RESEARCH MASTER NEUROSCIENCE

ERASMUS UNIVERSITY ROTTERDAM

ERASMUS MC

DEPARTMENT OF NEUROSCIENCE

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This report was finalized on 6 April 2020.

REPORT ON THE MASTER'S PROGRAMME NEUROSCIENCE OF ERASMUS UNIVERSITY ROTTERDAM

This report takes the NVAO's Assessment Framework for the Higher Education Accreditation System of the Netherlands for limited programme assessments as a starting point (September 2018). This report considers a research master's programme, therefore the NVAO's Specification of additional criteria for research master's programmes (May 2016) are considered additionally as supplementary to this framework.

ADMINISTRATIVE DATA REGARDING THE PROGRAMME

Master's programme Neuroscience

Name of the programme:	Neuroscience (research)
CROHO number:	60278
Level of the programme:	master's
Orientation of the programme:	academic
Number of credits:	120 EC
Specialisations or tracks:	none
Location(s):	Rotterdam
Mode(s) of study:	full time
Language of instruction:	English
Submission deadline NVAO:	01/05/2020

The visit of the assessment panel Cognitive Neuroscience to the Erasmus MC medical faculty of Erasmus University Rotterdam took place on the 25th of November 2019.

ADMINISTRATIVE DATA REGARDING THE INSTITUTION

Name of the institution:	Erasmus University Rotterdam
Status of the institution:	publicly funded institution
Result institutional quality assurance assessment:	positive

COMPOSITION OF THE ASSESSMENT PANEL

The NVAO has approved the composition of the panel on the 14th of October 2019. The panel that assessed the master's programme Neuroscience consisted of:

- Prof. dr. S. F. (Susan) te Pas, professor Cognitive Psychology at Utrecht University [chair];
- Prof. dr. R.T. (Rudi) D'Hooge, professor Biological Psychology at KU Leuven (Belgium);
- Prof. dr. R.A.H. (Roger) Adan, professor Molecular Pharmacology at Utrecht University;
- Prof. dr. C.M.A. (Cyriel) Pennartz, professor Cognitive and Systems Neuroscience at the University of Amsterdam;
- E. (Ekin) Tünçok BSc, master's student Cognitive and Clinical Neuroscience at Maastricht University [student-member].

The panel was supported by P. (Petra) van den Hoorn MSc, who acted as secretary.

WORKING METHOD OF THE ASSESSMENT PANEL

The site visit and assessment of the master's programme Neuroscience at the Department of Neuroscience of Erasmus University Rotterdam (situated in Erasmus MC) was part of the cluster assessment Cognitive Neuroscience. Between October and November 2019, the panel assessed 4 programmes of 4 universities. The following universities participated in this cluster assessment: Maastricht University, Vrije Universiteit Amsterdam, Erasmus University Rotterdam and Radboud University.

On behalf of the participating universities, quality assurance agency QANU was responsible for logistical support, panel guidance and the production of the reports. P. (Petra) van den Hoorn MSc was project coordinator for QANU and acted as secretary in the cluster assessment. Mr. H. (Hester) Minnema supported her during the site visits at Maastricht University and Vrije Universiteit Amsterdam. Both are certified NVAO secretaries.

Panel members
The members of the assessment panel were selected based on their expertise, availability and independence. The panel consisted of the following members:

- Prof. dr. R.T. (Rudi) D'Hooge, professor Biological Psychology at KU Leuven (Belgium);
- Prof. dr. S.F. (Susan) te Pas, professor Cognitive Psychology at Utrecht University [chair];
- Prof. dr. T. (Tobias) Kalenscher, professor Comparative Psychology at Heinrich Heine Universität Düsseldorf (Germany);
- Prof. dr. E.A. (Eddy) van der Zee, professor Molecular Neurobiology at University of Groningen;
- Prof. dr. N.J.A. (Nic) van der Wee, professor Biological Psychiatry at Leiden University Medical Centre;
- Prof. dr. C. (Christian) Steinhäuser, professor and director of the Institute of Cellular Neurosciences at the University of Bonn (Germany);
- Prof. dr. R.A.H. (Roger) Adan, professor Molecular Pharmacology at Utrecht University;
- Prof. dr. C.M.A. (Cyriel) Pennartz, professor Cognitive and Systems Neuroscience at the University of Amsterdam;
- Prof. dr. R. (Rufin) Vogels, professor Cognitive and Visual Neuroscience at KU Leuven (Belgium);
- Prof. dr. F.A.J. (Frans) Verstraten, professor and McCaughey Chair in Psychology at the University of Sydney (Australia);
- M. (Mesian) Tilmatine BSc, master's student Cognitive Neuroscience at Radboud University Nijmegen [student member];
- E. (Ekin) Tünçok BSc, master's student Cognitive and Clinical Neuroscience at Maastricht University [student-member].

Preparation
On 16 September 2019, the panel chair Prof. dr. S.F. (Susan) te Pas was briefed by QANU on her role, the assessment framework, the working method, and the planning of site visits and reports. A preparatory panel meeting was organised on 14 October 2019. During this meeting, the panel members received instruction on the use of the assessment frameworks. The panel also discussed their working method and the planning of the site visits and reports.

The project coordinator composed a schedule for the site visit in consultation with the Faculty. Prior to the site visit, the Faculty selected representative partners for the various interviews. See Appendix 4 for the final schedule.

Before the site visit to Erasmus University Rotterdam, QANU received the self-evaluation report of the programme and sent it to the panel. A thesis selection was made by the panel's chair and the project coordinator. The selection existed of 15 theses and their assessment forms for the programme, based on a provided list of graduates between 2016 and 2019. A variety of topics and a diversity of examiners were included in the selection. The project coordinator and panel chair

assured that the distribution of grades in the selection matched the distribution of grades of all available theses.

After studying the self-evaluation report, theses and assessment forms, the panel members formulated their preliminary findings. The secretary collected all initial questions and remarks and distributed these amongst all panel members.

Site visit
The site visit to Erasmus University Rotterdam took place on Monday the 25th of November 2019. Before and during the site visit, the panel studied the additional documents provided by the programme. An overview of these materials can be found in Appendix 5. Prof. dr. C.M.A. (Cyriel) Pennartz could not attend the site visit. Just like the rest of the panel, he did read the self-evaluation report and a selection of theses and reported his findings to the panel and the secretary.

At the start of the site visit, the panel discussed its initial findings on the self-evaluation report and the theses, as well as the division of tasks during the site visit. During the visit, the panel conducted interviews with representatives of the programme: students and staff members, the programme's management, alumni and representatives of the Board of Examiners. It also offered students and staff members an opportunity for confidential discussion during a consultation hour. No requests for private consultation were received.

The panel used the final part of the site visit to discuss its findings in an internal meeting. Afterwards, the panel chair publicly presented the panel's preliminary findings and general observations.

Consistency and calibration
In order to assure the consistency of assessment within the cluster, various measures were taken:

- The panel composition ensured regular attendance of (key) panel members, including the chair;
- The project coordinator was present during all site visits.

Report
After the site visit, the secretary wrote a draft report based on the panel's findings and submitted it to a colleague for peer assessment. Subsequently, the secretary sent the report to the panel. After processing the panel members' feedback, the project coordinator sent the draft report to the Faculty in order to have it checked for factual irregularities. The project coordinator discussed the ensuing comments with the panel's chair and changes were implemented accordingly. The report was then finalised and sent to the Faculty and University Board.

Definition of judgements standards
In accordance with the NVAO's Assessment framework for limited programme assessments, the panel used the following definitions for the assessment of the standards:

Generic quality
The quality that, from an international perspective, may reasonably be expected from a higher education Associate Degree, Bachelor's or Master's programme.

Meets the standard
The programme meets the generic quality standard.

Partially meets the standard
The programme meets the generic quality standard to a significant extent, but improvements are required in order to fully meet the standard.

Does not meet the standard
The programme does not meet the generic quality standard.

The panel used the following definitions for the assessment of the programme as a whole:

Positive
The programme meets all the standards.

Conditionally positive
The programme meets standard 1 and partially meets a maximum of two standards, with the imposition of conditions being recommended by the panel.

Negative
In the following situations:
- The programme fails to meet one or more standards;
- The programme partially meets standard 1;
- The programme partially meets one or two standards, without the imposition of conditions being recommended by the panel;
- The programme partially meets three or more standards.

SUMMARY JUDGEMENT

Intended learning outcomes
The panel is satisfied with the programme's profile. The programme is internationally well embedded with a clear educational vision and policy that fits a research master. The programme aims to train students to become excellent, broadly educated, independent researchers in the field of Neuroscience. Alumni should be ready to enrol in any nationally or internationally competitive PhD-programme in the field of Neuroscience and in various medical fields. Although the programme aims to prepare students also for a career outside academia, the panel encourages the programme to enhance their communication about career opportunities outside academia.

The panel has established, that the intended learning outcomes are in line with the Dublin descriptors and with the Domain-Specific Reference Framework. Although the panel recommends incorporating specific neuroscience-related ILOs, the current ILOs adequately represent the high standards suitable for a research master's programme, by paying much attention to research-related knowledge (ethics, integrity) and performing (parts of) the research cycle.

Teaching-learning environment
The programme has translated its intended learning outcomes into a coherent curriculum. The first year has a very solid set of modules in place, providing an overview of the field of neuroscience and letting students deepen their understanding and expertise on the topics they are most interested in. The programme also pays attention to new developments in the field, such as in computational neuroscience. The programme builds up from basic knowledge to more advanced and complex knowledge. However, the panel strongly advises the programme management to implement a course on statistics.

Research and theoretical knowledge are well-integrated throughout the programme. Through lab talks and journal clubs, students get a sense of the different research topics in the field of Neuroscience and the several research groups active within the department. The panel appreciates the clear choice for one long research internship. It allows students to be fully submerged in a research group where they experience the full research cycle, from writing a proposal all the way to presenting the findings.

The panel concludes that the programme uses a sufficient variety of teaching methods: lectures, practicums, workshops and interactive teaching in small classes. A large part of the programme entails the Research Project, where students are fully integrated in a research group under supervision of a tutor, experience the full research cycle and develop important research and communication skills along the way. The panel appreciates the fact that, over the course of the research project, the tutor's support and guidance decreases as the student becomes a more independent, competent and confident researcher, thereby preparing students to start their career as an independent researcher after graduation.

The panel thinks the selection and admission requirements are well chosen for a programme with a strong emphasis on research. Procedures for admission are adequate, but quite strict, so the programme should guard not to get too few students. The selection and admission procedure enables a heterogeneous yet coherent classroom, with students coming from several countries and with different educational backgrounds, willing to help each other.

According to the panel, the programme's staff has excellent expert knowledge. It advises the programme to stimulate all staff members to obtain a UTQ. The panel appreciates the fact that all research groups within the Neuroscience department are represented by teachers in at least one of the programme's modules. Including senior researchers and professors, the entire staff is actively involved in the programme, and the student-staff ratio is excellent. The panel concluded that the guidance in the Research Project differs per research group the student is enrolled in: the tutor's supervision differs in terms of quality and quantity. The panel is satisfied with the programme's plans

to develop student-tutor guidelines where the expectations regarding workload and supervision is specified.

The panel assessed that the programme's progression rate is very good. When delay of students occurs, it is often unrelated to the content and structure of the programme. Students indicated that the programme during the first year is intensive and at times they experience a heavy study load. The panel applauds the programme's initiatives to reduce the number of modules in 2020 and inform the teaching staff about their (perhaps too high) expectations of their students.

The Research Master programme is hosted by the department of Neuroscience (Erasmus MC) that has a strong position in the international research field. Therefore, the choice for English as the language of instruction is self-evident since all research in the field of neuroscience is performed in English and the main aim of the programme is to prepare students for a research career. The panel concludes that the quality of research within the department is excellent. The students' full participation in the research groups is very much appreciated by the panel. A specific strength of the department according to the panel, is the choice to have human and animal research performed on the same floor: people from different fields of research meet each other and can collaborate.

Student assessment
According to the panel, the Assessment Policy and Assessment Plan of the programme are very well designed and solid. All intended learning outcomes are assessed during at least one of the modules. According to the panel, assessment methods are sufficiently varied and suitable for the learning outcomes that they are meant to assess. The assessment methods are sufficiently varied, are both formative and summative and clearly reflect the level of the programme.

The panel is highly enthusiastic about the current procedure to assess the theses. The assessment procedure is a very elaborate, clear and transparent way to assess the final performance of the student. Regarding the assessment forms, the panel believes there is still room for improvement. The panel encourages the programme's plan to implement rubrics in the forms, which may help limit the variety of assessment styles.

The panel established that the programme's Examination Board adequately handles all of its legally mandated tasks. The panel is very satisfied with the board's professional upgrade in terms of quality assurance of assessments in the past few years. It is satisfied with the board's procedure to check all module's exams and it strongly advises the board to implement a procedure to check the master's theses quality as well.

Achieved learning outcomes
The panel believes that the size of the final project (Research Proposal – Research Project + Internship – Master's thesis) is large enough to include a full research cycle and to assess whether students have achieved all of the intended learning outcomes.

Most of the theses were of good to excellent quality, in some cases, the panel would even have given the thesis a higher grade. The theses show that the students achieve the intended learning outcomes and thus the research master's level.

Almost sixty percent of the programme's graduates start a PhD trajectory after completing the MSc Neuroscience. Given that about a quarter of the student population consists of medical students, who eventually intend to become a medical doctor, the panel thinks this is a reasonable number.

The panel encourages the programme to stay connected to its alumni, since they provide a source of information to the current students on career perspectives and opportunities the programme has to offer.

The panel assesses the standards from the *Assessment framework for limited programme assessments* in the following way:

Master's programme Neuroscience

Standard 1: Intended learning outcomes	meets the standard
Standard 2: Teaching-learning environment	meets the standard
Standard 3: Student assessment	meets the standard
Standard 4: Achieved learning outcomes	meets the standard
General conclusion	positive

The chair, Prof. dr. S.F. (Susan) te Pas, and the secretary, P. (Petra) Van den Hoorn MSc, of the panel hereby declare that all panel members have studied this report and that they agree with the judgements laid down in the report. They confirm that the assessment has been conducted in accordance with the demands relating to independence.

Date: 6 April 2020.

DESCRIPTION OF THE STANDARDS FROM THE ASSESSMENT FRAMEWORK FOR LIMITED FRAMEWORK ASSESSMENTS

Standard 1: Intended learning outcomes
The intended learning outcomes tie in with the level and orientation of the programme; they are geared to the expectations of the professional field, the discipline, and international requirements.

Findings

Profile
The research master (RMa) Neuroscience aims to train students to become excellent, broadly educated, independent researchers in the field of Neuroscience. They become capable of critically assessing and performing scientific research in a multidisciplinary setting and publishing about it in peer-reviewed scientific journals. The programme's alumni are ready to enrol in any nationally or internationally competitive PhD programme in the field of Neuroscience and in various medical fields, such as neurology, neurosurgery, ophthalmology, otolaryngology, oncology, psychology, psychiatry and gerontology. The programme acknowledges the fact that the field of neuroscience is rapidly expanding and that there are numerous possibilities for application, in a variety of industries. It therefore wishes to prepare its students for a career outside academia as well, for instance in the field of biomedical (clinical), fundamental (pharmaceutical companies) or applied neuroscience research (companies that work in the field of robotics). Situated in the Erasmus MC, the programme is actively building one of those bridges between academia and applied neuroscience, by creating an educational connection between neuroscience and the medical field.

The panel is satisfied with the programme's profile. The programme is internationally well embedded: with staff collaborating with a variety of international research partners, the programme keeps up with the latest developments in the field. According to the panel, the programme has a clear educational vision and policy that fits a research master. It aims to promote the acquisition of research skills and a critical attitude in its students, to educate students to become excellent researchers who are able to work in a multidisciplinary setting in the field of neuroscience and to publish in a peer reviewed international journal.

Even though the programme prepares students for careers outside academia, during the site visit the panel learned that the students experience the programme as largely 'academically focused'. There seems to be little attention for communication about how the knowledge and skills learned in the programme can be relevant for careers outside the university. There is a simple explanation for this: the programme's teachers are academics, and as a result, the main focus is on becoming a researcher in the field of Neuroscience. Although it naturally fits the purpose of a research master, the focus on becoming an academic is rather dominant throughout the programme. The panel thinks this is a missed opportunity, since the skills and knowledge taught in the programme are indeed perfectly fitting for other professional careers, such as a research career outside academia or a career in industry. The panel advises the programme management to look into ways to inform students more about career perspectives outside academia. For example, people from industries relevant to neuroscience can be invited as guest lecturers. The programme's alumni who did not start a PhD trajectory could also be invited to talk about their experiences (see standard 4).

Intended learning outcomes
The five research masters of the Erasmus MC have formulated common intended learning outcomes which are formulated according to the Dublin descriptors (Appendix 2). The ILOs are matched to the Dublin descriptors on a master's level. The learning outcomes are also aligned to the Domain-Specific Reference Frame for master's programmes in Neurosciences (Appendix 1).

By looking at the programme's ILOs, the panel could clearly see that this concerns a research master. It ascertained that the ILOs pay a lot of attention to research-related knowledge and skills, which fits a research master's programme. Many ILOs are related to performing some part of the scientific research cycle. The programme aims for the students to be able to publish in a peer-reviewed international journal, and this is specifically mentioned in one of the ILOs. In addition, ILOs concerning legislation, ethical issues and scientific integrity are included as well.

According to the panel, the ILOs are however formulated on a very general level. This is understandable since they apply to five research masters. The panel understands this choice: the university naturally wants to prepare all their research master students for a PhD trajectory in the same way, and so ILOs concerning research skills and scientific attitude need to be identical. However, the panel is of the opinion that particular knowledge and skills related to the field of neuroscience are currently underrepresented in the ILOs. This is a missed opportunity: specific neuroscience-related ILOs will reflect the RMa programme's profile more clearly. During the site visit, the panel discussed this with the programme management. The latter agreed with the panel's suggestion to incorporate neuroscience-specific ILOs. The SER states that in the near future, the programme plans to introduce more programme-specific ILOs, which better reflect the scientific methods and developments in the field of Neuroscience. The panel supports this.

Considerations
The panel is satisfied with the programme's profile. The programme is internationally well embedded with a clear educational vision and policy that fits a research master. The RMa Neuroscience aims to train students to become excellent, broadly educated, independent researchers in the field of Neuroscience. Alumni should be ready to enrol in any nationally or internationally competitive PhD-programme in the field of Neuroscience and in various medical fields. Although the programme aims to prepare students also for a career outside academia, the panel encourages the programme to enhance their communication about career opportunities outside academia.

The panel has established, that the intended learning outcomes are in line with the Dublin descriptors and with the Domain-Specific Reference Framework. Although the panel recommends incorporating specific neuroscience-related ILOs, the current ILOs adequately represent the high standards suitable for a research master's programme, by paying much attention to research-related knowledge (ethics, integrity) and performing (parts of) the research cycle.

Conclusion
Master's programme Neuroscience: the panel assesses Standard 1 as 'meets the standard'.

Standard 2: Teaching-learning environment
The curriculum, the teaching-learning environment and the quality of the teaching staff enable the incoming students to achieve the intended learning outcomes.

Findings

Structure of the programme and connection to intended learning outcomes
The research master's programme Neuroscience has a duration of two years (120 EC). The programme's content is specifically designed for research master's students; no courses or modules are shared with 'regular' master's programmes. Because students with a large variety in educational backgrounds are admitted, the programme starts with a baseline test, to uncover any knowledge deficiencies. Based on the results of this test, the students are offered extracurricular classes to obtain the desired level on the programme's main topics. The panel thinks this test, and the extracurricular classes for the students who need them, is an effective way to ensure that all students will start the programme with a similar baseline knowledge level regardless of their educational background.

The two-year programme's content consists of modules (50 EC), electives (10 EC), general skill courses like academic writing, lab talks and seminars (12 EC) and Research Project (48 EC).

The curriculum of the first year is structured around the textbook *Principles of Neural Science* by Kandel, Schwartz and Jessel (5th edition). The programme starts with modules (three weeks each) on basic knowledge and builds up to more advanced knowledge. Following the book, the students study neuroanatomy, molecular and cellular mechanisms, the nervous system, neurological and psychiatric diseases, and perception. The textbook is rarely used in class: teachers use the theory from the book as background information for students to work on during class, where they read and discuss scientific articles in groups. The first year consists of ten modules (33 EC in total), each covering one of the textbook's topics. The panel appreciates the programme's choice to structure the first year by following Kandel's textbook. The book covers all topics in the field of Neuroscience, and by structuring the programme according to the book, the first year becomes a coherent and incremental set of modules, building up from basic knowledge to more advanced and complex knowledge.

During the first year, the Lab Talks and Seminars course (2 EC) provides students with an overview of the field of neuroscience. Students attend presentations (lab talks) of the many research groups working on projects related to neuroscience (both inside and outside the Neuroscience department) and follow lectures on subjects on neuroscience in the international field (seminars). They then apply for a research group which best matches their personal interest, where they will learn laboratory skills and write a research proposal under the supervision of their tutor. Ultimately, this proposal will be carried out in the second year. Students are usually matched to the research group of their first choice. According to the panel, the work done in the research groups and the courses are well integrated, adding to the coherence of the programme.

The programme tries to incorporate state-of-the-art research methods in neurosciences as much as possible. An example of this is the Computational Neuroscience module (3 EC), which teaches students computational approaches to studying the nervous system. This is very much appreciated by the panel: knowledge of data science and modelling is very useful for students, and few programmes in the Netherlands include such a course in their curriculum. In the second year, the Lab Talks and Seminars course is continued. In addition, the research groups organise journal clubs, gatherings of students and staff members in which scientific articles and research methods are reviewed and discussed. During the journal clubs and the Lab Talks and Seminars course, students practice their communicating, reasoning and debating skills while at the same time learn about scientific methods and the latest revelations in the field.

The panel thinks the programme has a very coherent curriculum in place. This is mainly due to the use of Kandel's textbook as a guidance in the modules and the courses on general research and writing skills. These begin in the first semester of the first year and continue through to the last semester of the second year. For instance, ethics and integrity in science are discussed in the first module of the first year, The Scientific Method (1 EC), during which the students learn about the importance of the reproducibility of research. The first year's modules Academic Writing I and II (3 EC in total) emphasise the importance of communicating ideas clearly, and let students get acquainted with the peer-review process of academic writing. The lessons learned in these three modules are carried over into the preparation and writing of the Research Proposal and ultimately the conduct of the Research Project (internship + master's thesis) in the second year. In general, the panel is very satisfied with the way the more general skills courses (focussing on the main topics concerning research, such as academic writing and ethics) are represented in the programme. Nevertheless, it encourages the programme to devote even more time to ethics, since it is such an important part of performing research. A very effective way to increase the time spent on ethics is to have assignments in different courses focus on various ethical issues. This will help the students to actively think about and discuss ethical issues and thus determine their own position. The panel was pleased to hear that in 2020, the Scientific Method module will be extended to include interactive lectures on the rules, regulations and ethics of animal and human experiments as well.

The panel admires the programme's aim to give students a broad overview of the field of neuroscience, concurrently acquaint them with sufficient in-depth knowledge about a set of neuroscience-related topics and also teach them useful research skills to be able to perform scientific research in this particular field. Especially in the first year, there are many modules providing (a part of) an overview of the field as well as more in-depth modules, related to a specific topic. Simultaneously, skills related courses are present throughout the year. According to the panel, this creates a very demanding programme. The panel encourages the programme to keep monitoring the balance between the broad overview versus the in-depth knowledge versus the research-related knowledge and skills the students need to acquire and to further strengthen its efforts in monitoring an equilibrium between knowledge and research in the curriculum. It applauds the management's activities to make the teaching staff more aware of the position of their module related to other modules, especially when it comes to course work, thereby adjusting teachers' sometimes unrealistically high expectations of the students in this respect.

In the second year, the students follow up on the research described in their first-year proposals under the supervision of the same tutor. The panel appreciates the clear choice for one long research internship (13 EC; part of the Research Project). During this internship the students are fully submerged in a research group where they experience the full research cycle, practising and developing their research skills in terms of academic writing, setting up and performing research, acquiring laboratory skills, and presenting their findings. Additionally, during the second year, they follow modules and elective workshops (10 EC) to broaden or deepen their neuroscientific knowledge and skills based on their own field of interest. The programme offers several electives in a variety of topics, mainly in the form of workshops (1 or 2 EC), but the students also have the opportunity to follow electives at other institutions if these meet the programme's standards. In the latter case they also need approval from the programme director and Examination Board. The panel appreciates the opportunity the electives provide students to enhance their skills. The students are free to choose which skill to improve, tailored to their needs. At the end of the second year, they write and present their master's thesis (35 EC; together with the internship, this forms the Research Project).

In general, the panel is satisfied with the programme's curriculum. However, a course on statistics seems to be missing. Although statistics is touched upon during several courses, a course purely dedicated to statistics or data analysis is lacking. The students told the panel during the site visit and in the student chapter that they gained sufficient knowledge of statistics during their prior education, but would appreciate a statistics course to familiarise themselves with more neuroscience-related methods. The panel agrees with their point of view and strongly advises the programme management to implement a course devoted to statistics, in which attention is paid to methodologies specifically related to the field of neurosciences. It discussed this during the site visit with the programme management and was happy to see that the management is already examining several options to do so.

Teaching methods and student centredness
Through the SER and the site visit, the panel concluded that the programme uses a sufficient variety of teaching methods. The programme uses activating teaching methods according to the principle of Constructive Alignment, to ensure that learning objectives and learning activities are aligned. The theoretical knowledge acquired during the modules is usually applied in practicals and workshops. Thus, acquiring content knowledge and research skills are closely interwoven. Due to the optimal student-teacher ratio (see below), there is interactive teaching in small classes. Throughout the programme, the students often receive personalised feedback during the modules and during the execution of the Research Project (internship + master's thesis), which leads to higher levels of motivation and performance.

During most classes, students read and discuss scientific articles and textbooks in groups. Teachers make use of the variety in the students' educational background by stimulating them to use their prior knowledge to help each other.

A large part of the programme is occupied by the Research Project. The panel agrees with the clear vision of the programme to offer one long internship, instead of multiple shorter ones. To be able to work for more than a year on a single research project allows the students to be fully integrated in a research group, experience the full research cycle, and develop important research and communication skills along the way. During the site visit and in the student chapter of the SER, the students expressed their appreciation of this full-blown Research Project. They are provided with their own workspace and are physically present in the department for almost two years, thus they will become fully part of their research group. Additionally, they can work in the laboratories which are also used by the senior researchers, thereby creating an optimal environment for the apprenticeship model.

During this project the teaching method is largely inspired by the apprenticeship model. Starting in the first year, the student is matched to a senior researcher, who acts as a tutor. The tutor 'adopts' the student into his/her research department. Under the tutor's supervision, the student learns laboratory skills and writes the research proposal. The panel ascertained that, throughout the research project, the students submerge themselves in an inspiring and challenging learning environment and are sufficiently prepared to be able to start their career as an independent researcher after graduation. The panel appreciates the fact that, over the course of the research project, the tutor's support and guidance decrease as the student becomes a more independent, competent and confident researcher.

The programme encourages the students to take the lead in shaping their own study programme. This begins with the baseline test at the start of the programme, as the students are offered extra courses to attain the desired basic knowledge level, regardless of their educational background. They can choose their electives, workshops, and the design and content of the research project. This provides them with the opportunity to deepen their understanding and expertise on the topics they are most interested in. According to the panel, this creates a multidisciplinary and individually tailored programme for each student.

Selection and admission requirements
In response to the recommendations of the previous accreditation panel, the programme has improved the selection procedure in terms of transparency. The general requirement for admission to the programme is a university bachelor degree related to the life sciences (including psychology students with specialisations in brain and behaviour). Students interested in doing fundamental or translational neuroscientific research are invited to apply for the programme. Admission is based on their previous education. If they have a bachelor's degree from a university of applied sciences, they must have a grade point average of 8.0. When they have a bachelor's degree in psychology, they need to demonstrate sufficient basic knowledge in the life sciences. International applicants from countries where English is not the official language and who have not had any English-language education at secondary school and university must demonstrate a strong English language proficiency (TOEFL: 90; IELTS: 6.5; Cambridge Proficiency: C1). All applicants take an obligatory entrance exam and must pass this with a minimal score of 7.0. The entrance exam is used to determine whether they have the required starting level and are likely to cope with the study load and format of the teaching programme. Around 50% fails this exam. In 2019, 19 students were accepted from 160 applicants.

According to the panel, the selection and admission requirements are well chosen for a programme with a strong emphasis on research. The procedures for admission are transparent and adequate. Between 2017 and 2019, the proportion of international students in this period was 45%, thereby creating an international classroom. The panel appreciates the fact that talented students with a bachelor's degree from a university of applied sciences are admitted to the programme, as it thinks it is important that master's programmes are accessible to talented and ambitious students whose educational career did not follow the usual path. In addition, the programme welcomes Erasmus MC medical students who wish to combine this programme with the master's programme Medical

Sciences. The selection and admission procedure creates a heterogeneous classroom, with students coming from several countries and different educational backgrounds, and the panel established that students are willing to help each other with their deficiencies. However, the panel noted the admission and selection procedure is quite strict. It also understood that, in order to provide a good learning environment, staff and laboratories do not wish to accommodate more than 25 students per year. According to the programme management, having more students will detract from the programme's quality. The panel appreciates these considerations, but also thinks that the programme should maintain a certain level of students and not allow it to fall below a set limit. During the site visit, the panel addressed the fact that only 10% of the applicants are selected to enrol in the programme. According to the programme, 80% of the applicants do not meet the admission criteria or fail to pass the entrance exam. Of the 20% who pass, several decide not to enrol because they enrolled in multiple programmes and were admitted to the programme of their first choice. Others did not start the programme because of additional international fees (in 2016, fees more than doubled). The panel is pleased to see that the programme is planning to organise its own fellowships in the future, to facilitate access to more international students.

Language
For the panel, the choice for English as the language of instruction is self-evident since all research in the field of neuroscience is performed in English, and the main aim of the programme is to prepare the students for a research career. This is also reflected in the intended learning outcomes of the programme, where it is expected that graduates are able to communicate their research in an international, peer-reviewed journal (ILO 7). Only an English-taught research master can keep up with the high international standards and attract top researchers from different countries. In addition, this study environment attracts many students from all over the world, thereby creating an international classroom. This prepares students for a career in an international research environment and forms the start of their international research network.

Teaching staff
The panel met with very qualified and dedicated teaching staff. In its opinion, the staff has excellent expert knowledge. The staff members are active in numerous national and international research projects. The panel appreciates the fact that all research groups within the Neuroscience department are represented by teachers in at least one of the programme's modules. Thus, the broad overview in the research department is reflected in the curriculum and stays up to date. It ensures that a great variety of research (human, animal, microbiology) is incorporated in the programme and passed on to the students. Currently, 59% of all teachers and 74% of all examiners have obtained a University Teaching Qualification (UTQ) certificate or are following the UTQ training. Staff members without a UTQ usually have a lower teaching load. The panel advises the programme to stimulate all staff members to obtain a UTQ.

According to the panel, the entire teaching staff, including senior researchers and professors, are actively involved in the programme (either through their teaching duties in courses or supervision of graduation trajectories). During the Research Project, the students are supervised by a tutor, who is always a senior researcher. The programme has an excellent student-teacher ratio. The student-teacher ratio in the classroom is 18:1, but overall in the programme, including the research supervisors, the ratio is 1:2 (this number is based on the number of students and the total number of staff members). During the site visit, the students expressed their appreciation for the small class size and the fact that the teachers can be easily approached with questions or requests. The panel praises the staff members' commitment to the students. During the site visit, it learned that the students are considered a part of the research group, and their well-being is monitored closely.

Study progression and guidance
The panel discussed some figures related to study success during the site visit. According to the numbers provided by the programme management, about half of the students does not graduate on time, and many students from the 2014 - 2015 and 2015 - 2016 cohorts are still working on their graduation (42% and 22%, respectively). The panel concluded that the figures were biased by the

number of medical students who are also enrolled in this programme. These students' graduation only becomes official when both the research master and their medical programme are completed. This explains the large number of students who finish in more than two years. In addition, in 2016, the government altered some financial regulations for students, which caused some students who were doing a double degree to delay their official graduation procedure for this programme in order to finish another master's programme simultaneously. When these factors are cancelled out, 90% finishes in two years according to the programme management. The panel assessed that the actual progression rate is good, and that the delay is often unrelated to the content of the programme. Students who drop out from the programme usually decide to do so in their first year. This is mainly due to the work needed to remedy any knowledge deficiencies, combined with the workload that comes with the internship and the modules in the first year.

The students indicated that the programme is intensive during the first year, and at times they experienced a heavy study load. Because of the wide variety in their educational background, a large proportion of the students first need to improve their basic knowledge before they can fully embark on a research project. During the site visit, the students explained they sometimes felt rushed because of the pressure to gain knowledge on the one hand and conduct research on the other. Of course, this is partly due to the student's own high expectations, but the panel feels that the first year's content also plays a part in this. To address this, the programme is planning to reduce the number of modules, but make them longer (4-8 weeks) to integrate the topics more comprehensively. The revised curriculum should be effective from September 2020. The panel applauds this initiative.

During the site visit, the panel spoke with students, alumni and staff members and concluded that the students are very well guided and monitored during their study, while at the same time, there is a clear emphasis on their own initiative and responsibility. Because of the apprenticeship model and the small classes, the students are stimulated to explore and develop their own talents and work on projects within their own field of interest. Many students were unfamiliar with the supporting role of the programme coordinator, so this can be communicated more clearly to the students. According to the panel, there is in general a good balance between giving the students ownership of a project and providing advice and guidance when needed. However, zooming in on the expectations and workload within each research group, the panel concluded that there were some differences. Through its conversation with the students and the student chapter in the SER, the panel concluded that the guidance during the Research Project differs between different research groups. Depending on the size of the research group the student is enrolled in and the nature of the research question, the tutor's supervision differs in terms of quality and quantity. Where animals are involved, the students are informed that this means working on weekends as well (because of feeding time and other animal care). During the site visit, the students explained that the tutors vary in their expectations of the students' work and results as well. As a result, some students experience a much higher study load and workload. The communication about the number of lab hours, the availability of the tutor and his/her expectations could be explained more in advance, according to the panel. During the site visit, the students expressed the idea of implementing a checklist, with stepping stones and clear deadlines. The panel thinks this could be a good instrument to check each other's expectations, monitor the student's progress, and also evaluate the apprentice–master work relationship. It is satisfied with the programme's plans to develop student-tutor guidelines which specify the expectations regarding workload and supervision and advises the programme to exchange best practices between the research groups in this regard.

Context of research
The Research Master programme is hosted by the department of Neuroscience (Erasmus MC), which has a strong position in the international research field, with several of its members occupying positions in various national and international collaborations and committees. Staff members are frequently invited to be speakers at international meetings, which leads to internationally renowned speakers visiting the Erasmus MC, thereby creating an environment of a high scientific standard for

the students. The research programme within the Neuroscience department has 18 active research groups with research that ranges from the molecular level all the way to the population level.

The research at the department of Neuroscience has been assessed in 2014 and will again be assessed in 2020. In addition to the SER, the draft version of the self-evaluation report regarding their research department was also presented to the panel. Based on these documents and the tour during the site visit, the panel concluded that the research department is excellent (in terms of financing, number of publications, publishing in top journals).

A specific strength of the department according to the panel is the choice to have human and animal research performed on the same floor: people from different fields of research meet each other and can collaborate. The students' full participation in the research groups is very much appreciated by the panel: it provides an opportunity for them to take their time getting familiar with doing proper research (initiating a problem, getting acquainted with the research topic, analysing the results and presenting them). They become fully part of the research group, while at the same time they learn to work independently.

Considerations

The programme has translated its intended learning outcomes into a coherent curriculum. The first year has a very solid set of modules in place, providing an overview of the field of neuroscience and letting students deepen their understanding and expertise on the topics they are most interested in. The programme also pays attention to new developments in the field, such as in computational neuroscience. The programme builds up from basic knowledge to more advanced and complex knowledge. However, the panel strongly advises the programme management to implement a course on statistics.

Research and theoretical knowledge are well-integrated throughout the programme. Through lab talks and journal clubs, students get a sense of the different research topics in the field of Neuroscience and the several research groups active within the department. The panel appreciates the clear choice for one long research internship. It allows students to be fully submerged in a research group where they experience the full research cycle, from writing a proposal all the way to presenting the findings.

The panel concludes that the programme uses a sufficient variety of teaching methods: lectures, practicums, workshops and interactive teaching in small classes. A large part of the programme entails the Research Project, where students are fully integrated in a research group under supervision of a tutor, experience the full research cycle and develop important research and communication skills along the way. The panel appreciates the fact that, over the course of the research project, the tutor's support and guidance decreases as the student becomes a more independent, competent and confident researcher, thereby preparing students to start their career as an independent researcher after graduation.

The panel thinks the selection and admission requirements are well chosen for a programme with a strong emphasis on research. Procedures for admission are adequate, but quite strict, so the programme should guard not to get too few students. The selection and admission procedure enables a heterogeneous yet coherent classroom, with students coming from several countries and with different educational backgrounds, willing to help each other.

According to the panel, the programme's staff has excellent expert knowledge, but it advises the programme to stimulate all staff members to obtain a UTQ. The panel appreciates the fact that all research groups within the Neuroscience department are represented by teachers in at least one of the programme's modules. Including senior researchers and professors, the entire staff is actively involved in the programme, and the student-staff ratio is excellent. The panel concluded that the guidance in the Research Project differs per research group the student is enrolled in: the tutor's supervision differs in terms of quality and quantity. The panel is satisfied with the programme's plans

to develop student-tutor guidelines where the expectations regarding workload and supervision is specified.

The panel assessed that the programme's progression rate is very good. When delay of students occurs, it is often unrelated to the content and structure of the programme. Students indicated that the programme during the first year is intensive and at times they experience a heavy study load. The panel applauds the programme's initiatives to reduce the number of modules in 2020 and inform the teaching staff about their (perhaps too high) expectations of their students.

The Research Master programme is hosted by the department of Neuroscience (Erasmus MC) that has a strong position in the international research field. Therefore, the choice for English as the language of instruction is self-evident since all research in the field of neuroscience is performed in English and the main aim of the programme is to prepare students for a research career. The panel concludes that the quality of research within the department is excellent. The students' full participation in the research groups is very much appreciated by the panel. A specific strength of the department according to the panel, is the choice to have human and animal research performed on the same floor: people from different fields of research meet each other and can collaborate.

Conclusion
Master's programme Neuroscience: the panel assesses Standard 2 as 'meets the standard'.

Standard 3: Student assessment
The programme has an adequate system of student assessment in place.

Findings

Assessment
The programme's assessment follows a general assessment policy which is formalised in the Assessment policy and Assessment Plan Research Master Neuroscience programme. This document describes how the curriculum and assessment are organised to achieve the modules' learning goals, their relationship to the programme's learning outcomes and their connection to the Dublin descriptors. In addition, the Teaching and Examination Regulations Research Master Programmes 2018-2019 (TER RM) of the five Erasmus MC research master programmes specify the regulations regarding assessment. The panel thinks these documents are very solid and it established that all intended learning outcomes are assessed during at least one of the modules.

In the course descriptions and module programme, the learning goals of each module and the assessment method to test these learning goals are stated. According to the panel, the assessment methods are sufficiently varied and suitable for the learning outcomes that they are meant to assess. They clearly reflect the level of the programme. For instance, scientific presentations take up a large part of the assessment, because it is a critical skill for researchers to be able to present their findings to an audience in oral and written form. In many modules, students need to perform a literature study, which is an essential skill as a future researcher. In other modules, the students are asked to create several assignments similar to the way this works in the process of obtaining a scientific grant (research proposal, presentation of the proposal and discussion in a group of peers). Both formative and summative feedback and assessments are done. As a way of formative assessing, throughout the programme, the students receive ample feedback from their teachers/ tutor on their written work, exams or presentations. Written exams and presentations (individually or as a group assignment) are prominent, but other forms of assessment (writing an essay or taking part in quizzes) are also present. Up until now, participation in the journal clubs was voluntary, but the programme intends to make these clubs a mandatory activity, in which the level of active participation by students will be assessed.

In response to the curriculum revision (which takes effect in 2020), the programme plans to revise its assessment methods as well, making sure that the type of assessment still match the learning objectives of the module, according to the principles of Constructive Alignment. This is applauded by the panel.

Thesis assessment
The panel is very positive about the final project (Research Proposal – Research Project + Internship – Master's thesis). It fully covers the entire research cycle: planning, conducting, analysing, and interpreting the results of an empirical study, resulting in a written Master's thesis and a defence. The panel read a representative sample of 15 theses and assessed that, in general, it can agree on the final grades given by the examiners. In a few cases, the panel would have even given a higher grade.

Following the re-accreditation in 2014, a master thesis review and rebuttal procedure was added to strengthen the quality of the thesis and include reflection as an important competence of a researcher. In the current procedure, the master thesis is reviewed by two examiners, who were not involved in the research project. Based on their feedback, the students write an unsupervised rebuttal to the review remarks made by the examiners. This rebuttal often results in a revision of the thesis. This procedure shows that the student can defend, judge and evaluate his/her own research. After the written assessment, the students also give a presentation about their research, and the same two examiners will assess this presentation. When the thesis and/or the presentation is insufficient, the student will get one additional opportunity to improve the thesis and/or presentation. All elements must be adequate in order to pass. The entire process is documented on four different evaluation forms for the thesis, review report, presentation and rebuttal. The thesis defence is also attended by a third examiner, who was not involved in the research project and did not grade the thesis, to monitor the discussion between the two examiners regarding the grading. The internship during the research project is graded by the tutor, who assesses the way the student communicated during the internship, worked independently and to what extent theoretical knowledge was applied during the research project. Grades for the thesis and defence are compared to the grade for the internship. If there is a big difference, the third examiner will discuss this with the tutor to find an explanation. In some cases, this has resulted in an adjustment of the internship grade.

The panel is very enthusiastic about the current procedure to assess the theses. The assessment procedure is a very elaborate, clear and transparent way to assess the student's final performance. The panel likes the defence procedure, during which the students learn to present their research and their findings to a research audience. Regarding the assessment forms, it believes there is still room for improvement. It saw assessment forms with a huge amount of feedback, while others had only short sentences and were not very insightful. Some forms were very transparent in the way the final grade was determined, while other forms were rather vague. The panel encourages the programme's plan to implement rubrics in the forms, which may help limit the variety of assessment styles.

Examination Board
The panel established that the programme's Examination Board adequately handles all of its legally mandated tasks. It oversees the quality and level of the assessments, assessment system and research projects, determines whether students meet the requirements set out in the TER RM, and sets the rules and guidelines that are supplementary to the TER RM. The panel ascertained that the Board has made substantial progress in the field of quality assurance of assessments since 2018. Until then, the Board was very small and had little power to oversee the quality of assessment. In 2018, it was expanded, and a secretariat was added, thereby providing manpower to act in a more professional manner. It has recently joined forces with the Board of Examiners of the Medical programme. This has resulted in one Examination Board with two chambers (Research Master and Medicine). The panel is very satisfied with this professional upgrade and the learning opportunity that the collaboration with the Medicine board offers, and it encourages the Board to use this to further strengthen themselves professionally and try to broaden their mandate.

Following the mid-term review in 2017, an assessment committee was set up to help the Examination Board oversee the quality assurance of the programme's assessments. In 2019, the activities of the committee commenced. The committee consists of three members of the Examination Board, two examiners from the programme, and one assessment expert. Several times a year, the committee reviews the assessments of a number of modules, together with the module's examiner, to see whether the exams should be improved. The committee's review plan ensures that all modules are reviewed at least once every two years. Student evaluations of the exams are also consulted. The panel ascertained that the master's theses are not subject to such a thorough post-hoc review and thinks this is a missed opportunity. It strongly advises the Board to implement this same procedure to evaluate the theses.

Considerations
According to the panel, the Assessment Policy and Assessment Plan of the programme are very well designed and solid. All intended learning outcomes are assessed during at least one of the modules. According to the panel, assessment methods are sufficiently varied and suitable for the learning outcomes that they are meant to assess. The assessment methods are sufficiently varied, are both formative and summative and clearly reflect the level of the programme.

The panel is highly enthusiastic about the current procedure to assess the theses. The assessment procedure is a very elaborate, clear and transparent way to assess the final performance of the student. Regarding the assessment forms, the panel believes there is still room for improvement. The panel encourages the programme's plan to implement rubrics in the forms, which may help limit the variety of assessment styles.

The panel established that the programme's Examination Board adequately handles all of its legally mandated tasks. The panel is very satisfied with the board's professional upgrade in terms of quality assurance of assessments in the past few years. It is satisfied with the board's procedure to check all module's exams and it strongly advises the board to implement a procedure to check the master's theses quality as well.

Conclusion
Master's programme Neuroscience: the panel assesses Standard 3 as 'meets the standard'.

Standard 4: Achieved learning outcomes
The programme demonstrates that the intended learning outcomes are achieved.

Findings

Final project and thesis quality
The panel believes that the size of the final project (Research Proposal + Research Project) is large enough, includes a full research cycle, and suffices to assess whether the students have achieved all of the intended learning outcomes. The final project entails over 60 EC, beginning in the first year by making students work on their research proposal, and continuing throughout the entire second year.

As mentioned earlier, the panel read a representative sample of 15 final theses. It was generally pleased with their high level and, in some cases, would have given the thesis a higher grade. Most of the theses were of good to excellent quality. In many theses, the sections regarding the introduction, method and discussion were very solid. In general, the students were very thorough in their writing, and showed a critical attitude towards their own research. In a small number of theses, the panel thought the discussions were somewhat superficial or the figures could have been clarified more. This was also reflected in lower grades. Given that every student's research is carried out within the research groups, the research topics automatically fall well within the scope of the program and the ambitions of this research master. Many theses were deemed publishable, and the panel

ascertained that in most cases the student's work ends up as part of larger projects which are published. For the theses which were deemed unpublishable, the panel thought this was in most cases not due to poor research or writing skills of the student in question but could be explained by a too ambitious research project. It suggests that the tutors should keep an eye on the feasibility of the student's research proposal. On the whole, it is of the opinion that the theses show that graduates have achieved the intended learning outcomes and thus the research master's level.

Alumni success
According to the SER, almost 60% of the programme's graduates start a PhD trajectory after completing the MSc Neuroscience. The panel thinks this is an excellent number, certainly given that about a quarter of the student population consists of medical students, who eventually intend to become a medical doctor. Since 2016, over 20 graduates have co-authored 15 published neuroscientific articles. Graduates who do not continue on to a PhD programme or complete their medical degree continue their career in jobs in industry and technology or education (10%).

The programme uses a LinkedIn group to stay in touch with its alumni. Although the panel understands that the small size of the programme makes it hard to actively contact all alumni, it encourages the programme to use this group, or other means, to remain closely connected to the group of alumni. They can provide a source of information for the current students on career perspectives and opportunities the programme has to offer.

Considerations
The panel believes that the size of the final project (Research Proposal – Research Project + Internship – Master's thesis) is large enough to include a full research cycle and to assess whether students have achieved all of the intended learning outcomes.

Most of the theses were of good to excellent quality, in some cases, the panel would even have given the thesis a higher grade. The theses show that the students achieve the intended learning outcomes and thus the research master's level.

Almost sixty percent of the programme's graduates start a PhD trajectory after completing the MSc Neuroscience. Given that about a quarter of the student population consists of medical students, who eventually intend to become a medical doctor, the panel thinks this is a reasonable number.

The panel encourages the programme to stay connected to its alumni, since they provide a source of information to the current students on career perspectives and opportunities the programme has to offer.

Conclusion
Master's programme Neuroscience: the panel assesses Standard 4 as 'meets the standard'.

GENERAL CONCLUSION

The panel assessed standards 1, 2, 3, and 4 as 'meets the standard'. Based on the NVAO decision rules regarding limited programme assessments, the panel therefore assesses the programme as 'positive'.

Conclusion
The panel assesses the *master's programme Neuroscience* as 'positive'.

APPENDICES

APPENDIX 1: DOMAIN-SPECIFIC FRAMEWORK OF REFERENCE

Domain specific reference frame for master's level educational programmes in the Neurosciences[1] and intended learning outcomes

At the master's level, the field of Neurosciences in the Netherlands focuses on a multidisciplinary approach of research questions pertaining to the workings of the brain in health and disease. The field ranges from research at the interface between genetic, molecular and cellular processes to computational, system-level neuroscience with cognitive and behavioural analyses. The Neurosciences investigate all aspects of the brain, the nervous system and the senses: anatomy, physiology, biochemistry, genetics, cell biology, and molecular biology, and also investigate the interrelations between these aspects, as well as how these give rise to, e.g., perceptions, cognition, emotions and movement.

The Neurosciences address three main questions:

1. How does the brain work, and how does it give rise to, for instance, cognition, perception, emotions, learning, memory, consciousness and behaviour?
2. What goes wrong in brain diseases, and how does this affect, for instance, cognition, perception, emotions, learning, memory, consciousness and behaviour?
3. How can we influence the brain, and cure brain diseases or treat their symptoms?

In research to answer these questions, the brain is not viewed as an isolated organ; rather, the brain continuously interacts with the body and its environment, throughout an individual's lifespan. Concrete neuroscientific research projects are motivated by the three big questions in Neurosciences mentioned above, but they are aimed at answering smaller, more defined sub-questions. Neuroscience research ranges across all biological levels. At the molecular and cellular level, the Neurosciences investigate the processes within and between cells. At the organ level, the investigations focus on how brain cells organize in networks and circuits. At the level of the organism, the Neurosciences investigate brain function such as cognition, emotion and social interaction, including specific abilities such as movement, perception, language, or memory. Finally, at the population level, the field encompasses studies where epidemiological, qualitative approaches, as well as society-directed approaches may be used to investigate financial and political decision-making, and the societal consequences of brain disease. In addition, research in the Neurosciences provides technological innovations that can be used in a broad range of applications; from molecular and genetic approaches for drug/treatment development, to, e.g., artificial brain implants, or to new designs in robotics based on neural principles.

Due to its translational character, the strength of the Neurosciences lies in connecting parts of different sub-disciplines, such as biology, (bio)informatics, psychology, (bio)chemistry, medicine, mathematics, physics, and philosophy. Hence, the Neurosciences cover many elements from those disciplines and are characterised by a profound integration of these elements. In this way, Neuroscience research provides innovative methods and approaches to understanding the brain, behaviour and disease, based on developing insight into brain mechanisms. The Master of Sciences level of education in the Neurosciences aims to teach students about the aforementioned aspects, including the technological, methodological, societal and ethical developments in modern Neuroscience research. Note, however, that each Master programme has its own specific scope and foci, which are reflected by the content and name of the programme.

[1] The general label "The Neurosciences" is chosen here to highlight the broadness of the field and is meant to include programmes with various names, such as "Cognitive Neuroscience", or "Cognitive and Clinical Neuroscience".

General intended learning outcomes of Neuroscience Master programs in the Netherlands

Graduates of the research master within the domain of Neurosciences have an academic attitude and are academically skilled researchers in the field of Neuroscience.

Knowledge and Understanding
Master's graduates:
1. have an overview of the conceptual framework in the field of Neuroscience, including new theories, processes, instruments, and current research challenges;
2. appreciate the integrative scope of the Neurosciences bridging disciplines such as biology, biomedical sciences, psychology, medicine, philosophy, mathematics, and physics.

Applying Knowledge and Understanding
Master's graduates have demonstrated the ability to:
3. acquire, structure and integrate information in the field of the Neurosciences to generate novel hypotheses that further the field, both orally and in writing;
4. conceive, design, implement and adapt neuroscientific experiments;

Making judgements
Master's graduates have demonstrated the ability to:
5. critically analyse and interpret neuroscientific research, in relation to the design and execution of experiments or computational modelling, and the results obtained thereof;
6. reflect on ethical aspects of neuroscience research, and include these in decision-making processes;

Learning focus
Master's graduates have the learning skills:
7. to work in a team and to collaborate with researchers from other disciplines and/or countries;
8. to pursue a career as independent neuroscience researcher either in- or out-side of academia;

Communication
Master's graduates have demonstrated the ability to:
9. discuss neuroscience related topics with peers, the larger scholarly community and with non-researchers who are interested in the Neurosciences, both orally and in writing;
10. efficiently communicate in interdisciplinary research teams.

APPENDIX 2: INTENDED LEARNING OUTCOMES

Master's programme Neuroscience

All the Research Masters of the Erasmus MC have common learning outcomes. The following learning outcomes are applied to the field of Neuroscience for our graduates:

1. The ability to formulate a relevant problem and translate it into a scientific question.
2. The ability to translate a scientific question into a scientific protocol and/or a research proposal.
3. The ability to carry out an extensive literature study of an issue.
4. Acquisition of adequate knowledge where scientific research and biostatistics analytical methods are concerned, and the ability to apply this knowledge in composing a research proposal and in performing, analysing and interpreting research.
5. Acquisition of adequate knowledge where legislation, regulations and ethical rules are concerned, and the ability to apply this knowledge in composing a research proposal.
6. The ability to collaborate with other members of the research group in order to set up and carry out a research project; to collect data and to analyse these data to draw up conclusions.
7. The ability to compose a concept manuscript or Master of Science thesis, which, possibly in collaboration with the primary investigator, can be further developed into a scientific manuscript suitable for publication in an international peer-reviewed journal.
8. The ability to present the research findings in a scientific meeting.
9. The ability to respond to criticism from internal and external evaluators on the Master of Science thesis.
10. The ability to critically review and assess relevance of scientific results of others.

APPENDIX 3: OVERVIEW OF THE CURRICULUM

Master's programme Neuroscience

YEAR 1 (60EC)

The Scientific Method Neural Signaling	Structure and organisation Sensory systems of the nervous system Academic writing part I	Motor systems	Neurodevelopment	Neurological disorders
Monday morning lab talks and monthly Neuroscience seminars				
Preparation Research Proposal				

Molecular and Cellular mechanism	Cognitive Neuroscience	Autonomic Nervous and Limbic system Academic writing part II	Psychiatric disorders	Computational Neuroscience
				Preparation Research Proposal

YEAR 2 (60EC)

Workshops (electives) Neurohistology and pathology Eye movements of mice and man	F-MRI techniques Tools and therapy in Psychiatry	Molecular neurobiology beginners Linear systems	Genetics and Neurological diseases Matlab beginners	Matlab advanced Modelling using NEURON
Monday morning lab talks and monthly Neuroscience seminars				
Research project				

Introduction to Labview Nerve conduction studies	Optical imaging Brain simulations	"Off campus" workshops or courses	
			Writing and presenting Master thesis

APPENDIX 4: PROGRAMME OF THE SITE VISIT

Monday 25 November 2019

09.00	09.15	Welcome
09.15	10.45	Internal consultation committee + viewing documents (open consultation: 09.45-10.15)
10.45	11.30	Interview programme management
11.30	12.15	Interview students + alumni
12.15	13.00	Lunch + preparation meetings
13.00	13.45	Tour
13.45	14.30	Interview lecturers
14.30	15.15	Interview Examination Board
15.15	15.45	Internal consultation committee
15.45	16.15	Final interview management
16.15	17.45	Internal consultation committee; assessing the programme
17.45	18.00	Presentation findings and closing

APPENDIX 5: THESES AND DOCUMENTS STUDIED BY THE PANEL

Prior to the site visit, the panel studied 15 theses of the master's programme Neuroscience. Information on the selected theses is available from QANU upon request.

During the site visit, the panel studied, among other things, the following documents (partly as hard copies, partly via the institute's electronic learning environment):

- Self-evaluation report
- List of departments and institutes participating in the programme
- Intended learning outcomes for all the Research Master programmes at Erasmus MC
- Textbook Principles of Neural Science (5th edition) by Kandel, Schwartz and Jessel (2012)
- Overview of students' success rate 2012-2018
- Overview of teachers' education level and student-teacher ratio
- Recommendations of the previous visitation and the programme's response
- Domain specific reference framework Research Masters Neuroscience
- List of published neuroscientific articles with RM graduates participation (authorship)
- Teaching and Examination Regulations Research Master Programs 2019-2020
- Teaching and Examination Regulations Appendices Research Master Programs 2019-2020
- Annual report Examination Board Erasmus MC
- Course descriptions and module programme
- Assessment policy and Assessment Plan Research Master Neuroscience programme 2019-2020
- Overview Teachers (titles and bko/sko/examiner status)
- Dutch Rules and Regulations of exams of the Research Master programmes (*Regels en Richtlijnen van de Examens voor de Research Masteropleidingen*)
- Educational Vision Erasmus MC Research Masters
- Anonymised list of graduates last 3 years
- SEP self-evaluation draft report Department of Neuroscience 2019
- List of examiners of the Research Master Neuroscience programme