



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) for Systems Engineering with focus on Information Modelling and Workflow Management for MDO (EG 13 TV-L, full-time)

The position is available on a fixed-term basis for four years, offering the successful candidate an opportunity to pursue doctoral studies during this period.

Addressing the challenge of achieving climate-neutral aviation necessitates the development and integration of novel and disruptive technologies. Central to this endeavour is the handling of a wide variety of information and results from different disciplines within aircraft design. Consequently, the traditional approach to multidisciplinary design analysis and optimization (MDAO/MDO) requires enhancement through new engineering disciplines.

This project aims to develop methodologies and methods that extend the classical aircraft design optimization approach with advanced systems engineering topics. This includes a focus on information modelling, surrogate modelling, and dynamic workflow management. Such advancements in MDO are crucial for a more detailed and accurate performance analysis, vital for optimizing an aircraft holistically to minimize its environmental impact.

In collaboration with experts in aircraft design, artificial intelligence (AI), machine learning (ML), and systems engineering (SE), your role will involve further developing information handling, abstraction, and parameterization processes within a product development framework, specifically applied to aircraft design campaigns. Surrogate modelling, a validated approach in MDAO/MDO, is key to integrating expanding information and increasing model and analysis fidelity, including Finite Element Method (FEM) and Computational Fluid Dynamics (CFD) data. This process is linked to the need for automated dynamic workflow management for effective global design optimization.

While the research is methodologically tool-agnostic, a practical use case implementation will be developed, drawing upon state-of-the-art approaches and tools from both industry and academia such as SUAVE, UNICADO, CPACS, XDASM etc. This work will require significant interaction and collaboration with other domain experts. Your doctoral journey will be supported by our international team of researchers.

The Institute of Aircraft Design and Lightweight Structures (IFL) addresses a broad range of topics in aircraft design and lightweight structures. Our research encompasses everything from innovative aircraft concepts within multidisciplinary optimization tasks to the numerical and experimental investigation of lightweight materials and functional structures. We are an innovative and international team of about 40 members, operating under the Chair of Overall Aircraft Design (Prof. Staack) and the Chair of Lightweight Structures (Prof. Heimbs). Established in 1938, the IFL is a renowned partner in conceptual and preliminary aircraft design, functional lightweight design, fibre reinforced materials, crash and safety

structures, technology assessment, systems engineering, and MDAO. Collaborating with both local and international partners, we conduct our research in a well-equipped large test facility. The IFL is part of the Niedersachsen Aviation Network (NFL), the SE²A Cluster of Excellence in Sustainable and Energy-Efficient Aviation, and a founding member of the Transregio CRC SynTrac. For detailed information on our research projects and teaching events, please visit our website <http://www.tu-bs.de/ifl> follow us on LinkedIn <https://de.linkedin.com/company/tubs-ifl> for the latest news and updates.

Your tasks

- You will carry out research in the area of systems engineering, aircraft design, AI/ML, surrogate modelling, workflow management and multidisciplinary optimization (MDO).
- You will conduct your research together with international leading aeronautical experts.
- You will publish research findings and participate in national and international conferences.
- You will be involved in traditional and new forms of teaching activities at the university.

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 or German language. Proficiency in both languages is highly advantageous and will be considered favourably.
- You have knowledge or experience of either MDO, surrogate modelling, ML/AI, modelling and simulation, systems engineering or MBSE. Aircraft design knowledge is of advantage but not mandatory.
- You have programming skills (e.g., Python, Matlab, Julia, or C++)
- You are enthusiastic about actively working on the challenge of climate-neutral aviation and an inspiring work atmosphere.
- You are encouraged and motivated. You 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 Prof. Ingo Staack +49 (0) 531 391- 9930

Application process

Deadline for applications is 29.02.2024

Applications should be sent by e-mail to Prof. Dr.-Ing. Ingo Staack (ingo.staack@tu-braunschweig.de) by the deadline.

You can also send your application via mail to

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