

# PhD position

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## *Pedestrian/Cyclist Motion Prediction for Self-Driving Vehicles*

<b>Location</b>	Delft
<b>Scientific fields</b>	Engineering
<b>Hours</b>	38.0 hours per week
<b>Salary</b>	€ 2325 - € 2972
<b>Education</b>	University Graduate
<b>Job number</b>	3mE19-16
<b>Translations</b>	en
<b>About employer</b>	<a href="#">Delft University of Technology (TU Delft)</a>
<b>Short link</b>	<a href="http://www.academictransfer.com/53022">www.academictransfer.com/53022</a>
<b>PDF version</b>	<a href="#">here</a>

### **Job description**

The Intelligent Vehicles group at TU Delft ([www.intelligent-vehicles.org](http://www.intelligent-vehicles.org)) is seeking a PhD candidate with an interest in performing cutting edge research in the area of self-driving vehicles. This PhD position is part of the project "Safe interaction of automated vehicles with vulnerable road users" (SafeVRU). The project will develop sensing, intent recognition, and vehicle control strategies for the interaction of automated vehicles with vulnerable road users (VRU) such as pedestrians and cyclists. Several Dutch industry partners participate in this project (2getthere, TNO Automotive, NXP); beyond these, multiple collaborations with the European automotive industry exist.

The PhD position involves developing motion/behavior models for pedestrians/cyclists, that can accurately predict their future trajectories. These models are to be learned/parametrized using training data and will take into account sensor measurements (e.g. position, velocity, pose, gestures, and traffic environment) and prior knowledge (physical constraints, map data). A challenge is to deal with the uncertainty derived from imprecise sensor measurements and from highly maneuverable targets that can change their velocities abruptly (e.g. change of direction, start/stop walking). Several motion model types will be considered initially, based on explicit dynamics, trajectory learning and planning (agents). In particular, deep learning for motion prediction will be investigated.

### **Requirements**

Applicants should have a strong academic record with a solid background in computation, sensor processing (e.g. computer vision), machine learning and AI. Good programming skills are expected,

preferably in C++ and MATLAB/Python. Knowledge of deep-learning frameworks (TensorFlow/Torch/Caffe) and OpenCV/ROS/CUDA is a plus. A certain affinity towards turning complex concepts into real-world practice (i.e. vehicle demonstrator) is desired. Applicant(s) are expected to be able to act independently as well as to collaborate effectively with members of a larger team. Good English skills are required.

### **Conditions of employment**

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. 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 [www.tudelft.nl/phd](http://www.tudelft.nl/phd) for more information

### **Contract type**

Temporary, 4 years

### **Employer**

Delft University of Technology (TU Delft) is a multifaceted institution offering education and carrying out research in the technical sciences at an internationally recognised level. Education, research and design are strongly oriented towards applicability. TU Delft develops technologies for future generations, focusing on sustainability, safety and economic vitality. At TU Delft you will work in an environment where technical sciences and society converge. TU Delft comprises eight faculties, unique laboratories, research institutes and schools.

### **Department**

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 Cognitive Robotics department within the 3mE Faculty aims to develop intelligent robots and vehicles that will advance mobility, productivity and quality of life. Its mission is to bring robotic solutions to human-inhabited environments, focusing on research in the areas of machine perception, motion planning and control, machine learning, automatic control and interaction. The department combines fundamental research with work on physical demonstrators in areas such as self-driving vehicles, collaborative industrial robots, mobile manipulators and haptic interfaces. Collaborations exist with cross-faculty institutes (TU Delft Robotics Institute and TU Delft Transport Institute), the national robotic ecosystem (RoboValley, Holland Robotics) and international industry and academia. For more information, see [Cognitive Robotics \(CoR\)](#).

**Additional information**

For more information about this position, please contact Prof.dr. D.M. Gavrilă, e-mail: [D.M.Gavrila@tudelft.nl](mailto:D.M.Gavrila@tudelft.nl).

To apply, please submit:

- a letter of motivation explaining why you are the right candidate,
- a detailed CV,
- a complete record of Bachelor and Master courses (including grades),
- a link to your Master's Thesis (at least as draft),
- any publications, and a list of projects you have worked on with brief descriptions of your contributions (max 2 pages), and
- the names and contact addresses of two references.

All these items should be combined in one PDF document. Applications should be submitted as soon as possible by email to [Application-3mE@tudelft.nl](mailto:Application-3mE@tudelft.nl). When applying for this position, please refer to vacancy number 3mE19-16 in the subject of the email.