2008 after the "Grenelle de l'Environnement" by the Ministries for research and for ecology, it was created by eight public research institutions (BRGM, CIRAD, CNRS, IFREMER, INRA, IRD, IRSTEA and MNHN), joined in 2014 by LVMH and in 2017 by the University of Montpellier. Its aim is to implement the innovative work of synthesis and analysis of existing data in the field of biodiversity. Advancing knowledge, developing culture

and collaboration, facilitating links between scientific disciplines and with the stakeholders, are the main objectives of CESAB, which welcomes every year a large number of researchers from all continents. For more information about CESAB: <https://www.fondationbiodiversite.fr/en/about-the-foundation/le-cesab/>

- **Your role**

You will interact with an international consortium of experts, including network ecologists, fungal taxonomists and experts on eDNA and community ecology. Based in São Paulo University (USP) in the Paulo R. Guimarães lab for up to two years, you will also participate in recurrent international workshops held in São Paulo and Montpellier.

Your research will consider the ecology of neotropical forest soil fungi under a new perspective by investigating whether the low frequency of ectomycorrhizal symbiosis and ectomycorrhizal fungi - in particular in the neotropical lowlands - results from a competitive exclusion by the members of the rest of the soil fungal community. This project will allow you to compare the patterns of interactions using a large number of datasets and your skills of network ecology.

Working with a consortium of experts that will provide data on fungal specimen sequences, and soil fungal community datasets from neotropical forests, your dataset will include habitats where ectomycorrhizal fungi are more abundant such as dry habitats. Your role will first consist in gathering these datasets and handling an ambitious meta-analysis on neotropical fungal communities and their co-occurrences across habitats. We hope you are able to explore if ectomycorrhizal fungi - occurring locally at a low frequency in the Neotropical lowlands - show a larger distribution and a higher frequency in other habitats of the Neotropics. Moreover, your analysis will consist in (1) identifying ectomycorrhizal fungi in a diversity of datasets, (2) test if ectomycorrhizal fungi show different interactions compared to other fungi and (3) if ectomycorrhizal fungi have more positive interactions with other fungi outside of the neotropical lowlands than within, notably in dryer habitats of the Neotropics.

Qualifications

The post-doc shall have experience on network science, specifically on the structural analysis of empirical ecological networks. The post-doc is required to be proficient in programming languages, such as R, Python, Matlab, Fortran, or C++ for her/his/their analyses.

It would be appreciated if the applicant has experience with meta-analyses, handling of large datasets of (meta)barcoding and ecological community data, and approaches to create, infer, and describe network structure.

It is not mandatory, but appreciated if the post-doc may already be familiar with fungi, or at least with the Neotropical biodiversity, and interested in fungi and network ecology. Going to the field is not part of the project but could be planned during the post-doc for an immersion in fungi ecology.

The post doc is required to be fluent in English and have excellent/good writing and publications skills. Speaking Portuguese and/or Spanish is not required but will be a plus and it would definitely facilitate to live in São Paulo.

Application instructions:

- A cover letter;
- Your curriculum vitae
- two to three reference contacts (name and e-mails)

Applications must be sent no later than 14/08/22 to: prguima@usp.br and melanie.roy@cima.fcen.uba.ar