

PhD position in super-resolution fluorescence microscopy: "Measuring molecules on the move."

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| Location: | department of Physics and Astronomy, VU University Amsterdam |
| Function type: | PhD student |
| Scientific fields: | Physics, chemistry or biology |
| Hours: | 38.0 hours per week (for 4 years) |
| Education: | Master degree |
| Salary: | €2086 to €2673 per month gross |

"Nanoscopy: From sharp images to molecular interaction"

The *STW-Perspectief* program: "Nanoscopy: From sharp images to molecular interaction" is a large national program 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 program 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

VU University Amsterdam is one of the leading institutions for higher education in Europe. It is part of international science networks and collaborates with many major universities throughout the world. The Faculty of Sciences consists of four departments; Physics and Astronomy, Informatics, Mathematics, and Chemistry and Pharmaceutical Sciences with 600 employees including researchers, lecturers, full- and part-time professors. The faculty offers 10 bachelor and 12 master programs and has over 1600 students.

Within the **department Physics and Astronomy**, physics of life is a major research and educational theme. The research group Physics of Complex Systems is internationally renowned for single-molecule biophysics research on motor proteins and DNA-binding proteins. The group is part of the Institute of

Lasers, Life and Biophotonics (LaserLaB) Amsterdam and is equipped with unique microscopy instrumentation and excellent facilities for biological research on the cellular and molecular scale. The group is involved in many (inter)national collaborations and has a strong international atmosphere.

Job description

Within the *STW-Perspectief* program “Nanoscopy: From sharp images to molecular interaction”, the research group of dr.ir. Erwin Peterman at VU University Amsterdam will develop methods that allow visualization of intracellular dynamics with high spatial and temporal resolution, in collaboration with dr.ir. Yves Bollen (Structural Biology, VU) and dr. Adriaan Houtsmuller (Erasmus Medical Center, Rotterdam). To this end we will apply photo activation of fluorophores with strict temporal and spatial control, followed by tracking them with an accuracy of a few tens of nanometers at video rate. The successful applicant will develop and implement the instrumentation for spatiotemporally controlled photo activation, will develop the software for data acquisition and data analysis, will test and benchmark the method in *in vitro* systems and apply it to live cells. Tests will be performed on diffusion and directional motion of kinesin motor proteins bound to microtubules. Biological applications will include the study of diffusion and interaction of membrane proteins in bacterial membranes, motor-driven intracellular transport in *C. elegans* neurons, and transcription regulation in human cells.

Keywords: super-resolution microscopy, fluorescence microscopy, single-molecule fluorescence, live-cell imaging, diffusion, intracellular transport

Requirements

We are looking for a talented, ambitious and highly motivated young researcher with an M.Sc. degree in physics, chemistry, biology or a related field. Essential is a strong interest in interdisciplinary research, desirable are knowledge of and experience with fluorescence microscopy and computer programming.

Conditions of employment

The initial appointment will be for a period of 1 year. After satisfactory evaluation of the initial appointment, it can be extended for a total duration of 4 years. You can find information about our excellent fringe benefits of employment at www.workingatvu.nl like:

- remuneration of 8,3% end-of-year bonus and 8% holiday allowance;
- a minimum of 29 holidays in case of full-time employment;
- generous contribution (70%) commuting allowance based on public transport;
- discounts on collective insurances (healthcare- and car insurance).

The salary will be in accordance with university regulations for academic personnel, and amounts € 2.042,- gross per month in the first year up to € 2.612,- in the fourth year based on a full-time employment.

Application and information

For additional information contact Dr.ir. Erwin Peterman, phone: +31-20-5987576, email: e.j.g.peterman@few.vu.nl, web www.nat.vu.nl/~erwinp.

Applicants are asked to write a letter in which they describe their abilities and motivation, accompanied by a curriculum vitae, including two references. Applications should be addressed to Dr.ir. Erwin Peterman, email: e.j.g.peterman@few.vu.nl, The closing date for this application is **September 7, 2011**.