The Cognitive Robotics department at Delft University of Technology, The Netherlands, announce a vacancy for one

*PostDoc position*

**Interactive Reinforcement Learning**

## Job description

Programming and re-programming robots is extremely time-consuming and expensive, which presents a major bottleneck for new industrial, agricultural, care, and household robot applications. The goal of this project is to enable robots to learn how to perform manipulation tasks from few human demonstrations, based on novel interactive machine learning techniques. Robot learning will no longer rely on initial demonstrations only, but it will effectively use additional user feedback to continuously optimize the task performance. It will enable the user to directly perceive and correct undesirable behavior and to quickly guide the robot toward the target behavior. The PostDoc will explore various aspects of interactive reinforcement learning: learning force-interaction skills with user inputs, requesting additional advice, interactive reinforcement learning for sequences, and interactive inverse reinforcement learning. The approaches will be evaluated with generic real-world robotic force-interaction tasks related to handling and (dis)assembly. The potential of the newly developed teaching framework will be demonstrated with challenging bi-manual tasks and a final study evaluating how well novice human operators can teach novel tasks to a robot.

The PostDoc position is in the context of the project "Teaching Robots Interactively" (TERI), funded by the European Research Council as ERC Starting Grant.

## Requirements

We are looking for a candidate with a PhD degree in systems and control, robotics, applied mathematics, artificial intelligence, machine learning, or a related subject. The candidate must have strong analytical skills and must be able to work at the intersection of several research domains. Experience with real robot applications is a plus. The applicant should have demonstrated ability to conduct high-quality research according to international standards, as demonstrated by publications in international, high-quality journals. A very good command of the English language is required, as well as excellent communication skills.

## 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.

TU Delft creates equal opportunities and encourages women to apply.

## Specifications

Contract: Temporary, 30 months.
Hours: 38.0 - 40.0 hours per week
Salary: € 3255 - € 4274 per month gross (depending on the candidate's qualifications)

## 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. https://www.tudelft.nl

The *faculty Mechanical, Maritime and Materials Engineering* (3mE) trains committed engineering students, PhD candidates and post-doctoral researchers in ground-breaking 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. https://www.tudelft.nl/en/3me

The main focus of the *Cognitive Robotics department* is the development of intelligent robots and vehicles that will advance mobility, productivity and quality of life. Our 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 physical interaction of intelligent machines with humans. We combine fundamental research with work on physical demonstrators in areas such as self-driving vehicles, collaborative industrial robots, mobile manipulators and haptic interfaces. Strong collaborations exist with cross-faculty institutes TU Delft Robotics Institute and TU Delft Transport Institute), our national robotic ecosystem (RoboValley, Holland Robotics) and international industry and academia. http://www.cor.tudelft.nl/

**Additional information**

If you have specific questions about this position, please contact Dr. Jens Kober, e-mail: J.Kober@tudelft.nl . Please do not send application emails here, but use the specified address below.

To apply, please prepare:
- a cover letter
- a separate letter of motivation explaining why you are the right candidate for this project,
- a detailed CV,
- electronic copies of your top three publications,
- a summary of your PhD thesis,
- the names and contact addresses of two or three references,
- any other information that might be relevant to your application.

All these items should be combined in one PDF document. Applications should be submitted by email at the earliest convenience to application-3mE@tudelft.nl. When applying for this position, please refer to vacancy number 3mE19-84. The review of applications will start on November 1st 2019 and continue until the position is filled. The intended starting date is early 2020.