



PhD position Distributed Optimization in Cyber-Physical Networks

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Do you want to work on fundamental research problems for the next generation of fast and distributed optimization and optimal control algorithms?

Job description

This position aims at improving our understanding and control of cyber-physical systems composed of a large number of interconnected and embedded components. Such networks of systems contain a huge number of sensors and actuators that generate a tremendous amount of data to be processed in real-time in order to increase the autonomy of the participating entities, or accomplish a high level of automation.

We are looking for a talented, motivated and outstanding Ph.D. candidate with enthusiasm for fundamental research challenges at the interface of Systems and Control Theory, Optimization, and Operations Research in order to develop new theories, methodologies, algorithms, and numerical tools to optimize over such complex networked systems.

The successful candidate will be supervised by Tamas Keviczky (TU Delft), and will conduct both theoretical and algorithmic/applied research on the development and validation of optimization and control strategies that allow distributed and fast solutions in an embedded (resource constrained) environment. The list of envisioned activities include:

- Development of novel distributed optimization algorithms for large-scale systems
- Accelerated optimization algorithm design from a controls/dynamical systems perspective
- Applications in learning and estimation, control and decision-making problems associated with cyber-physical networks

We offer the opportunity to perform scientifically challenging research in a multi-disciplinary research group in collaboration with several key academic (and industrial) partners working on next-generation distributed control and optimization solutions. The PhD student will also be able to participate in the research school DISC.

Department

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 and machine learning, advanced control theory, AI, optimization and signal analysis. The research is motivated by advanced technology development in physical imaging systems, renewable energy, health and biomedical technology, robotics, and transportation systems.

Requirements

- Candidates for this challenging project should have an MSc degree and background in e.g., systems and control, operations research, applied mathematics, electrical/mechanical engineering, or related field.
- The candidate should demonstrate a strong mathematical background in terms of optimization and preferably also systems and control theory.
- A successful candidate should have good programming skills, an ability and interest to conduct interdisciplinary research, and act as a team player who is willing to actively participate and initiate national/international collaborations with fellow researchers across diverse scientific fields, potential industrial partners, and other stakeholders.
- In addition, excellent written and oral communication skills in English are important for this position (Dutch not required).

Doing a PhD at TU Delft requires English proficiency at a certain level to ensure that the candidate is able to communicate and interact well, participate in English-taught Doctoral Education courses, and write scientific articles and a final thesis. For more details please check the [Graduate Schools Admission Requirements](#).

Conditions of employment

Doctoral candidates will be offered a 4-year period of employment in principle, but in the form of 2 employment contracts. An initial 1,5 year contract with an official go/no go progress assessment within 15 months. Followed by an additional contract for the remaining 2,5 years assuming everything goes well and performance requirements are met.

Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities, increasing from € 2443 per month in the first year to € 3122 in the fourth year. As a PhD candidate you will be enrolled in the TU Delft Graduate School. The TU Delft Graduate School provides an inspiring research environment with an excellent team of supervisors, academic staff and a mentor. The Doctoral Education Programme is aimed at developing your transferable, discipline-related and research skills.

The TU Delft offers a customisable compensation package, discounts on health insurance and sport memberships, and a monthly work costs contribution. Flexible work schedules can be arranged. For international applicants we offer the Coming to Delft Service and Partner Career Advice to assist you with your relocation.

TU Delft (Delft University of Technology)

Delft University of Technology is built on strong foundations. As creators of the world-famous Dutch waterworks and pioneers in biotech, TU Delft is a top international university combining science, engineering and design. It delivers world class results in education, research and innovation to address challenges in the areas of energy, climate, mobility, health and digital society. For generations, our engineers have proven to be entrepreneurial problem-solvers, both in business and in a social context. At TU Delft we embrace diversity and aim to be as inclusive as possible (see our [Code of Conduct](#)). Together, we imagine, invent and create solutions using technology to have a positive impact on a global scale.

Challenge. Change. Impact!

Faculty Mechanical, Maritime and Materials Engineering

The Faculty of 3mE carries out pioneering research, leading to new fundamental insights and challenging applications in the field of mechanical engineering. From large-scale energy storage, medical instruments, control technology and robotics to smart materials, nanoscale structures and autonomous ships. The foundations and results of this research are reflected in outstanding, contemporary education, inspiring students and PhD candidates to become socially engaged and responsible engineers and scientists. The faculty of 3mE is a dynamic and innovative faculty with an international scope and high-tech lab facilities. Research and education focus on the design, manufacture, application and modification of products, materials, processes and mechanical devices, contributing to the development and growth of a sustainable society, as well as prosperity and welfare.

Click [here](#) to go to the website of the Faculty of Mechanical, Maritime and Materials Engineering. Do you want to experience working at our faculty? This [video](#) will introduce you to some of our researchers and their work.

Additional information

For more information about this vacancy, please contact Prof. Tamás Keviczky, t.keviczky@tudelft.nl.

For information about the application procedure, please contact Hilma Bleeker, HR Advisor, application@tudelft.nl.

Application procedure

Are you interested in this vacancy? Please apply by 31 August 2022 via the application button and upload:

- a cover letter stating your motivation,
- detailed curriculum vitae (including a list of publications, if any),

- names of up to three professional referees,
- a summary of your MSc thesis,
- list of courses and grades at Master and Bachelor level (in English).

A pre-employment screening can be part of the selection procedure.

You can apply online. We will not process applications sent by email and/or post.
Acquisition in response to this vacancy is not appreciated.

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