



Post-doctoral position in management and storage of thermal energy



HR EXCELLENCE IN RESEARCH

La Rochelle Université is recruiting a Post-doctoral fellow on a 3-year fixed-term contract.

Employer description

Why not join a daring and innovative university?

Since its creation in 1993, La Rochelle University has been on a path of differentiation.

Thirty years later, as the university landscape recomposes itself, it continues to assert an original proposition, based on a strong identity and bold projects, in a human-scale establishment located in an exceptional setting.

Anchored in a region with highly distinctive coastal features, La Rochelle University has turned this singularity into a veritable signature, in the service of a new model. Its research is focused on the theme of Urban, Sustainable and Intelligent Coastlines (LUDI).

For more information, visit our website : [click here](#)

Service description

The new recruit will join the Laboratory of Engineering Sciences for the Environment (LaSIE, UMR 7356 CNRS, La Rochelle).

The laboratory's activities cover the following fields of application:

- Durability and protection of materials under environmental constraints,
- Quality of living environments,
- Eco-processes for product quality and energy recovery from bio-resources.

The laboratory brings together a broad spectrum of skills, with integrated approaches ranging from the atomic scale to materials, buildings and their environment at different time and space scales. It establishes a continuum from the development of mathematical tools, through numerical and experimental models and simulations, to applications and patent applications.

The person recruited will work in the Sustainable Buildings and Cities: Energy and Quality of Living Environments (BVD) team, which focuses on building energy and controlling the quality of living environments, be they habitats, habitacles or urban microclimates. They respond to societal challenges in terms of sustainable development, healthy, energy-efficient housing, energy self-sufficiency and urban microclimates. They focus on heat and mass transfer, energy efficiency in buildings and air-conditioning systems, indoor and outdoor air quality and comfort in living spaces. These activities are supported by partnerships with CSTB, EDF R&D (4evLab joint laboratory) and the Tipee technology platform.

Context and Research project

Faced with energy, environmental (global warming) and economic (rising energy prices) challenges, we must work towards a new energy management and rethink the emitters in order to bring flexibility to the electrical system. The GreenovMAT national project aims at contributing to the development of a new generation of cooling ceilings integrating latent energy storage technologies. Their development necessarily requires special attention to the scale of the material. The innovative contribution is therefore the development of composite materials that will constitute these ceilings with the following main objectives:

to improve the management of thermal energy on the scale of tertiary buildings by integrating the needs of buildings/users in the summer period; to adapt and control the dynamics of production and use of cooling to provide security of supply and flexibility; to participate in the decarbonation of cooling by promoting the use of available thermal energy as well as the development of sustainable and innovative envelopes for buildings. This project is transverse, at the interface of many disciplines and integrates numerical and experimental research activities at all scales combining fundamental and applied sciences.

Main tasks and skills required

The profile sought is that of a seasoned researcher with a Habilitation à Diriger des Recherches, which is the highest university-granted and education-sanctioned degree in France, above the Doctorate, which accredits to supervise alone PhD students and allows to run for positions of full professor in french universities (or equivalent ~ 10-15 years' experience). The profile sought has already taken part in R&D projects, specializing in thermal energy management and/or storage, with a dual experimental and digital component. A strategy for taking project developments to industrial scale will be drawn up. Experience in the industrial sector would be a plus.

The person recruited will be in charge of developing and characterizing innovative materials and integrating them into a cooling ceiling for thermal energy management and/or storage, with a dual experimental and numerical component.

The main tasks of the person recruited are as follows:

- Definition of specifications for materials and a cooling ceiling based on usage temperatures and user needs.
- Study of complex multi-component materials, determination of their phase diagrams
- Development of advanced numerical methods for processing large quantities of noisy data (images and signals).
- Elaboration and characterization of micro-encapsulated materials and composite architectural materials using sustainable and innovative processes (choice of materials and development of a manufacturing process for composite filaments, implementation and optimization of the 3D printing process for architectural shapes).
- Experimental characterization of printed elements and composites (development of original methods for estimating the thermal properties of heterogeneous materials, inverse methods)
- Multi-scale simulation (from microstructure to macro system) of heat transfer, phase change and fluid-structure coupling to take account of mechanical stresses in the support matrix (Openfoam, Python)
- Multi-scale modeling, from the material to the system, dimensioning of the cooling ceiling and improvement of its performance.
- Development and experimental and numerical evaluation at scale 1 of a first prototype of a hybrid cooling ceiling, taking into account user comfort, energy consumption and energy flexibility.

Type of recruitment

Category: A

Placement: La Rochelle University, LaSIE laboratory, UMR 7356 CNRS

Recruitment: fixed-term contract

Working hours: full-time

Remuneration: According to level of experience and degree of expertise, with reference to the A category salary scale, equivalent to a research engineer.

Recruitment open to anyone with a RQTH (Qualified Health and Disability certificate).

Benefits

- 75% contribution to home-to-work public transport costs
- Sustainable mobility package for the use of a cycle/carpool for home-work journeys.
- Partner KLAXIT
- Mutuelle participation of €15/month
- Collective catering on the university campus
- Telecommuting possible for up to 2 days a week, depending on departmental needs and organization
- Support for staff in their professional development and preparation for civil service entrance examinations
- Sport, leisure and cultural activities for all employees

Contact for information on the recruitment procedure

Institut LUDI - Marie de Chalendar

Scientific Support and Coordination Department

marie.de_chalendar@univ-lr.fr

Contact for information on the position to be filled

Marie DUQUESNE - Professor - marie.duquesne@univ-lr.fr

How to apply?

Your application must include:

- cover letter
- detailed curriculum vitae
- copy of highest diploma

This application must be submitted via the dedicated application form available by [clicking here](#) (Job reference: RECH/LaSIE/24-001).

INCOMPLETE APPLICATIONS OR THOSE SENT BY E-MAIL WILL NOT BE CONSIDERED.

Application deadline: 06/10/2024

Start date: 01/11/2024