18-month postdoctoral position in Paris, UMR 7619 METIS, Sorbonne Université

"Water management for different urban greening scenarios in the Ile-de-France region"

How to apply?

- Send your resume, cover letter, and contact details for two references to: agnes.ducharne@sorbonne-universite.fr and ludovic.oudin@sorbonne-universite.fr
- Application deadline: November 15, 2025.
- Applications will be reviewed and interviews will be conducted between mid-November and mid-December 2025 for a start date in early 2026.

Mission

The main objective is to assess the water resilience of urban vegetation planned to be deployed in Paris and the Ile-de-France region to improve the quality of life of residents in the face of global warming, by comparing water supply and demand in a spatialized way, according to different climate change and land use scenarios.

Context

This post-doc contributes to the inteGREEN project, which brings together researchers from a wide range of disciplines (ecology, climatology, hydrology, health, social sciences) and professionals involved in urban planning (local authorities, associations, public agencies, etc.) to conduct a scientific and integrated assessment of the services provided by urban greening solutions, and their potential to meet the needs of residents in changing climatic and environmental conditions. The project focuses specifically on the Tree plan of the City of Paris (more than 170,000 trees between 2020 and 2026) and the municipalities of the Île-de-France region.

The water resources in Ile-de-France come mainly from rivers and groundwater, which are already heavily exploited and expected to decline significantly in summer over the coming decades as a result of climate change. The hired researcher will assess whether urban vegetation can be sufficiently supplied with water in the new climate context to ensure its health and the expected services (cooling, biodiversity, reduction of urban runoff), without compromising other uses of water at the metropolitan level and downstream. Future water use will take into account urban development and water management scenarios selected with the professionals involved in the inteGREEN project (de-impermeabilization, increased vegetation, housing densification, national target to reduce water consumption by 10% by 2030, development of agricultural irrigation in the Seine basin upstream of Paris, etc.).

Main activities

1. Collect the necessary data by harvesting existing data, expert opinions, or scientific and technical literature, and structure this data in a spatialized GIS database. The data concerns (i) the information needed to quantify the water requirements of vegetation, e.g. development and greening plans in terms of existing and planned plant species, their water requirements, their resistance to water and heat stress, and the hydrodynamic properties of urban soils; (ii) the characteristics of water management at the level of the City of Paris and neighboring municipalities: decisions on when to water and watering

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volumes, the origin of the water used for watering, other water uses, and the future evolution of water resources and uses.

2. Organize meetings with academic and non-academic partners of the inteGREEN project to obtain data, design a number of contrasting development scenarios for evaluation (greening, de-impermeabilization, water saving plans, construction plans, etc.), and then discuss the results.
3. Build a tool to quantify the water supply and demand in a spatialized manner based on the data collected, then compare supply and demand for different scenarios, defined by a selection of input data and modulation parameters chosen with the managers to test certain assumptions (tree species, watering management, warming levels, urban runoff capture efficiency, etc.).
4. Use the tool to assess whether the Île-de-France greening projects are compatible with current water availability, explore the resilience or failures of contrasting prospective scenarios chosen with partners, across multiple time horizons or levels of warming; identify possible breaking points, and the ways to modify these scenarios to remain within a resilience envelope combining good plant health and balanced water resource management.
5. Write up and promote the results (project meetings, technical reports, scientific articles and conferences, presentations to the general public).

Required profile

The successful candidate must hold a doctorate or PhD in environmental sciences, ideally in hydrology, physical geography, or plant physiology. Experience in geographic information systems, data processing, and programming is required. The position also requires the ability to communicate scientific results clearly to a diverse audience (oral and written), fluency in French and English, and capacity for teamwork.

Working conditions

We are looking to fill a full-time postdoctoral contract for 18 months, with the possibility of extension for an additional 12 months. The gross monthly salary is €3,000.

The successful candidate will be based at the METIS research unit, which brings together 50 permanent staff and 50 contract staff (half of whom are doctoral students) on the Pierre and Marie Curie campus of Sorbonne Université, in central Paris (75005). The research of METIS mainly addresses the study of water and material flows in areas where human influence is effectively or potentially significant (contamination, resource use, environmental change, climate change, etc.).

The successful candidate will work more specifically with Ludovic Oudin (Professor at SU) and Agnès Ducharne (senior researcher at CNRS). He/she will collaborate with the partners of the InteGREEN project, including academic partners working on other aspects of urban greening, and stakeholders implementing greening projects (City of Paris, other local authorities, Seine Normandy Water Agency, etc.).

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