



# PhD Position Super-Resolution Visualisation and Control of Cellular Dynamics

Apply Now

*Would you like to contribute to groundbreaking research on establishing microscopy-guided automated real-time control of biological processes, as a PhD candidate? Then this might be the vacancy for you!*

## Job description

Become part of the new research consortium IMAGINE! (Innovative Microscopy And Guidance of cells In their Native Environment). Our programme aims to transform cell biology by developing and applying advanced microscopy and real-time molecular manipulation techniques to study cells in their natural complexity and diversity. The consortium will form a unique and highly interdisciplinary team that combines cell, organoid, and tissue biology, as well as chemical and optical cell manipulation to study cell behaviour in development, cancer, and targeted drug delivery.

As a PhD student in the Smith lab you will develop a novel optical instrument for event-driven super-resolution visualization and high-precision control that enables real-time manipulation of key aspects of cell and developmental biology (smart microscopy). Ultimately, the goal is to establish microscopy-guided automated real-time control of biological processes. This will enable the automatic identification of certain cellular states or events (e.g. a cell in mitosis, a cell moving out of a niche) within a tissue followed by the automatic and iterative light-driven perturbations that can alter the cellular state or event (e.g. altering the orientation of the mitotic spindle, directing cells to specific locations). You will apply the framework that you develop here to our biological aims, for example, to perform super-resolution microscopy of cell division or other cellular reorganizations that occur in developing organoids or tumor initiation in organoids. In this exciting project, you will collaborate with different research groups within the IMAGINE! project. For the biological systems, you will work closely with the Kapitein, and Rios labs and for the optical hardware, information processing, and control algorithms with the Stallinga, Carroll, and Smal labs.

## What are you going to do?

In this fully-funded 4-year project, you and your team members will:

- be embedded in a communicative interdisciplinary team that is formed by a collaboration between research groups at University of Utrecht, Princess Máxima Center for Pediatric Oncology, Erasmus Medical Centre and the TU Delft;
- build on our experience with optical design and instrumentation to design and build a novel microscope combining imaging and ontogenetic control;

- develop/apply simulations and data analysis routines to predict and verify instrument functionality;
- have the opportunity to obtain teaching experience and improve your leadership skills while guiding students;

[The Carlas Smith Lab](#), internationally recognized for the development of next-generation imaging systems, is located within the Department of Delft Center for Systems and Control (DCSC) at the TU Delft. The lab develops next-generation imaging systems by synergistically combining novel hardware and information processing algorithms to achieve unprecedented performance. Here at the convergence of artificial intelligence, optics, mechatronics, and electronics, our diverse and interdisciplinary team at DCSC comprises passionate students and postdocs who strive to transcend the boundaries of imaging and actuation technologies by making the invisible visible.

## Requirements

We are looking for a highly motivated and creative candidate to join us in this unique project. We would like you to bring:

- A master's degree or equivalent in Master of Science in Photonics, (bio)physics or similar;
- Experience in programming;
- Prior experience in artificial intelligence/machine learning is a plus, but not required;
- Intellectual curiosity for biology and the life sciences.

If you feel that this role is the perfect match, but you do not yet meet all the qualifications, we also welcome you to apply.

Doing a PhD at TU Delft requires English proficiency at a certain level to ensure that the candidate is able to communicate and interact well, participate in English-taught Doctoral Education courses, and write scientific articles and a final thesis. For more details please check the [Graduate Schools Admission Requirements](#).

## Conditions of employment

Doctoral candidates will be offered a 4-year period of employment in principle, but in the form of 2 employment contracts. An initial 1,5 year contract with an official go/no go progress assessment within 15 months. Followed by an additional contract for the remaining 2,5 years assuming everything goes well and performance requirements are met.

Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities, increasing from € 2541 per month in the first year to € 3247 in the fourth year. As a PhD candidate you will be enrolled in the TU Delft Graduate School. The TU Delft Graduate School provides an inspiring research environment with an excellent team of supervisors, academic staff and a mentor. The Doctoral Education Programme is aimed at developing your transferable, discipline-related and research skills.

The TU Delft offers a customisable compensation package, discounts on health insurance and sport memberships, and a monthly work costs contribution. Flexible work schedules can be arranged. For international applicants we offer the [Coming to Delft Service and Partner Career Advice](#) to assist you with your relocation.

## TU Delft (Delft University of Technology)

Delft University of Technology is built on strong foundations. As creators of the world-famous Dutch waterworks and pioneers in biotech, TU Delft is a top international university combining science, engineering and design. It delivers world class results in education, research and innovation to address challenges in the areas of energy, climate, mobility, health and digital society. For generations, our engineers have proven to be entrepreneurial problem-solvers, both in business and in a social context.

At TU Delft we embrace diversity as one of our core [values](#) and we actively [engage](#) to be a university where you feel at home and can flourish. We value different perspectives and qualities. We believe this makes our work more innovative, the TU Delft community more vibrant and the world more just. Together, we imagine, invent and create solutions using technology to have a positive impact on a global scale. That is why we invite you to apply. Your application will receive fair consideration.

Challenge. Change. Impact!

## Faculty Mechanical, Maritime and Materials Engineering

The Faculty of 3mE carries out pioneering research, leading to new fundamental insights and challenging applications in the field of mechanical engineering. From large-scale energy storage, medical instruments, control technology and robotics to smart materials, nanoscale structures and autonomous ships. The foundations and results of this research are reflected in outstanding, contemporary education, inspiring students and PhD candidates to become socially engaged and responsible engineers and scientists. The faculty of 3mE is a dynamic and innovative faculty with an international scope and high-tech lab facilities. Research and education focus on the design, manufacture, application and modification of products, materials, processes and mechanical devices, contributing to the development and growth of a sustainable society, as well as prosperity and welfare.

Click [here](#) to go to the website of the Faculty of Mechanical, Maritime and Materials Engineering. Do you want to experience working at our faculty? These [videos](#) will introduce you to some of our researchers and their work.

## Additional information

For more information about this vacancy, please contact Dr.ir. Carlas Smith, [c.s.smith@tudelft.nl](mailto:c.s.smith@tudelft.nl).

This position is one of many PhD and postdoc positions available as part of the gravitational programme IMAGINE! (Innovative Microscopy And Guidance of cells In their Native Environment). IMAGINE! is an interdisciplinary programme combining cell, organoid, and tissue biology, as well as chemical and optical cell manipulation and analysis to study cell behaviour in development and cancer, and targeted drug delivery. Participating institutes are based throughout the Netherlands in Utrecht, Amsterdam, Delft, Rotterdam, Nijmegen, and Eindhoven. For more information on the individual positions, please visit our [IMAGINE!](#) website.

## Application procedure

Are you interested in this vacancy? Please apply by **15 February 2023** via the application button and upload:

- your letter of motivation;
- your Curriculum vitae;
- reference letters are optional but appreciated

For information about the application procedure, please contact Irina Bruckner, HR advisor, [recruitment-3me@tudelft.nl](mailto:recruitment-3me@tudelft.nl).

Please note:

- A pre-employment screening can be part of the selection procedure.
- You can apply online. We will not process applications sent by email and/or post.
- Contact by recruitment agencies is not appreciated.

[Apply Now](#)