PhD Position High-Speed Adaptive Optics Systems in Super-Resolution Microscopy

Are you interested in working on the interface between physics and biology, to solve real-life problems and build advanced technological systems that can be used by researchers worldwide?

Job description

Advanced imaging methods such as multi-photon excitation microscopy provide 3-D imaging in (optically thick) specimens. If you like tinkering with hardware or the coding of fast computational algorithms to incorporate and extract information from a lot of imaging data, then a PhD in super resolution microscopy is just what you are looking for. The projects concern with the design and realization of a high-speed sensor, an adaptive optics module, and the software for aberration sensing and the deformable mirror control and require interdisciplinary work.

Department

The aim of our research group is to increase nanoscopy resolution and robustness so that it can be used within intact live tissue. We believe that the time is right, both technically and conceptually, to make the step from optical microscopy to optical nanoscopy. We break away from the traditional design philosophy of mere addition of optimal components into a system, to instead apply optimal information processing for all components present in the system. The synergy between integrated optics and information processing allows us to develop completely new nanoscopy methodologies. During the next few years we will develop new optical methodologies in close collaboration with neuro-scientists who apply them. For us, it's all about creating new innovative methodologies that truly enable leading scientists to discover more about cellular functions and the neural network. That includes making our nanoscopy accessible, easier to use and more automated through smart hardware and data analysis tools. The field of smart optics systems is characterized using deformable mirrors, lenses and wavefront sensors and intelligent image processing to enhance the image quality in real-time of scientific observation equipment. Together with our collaborators we will set out to study the live brain with the aim to shed new nanoscale-light on the properties of the nervous system, e.g. the molecular plasticity associated with learning and memory-formation processes.

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.

Requirements

*Required qualifications and experience*

- A master’s degree or equivalent degree preferably in physics, computer science or control.
- Able to gather and analyse data effectively from different resources to build an eloquent, comprehensible and convincing story
- Able to manage your time
- Wide-ranging interdisciplinary interests
- Passionate about tinkering in the lab and programming

*Skills*

- Focused and organised
- Strong interpersonal and communication skills
- Curiosity
- Demonstrated ability to apply creativity and out-of-the-box thinking to produce innovative concepts and solutions.

Conditions of employment

TU Delft offers PhD-candidates a 4-year contract, with an official go/no go progress assessment after one year. Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities, increasing from € 2395 per month in the first year to € 3061 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. For generations, our engineers have proven to be entrepreneurial problem-solvers both in business and in a social context. TU Delft offers
16 Bachelor’s and 32 Master’s programmes to more than 23,000 students. Our scientific staff consists of 3,500 staff members and 2,800 PhD candidates. 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.

Additional information

For information about this vacancy, you can contact Prof. Michel Verhaegen or Carlas Smith, Assistant Professor, email: m.verhaegen@tudelft.nl or c.s.smith@tudelft.nl.

For information about the selection procedure, please contact Ms. Irina Bruckner, HR advisor, email: application-3mE@tudelft.nl.

Application procedure

Interested applicants should send their detailed curriculum vitae, the names of two professional referees, a list of courses taken with grades obtained in their BSc and MSc program, a list of publications (if any), a summary of their MSc thesis, and a cover letter stating their motivation to application-3mE@tudelft.nl with reference to vacancy number TUD00282. The application deadline for the position is 1 August 2020.

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