Institut für Werkzeugmaschinen und Fertigungstechnik

Life Cycle Assessment of emerging technologies in the aviation sector

Project Description

In a scenario of pandemic-crisis in the aviation sector, concerns regarding the future of aviation and the increasing pressure to make flying more sustainable have motivated intensive investigations on solutions towards decarbonization. Among the alternatives to reduce the reliance on fossil kerosene, batteries, sustainable aviation fuels (SAF), and hydrogen fuel cells are investigated as the most promising technologies with the potential to reduce the environmental impact of aviation. However, even though in-flight emissions can be minimized with the electrification of the powertrain, or with the use of alternative fuels, the burdens might be shifted to other stages of the aircraft's life cycle, or between impact categories. In order to understand the real implications of these upcoming technologies across the life cycle, robustly assessing their sustainability, and the development in the following years, an integrated computational life cycle engineering (IC-LCE) approach is introduced for the field of aviation.

In this context, the goal of this project is to develop integrated computational models to apply the Life Cycle Assessment (LCA) methodology in order to quantify and identify the potential environmental impacts of the emerging technologies in aviation. In this way, you will have the opportunity to work in the following tasks:

- Analysis of the electric powertrain of aircraft's foreground systems;
- Investigation of the state of the art and state of research of energy carriers for aviation applications;
- Development of inventories for modelling the components of the powertrain along the life cycle and SAF via different production pathways;
- Familiarization with computational modelling in LCA with Brightway2;
- Comprehensive assessment of the environmental impacts and sensitivity analysis of the modelled systems using Brightway2.

Requirements

Background in engineering; good knowledge on environmental assessment methodologies, such as LCA; very good programming skills (Python, MATLAB or similar), and excellent English language skills.

The entry date is as soon as possible, and the duration of employment is limited to 6 months. The position is part-time with 50% of the regular weekly working time (currently 19,9h). Ongoing applications are possible until all positions are filled.

The payment is made according to task assignment and fulfillment of personal requirements to salary group EG 13 TV-L. International applicants may have to successfully complete a visa process before hiring can take place. Candidates with handicaps will be preferred if equally qualified. Please enclose a proof. The position is part of the SE²A International Female Programme, so only applications by female graduates of non-German universities are possible.

All documents should be in PDF format, preferably in a single file. Personal data and documents relating to the application process will be stored electronically. Please note that application costs cannot be refunded.

Contact information

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