Postdoctoral

Ecole/Institution/Société:
TAMPERE UNIVERSITY, **Finland / Tampere**

Discipline:
Computational Engineering

Type d'emploi::
Full-time

Date de publication:
2022-04-27

Personne à contacter:
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Postdoctoral Research Fellow (Computational electromagnetics)

Tampere University and Tampere University of Applied Sciences create a unique environment for multidisciplinary, inspirational and high-impact research and education. Our universities community has its competitive edges in technology, health and society. www.tuni.fi/en

The research group of Electromechanics at the Electrical Engineering Unit at the Faculty of Information Technology and Communication Sciences at Tampere University focuses on numerical electromagnetics and magnetic materials.

We work at the interface of electromagnetic theory, computational science, physics of magnetic materials and electrical engineering applications of practical importance. Our vision is to integrate advanced electromagnetic modeling tools together with practical design of electromagnetic energy conversion devices, such as electrical machines, transformers, inductors and energy harvesters.

We are taking part in an Academy of Finland Centre of Excellence (CoE) on “High-Speed Electromechanical Energy Conversion Systems”.

The CoE aims at the development of next generation high-speed electrical machines for energy conversion and transport applications. Our part is related to the development of numerical modeling techniques for the high-frequency behavior of electrical machine windings. We are also running a 5-year European Research Council funded project “Multiscale Magnetic Models for Emerging Energy Conversion Applications” related to the development of electromagnetic modeling tools for passive magnetic components used in power electronics applications.

JOB DESCRIPTION

We are now looking for a postdoctoral researcher for working with electromagnetic modeling of windings or passive magnetic components at high frequencies.

The work comprises of development of new finite element (FE) modeling techniques and/or power loss models for magnetic cores, and application of them to high-speed electrical machines or high-frequency transformers.

The work is expected to be carried out with suitable open-source tools (such as MFEM, GetDP, Sparselizard or NGSolve). Commercial FE software (mainly COMSOL Multiphysics) may be used for validation purposes, but not as the main research tool. See the following articles as examples of our

earlier research in the field:

- https://doi.org/10.1109/TMAG.2020.3024158
- https://doi.org/10.1109/TMAG.2019.2950181
- https://doi.org/10.1109/TPEL.2018.2835661

Participation in project management and instruction of Ph.D. students is required. The job requires occasional traveling to international conferences to disseminate the research results. International research visits to other universities or research institutes are also possible.

REQUIREMENTS

A successful candidate holds a Ph.D. in electrical engineering, electromagnetics or applied mathematics and is familiar with electrical machines or magnetic components. They possess the relevant theoretical skills and can demonstrate previous experience in programming or developing FE tools for numerical analysis. In addition, experience on some of the following topics is required:

- Numerical techniques such as domain decomposition, model order reduction or homogenization
- So-called Darwin formulations for accounting for displacement currents in electromagnetic simulations
- Modern mathematics (e.g. differential forms) in modeling
- Modeling of magnetic materials (in particular tape-wound magnetic cores)
- Design and experimental work related to magnetic components (in particular design of high-frequency transformers or loss measurements in magnetic materials)

The position also requires:

- Good English language skills
- Ability to independently conduct systematic scientific research
- Ability to work in a team and communicate clearly in a multidisciplinary and international environment
- Tampere University is a unique, multidisciplinary and boldly forward-looking, evolving community. Our values are openness, diversity, responsibility, courage, critical thinking, erudition, and learner-centredness. We hope that you can embrace these values and promote them in your work.

WE OFFER

The position will be filled for a full time. The starting date will be mutually agreed. A trial period of six months applies to all our new employees.

The salary will be based on both the job requirements and the employee's personal performance in accordance with the Finnish University Salary System. According to the criteria applied to teaching and research staff, the position of a Postdoctoral Research Fellow is placed on level 5-6 of the job requirements scale, depending on career stage. A typical starting salary for a Postdoctoral Research Fellow is 3500 EUR per month. The salary increases based on experience.

Tampere University offers many benefits to its employees, e.g. occupational health services, flexible working hours, high-quality sport services and affordable lunch opportunities on campus.

International HR services offer their help with e.g. official issues in settling in Finland and Tampere.

Tampere region is one of the fastest growing city areas in Finland. Tampere is the largest inland city in the Nordic countries and a traditional centre of the Finnish industry. Today, the city is best known

for its high-tech expertise and extensive knowhow in various fields. Tampere is also the most popular city in Finland for higher education studies.

HOW TO APPLY

Please submit your application through our online recruitment system (link below). Applications and all accompanying documentation must be in English.

The following documents should accompany your application:

- a CV (with a list of publications)
- a free-form application letter including names of two referees (max. 1 page)
- degree certificates
- other relevant documents that support your application (e.g. D.Sc. thesis, the most relevant publications regarding the call (max. 2), examples of numerical models you have developed, etc.)

For questions and more information, please contact:

Associate Professor Paavo Rasilo, **paavo.rasilo (at) tuni.fi**, +358 40 849 0409

Job details

Title: Postdoctoral Research Fellow (Computational electromagnetics)

Employer: Tampere University

Location: Kalevantie 4 Tampere, Finland

Job type: Postdoc

Field: Applied Mathematics, Computational Physics, Electrical Engineering, Electromagnetism

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