



NVAO • THE NETHERLANDS

## INITIAL ACCREDITATION

MSC MOLECULAR IMAGING AND  
ENGINEERING

Maastricht University

SUMMARY REPORT  
18 NOVEMBER 2021



## 1 Peer review

The quality of a new programme is assessed by means of peer review. A panel of independent peers including a student reviews the plans during a site visit to the institution. A discussion amongst peer experts forms the basis for the panel's final judgement and the advisory report. The focus is on the curriculum, the teaching and learning environment, and student assessment.

The Accreditation Organisation of the Netherlands and Flanders (NVAO) takes a formal decision on the quality of the new programme based on the outcome of the peer review. This decision can be positive, conditionally positive or negative. Following a positive NVAO decision with or without conditions the institution can proceed to offer the new programme. Upon completion of the programme graduates are entitled to receive a legally accredited degree.

This summary report contains the main outcomes of the peer review. A full report with more details including the panel's findings and analysis is also available. NVAO bases an accreditation decision on the full report.

Both the full and summary reports of peer reviews are published on NVAO's website [www.nvao.net](http://www.nvao.net). There you can also find more information on NVAO and peer reviews of new programmes.

Because of COVID-19 temporary measures apply for this peer review.

## 2 Panel

### Peer experts

- Prof. dr. Jurriaan Huskens, (chair), Professor of Supramolecular Chemistry & Nanofabrication, Molecular Nanofabrication group (MnF), University of Twente, Enschede;
- Prof. dr. Thomas Rizzo, Professor of Physical Chemistry and Chair of the Laboratory of Molecular Physical Chemistry, École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland;
- Dr. Ellen Wehrens, scientific writer to the Rios Group at Princess Máxima Center for Pediatric Oncology, Utrecht;
- Willem Gommans BSc, Student MSc Construction Management & Engineering, Eindhoven University of Technology (TU/e).

### Assisting staff

- Aurelie van 't Slot MA (secretary)
- Lotte Ninaber van Eijben MSc (NVAO policy advisor and process coordinator)

### Site visit (online)

13 October 2021

### 3 Outcome

The NVAO approved panel reached a positive conclusion regarding the quality of the MSc Molecular Imaging and Engineering offered by Maastricht University.

Maastricht University offers a two-year interdisciplinary programme in molecular imaging and engineering at academic master's level. Its graduates will be trained in the theoretical, technical and practical aspects of high-end imaging research and instrumentation engineering. The programme clearly answers to calls from academia and industry for interdisciplinary top-level specialists who can integrate relevant aspects of imaging engineering in areas such as mass spectrometry and microscopy. The panel is of the opinion that the title of the programme, and that of one of its specialisations, misrepresents its content and therefore strongly advises to reconsider it. In the first semester, students are provided with a broad basis in molecular imaging and engineering, imaging techniques and instrumentation, molecules and structures and imaging informatics, before they develop more fundamental knowledge, insight and skills in either "instrumentation imaging engineering" or "molecular imaging engineering" as their chosen specialisation.

The interdisciplinary approach and connection to real-life problems or challenges are strong points: students take part in two research projects and work in interdisciplinary teams where they are exposed to different backgrounds. The projects facilitate the integration and application of acquired knowledge, understanding and skills by addressing real-life interdisciplinary research and engineering challenges in the field of molecular imaging and engineering. Students conclude the programme with a master thesis, which can be carried out at UM, at other universities, research institutes or companies in the Netherlands or abroad. The programme thus offers many opportunities for interaction with industry, academia and/or participation in the (inter)national R&D and engineering community. The design and content of the programme is well thought through: courses address timely and relevant issues and the option to specialize benefits the relatively broad influx of students. The teaching staff is highly qualified and clearly committed to the success of the programme. The programme has a sound and transparent system of assessment in place and makes use of a wide variety of assessment methods, which is appropriate considering its interdisciplinary nature. The Board of Examiners plays an active role in ensuring the quality of assessment.

Maastricht University proposes that the programme has a duration of two years totalling 120 European Credits (EC). The arguments of the programme management concern (inter)national engineering standards, as well as the content of the curriculum, in terms of the required knowledge, skills, research and engineering experience. The panel agrees that the qualifications graduates should have in order for them to be competitive in the (inter)national job market is unachievable in a programme of less than two years. The panel advises to grant the programme the right to offer a two-year master programme (120 EC).

In conclusion, the panel is convinced of the quality of the proposed programme and expects that the MSc Molecular Imaging and Engineering will be an attractive programme fulfilling a clear industry need. All in all, the panel assesses the quality of the programme as positive.

### 4 Commendations

The programme is commended for the following features of good practice.

1. Key technological field – Molecular imaging and engineering is a key technological field. The panel applauds Maastricht University's integrated approach and considers it a timely and much needed programme.
2. Teaching staff – The teaching staff are enthusiastic, motivated and show a great collaborative spirit. The staff members bring in a wide array of expertise from various disciplines. They constitute a strong team, committed to educating future engineering professionals.

3. Interdisciplinary projects – Students take part in two research projects and work in interdisciplinary teams where they are exposed to different backgrounds. The projects facilitate the integration and application of acquired knowledge, understanding and skills by addressing real-life interdisciplinary research and/or engineering challenges in the field of molecular imaging and engineering.

## 5 Recommendations

For further improvement to the programme, the panel recommends a number of follow-up actions.

1. Title of the programme – Reconsider the title of Molecular Imaging and Engineering to accurately represent the distinct profile of the programme<sup>1</sup>. Also reconsider the title of the specialisation Instrumentation Imaging Engineering.

2. *Molecular Engineering for Imaging* course – Ensure the course is optimally aligned with the goals of the programme. In the current set-up, the course does not sufficiently emphasize issues related to imaging, such as molecular probes and other types of labels and their incorporation into molecular systems suited for optical detection.

## 6 What comes next?

NVAO grants initial accreditation to a new programme on the basis of a panel's full report. The decision is valid for a maximum of six years. For conditional accreditation other regulations apply. Upon accreditation the new programme will follow the NVAO review procedures for existing programmes. NVAO publishes the accreditation decision together with the full report and this summary report.<sup>2</sup>

Each institution has a system of quality assurance in place ensuring continuous follow-up actions and periodic peer-review activities. Peer reviews help the institution to improve the quality of its programmes. The progress made since the last review is therefore taken into consideration when preparing for the next review. The follow-up activities are also part of the following peer-review report. For more information, visit the institution's website.<sup>3</sup>

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<sup>1</sup> Following the site visit, on November 10th 2021, the programme announced that it will choose the following name: Imaging Engineering. In this advisory report, Molecular Imaging and Engineering remains the name of the programme, as this name is part of the application. The NVAO accreditation decision will use the new name as the first name of the programme so that CROHO registration takes place accordingly.

<sup>2</sup> <https://www.nvao.net/nl/besluiten>

<sup>3</sup> <https://www.maastrichtuniversity.nl/>

## 7 Summary in Dutch

Het panel oordeelt positief over de kwaliteit van de wo-masteropleiding Molecular Imaging and Engineering van de Universiteit Maastricht. Dit is de uitkomst van de kwaliteitstoets uitgevoerd door een panel van peers op verzoek van de Nederlands-Vlaamse Accreditatieorganisatie (NVAO). Voor deze beoordeling heeft het panel (online) gesprekken gevoerd met de opleiding op 13 oktober 2021.

De Universiteit Maastricht biedt een tweejarige interdisciplinaire opleiding aan in molecular imaging en engineering op academisch masterniveau. De afgestudeerden zullen worden opgeleid in de theoretische, technische en praktische aspecten van hoogwaardig imaging-onderzoek en instrumentatie-engineering. De opleiding komt duidelijk tegemoet aan een vraag van de wetenschap en het werkveld naar interdisciplinaire specialisten van het hoogste niveau die relevante aspecten van imaging-technologie kunnen integreren op gebieden zoals massaspectrometrie en microscopie. Het panel is van mening dat de naam van de opleiding, en van één van de specialisaties, een verkeerde weergave biedt van de inhoud en adviseert om deze te heroverwegen. In het eerste semester krijgen studenten een brede basis in molecular imaging en engineering, imagingtechnieken en -instrumentatie, moleculen en structuren en imaging informatics, voordat ze meer fundamentele kennis, inzicht en vaardigheden ontwikkelen in ofwel "instrumentation imaging engineering" of "molecular imaging engineering" als hun gekozen specialisatie.

De interdisciplinaire benadering en verbinding met levensechte uitdagingen zijn sterke punten: studenten nemen deel aan twee onderzoeksprojecten en werken in interdisciplinaire teams waar ze worden blootgesteld aan verschillende achtergronden. De projecten ondersteunen de integratie en toepassing van verworven kennis, inzicht en vaardigheden. Studenten werken aan interdisciplinaire onderzoeks- en technische uitdagingen op het gebied van molecular imaging en engineering. Ze sluiten de opleiding af met een masterscriptie, die eventueel in een industriële omgeving kan worden uitgevoerd. De opleiding biedt veel mogelijkheden voor interactie met het werkveld en/of deelname aan de (inter)nationale R&D- en engineeringgemeenschap. De opzet en inhoud van het curriculum is goed doordacht: vakken gaan in op actuele en relevante vraagstukken en de mogelijkheid tot specialisatie past bij de relatief brede instroom van studenten. Het onderwijzend personeel is hooggekwalificeerd en duidelijk toegewijd aan het succes van de opleiding. De opleiding heeft een degelijk en transparant beoordelingssysteem en maakt gebruik van een breed scala aan beoordelingsmethoden, wat passend is gezien het interdisciplinaire karakter. De examencommissie speelt een actieve rol bij het bewaken van de kwaliteit van de toetsing.

De Universiteit Maastricht heeft verzocht om een studieduur te hanteren van twee jaar met in totaal 120 European Credits (EC). De argumenten van het opleidingsmanagement betreffen de (inter)nationale ingenieursnormen, evenals de inhoud van het curriculum, in termen van de vereiste kennis, vaardigheden, onderzoek en ingenieurservaring. Het panel beaamt dat de kwalificaties die afgestudeerden moeten hebben om competitief te zijn op de (inter)nationale arbeidsmarkt onhaalbaar zijn in een opleiding van minder dan twee jaar. Het panel adviseert de opleiding het recht te verlenen om een tweejarige masteropleiding (120 EC) aan te bieden.

Concluderend is het panel overtuigd van de kwaliteit van de voorgestelde opleiding en verwacht dat de MSc Molecular Imaging and Engineering een aantrekkelijk programma zal zijn dat voldoet aan een duidelijke behoefte van het werkveld. Al met al beoordeelt het panel de kwaliteit van de opleiding als positief.

Meer informatie over de NVAO-werkwijze en de toetsing van nieuwe opleidingen is te vinden op [www.nvao.net](http://www.nvao.net). Voor informatie over de Universiteit Maastricht verwijzen we naar de website van de instelling.<sup>4</sup>

Als gevolg van de beperkende omstandigheden door COVID-19 geldt voor deze kwaliteitstoets een tijdelijke procedure.

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<sup>4</sup> <https://www.maastrichtuniversity.nl/nl>

