

Tampere University of Technology (TUT) is an active scientific community of 2,000 employees and more than 10,000 students. The University operates in the form of a foundation and has a long-standing tradition of collaboration with other research institutions and business life. Many of the fields of research and study represented at the University play a key role in addressing global challenges. Internationality is an inherent part of all the University's activities. Welcome to join us at TUT!

Two Doctoral Student Positions in Image Processing

The Department of Signal Processing (DSP) of TUT undertakes world-class research in signal and image processing with application in various fields of science and engineering.

The two Ph.D. position will be in Computational Imaging Group of Signal Processing Laboratory (Prof. Karen Egiazarian).

For more information on the recent projects of the group, please refer to

<http://www.cs.tut.fi/sgn/imaging/>. The work will be carried out in close collaboration with other research groups from TUT and abroad.

Research area:

We offer modern and challenging research topics in the area of lensless *computational inverse imaging* based on a joint design of software (image processing algorithms) and hardware (diffractive optical elements for instance binary phase masks (BPMs)). We consider both wide band *intensity* (analog to conventional cameras) and *coherent* (and *partially coherent*) *phase imaging* systems.

Lensless imaging devices (cameras) are thin, compact, light and inexpensive in fabrication and with an accurate superfast sensing. This is a novel area of computational imaging which is possible thanks to technological breakthrough in diffractive optics, semiconductor technology and due to advancements in computational imaging, in particular, *complex domain sparse wave field imaging* or briefly *sparse phase imaging*. In timeless *phase imaging* applications, a physical quantity of interest is coded in an image of the phase.

Few relevant examples of application areas of the lensless systems are the following:

- a) microscopy for fast and cheap tests in medicine and biology;
- b) security and inspection systems;
- c) optical interferometry - phase is used to measure shape, deformation, and vibration of objects;
- d) digital holography- used for 3D imaging

Job description:

- a) Theoretical study, mathematical modeling and simulations;

- b) Experimental work with prototypes including design and implementation of lensless systems.

The duties of all doctoral students include teaching that amount to approximately 5% of their annual working hours, unless there are justified reasons to the contrary.

The successful candidate must hold an applicable higher university degree and a research plan for the completion of a doctorate, that will be prepared according to TUT's instructions after the suitable candidate is found. The candidate must have demonstrated, during his or her studies towards the higher university degree or otherwise, the competence and motivation to pursue postgraduate studies and complete a doctoral degree. A certificate of proficiency in the English language for students whose first language is not Finnish or English will be required from the chosen candidate within four months after being appointed for the position.

Requirements:

A successful applicant should be highly motivated in research activities. Requirements for the mathematical background: linear algebra, optimization theory and algorithms, inverse problems, Fourier transforms. Programming skills: MATLAB, C++ (knowledge of CUDA and Python will be considered as a benefit). Experience and knowledge in optics, in particular in coherent optics (wave field modeling, Fourier optics, interferometry, etc.) will be considered as a benefit.

Salary:

The salary will be based on both the job demands and the employee's personal performance in accordance with the University Salary System. According to the criteria applied to teaching and research staff the position of a Doctoral Student is placed on the job demands levels 1-4, typically, the initial salary is about 2000-2200 EUR.

Trial period:

Trial period of 4 months applies.

Other:

The positions are for a fixed-term period of 3.0 years, but can be extended for 6-12 months depending on performance. Appointment is expected to commence on 1 March 2018 or as mutually agreed.

For more information, please contact:

Details on Ph.D. study in TUT can be seen in <http://www.tut.fi/en/admissions/doctoral-studies-phd/computing-and-electrical-engineering/index.htm>.

For further information on the call, please, contact Prof. Karen Eguiazarian (Eguiazarian), or Prof. Vladimir Katkovnik by emails [karen.egiazarian \(at\) tut.fi](mailto:karen.egiazarian@tut.fi), and [vladimir.katkovnik\(at\)tut.fi](mailto:vladimir.katkovnik@tut.fi)

How to apply:

Applications must be submitted through the University's online employment system. The closing date for applications is 15 February 2018 (at 12.00 pm EEST). Applications and all accompanying documentation must be in English.

The applications should include the following documents:

- CV;
- Letter of motivation (max. one A4 page);
- Letter(s) of recommendation;
- Transcript of record (master's degree studies);
- English language certificate of proficiency (if applicable).

Additional information on [attachments to applications](#).

[Fill application form](#)