



Technische
Universität
Braunschweig



PhD-Researcher Position (m/f/d) within the SE²A Research Cluster

Simultaneous scenario-based optimization of aircraft flight routes and noise assessment (SONAR)

Temporary Position (up to 3 years), up to Salary Level EG 13 TV-L, 100%

Background

The Cluster of Excellence SE²A - *Sustainable and Energy-Efficient Aviation* is a DFG-funded interdisciplinary research center investigating technologies for a sustainable and eco-friendly air transport system. Scientists from aerospace, electrical, energy and chemical engineering as well as economics and social science are working on the reduction of drag, emissions and noise, life-cycle concepts for airframes, improvements in air traffic management and new technologies for energy storage and conversion. Technische Universität Braunschweig, the German Aerospace Center (DLR), Leibniz University Hannover (LUH), the Braunschweig University of Art (HBK) and the National Metrology Institute of Germany (PTB) have joined forces in this extraordinary scientific undertaking. The overall project is structured into the three core research areas "Assessment of the Air Transport System", "Flight Physics and Vehicle Systems" and "Energy Storage & Conversion". (www.tu-braunschweig.de/en/se2a)

Employment

The position is located at the Institute for Acoustics (<https://www.tu-braunschweig.de/ina>) in Braunschweig. The entry date is as soon as possible and the duration is initially limited until 12/2025. The position is part-time suitable, but should be occupied 100%. For all doctoral researchers of the cluster, an active participation in SE²A's own qualification programme is mandatory, the time effort for this training measure entails 10% of the working time. The payment is made according to task assignment and fulfillment of personal requirements up to salary group EG 13 TV-L. International applicants may have to successfully complete a visa process before hiring can take place. Applications from international scientist are welcome. The Cluster SE²A aims to increase the share of women in academic positions. Applications from female candidates are very welcome. Where candidates have equal qualifications, preference will be given to female applicants. Candidates with handicaps will be preferred if equally qualified. Please enclose a proof.

Task

The research project SONAR (Simultaneous scenario-based optimization of aircraft flight routes and noise assessment) aims at coupling simulation tools for flight physics, flight guidance and noise assessment to allow a meaningful noise prediction of future aircraft concepts. Moreover, the aforementioned tools are enclosed into an optimization loop to optimize flight trajectories and/or flight procedures with respect to, or under the constraint of, the noise on the ground. This chain is expected to answer the research question, to which extend novel flight physics and flight procedures can alter the noise on the ground.

Within this PhD position we focus on the noise assessment of the simulation chain, the other components are covered by partner institutions at TU Braunschweig. Therefore, a noise assessment tool suitable for

aircraft noise (i.e. ECAC Doc. 29) needs to be implemented and verified against commercial software tools. Additionally, the tool needs to be extended to being capable of using different prediction models and to incorporate novel aircraft concepts. In order to allow for maximum flexibility, the tool needs to be implemented in a platform-independent manner using a high-level programming language (python). Moreover, a specific focus on sustainable code development required. Sustainability here refers to both, long-term usability and efficiency.

In order to answer the aforementioned, underlying research question of the research project, the works in this PhD position directly and intensely connect to the works conducted by the partner institutions (works on flight physics, flight guidance and optimization). Therefore, the works in this position involve a high amount interdisciplinary research at the interface of the different research fields and require a mutual understanding of the respective tasks and questions of the partners.

Who we are looking for

For the research works in the Cluster of Excellence SE²A and specifically in this research project being highly interdisciplinary and embedded into a competitive research field, applicants need the ability and will to conduct high-quality research in the field of acoustics and the context of aviation. Moreover, applicants need to fulfil the following requirements:

- Very good accomplishment of studies (M.Sc.) in engineering, physics, mathematics or similar
- Openness to work in a interdisciplinary research field with partners from other institutions
- Openness to conduct and supervise student projects and theses
- Good communication skills in English; at least basic skills in German
- Experience in code development (ideally with python)
- Interest in acoustics and aviation

Application Process

Applications should be preferably sent by e-mail to ina-leitung@tu-braunschweig.de (or by postal mail to the address given below) **until 28.02.2023** (prolonged) and must contain the following documents:

- Motivation Letter
- Curriculum Vitae including complete address, phone number, email address, educational background, language skills, and work experience
- Copies of bachelor and master diploma (or equivalent) and transcript of grades in original language and in english or german translation
- Additional informative documents are welcome

All documents should be in PDF format, preferably in a single file. Please note that application costs cannot be refunded. For the purpose of carrying out the application process, personal data will be stored.

Contact information

For more information or postal mail application:

TU Braunschweig
Institute for Acoustics
Dr. Tobias Ring
Langer Kamp 19
38106 Braunschweig
Phone: +49 (0) 531 391-8773.