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# Postdoc Position



## Postdoc Position in Turbocompressor Driven Heat Pumps

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The TurboHeat project, funded by the Swiss National Science Foundation, addresses the technical challenges associated with advancing heat pump technology through the integration of small-scale gas bearing supported turbocompressors. The goal is to improve energy efficiency by 20-25% over existing heat pumps for heating, ventilation, and air conditioning (HVAC) systems in domestic and transport applications. This improvement hinges on addressing critical design and control issues at small scales, where dynamic operating conditions and manufacturing imperfections pose significant challenges.

Our contributions to this highly interdisciplinary project focus on (1) the creation of a fast framework for the automated design and constrained optimization of gas-bearing supported turbocompressors focusing on maximizing performance and robustness, (2) the design and impact of flexibly supported bushings on the rotordynamic behavior of gas-bearing supported rotors to enhance the rotordynamic performance, and resilience to external shocks, vibrations & manufacturing deviations, and (3) the dynamic modeling of turbocompressor driven heat pumps.

We will design, optimize, and manufacture gas bearing supported turbocompressors and test them in a heat pump loop to assess the computational tools developed in this project to improve the energy efficiency of heat pumps.

**Background** The ideal candidate will have a strong background in turbomachinery aerodynamics, heat pumps, modeling approaches for dynamic systems, model order reduction techniques, 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 postdoc position will contribute to the thermodynamic modeling, design and optimization of turbocompressor driven heat pump systems. The candidates will work in close collaboration with teams from the Scientific Computing and Uncertainty Quantification Lab (CSQI) and the Laboratoire d'Automatique (LA) at EPFL. A positive and collaborative attitude and ability to work and interact with others in an interdisciplinary team is essential.

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### How To Apply

Contact Prof. J. Schiffmann at [jurg.schiffmann@epfl.ch](mailto:jurg.schiffmann@epfl.ch) with your CV, list of references and example of your work.

### Deadlines

- Evaluation of candidates will be performed continuously
- Start-date: First half of 2025

Prof. J. Schiffmann

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