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Post-Doctoral Researchers And Researchers In Applied Mathematics And Machine Learning

Ecole/Institution/Société:
LUT University, **Finland / Lappeenranta**

Discipline:
Applied Mathematics, Machine Learning

Type d'emploi::
Full-time

Date de publication:
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Personne à contacter:
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JOB DESCRIPTION

The Department of Computational Engineering (CopE) is a unit of the LUT School of Engineering Science (LENS) at LUT University, Finland. In research and education, the department specialises in computational science and data-centric engineering. CopE is well known for its expertise in inverse problems, computer vision and pattern recognition. The department has been evaluated as a high-quality research unit carrying out basic and application-oriented research with an impact on science and industrial applications.

To strengthen its competence in selected areas and further integrate its research groups representing applied mathematics and computer science and engineering, CopE is opening five post-doctoral researcher / researcher positions in the following areas for application:

- data analytics for environmental and industrial applications
- foundations of machine learning
- numerical analysis
- generative adversarial networks for industrial applications
- statistical inverse problems

The details of each position and how to apply are available below.

Post-doctoral researcher in data analytics for environmental and industrial applications

The Department of Computational Engineering (CopE) of the LUT School of Engineering Science is looking for a post-doctoral researcher in data analytics for environmental and industrial applications to strengthen the department's research on water resource engineering and the state of the environment.

Data analytics focuses on extracting insights from data, and it plays a major global role in the digital transformation of monitoring and decision-making. The development and basis of analytical tools should arise from strong expertise in computational engineering and mathematics. Strengthening competence in data analytics is part of the department's recently revised research and education

strategy.

Data analytics combines the expertise of the department's two main research groups, Uncertainty Quantification and Inverse Problems (UQIP) and the Computer Vision and Pattern Recognition Laboratory (CVPRL). CopE has focused on the environmental monitoring of the Baltic Sea and natural inland lakes, industrial emission plumes, and effects of effluents on catchment areas.

An example is the use of hyperspectral images in various satellite missions, including EnMAP, PRISMA, Chime, and AVIRIS-NG, in preparation for the forthcoming NASA mission on Surface Biology and Geology. Another competence area is the development of adequate data-centric methodology and analytics to extract information provided by real-time (spectral) instruments applied in manufacturing processes.

For example, online monitoring via spectral instruments in refineries, mining and the food industry have been in the spotlight. The post-doctoral researcher will concentrate on developing data-centric approaches for applications and participate in academic teaching and the planning of new research.

You should have a PhD or DSc (Tech.) Degree in a relevant field (eg mathematics, physics or computer science). A strong background in the field of applied mathematics and good communications skills in English are required. Experience in environmental, chemical or sustainability engineering is considered an advantage. The work will start as soon as possible.

For further information, please contact Professor Satu-Pia Reinikainen (firstname.lastname@lut.fi).

Post-doctoral researcher in the foundations of machine learning

The Department of Computational Engineering of the LUT School of Engineering Science is looking for a postdoctoral researcher in the foundations of machine learning (ML) to strengthen the department's focus on ML-enhanced computational engineering (research) and data-centric engineering (education / research).

Machine learning as a form of artificial intelligence has been adopted by practically all fields of science and industry. Despite its major successes in a variety of applications, theoretical research is needed to remedy its present challenges especially in safety-critical applications. This calls for research on the foundations of ML related to the robustness and explainability of the methods.

The researcher appointed to the position must present strong merits in basic research on ML, including evidence of individual method development and applications of the methods. Examples of suitable areas of expertise include but are not limited to the following:

- explainable Bayesian surrogate models for deep neural networks
- hybrid models combining physical and black-box models
- data biases, distribution shifts and model calibration

The post-doctoral researcher will focus on basic research on ML and participate in academic teaching. You should have a PhD or DSc (Tech.) Degree in a relevant field (mathematics or computer science). A strong background in ML and good communications skills in English are required. The work will start as soon as possible.

For further information, please contact Associate Professor Lassi Roininen (firstname.lastname@lut.fi) or Professor Lasse Lensu (firstname.lastname@lut.fi).

Post-doctoral researcher in numerical analysis

The Department of Computational Engineering of the LUT School of Engineering Science is looking

for a post-doctoral researcher in applied mathematics to strengthen the department's research activities at the interface of numerical analysis and inverse problems.

The numerical analysis research at the department currently deals with computational fluid dynamics and finite element methods (in particular, discontinuous Galerkin and hybrid methods) with applications varying from soil science to engineering and astrophysics. The research group Uncertainty Quantification and Inverse Problems (UQIP) focuses on applied statistics and inverse problems. The UQIP group is part of the Center of Excellence of Inverse Modeling and Imaging (2018–2025) of the Academy of Finland.

The main objective of the position is to strengthen collaboration between the numerical analysis and UQIP research groups. The post-doctoral researcher will focus on developing numerical methods in partial differential equations for applications and related inverse problems. The researcher will contribute to ongoing industrial projects which are related to the subject area. The research topics can be adjusted to the background of the applicant.

You should have a PhD or DSc (Tech.) Degree in a relevant field (eg mathematics, physics or computer science). A strong background in the field of applied mathematics and good English skills are required. The work will start as soon as possible.

For further information, please contact Associate Professor Tapio Helin (firstname.lastname@lut.fi) or Assistant Professor Andreas Rupp (firstname.lastname@lut.fi).

Post-doctoral researchers

In addition to a doctoral degree, a post-doctoral researcher is required to have the ability for independent scientific work and teaching skills in the performance of the duties.

The employment contract of a post-doctoral researcher is fixed-term (2 + 2 years). The positions include a six-month trial period and the salary is determined according to the salary system for university teaching and research personnel. The annual salary range of post-doctoral researchers is approximately 45 600-54,000 euros (gross income including holiday bonus) depending on the qualifications and experience of the candidate.

Researcher in generative adversarial networks for industrial applications

The Department of Computational Engineering of the LUT School of Engineering Science is looking for a post-doctoral researcher in generative adversarial networks for industrial applications to continue and strengthen research collaboration between academia and industry.

The main objective of the project is to develop cross-modal translation methods based on generative adversarial networks (GANs). These methods enable transforming data between a variety of modalities, such as images, X-ray measurements and laser point clouds.

  The main application area will be industrial data analysis focusing especially on the sawmill industry, where versatile measurement data will be analyzed for process optimization purposes. However, the research will aim for generic methods that can be applied to a wide variety of applications, including multimodal medical image analysis.

The researcher will focus on the development and implementation of GAN-based methods. You are expected to have a doctoral degree, such as PhD or DSc (Tech.), In a relevant field (computer science or mathematics). A strong background in machine learning and good English skills are required.

For further information, please contact Associate Professor Tuomas

Eerola **(**firstname.lastname@lut.fi**).**

Researcher in statistical inverse problems

The research group Uncertainty Quantification and Inverse Problems focuses on applied statistics and inverse problems. We specialize in Bayesian statistical inverse problems: addressing real-world inverse problems as Bayesian statistical estimation problems. We study how statistical errors in measured data propagate to solutions within the complex mathematical models of inverse problems. Our group at the School of Engineering Science is part of the Center of Excellence of Inverse Modeling and Imaging (2018–2025) of the Academy of Finland.

The position focuses on research at the interface of inverse problems and statistics. The research topics can be adjusted to the background of the applicant.

You are expected to have a doctoral degree, such as PhD or DSc (Tech.), In a relevant field (eg mathematics, physics or computer science). A strong background in the field of applied mathematics and good English skills are required. The work will start as soon as possible.

For further information, please contact Associate Professor Tapio Helin (firstname.lastname@lut.fi).

Researchers

The employment contract of a researcher is fixed-term (2 years). The position includes a six-month trial period and the salary of the researcher is determined according to the salary system for university teaching and research personnel. The annual salary range of researchers is approximately 45 600-54,000 euros (gross income including holiday bonus) depending on the qualifications and experience of the candidate.

How to apply

- your CV
- a motivation letter for the applied position
- a copy of your academic degree certificate and transcript of records; if the original documents are not in English, Finnish or Swedish, each document must be accompanied by an official certified translation into English or Finnish.

Please specify the position / positions applied to.

Only applications submitted through the university's online application system will be considered.

Join our team of trailblazers. Clean energy, water and air are life-giving resources for which we at LUT University seek new solutions with our expertise in technology and business. We help society and businesses in their sustainable renewal. Our international community consists of 6500 members. Our modern campuses are in Lappeenranta and Lahti. Video of our strategy: https://youtu.be/PpFawdT8CDE

Technical support for using the recruitment system: recruitment@lut.fi

JOB DETAILS

Title   Post-doctoral researchers and researchers in applied mathematics and machine learning

Employer   LUT University

Job location Skinnarilankatu 34, 53850 Lappeenranta

Job types Postdoc

Fields Statistics, Data Mining, Data Structures, Analysis, Applied Mathematics, Computational Mathematics, Computational Engineering, Machine Learning

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