

PhD position in super-resolution fluorescence microscopy: " Finding the DNA code for the brightest biomolecular flashlamp "

Location:	University of Amsterdam
Function type:	PhD student
Scientific fields:	Molecular biology, biochemistry, biophysics
Hours:	38.0 hours per week (for 4 years)
Education:	Master degree
Salary:	€2042 to €2612 per month gross

"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 talented PhD students and post-doctoral fellows who would like to contribute to the next step in advanced microscopy: "biomedical nanoscopy"

The van Leeuwenhoek Centre for Advanced Microscopy (LCAM)

The van Leeuwenhoek Centre for Advanced Microscopy (LCAM) in Amsterdam is an expertise centre in the field of advanced light microscopy for biomedical and life-science applications.

The centre is embedded in three research institutes in the Amsterdam area: the Academic Medical Centre and the Faculty of Science (FNWI) of the University of Amsterdam and the Netherlands Cancer Institute in Amsterdam. The LCAM is an expertise centre that hosts researchers from the Amsterdam area, but also from the rest of the Netherlands and abroad, and helps them with professional expertise and advanced microscopy equipment. LCAM organized international microscopy courses and, as a third

goal, focuses on the development of new technology and methods in the field of advanced light microscopy and their applications in biomedical research.

Molecular Cytology group at the University of Amsterdam (UvA)

The Faculty of Science of the UvA occupies a leading position internationally in its fields of research and participates in a large number of cooperative programmes with universities, research institutes and businesses. The faculty has a student body of around 3,000 and 1,500 members of staff, spread over eight research institutes and a number of faculty-wide support services. A considerable part of the research is made possible by external funding from Dutch and international organisations and the private sector. The Faculty of Science offers thirteen Bachelor's degree programmes and eighteen Master's degree programmes in the fields of the exact sciences, computer science and information studies, and life and earth sciences. Since September 2010, the whole faculty has been housed in a brand new building at the Science Park in Amsterdam. The installment of the faculty has made the Science Park one of the largest centres of academic research in the Netherlands. The Swammerdam Institute for Life Sciences (SILS) is one of the Faculty's largest institutes. Its approximately 200 scientists and staff members work in 11 research groups that perform excellent research centered on four themes: 1) The Living Cell, 2) Plant Signaling, 3) Neuroscience, and 4) Life Science Technologies. Within the research group of Molecular Cytology in the van Leeuwenhoek Centre for Advanced Microscopy, which is studying protein signaling networks using microscopy methods (see www.science.uva.nl/sils/mc), there is a vacancy for a

PhD student to develop new genetically encoded fluorescent probes for super resolution microscopy.

Fluorescent proteins (FPs) have revolutionized molecular cell biology and the more recent development of photoswitchable fluorescent proteins (psFPs) and photoactivatable FPs (paFPs) hold great promise for further boosts in this field. psFPs and paFPs have found special application in enabling super resolution microscopy methodologies. For instance by switching on an individual FP the center of gravity of the fluorescent detected spot can be determined with an accuracy that is well below the optical diffraction limit. The enormous advantage of FPs is that they are genetically encoded and hence that they can be fused to any protein of interest and the endogenous protein sorting machinery of the cell provides for authentic labeling of subcellular structures with minimal perturbation.

However, the first (currently available) generation psFPs and paFPs is limited in number and with respect to their photophysical characteristics. In this STW project a second generation of FPs with enhanced properties will be engineered. After successful development, the psFPs will be used to enhance resolution and/or speed of super resolution microscopy and be used for the study of localization, mobility and molecular interactions of proteins involved cellular signaling. This project builds on extensive expertise in the group in fluorescent protein optimization and integrating molecular technologies with microscopy. The project will combine (i) protein engineering, production and characterization using molecular cloning and evolution strategies with (ii) microscopic approaches to test and apply the developed FPs using advanced instrumentation and living cells.

Requirements

A master/academic degree in Biochemistry, Cell biology or Molecular biology (or related fields). The candidate should have experience with molecular biological techniques (cloning, PCR), protein production and characterization techniques. Affinity with microscopy and spectroscopy is recommended.

In addition the applicant should have the ability to work in a team, to work independently, to publish and present scientific research in English, to quickly gather and master scientific knowledge & concepts. Strong communication and organizational skills, problem solving skills and perseverance are recommended.

Conditions of employment

The full-time appointment will be on a temporary basis for a maximum period of four years (18 months plus a further 30 months after a positive evaluation) and should lead to a dissertation (PhD thesis). An educational plan will be drafted that includes attendance of courses and (international) meetings. The PhD student is also expected to assist in teaching of undergraduates.

Based on a full-time appointment (38 hours per week) the gross monthly salary will range from € 2042 in the first year and € 2612 in the final year, according to the Dutch salary scales for PhD students. The collective employment agreement (CAO) of Dutch universities is applicable.

Application and information

Applications, quoting the vacancy number and marked strictly confidential (in the upper left-hand corner of the envelope) should include a curriculum vitae. Applications should be sent to:

Dienst Personeelszaken Universiteit van Amsterdam Faculteit der Natuurwetenschappen, Wiskunde en Informatica Postbus 94216 1090 GE Amsterdam the Netherlands.

Applications can also be emailed to application-science@uva.nl, bearing the vacancy number in the subject line and relevant documents as attachments.

Project information can be obtained from Prof. Dr. Th.W.J. Gadella Jr., e-mail: Th.W.J.Gadella@uva.nl; phone 0031-(0)20-525-6259.

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