POST DOCTORAL FELLOW POSITION IN COMPUTATIONAL MECHANICS/COMPUTATIONAL FLUID DYNAMICS

Short description of the position

The position is connected with the project *"A numerical model of translational and rotational momentum transfer of small non-spherical rigid particles in fluid dominated two-phase flows"*, funded by the Deutsche Forschungs Gemeinschaft (DFG). The overarching goal of the proposed project is to establish a numerical model of translational and rotational momentum transfer of small non-spherical rigid particles in fluid dominated two-phase flows. Thereby the main aims are: (1) Using the already developed model to simulate the flow of air and particles through a digital replica of the model of human lung and thus validate the already developed force model. (2) Develop a particle - particle interaction algorithm using the assumption of fibre like particle geometry, i.e. the particles are considered as prolate ellipsoids or superellipsoids, and thus extend the developed algorithm for dense flows and expand the applicability of the algorithm to a wider range of engineering problems, such as pharmaceutical industry (pills). (3) Study particle deposition at the walls, and develop a model for particle – wall interaction. (4) In many industrial and natural cases, the size of the particle in question is very small. This can lead to the case, where the continuum hypothesis, on which the governing equation of motion are derived, fails. Implement and verify the Cunningham slip correction into the particle tracking algorithm. (5) There exist many databases with results of DNS simulations of fully resolved turbulence. These databases present a perfect opportunity to test and verify our numerical algorithm for particle tracking. We plan to test our lift force model in turbulent flow using these databases.

- Job Type: Contract, Full-time.
- Duration: 2 years.
- Start: January, 2020
- Location: Erlangen, Germany; Exchange with University of Maribor, Maribor, Slovenia (2 months/year).
- Salary Scale: E13

Partners in the project: Friedrich-Alexander-Universität Erlangen-Nürnberg, Chair of Applied Mechanics (prof. P. Steinmann) and University of Maribor, Faculty of Mechanical Engineering, Slovenia, Laboratory for Computational Fluid Dynamics (prof. M. Hriberšek, prof. J. Ravnik). The project depends on close collaboration between Erlangen and Maribor. The fellow will be expected to spend one or two periods per year working in Maribor, to exchange ideas and expertise.

Requirements/qualifications: Applicants must hold a Doctoral degree in Computational Mechanics or Computational Fluid Dynamics or Computational Physics. Experience in computational modelling of coupled problems and/or dynamics of particles is highly appreciated. Applicants must be fluent in spoken and written English and effective team members. They must have a strong knowledge of rigid-body mechanics and fluid dynamics, and should also possess solid programming skills.

The application must include:

- Application letter.
- CV (summarizing education, positions and academic work - scientific publications).
- Copy of PhD Certificate.
- 2 letters of recommendation (including names and contact details of referees).

Contact: Prof. Dr.-Ing. Paul Steinmann, Chair of Applied Mechanics, Egerlandstraße 5, 91058 Erlangen, email: paul.steinmann@fau.de

Deadline for application: 20th October, 2019

We invite applications from all interested individuals regardless of gender or ethnicity.