

# PhD Position on Sensor AI for human motion estimation

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**Challenge:** Extract biomechanical outcomes from sensor data to improve human motion estimation.

**Change:** Develop new algorithms by combining and extending on ideas from the fields of sensor fusion and machine learning.

**Impact:** Improve human motion estimation while developing algorithms that are applicable also far beyond this application area.

## Job description

The focus of this PhD project is two-fold. Firstly, the goal is to develop novel algorithms that use and extend on ideas from the fields of sensor fusion and machine learning, in order to extract more information from available sensor data. Focus will specifically be on estimating human motion using wearable sensors (mostly inertial measurement units). A second goal is to develop a new sensor fusion framework that incorporates biomechanical models for human motion estimation. The framework can subsequently be extended by learning parts of the model that are difficult to model accurately using the biomechanical models. The work will be heavily algorithmic but will also involve experiments for algorithmic validation. Furthermore, an important part of the position will be teaching.

The successful candidate will work in the research group of Manon Kok (for more information see this [link](#)) and will be co-supervised by Ajay Seth (for more information see this [link](#)). Furthermore, the PhD will be part of the [Sensor AI lab](#). The Sensor AI Lab is a TU Delft Artificial Intelligence Lab which unites the fields of sensor fusion and AI, focusing on the inclusion of physical knowledge (models) in AI to enable the extraction of more relevant and accurate information from available sensor data. In a TU Delft AI Lab, experts in 'the fundamentals of AI technology' along with experts in 'AI challenges' run a shared lab. As a PhD, you will work with at least two academic members of staff and three other PhD candidates. In total TU Delft will establish 24 TU Delft AI Labs, where 48 Tenure Trackers and 96 PhD candidates will have the opportunity to push the boundaries of science using AI. Each team is driven by research questions which arise from scientific and societal challenges, and contribute to the development and execution of domain specific education. All team members have many opportunities for self-

development. You will be a member of the thriving TU Delft AI Lab community that fosters cross-fertilization between talents with different expertise and disciplines.

## Requirements

We are looking for a talented, motivated and outstanding candidate with an MSc degree (or close to completion) in Systems and Control, Electrical or Mechanical Engineering, Computer Science, Probabilistic Machine Learning or a related field. The candidate should demonstrate a strong background and/or interest in the fields of Sensor Fusion and Machine Learning and affinity with the topic of human motion estimation using inertial and other wearable sensors. The candidate must be enthusiastic and greatly interested in fundamental research in addition to having good programming skills, e.g., in Matlab or Python, for implementing state-of-the-art advanced algorithms. Furthermore, excellent written and oral communication skills in English, affinity with teaching and guiding students and the ability to work in a team and taking initiative are important for this position.

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

The standard duration of a Doctoral programme is 4 years, but the expected duration of a PhD programme within the TU Delft AI labs programme is 5 years. The extra fifth year accommodates for additional 20% teaching with regard to AI, Data and Digitalization education related activities. The TU Delft enters into an initial employment contract for the duration of 18 months. In case of proven suitability (Go/No Go meeting around one year after the start), the employment contract will be continued for the remaining expected duration of 3,5 years of your PhD promotion programme.

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 Dr. Manon Kok, [m.kok-1@tudelft.nl](mailto:m.kok-1@tudelft.nl).

For information about the application procedure, please contact Irina Bruckner, HR Advisor, [application-3me@tudelft.nl](mailto:application-3me@tudelft.nl).

### Application procedure

Are you interested in this vacancy? Please apply no later than 1 November 2022 via the application button and upload:

- 1 page motivation letter
- your CV

- course list from your Masters curriculum
- your MSc thesis or a paper that you have written, in which you demonstrate your writing (and scientific) skills
- the names and contact information of two references.

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

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

Acquisition in response to this vacancy is not appreciated.

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