

The Delft Center for Systems and Control of the Delft University of Technology, The Netherlands, announces a Ph.D. position on the topic

Development of novel
Hybrid Dynamical Models
for the study of Transportation Networks

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[Delft Centre for Systems and Control](#)

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, optimization and signal analysis. The research is motivated by advanced technology development in mechatronics and microsystems, sustainable industrial processes, transportation and automotive systems, and physical imaging systems. The group actively participates in the Dutch Institute of Systems and Control (DISC).

[General project description](#)

Transportation Networks are ubiquitous nowadays. A reliable, resilient, secure, and efficient operation of these systems (such as road traffic networks, railway networks, electricity networks, etc.) is of paramount importance both when the systems are operated to the limits of their performance during critical situations, as well as under regular operating conditions. This can translate into a significant societal impact involving economic growth and quality of life and the environment. A quantitative and formal understanding of this complex systems calls for the development of proper mathematical formalisms to model and analyze them.

Discrete-event systems are mathematical models developed to describe synchronization and concurrency for time-dependent, resource-constrained systems shared by multiple users. Hybrid Systems are dynamical models that, by construction, are suitable at describing complex systems, where analog/continuous/physical quantities interact with discrete/digital ones.

The major goal of this project is to introduce a novel formal mathematical framework that is capable of connecting the theory of classes of discrete-event systems with that of (probabilistic) hybrid systems. Secondly, the project will apply the generated model framework in the description, analysis, verification and control of classes of transportation networks. In particular, applications in intelligent traffic control will be developed in connection with the research team of Prof. Bart De Schutter at DCSC.

[Candidate profile](#)

We are looking for a candidate with an MSc degree, or equivalent (expected graduates are also welcome to apply). We are seeking a candidate with a strong background and interest in (applied) mathematics and/or systems and control theory. The candidate is expected to be

involved in fundamental research and in applications at the boundary of several research domains. A good command of the English language is also required.

Conditions of employment

We offer the opportunity to do fundamental research on scientifically challenging topics and to acquire a premier doctoral curriculum in Systems and Control Engineering. The PhD student will work in collaboration with other researchers in an international, multi-disciplinary research group at DCSC, the Delft Center for Systems and Control. DCSC is part of the Faculty of 3mE at TU Delft – Delft University of Technology. The PhD student will also participate in the national research school DISC (The Dutch Institute of Systems and Control).

The appointment will be for up to 4 years. As an employee of the university the student will receive a competitive salary starting at EUR 2042 gross per month in the first year and rising to a maximum of 2612 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 accommodations can be arranged.

Information and application

If you are interested in this position, please send:

1. a detailed curriculum vitae,
2. a research statement tailored to the proposed research topic,
3. a publication list and copies of the two most relevant articles (if applicable),
4. your BSc and MSc course program with corresponding grades (copy of official transcript),
5. names and addresses of (at least) two reference persons,
6. and all other information that might be relevant to support your application

to Dr. Alessandro Abate, email: a.abate@tudelft.nl

More information on this position can be obtained from Dr. Alessandro Abate, at http://www.dcsc.tudelft.nl/_aabate

The position will remain open until filled, however evaluations and possible interviews of candidates will start as early as Fall 2009.