

RESEARCH MASTER'S PROGRAMME
Genes in Behaviour and Health
Vrije Universiteit Amsterdam

Report on generic quality
April 16, 2023

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1. Introduction

This advisory report contains findings, considerations and judgements about the research master's programme Genes in Behaviour and Health (GBH) of the Vrije Universiteit Amsterdam (VU). The Accreditation Organisation of the Netherlands and Flanders (NVAO) bases its accreditation decision on this report.

1.1 Panel

The panel that performed the assessment of the research master's programme Genes in Behaviour and Health consists of four independent experts, including one student member. The NVAO has approved the composition of the panel on 22 December 2022:

- Prof. Harold Snieder (chair), Professor of Genetic Epidemiology, University Medical Centre, Groningen;
- Prof. Cathy Fernandes, Professor of Preclinical Models of Neurodevelopmental Disorders, King's College London, UK;
- Prof. Karin Verweij, Professor of Genetics in Psychiatry, Amsterdam University Medical Centers-UvA;
- Jeanne Arnold, BSc (student member), student Master in Medicine, Erasmus University Rotterdam.

The panel was supported by drs. Linda te Marvelde, who acted as secretary.

1.2 Assessment framework

The research master's programme Genes in Behaviour and Health is subject to assessment in accordance with the Assessment Framework for Limited Programme Assessment (NVAO 2018, hereafter: 'the assessment framework') and the additional criteria for the assessment of research master's programmes (NVAO 2016).

1.3 Approach

The university, programme, panel and secretary have agreed on a 'development-oriented' approach to the assessment. This makes use of the opportunity offered by the assessment framework to place less emphasis on accountability and more on improvement and development. This methodology is based on trust and responds to the autonomy and ownership of the study programme as emphasised in the framework. Transparency, openness, and co-creation are key in this approach. Characteristic of the development-oriented approach is that the panel makes a preliminary statement about the generic quality of the programme on the basis of existing documentation. The subsequent site visit is – in part – dedicated to discussing the programme's own themes that are of importance to its development. This step-by-step approach aims to reduce the pressure traditionally placed on site visits. The programme knows in advance where it stands and thus experiences the opportunity to openly submit development themes to the panel. This promotes an equal dialogue between peers.

1.4 Working method

Approximately seven weeks before the site visit, the panel received the documentation, including a self-assessment report and a selection of fifteen recent master's theses including their evaluation forms (see appendix 7.1). These documents formed the basis for the assessment of the generic quality achieved. The panel studied the documents and organised an online panel meeting two weeks prior to the site visit. In this meeting, the panel discussed its initial findings and provisional conclusions regarding the quality achieved on the four standards of the assessment framework. Part of the meeting was a (online) consultation opportunity for students and lecturers who wanted to engage in conversation with the panel. No one took advantage of the opportunity to speak with the panel at this stage. Shortly after the meeting, the chair and secretary shared the panel's initial findings with the programme in an online meeting.

The site visit took place on 7 February 2023 in Amsterdam (see appendix 7.2). During the site visit, the panel spoke with delegations of students and teaching staff, examinations board, alumni, and the management team of the programme. The discussions were partly organised around the development themes that the programme itself identified: 1) student numbers and recruitment 2) alumni tracking, and 3) how to handle less successful internships. These discussions also provided the panel with the opportunity to raise (remaining) questions regarding the generic quality of the programme with those involved. At the end of the visit, the panel drew up findings and recommendations. The panel's chair presented these orally to stakeholders of the programme.

After the visit, the secretary drew up the advisory report. This report (presented here) contains the assessment of the programme's generic quality on the four standards of the framework and the additional criteria for research master's programmes. On the basis of this report, the NVAO makes an accreditation decision. After processing the panel's feedback, the secretary sent the advisory report to the programme for the purpose of fact-checking the text. The secretary has corrected factual inaccuracies identified by the programme in the final version. The executive board of the Vrije Universiteit Amsterdam received the final report on April 16, 2023.

Representatives of the programme gathered their main findings concerning the development opportunities of GBH and submitted their insights to the panel as input for the development report. This report is not part of the application for renewal of accreditation, but rather discusses development opportunities identified during the site visit. The programme will publish the report (on its own website) within a year of the NVAO's accreditation decision.

2. Characteristics of the programme

2.1 Administrative data

Name of the programme:	Genes in Behaviour and Health
Croho:	69324
Level and orientation of the programme:	academic research master's programme
Credits:	120 EC
Specialisations or tracks:	n.a.
Location:	Amsterdam
Mode of study:	full time
Language of instruction:	English

2.2 Organisation

The research master's programme Genes in Behaviour and Health (GBH) is a two-year academic research master's programme offered by the Faculty of Behavioural and Movement Sciences (Faculteit der Gedrags- en Bewegingswetenschappen; FGB). The faculty offers sixteen bachelor's and (research) master's programmes in three disciplines (departments): Psychology (in Departments of Biological Psychology; Clinical, Neuro- & Developmental Psychology; Experimental and Applied Psychology), Educational and Family Studies, and Human Movement Sciences. The lecturers involved in GBH are housed at the Department of Biological Psychology. The other research master's programmes that are offered by the Psychology departments include Clinical and Developmental Psychopathology, Social Psychology, and Cognitive Neuropsychology.

GBH's daily management resides with a programme director who is responsible for all decisions pertaining to the programme, in close collaboration with the head of the department of Biological Psychology, where GBH's lecturers are appointed. Together they oversee issues such as allocations of lecturers to courses, personnel decisions and hiring, the content of the curriculum, and any other decision-making that is necessary for the functioning of the programme.

GBH intends to immerse students in relevant research of the Department of Biological Psychology. Research at this department is focused on the analysis of genetic and biological causes of individual differences in behaviour, health and well-being. Research and educational activities at the Department of Biological Psychology are centred around the analysis of individual differences in mental and physical health, brain structure and function, and normal and abnormal behaviour. The department studies the genetic and biological basis of individual differences in human behaviour using approaches from psychophysiology and neuroscience, behaviour and molecular genetics and epidemiology.

3. Summary

The research master's programme Genes in Behaviour and Health (GBH) aims to equip students with the knowledge and understanding of the relevant research methods to design and carry out high-quality research within the field of behaviour/molecular genetics and genetic epidemiology. In choosing this programme, students take their first steps to become part of a new generation of researchers capable of contributing to the rapid spread of 'omics', from curative medicine to wider applications in the behavioural and health sciences involving prevention and care. A unique aspect of the programme is its interdisciplinary perspective to understand complex human traits and disorders. The likely outcomes for the students following graduation would be to continue in academic research (e.g., start a PhD project) and/or work in relevant industry (e.g., data scientists) and/or science communication.

The programme's intended learning outcomes match its profile and are in line with international requirements for an academic research master's programme. GBH attracts students from all over the world with different educational and cultural backgrounds. It is designed to provide them with a rich academic environment that promotes enthusiasm for the process of scientific inquiry, and that facilitates creative and intellectual exchange among students and staff. GBH offers teaching in small classes and individual guidance; it places a strong emphasis on theoretical specialization, research skills and communication skills. The teaching team are research-active, and many are internationally recognized experts in the topics taught in the programme. GBH uses its small scale to its advantage. However, the panel finds that the programme could encounter some scalability issues if/when the programme grows in the future.

A robust and detailed assessment policy and quality assurance processes are in place, including descriptions of the quality assurance and assessment criteria for GBH. There is evidence for constructive alignment between the learning goals, teaching and assessment, using assessment to support rather than just evaluate learning. The panel has made several suggestions, mainly relating to the use of thesis assessment forms and improving the traceability of the quality assurance of assessments. While these are important aspects that GBH is advised to act on, the panel has seen ample and convincing evidence of the substantive quality of course and thesis assessments, and the professionalism and expertise of staff involved.

The panel found that the theses students produced are high-quality, detailed research projects that are carefully written and well presented. The projects are impressive, clearly academic, and definitely meet, and in some cases exceed, the expectations for a master's level thesis. This is evidenced in the thesis quality (organization, critical writing), high level of statistical analysis and data presentation. The projects involve the full research cycle (generally after data collection), are appropriate in size, complexity, and ambition, and reflect the curriculum well. The project topics are relevant and current for the field, contributing novel findings. The theses are typically of publishable quality, and many have contributed to a publication.

GBH delivers graduates that are qualified for the academic and non-academic labour market. The programme recognizes that its alumni are valuable contacts and is interested to see how they and their careers develop. Furthermore, GBH expresses an interest to increase collaborations with alumni. The panel supports the programme's aim to look into different ways to optimize alumni tracking.

Standard	Judgement
1 Intended learning outcomes	Meets the standard
2 Teaching-learning environment	Meets the standard
3 Student assessment	Meets the standard
4 Achieved learning outcomes	Meets the standard
Final conclusion	Positive

4. Strong points

The panel identified numerous strengths with the key strengths listed below.

1. **Research environment** - The programme is designed and conducted by leading researchers in the discipline, resulting in research-led education. The programme is firmly connected to the renowned (research) department of Biological Psychology.
2. **High quality theses** - The research projects carried out during the internships are sufficiently advanced and challenging, resulting in excellent research training and experience for the students and high quality theses. The number of publications that come out of the internships is impressive.
3. **Small-scale education** – The programme offers a high degree of intensive individual staff contact and guidance from top researchers in the field.
4. **Strong curriculum** - The programme has an interesting and diverse curriculum that covers the significant topics in this field. In addition to the scientific content, it includes methodological and statistical development of skills, which is an essential part of training in this field. In addition, the programme includes academic/transferable skills, the key to students' employability when they graduate.
5. **Diversity in assessment methods** – The programme ensures that it uses a great diversity in assessment methods fitting with the intended learning outcomes.

5. Recommendations

The panel makes several recommendations to aid with the further development of the programme. These do not detract from the positive assessment of the generic quality of the programme.

1. **Ensure the programme curriculum and training remains relevant and valued via feedback from the professional field** – The panel encourages GBH to take advantage of the insights of contacts in the professional field (academia, industry, employers et cetera) to further develop the programme, either via an external advisory board or by other means that the programme deems appropriate.
2. **Develop thesis assessment** – The panel recommends a reconsideration of the thesis assessment form itself to do justice to the field of behaviour and molecular genetics. In terms of the use of the form, the panel finds that the forms should contain qualitative feedback to underpin the grade given. The panel encourages the team to agree on the manner in which the form is used by all assessors.
3. **Coaching and mentoring** – The programme already provides excellent individual guidance and supervision. In addition to this, the panel finds that the programme could consider setting up coaching groups that are focused on personal and professional development of the students.
4. **Extend formal quality assurance structure** – The panel recommends to increase quality assurance activities of the examinations board at programme level, by extending the sample size within the thesis screening process and providing in-depth feedback on course assessment files. Ensure careful reporting and documentation of findings to increase traceability and transparency.

6. Assessment

6.1 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 and considerations

The two-year research master's programme Genes in Behaviour and Health (GBH) is one of the few programmes worldwide to offer a comprehensive curriculum that combines behaviour and genetics. Behaviour (how people develop, what they observe, what decisions they make) is influenced by where and how people grow up and the biological and social predispositions passed on to them by their parents. The interplay between all these factors shapes who people are, what they do, how they view the world, and impacts on the mental and physical health. GBH explores to what extent these individual differences between people can be attributed to genetic and/or environmental factors.

GBH aims to equip students with the knowledge and understanding of the relevant research methods to design and carry out high-quality research within the field of behaviour/molecular genetics and genetic epidemiology. In choosing this programme, students take their first steps to become part of a new generation of researchers capable of contributing to the rapid spread of 'omics', from curative medicine to wider applications in the behavioural and health sciences involving prevention and care. The panel notes that GBH is a unique programme as there are no current comparable/competing research master's programmes offered elsewhere in the world, making it a strong, international market leader.

The aims of the programme are translated into twenty intended learning outcomes (ILOs) that are explicitly linked to the Dublin Descriptors, the framework of comparable and compatible qualifications for higher education systems across Europe. The panel has reviewed the ILOs and finds that they are appropriate and fitting for the level of a master's degree with clear orientation towards academic studies and research training in this interdisciplinary field. The learning outcomes are supported by the curriculum and assessment profile of this programme and are in line with both national and international expectations of this research field. The emphasis on interdisciplinary training and skills development closely matches the expertise the panel would hope to see in the most competitive candidates applying for PhD and/or research careers in complex trait genetics.

The relevant areas of GBH's professional field are well represented in the diverse expertise of the academic staff. All staff members are embedded in the (research) department of Biological Psychology and are part of the overarching research programmes of the Amsterdam Public Health Institute (APH). Some are also affiliated with the Amsterdam Reproduction and Development Institute, which further highlights the interdisciplinary context in which the (lecturers within) the programme work. Staff actively contribute to the development of the programme's profile, making sure that it stays up to date with the latest developments in the field. The programme also receives wider academic input, since students complete their second research projects at research groups elsewhere in the Netherlands and abroad. To facilitate a further opening to the outside world (which includes industry and other employers), the panel encourages a more structured approach to

involving external contacts, as some students will step away from academia and pursue a career elsewhere. It becomes increasingly important to know what industry and other employers (besides academia) need and how GBH can contribute.

In conclusion, the panel finds that the primary aim of the programme is to train students to be independent research scientists in the field of complex trait analysis, providing both the content knowledge and research methodology skills. A unique aspect of the programme is its interdisciplinary perspective to understand complex human traits and disorders. The programme's ILOs match its profile and are in line with international requirements for an academic research master's programme. The likely outcomes for the students following graduation would be to continue in academic research (e.g., start a PhD project) and/or work in relevant industry (e.g., data scientists) and/or science communication. The panel encourages the programme to more formally take advantage of the insights of contacts in the professional field that extend beyond academia to further develop the programme. This could be achieved via an external advisory board or other means that the programme finds appropriate or suitable.

Conclusion

Meets the standard

6.2 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 and considerations

GBH attracts students from all over the world with different educational backgrounds who are interested in the field of behaviour/molecular genetics and genetic epidemiology.

The panel finds that the programme has set up robust admissions requirements that consider academic achievement, prior experience and English language ability resulting in the selection of high-quality students. An admissions committee, consisting of two senior staff members, considers all applicants on their individual merits. In its assessment of applicants, the admissions committee focuses mainly on the grades obtained for courses on statistics, research methods, courses related to more biologically orientated courses (biological psychology, neuropsychology, neuroscience, genetics) and their bachelor's thesis. The committee also considers the applicants' personal statements/motivational letters, and any other information that may be relevant to students' prior academic achievements and potential for future success. Students who do not meet (all) the verifiable admissions criteria may be admitted based on their level of motivation for GBH, as the programme finds that motivation is a great predictor for academic success. After initial screening, all applicants are invited for an interview to discuss background, motivations, and mutual expectations. The panel established that this selection process results in a diverse group of students, that are highly motivated, talented and enthusiastic. Approximately 10-15 students enrol each year, an average influx that the programme seeks to increase.

The panel appreciates that, due to the diversity in the students' (educational, cultural) backgrounds, the programme starts the first year with two parallel courses to bring everybody up to the same

speed. Introduction to 'omics' is a course which covers the basics of 'omics' for students that lack biomedical background knowledge in general, and specifically in the area of 'omics', with the necessary knowledge required for the next courses in the programme. In parallel, the course Statistical Programming in R provides students with a more biological/ biomedical background which might be lacking in research methods training with the basics of statistical analyses and use of the appropriate software that they will need in other courses throughout the programme as well.

The panel finds that diversity of the student community is a great asset, but also realises that it brings several challenges regarding classroom dynamics, student engagement and experience, didactical choices, feedback practices etc. Currently, the programme has a modest yearly intake of students. The advantage of being a small programme means that students are able to help each other, which is something that GBH encourages and also somewhat relies upon when dealing with diversity of its cohorts. The panel agrees that peer support is beneficial, but if the student intake increases, the reliance on this "small scale advantage" could be less effective. The panel agrees with the suggestion proposed during the student interview that GBH could benefit from insight of the demographics of the student cohorts including prior education backgrounds in relation to any attainment gaps/issues (that should be acted upon).

The panel established that GBH offers students an attractive and challenging curriculum. The curriculum is well aligned and structured logically. The content of the mandatory courses is highly relevant and they are taught at research master's level. The panel agrees that most courses are cutting-edge, innovative and unique. The curriculum provides a good mix between courses in background/content and research skills. Students undertake research internships both years of the programme. Throughout the programme, ELSIs (ethical, legal, social implications) are addressed and assessed and there is training in a variety of academic/transferable skills. In addition, there is innovation in application of employability skills training across the programme and emphasis on developing the students' scientific inquiry skills and fostering creative exchange between staff and students.

The first year is designed to provide a solid theoretical foundation along with advanced research and data analysis skills that permit the student to translate theoretically driven ideas into research designs that can be implemented. Students are given the opportunity to put their knowledge and skills into practice through an individual research project. At the beginning of the new academic year the students present their first internship project in a poster presentation at the welcome event for the new GBH students. During this event all teaching staff but also all other department members (including PhD students, postdocs) are present to discuss and give feedback on the posters with the students.

The second year of the programme is designed to expand the students' understanding of the field and to diversify their experience via an elective course. It builds upon the first year and covers research on new trends in gene-environment interplay and personalized medicine. There is also a strong focus on scientific integrity, e.g., by teaching students about pre-registration, scientific robustness and integrity. Students are actively involved in data collection, cleaning, analysis, and writing, often resulting in peer-reviewed publications. The ethical and open science considerations are intrinsic to this process.

An issue that the panel discussed at length is that although the curriculum is generally comprehensive, the focus of the programme seems heavily genetic (nature). The panel had expected to find explicit content on environment (nurture) in a programme covering quantitative genetics/complex traits, in addition to content on the gene-environment interplay. The panel discussed how and where the programme addresses (aspects of) social environment and what definition of environment the programme uses. The panel understood that GBH has explicitly decided not to offer a separate course/definition on environment, but rather chooses to incorporate (aspects of) environment in genetically informed designs. Students corroborated that lecturers ensure that aspects of environment are covered sufficiently throughout all courses.

The flexibility of optional courses within the programme allows students to tailor their studies to best match their individual needs and interests, helping them to shape their own identity as upcoming researchers. Some students might discover that a career in academic research is not for them, but they can still learn a lot from GBH. Students are granted flexibility in their choices of internships, through feedback and personal guidance from lecturers, and through the elective space. They may pick a course from the faculty's elective pool or pick another course at master's level at another faculty or university. Due to scheduling restrictions most of the students follow an elective at the VU but often in another department or faculty. The panel discussed the set of elective courses that students may currently choose from, as they were concerned these might not quite fit all students on the programme. However, students are allowed to pick courses outside of the set presented by the panel. As long as the elective is of value to the student (and has the level expected for a research master's programme), students can apply for approval. Students indicated that an increase in elective space would be welcomed, but also recognized that it would be challenging to combine the current mandatory courses.

The panel appreciates that students undertake two internships. Internship 1 always takes place at the Department of Biological Psychology at the VU. During internship 1, the students participate, with their own subject, in a current research line or, if desired, a new project is started. It allows GBH to keep a close eye on how students act and what they do.

The second half of the second year is dedicated to internship 2, which involves all aspects of research, including the theoretical preparation and literature survey, practical execution consisting of data collection and/or data preparation as well as data analyses. The goal for internship 2 is to undertake an assignment outside the VU, within an academic or a Research & Development setting. It may be that students focus on the same subject as in internship 1 because that is their primary interest, but they will have to do a different internship on that subject with another supervisor. Before the start of internship 2, students are required to present their projects to the staff of the Department of Biological Psychology and will receive feedback and suggestions. The work will result in a paper in the format of a scientific publication and a presentation during a research meeting. All ILOs are achieved in the second internship. After passing all the courses and both internships the students also have automatically built their ELSI and ethics portfolio. The panel notes that supervisors regularly spend more hours on internship 2 supervision than they are given time for; and finds that 25 hours supervision is on the low side. The panel urges GBH to ensure that all lecturers dedicate the same amount of time to supervision for all students to avoid disparity; as this would potentially create unfair situations between students.

The panel established that GBH introduces students to a solid research environment. The department of Biological Psychology is a world leading department in human behavioural genetics research. It has extensive experience in training PhD students. PhD students and early career researchers also are trained in the department, thus demonstrating research training excellence across the range of levels and academic trajectories. The quality of the research environment is further evidenced by the 'excellent' scores concerning research quality, relevance to society and viability at the most recent research review of the Department of Biological Psychology.

The Department of Biological Psychology is renowned for its Nederlands Tweelingen Register (NTR): a unique data repository containing genetic and environmental information for more than 50,000 twin families, who are followed longitudinally. The NTR was set up with the aim to investigate the influence of genetic and environmental influences on individual differences in development, behaviour, and health. It has become one of the largest twin registers in the world, with some unique features such as monitoring the development of children from birth, the inclusion of parents, siblings, spouses and children of twins and the combination of longitudinal survey data with extensive biological information, including genetic information. GBH's students have the unique opportunity to use the wide variety of data stored in the NTR repository in their research training, and to contribute to new data collection and interact directly with the NTR families participating in the Register.

The panel appreciates the close connection between GBH and the NTR, but did discuss whether it potentially limits the scope of the research experiences undertaken by most of the students. The students raised the importance of diversifying the populations studied, so the panel explicitly explored the opportunities to diversify the datasets offered to the students. The panel learned that during the second internship students gain access to databases from other institutions. Also, the programme informed the panel that it wishes to gain access to diverse datasets from across the world, but some administrative issues make it hard to gain access to other datasets, such as GDPR rules. However, the programme ensures that not only twin based methods are used, but also various molecular genetics methods. Students are aware of the limitations (in diversity) of the NTR and discuss issues on datasets in class. In fact, through dialogue the panel learned that the NTR provides a wonderful opportunity for students to practice with a top-quality and well curated and accessible resource in the first year of the programme, which lays a great foundation to work with other datasets during the second internship.

The panel finds that the teaching team are research-active, and many are internationally recognized experts in the topics taught in the programme. Staff on the teaching team are expected to have a PhD in behaviour or molecular genetics or a related field of research, enrol onto/passed the BKO Teaching Qualification and be actively involved in research. Given English is the standard language for science, the teachers have appropriate English language skills, and for some, English is their first language. There is a very favourable staff:student ratio. Lecturers receive an average of 8.7 in student evaluations, which is high. The students' enthusiasm about the lecturers was evident in conversations with the panel. The expertise and personal feedback given by lecturers is highly appreciated. Nevertheless, the team is currently stable and able to execute the programme.

Students also feel represented and heard, with their feedback taken seriously and acted on. This is largely due to GBH's own quality assurance system, which comes on top of faculty- and cluster wide

structures. The programme provides for meetings between year representatives and management and generally encourages students to raise issues as soon as they come up, so that they can be dealt with promptly. The panel feels that this practice is an appropriate and viable addition to the representation offered by the joint research masters' programme committee.

The panel concludes that the programme is designed to provide a rich academic environment that promotes enthusiasm for the process of scientific inquiry, and that facilitates creative and intellectual exchange among students and staff. GBH offers teaching in small classes and individual guidance; it places a strong emphasis on theoretical specialization, research skills and communication skills. All of these are highly appreciated by the students that the panel spoke with. Students have access to the facilities they need, but do suggest that they would appreciate having a dedicated space for studying in small groups and maybe some socialising as well.

The programme uses its small scale to its advantage. However, the panel discussed whether the programme could encounter some scalability issues if/when the programme grows in the future. Direct (one-on-one) interaction between staff and students could become more challenging; the same applies to the reliance on students helping each other at the start of the programme. GBH does not have a "mentoring programme"; the supervisors for internships function as de facto mentors, which will suffice as long as student numbers are relatively low. But for now, the panel is very impressed with the manner in which GBH has created a learning community that is clearly high functioning. A suggestion for GBH to take into consideration is to create coaching groups that are geared towards personal and professional development; the panel thinks that students could benefit from this type of support.

Conclusion

Meets the standard

6.3 Standard 3: Student assessment

The programme has an adequate system of student assessment in place.

Findings and considerations

GBH adheres to the principles for assessment as laid out in the VU assessment policy (*VU Toetskader*) and the faculty's assessment framework. Building on these frameworks, GBH has drawn up a concise assessment plan. The panel needed several discussions to clarify procedures and the reliability of GBH's assessment practice, but through this dialogue, the panel established that this plan is effectively implemented and leads to valid, reliable, and transparent student assessment. As a rule, the principle of constructive alignment is applied appropriately: learning outcomes at course level are aligned with specific ILOs at programme level. Assessment within a course is in turn aligned with its respective learning objectives and modes of instruction. The panel applauds that the faculty has appointed a policy officer for assessment, who is available to provide hands-on support to programmes with any issues concerning assessments.

All courses are concluded with a formal assessment, such as an exam, a written essay, and/or assignments such as giving a presentation, or writing a research proposal, a literature review or a research paper. These different methods of assessment are selected to address the knowledge,

skills, and abilities as expressed in the ILOs of the programme. To assess the students' writing skills and their ability to present arguments in a logical and convincing manner, many courses include the writing of an essay or research proposal. Moreover, in these courses, students have to apply their knowledge and understanding, to demonstrate problem-solving abilities, to formulate judgments and to motivate and communicate their conclusions. Finally, students' presentation skills are monitored and assessed in several courses. The specific grading criteria are provided in the course outline. In the case of written papers, literature reviews and research reports, it is expected that the examiner uses standardized evaluation forms and/or predefined rubrics. When available, these rubrics are provided on a digital learning environment (Canvas) to give the students an idea of the expectations.

Students confirm that the programme presents them with a great diversity of fitting assessment methods, but note that the assessment load can be high. The panel agrees that the assessment load is heavy for both students and staff and would encourage the programme to consider reducing the load, and/or ensuring parity across credits.

The master thesis (internship 2) is independently graded by the first supervisor and a second assessor. Most of the internships are undertaken at external departments, under the supervision of an external supervisor. In such cases, students always have a supervisor (GBH staff member) who is responsible for monitoring the student's progress and to ensure the quality of their thesis in line with the VU standards. Furthermore, the final assessment is always conducted by an examiner approved by the examinations board. The programme does not run formal marking calibration sessions for assessors. Going forward, the panel suggests that this could be a valuable practice for the assessors. In addition, the external supervisors need to have clear guidance on expected marking practices at the VU.

Internship 1 and 2 theses are assessed by using the faculty's official assessment form for master's theses. The panel discussed the use of this form at length, as the programme and panel both find that the weights of the different categories on the faculty's form do not match the field of behavioural and molecular genetics. In addition, the thesis assessment forms for first versus second assessors are the same and a little confusing given the second marker does not assess "Grading Work attitude" so a "Combined grade" on the second form is not appropriate. Finally, some forms do not contain any qualitative feedback or an indication that the plagiarism check has been done. The panel recommends that GBH ensures it makes its expectations on the proper use of these assessment forms clear to all stakeholders.

Students often publish their theses as peer-reviewed papers. GBH aims to offer students first authorship, if their effort justifies this. Also, GBH discusses with students how to deal with the procedures of getting their work published and encourage staff to facilitate this process. The programme ensures that it does not mix the roles of supervision with being a co-author. Every thesis is first fully supervised and graded by the first and second independent assessor before any discussion on the possibility of transforming the thesis into a submission for a journal article manuscript takes place.

Finally, the panel considered activities undertaken by the faculty-wide examinations board (EB) to safeguard the quality of assessment and the final level of the programme. It found that the central

EB and its three sub-boards at cluster level operate at quite some distance from individual programmes. Annual screenings of assessment plans, student evaluations, examination results and sample theses are more procedural than content driven. Only where outliers are found, the (sub)board will take additional steps. Annual reports contain very little specific information on individual programmes, and forms used for screening (arguably small) samples of theses do not offer a substantiation of findings. A conversation with EB representatives revealed that, under its new working method, the board mainly relates to programme directors and not to individual examiners. This means that programme directors are expected to be in control of quality care and are held responsible for following up on recommendations made by the EB. This approach is in line with what the VU Assessment Framework states about the duties and responsibilities of the EB, programme directors, and examiners. GBH will start with the new method in 2023. In response to the introduction of the new working method of the EB, the panel requested an impromptu conversation with the programme director during the site visit to discuss the implementation of this new method.

The panel would advise a more hands-on and individualised approach to quality assurance from the EB. The panel cannot assess whether the new working method will contribute to this. It notes that a small and well-functioning research master's programme could easily be forgotten within a cluster that also includes a very large bachelor's programme. Particularly, the panel recommends that the EB extends its annual thesis screening to at least 10% of the entire cohort or four theses (whichever is greater), covering the full range of grades and that it adopts a forward approach to screening assessment quality at course level. In both cases, a detailed reporting of findings is called for. However, the panel sees no direct risk for GBH as a result of the board's current approach. This is mostly because GBH has its own checks and balances in place. From its conversations with staff and management, the panel is confident that informal mechanisms within GBH work well. Staff are in close contact, year representatives are well tuned to the views of the student cohort, and the programme director is well-informed and available. By consequence, (potential) issues are identified and addressed quickly, with adequate reporting mechanisms in place.

In conclusion, the faculty and programme have a robust and detailed assessment policy and quality assurance processes, including descriptions of the quality assurance and assessment criteria for GBH. There is evidence for constructive alignment between the learning goals, teaching and assessment in GBH, using assessment to support rather than just evaluate learning. The panel has made several suggestions, mainly relating to the use of thesis assessment forms and improving the traceability of the quality assurance of assessments. While these are important aspects that GBH is advised to act on, the panel has seen ample and convincing evidence of the substantive quality of course and thesis assessments, and the professionalism and expertise of staff involved.

To further develop its assessment practices, the panel suggests that GBH and the EB could look into any possible attainment gaps and inclusive testing (given the diversity of students' educational and cultural backgrounds), take a proactive stance concerning the rising use of AI, and consider its position on blind marking.

Conclusion

Meets the standard

6.4 Standard 4: Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

Findings and considerations

To assess whether GBH fulfils its ambition of delivering graduates that function at the level of starting PhD candidates, the panel studied a selection of 15 recent research projects (theses) written as part of the second internship. The panel is pleased with the high quality of the work it reviewed.

The panel found that the theses clearly meet the final objectives of the programme and achieve the intended learning outcomes of the programme as these are high quality, detailed research projects carefully written and well presented. The projects are impressive, clearly academic, and definitely meet, and in some cases exceed, the expectations for a master's level thesis. This is evidenced in the thesis quality (organization, critical writing), high level of statistical analysis and data presentation.

The research projects provide evidence of a substantial test of research competence of the students. The projects involve the full research cycle (generally after data collection), are appropriate in size, complexity, and ambition, and reflect the curriculum well. The project topics are relevant and current for the field, contributing novel findings. The theses are typically of publishable quality and many have contributed to a publication. This is a highly desirable feature of the projects contributing to the employability of the students after graduating.

After completing the programme, students have had a high-level training in behavioural genetics, molecular genetics, and multi-omics. Moreover, they have had extensive training in developing, conducting, analysing, and reporting on research, which should make them capable of working at a professional level. GBH has not yet succeeded in developing a consistent system for tracking its alumni. Based on (informal) alumni contacts, the programme estimates that approximately 50% of students continue to do a PhD, albeit not necessarily directly after graduation. Approximately 38% of students continue their careers as data scientists either in healthcare or in other companies. Students indicate that GBH makes an effort to prepare students for a non-academic career, but they are not that familiar with their options outside of academia. Students report they “get the most mileage” out of the programme if they wish to become a PhD.

The programme recognizes that its alumni are valuable contacts and is interested to see how they and their careers develop. Furthermore, the programme expresses an interest to increase collaborations with alumni, for instance to inform current students about possible careers and to learn from their experiences. To stay in contact with alumni the programme set up a LinkedIn page and annually organises a careers-focussed afternoon, where alumni are invited to speak with the current students about their post-master's careers. The panel believes that relatively simple solutions, such as using GBH's own students as outreach ambassadors, could help the programme to track and stay in touch with alumni systematically and help the programme in establishing an even wider network of academic and non-academic partners.

All in all, the panel is fully convinced that GBH delivers high-quality graduates that are qualified for the academic and non-academic labour market.

Conclusion

Meets the standard

7. Appendices

7.1 Documents studied

The panel studied a wide selection of documents relating to the programme's profile and intended learning outcomes, its teaching-learning environment, assessment and end level.

These included:

- Self-assessment report (including a student chapter)
- Course files of:
 1. Behavioural Genetics
 2. Epigenomics and Sequencing
 3. Grant Writing and Science Communication
 4. Imaging and Cardiovascular Genetics
- Master's theses of fifteen graduates (student numbers available on request)

7.2 Site visit programme

7 February 2023

09.00 – 09.15	Welcome and opening of the day
09.15 – 10.00	Internal meeting panel
10.00 – 10.30	Meeting programme management
10.45 – 11.30	Meeting course coordinators/teacher
11.30 – 12.30	Meeting students/alumni
12.30 – 13.30	Lunch (including poster presentations students)
13.30 – 14.00	Meeting Exam committee
14.15– 14.45	Discussion topic 1: Student numbers and recruitment
15.00 – 15.30	Discussion topic 2: Alumni tracking
15.45 – 16.15	Discussion topic 3: How to handle less successful internships
16.15 – 17.15	Internal meeting panel (management available for questions)
17.15	Preliminary feedback of the panel