

PhD position in Learning and Control with Application to Dynamic Wind Turbine control

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Job description

The amount of data in future engineered systems is growing exponentially. By involving techniques from the rapidly emerging fields of Artificial Intelligence (AI) and Machine Learning (ML), control can take advantage to achieve next-level performance. A prominent challenge is to bridge the gap between the techniques from AI and ML, and established control and identification methodologies that have been extensively developed and proven their effectiveness in the last decades.

Within our data-driven control research group, we are looking for an enthusiastic and ambitious PhD candidate with a strong background in control and system modeling. The group has a strong history in control for wind energy (wind turbines and wind farms), with a strong impact through practical applicability. This PhD position is unique in the opportunity to directly apply results to state-of-the-art systems, possibly together with renowned industrial partners. Also, the exact application and course of the trajectory are flexible.

Some keywords and techniques from the field of control and system identification that are actively used in our group are:

- Machine learning, including Gaussian processes and Neural networks
- Direct data-driven control
- Adaptive and learning control
- System identification
- (First-principles) system modeling
- Frequency domain analysis / Loop-shaping
- Multivariable control

Knowledge of the following software tools is a plus:

- MATLAB / Simulink
- Python (NumPy, SciPy, Pandas, ...)
- LaTeX (optional)
- C / C++ (optional)
- FAST / SOWFA (optional)

We are specifically looking for candidates with a relevant background and strong interest in the above sketched research domains. Do the following techniques resonate excitement with you? Then you might be the right candidate for this position. Please do not hesitate to get in touch with us for more information. A short description of your motivation and an up-to-date curriculum vitae is required to apply for this position.

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

Requirements

The successful candidate has the following qualifications:

- An MSc. degree in systems and control (control engineering), mechatronics, mechanical engineering, aeroelastics or a related field.
- Fundamental knowledge in the field of control and/or mechanics.
- Good programming skills are a plus: MATLAB/Simulink, Python, Git.
- You enjoy to work independently: Creativity, auto-didactic capabilities, and a strong research-oriented attitude are an absolute must.
- Fluency in English.
- The capacity to communicate effectively with peers, students and stakeholders in the application field.
- An open personality and good communication skills in written and spoken English. You thrive in transferring knowledge and presenting your work to larger audiences.
- Ability to present challenges and results clearly during progress meetings.
- Potential in being a positive and open-minded supervisor for (graduate) students.

Conditions of employment

TU Delft offers PhD-candidates a 4-year contract, with an official go/no go progress assessment after one year. Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities, increasing from € 2434 per month in the first year to € 3111 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 Sebastiaan Mulders, Postdoctoral researcher, email: s.p.mulders@tudelft.nl, Jan-Willem van Wingerden, Full professor, e-mail: j.w.vanwingerden@tudelft.nl, or Tom Oomen, Full professor, e-mail: t.a.e.oomen@tue.nl.

For information about the selection procedure, please contact Hilma Bleeker, HR Advisor, email: application-3mE@tudelft.nl.

Application procedure

Are you interested in this position, please apply before 31 January 2022 via the application button and upload:

1. a detailed curriculum vitae that explicitly states your educational record, recent major achievements, list of publications,
2. a separate motivation letter stating why the proposed research topic interests you,
3. a vision on research and education, and
4. the names of three persons who could be contacted for a reference and any other information that might be relevant to your application.

The available position will be filled as soon as possible (i.e. once a suitable candidate is found). This means that the selection of candidates will already start before the application deadline.

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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