Postdoctoral researcher on mathematical optimization

Specifications

- Postdoc positions; Research, Development, Innovation
- Engineering
- max. 38 hours per week, temporary
- €3255—€4274 per month
- Doctorate
- 3mE19-25

JOB DESCRIPTION

As systems become more complex and multidisciplinary, design of these systems also becomes more complicated. To assist design of such systems, physical models and computational tools are needed for their analysis and optimization. Our research focus is on the development of such advanced (computational) design techniques, combined with the understanding and design of innovative mechanical devices.

Supported by vast experience in structural optimization and modeling available in Precision and Microsystems Engineering (PME) with the mathematical optimization and machine learning expertise in the Delft Center for Systems and Control (DCSC), the candidate will fuse the worlds of artificial intelligence and structural optimization. To that end, the candidate will develop, conduct, and supervise research on AI-based optimization applied to structural systems (machine learning algorithms with novel regularization techniques for scarce training data, applied to problems in structural mechanics).

The tasks to be performed include:

- Learning about finite element modeling and topology optimization.
- Learning recent advances in modern convex optimization theory emerging in machine learning applications, in particular kernelized methods and distributionally robust optimization.
- Developing new numerical algorithms by leveraging these modern tools for the problem of topology optimization.
- Inspiring MSc and PhD students through teaching and supervision.

REQUIREMENTS
The applicants should have the following qualifications:

- PhD in Engineering, Mathematics, Computer Science, or a related area with a strong background on mathematical optimization and/or machine learning. Knowledge of topology optimization (gradient-based) and finite element methods will be considered an asset, though not necessary.
- A solid publication record.
- A good programming experience. Most of the programming tasks will be executed in Python, but knowledge of C/C++ will be an asset.
- Proactive, team player attitude and good communication skills.

CONDITIONS OF EMPLOYMENT

TU Delft offers a customisable compensation package, a discount for health insurance and sport memberships, and a monthly work costs contribution. Flexible work schedules can be arranged. An International Children’s Centre offers childcare and an international primary school. Dual Career Services offers support to accompanying partners. Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities.

EMPLOYER

Delft University of Technology

Delft University of Technology (TU Delft) is a multifaceted institution offering education and carrying out research in the technical sciences at an internationally recognised level. Education, research and design are strongly oriented towards applicability. TU Delft develops technologies for future generations, focusing on sustainability, safety and economic vitality. At TU Delft you will work in an environment where technical sciences and society converge. TU Delft comprises eight faculties, unique laboratories, research institutes and schools.

https://www.tudelft.nl

DEPARTMENT

Faculty Mechanical, Maritime and Materials Engineering

The 3mE Faculty trains committed engineering students, PhD candidates and post-doctoral researchers in groundbreaking scientific research in the fields of mechanical, maritime and materials engineering. 3mE is the epitome of a dynamic, innovative faculty, with a European scope that contributes demonstrable economic and social benefits.

The Department of Precision and Microsystems Engineering (PME) focuses on developing knowledge and methods for small, innovative, high-precision devices and systems, such as
precision equipment and scientific instrumentation for the high-tech industry. Increasing miniaturisation and function density along with improving precision, speed and reliability are the key topics in our work. Our approach is multidisciplinary, fundamental and inspired by industry needs.

The department Delft Center for Systems and Control (DCSC) of the faculty Mechanical, Maritime and Materials Engineering, coordinates the education and research activities in systems and control at Delft University of Technology. The Centers' research mission is to conduct fundamental research in systems dynamics and control, involving dynamic modelling, advanced control theory, optimization and signal analysis. The research is motivated by advanced technology development in physical imaging systems, robotics and transportation systems.

https://www.tudelft.nl/en/3me

ADDITIONAL INFORMATION

For more information about this position, please contact Alejandro M. Aragón, Assistant Professor, email: a.m.aragon@tudelft.nl, tel. +31 (0)15 2782267. For information about the selection procedure, please contact Irina Bruckner, HR advisor, email: application-3mE@tudelft.nl.

Applications should include: a letter of motivation, a detailed CV including publication list, summary of academic record or research experience, abstract of PhD thesis (1 page), preferred starting date, proof of English language skills (if applicable), and names of three references. Please submit all these documents in one single pdf file (max. 6 MB) by 31 May 2019 to Irina Bruckner, application-3mE@tudelft.nl. When applying for this position, please refer to vacancy number 3mE19-25.