



With more than 16,000 students and 3,800 employees, the **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 neighbourhood as we do with our international partner universities.

Starting from the earliest possible date the Institute of Aircraft Design and Lightweight Structures (IFL) is looking for a

Research Associate / Postdoc / Doctoral Candidate (m/f/d) in the field of Advanced Aircraft Design and AI/ML-based Optimization for Robust Design (EG 13 TV-L, full-time)

The position is 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.

Novel and disruptive technologies are crucial to achieve climate-neutral aviation in the future. Therefore, six universities in Germany have recently launched the joint-project UniSELECT, which stands for "University Sustainable Long-Range Commercial Transport Vehicle Study". This project aims to develop aircraft design to the next stage. Within that project, the Technische Universität Braunschweig has an important role in developing methods for efficient multidisciplinary design optimization (MDO) for aircraft design.

The focus of your work in this project is to extend the AI/ML-based efficient global optimization (EGO) toolbox developed in the UNICADO project. This expansion will allow for the integration of future technologies (proposed by the other partners) into the design toolbox. Another important work topic is the uncertainty quantification (UQ) to qualitatively evaluate the future technologies in the optimization design process. This approach will enable designs that are robust, resilient, and reliability. AI/ML and UQ are closely related in their modelling approach based on probability theory. The experiences and knowledge of both fields synergistically facilitate the tasks in this research work.

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 applied concept of New Work.

The Institute of Aircraft Design and Lightweight Structures (IFL) deals with a wide range of different topics in the field of aircraft design and lightweight structures. The scope of research ranges from the investigation of innovative aircraft concepts within the framework of multidisciplinary optimisation tasks to numerical and experimental investigations of the characteristics of lightweight materials and functional structures. We are an innovative and international team of about 40 employees located at two sites consisting of the Chair of Overall Aircraft Design (Prof. Ingo Staack) and the Chair of Lightweight Structures (Prof. Sebastian Heimbs). Founded in 1938, the IFL is a renowned partner in the fields of conceptual and preliminary aircraft design, functional lightweight design, fibre reinforced materials, crash and safety structures, technology assessment, systems engineering and multidisciplinary design analysis and optimisation (MDAO). We conduct our research in collaboration with local and international partners and operate a large test facility equipped with experimental equipment. The IFL is a partner in the Niedersachsen Aviation Network (NFL), the Sustainable and Energy-Efficient Aviation (SE2A) and a founding member of the Transregio CRC SynTrac. A detailed list of our research projects and teaching events can be found on our website http://www.tu-bs.de/ifl. The best way to keep up with the latest news and updates is through our LinkedIn channel https://de.linkedin.com/company/tubs-ifl.

Your tasks

- You will carry out research in the area of AI, machine learning (ML) and uncertainty quantification (UQ) for aircraft design and multidisciplinary optimization (MDO).
- You will conduct your research together with renowned research groups and institutes within an international research project.
- You will publish research findings and participate in national and international conferences.
- You will be involved in teaching at the university (preparation and implementation of courses as well as supervision of students' work).

Your Qualifications

- You have a degree (Master's or equivalent) in Mechanical Engineering, Aerospace Engineering or a comparable engineering discipline. Also Mathematics or Computer Science may be eligible.
- You have very good knowledge of the English language. German language skills are preferable but not necessary.
- You have knowledge or experience of either machine learning (ML), artificial intelligence (AI) or uncertainty quantification (UQ), surrogate modelling. Aircraft design knowledge is of advantage but not mandatory.
- You have good programming skills (Python, C++, etc.).
- You are enthusiastic about actively working on the challenge of climate-neutral aviation and are open to work in an interdisciplinary, cross-location team.
- You are flexible, can perform under pressure and work well in a team.
- You are aiming for a doctorate.

We offer

- Work on exciting future-oriented research topics in an inspiring work environment as part of the university community.
- A vibrant campus life in an international atmosphere with lots of intercultural offers and international cooperations.
- 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.

Further notes

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 form of evidence of your handicap 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.

Questions and Answers

For more information, please call Dr. Daigo Maruyama on +49 (0) 531 391-9925.

Application process

Deadline for applications is 29.02.2024

Applications should be sent by e-mail to Dr. Daigo Maruyama (<u>d.maruyama@tu-braunschweig.de</u>) and Prof. Dr.-Ing. Ingo Staack (<u>ingo.staack@tu-braunschweig.de</u>) by the deadline.

You can also send your application via mail to

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