



Delft Center for Systems and Control



Delft University of Technology

The [Delft Center for Systems and Control](#) (DCSC) of [Delft University of Technology](#), The Netherlands has a vacancy for a 2-year **postdoc position** on

Integrated optimization- and learning-based multi-agent control of large-scale networks with hybrid dynamics

Project description

In this postdoc project we will develop integrated optimization-based and learning-based control methods for large-scale hybrid systems – in particular network systems with piecewise affine (PWA) dynamics. More specifically, the aim is to develop innovative approaches to combine model predictive control (MPC) and reinforcement learning so as to merge the advantages of both approaches, and to embed them in a distributed/multi-agent control setting. The key challenge will be to determine efficient approaches to obtain coordination among the control agents. We will also investigate performance-related topics such as stability, computational complexity, error bounds, formal or probabilistic performance guarantees, robustness, finite-termination effects, safety, etc.

Applications for the case studies include multi-modal intelligent transportation networks and smart multi-energy networks.

The postdoc project has a distinct fundamental flavor and is part of the European ERC Advanced Grant project CLariNet (A novel control paradigm for large-scale hybrid networks). The goal of CLariNet is to create a novel paradigm for control of large-scale networks with hybrid dynamics by bridging the gap between optimization-based control and learning-based control. The breakthrough idea is to bridge that gap by using piecewise affine models and to unite the optimality of optimization-based control with the on-line tractability of learning-based control.

The postdoc will join our machine learning and optimization team at the Delft Center for Systems and Control (DCSC) of Delft University of Technology. At the DCSC, our mission is to conduct foundational research in systems and control, involving dynamic modeling, advanced control theory, and optimization with societally important application fields including energy, transportation, and sustainability.

What do we ask?

This position is perfect for you if you have a PhD degree in systems and control, computer science, AI, applied mathematics, or a related field, and with a strong background in optimization-based control and machine learning, in particular reinforcement learning. You are also expected to work on the boundary of several research domains. A good command of the English language is required.

What do we offer?

We offer the opportunity to do scientifically challenging research in a multi-disciplinary research group. The appointment will be for up to 2 years. As an employee of the university you will receive a competitive salary starting of EUR 4036 gross per month in the first year and rising to a maximum of EUR 5090 gross per month based on a full-time appointment, as well as excellent secondary benefits in accordance with the Collective Agreement (CAO) of the Association of Universities in the Netherlands (VSNU). Assistance with accommodation can be arranged.

The position can either be a full-time one, or if the successful candidate requests it, a part-time one (80 % or higher). In accordance with the equal opportunity policy of Delft University of Technology female candidates are in particular encouraged to apply.

How to apply?

Are you interested in this vacancy? Please apply by January 8, 2024 via the “Apply now” button on the application webpage

<https://www.tudelft.nl/over-tu-delft/werken-bij-tu-delft/vacatures/details?jobId=15065>

and upload your letter of application along with a detailed curriculum vitae, a motivation why the proposed research topic interests you, a list of publications, the abstract and/or summary of your PhD thesis, your MSc course program and the corresponding marks, names and addresses of three reference persons, and all other information that might be relevant to your application.

More information on this position can be obtained from Bart De Schutter (email: b.deschutter_at_tudelft.nl).

The application deadline for the position is January 8, 2024. However, the position will stay open until a suitable candidate has been found.