

Postdoctoral position in ecology - 24 months Alternative stable and transient states in tree community dynamics – application to European forests.

Funding: ANR Declic

Starting date: Ideally, between May and September 2022 (with possible adjustments)

This postdoctoral position is available in the LISC lab (<https://lisc.inrae.fr/>) located in Clermont-Ferrand, France. It takes place in the context of the ANR funded project Declic (Tree demographic responses to climate stresses and competition for a trait-based biogeography - <https://anr.fr/Project-ANR-20-CE32-0005>).

Within the Declic project, integral projection models (IPM) of tree population dynamics are currently developed for European and North-American taxa and calibrated using a set of national forest inventories (Kunstler et al. J. Ecol. 2021). The idea of this postdoc is to use these IPM to assess the likelihood and duration of alternative transient states in temperate tree communities, and whether this likelihood changes along environmental gradients.

The concept of alternative transient states (Fukami and Nakajima Ecol. Lett. 2011) generalizes the concept of alternative stable states to systems that are out of equilibrium. Tree communities are good examples of ecological systems out of equilibrium due to the long lifespan of trees and to the recurrent disturbances imposed by forest management in harvested stands. Yet, the occurrence of alternative transient states in tree communities has received little attention to date.

The aim of the postdoc will be to use already calibrated IPMs for European and North-American trees to assess by simulations the likelihood and duration of alternative transient states in tree communities, and how these alternative transient states might be influenced by environmental conditions along large environmental gradients at continental scales. More generally, this work will contribute to our growing understanding of the role of transient dynamics for species coexistence in various ecological systems (Jabot et al. Ecol. Lett 2020, Pouget et al. JVS 2021, Jacquet et al. 2022).

The postdoc will be supervised by Dr Franck Jabot. He/She will have strong interactions with two other postdocs hired in the project: a postdoc working with physiological traits supervised by Dr Sylvain Delzon at INRAE BIOGECO and Dr Guillaume Charrier at INRAE PIAF, and a postdoc working on IPM of trees supervised by Dr Georges Kunstler at INRAE LESSEM. We also expect strong interactions with two other postdocs and one Phd student working at INRAE LISC on dynamical properties of communities in various ecosystems.

The successful candidate should develop his/her own creative research ideas while fulfilling the above objectives.

In addition, candidates should meet the following criteria:

(1) have a PhD in ecology, computer science or a related field

(2) have a good publication record evidencing quantitative skills.

The position is available for a period of 24 months starting between May and September 2022 (with possible adjustments). Gross monthly salary is in the range €2,500–2,900 depending on experience. Review of applications will begin on the 1st of February 2022 and continue until the position is filled.

To apply, e-mail a letter of application, a CV and the names and email addresses of two references to Franck Jabot franck.jabot@inrae.fr

References:

Fukami, T., & Nakajima, M. (2011). Community assembly: alternative stable states or alternative transient states?. *Ecology letters*, 14(10), 973-984.

Jabot, F. et al. (2020). Assessing metacommunity processes through signatures in spatiotemporal turnover of community composition. *Ecology letters*, 23(9), 1330-1339.

Jacquet, C. et al. (2022). Temporal variation of patch connectivity determines biodiversity recovery from recurrent disturbances. *Biorxiv*. 10.1101/2022.01.02.474736v1

Kunstler, G., et al. (2021). Demographic performance of European tree species at their hot and cold climatic edges. *Journal of Ecology*, 109(2), 1041-1054.

Pouget, C., et al. (2021). Fine-scale functional metacommunity dynamics: Analysing the role of disturbance-driven environmental variability in grasslands. *Journal of Vegetation Science*, 32(4), e13068.

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