

# Postdoc Position Active Sensing & Control for Hydrofoil Craft under Uncertain Loading

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*Hydrofoil craft offer a reliable and cost-efficient solution where high-speed waterway transportation is desired but require sophisticated on-board control systems to ensure that the vessel motions are safe and comfortable for passengers. Especially in harsher ocean environments the reliability of the control system is critical. Such control systems must accurately estimate the hydrofoil position, velocity, and the stochastic wave environment and be responsive enough for quick maneuvering. Current solutions suffer from inaccurate estimates of the system parameters like lift and drag coefficients and from unreliable predictions of short-term excitation conditions. Therefore, to ensure reliable operation over a wide spectrum of environmental conditions, we seek a Postdoc to construct a novel hybrid control design that exploits a risk-averse statistical analysis of acquired environmental data and high-fidelity sensor fusion.*

## Job description

The Postdoc will work with the *Ship Hydromechanics group (Maritime & Transport Technology)* and the *Data-Driven group (Delft Center for Systems and Control)*. The goal of the project is to leverage sensor fusion techniques to predict the state of hydrofoil craft and assign control inputs to optimize its response to random wave excitation. Using the [HEARP hydrofoil education and research platform](#) at TU Delft as a case study, the Postdoc will design optimal sensor layouts on the platform to robustly quantify uncertain parameters and excitation factors and will exploit these results to obtain robust optimal controllers. Aided by the expertise of both research groups, she(he) will develop control algorithms that will be tested in physical experiments on the hydrofoil platform to quantify controller performance and hydrofoil reliability.

The department [Delft Center for Systems and Control](#) (DCSC) of the faculty Mechanical, Maritime and Materials Engineering, coordinates the education and research activities in systems and control at Delft University of Technology. The Centers' research mission is to conduct fundamental research in systems dynamics and control, involving dynamic modelling, advanced control theory, optimisation and signal analysis. The research is motivated by advanced technology development in physical imaging systems, renewable energy, robotics and transportation systems.

The essence of the department Maritime and Transport Technology is to develop, design, build and operate marine, dredging and transport systems and their equipment. New generation transport and marine systems have to be based on new concepts. This requires the further development of the knowledge of the dynamics and the physical

processes involved in transport, dredging and marine systems, the logistics of the systems and the interaction between the equipment and control systems.

## Requirements

The ideal candidate has a background in automatic control, sensor fusion, maritime technology, signal processing, or a related field, and strong theoretical knowledge combined with an application focus. Experience in running physical experiments and collecting/processing data is highly desirable. A strong command of the English language and good communication skills are also required.

## Conditions of employment

Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities (salary indication: €3491- €4402 per month). The TU Delft offers a customisable compensation package, a discount on health insurance and sport memberships, and a monthly work costs contribution. Flexible work schedules can be arranged.

For international applicants we offer the Coming to Delft Service and Partner Career Advice to assist you with your relocation. An International Children's Centre offers childcare and there is an international primary school.

## TU Delft (Delft University of Technology)

Delft University of Technology is built on strong foundations. As creators of the world-famous Dutch waterworks and pioneers in biotech, TU Delft is a top international university combining science, engineering and design. It delivers world class results in education, research and innovation to address challenges in the areas of energy, climate, mobility, health and digital society. For generations, our engineers have proven to be entrepreneurial problem-solvers, both in business and in a social context. At TU Delft we embrace diversity and aim to be as inclusive as possible (see our [Code of Conduct](#)). Together, we imagine, invent and create solutions using technology to have a positive impact on a global scale.

Challenge. Change. Impact!

## Faculty Mechanical, Maritime and Materials Engineering

The Faculty of 3mE carries out pioneering research, leading to new fundamental insights and challenging applications in the field of mechanical engineering. From large-scale energy storage, medical instruments, control technology and robotics to smart materials, nanoscale structures and autonomous ships. The foundations and results of this research are reflected in outstanding, contemporary education, inspiring students and PhD candidates to become socially engaged and responsible engineers and scientists. The faculty of 3mE is a dynamic and innovative faculty with an international scope and high-tech lab facilities. Research and education focus on the design, manufacture, application and modification of products, materials, processes and

mechanical devices, contributing to the development and growth of a sustainable society, as well as prosperity and welfare.

Click [here](#) to go to the website of the Faculty of Mechanical, Maritime and Materials Engineering. Do you want to experience working at our faculty? This [video](#) will introduce you to some of our researchers and their work.

## Additional information

For more information about this vacancy, you can contact Dr. Dimitris Boskos (email: [d.boskos@tudelft.nl](mailto:d.boskos@tudelft.nl), tel: +31(0)15 27 82 654).

## Application procedure

Are you interested in this vacancy? Please apply by **May 11, 2021** via the application button and upload:

- A motivation letter
- A detailed CV
- The contact information of 2 references
- The title and a link to/the pdf file of the doctoral dissertation
- A publication which best represents the applicant's research experience

A pre-employment screening can be part of the selection procedure.

You can apply online. We will not process applications sent by email and/or post.

Acquisition in response to this vacancy is not appreciated.