Open Positions at the Thermodynamics Institute LRT-10

„Modelling of turbulent flames with deep learning methods“

PhD researcher / postdoc

Our institute:

We conduct fundamental research in the field of numerical modeling and experimental investigation of turbulent combustion, heat transfer, aerothermodynamics, as well as application-oriented investigations to support the development of e.g. jet engines, rocket engines, vehicle engines, stationary gas turbines and industrial burners.

At the institute you will find demanding and creative tasks and excellent support. Doctorate possibility is given for all positions. Female applicants and foreign students / scholarship holders with good German language skills are welcome! The PhD topics can be tailored to your specific interests / abilities. **Feel free to contact us !**

Your task:

High-precision simulations of flow and combustion in gas turbine and rocket combustion chambers, car engines and other industrial burners are prerequisites for their further development with a focus on the reduction of pollutants such as NOx and soot. Modern Large Eddy Simulations resolve unsteady large-scale turbulent flow structures, but require accurate subgrid models to account for the effect of smaller, non-resolved eddies and for the interaction of these eddies with chemical reactions. A standard modeling of partially premixed flames with large fluctuations in the local ratio of fuel and oxidizer is not yet known. Due to the advances in computer technology, data sets from direct numerical simulations have been increasingly available in recent years, which can serve as a basis for the further development of modeling. In the area of artificial intelligence research, methods have been developed to automatically gain insights from big data datasets using deep neural networks ("deep learning"). The focus of this numerically oriented work is the further development of turbulent combustion models for partially premixed flames using methods of deep learning. The aim of the application of deep learning methods, in addition to the efficient presentation of chemical reaction mechanisms, is to derive and optimize subgrid model approaches for the turbulence-chemistry interaction. The basis of the CFD simulations are inhouse versions of the open source code OpenFOAM.

Which profile do we expect:

Very good degree in engineering, science or technical-mathematics. Good knowledge of fluid mechanics, thermodynamics, combustion, neural networks is an advantage. You are interested in problems that have both fundamental and application-relevant aspects. Programming experience (C, C ++) and enjoyment in the development and numerical implementation of mathematical models as well as knowledge of the functioning of CFD code, especially OpenFOAM with pre- and post-processing tools are beneficial.

Start / Duration: from 1st May 2018 or later in 2018

Payment: TVÖD E13 (full PhD or postdoc position)

We look forward to your application!

Contact: Please send your complete documents to the University of the Bundeswehr Munich, Prof. Dr.rer.nat. Michael Pfitzner, Thermodynamics institute LRT-10, Faculty of Aerospace, Werner-Heisenberg-Weg 39, 85577 Neubiberg (letter or email).

For more information, please call +49-89-6004-2103 or email *michael.pfitzner@unibw.de*. Institute homepage: *https://www.unibw.de/thermodynamik*