

# PhD Position Cooperative and Distributed Data-Driven Control with Applications in Agriculture

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## Job description

To deal with uncertainties and the increasing complexity in plants to be controlled, data-driven methods have been developed to synthesize feedback controllers directly from data. These data-driven control methods have a wide range of applications in both natural and man-made systems. On the other hand, control of a network of subsystems is an important topic inspired by various engineering applications.

This project focuses on the development and application of cooperative and distributed data-driven control approaches in agriculture. Rapid human population growth results in high global food demand. Producing nutrient dense foods with minimal environmental impact has become crucial. As control engineers, our opportunities lie in developing advanced control approaches to increase production efficiency, reduce climate impact, and improve sustainability.

Motivated by applications such as the cooperative control of sensor networks and distributed regulation problems in open-field farming, this PhD project aims at developing data-driven control approaches for multi-agent and/or large-scale systems. Relevant research questions include what are the necessary data and information to be collected and exchanged for designing distributed controllers, how to achieve optimality for the subsystems via data, and how to improve the scalability of the control design with respect to time and spatial scales. Learning from the state-of-the-art in data-driven control, novel approaches will be developed for multi-agent and/or large-scale systems.

## Requirements

We are looking for a candidate who has:

- a Master degree in systems and control, applied mathematics, electrical engineering, or a related field with a strong background in control theory;
- a strong mathematical background is a plus;
- experience in data-driven control, distributed control, or agriculture applications is a plus.

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 € 2541 per month in the first year to € 3247 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 as one of our core [values](#) and we actively [engage](#) to be a university where you feel at home and can flourish. We value different perspectives and qualities. We believe this makes our work more innovative, the TU Delft community more vibrant and the world more just. Together, we imagine, invent and create solutions using technology to have a positive impact on a global scale. That is why we invite you to apply. Your application will receive fair consideration.

Challenge. Change. Impact!

## Faculty Mechanical, Maritime and Materials Engineering

From chip to ship. From machine to human being. From idea to solution. Driven by a deep-rooted desire to understand our environment and discover its underlying

mechanisms, research and education at the 3mE faculty focusses on fundamental understanding, design, production including application and product improvement, materials, processes and (mechanical) systems.

3mE is a dynamic and innovative faculty with high-tech lab facilities and international reach. It's a large faculty but also versatile, so we can often make unique connections by combining different disciplines. This is reflected in 3mE's outstanding, state-of-the-art education, which trains students to become responsible and socially engaged engineers and scientists. We translate our knowledge and insights into solutions to societal issues, contributing to a sustainable society and to the development of prosperity and well-being. That is what unites us in pioneering research, inspiring education and (inter)national cooperation.

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? These [videos](#) will introduce you to some of our researchers and their work.

## Additional information

For more information about this vacancy, please contact Meichen Guo, [m.guo@tudelft.nl](mailto:m.guo@tudelft.nl).

## Application procedure

Are you interested in this vacancy? Please apply by 17 April 2023 via the application button and upload:

1. a detailed curriculum vitae stating your education record, and (if applicable) recent major achievements and a list of publications,
2. a letter of motivation and research interests,
3. up to 3 research-oriented documents authored by the applicant (e.g. thesis, journal/conference publication)
4. your BSc and MSc course program and the corresponding marks
5. contact information of 2 to 3 academic references.

For information about the application procedure, please contact Irina Bruckner, HR advisor, [recruitment-3mE@tudelft.nl](mailto:recruitment-3mE@tudelft.nl).

Please note:

- 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.
- Please do not contact us for unsolicited services.

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