

Post-Doc Scholarship/Job Offer

Post-Doc in Computational Material Modeling

In collaboration with
e-Xstream Engineering (Luxembourg)
&
A Leading Research Center in Aeronautics (United States)

About e-Xstream engineering

e-Xstream engineering is a leading engineering high-tech software and services company fully focused on state-of-the-art and innovative multi-scale material modeling technologies. Our mission is to help our customers to excel in effectively and efficiently designing innovative materials and structures (see www.e-xstream.com).

Post-doc description

e-Xstream is proposing a Post-doc in the field of Computational Material Modeling for the advanced modeling of continuous fiber materials. Fiber-reinforced polymer-matrix composites (FRPs) are widely used today for aeronautical applications and their use is generally accepted for primary and secondary parts. Though all the progress done over the last twenty years in terms of design, their manufacturing process remains expensive in terms of tool investment but also of processing and development time required to reach a perfect final quality part. Defects arise such as porosity, dry area or wrinkle of the reinforcement which force the manufacturer to follow a costly and slow trial-and-error procedure.

The Post-doc will be performed jointly in a Research Center located in the United States and at e-Xstream in Luxembourg. This research center is a leading research institute in the field of Aeronautics and Composites Materials. Both actors of this project are closely collaborating with major players in the aeronautic sector.

The objective of the Post-doc is to develop models and methodologies, to be inserted in a predictive simulation tool, leveraging existing capabilities of the Digimat software package. The simulation tool aim at speeding-up the material development cycle based on a deep knowledge of the material microstructure, its link with the manufacturing process and the final end performances.

This objective will include the following activities:

- Process modeling: Rheology, curing and thermal behavior of the composites will have to be accounted for to predict internal stresses, occurrence of defects, ...
- Material modeling: Analyze the effect of the presence of defects on the final mechanical properties of the composites and later over the structural performances.
- Uncertainty quantification: Account for the statistical distribution of defects occurrence to predict the material allowables.

These aspects will have to be integrated in a multi-scale analysis workflow as the final objective of this work is to apply the simulation tool on an industrial metric (e.g. an aeronautic part). This multi-scale simulation tool will rely over full-field homogenization (e.g. finite element based homogenization) as well as on mean-field homogenization.

Required qualifications

The candidate must have:

- An engineering degree as well as a Ph.D. in Mechanics, Material Sciences, Mathematics or equivalent. Knowledge of Composites Material Modeling is a plus.
- The Ph.D. must be obtained before the application and the application must not take place later than 8 years after the Ph.D. degree.
- Fluent in English as business language.
- A high level of self-motivation, flexibility and self-learning aptitude.

The benefits

- A challenging research topic in an international environment in one of the top Aeronautics Research Center in the US and in collaboration with e-Xstream.
- A great opportunity to apply the research work on challenging industrial applications from the top players in the aero industry.

The procedure

- The candidate has to send his/her CV and motivation letter by e-mail to Laurent.Adam@e-xstream.com prior to August 15th.
- An interview will then take place in order to measure the adequacy between the skills of the candidate and the Post-doc objectives.
- If selected, the candidate, together with e-Xstream, will submit a common proposal to the funding agency.

Note : *Other post-doc positions are open at e-Xstream. If you are interested by a post-doc position, please get in contact with us.*