2018-00394 - PhD Position / Scientific computing / Numerical schemes and simulations / Virtual Prototyping of the EVE expandER (VIPER Porject)

Type de contrat : CDD de la fonction publique
Niveau de diplôme exigé : Bac + 5 ou équivalent
Fonction : Doctorant
Niveau d'expérience souhaité : Jeune diplômé

Contexte et atouts du poste

Within the framework of a partnership:

- project VIPER with the EXOES company
- public partnership with the Conseil Régional d'Aquitaine

Mission confiée

Assignments :

The main objective of this thesis is the construction of a numerical platform, for permitting an efficient virtual prototyping of the EVE expander. This will provide the EXOES Company with a numerical tool, that is much more predictive with respect to the tools currently available and used in EXOES, by respecting an optimal trade-off in terms of complexity/cost needed during an industrial design process.

Collaboration:
The recruited person will be in connection with Héloïse Beaugendre (CARDAMOM Team) and Pietro Congedo (DEFI Team)

Principales activités

Two research axes will be mainly developed. First, the objective is to perform some high-predictive numerical simulation for reducing the amount of experiments, thanks to a specific development of RANS tools (Reynolds Averaged Navier-Stokes equations) for the fluids of interest for EXOES. These tools would rely on complex thermodynamic models and a turbulence model that should be modified. These modifications will be realized by calibrating the turbulence model with respect to some high-fidelity simulations as for example Direct Numerical Simulations or Large Eddy simulations, provided by Prof. A. Giauque and Prof. C. Corre in the context of a strong collaboration between INRIA and LFMA Lab (http://www.ec-lyon.fr/en/research/laboratories/Imfa). Another action will be devoted to the formulation of low-fidelity models, i.e. models providing a low-cost estimation of the system performances. This is of prominent importance in order to control the global cost, considering that running several unsteady RANS simulations could be very expensive.

The second axis is focused on the integration of the solvers of different fidelity in a multi-fidelity platform for performing optimization under uncertainties. The idea is to evaluate the system performances by using massively the low-fidelity models, and by correcting these estimations via only few calculations with the high-fidelity code. In order to improve the predictive character of the simulation, the effect of each source of uncertainty, both on the physical modeling and the experimental data will be taken into account, by integrating every element within a robust optimization loop. In this way, EXOES could exploit a general tool for a fast and efficient design, by adapting the strategy
according to the specific constraints required from the customers in terms of design and technological constraints.

**Avantages sociaux**

- Subsidised catering service
- Partially-reimbursed public transport
- Social security
- Paid leave

**Rémunération**

Fix term contract  
**Duration : 36 months**  
**Gross Salary : 1982€ / month (before taxes) during the first 2 years, 2085€ / month (before taxes) during the third year**

**Informations générales**

- **Thème/Domaine :** Schémas et simulations numériques  
  Calcul Scientifique (BAP E)  
- **Ville :** Talence  
- **Centre Inria :** CRI Bordeaux - Sud-Ouest  
- **Date de prise de fonction souhaitée :** 01-05-2018  
- **Durée de contrat :** 3 ans  
- **Date limite pour postuler :** 31-05-2018

**Contacts**

- **Equipe Inria :** CARDAMOM  
- **Recruteur :**  
  Beaugendre Heloise / heloise.beaugendre@inria.fr

**L'essentiel pour réussir**

Candidates are required to have a Master's degree in engineering, applied mathematics or a related discipline, and a specialization in computational fluid dynamics. Preferable qualifications for candidates include proven research talent, an excellent command of English, and good academic writing and presentation skills.

Applicants should submit a Curriculum Vitae, a covering letter as a single document detailing the knowledge, skills and experience you think make you the right candidate for the thesis, two letters of reference, a list of your MSc courses and grades, copy of your Master’s thesis and preferably a list of publications.

**Conditions pour postuler**

Thank you to send:

- updated CV  
- cover letter  
- letters of recommendation  
- Master Degree Transcripts (please include your "Transcripts" document with your cover letter or with the letters of recommendation)

**Sécurité défense :**

Ce poste est susceptible d'être affecté dans une zone à régime restrictif (ZRR), telle que définie dans le décret n°2011-1425 relatif à la protection du potentiel scientifique et technique de la nation (PPST). L'autorisation d'accès à une zone est délivrée par le chef d'établissement, après avis ministériel favorable, tel que défini dans l'arrêté du 03 juillet 2012, relatif à la PPST. Un avis ministériel défavorable pour un poste affecté dans une ZRR aurait pour conséquence l'annulation du recrutement.
Politique de recrutement :
Dans le cadre de sa politique diversité, tous les postes Inria sont accessibles aux personnes en situation de handicap.

**Attention**: Les candidatures doivent être déposées en ligne sur le site Inria. Le traitement des candidatures adressées par d'autres canaux n'est pas garanti.