

	OFFRE D'ALLOCATION DE THESE / PhD GRANT	
	ÉCOLE DOCTORALE SCIENCES EXACTES ET LEURS APPLICATIONS - ED 211 / NATURAL SCIENCES DOCTORAL SCHOOL Avenue de l'université BP 1155 64 013 PAU Cedex – France	
PhD SUBJECT		
TITLE: Emerging Macroecological and Macroevolutionary Patterns of Island Radiation: A Global Assessment.		
<p>ABSTRACT: Understanding the origin and maintenance of biodiversity is a key issue in macroecology and macroevolution. In this quest, islands along with the exceptional species radiations (rapid episodes of diversification from a common ancestor) they harbor have always served as testing ground for ecological/evolutionary theories. Despite recent accumulation of data for islands, we still lack a synthetic view of what island radiations are and no formal extensive comparative analysis across island systems and lineages has been yet achieved. By means of meta-analysis, this PhD intends to perform a first global assessment of island radiation in order to estimate the tempo and mode of diversification among lineages and archipelagos and to further examine the relationships between diversification patterns, emerging community structure and biogeographic processes. At first, the project will focus on oceanic archipelagos (islands formed over oceanic plates and never connected to continental landmasses) since they harbor most of the spectacular radiations reported in the literature. In the course of the research project, other types of islands or island-like systems (continentals, mountains tops) might be taken into consideration. Overall, we expect this project to provide strong baseline information regarding the eco-evolutionary processes structuring island communities.</p>		
Keywords: Diversification Endemism Island biogeography Radiation Macroecology Macroevolution Phylogeny		

WORKING PLACE	
Laboratory: IPREM UMR5254 - UPPA/CNRS Website: https://iprem.univ-pau.fr/fr/index.html	
PhD supervisor: François Rigal	
Place: IBEAS – Campus universitaire, Av de l'université - BP 1155 - F64013 Pau	
Starting date: October 2020	Duration: 3 years
Employer: Université de Pau et des Pays de l'Adour (UPPA)	
Monthly gross salary: 1768 € + extra gratification for teaching duties 32 hours per year.	

HOSTING UNIVERSITY / LABORATORY	
<p>The Université de Pau et des Pays de l'Adour (UPPA) is a leading research and teaching university, among the top 20 universities in France, located in the beautiful, culturally rich and highly diverse area of the Atlantic Pyrenees (https://www.pau-pyrenees.com). UPPA has been recently labeled as <i>Université d'Excellence</i> as part of the Future Investments program launched by the French government with the core scientific domain spanning over all areas of Energy and Environment (http://www.e2s-uppa.eu). Within UPPA, the laboratory IPREM is Joint Research Unit CNRS / UPPA (UMR 5254) with members interesting in the development of fundamental knowledge in chemistry, microbiology, environmental and ecological sciences, in relation to applications concerning the management of the environment in a context of global change. The PhD supervisor (Assistant Professor in Biostatistics/Community Ecology – STEE/IPREM) is an ecologist with broad interests in island biogeography, community ecology, macroecology and biostatistics. Since September 2015, he is also an external</p>	

collaborator of the Centre for Ecology, Evolution and Environmental Changes (cE3c) of the University of Lisbon. (<https://frugal.netlify.app>). The PhD project will also capitalize on long-term, and ongoing, collaborations established between the PhD supervisor and several close collaborators in the field of island ecology, specifically in the Universidad Autónoma de Madrid, Finnish Museum of Natural History, University of Azores, Oxford, Birmingham and Athens. In the course of the PhD project, the student will be able to apply for International Doctoral Mobility Grants in UPPA to undertake collaborative work with researchers abroad for up to 6 months.

PROJECT DETAILS

I. Scientific Context

Understanding the origin and maintenance of biodiversity is a central issue in macroecology and macroevolution (Ricklefs 2004). This knowledge is also an essential pre-requisite to quantify and predict the impact of global change on ecosystems and the biodiversity they harbor (Bellard et al. 2012). In this quest, islands with the exceptional species radiations they harbor (i.e. rapid episodes of species diversification from a continental ancestral species, Gillespie 2004) have always triggered new ideas and served as testing ground for ecological and evolutionary theories (i.e. the natural laboratory paradigm), pushing further our knowledge of the natural world (Whittaker et al. 2017). Beside the emblematic adaptive radiation of Galapagos finches and its pivotal role in the formulation of the theory of evolution, studies of island species radiation have provided unique insights into evolutionary processes underlying species diversification and biodiversity patterns (Whittaker et al. 2017). The development of phylogenetic theory, the generation of massive DNA sequence database as well as the progress in analytical methods in macroevolution (Morlon 2014) have resulted in a massive accumulation of high-quality data for island species radiations. However, and surprisingly, we still lack a synthetic view of what island radiations are and despite the development of conceptual verbal models (Borregaard et al. 2017), so far, no formal extensive comparative analysis has been yet achieved.

II. Objectives

This PhD project will intend to perform a first global assessment of island radiations by means of meta-analysis in order to examine how diversification patterns and emerging community structure vary across island systems and lineages. This project will therefore tackle fundamental questions that still remain poorly tested such as: What is the diversity of tempo and mode of diversification among lineages and archipelago? Could we relate diversification patterns to archipelagic features (e.g. age, current/past area and climate) and species traits (dispersal, trophic guild)? Is there a link between diversification patterns and assembly patterns for the constituent species of island radiations?

III. Work plan

This project will be three-fold: (1) Provide an exhaustive literature review on island radiation in order to, first, identify current research gaps and, then, propose a comparative framework for the global analysis of island radiation, including a novel set of predictions/hypotheses to test (2) Assemble a novel database linking species distribution data, molecular-based phylogenies and island features for several hundred of island radiations by means of intensive data-mining analysis on literature and public genetic databases (JSTOR, ISI Web of Knowledge, GenBank) (3) Implement global meta-analysis on island radiation. Note that meta-analyses and diversification analyses have met very important statistical developments these last years and currently several methods are available. For these reasons, the design of the statistical pipelines will receive special attention. Several approaches will be tested and if required specific analytic tools will be develop to tackle novel challenges raised by such global analyses. All the statistical analyses will be implemented with the statistical programming language R. At first, the project will focus on oceanic archipelagos (islands formed over oceanic plates and never connected to continental landmasses) since they harbor most of the spectacular radiations reported in the literature. In the course of the research project, other types of islands or island-like systems (continentals, mountains tops) might be taken into consideration.

IV. References

- Bellard, C., Bertelsmeier, C., Leadley, P., Thuiller, W., & Courchamp, F. (2012). Impacts of climate change on the future of biodiversity. *Ecology letters*, 15(4), 365-377.
- Borregaard, M. K. et al. (2017). Oceanic island biogeography through the lens of the general dynamic model: assessment and prospect. *Biological Reviews*, 92(2), 830-853.
- Gillespie, R. (2004). Community assembly through adaptive radiation in Hawaiian spiders. *Science*, 303(5656), 356-359.
- Morlon, H. (2014). Phylogenetic approaches for studying diversification. *Ecology letters*, 17(4), 508-525.
- Ricklefs, R. E. (2004). A comprehensive framework for global patterns in biodiversity. *Ecology letters*, 7(1), 1-15.
- Whittaker, R. J., Fernández-Palacios, J. M., Matthews, T. J., Borregaard, M. K., & Triantis, K. A. (2017). Island biogeography: Taking the long view of nature's laboratories. *Science*, 357(6354), eaam8326.

REQUIRED COMPETENCIES

- MSc degree or equivalent in ecology/evolutionary biology with good knowledge of ecological, evolutionary and biogeographical processes.
- Prior experience with data analysis in R is required.
- Prior experience with phylogenetic inference software will be advantageous.
- Very good spoken and written English communication skills.

SELECTION CRITERIA

A jury panel will select the best candidate based on her/his merit, through the overall appreciation of the Curriculum Vitae. The best candidates will be invited for an interview in person or by videoconference, to establish the final ranking. Criteria used in selection of the candidate will be the candidate's motivation, scientific maturity and curiosity, her/his marks and rankings in MSc and her/his English proficiency.

REQUIRED DOCUMENTS

Send an e-mail with your application containing:

- CV.
- Cover letter.
- Copy of the diploma.
- Candidate's MSc or equivalent: marks and ranking.
- Letters of recommendation.
- Contact details for two references.

LAST DATE TO SUBMIT THE APPLICATION

15/06/2020

CONTACTS

Dr. François Rigal
IPREM UMR5254 - UPPA/CNRS - College STEE
Bâtiment IBEAS
Avenue de l'Université
BP 1155
64013 PAU CEDEX
Email : francois.rigal@univ-pau.fr
<https://frigal.netlify.app>
<https://scholar.google.fr/citations?user=hXIEcUsAAAAJ&hl=en>