PhD Position

PhD Position in Novel Gas Bearing Designs and Testing

Small-scale turbomachinery in domestic scale heat pumps, fuel cell blowers, or organic Rankine cycles rotate at very high speeds and require a long lifetime. Due to their inherent features, gas lubricated bearings offer exciting benefits, particularly at small scale. In this project, we want to identify and investigate novel bearing technologies and designs with increased load capacity to extend the usage of gas bearing supported turbomachinery to higher power levels.

Our contributions to this highly interdisciplinary project focus on (1) the creation of a fast framework to design and optimize gas lubricated bearings for rotordynamic performance, load capacity, minimal losses, and manufacturability, (2) the design of a test rig to characterize the bearings, and (3) devising unified design guidelines for the application of gas lubricated bearings, while highlighting their physical limitations.

This research project is characterized by (1) a theoretical/numerical phase to fully capture the dynamics of the bearing's fluid film interacting with mechanically compliant surfaces and the rotor's motion, (2) an optimization phase to identify ideal bearing geometries, and (3) an experimental phase to validate the developed models and test novel bearings.

Background The ideal candidate will have a strong background in gas lubricated bearings and rotordynamics, modeling approaches for dynamic systems, model order reduction techniques, multi-objective optimization, topology optimization, surrogate modeling approaches, and experimental methods.

Our lab is composed of people with different nationalities and backgrounds, and we encourage applicants from all locations, backgrounds, and genders to apply.

Collaboration The PhD position will contribute to theoretical and experimental gas-lubricated bearing investigation with a focus on novel bearing configurations. The candidates will work in close collaboration with other team members working on gas lubricated bearings and dynamic modeling approaches. A positive and collaborative attitude and ability to work and interact with others in an interdisciplinary team is essential.

LABORATORY FOR APPLIED MECHANICAL DESIGN

How To Apply

1. Fill in the form provided by the doctoral program in *EDEY, EDME, or EDRS* (`phd.epfl.ch`). Indicate your intention to apply to Prof. J. Schiffmann.
2. Email the application package directly to Prof. J. Schiffmann indicating your interest in this project. Please do this now; it is not necessary to wait for the deadline of the doctoral school.

Deadlines

- Evaluation of candidates will be performed continuously
- Start-date: as soon as possible

Prof. J. Schiffmann

`lamd.epfl.ch`
`jurg.schiffmann@epfl.ch`