

Postdoctoral position in Computational Fluid Mechanics / Applied Mathematics

14-month postdoctoral position at SIAME Laboratory (UPPA) in the framework of 2 projects :

- MiACE-PEF (*MicroAlgae Continuous Extraction by Pulsed Electric Field: MiACE-PEF- 4 months*) and EXTRA-PEF co-funded by ADEME and PUI Sud Aquitaine Innovation
- BioACE (*Bio Algae Culture Enhancement - 10 month*) funded by Institut Carnot ISIFoR

Project descriptions/Duties:

The MIACE-PEF project consists in developing a continuous extraction process demonstrator to obtain extracts from microalgae biomass using pulse electric fields. The overall objective will be to propose an innovative method to extract various bioactive compounds that could be used in a broad range of application fields such as pharmaceuticals, cosmetics, green chemistry, agriculture...

The demonstrator uses the principle of chaotic mixing obtained for the flow of the algal solution within a channel comprising movable wall sections.

The objective is to standardize the residence time distribution in the channel receiving the pulsed electric field so that all microalgae in the solution receive the electric field for equal durations. The aim is to continue the numerical study (CFD) already undertaken in this field to find the range of optimal physical parameters associated with flow/viscosity pairs of the algal solution in order to achieve good uniformity of residence times.

The BioACE project aims to develop a new type of continuous photobioreactor that exploits bioconvective instabilities to intensify microalgae cultivation on a large scale and at high concentrations, with a view to producing biofuels. Stability analyses, numerical simulations, and experiments will be conducted to understand the mechanisms of instability and determine the best geometries and operating conditions for exploiting them. The work will mainly involve conducting linear stability analyses of 3D flows of the algal solution for specific boundary conditions (wall heating, solar radiation, free surface or not). Additional 3D numerical simulations will also be carried out in collaboration with the CERI EE team at IMT Nord Europe in Douai. This work will enable the selection of experimental geometries that are suitable for microalgae cultivation. The BioACE project is funded by Inter Carnot ISIFoR/Mines (UPPA and IMT Nord Europe).

The position includes research, write scientific reports and publications and meetings with partners/collaborators.

Research Group:

Host Lab: SIAME Laboratory at UPPA - Laboratoire des **Sciences de l'Ingénieur Appliquées à la Mécanique** et au génie **Electrique**.

The work will be carried out within the "Ecoulements et Energétique" Team at the SIAME Laboratory at UPPA in Pau. For more details on the activities of the laboratory's four teams ("Interactions Vagues-Structure" and "Géomatériaux et Structures" in Anglet and "Procédés Haute Tension" and "Ecoulements et Energétique" in Pau), please visit the laboratory's website:

<https://siame.univ-pau.fr/fr/organisation.html>

More information on the UPPA is available in the website: Université de Pau et des Pays de l'Adour (UPPA), Pau, France : <https://www.univ-pau.fr/fr/index.html>

Requirements:

- PhD on Computational Fluid Mechanics / Applied Mathematics on Fluid Mechanics
- Large part of the applicant PhD project and/or postdoc should have been focused on Computational Fluid Mechanics and linear stability analysis of 3D flow in rectangular channels
- Knowledge of ANSYS FLUENT and/or OPEN Foam CFD codes, Python, Paraview, ...
- Extensive experience in programming
- A knowledge of complex fluid rheology on complex fluid would be an advantage.
- The applicant must have a good level in spoken and written English.

The candidate's personal qualities will be appreciated, with particular importance given to the ability to work within a multidisciplinary team.

The candidate will be responsible for certain parts of larger projects and must be able to work independently and take on responsibilities.

Location:

This position will be based in UPPA, Pau with short trips to the other locations of the project (particularly in Douai, France).

Application:

A person with a PhD obtained not more than three/four years before the end of the application period is particularly eligible for the position. The application should include:

- CV,
- Copy of PhD thesis diploma,
- Motivation letter (one, or maximum two pages)
- Contact details of two references

The application must be written in English or in French.

Send the required documents to:

Yves Le Guer: yves.leguer@univ-pau.fr

Pierre-Henri Cocquet: pierre-henri.cocquet@univ-pau.fr

The application will be evaluated based on the following criteria:

Appropriate education and work/research experience in related fields. Candidate motivation, knowledge, scientific maturity and curiosity. Emphasis will also be placed on personal skills.

Selection process:

1. Evaluation of the candidates' application.
2. If selected, the candidate will have 15 min to present her/his CV and project. The presentation will be followed by questions/discussion.

Gross Salary: 2 800 € per month (according to UPPA index before taxes)

Starting date: April 2026 if possible.

Type of position: Full-time temporary position for 14 months

Please submit your application by 5th March 2026