Universität Stuttgart

SynTrac

Starting from 1st October 2023, the Institute of Aerospace Thermodynamics within the collaborative research centre Transregio SynTrac is looking for:

2 Research Associate (m/f/d) in the field of

Condensation and mass transport in porous structures

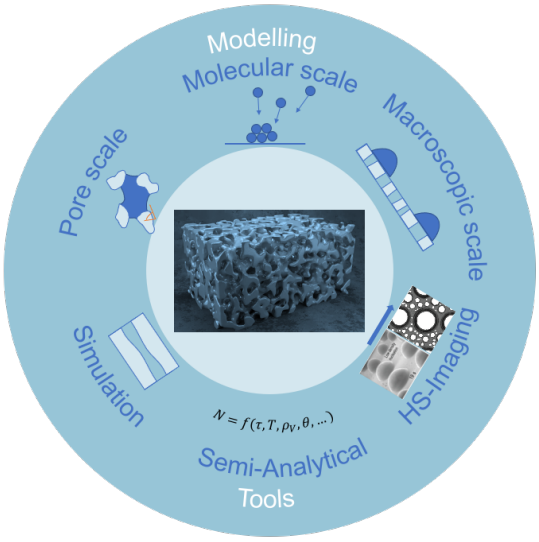
(Full time – 3.75 years fixed-term – Doctorate)

With the major goal of climate-neutral flying, we are exploring potentials and synergies through highly integrated aircraft development in numerous sub-projects at TU Braunschweig, University of Stuttgart, LUH Hannover and DLR Braunschweig in the new research centre SynTrac. We use interactions between the disciplines of aerodynamics, acoustics, flight physics, structural mechanics and thermodynamics through a multidisciplinary, cross-system view of the aircraft development process to develop future highly efficient aircraft through innovative approaches.

SynTrac

In sub-project C2 at the Institute of Aerospace Thermodynamics (ITLR), you will investigate the use of porous structures in future propulsion systems. One possible application is to reduce the water content in the exhaust gas stream in order to reduce the formation of condensation trails. For this purpose, the water vapour is condensed on the surface of a porous structure, mounted perpendicularly to the direction of flow, and removed through the pores.

For the successful implementation of porous structures in future, highly integrated aircrafts, the effect of microscopic processes on the macroscopic level must be understood. Thus, a multiscale description of the overall process is necessary, which includes nucleation, condensation on the surface and water transport in the porous medium. To achieve this, experimental optical methods and numerical simulations will be combined. Therefore, the project foresees one experimental and one numerical doctoral position. While the experimental investigations focus on the interaction of porous structure and external flow (macroscopic scale), the numerical investigations focus on the detailed modelling of the processes on the pore scale. A simplified model will then be developed from these two approaches, which will enable integration into the aircraft system and optimisation of the condensation process.



Your path to a doctorate in an interdisciplinary and cross-location research team will be accompanied by an integrated research training group. New forms of collaboration will emerge through the concept of "New Work".

Make a Difference

- You will carry out research in the collaborative research centre on the topic “Exhaust gas treatment and thermal management in advanced propulsion systems by use of porous media”
    - The experimental position will focus first on the design and construction of a test rig. Subsequently, the experiments will be carried out using optical methods and the obtained data will be analysed.
    - The numerical position will focus first on the extension of an existing numerical code (FS3D) for the simulation of multiphase flows with regard to the modelling of condensation. Subsequently, extensive parameter studies have to be carried out.
    - A multiscale thermodynamic model will be jointly developed from the experimental and numerical results. A simplified, engineering model is then derived for facilitating the interactions with the other sub-project and for enabling the integration of the porous media into the airframe.
- You will publish research findings and participate in national and international conferences
- You will be involved in teaching at the University by supervision of students’ work

Your Qualifications

- Master’s degree or equivalent in engineering, simulation technologies or similar specialisations
- Strong oral and written communication skills and good knowledge of the English language
- You are enthusiastic about actively working on the challenge of climate-neutral flying and are open to work in an interdisciplinary, cross-location team
- You are aiming for a doctorate

Our Benefits

- Fixed-term contract for up to 4 years
- Full research assistant position paid according to TV-L 13 with the possibility of doctorate
- Interesting and diverse tasks in a pleasant working atmosphere with a friendly and motivated team that works closely together across the locations.
- Start: 1st October 2023

University of Stuttgart

At the University of Stuttgart, we actively promote diversity among our employees. We have set ourselves the goal of recruiting more women scientists and employing more people with an international background, as well as people with disabilities. We are therefore particularly pleased to receive applications from such people. Regardless, we welcome any good application.

Women who apply will be given preferential consideration in areas in which they are underrepresented, provided they have the same aptitude, qualifications and professional performance. Severely disabled applicants with equal qualifications will be given priority.

As a certified family-friendly university, we support the compatibility of work and family, and of professional and private life in general, through various flexible modules. We have an employee health management system that has won several awards and offers our employees a wide range of continuing education programs. We are consistently improving our accessibility. Our Welcome Centre helps international scientists get started in Stuttgart. We support partners of new professors and managers with a dual-career program.

What’s more to know

Information in accordance with Article 13 DS-GVO on the handling of application data can be found at https://careers.uni-stuttgart.de/content/Datenschutz/?locale=de_DE

Questions and Answers

For more information, please call PD Dr.-Ing. Grazia Lamanna on (0711) 685-62173.

Apply by 20 August 2023

Are you interested? Please send your application preferably via email to grazia.lamanna@itlr.uni-stuttgart.de