



PhD Position Sensor Fusion for Ship State Estimation

Apply Now

This PhD position offers a unique opportunity to apply fundamental research from the fields of automatic control and sensor fusion towards an innovative maritime application.

Job description

Challenge: Using sensor fusion to improve estimates of wave environment, vessel loading and structural response, and for identification of state-space models of vessel dynamics.

Change: Provide a practical blueprint for smart on-board sensing feeding into digital twin modelling, leading to increased vessel safety and life span as well as a decrease in cost and waste.

Impact: Leading to a safer, cleaner, and more cost-efficient society.

In the maritime field, exciting new possibilities arise with increasing availability of on-board sensors, enabling the estimation of ship state factors like wave excitation and resulting vessel loading and structural response. Challenges lie in the facts that the wave environment inherently introduces system nonlinearities as well as model uncertainties, and sensor measurements are noisy and potentially biased or faulty. To solve this, the maritime field is currently in a transition to developing more advanced sensor fusion algorithms, enabling the anticipation of real-life situations. This way, vessel life span and safety can be increased while costs and waste are kept as low as possible. We need you as a skillful control engineer to make this happen.

Much is still to be explored in this area, as the vessel state-space models themselves need to be derived and applicable sensor fusion algorithms need to be developed. This is where you come in. This position offers you the unique opportunity of bringing two worlds together: automatic control and maritime systems. You will thus lay the foundation of something completely new. This position is a great opportunity if you are a true pioneer with strong technical and leading skills. You will conduct fundamental research in the field of sensor fusion for maritime applications to solve very practical problems. The solutions you develop will be applied in real-life situations for ship structural health monitoring.

This interdisciplinary PhD position emerges from a collaboration between the Delft Center for Systems and Control ([DCSC](#)) and the Maritime & Transport Technology ([MTT](#)) department within the faculty of 3mE at TU Delft. Working closely with advisors from DCSC and MTT, you will further develop vessel state-space models and design sensor systems and algorithms for estimating wave energy spectrum and vessel

structural response. Your next step will be to validate this system based on physical model tests. You will benefit from two research departments and have access to a lot of expertise. Also, you will collaborate with a large group of stakeholders, among whom are industry partners, research institutes, governmental organizations, ship builders, and more. Your base will be the maritime department of the 3mE faculty.

Requirements

This is truly an enjoyable position if you are someone independent who can synthesize the fields of automatic control and maritime systems and combine these disciplines into something completely new. You need to have both strong research skills as well as a very practical focus, as we need actual solutions. Also, we are looking for someone who takes the lead of this project and can interact with a large group of stakeholders. Thus, good social and communication skills are helpful.

You also have:

- An MSc in automatic control, sensor fusion, signal processing, data science or maritime dynamics.
- A thorough understanding of state-space modelling and estimation techniques such as (extended) Kalman filtering, (nonlinear) least squares and optimisation.
- An excellent command of English, both spoken and written. Note that a minimum TOEFL score of 100 or IELTS of 7.0 applies to all candidates wishing to pursue a PhD programme at TU Delft.

An understanding of maritime dynamics is a plus, but not required. If you feel you are a perfect match but have no experience in the maritime field, we very much invite you to apply. Do consider that the practical application for this position is solely maritime focused.

Doing a PhD at TU Delft requires English proficiency at a certain level to ensure that the candidate is able to communicate and interact well, participate in English-taught Doctoral Education courses, and write scientific articles and a final thesis. For more details, please check the [Graduate Schools Admission Requirements](#).

Conditions of employment

Doctoral candidates will be offered a 4-year period of employment in principle, but in the form of 2 employment contracts. An initial 1,5 year contract with an official go/no go progress assessment within 15 months. Followed by an additional contract for the remaining 2,5 years assuming everything goes well and performance requirements are met.

Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities, increasing from € 2541 per month in the first year to € 3247 in the fourth year. As a PhD candidate you will be enrolled in the TU Delft Graduate School. The TU Delft Graduate School provides an inspiring research environment with an excellent team of supervisors, academic staff and a mentor. The Doctoral Education Programme is aimed at developing your transferable, discipline-related and research skills.

The TU Delft offers a customisable compensation package, discounts 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.

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 as one of our core [values](#) and we actively [engage](#) to be a university where you feel at home and can flourish. We value different perspectives and qualities. We believe this makes our work more innovative, the TU Delft community more vibrant and the world more just. Together, we imagine, invent and create solutions using technology to have a positive impact on a global scale. That is why we invite you to apply. Your application will receive fair consideration.

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? These [videos](#) will introduce you to some of our researchers and their work.

Additional information

For more information about this vacancy, please contact Harleigh Seyffert at H.C.Seyffert@tudelft.nl.

For more information about the application procedure, please contact recruitment-3me@tudelft.nl.

Application procedure

Are you interested in this vacancy? Please apply by **30 December 2022** via the application button and upload:

1. Motivation letter
2. Detailed CV
3. Names and contact information of at least two relevant references
4. Academic record
5. If possible, a master thesis (or a written report of other research performed during your master's degree).

The available position will be filled as soon as possible (i.e., as soon as a suitable candidate is found). This means the selection of candidates may already begin before the application deadline passes.

A pre-employment screening can be part of the selection procedure. You should apply online, and applications sent via email or post will not be considered. Acquisition in response to this vacancy is not appreciated.

Apply Now