Postdoc/Research Engineer
numerical modelling of nature-based solutions

La Rochelle Université is recruiting within the LIENSs Laboratory **a postdoc or a research engineer for 9 to 10 months** to improve the numerical modelling of nature-based solutions in coral reef and saltmarsh environments using the numerical modelling system SCHISM.

Key words: numerical modelling, numerical methods, nature-based solutions, saltmarsh, coral reefs.

Research context

Coastal risks are increasing due to ongoing climate changes combined with the growing attractivity of coastal zones, calling for a better understanding of underlying processes and the development of adaptation solutions. In the scope of the research projects La Rochelle Territoire Zéro Carbone 2040 (LRTZC hereafter) and PPR Océan et climat FUTURISKS, we are studying the **effects of coastal vegetation and coral reefs on wave dissipation and mitigation of extreme sea levels and flooding**, combining field observation and high-resolution numerical modelling. However, the high computational cost associated with the numerical modelling approaches used at LIENSs (SCHISM modelling system ; Zhang et al., 2016), partially developed at LIENSs (e.g. Bertin et al., 2020; Martins et al., 2022), prevents the performance of simulations on sufficiently-long time scales to assess the impacts of climate change. In this context, **we are exploring solutions to improve the numerical efficiency of SCHISM when applied to coastal environments characterized by very rough bottom**.

Missions of the postdoc/research engineer

In order to meet with the scientific objectives described above, we are hiring a postdoc or research engineer in order to improve the numerical efficiency of the modelling system SCHISM. Due to administrative constraints, the duration of the contract is limited to 9 to 10 months but extensions up to 2 years could be considered (funding already acquired) upon performance.

For coral reef environments, the improvements will concern the implicit treatment of vertical mixing terms in the circulation model, which is already implemented for vegetated environments. This will require adaptations and further validation using comprehensive field datasets collected within the scope of the project FUTURISKS in La Réunion, Mayotte and Rangiroa Islands.

For saltmarsh environments, efforts will focus on the morphodynamic module of SCHISM, which enables to simulate the coupled evolution of the seabed and the salt marsh. In fact, solving an advection-diffusion equation for different sediment grain sizes and vertical levels rapidly dominates the computational time and does not currently allow to perform numerical simulations over more than a few years (e.g., Bertin et al., 2020). Alternative methods such as the Eulerian-Lagrangian Method (ELM), which remain stable with much larger time steps, will be explored.

Skills required

We are seeking a highly-motivated candidate, skilled in numerical model development (programming in FORTRAN, numerical methods, HPC environment).

Experience in numerical methods on unstructured grids and/or GPU would be strong assets.

Type of recruitment

Recruitment : Fixed term contract of 9 to 10-month duration based in La Rochelle (France).

Salary: €2 569.69€ gross per month,.

The selected candidate will be hosted at the lab LIENSs, a joint research between CNRS and La Rochelle University that aims at studying coastal zones through interdisciplinary approaches (https://lienss.univ-larochelle.fr/?lang=en).

Benefits

- 75% contribution towards the cost of public transport to and from work
- Sustainable mobility package for the use of a cycle/carpool on home-work journeys
- Health mutual insurance contribution of €15/month
- Sport, leisure and culture for all employees

Contact for information on the recruitment procedure

Marie de Chalendar - HR Manager for Research - marie.de_chalendar@univ-lr.fr

Contact for information on the position to be filled

Xavier Bertin (xbertin@univ-lr.fr) and **Kévin Martins** (kevin.martins@univ-lr.fr)

How do I apply?

Your application must include:
- Cover letter
- detailed curriculum vitae
- copy of highest diploma

This application must be submitted as a single file via the dedicated application available by clicking here (Job reference: *RECH/LIENSs/26-07*).

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

Recruitment process:

After a review of the applications, selected candidates will be invited to an interview, preferably in person but through visioconference for foreign candidates who cannot travel to France.

Please note that the position if located in a sector where scientific and technical potential are protected and therefore requires, in accordance with the regulations, that the arrival of the candidate recruited be authorised by the competent authority of the French Ministry for Higher Education and Science (MESR).

Application deadline: 10/04/2025

Starting date: June or July 2026