



# Rolls-Royce



Announcement: Master's Thesis Opportunity

Date: October 2023

Topic: Investigating of Entropy-Fluctuation Convection in an Aero-Engine Combustion Chamber

### Introduction:

We present an opportunity for a dedicated master's student to embark on a challenging master's thesis project in collaboration with our esteemed project partner, Rolls-Royce Deutschland. This research endeavour will focus on the investigation of entropy fluctuation convection within an aero-engine combustion chamber. Entropy convection, characterized as fluctuating temperature inhomogeneities, is often caused by imperfect fuel-air mixing. If accelerated towards the first turbine stage, these entropy inhomogeneities have the potential to emit significant sound waves, which may lead to increased engine noise emissions or, in more critical scenarios, contribute to a thermoacoustic feedback cycle.

### Project Description:

The master's thesis project will utilize a state-of-the-art analytical tool for linear mean field analysis (FELICS-Code). In the broadest sense, this represents a method from the field of numerical fluid mechanics and will be applied in this project to investigate the advection and diffusion of entropy fluctuations in a real aero-engine environment. The main goal of this project is to enhance our understanding of low-frequency acoustics that occur under certain operating conditions. Key aspects of the project include:

- Analysing the formation and propagation of entropy fluctuations.
- Investigating the impact of effects, such as turbulent mixing and mean flow dispersion.
- Identifying conditions that lead to low-frequency oscillations and understanding their mechanisms.

### Qualifications:

We are seeking a highly motivated master's student with the following qualifications:

- Enrolment in a relevant master's program at TU Berlin (e.g. physics engineering).
- A strong academic background in computational fluid dynamics and aero-acoustics.
- A genuine interest in gas-turbine combustion dynamics.
- Proficiency in flow modelling and data analysis.
- Strong communication and teamwork skills.

Duration: 6 Months

Earliest start: Nov/Dec 2023

Payment: yes (550€ /per month) for 6 months max.

It's planned that the student is partly located on-site at Rolls-Royce Deutschland and TU-Berlin

### How to Apply:

Interested candidates are invited to submit their applications. To apply, please provide the following documents:

- A detailed resume or curriculum vitae.
- Transcripts of your academic records.

### Please contact:

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