



# Top Master Programme in Nanoscience





The fundamental and functional properties of matter on the nanoscale ( $\sim 10^{-9}$  m) often differ dramatically from those in the macroscopic world. Nature has already made good use of many of these remarkable nanoscale phenomena. The challenge for scientists in nanoscience is to understand the fascinating world of small length scales, and to exploit the new technological possibilities this offers. To meet this challenge, the Zernike Institute for Advanced Materials has designed a multi-disciplinary educational programme to prepare highly talented and motivated persons for a career as a world-class researcher in this rapidly developing field.

### Graduate programmes in the Dutch setting

The Dutch system of university education (in line with the European Bologna structure) comprises three phases, leading sequentially to the BSc, MSc and PhD degrees. The BSc normally takes three, the MSc two, and the PhD four years (full time).

This leaflet primarily describes the Top Master Programme in Nanoscience, an internationally oriented, multi-disciplinary, high-level MSc programme aimed at very talented and motivated students, seeking a career in scientific research. Indeed, nearly all graduates of the Top Master Programme continue their training in a PhD programme. The Zernike Institute for Advanced Materials offers a PhD position to all students who complete the Top Master Programme in Nanoscience with sufficiently high marks. For quite exceptional students, it may even be possible to combine the second year of the MSc with the first year of the PhD programme, leading to a combined MSc/PhD phase of five instead of six years.

### Excellence in research and teaching

The Zernike Institute for Advanced Materials, which is responsible for the Top Master Programme in Nanoscience, is a leading international research centre. It unites some 300 researchers with backgrounds in physics, chemistry, and biology. In 1999, the excellence of the research done in the Zernike Institute was recognized by awarding the Institute the status of National Research Centre and Top



Research School. Like all Dutch university teaching programmes, the Top Master Programme in Nanoscience is frequently assessed by NVAO (Accreditation Organisation of the Netherlands and Flanders). The most recent assessment (2018) resulted in an extension of the accreditation of the Programme until early 2025 and a truly unique award of 'excellent' on the Programme. In the previous rounds (2007 and 2012) it was also reviewed as excellent.

### Programme content

The Top Master Programme in Nanoscience takes two full years. Roughly, the first year is devoted primarily to participating in courses, the second year is spent on a large research project. After remedying any deficiencies in background knowledge a student may have, the first half of the first year is taken up by three large modules representing the foundational knowledge of Nanoscience.

They cover *Preparation of nanomaterials and devices*, *Characterization of nanomaterials*, and *Fundamental and functional properties of nanomaterials*.

These modules are taught by staff members of the Zernike Institute, all leading researchers in the topics they teach.

The second half of the first year is spent on optional modules, chosen by the student from the wide variety offered by the Faculty of Science and Engineering; on writing a review paper; and on doing a small research project, guided by a senior staff member. The review paper and the small research project have to be done in different research groups, giving the student additional exposure to the variety of research present in the Zernike Institute.

The second year comprises some more optional modules, but is mainly devoted to a large research project, forming the subject of the MSc thesis. All of the state-of-the-art equipment of the Zernike Institute is available to the student. Additionally, the student writes a PhD research proposal, to become acquainted with this important aspect of research.

Each student is assigned a senior staff member as mentor, and can profit from coaching by a 2nd- year student of the Programme (buddy system). The small scale of the Top Master Programme in Nanoscience allows for intensive collaboration between students and staff, and for jointly participating in cultural and social events.



Top master Nanoscience Students inside cleanroom of NanoLab NL in Groningen.

### Field of research

The Zernike Institute for Advanced Materials covers a wide range of research topics, ranging from the design and creation of new materials and devices to characterizing, modelling, controlling and understanding the fundamental properties at a microscopic level. Theoretical, experimental, and computational approaches are all found under one roof.

The Zernike Institute prides itself on its long tradition of multidisciplinary and interdisciplinary research. Most research is done in collaboration between several research groups. The Top Master Programme in Nanoscience likewise combines topics conventionally taught either in physics or in chemistry. The combination of the different approaches is what makes the Top Master Programme unique and challenging.

### Setting and international ranking

The University of Groningen, founded in 1614, is the second-oldest university in The Netherlands. All facilities of this classical university are available to the participants in the Top Master Programme in Nanoscience. The city of Groningen has been rated as the best student city several times.

The University of Groningen, and in particular the Zernike Institute for Advanced Materials, are listed very high in all of the important international ranking systems.

## Admission requirements

Admission to the Top Master Programme in Nanoscience is highly selective. The requirements include:

- A Bachelor or Master degree in physics, chemistry, materials sciences or in a related field.
- English proficiency [native English speakers and Dutch students are exempt].
- Appropriate attitude, motivation, ambition and talent.
- Recommendations by qualified referees.
- A statement of available financial support.

## Application

Applying for the Programme is a two-step procedure. Applicants are first screened on the basis of their motivation letter, prior study results and recommendations from referees. Promising candidates are invited to Groningen for an interview with members of the Admissions Board. Early-bird applications submitted before **15 November** will be processed with priority. The deadline for applications is **1 February** [for students who need visa to come to The Netherlands (non-EU)] or **1 May** [for students who do not need a visa and have a bachelor degree from education in the EU/EEA]. All applications should be submitted via Studielink. Selection interviews will take place in the period February till June.

Visit our website for starting an application.

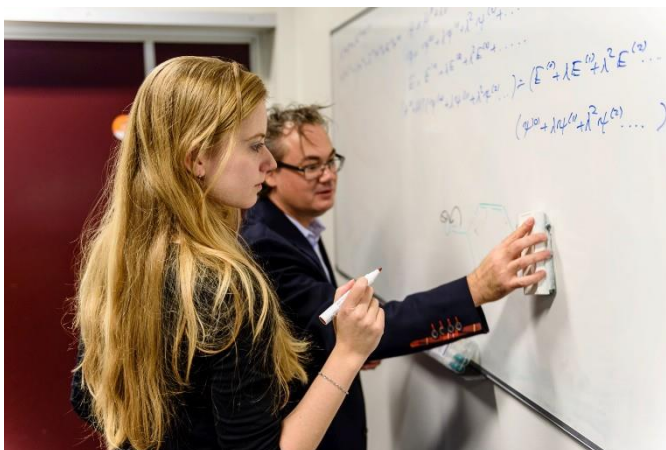


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## Financial aspects

Early efforts by a student for getting external financial support (scholarships) are recommended. The Zernike Institute can help applicants and admitted students with this. The Zernike Institute has its own scholarship scheme with limited scholarships available.

## Further information

Further information on the Top Master Programme in Nanoscience is available on the website <http://tinyurl.com/nanosciencemaster>. Here you can also find information on the research groups participating in the Top Master Programme.

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<https://www.rug.nl/ocasys/fwn/vak/showpos?opleiding=4100>

## Top Master in Nanoscience key facts

- Programme start: 1 September annually
- Duration: 24 months
- Language: English
- Degree: Master of Science (MSc)
- Twitter: @NanoscienceTop
- <https://www.facebook.com/nanoscienceetopmaster/>