

Starting from July 1st, 2024, the Institute of Fluid Mechanics and Institute of Aircraft Design and Lightweight Structures are looking for

2 Doctoral Candidates (m/f/d)

(EG 13 TV-L, full-time)

on the topics

“Aerodynamics of a Multi-Functional Leading Edge for Energy-Efficient Aircraft”

and

“Structure of a Multi-Functional Leading Edge for Energy-Efficient Aircraft”

The positions are to be filled on a fixed-term basis for a period of 3 years. The successful applicant will be given the opportunity to pursue a doctorate.

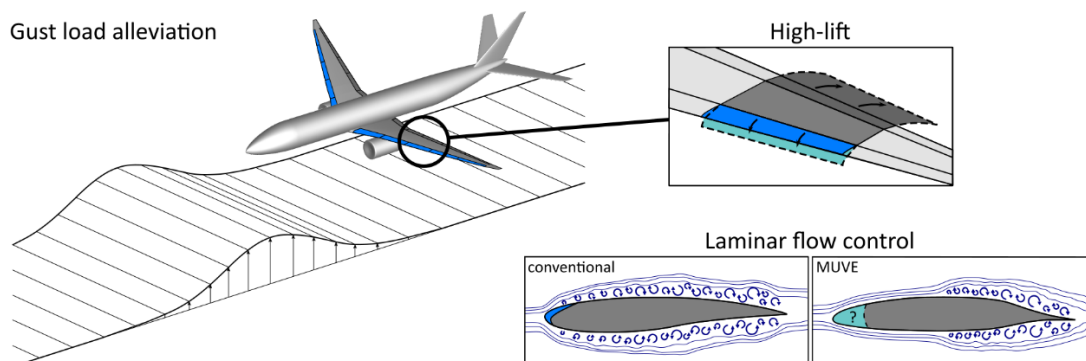


Figure: Sketch of the multifunctional leading edge device to be investigated in the project MUVE

Background and Research Objectives

In this project, we strive to contribute to the goal of sustainable and climate-friendly aviation by targeting a reduction in primary energy consumption through reduced wing weight and drag. To achieve this, multiple functions will have to be combined on future wings: i) laminar flow control to reduce viscous drag on both the upper and lower wing surface, ii) active suppression of gust- and maneuver-induced loads to reduce the structural requirements and fatigue loads, allowing the structural weight to be reduced, iii) high aspect ratio wings to reduce induced drag, and iv) high lift capabilities for take-off and landing.

The combined application of these different functions poses demanding requirements on the leading edge of the wing, as shown in the figure above. Current leading edge concepts do not allow for the integration of all of these different functions and thus prevent their joint application. A multifunctional leading edge system as an enabler for these different technologies is therefore essential for achieving current climate targets. The research project MUVE, funded by the Federal Aeronautical Research Programme (LuFo) of the Federal Ministry for Economic Affairs and Climate Action (BMWK) in Germany, pursues the design of this multifunctional, innovative leading edge system and the evaluation of its climate-relevant effects.

Two PhD researchers at the TU Braunschweig will investigate the structural-mechanical and aerodynamic aspects of this novel leading edge design, in close collaboration with the TU Hamburg (system-technical design) and University of Stuttgart (aerodynamic performance evaluation). A significant proportion of the work is carried out on the basis of flow/structure-coupled high-fidelity simulations, while the feasibility of the leading edge system is to be demonstrated through the construction and testing of functional demonstrators.

About TU Braunschweig

With more than 16,000 students and 3,800 employees, [Technische Universität Braunschweig](#) is one of Germany's leading institutes of technology. It stands for strategic and performance-oriented thinking and acting, relevant research, committed teaching, and the successful transfer of knowledge and technologies to the economy and society. We consistently advocate for family friendliness and equal opportunities.

Our research focuses are mobility, engineering for health, metrology, and city of the future. Strong engineering and natural sciences are our core disciplines. These are closely interconnected with economics, social and educational sciences and humanities.

Our campus is located in the midst of one of the most research-intensive regions in Europe. We work successfully together with over 20 research institutions in our neighborhood as we do with our international partner universities.

About the Host Institutions

We, the [Institute of Fluid Mechanics](#) and [Institute of Aircraft Design and Lightweight Structures](#), are part of the [Aeronautics Research Centre Niedersachsen](#) (NFL). The NFL is a leading research centre for aviation in Germany with excellent research and education. As part of the NFL, we have an internationally unique infrastructure with research aircraft, wind tunnels, simulators and test rigs with which our scientists and dedicated students conduct cutting-edge research. A major focus of current research at the NFL and TU Braunschweig is the mobility needs of society in the future and, in particular, the factors of environmental compatibility, safety and economic efficiency of air transport. In several national and international research projects, our two institutes have investigated aspects of laminar flow control, active and passive load reduction, and high-lift on current and future transport aircraft.

Your Tasks

- You will carry out research in the area of aircraft aerodynamics and structural mechanics.
- You will collaborate with other national research institutions and industrial partners.
- You will publish research findings and participate in national and international conferences.
- You will be involved in teaching at the University (contribution to courses as well as supervision of students' work).

Your Qualifications

- You have a degree (Master's or equivalent) in Aerospace Engineering, Mechanical Engineering, Applied Physics or a related field.
- You do not have a doctoral degree yet, but aim for one.
- You have very good knowledge of the English language, and ideally also of the German language.
- You have practical experience in numerical flow or structural simulations. Knowledge in aircraft aerodynamics and structural mechanics is desirable.

We offer

- Work on exciting future-oriented research topics in an inspiring work environment as part of a friendly and motivated team as well as the university community.
- A vibrant campus life in an international atmosphere with intercultural offers and international cooperations
- You receive a 3-year full-time employment contract with pay in accordance with the collective agreement TV-L (a special payment at the end of the year as well as a supplementary benefit in the form of a company pension, comparable to a company pension in the private sector) including 30 days' vacation per year.
- Flexible working and part-time options and a family-friendly university culture, awarded the "Family-friendly university" audit since 2007.
- Special continuing education programs for young scientists, a postdoc program, as well as other offerings from the Central Personnel Development Department and sports activities.

What's more to know

We welcome applicants of all nationalities. At the same time, we encourage people with severe disabilities to apply. Applications from severely disabled persons will be given preference if they are equally qualified. Please attach a proof of disability to your application. We are also working on the fulfilment of the Central Equality Plan based on the Lower Saxony Equal Rights Act (Niedersächsisches Gleichberechtigungsgesetz—NGG) and strive to reduce under-representation in all areas and positions as defined by the NGG. Therefore, applications from women are particularly welcome in this case.

The personal data will be stored for the purpose of processing the application. By submitting your application, you agree that your data may be stored and processed electronically for application purposes in compliance with the provisions of data protection law. Further information on data protection can be found in our data protection regulations at <https://www.tu-braunschweig.de/datenschutzerklaerung-bewerbungen>. Application costs cannot be reimbursed.

Selection Process

Applications can be in German or English and should contain the following documents:

- a CV (including list of publications, if any),
- a motivation letter,
- copies of degree and academic transcripts (with grades and rankings), for both the Bachelor's and Master's degrees. Academic records not written in English should be accompanied by a translation into English (it can be either an official translation or self-translation). If the candidate has not been awarded the qualifying degree yet, he/she should provide a document proving the expected date of award.
- Master's thesis report or a summary of it,
- names and email addresses of two referees.

Optional documents:

- English Proficiency Certificate,
- publications: maximum 3 journal papers or conference proceedings,
- reference letters.

Questions and Answers

For more information, please contact Dr.-Ing. André Bauknecht at a.bauknecht@tu-braunschweig.de.

Deadline for applications is 31.03.2024

Are you interested? Please send your application preferably via email to a.bauknecht@tu-braunschweig.de or via mail to

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