

### **NewPores International Hub presentation**

*NewPores* is an international hub dedicated to the mechanics and physics of porous materials, which intends to answer to new Energy and Environment challenges. This is a joint effort of the group on Mechanics and Physics in Porous Media (MPPM) of the LFCR lab (UMR5150) at E2S UPPA (France), the Centre for Sustainable Engineering of Geological and Infrastructure Materials (SEGIM) at Northwestern University (USA), the University of Vigo (Spain), the Technical University of Madrid (Spain) and University of Liège (Belgium).

### **General context**

Within the *Hub Newpores*, the VALOCOQ project aims to address the emerging challenges related to environment by enhancing the performance and reducing the environmental impact of concrete and mortar materials. It will be achieved by incorporating crushed seashell waste in a local and circular economy approach.

France is the leading producer of oysters in Europe, and the Aquitaine region is famous for its oyster seashells, particularly in the Arcachon bay area. The two main economic activities in this region are oyster farming and tourism. Unfortunately, oyster farming produces a considerable amount of waste, including dead or diseased oysters, as well as waste from food consumption and park cleaning. If this waste is not disposed of properly, it could have a significant negative impact on both the natural ecosystem and tourism.

In the same time, there is currently a decrease in the production capacity of local quarries for construction aggregate supply and the exploitation of distant quarries increases the global environmental cost of the concrete used locally. As a result, several research projects have been conducted in recent years to explore the re-use of seashell waste in more sustainable construction materials and the MPPM team recently designed different formulation of concrete and mortar where the full skeleton granular is entirely replaced by seashell waste. These formulations present very interesting mechanical properties and can be transfer in industrial context.

On the French Basque Coast, local authorities are in charge of the maintenance and repair of different protective buildings such as the Artha dam in Saint-Jean-de-Luz or the Socoa wharf in Ciboure. For the repair operations, they use different concrete and mortar formulations with both high environmental and economic costs. These materials are submitted to severe environmental solicitations such as wave impacts, storm, heavy rain and salt weathering (haloclasty).

### **Global project objectives**

In this context, the VALOCOQ project aims to propose to the local authorities different formulations of mortar and concrete including 100% crushed seashell waste aggregates to be used for the maintenance and repair of coastal protective structure.

### **Postdoc candidate objectives**

Within this project, the Postdoc candidate will be in charge of the material formulation and the performance validation of the proposed materials. The formulation will be first designed in the lab, casted and compared with some materials traditionally used locally in term of mechanical properties and resistance to haloclasty. Then the best formulations will be casted on real site to validate their durability in real environmental conditions.

### **Partners**

**CRCAA** (oyster farming union of the Arcachon bay area), **Ovive SA** (seashell collect and valorisation), **Conseil général 64** (local authorities), **SATT Aquitaine** (technology transfer office), **ODEYS** (regional cluster for sustainable construction).

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### Candidate's profile

The candidate should hold a PhD degree in civil engineering. The candidate could be in the process of obtaining his PhD degree in 2024 but the evaluation of his manuscript by his PhD reviewers must have started before the envisioned starting date of the postdoc position. Previous experience with seashell concrete formulation and validation is mandatory. The candidate should have a strong interest in performing experimental work in a multi-disciplinary and international team. Proficiency in English is mandatory for both oral and writing communication. Proficiency in French can be useful but is not mandatory.

### Job details

The successful candidate will be hosted at ISABTP Civil Engineering School by LFCR (UMR5150, UPPA-CNRS). The Postdoc candidate will be fully supervised by Prof. David Grégoire. The envisioned starting date is October 1st, 2024, and the maximum duration is 1 year. The position includes full social security coverage and a gross salary of approx. 3000 € per month. Depending on the candidate profile and the candidate career plans, teaching lectures at ISABTP may be additionally proposed with an additional salary.

### Evaluation procedure

Candidates will be ranked in a first phase based on their submitted application.

In a second phase, a visioconference interview will be organised with the pre-selected candidates.

Applications should include a cover letter, CV, passport/ID copy, transcripts of diplomas and lists of courses attended (with grades obtained), recommendation letters, and names and contact details of at least two references.

Applications should be submitted at [www.davidgregoire.fr/opening-positions](http://www.davidgregoire.fr/opening-positions) .

Application deadline: August 29<sup>th</sup>, 2024, 23:59 CET.

The interview will take place on September 2<sup>nd</sup>, 2024.

Final answer will be provided by September 3<sup>rd</sup>, 2024.