2 PhDs: Dynamic Fleet Management for Autonomous Vehicles

Faculty/department Mechanical, Maritime and Materials Engineering
Level Master degree
Maximum employment Maximum of 38 hours per week (1 FTE)
Duration of contract 4 years
Salary scale €2174 to €2779 per month gross

Mechanical, Maritime and Materials Engineering

The 3mE Faculty trains committed engineering students, PhD candidates and post-doctoral researchers in groundbreaking scientific research in the fields of mechanical, maritime and materials engineering. 3mE is the epitome of a dynamic, innovative faculty, with a European scope that contributes demonstrable economic and social benefits.

The Transport Engineering and Logistics (TEL) section is part of the Department of Maritime and Transport Technology in the Faculty of Mechanical, Maritime and Materials Engineering (3mE) at Delft University of Technology. The focus is on the development, design, construction and operation of transport systems and equipment. Education and research deals with transport-related topics that involve both technological and logistic issues. This combination of transport technology and logistics is considered one of the strong points of the TEL section.

The Transport Engineering and Logistics section seeks two talented and ambitious PhD candidates for a challenging multidisciplinary research project on modelling, control, and management of fleets of cooperative vehicles. The PhD positions are defined within the framework of the NWO/STW Perspectief Programme "i-CAVE: Integrated Cooperative Automated Vehicles".

Job description

Cooperative driving solutions for areas such as business parks, leisure sites, port areas, or event sites demand efficient management of fleets of cooperative vehicles. This project considers the challenges at the logistics and system level for organisations owning fleets of cooperative vehicles. This encompasses the entire spectrum of logistics systems: fleet size selection, vehicle rostering and assignment, dispatching, repositioning, and maintenance. The aim is to develop efficient methods that will enable the efficient deployment and operation of such fleets of cooperative (automated) vehicles.

Within the framework of the project there will be two PhD positions that will focus on the above aspects from different perspectives.

PhD Project 1 will take a more application-oriented perspective. The PhD candidate working on this project will determine in close cooperation with industrial partners high-potential logistic applications that could be enabled with fleets of automated vehicles, and their possible interaction with traffic management. Integrating fleet system dynamics in models representing traffic, simulating the combined behaviour under varying fleet control strategies, and assessing the performance of the different control strategies are core parts of this project. This connects the fields of simulation systems, operations research, and transport sciences. The PhD candidate will have the unique opportunity to work with engineers at a leading company that designs the communities and cities of the future in

order to assess the potential of proposed methods in highly relevant case studies.

PhD Project 2 will take a more methodological, artificial intelligence and distributed control perspective. Automatic coordination strategies and planning algorithms that will maximise the performance of fleets of vehicles themselves or as a system will be proposed and investigated. Autonomous learning algorithms, e.g. using (multi-agent) reinforcement learning, and how to integrate expert knowledge will be formally analysed. State-of-the-art logistic service simulators will be used to investigate the technical and logistic performance that could be realised with the new fleet management strategies. The value of integrating real-time maps with up-to-date transport system conditions (e.g. related to travel times) will then also be explored.

Requirements

We are seeking two outstanding and enthusiastic researchers who have expertise and interest in one or more of the following areas:

- fleet management, logistics, intelligent transport systems, vehicle routing, traffic control;
- multi-agent systems, planning algorithms, artificial intelligence, computer science, automatic coordination / negotiation, modelling and control, control theory, optimisation.

You have obtained an MSc or an equivalent degree or expect to obtain an MSc very soon related to these areas (Transport and Logistics, Operations Research, Computer Science / AI). Good spoken and written English and the ability to work in a team are mandatory.

Conditions of employment

The TU Delft offers a customisable compensation package, a discount for health insurance and sport memberships, and a monthly work costs contribution. Flexible work schedules can be arranged. An International Children's Centre offers childcare and an international primary school. Dual Career Services offers support to accompanying partners. Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities.
As a PhD candidate you will be enrolled in the TU Delft Graduate School. The TU Delft Graduate School provides an inspiring research environment; an excellent team of supervisors, academic staff and a mentor; and a Doctoral Education Programme aimed at developing your transferable, discipline-related and research skills. Please visit http://graduateschool.tudelft.nl/ for more information.

Information and application

For more information about these positions, please contact R. R. Negenborn, phone: +31 (0)15-2786718, e-mail: r.r.negenborn@tudelft.nl. To apply, please e-mail an up-to-date, detailed curriculum vitae, a letter of application, a transcript of grades obtained during your MSc studies, and the names and contact information (telephone number and e-mail address) of two references by 30 April 2016 to: application-3mE@tudelft.nl.
When applying for one of these positions, please refer to vacancy number 3ME16-16 and specify for which position you are applying (PhD1 or PhD2).