Technische Universität Berlin

Research Assistant - salary grade E13 TV-L Berliner Hochschulen

part-time employment may be possible

Faculty V - Mechanical Engineering and Transport Systems, Faculty V - Institute of Fluid Dynamics and Technical Acoustics / Flow Instabilities and Dynamics
Reference number: V-65/25 (starting at the earliest possible / for max 36 months / closing date for applications 05/09/25)

Your responsibility:

In order to meet future climate goals, combustion processes, such as gas turbines for energy generation or as engines for aircraft, need to be fully converted to green hydrogen. Due to the high reactivity of hydrogen flames and their different physical properties, hydrogen flames generate significantly higher noise emissions compared to conventional methane flames. This leads to negative effects on both humans and the environment.
This research project aims to investigate the generation of sound from turbulent hydrogen flames. The focus will be on studying reduced dynamic models for turbulent flow and their interaction with hydrogen flames, as well as the resulting sound emissions. The project will utilize empirical modal decomposition methods (SPOD/DMD and others), physics-based dynamic modeling (global stability analysis, resolvent analysis), acoustic hybrid methods, and data assimilation techniques.

The position involves setting up an experimental setup with a turbulent hydrogen flame in an anechoic chamber, coducting acoustic array measurements, and performing high-resolution time-resolved flow and flame diagnostic (PIV, OH* imaging, etc.). While the primary focus is on experimental measurements, there may also be the opportunity to run high-resolution numerical simulations (LES/DNS).

The project is funded by the German Research Foundationd (DFG) and the French National Research Agency (ANR), with close collaboration with Peter Jordan´s group and colleagues at CNRS Poitiers, providing opportunities for international stays.

Job Responsibilities:

- acoustic measurements and laser-based flow and flame measurements of a turbulent hydrogen flame
- data assimilation
- data-driven analysis of coherent structures
- modeling of flow and flame dynamics using linear stability analysis and resolvent analysis
- continuous publication of results in relevant scientific journals and presenting findings at conferences
- opportunity for a PhD

Your profile:

- a successfully completed scientific university degree (Master, Diplom or equivalent) in Engineering Science, Mechanical Engineering, Aerospace Engineering, Data science or something similar
- experience in the following areas: Experimental methods in fluid mechanics, data analysis of turbulent flows, aeroacoustics, turbulent combustion, data assimilation
- programming skills (Python)
- good command of German and/or English required; willingness to learn either English or German is expected

How to apply:

Please send your application, stating the **reference number**, with the usual documents (summarized in a PDF document, max. 5 MB) **by e-mail to Prof. Dr. Kilian Oberleithner via office@hfi.tu-berlin.de**.

By submitting your application via email you consent to having your data electronically processed and saved. Please note that we do not provide a guaranty for the protection of your personal data when submitted as unprotected file. Please find our data protection notice acc. DSGVO (General Data Protection Regulation) at the TU staff department homepage: https://www.abt2-t.tu-berlin.de/menue/themen_a_z/datenschutzerklaerung/ or quick access 214041.

To ensure equal opportunities between women and men, applications by women with the required qualifications are explicitly desired. Qualified individuals with disabilities will be favored. The TU Berlin values the diversity of its members and is committed to the goals of equal opportunities. Applications from people of all nationalities and with a migration background are very welcome.

The vacancy is also available on the internet at:
https://www.jobs.tu-berlin.de