

Open PhD Position for: Fluorescence-on-the-fly

Job description

The project is motivated by the emerging field of digital pathology. The primary activity of a pathologist, making a diagnosis via microscopic examination of tissue and cells from a biopsy, is aided by the availability of digital high-resolution images of tissue slides acquired with a high-throughput automated microscope ('whole slide imaging'). This enables a number of applications such as connectivity for cooperation amongst pathologists and with other clinicians, and quality control by workflow management.

There is also a rising need for molecular pathology, i.e. the use of specific genetic molecular markers of genes or proteins in diagnosis and treatment planning. For example, testing for the (over)-expression of tumor genes in breast cancer biopsies has important consequences for the type of drug treatment. These molecular markers are usually labeled with fluorophores in order to increase detection sensitivity and specificity. In this project we expand the palette of imaging modalities of a scanner platform based on a recently developed 3D image sensor to various modes of fluorescence scanning. The sensor consists of a set of sensorlets for simultaneous scanning at multiple focus levels.

In the first phase of the project we target large area scanning of tissue slides for Fluorescence In-Situ Hybridization (FISH) diagnostics. This will be combined with parallel image processing (dot segmentation) based on a wavelet compressed image representation ("FISH-on-the-fly"). In the second phase of the project we intend to broaden the scope to fluorescence lifetime imaging and structured illumination scanning microscopy for lateral resolution improvement.

The research will be performed at the Quantitative Imaging Group, Department of Imaging Physics at the faculty of Applied Sciences of the Delft University of Technology, and is supported by the Dutch Technology Foundation STW.

Keywords

Digital pathology, whole slide imaging, fluorescence microscopy, molecular pathology, fluorescence lifetime imaging, structured illumination.

Requirements

The candidate must hold a MSc. degree in *Physics* or *Electrical Engineering*, with a strong background in experimentation and signal analysis. Excellent analytical skills and a mindset towards application of the technology are essential. Experience with image processing and a superb programming capability are expected. Knowledge of the fields of light microscopy or optics is beneficial.

Conditions of employment

TU Delft offers an attractive benefits package, including a flexible work week and the option of assembling a customised compensation and benefits package. Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities. As a PhD candidate you



will be enrolled in the TU Delft Graduate School. The TU Delft Graduate School provides an inspiring research environment; an excellent team of supervisors, academic staff and a mentor; and a Doctoral Education Programme aimed at developing your transferable, discipline-related and research skills. Please visit www.phd.tudelft.nl for more information.

Information and application

Your application should include your CV, a motivation letter and a grade list, and can be sent to:

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