

# Position Offered: UNIVERSITY GRADUATE

Project: *Integrating emerging technology for automated forecasting and monitoring of migratory insect population dynamics and connectivity*

**Technological and scientific fields:** Remote sensing, Climate Change and Biodiversity, Advanced techniques in Earth Observation, Ecological modelling, Massive Data Processing

**Location:** Barcelona, Catalonia, Botanical Institute of Barcelona (IBB), <https://www.ibb.csic.es>

**Research Group/PI:** Entomology and Insect-Plant Interactions, Insect Migration and Phylodiversity Lab, Gerard Talavera, [www.phylomigrationlab.com](http://www.phylomigrationlab.com)

## PROJECT SUMMARY

This multidisciplinary project harnesses emerging technologies to automate remote monitoring of insect population dynamics. Insects, highly diverse and abundant, migrate long distances, connecting ecosystems and impacting global processes. They play crucial roles pollination and nutrient transfer, while also pose risks as pests and disease vectors. Recent advances in remote sensing, radar tracking, atmospheric simulations, ecological modeling offer new ways to predict and track insect movements. The project will develop real-time monitoring tools, including automated pipelines for satellite imagery, radar to detect airborne insects, and atmospheric models to predict colonization hotspots. Spatio-temporal models will forecast distribution shifts, invasiveness, and habitat loss. A public web-based platform and a R package will support data integration, outbreak prediction, movement analysis, map visualization, and decision-making.

## PROFESSIONAL PROFILE

### Minimum requirements:

- Master in Remote Sensing applications to Ecology and Geographic Information Systems
- Degree on Environmental Sciences or Biology

### Merits to be considered:

- Proficient in coding with R and Python
- Experienced in working with high-performance computing clusters and LINUX systems
- Skilled in Species Distribution Modelling and spatial analyses using time-series climate data, land cover maps, vegetation phenological metrics, water indices and wind circulation
- Knowledge of insect biology and biodiversity

## WHAT IS OFFERED

The project will offer training in both computational and biological aspects. Technical training will include geospatial and data science, high-performance computing, advanced R and Python programming, atmospheric and EBVs modeling, remote sensing, and Bayesian statistics. Biological training will cover insect movement, biology, biogeography, population ecology, pest ecology, and ecological modeling. The contract will complete 260 ECTS, including 55 ECTS for stays abroad in radar movement ecology, high-performance computing, and web-based spatial visualization; 85 ECTS in training courses; and at least 120 ECTS in research and supervised activities.

### Contract conditions:

Indefinite contract for a University Graduate associated with the Momentum Project of 4 years' duration according to Spanish science law. Gross annual salary (37.000 € - 41.000 €).

**Start of contract: before 31 December 2024**

## PRINCIPAL INVESTIGATOR CONTACT

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