

Job Offer

Postdoctoral Fellowship

IoT-based smart rainwater harvesting system

CONTEXT

Position:

Post-Doctoral position on Electronics and Embedded Systems

Location:

ESTIA Campus, Technopole Izarbel, Bidart, France

Remuneration:

Set according to the candidate's experience

Expected start:

First semester of 2026

Contract duration:

18 month fixed-term contract

ESTIA (www.estia.fr) is built around three core missions: (1) education, (2) research and technology transfer, and (3) entrepreneurship, supported by its incubator and technology park.

ESTIA trains multilingual generalist engineers in fields such as embedded systems, mechanics, computer science, industrial organization, and management. Affiliated with the University of Bordeaux, ESTIA is a member of the Conférence des Grandes Écoles and is accredited by the Commission des Titres de l'Ingénieur (CTI). Its academic programs also include a CTI-accredited Bachelor of Technology, an Engineering Preparatory Cycle, and a range of specialized master's degrees.

Beyond its educational programs, ESTIA drives innovation through its multidisciplinary Research Unit, ESTIA-Recherche. ESTIA-Recherche is affiliated with the Department of Engineering and Digital Sciences of the University of Bordeaux and is also part of the Carnot ARTS Institute. It leads fundamental and applied research activities, addressing the study, design, and implementation of Human-Human, Human-System, and System-System interactions, to foster the emergence of positive intelligence for users. To support and expand its collaborative activities through chairs, national and European projects in collaboration with industrial partners, ESTIA relies on ESTIA-Tech and its specialized technology platforms: COMPOSITADOUR, ADDIMADOUR, TURBOLAB, ENERGEA, PEPSS, DATALAB and CETIA.

In addition to these activities, ESTIA offers a tailored entrepreneurial support program, managed and led by the ESTIA Entrepreneurs team, dedicated to student entrepreneurs and creators of innovative technological startups.

As part of developing its research and training activities, **ESTIA Institute of Technology is looking for a Postdoctoral Fellowship: IoT-based smart rainwater harvesting system**. This postdoctoral is part of the Interreg SUDOE-funded SUDWaMa¹ project. The successful candidate will join the research axis focusing on "Technological and Human Systems" and may also contribute to teaching activities within ESTIA's academic programs.

RESEARCH ACTIVITIES

Access to clean and safe water is essential to ensure not only human health and agricultural productivity but also for preserving our environment and biodiversity. However, this vital resource is becoming increasingly scarce. In response, the SUDWaMa project aims to tackle the challenges related to water consumption and quality in institutional buildings. Its core objectives are to develop innovative solutions for efficient water use, promote circular economic practices, such as rainwater and greywater reuse, and ensure end-user adoption of these innovations. As part of this project,

¹ SUDWaMA, SUDOE Water Management, is a collaborative European Interreg project bringing together 9 partners from Spain, Portugal and France

ESTIA, following the work initiated as part of the Ur'Zain project², will focus on the deployment and evaluation of rainwater harvesting and reuse solutions. These increasingly popular solutions enable the collection and treatment of rainwater for various uses, including flood prevention, irrigation, and cleaning. Nevertheless, as highlighted in scientific literature, effective rainwater harvesting solutions require real-time monitoring, both quality and quantity, and the implementation of smart control strategies to optimize the use of collected water. In this regard, the combination of Internet of Things (IoT) technologies with advanced software tools such as machine-learning or multi-agent system has emerged as a promising approach, supported by recent research in rainwater management.

Key responsibilities of the successful candidate:

- **Development and prototyping of an IoT infrastructure.** Design an IoT system dedicated to gathering data about water usage and harvested rainwater as well as controlling the overall rainwater harvesting system. Sensors and actuators will be interconnected thanks to the IoT infrastructure deployed at the ESTIA Campus as part of CAP ELENA project³.
- **Proposal and evaluation of smart control strategies for rainwater management.** Develop, simulate and evaluate advanced control strategies, based on AI algorithms or Multi Agent System, to optimize rainwater harvested management and use, leveraging the collected data.

TEACHING ACTIVITIES

Depending on its experience, the successful candidate will be invited to contribute to teaching Electronics, Electrical Engineering, and Automation (EEA) across all ESTIA graduate programs.

KEYWORDS

Internet of Things, Artificial Intelligence, Multi-agent system, Rainwater Harvesting and Management.

CANDIDATE PROFILE

Candidate must have completed a PhD in Embedded Systems and Internet of Things.

The following skills will be highly appreciated:

- Embedded systems/IoT Hardware design and Software programming expertise.
- AI models and multi-agent system knowledge.
- Good English and French level.

Teaching experience at post-secondary level up to master's degree will be a plus.

APPLICATION PROCESS

Recruitment will begin on 1st of February and continue until the position is filled. Interested candidates should submit a detailed CV, a cover letter and the names and e-mail addresses of three referees who can provide recommendation letters. Any supporting evidence of skills or experience gained in previous roles should be also included. Applications should be sent to: Isabelle ERREÇARRET, i.errecarret@estia.fr, +33 5 59 43 84 14.

Research contact: Guillaume TERRASSON, g.terrasson@estia.fr

Administrative contact: Isabelle ERREÇARRET, i.errecarret@estia.fr

General presentation of ESTIA: <https://youtu.be/vIZszjZ7SH8>

² Ur'Zain project was financially supported by the French Water Agency of Great Southwest

³ CAP ELENA project is financially supported by the program France 2030.