

The Faculty of Science, Leiden Institute of Physics is looking for a:

PhD candidate, “Raman Sensing of Cell Differentiation”

Vacancy number: (woordt door HRM ingevuld)

Project description

The project addresses a challenge in the development of stem-cell based therapies and personalized medicine: fast and non-disruptive quality control of cell cultures. It has been shown that Raman spectroscopy is uniquely able to resolve various cell states with minimal impact on cell physiology. The drawback of classical Raman microscopy though is its low signal rendering data acquisition extremely slow. In this project Raman spectroscopy will be supplemented by a compressed-sensing scheme which alleviates this major disadvantage, ultimately permitting to use the technique even for high-throughput applications, such as drug screening.

You will develop a novel microscopy setup that optically implements a programmable compressed sensing scheme. Simultaneously you will develop a machine-learning platform to determine the optimal parameters of the optical elements. You will characterize the setup quantitatively and apply the methodology to a variety of cell models including immune cells and stem cells. In your endeavour you will be supported by a team of biophysicists with ample experience in imaging, from individual molecules to organoids, all in the context of cells and tissue. Our group is embedded in the Cell Observatory, which facilitates our collaborative research with groups from biology and drug development.

Key responsibilities

- Design, build, optimize and characterize the compressed-sensing Raman microscope;
- Realize a deep-learning platform for optimization of the compressed-sensing scheme;
- Publish academic papers and present your findings at academic conferences;
- Communicate closely with the team members and collaborators in biology;
- Assist with teaching and student supervision;
- Complete a PhD thesis within four years (1.0 FTE).

The PhD candidate will work closely together with the two PIs (prof T. Schmidt, www.schmidtlab.nl; and prof S. Semrau, www.semraulab.com) driving the project, and the other team members of the group. The candidate will carry responsibility for the research goals within the project.

Selection Criteria

- Research Master in Physics, Engineering or equivalent;
- Knowledge in optics and optical techniques is a plus;
- Excellent command of the English language, and excellent communication skills;
- Well-developed analytic and organisational skills;
- Excellent social skills in order to be able to work in a team of varied background.

Research at our faculty

The Faculty of Science is a world-class faculty where staff and students work together in a dynamic international environment. It is a faculty where personal and academic development are top priorities. Our people are committed to expand fundamental knowledge by curiosity and to look beyond the borders of their own discipline; their aim is to benefit science, and to make a contribution to addressing the major societal challenges of the future.

The research carried out at the Faculty of Science is very diverse, ranging from mathematics, information science, astronomy, physics, chemistry and bio-pharmaceutical sciences to biology and environmental sciences. The research activities are organised in eight institutes. These institutes offer eight bachelor's

and twelve master's programmes. The faculty has grown strongly in recent years and now has more than 2,300 staff and almost 5,000 students. We are located at the heart of Leiden's Bio Science Park, one of Europe's biggest science parks, where university and business life come together.

For more information, see <http://www.universiteitleiden.nl/en/science> and <http://workingat.leiden.edu/>

Terms and conditions

We offer a full-time 4 year fixed-term PhD position with a flexible starting-date. Salary range from €2770,- tot €3539,- gross per month (pay scale P in accordance with the Collective Labour Agreement for Dutch Universities).

Leiden University offers an attractive benefits package with additional holiday (8%) and end-of-year bonuses(8.3 %), training and career development and sabbatical leave. Our individual choices model gives you some freedom to assemble your own set of terms and conditions. Candidates from outside the Netherlands may be eligible for a substantial tax break.

Leiden University is strongly committed to diversity within its community and especially welcomes applications from members of underrepresented groups.

Applications

To apply for this vacancy, please send an email to Thomas Schmidt (schmidt@physics.leidenuniv.nl), with 'Application PhD' in the subject line. Please ensure that you attach the following:

- A short motivation (max one page) on why you would like to join our group and about your research interests;
- A Curriculum Vitae, including information about the grades you had as an undergraduate;
- Contact details of a university teacher or previous/current supervisors who can be contacted for a reference.

Applications will be reviewed starting **1st of November** until the position is filled. The starting date of the PhD program is at the beginning of 2024.