228_CASE_HPCM_R2

Job Reference

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Position

Postdoctoral Researcher in aero engine combustors (R2)

Data de tancament

Divendres, 30 Novembre, 2018
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Job title: Postdoctoral Researcher in aero engine combustors (R2)

About BSC

The Barcelona Supercomputing Center - Centro Nacional de Supercomputación (BSC-CNS) is the leading supercomputing center in Spain. It houses MareNostrum, one of the most powerful supercomputers in Europe, and is a hosting member of the PRACE European distributed supercomputing infrastructure. The mission of BSC is to research, develop and manage information technologies in order to facilitate scientific progress. BSC combines HPC service provision and R&D into both computer and computational science (life, earth and engineering sciences) under one roof, and currently has over 500 staff from 44 countries.

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Context And Mission

The main objective of the project is to develop a modelling strategy using CFD simulations for the prediction of soot in terms of chemical evolution and particle formation in conditions relevant to aero engine operation. The model developments are based on the use of detailed chemical kinetics for kerosene surrogates, and advanced combustion and spray models validated with reference experiments. It includes the development of efficient algorithms for the coupling of soot particles with gas phase dynamics allowing the use of large-scale applications with high computational efficiency. The candidate will be focused on the integration of soot models into a turbulent combustion model based on detailed chemistry and presume-shape PDF. The work departs from the validation of the turbulent combustion model at conditions representative of aero engine operation up to the simulation of the spray flame with soot generation in complex geometries. The project is defined in order to use high-fidelity numerical simulations to predict
complex fluid phenomena in modern and new generation combustion systems. It takes place in the context of a scientific and industrial framework aiming to enhance the accuracy, flexibility, user decision and applicability of numerical tools for industrial design.

The research team that the applicant will be involved is the High-Performance Computational Mechanics Group at CASE Department of BSC. The team is a multidisciplinary group with more than 30 researchers from all disciplines and with strong background in Computational Fluid Dynamics (CFD). The team is involved in many EU and industrial projects related to this topic, where the successful activities and the publications on highly ranked scientific journals give the proved expertise.

The applicant will based at BSC, but will also interact with the project partners: Karlsruher Institute of Technology (Germany), Technischen Universität Berlin (Germany), Technische Universiteit Eindhoven (the Netherlands), CMT-Motores Térmicos (Spain), Technische Universität Darmstadt (Germany) and Universität Stuttgart (Germany).

**Key Duties**

- The offered position is a Postdoctoral position for three years to investigate the formation of soot in spray flames.
- Validation of the Conditional Moment Closure for LES using detailed and reduced chemistry for kerosene.
- Integration of a Lagrangian atomization model.
- Coupling with existing soot models.

**Requirements**

- **Education**
  - PhD in Aerospace, Aeronautics or Mechanical Engineering degree with concentration on turbulence and combustion.

- **Essential Knowledge and Professional Experience**
  - 0-3 years of PostDoc experience in a similar position.
  - The work conducted in the project will be performed with the parallel multiphysics code Alya, which is an inhouse finite-element solver developed at BSC.
  - The applicant is expected to get familiar with the code running benchmarking cases, and developing physical models that will be integrated in the multiphysics platform of Alya.

- **Additional Knowledge and Professional Experience**
  - General knowledge on fluid mechanics, LES, numerical methods, soot, combustion chemistry are expected.
  - Computational skills and parallel programming for HPC are not necessary, but will be considered an asset.
  - Some familiarity with the Conditional Moment Closure will be a plus.

- **Competences**
  - Ability to rapidly become productive in new research fields
  - High level of English, both oral and written
Conditions

- The position will be located at BSC within the CASE Department
- We offer a full-time contract, a good working environment, a highly stimulating environment with state-of-the-art infrastructure, flexible hours, extensive training plan, tickets restaurant, private health insurance, fully support to the relocation procedures
- Salary: we offer a competitive salary commensurate with the qualifications and experience of the candidate and according to the cost of living in Barcelona
- Starting date: 01/12/2018 or 01/01/2019

Applications Procedure

All applications must include:

- A motivation letter with a statement of interest, including two contacts for further references - COMPULSORY - Applications without this document will not be considered
- A full CV including contact details

Deadline

The vacancy will remain open until suitable candidate has been hired. Applications will be regularly reviewed and potential candidates will be contacted.

Diversity and Equal Opportunity Employment

BSC-CNS is an equal opportunity employer committed to diversity and inclusion. We are pleased to consider all qualified applicants for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, disability or any other basis protected by applicable state or local law.

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