

# **PhD scholarship in *Quantification of flow using Super Resolution Ultrasound Imaging***

A 3-year PhD scholarship is available at the Center for Fast Ultrasound Imaging (CFU), Department of Health Technology from March 2025 sponsored by the European Research Council (ERC) and the Department of Health Technology at DTU. It is conducted in collaboration between CFU and the MEMS group at DTU Health Tech, DTU Compute, the University of Copenhagen, and the Copenhagen University Hospital (Rigshospitalet) in the ERC Synergy Grant “3-D Super resolution Ultrasound Real time imaging of Erythrocytes” - SURE.

The SURE project develops and researches a new super resolution ultrasound imaging method capable of resolving 3-D capillary flow in the human body. The approach tracks the motion of the individual red blood cells (erythrocytes) in a three-dimensional volume for a full visualization of anatomy, flow, and perfusion. The approach can potentially yield a paradigm shift in the scientific study, diagnoses, and treatment of cancer, diabetes, and vascular diseases at the capillary level, as it enables the possibility of volumetrically visualizing capillary perfusion in real-time at frame rates above 20 Hz without injection of contrast agents.

## **Responsibilities and tasks**

This project investigates methods for quantification of flow using 3-D SURE imaging. The purpose is to automatically expand our current processing pipeline to reveal flow velocities for 3-D data and use this in quantification of perfusion and organ state for cancer and hypertension. Data will be acquired in rodents and human volunteers to develop the approach and reveal its performance in the clinic.

The research is conducted in a truly multi-disciplinary environment consisting of the 6 academic partners specializing in advanced ultrasound imaging, silicon CMUT probes, animal experiments, image processing, CT scanning and clinical investigations, and the main purpose is to translate the SURE method from a research idea to the clinic.

## **Qualifications**

Candidates should have a two-year master's degree (120 ECTS points) or a similar degree with an academic level equivalent to a two-year master's degree. Experience with digital signal and image processing, deep learning, and programming is desirable. Similarly, knowledge of medical imaging and acoustics will also be beneficial.

## **Approval and Enrolment**

The scholarship for the PhD degree is subject to academic approval, and the candidate will be enrolled in one of the general degree programmes at DTU. For information about our enrolment requirements and the general planning of the PhD study programme, please see the [DTU PhD Guide](#).

## **We offer**

DTU is a leading technical university globally recognized for the excellence of its research, education, innovation, and scientific advice. We offer a rewarding and challenging job in an international environment. We strive for academic excellence in an environment characterized by collegial respect and academic freedom tempered by responsibility.

## **Salary and appointment terms**

The appointment will be based on the collective agreement with the Danish Confederation of Professional Associations. The allowance will be agreed upon with the relevant union. The period of employment is 3 years.

You can read more about [career paths at DTU here](#).

### **Further information**

Further information is available at [www.cfu.dtu.dk](http://www.cfu.dtu.dk) or from Professor Jørgen Arendt Jensen, tel: +45 4525 3924, e-mail: [jaje@dtu.dk](mailto:jaje@dtu.dk).

**Please do not send applications to this e-mail address, instead apply online as described below.**

You can read more about Department of Health Technology on [www.healthtech.dtu.dk](http://www.healthtech.dtu.dk) and about CFU at [www.cfu.dtu.dk/](http://www.cfu.dtu.dk/)

### **Application**

Please submit your online application no later than **January 31, 2025 (local time)**. Apply online at [www.career.dtu.dk](http://www.career.dtu.dk).

Applications must be submitted as **one PDF file** containing all materials to be given consideration. To apply, please open the link "Apply online", fill out the online application form, and attach **all your materials in English in one PDF file**. The file must include:

- A letter motivating the application (cover letter)
- Curriculum vitae
- Grade transcripts and BSc/MSc diploma
- Excel sheet with translation of grades to the Danish grading system (see guidelines and [Excel spreadsheet here](#))

Candidates may apply prior to obtaining their master's degree but cannot begin before having received it.

Applications and enclosures received after the deadline will not be considered.

All interested candidates irrespective of age, gender, race, disability, religion or ethnic background are encouraged to apply.

**DTU Health Tech** creates health technology to improve health and well-being for humans in collaboration with companies, hospitals as well as national and international researchers. The cross-disciplinarity at the department, which includes mathematics, computer science, physics, chemistry and biology, provides the foundation for new and innovative technology for the future.

### **Technology for people**

*DTU develops technology for people. With our international elite research and study programmes, we are helping to create a better world and to solve the global challenges formulated in the UN's 17 Sustainable Development Goals. Hans Christian Ørsted founded DTU in 1829 with a clear vision to develop and create value using science and engineering to benefit society. That vision lives on today. DTU has 11,500 students and 6,000 employees. We work in an international atmosphere and have an inclusive, evolving, and informal working environment. Our main campus is in Kgs. Lyngby north of Copenhagen and we have campuses in Roskilde and Ballerup.*