

PhD Offer 2025-2026

UMR ECOSYS

« Modelling the water balance of green spaces in highly artificial environments (urban areas) »

Applicants are invited for a PhD fellowship/scholarship at UMR ECOSYS, within a scientific programme supported by the Lab Recherche Environnement.

The position is available from 01 January 2026 or later. You can submit your application by sending an email to

erwan.personne@agroparistech.fr or erwan.personne@universite-paris-saclay.fr including CV and cover letter

Simplified summary of the project :

Design, implementation and testing of a water balance model for green urban areas.

Context and objectives :

The greening of urban areas is developing for many reasons, including improving the thermal insulation of buildings, reducing or delaying the flow of rainwater collected on roofs, and helping to mitigate the urban heat island effect.

The ECOSYS joint research unit has already developed a simple water and energy balance model adapted for agrosystems (crops) and ecosystems. The task now is to adapt this model for vegetated urban environments. The aim is to design a specific model dedicated to urban spaces, which have many particularities in relation to the built environment surrounding urban green spaces (modified air flows and radiation, non-homogeneous and often limited water resources, amplified thermal and pollution stress, etc.).

This PhD will comprise:

- A bibliographic study on the state of the art in modelling the water and energy balance of urban green spaces.
- The design or adaptation of a water balance model suitable for green spaces in cities, whether in "urban canyons" or more open but linear spaces (green roads).
- Handling a specific dataset where vegetation and built environments intermingle.
- Reflection on an experiment to be set up and, if the material and temporal conditions are suitable, its implementation, monitoring and use (in terms of interpretation and comparison with model outputs).

The PhD student will work within the Eco&Phys team at the ECOSYS joint research unit, with Erwan Personne as supervisor.

Localisations :

The PhD student will be based at the Palaiseau campus in the ECOSYS joint research unit. Collaboration with other French or international laboratories are possible.

UMR ECOSYS, site de Palaiseau (Batiment F)

91 120 Palaiseau, France

Doctoral supervision:

Professor Erwan Personne,
Deputy Director - UMR ECOSYS, INRAE-AgroParisTech,
Director - Graduate School Biosphera, Paris-Saclay University

Specific conditions for PhD :

The PhD is funded and supported financially and scientifically by the *Lab Recherche Environment* (private chair from Vinci). Interactions with the *Lab* are to be expected in order to articulate operational needs and research barriers.

Required profile, expected skills

Applicants to the PhD position must have a relevant MSc degree in environmental science, physics, computer science or other disciplines with relevant specialization.

It is an advantage to have experience with

- transfer physics, hydrology, functional ecology, fluid mechanics
- programming in C or similar languages (Fortran, ...),
- processing in Python or R;

We expect that the applicants are motivated to acquire and develop strong computational and analytical skills.

Additional requirements include fluency in English or French, strong oral and written communication skills, as well as the ability to work both independently on certain topics and as part of a team for the overall construction of the project.

In return, we provide an international research environment and a connexion with private environment working in the field of construction industry. You will be an integral part of an inclusive, social and multidisciplinary group of ~90 scientists (UMR ECOSYS), fostering a variety of local and international collaborations.

Contacts:

Applicants seeking further information regarding the PhD position are invited to contact:

Pr. E. Personne

erwan.personne@agroparistech.fr or erwan.personne@universite-paris-saclay.fr

It is possible to commence work alongside a 5- or 6-month master's internship prior to commencing a PhD programme.