

Post-doctoral fellow in super-resolution microscopy: "Characterization of fluorophores for nanoscopy."

Location:	Nanobiophysics, MESA+ Institute for Nanotechnology, University of Twente
Function type:	Post-doctoral fellow
Scientific fields:	physics, physical chemistry or optical engineering
Hours:	38.0 hours per week (for 3 years)
Education:	PhD degree
Salary:	University of Twente salary scale and commensurate with your experience.

"Nanoscopy: From sharp images to molecular interaction"

The STW-Perspectief programme: "Nanoscopy: From sharp images to molecular interaction" is a large national programme on the development of super-resolution microscopy or "nanoscopy" and its applications in biomedical sciences. In the last decade new technologies has been developed that enable achieving resolutions down to 10-50 nm (in contrast of the limited resolution (~250 nm) in classical microscopy). This is a spectacular development, however, the potential of nanoscopy is much higher; it will allow the direct observation of the molecular machines that make up the cell and enable extraction of functional data such as molecular interactions and dynamics. It is our ambition to lift existing nanoscopy techniques to a level than enables extraction of information on biomolecular action and interaction in intact cells.

To achieve this, we will tackle various aspects of experimental nanoscopy in seven projects, all with the same ultimate goal: adding nanoscopy integrally to the toolbox for biomedical research. We have assembled a strong, interdisciplinary and enthusiastic team of scientists from seven Dutch universities, each with broad experience in advanced microscopy. Seven companies are committed to this program and are enthusiastic to work together with this consortium towards our common goal. This collaboration between scientific and commercial partners will result in high impact scientific papers, new hardware, software, new fluorescent molecules and methodology. For this programme we search for 12 enthusiastic and talented PhD students and post-doctoral fellows who would like to contribute to the next step in advanced microscopy: "biomedical nanoscopy"

Research group

The Nanobiophysics group at the University of Twente has a broad range of state of the art single molecule fluorescence instrumentation (confocal single molecule detection, lifetime and emission spectra; total internal reflection – TIRF – based setup for STORM and PALM imaging). We have extensive optical microscopy infrastructure (Zeiss LSM 510 confocal, Nikon TE2000 with Lambert Instruments LIFA lifetime imaging system). The group is embedded in the MESA+ Institute for Nanotechnology and the MIRA Institute for Biomedical Technology. MESA+ has new state of the art clean room infrastructure (NanoLabNL), which will be used extensively for this project. A suite of microscopy/nanoscopy instrumentation (Nikon A1 confocal microscope, Nikon NSTORM superresolution setup, including TIRF excitation for wide field single molecule imaging) within the newly created BioNanoLabNL will also be available.

The University of Twente. We stand for life sciences and technology. High tech and human touch. Education and research that matter. New technology which drives change, innovation and progress in society. The University of Twente is the only campus university in the Netherlands; divided over six faculties we provide more than fifty educational programmes. The University of Twente has a strong focus on personal development and talented researchers are given scope for carrying out pioneering research. Within the TNW Faculty (**Faculty of Science & Technology**) of the University of Twente some 700 staff members and more than 1100 students are involved in training and research on the interface of chemical technology, applied physics and biomedical technology. Fields of application include sustainable energy, process technology and materials science, nanotechnology and technical medicine. Research, which enjoys a high profile both at home and internationally, has been accommodated in the multidisciplinary research institutes MESA+ and MIRA. The faculty works together intensively with industrial partners and researchers in the Netherlands and abroad and conducts extensive research for external commissioning parties and funders.

Job description

Optical nanoscopy is rapidly becoming one of the key enabling imaging technologies in various fields of research, especially in the life-sciences. However, optical nanoscopy is dependent on the availability of well-characterized fluorescent probes that can switch between spectrally different states, e.g. dark and bright states. One of the current major challenges for the use of optical nanoscopy is the development and characterization of these nanoscopy probes. The photophysics of suitable fluorescent probes is very complex, and important photophysical aspects and parameters are not accessible using conventional characterization methods.

Within our consortium new fluorescent proteins for single molecule detection based optical nanoscopy will be developed. We seek a postdoctoral researcher to develop new nanophotonic methods based on the manipulation of the local density of optical states in close proximity to a mirror to measure key photophysical properties of fluorescent probes for optical nanoscopy that would otherwise be hidden to conventional methods (see Cesa et al. Phys. Chem. Chem. Phys. 11: 2525-2531 (2009)). Sample platforms will be developed to position the fluorophores at precisely defined distances, with nanometer precision, from the metallic mirror. The fluorescent probes will be characterized on the ensemble and single molecule levels. These results will not only help to rationally use fluorescent probes in nanoscopy applications, but will also aid the development and further refinement of probes within the consortium.

Requirements

You will have earned a doctorate in physics or physical chemistry with a strong background in optics. Experience with data modeling and analysis using Matlab is essential. Cleanroom experience, knowledge of fluorescence microscopy, spectroscopy, photophysics of fluorophores, single molecule detection and nanophotonics would be beneficial. You will have demonstrated experience in working both independently and as member of a larger team. The successful applicant will be embedded in an enthusiastic academic environment with world-class clean room facilities, and single molecule characterization capabilities. As part of a large consortium, you will work closely with leading industrial and research groups in optical nanoscopy. In particular you will collaborate closely with the group of Prof. Th. W. J. Gadella at the University of Amsterdam.

Conditions of employment

We offer you a post-doctoral research position for 3 years. Your starting salary will be set by the University of Twente salary scale and commensurate with your experience. In addition, the

collaborative nature of this project will provide the candidate with ample opportunity to interact with many leading scientists working in optical nanoscopy.

Application and Information

For more information please contact Prof. Vinod Subramaniam (v.subramaniam@utwente.nl) or Dr. Christian Blum (tel nr: +31-(0)53-489-4622,c.blum@utwente.nl). Applications should include an application/motivation letter, a detailed CV (resume), a publication list, and contact details of at least 2 references.

The closing date for this application is **September 7, 2011**.