Advanced Thermal Management systems for Electric Machines using Additive Manufacturing

Summary

The PhD student will support the development of new thermal management strategies for Next Generation Additively Manufactured Electric Motors (EM). With an emphasis on improving EM's thermal efficiency, the PhD student will contribute to the development of new design methods and technologies which will shape the future of EM.

Research field:	Electrical power engineering and mechatronics
Supervisors:	Prof. Dr. Ants Kallaste Payam Shams Ghahfarokhi
Availability:	This position is available.
Offered by:	School of Engineering Department of Electrical Power Engineering and Mechatronics
Application deadline:	Applications are accepted between May 03, 2021 00:00 and May 31, 2021 23:59 (Europe/Zurich)

Description

Main tasks within this PhD project :

1. State of the art research in the field of Thermal management systems using AM:

- examining various thermal management systems and the possibility of developing and optimizing the thermal management system using AM;
- examining the challenges and opportunities of AM to manufacture the novel EM's thermal management systems and providing the solution to overcome the difficulties.

2. Designing and modelling the appropriated thermal management system for EM:

- designing novel structures, heat exchangers, heat guides, heat sinks;
- modelling the design and examining the performance of cooling using Finite Element (FE) software and computational fluid dynamic (CFD).

3. Developing the test bench and verifying the analytical and numerical models:

- drawing the models using CAD software;
- constructing the model using 3D selective laser melting (SLM) printer;
- developing the test bench, measuring and collecting the data;
- comparing the analytical, numerical, and experimental results.

Applicants should fulfil the following requirements:

- Master's degree in Electrical engineering or Mechanical engineering
- experience in thermal analysis, FE Software, fluid mechanics, CFD, and CAD software
- practical experience with EM
- practical experience with publishing and presenting research works (e.g., conference papers)
- ability to work in a team

- excellent command of English

To get more information or to apply online, visit https://taltech.glowbase.com/positions/229 or scan the the code on the left with your smartphone.