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DLR – DAAD Fellowships

Fellowship No. 648

Research Area : Transportation

Research Topic: **Development of a methodical approach to the design of modular lightweight crash structures in a small, light, autonomous passenger rail vehicle under consideration of differing vehicle configurations and usage scenarios**

DLR Institute: Institute of Vehicle Concepts (FK), DLR Stuttgart

Position: Doctoral Fellow

Openings: 1

Job Specification:

Light rail vehicles are generally limited to operation on tracks separated from heavy rail traffic, and can therefore be optimized for best crash performance, mass and cost, based on the assumption that collisions will only take place between similar or even identical vehicles. A new approach intends to create a new type of driverless ultra-light rail vehicle which can be configured to operate either in separated or in mixed traffic, with the appropriate structures compliant to the differing crash-safety-requirements in either case. The primary challenge with regard to these requirements is to develop a methodology to systematically design crash structures which are adapted to the relative requirements of crashworthiness in interaction with the vehicle structure. To this end, a modularity has to be considered which allows a maximum of common parts between variants while minimizing the variants' masses and cost.

The aim of the PhD work is therefore to examine the crash safety requirements for the usage scenarios and vehicle variants given and focus on the development of a systematically methodical approach for the design and optimization of modular crash energy absorption structures and technologies with special regard to the vehicles in question. The exemplary implementation of the methodical approach will include design

of appropriate structures, their integration into the structure of the vehicle, and simulation of the resulting compositions in all configurations and under all relevant crash scenarios.

This project is part of ongoing cooperative research between the German Aerospace Center (DLR) and a major UK University. The scientific work will be conducted at DLR in the institute of vehicle concepts in Stuttgart (Germany). The candidate is required to enroll onto a PhD program with our partner in the UK. The position therefore requires stays in the UK and travelling between the two institutions.

DLR is the national center for aerospace, energy and transportation research of Germany and is a member of the Helmholtz Association of German Research Centres. DLR's research portfolio, which covers the four focus areas Aeronautics, Space, Transportation and Energy, ranges from basic research to innovative applications. The Institute of Vehicle Concepts researches, develops and evaluates new vehicle concepts and technologies in light of future demands on the transportation system. The institute develops and demonstrates innovative, application-based solutions for road and rail vehicles, thereby contributing to the design of a sustainable and cost-effective, user-oriented and secure mobility concept.

The position includes a tuition waiver for the PhD program at the UK partner.

Required Qualification:

Applicants should check that they meet the entry requirements for PhD study at our UK partner:

- A minimum of a 2:1 first degree in a relevant discipline/subject area with a minimum 60% mark in the project element or equivalent with a minimum 60% overall module average.
 - In the event of a first degree classification of less than 2:1, a Masters Degree in a relevant subject area will be considered as an equivalent.
 - The Masters must have been attained with minimum overall marks at merit level (60%). In addition, the dissertation or equivalent element in the Masters must also have been attained with a minimum mark of merit level (60%).
- Expertise in the field of Finite Elements
 - Expertise in optimization
 - Programming skills
 - Very good English language skills

Advantageous Skills:

- Experience in vehicle design (in particular rail vehicles)
- Experience in explicit FE solver

English competence: See requirements on www.daad.de/dlr

Earliest Start Date: August 2024

Application Deadline: 7th of June 2024

Further Information: <http://www.dlr.de>
<http://www.daad.de/dlr>

More information may be obtained by contacting:
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Thank you for your attention!
We look forward to receiving your application!