Delft Center for Systems and Control

TU Delft
Delft University of Technology

PhD Position in Control Theory and Machine Learning for Robust and Sustainable Plants Models at CropXR/TU Delft

Apply Now

Challenge: Analyse properties of biological systems

Change: Develop novel control theory and machine learning methods to study natural systems and their robustness

Impact: Produce new intelligent, possibly data-driven, methods for breeding extra resilient crops

Job description

TU Delft is a top tier university and is exceedingly active in the field of Artificial intelligence and Control Systems. With a budget of 96 million Euro over the next decade, CropXR focuses on creating eXtra Resilient (XR), sustainable, and climate-adaptive crops. By combining plant biology, simulation modelling, and artificial intelligence we aim to develop ‘smart breeding and cultivation’ methods to speed up breeding for complex resilience traits in different growing systems for several crops. This collaborative effort involves four universities, numerous companies, and encompasses scientific research, data collection and sharing, education, and practical applications in agriculture and plant breeding.

On this PhD project you will develop novel systems biology methods employing control and analysis of dynamical models, and machine learning models, in particular neural networks. The developed methods will be employed to formally study combinations of mechanistics models commonly used in biology with data-driven (AI) models from genomic data. You will guide parameter estimation and synthesis of models of molecular processes combining data and mechanistic insights.

You will work at the Delft Centre of Systems and Control (DCSC) and will be supervised by Luca Laurenti & Manuel Mazo.

The Delft Centre for Systems and Control (DCSC) coordinates the education and research activities in systems and control at Delft University of Technology. The Centre's research mission is to conduct fundamental research in systems dynamics and control, involving dynamic modelling, advanced control theory, optimisation and signal analysis. The research is motivated by advanced technology development in physical imaging systems, robotics and transportation systems. The group actively participates in the Dutch Institute of Systems and Control (DISC).

CropXR was launched in 2023 to help make agricultural production less vulnerable to climate change and less dependent on artificial fertilizers and chemical pesticides. The institute is a joint venture of the universities of Amsterdam, Delft, Wageningen and Utrecht in partnership with Plantum, the Dutch plant breeding sector association.

CropXR brings together efforts from different academic disciplines (such as plant sciences, computational and data sciences, and social sciences) and private industry to help bring about sustainable change. It receives support from NWO, the Dutch National Growth Fund, and the Foundation for Food & Agricultural Research. Learn more about CropXR at cropx.org.

Requirements

- An MSc degree in systems and control, applied mathematics, electrical engineering, computer science, or related fields.
- Basic knowledge of control theory and/or machine learning (waived if the candidate is particularly skilled on theoretical computer science, optimization, or system biology).
- Strong analytical skills and an ability to work at the intersection of several research domains, in particular control theory, computer science, and biology.
- Basic programming skills are expected.
- Good command of the English language and good communication skills.

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 € 2770 per month in the first year to € 3539 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 a monthly work costs contribution. Flexible work schedules can be arranged.

For international applicants, TU Delft has the Coming to Delft Service. This service provides information for new international employees to help you prepare the relocation

and to settle in the Netherlands. The Coming to Delft Service offers a Dual Career Programme for partners and they organise events to expand your (social) network.

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 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 ME faculty focusses on fundamental understanding, design, production including application and product improvement, materials, processes and (mechanical) systems.

ME 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 ME'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 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 Luca Laurenti l.laurenti@tudelft.nl or Manuel Mazo, m.mazo@tudelft.nl.

Application procedure

Are you interested in this vacancy? Please apply before 15 May 2024 via the application button and upload:

- 1-page motivation letter
- your CV
- academic transcripts of both your BSc and MSc degrees
- a (part of your) M.Sc. thesis
- a scientific report, or a paper that you have written, in which you demonstrate your writing skills.

Please highlight in your motivation letter and/or CV examples of projects and achievements that demonstrate your relevant competences

For information about the application procedure, please contact our HR advisor by sending an email to recruitment-me@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.

Apply Now