MUSEUM NATIONAL D'HISTOIRE NATURELLE

Post-doc position: acoustic classification and biodiversity monitoring

Institution	**Muséum National d'Histoire Naturelle (MNHN)** CESCO, UMR 7204, 75005 Paris
Period	01/10/2021 – 31/12/2022 (15 months)
Project	**1. Description of the project justifying the recruitment** **BIOCLIMATE research programme** Conserving tropical forests is one of the most economically efficient mechanisms for tackling the conjoined crises of climate change and biodiversity loss, Securing the fate of the Amazon basin will likely be crucial if international targets to limit global warming are to be met. Understanding the importance of biodiversity in maintaining and restoring human-affected forests is essential for developing evidence-based policies that help preserve Amazon forests in a changing climate. The BIOCLIMATE project aims to use new and well-established methods to study biodiversity and associated ecosystem processes in climate-affected and human-modified Amazon forests in the Santarém region of Brazil, where BIOCLIMATE scientists have been working for the past 10 years. Studies on the relationship between climate and biodiversity in tropical forests are mainly based on short-term research and in non-degraded forests. To fully understand the climatic resilience of tropical forests, we also need longer-term data on responses to climate stressors. The National Museum of Natural History is collaborating in this project with Embrapa Amazonia Oriental in Brazil and the Universities of Lancaster, Oxford and Manchester Metropolitan in the UK, to develop innovative methods for monitoring biodiversity using ecoacoustics. Building on a proof of concept on nocturnal birds, the post-doctoral fellow will develop a method for analysing the long-term recordings already made (more than 10,000 hours of recordings) to quantify the acoustic activity of as many bird species as possible. For this, the post-doc will benefit from the experience and tools already developed by the MNHN teams (Bas et al. 2017, Ulloa et al. 2018, Barré et al. 2019), notably on automatic segmentation, signal processing, machine learning and artificial intelligence (random forest, deep learning, contextual classification, data augmentation). The resulting work will ultimately allow the project team to identify trophic interactions along a gradient of human-modified forests exposed to extreme and temporally variable climate conditions. This knowledge will also allow us to assess the rarity, vulnerability and conservation status of these species - valuable resources to inform government agencies and private sector organisations involved in conservation assessments, land-use planning and forest management. **General objective:** To develop and evaluate a method for sampling bird communities using ecoacoustics. 1. To use existing tools to build one or more vocalization classifiers for target species (a minimum of ten) 2. Evaluate its performance and the impact of known biases (masking, attenuation) 3. To propose a methodology for the use of these data in spatial and temporal analyses

	All these missions will be carried out in close collaboration with the ecoacousticians of Vigie-Nature (CESCO) and the EAR project (ISYEB). **2. Duration of the project/operation or phase of the project/operation** 15 months Start date 01/10/2021, end of contract 31/12/2022 **3. Objective event or result determining the end of the contractual relationship and the modalities of evaluation and control of this result** - Production of atomised scripts in R or Python and the corresponding documentation allowing the reuse and improvement of the methods implemented - Publication of a leading methodological article
Supervisors	Yves Bas (CESCO) Jérome Sueur (ISYEB)
Duration	15 months
Main professionnal relationships	The tools will be developed in coordination with the supervising team and several young researchers whose projects are related: - Dr Oliver Metcalf, a post-doctoral fellow in eco-acoustics at Manchester Metropolitan University on the Bioclimate project - a post-doctoral fellow at CESCO to be hired on the similar project Verbatim (urban context) - Dr. Sylvain Haupert, CNRS research engineer at ISYEB - Félix Michaud SU SCAI PhD student at ISYEB
Skills and knowledge required	**Education:** Ecology and/or bioinformatics and/or artificial intelligence **Requirement:** strong experience in programming with R and/or Python if having an ecology background, experience in ecological data analysis if having a computer science background. Experience in machine learning, acoustic data analysis and/or in ornithology will be an asset but not essential.
Working hours and conditions	- Full-time, fixed-term public law contract. Specific timetable for research activities. - The successful candidate will be based at the Jardin des Plantes (Paris).
Contact and application	Curriculum Vitae and covering letter to be sent to Yves Bas (yves.bas@mnhn.fr) Application deadline 5 July 2021