



Post-Doctoral position on the thermoacoustic dynamics of hydrogen fired combustors for aircraft propulsion

The **Laboratory of Combustion and Acoustics for Power & Propulsion Systems (CAPS)** in the Department of Mechanical and Process Engineering invites applications for a **Post Doctoral position on the thermoacoustic dynamics of hydrogen fired combustors for aircraft propulsion**.

The goal of this research is **to understand, model and control thermoacoustic instabilities and flame dynamics in future hydrogen-fired aircraft combustors**. These combustors will enable **net CO₂ reductions of future aircrafts of 75% compared to kerosene-powered aviation**. The thermoacoustic instabilities result from the constructive interaction of the unsteady combustion process and the combustor acoustics. They are strongly undesirable because they can severely restrict the operating range of the engine. In this context, the development of special annular combustors for hydrogen necessitates significant research effort to predict and prevent thermoacoustic instabilities and to ensure robust and low-NO_x combustion process.

This work will be performed through **theoretical modelling, experiments and numerical simulations**. The modelling tasks will deal with partial and ordinary differential equations to model the interaction between acoustic field, entropy waves and heat release fluctuations. A lab-scale, high-pressure test facility is being set up to gather the required experimental input. Acoustic and laser-based optical techniques will be used to experimentally identify the response of the hydrogen flames to acoustic excitation. In addition, CFD and advanced system identification methods will be used to quantify the coupling between heat release the acoustic field. The research outcome is expected to be published in major specialized and broad-audience journals.

You are expected to have an excellent **PhD degree in Mechanical Engineering or Physics**. Very solid background in math and physics is required. Ideally, you have experience and a proven record in one or more of the following: combustion, acoustics, fluid dynamics, nonlinear dynamics.

We are looking for highly motivated, committed, and creative individuals, able to work in a team and with excellent communication skills. Working in a top-level research environment with advanced laboratory infrastructure, you will have a unique opportunity to develop your research abilities.

ETH Zurich is a family-friendly employer with excellent working conditions. You can look forward to an exciting working environment, cultural diversity and attractive offers and benefits.

We look forward to receiving your online application until **July 1st 2022**, including: letter of motivation, CV, contact details of two references (no reference letter needed), transcripts of records.

Please note that we exclusively accept complete applications submitted through our online application portal (https://jobs.ethz.ch/job/view/JOPG_ethz_DrR5jjDFYtgCp4TLbV). Applications via email or postal services will not be considered.

Further information about the CAPS laboratory can be found on our website www.caps.ethz.ch.