

# Master-Thesis, Hiwi



TECHNISCHE  
UNIVERSITÄT  
DARMSTADT

## Effusion cooling air – flame and flame – wall interaction with direct chemistry and thermochemical manifolds



### Motivation & Background

The Institute for the Simulation of Reactive Thermo-Fluid Systems (STFS) is at the forefront of research and development in the field of reactive thermo-fluid dynamics. One of our research areas is the optimization of combustion chambers using simulation methods with regard to pollutant emissions.

A combustion chamber is for example found in gas turbines, where effusion cooling is employed to mitigate the impact of high thermal loads on the combustor walls. In effusion cooled combustors, the interaction of the flame with the cooling air influences the local flame structure and pollutant formation, a phenomenon not yet fully understood.

In your work, these effects are to be investigated in more detail under different operating conditions with detailed chemistry and thermochemical manifolds (a method often used in our institute to speed up simulations).

Do you have a programming background (preferably in C/C++), and proficiency in Unix-based systems? If so, we encourage you to contact us for more information!

### Tasks

- Familiarizing yourself with OpenFOAM and carrying out simulations
- Familiarizing yourself with thermochemical manifolds, creation and improvement of thermochemical manifolds
- Post-processing of large amounts of data and visualization with python



### Focus areas

Simulation	● ● ●
Modeling	● ● ○
Implementation	● ○ ○
Data analysis	● ● ○

### Date

03/06/2024

### Start date

immediately

### Contact

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