

## **JOB DESCRIPTION TEMPLATE**

**(Euraxess labels)**

**TITLE (include department or project): Postdoctoral Position on Mathematical and Statistical Models of infectious diseases at the Climate and Health Group (Climate and Health Group) – Wellcome Trust Discovery Award**

**LOCATION** : Campus Mar

**REPORTS TO** : Xavier Rodó, ICREA Research Professor

**SEND APPLICATIONS TO:** [Esther.brinquis@isglobal.org](mailto:Esther.brinquis@isglobal.org); [job@isglobal.org](mailto:job@isglobal.org)

**PUBLISH ON (optional):** ResearchGate, Euraxess, findaPhD, Nature, Mathjobs, Indeed.com, more....

### **Description:**

The Barcelona Institute for Global Health (ISGlobal) is a cutting-edge institute addressing global public health challenges through research, translation into policy and education. ISGlobal has a broad portfolio in communicable and non-communicable diseases including environmental and climate determinants, and applies a multidisciplinary scientific approach ranging from the molecular to the population level. Research is organized in five programs: Climate, Air Pollution, Nature and Urban Health; Environment and Health over the Lifecourse; Global Viral and Bacterial Infections; Malaria and Neglected Parasitic Diseases and Maternal Child and Reproductive Health. ISGlobal is accredited with the Severo Ochoa distinction, a seal of excellence of the Spanish Science Ministry.

### **What We Are Looking for:**

The Climate and Health Group (led by ICREA Professor Xavier Rodó) invites applications for a postdoctoral position (exceptional PhD candidates may also be considered) in the area of mathematical modelling of vectorborne diseases and in general, the epidemiological dynamics of communicable diseases. The position is full-time available immediately and for a fixed-term period of 24 months (1+1 year after successful evaluation) with the possibility of further extensions.

We are seeking a highly motivated individual with a degree (PhD) in mathematics, physics, engineering, computer science, meteorology or theoretical ecology. A broad interest in natural sciences and more specifically in ecology is essential. We are looking for candidates motivated by science with the ability to run simulations and eventually help develop code and to integrate scientific knowledge into numerical schemes.

**Project Code:** ARBOTHAI Multi-scale seamless prediction of arboviral outbreaks in Thailand  
WELLCOME TRUST Grant Number UNS138749.

**About the postdoctoral position:**

At a time when Bangladesh and Brazil are facing dengue epidemics on an unprecedented scale, the question of monitoring and controlling arboviral diseases has never seemed so urgent in endemic regions. Arboviral diseases are seen to be strongly conditioned by climate, essentially through the modulation of the vector population and the vectorial capacity. Skill exists for these diseases and regions and it can be incorporated into actionable alert systems for enhanced seasonal incidences. However, despite the scarcity of actionable Early-Warning Systems available for forecasting infectious diseases driven by climate, a recent report identified vector borne diseases as being the target of most of those tools. A closer inspection, though, indicates that prediction models that can be used on an operational basis are lacking and their skill for out-of-fit prediction is limited. To this end, the present project intend to adapt a formerly developed platform for arboviral risk prediction in Catalonia (Spain), named ARBOCAT ([www.arbocat.org](http://www.arbocat.org)) to a fully endemic country, Thailand, to be used as an operational prediction tool for national stakeholders at the scale of the 77 provinces in Thailand and also locally in Bangkok. To this end, we will adapt the current model architecture in ARBOCAT to work in ARBOTHAI and we will use for ARBOBANG an urban climate model to downscale it to a 200-m resolution in Bangkok.

Similarly, recent studies published point to a contraction of malaria-prone regions in Africa due to the future rising in continental temperatures beyond the optimal conditions for vector liveability. The studies to be conducted aim to either challenge those results or eventually confirm.

This recruitment targets the following specific directions:

Develop mathematical models describing disease dynamics and the impact of climate variability and change, socioeconomic, demographic and environmental determinants in the evolution of seasonal to interannual arboviral epidemics (dengue, yellow fever, chikungunya and zika).

The candidate will use a suite of modelling approaches, ranging from deterministic models, stochastic compartmental models, and individual-based models.

Use simulations of interventions (e.g. mosquito control) to feed mathematical disease models.

Develop new simulations for future projections for malaria changes in Africa under different global warming scenarios.

Review and validate different approaches and existing models.

Publish research findings in scientific journals and present them at major medical/scientific meetings.

**Field research: (please, highlight the fields that define the position)**

Biological sciences  
Computer science  
Environmental science  
Ecology  
Geosciences  
Mathematics

**Is the job funded through a EU Research Framework Programme? (please, highlight the relevant field)\***

Wellcome Trust

**TAGS (GENERAL KEYWORDS):**

#Dengue, arboviruses, epidemic models, malaria modelling, climate change, early-warning systems, Thailand, Africa.

**TRAINING AND EXPERIENCE /QUALIFICATIONS:**

A Ph.D. degree in a quantitatively-oriented field, such as mathematical epidemiology, theoretical physics, or applied mathematics.

Robust research experience in mathematical modelling and building different kinds of models.

Experience in analytical and quantitative methods, such as deterministic and stochastic differential equations, integral equations, nonlinear dynamics, probability theory, and stochastic processes.

Extensive experience in scientific computing involving programming, numerical analysis, symbolic and logical analysis, Monte Carlo simulations, and computer graphics.

Experience in Matlab, Mathematica, Python and R

Experience with statistical data analysis of large databases.

## KEY RESPONSIBILITIES<sup>1</sup>:

Candidates will be expected to lead modeling and data analysis projects and contribute to articles and proposal writing. Main task will involve among others, the development of applied models of dengue and other arboviruses based on data, the handling and integration into those simulations of climate variability and change provided by other members of the group. The development of a computational platform for simulation of future scenarios for malaria in Africa will also be the other important task. Prior research experiences and strong interest in infectious diseases modeling, stochastic computational modeling are required for this position. Additional desirable skills and experience include one or more of the following: disease epidemiology, model fitting/calibration to empirical data, and/or advanced statistical analyses. Candidates will need to work independently and as effective members of multidisciplinary collaborative teams.

This job description reflects the present requirements of the **post but may evolve** at any time in the future as duties and responsibilities change and/or develop providing there is appropriate consultation with the post-holder.

This job description is not a definitive or exhaustive list of responsibilities but identifies the key responsibilities and tasks of the post holder. The specific objectives of the post holder will be subject to review as part of the **individual professional assessment process** .

## SKILLS<sup>2</sup>

In general, the candidate we are seeking is expected to have the following skills and qualifications:

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<sup>1</sup> **To adapt the post to a Hybrid model: Outcome-focused descriptions.** These articulate the outcomes expected from a role—not the specific tasks or duties the employee would be required to perform. This approach gives employees flexibility to determine the best way to achieve those results.

<sup>2</sup> **We recommend skills-focused descriptions.** These outline the skills and capabilities an employee should bring to the position (or aim to develop). With this approach, the emphasis shifts from required tasks to required talents—and how those talents could be applied in the role.

**Team-based descriptions.** Instead of focusing on the individual role, these descriptions emphasize the collective responsibilities, objectives, and deliverables of the team, who collectively decides how each member will contribute.

Basic knowledge in climatology and ecology

Very good programming skills (e.g., Python, R, Matlab, C/C++, Fortran in the Linux environment) and experience in big data analytics are required.

Cutting-edge expertise in modeling and statistical analyses;

Proven abilities to publish at a high international level;

Good oral and written communication skills in spoken and written English;

Rigor, autonomy and abilities to work in a team environment.

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The post holder will adhere to ISGlobal principles contained in **People management policy, including Equity, diversity and health safety**. The post holder will respect, and accountable to ensure ISGlobal policies and procedures .

**LANGUAGE LEVEL:** Proficient in English, at least C1 level

**CONDITIONS:**

Duration: 2 years

Starting date: as soon as filled

Contract: Full-time

Salary Range: Salary is commensurate with spanish standards and offered at the ISGlobal Postdoctoral level A or B depending on the qualifications. You will have up to 30 days of annual leave + 15 days « Reduction of Working Time ». You can benefit of teleworking hybrid system (weekly presence requested).

**HOW TO APPLY:**

Applicants must fill in the request form and include the following code reference position: **Postdoct\_ARBOTHAI\_May24**, attach the CV and a Cover Letter. Each attached document must be named with the candidate name and surname.

**The application should include:**

+A personal letter (max 3 pages) where the applicant describes her/himself in relation to the above-described requirements, a motivation to why the applicant is interested in the position and a short description of the candidate's research interests.

+CV with academic qualifications and publication list.

+Copy of doctoral degree certificate and other relevant degree certificates.

+Contact information to three reference persons.

+Other relevant documents.

### **SELECTION PROCESS:**

The receipt of applications will be open until the position is filled

Only the applications submitted through the request form will be considered.

Only shortlisted candidates will be contacted.

The interviews could be placed during the reception candidatures period.

Diverse candidatures are encouraged, that includes: gender, race, ethnicity, religion, age, sexual orientation, physical abilities, and political views.

The selection process is designed in two phases for shortlisted candidates:

1- Interview phase of a technical nature, with the team that requires the incorporation. To assess the person's skills and CV.

2 - Meeting with HR with the finalist(s) to finish assessing the profile and discuss contractual and institutional issues.

If needed any technical test could be pass. A Psychological Competency Evaluation Test will be required for the structural or transversal positions.

In accordance with the OTM-R principles, a gender-balanced recruitment panel is formed for every vacancy at the beginning of the process. After reviewing the content of the applications, the panel will start the interviews, with at least one technical and one administrative interview. A profile questionnaire as well as a technical exercise may be required during the process.

*In ISGlobal we are committed to maintaining and developing a work environment in which the values and principles of our organization are respected and equal opportunities between women and men be promoted in each of the areas in which we operate, not tolerating discrimination based*

*on criteria such as age, gender, marital status, race, ethnicity, functional diversity, political leanings, religion, sexual orientation, gender identity or gender expression.*

*ISGlobal supports the initiative [#ScienceforUkraine](#). Therefore, to sustain Ukraine's presence in the European Research Area and international scholarly community, candidates from Ukraine on all levels of scholarly career are welcome: students, PhD candidates, early career researchers and senior scholars.*

*We confirm our commitment towards the value of the diversity of our staff and student population and seek to promote peace, equity, diversity and inclusion as essential elements in contribution to improving health worldwide.*