

Assessment

PhD Program

The Faculty of Mathematics and Natural Sciences
University of Oslo

Autumn 2022

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i. International Panel

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*) Morten Pejrup acted as chair of the committee until July, 2022. Kell Mortensen replaced Morten Pejrup July, 2022.

ii. Site Visit

The panel visited the Faculty of Mathematics and Natural Sciences, University of Oslo, on November 21-22, 2022.

The panel found the site-visit program, given in Appendix 2, well organized. The panel met initially, in the evening Nov. 21, with representatives of the management at the MN- Faculty as well as the departmental level. On Nov. 22, the panel interviewed about 30 PhD candidates, supervisors, the FORVEI and the PhD Program management represented by the head of the PhD Program, heads of the PhD-committees, the PhD administration and others.

iii. Summary of Report

The PhD program at the Faculty of Mathematics and Natural Sciences, University of Oslo, is very well-functioning and well-managed.

The ratio between Norwegian and international candidates is roughly 1:1, which seems satisfactory. International PhD candidates reference the good ranking of UiO as a primary reason for their choice of the university.

The gender balance is satisfactory but should be monitored closely.

The employment rate after graduation is high, and well distributed between the public- and private sector. The rate of employment within research and development is high.

The mandatory parts of the PhD program function well, even though further alignments are recommended concerning course work and duty work, in particular with reference to more uniform treatment across the departments.

Information from the MN-Faculty to PhD candidates and supervisors are generally of high quality, but the faculty should ensure that English documentation is available and easily accessible from the MN-faculty webpages, and that IT-based PhD administration (approval of course works, leave of absence, etc) is prioritised.

Based on the feedback and ratings obtained on theses assessed by international committees, the panel further concludes that the quality of the theses are of high, international standard. To ensure the ability to assess the quality of the theses, the MN Faculty should consider expanding the questionnaire posed to the international dissertation committees.

The panel finds that, overall, the PhD program fully supports the MN-Strategy 2030 presented to UiO.

iv. Recommendations

(not prioritized order)

GENERAL:

- The PhD-administration system, requiring input from PhD candidates, supervisors and administrative personnel should be converted to a fully digital system for improved oversight and timeliness.
- The reporting of time for completion should be extended to keep oversight of approved leave-of-absence from the PhD study and the dedicated duty work. This to enable reporting excluding these.
- The Dean for Study may include the Dean for Research in the yearly meetings with the departments.
- The MN-Faculty could possibly consider whether a policy on the fraction of international PhD candidates is desirable.
- The MN-Faculty should make it clear to both PhD candidates and supervisors that generic skills represent a focus area for the faculty and the overall quality of the program. Generic skills and career planning may be mandatory parts of the PhD study program.
- Traditionally, the trial lecture is held the day before the defence. It should be considered if this is ideal, or whether the trial lecture should be moved to an earlier stage of the program.

HIRING:

- Candidates invited for interview should be informed about what to expect during the interview, typical questions and what constitutes the basis for the final assessment.
- The MN-faculty should consider to minimize the differences over the faculty of the PhD-employment interview by providing guidelines.

SUPERVISOR

- The MN-Faculty should define a minimal plan for the PhD start-up, including the mandatory meeting with the main supervisor to present and discuss the PhD project and ensure alignment of expectations.
- The panel proposes that the MN-Faculty adopts clear action-plans for situations, where serious problems occur between PhD candidate and supervisor.
- MN faculty should consider formalizing a mentoring arrangement or similar for new supervisors who are younger researchers or new hires.

3 YEAR STUDY PROGRAM

- The MN-Faculty should consider how to better achieve a balance between the nominal 3-year study period, the mandatory duty work and other obligations during the PhD study program.
- Rules for the one-year duty work should in general be clarified and better homogenized across the departments to equalize the burden among the PhD candidates.
- The MN-Faculty should secure that supervisors are actively facilitating international exchange for more PhD candidates and ensure that all PhD candidates experience participation in international conferences.
- The MN-Faculty should consider defining forms for the progress reporting with mandatory entities to ensure that all relevant points are addressed and agreed upon.

- The departments have different practices regarding changes in project descriptions. The Panel acknowledges high flexibility but recommends that the MN- Faculty defines clear regulations on how to modify and approve project descriptions.
- The MN -Faculty should look into the origin of the 20 % non-complied PhD studies.

TRAINING COMPONENT

- The Panel recommends that the MN-Faculty evaluate how well the training component supports the learning outcome of the PhD Programme, and considers to open up for more activities to be included in the training component, especially related to generic skills, as long as it is connected to the learning outcome.
- The Panel recommend that the MN Faculty continuously look into the course portfolio at the faculty and makes internal as well as selected national/international courses visible on a dedicated MN/UiO/National webpage.
- The course portfolio should, besides offering sufficient number of topical courses, include courses for awareness of society and corporates needs, and training on how to communicate on this.
- The MN Faculty should play a more visible role in harmonizing rules and practices for approving courses taken outside the faculty.

MENTAL HEALTH

- The MN- Faculty should further investigate reasons for the large fraction of PhD candidates that experiences high mental health issues, including stress, and the connection to work-related activities and ensure continuation of the already very good initiatives established to tackle such issues.
- The MN-Faculty must secure that all PhD candidates belong to a research group, with the aim to improve perceived supervision, well-being and mental health.

QUALITY ASSESSMENT

- To ensure the ability to assess the quality of the theses, the MN-Faculty should consider expanding the questionnaire posed to the international dissertation committees.
- The findings from these questionnaires should be monitored and discussed in the PhD Council on an annual basis, including an assessment of whether the questionnaire captures the international committee's quality feedback in a best possible manner.

0. Introduction

The PhD program at the Faculty of Mathematics and Natural Sciences, University of Oslo, is very well-functioning and well-managed with about 800 enrolled PhD-candidates. The 820 MN-Faculty members constitute 328 professors, 226 associate professors and 266 researchers, given a reasonable average PhD-to-supervisor fraction, although there are large variations. The annual uptake is about 160 PhD candidates and the number of degrees issued during the last 5 years varies between 127 and 147. A little more than 50 % of the PhD candidates are non-Norwegian. The gender balance is around 40 % female and 60 % men, slightly varying from year to year. These numbers are fairly similar to international figures at corresponding faculties. Almost all theses (94%) are based on articles including both manuscripts and articles that have been peer reviewed before included in the thesis.

The MN-Faculty presents impressive statistics regarding the PhD candidates' employment rate after graduating from the MN Faculty. 98 % of the candidates are employed, 58% are employed in the public sector, 41% are in private companies, and 59 % has jobs within research and development, according to the 2018-statistics.

The panel acknowledges the very detailed internal assessment report: "*Periodisk egnevaluering av Ph.d.-programmet til Det matematisk-naturvitenskapelige fakultet*", Universitetet i Oslo, October 2021, and agrees in the both positive and negative critics raised there. The panel finds that, overall, the PhD program fully supports the MN-Strategy 2030 presented to UiO and commends the MN-Faculty for their high ambition of the internal assessment and quality control work. Based on the theses assessed by international committees, the panel further conclude that the quality of the theses are of high, international standard.

1. Organisation of the Graduate School and Communication

Chair of PhD Program

The PhD program at the MN-Faculty has a clear and effective organization. The program is headed by the Dean for Research, who has the overall responsibility for the PhD candidates and their study program, ensuring that the education follows the strategic plans laid out by the faculty and national rules in general.

The PhD Council (Ph.d.-programrådet), consists of the chair of the departmental PhD-Committees, and the Dean for Research. The Council has responsibility for

- The admission requirement and framework for the training parts
- Assessments, scope and level of subjects
- Learning environment in the program, including the overall course portfolio.
- Research training reports.

A central goal of the PhD Council is to ensure a high-quality PhD program at MN and together with the MN-Faculty management to plan strategic developments and to ensure continuously improved quality. The MN-Faculty management organizes workshops and seminars for the PhD Council, discussing such strategic development of research training

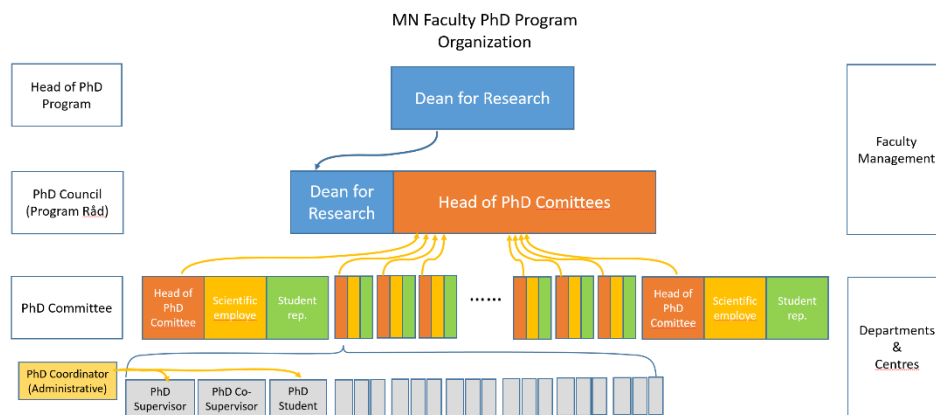
PhD-committee

Each department has a PhD-committee, whose members include the Head of the Committee, one or more PhD candidate(s) (kandidatrepresentant), and one scientific employee, all appointed by the Head of the Department. Some departments have PhD representatives from all research groups to secure academic diversity. The PhD committees have responsibility for

- Assessing all applications to the program in accordance with professional priorities and quality requirements
- Onboarding and integration of the PhD candidates
- Follow-up of each individual candidate
- Progress reporting based on the supervisors' and PhD candidates' independent reports
- Resolve any conflicts
- Contributing to the researcher's education report

PhD coordinators

Each department has one (or more) administrative PhD coordinators, (ph.d. koordinatorer), who are important points of contact for candidates and supervisors. A few coordinators work fulltime with PhD administration, but most have allocated a certain percentage of their position to PhD administration in addition to other tasks. The PhD-coordinator introduces the PhD candidate to the PhD program, assists the PhD candidates and supervisors in general study subjects, help in case of conflict between PhD candidate and supervisor, etc. They have an important role in quality assurance and day to day follow up that the program's quality assurance are in place.



Communication

The general information from the MN-Faculty to the PhD candidates appears effective in terms of regular e-mails from The Career Support Program, Faculty Bulletins, webpages and information meetings. It is interesting to note that, according to the PhD candidate survey "Ph.d.-kandidatundersøkelsen 2021", a relatively small proportion of the PhD candidates want information via social media. Information by e-mails is not part of the survey.

The Panel acknowledges that the Faculty Dean of Studies, as part of the systematic study quality routines, conducts annual, departmental meetings with the department management, including heads of department, administration and education, chairs of committees and PhD candidate representatives. But the Panel wonders why the Dean for Research, who represents the PhD program, is not part of such meeting.

The Panel acknowledges that the language used at the MN-Faculty is Norwegian and appreciate the policy that international PhD candidates is recommended to learn the Norwegian. Still, the Panel is sceptical that much formal information and communication seems to be given in Norwegian. This may cause problems among many international PhD candidates as it appears as they rely on oral information from more senior international PhD candidates, and maybe even prevents some PhD candidates to choose the MN-Faculty for their PhD study. The Panel recommends that all formal information and regulations are not restricted to Norwegian, but in addition (or only) given in English and made available on the webpage. PhD candidates argued that it is difficult to find documents on the MN webpages. Often, they only find Norwegian documents (even though basically all documents are available in English according to the discussion with the management). Some documents are further difficult to unravel.

2. Admission / Enrolment

The annual uptake is about 160 PhD candidates, while the number of degrees issued during the last 5 years varies between 127 and 147 with a mean of 134.

A little more than 50 % of the PhD candidates are non-Norwegian which may seem high, but still comparable to other international universities. The MN-Faculty may make a policy on the aimed fraction of international PhD candidates in order to be specific about both the goal and the considerations resulting in the advised goal and benefits and drawbacks of different fractions.

The gender balance is around 40 % female and 60 % men, with the figures varying from year to year. The MN- Faculty may aim for a more equal distribution over time, but the Assessment Panel admits that the numbers are reasonable similar to the figures at corresponding international faculties.

The MN-Faculty accepts joint degree students, provided that the faculty has formal agreements with the second university. The provided documents do not discuss possible challenges in merging the rules and expectations, and other possible issues with joint PhD-diplomas.

Hiring procedure

The Assessment Panel finds that the way in which the MN-Faculty announces PhD positions is generally relevant and adequate and will likely ensure hiring of good candidates. The panel appreciates the Internal Panel's suggestion to supplement the local UiO-website announcements with announcements at international web-platforms, and publishing on social media such as Twitter and Facebook. The Panel appreciates the annual joint call for the whole MN-Faculty, but advises the MN-Faculty to consider making such joint calls more frequently, e.g. twice a year. This will promote the MN-Faculty as a top research university and might be used for international marketing, but probably not fit all openings.

The MN-Faculty must, though, be aware of possible large numbers of irrelevant or low-quality applications by widely published calls. The panel will therefore also support the MN-Faculty, if it chooses to restrict calls directed into specific platforms known to address international leading and most relevant candidates.

Financial support for the PhD studies.

PhD candidates are typically financed by funded projects from research councils and related entities, or university funding via funds from the Ministry of Education and Research (KD). The MN-Faculty has for some time had focus on funding including innovation and interaction with companies, and more recently initiated focus on sustainability. The Panel acknowledges that the MN-Faculty has dedicated resources and have established six innovation clusters to strengthen strategic cooperation in the PhD Programme.

Self-financed candidates / candidates with scholarships from abroad.

During the last 10 years, the MN-Faculty has had more than 30 self-financed candidates. By June 2022, the MN-Faculty had 9 active PhD candidates with scholarships from abroad. The panel support strongly the MN-requirement of a minimum funding throughout the PhD study period, presently 20 NOK/month, as introduced by April 2021. Such requirement will ensure that these PhD candidates have scientific as well as social conditions that are not too incomparable to Norwegian funded PhD candidates.

Employee Interview

The students' application forms and CVs should express the candidates' qualities and reveal possible shortcomings. It may be useful to have a formal list of topics to help the hiring-

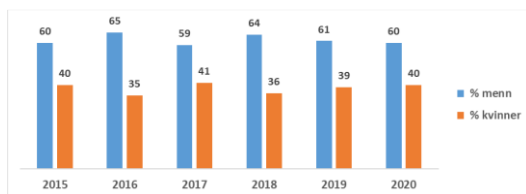
committee to uncover possible deficiencies. The formal requirement for language skills seems fair to the Panel.

Candidates invited for interview should be informed about the content of the interview, typical questions addressed to the candidate, and what is typically the basis for the final assessment (independence, professional competence, oral and written presentation). This may contribute to more gender-neutral recruitment.

The panel appreciate the MN-Faculty's demand for both genders represented in the interview committee (when possible) and find that a guidance on the interview may be valuable and effective.

Gender aspects

The gender balance is around 40 % female and 60 % men. The figures fluctuate only little from year to year. The panel acknowledges that the MN-Faculty has initiated the project, *FRONT*, with the goal to promote equality and work for a better gender balance. It is as well appreciated that *FRONT* in the future additionally will work on general diversity.



International PhD candidates and Internationalization

A little more than 50 % of the PhD candidates are non-Norwegian. This number seems reasonable to the panel and is similar to international figures at corresponding faculties. The large number of international PhD candidates helps to ensure an international environment, and reflects a high-quality, internationally competitive PhD-program at the MN- Faculty. The MN- Faculty has no defined strategy for a specific fraction that would be optimal for the MN-Faculty (or for Norway), but may consider to define a given range of international PhD candidates, that the MN-Faculty aim for.



It is not mandatory for the PhD candidates at the MN-Faculty to have extended exchange to international institutes and it is not mandatory to participate in international conferences. According to the PhD candidate survey, 22 % of the PhD candidates have had international exchange and only 25 % have participated in international conferences. The numbers may very well be affected by the corona pandemic, but still, it is important that the MN-Faculty and the Supervisors strongly recommend and facilitate such activities.

3. Starting up a PhD

The PhD Start-Up seems in most cases to go well, supported by the MN-Faculty and their awareness of the importance. Still, PhD candidates meet a variety of different challenges. PhD candidates experience administrative problems, as for example no salary for several months, challenges on where to find administrative help and/or information. PhD candidates face problems identifying what the role of the supervisor is compared to HR, the MN-Faculty, FORVEI and other units, and how to access the various entities. It is clear from discussions with the PhD candidates, that there are big differences among the departments, and possible also among the research groups.

The panel acknowledges the two-day welcome seminar organized by the MN-Faculty. The Panel further acknowledges that an anticipation interview is mandatory and appreciates the aim for a good start-up expressed in the document "*mottak-og-oppfølging-av-interne-kandidater.pdf*". The panel finds, though, the text somewhat general.

The documents given on the UiO-PhD-homepage:

(<https://www.mn.uio.no/english/research/phd/inductionconversation/index.html>) defines departmental mandatory induction conversations between new PhD candidates and their main supervisors, with the aim to clarify the expectations between the two parties. These guidelines seem very well worked out. In the interview with the PhD candidates, the international PhD candidates in particular expressed satisfaction with the start-up process, reflecting extended use of the formalized induction conversation. The internal Norwegian PhD candidates expressed more dispersed experiences. For the latter cases, supervisors may, correctly or incorrectly, expect that the internal PhD candidates are already aware of expectations, working conditions etc.

In a questionnaire survey only 73 % of the PhD candidate answered that they have had an introduction conversation with their main supervisor. The panel finds that this is an unacceptable low figure. Even though some PhD candidates perhaps have had conversations with the co-supervisors or have "forgotten" such conversation, this number is not acceptable. The main supervisor has the responsibility and must be aware of his/her duty in such respect. The panel is aware that some co-supervisors effectively act as the main supervisor. But if this is the case, the two persons should switch their formal appointments, regardless of who raised the funding. Such demand is consistent with internationally approved ethical rules.

The panel suggest that the MN-Faculty introduce a document, a visualization, or a plan, that is easy and effective for the new PhD candidates to follow. It should be short, decisive and include the mandatory meeting with the main supervisor to present/discuss the PhD project and to make the expectations alignment. Moreover, such a document should include a mandatory introduction to the department, presenting the administration, IT-systems and experimental facilities, and introduction to the most relevant research group(s). In an IT-based administrative PhD-system, such mandatory activities could easily be registered. The panel further suggests that the MN-Faculty considers demanding a dedicated follow up of the conversation meeting (as part of) the other mandatory follow up meetings (annually etc).

Interaction with other PhD-candidates and student networks, are often the most effective tool for exchange of information and experiences. It is recommended, that each department creates and maintains formalized networks of PhD candidates. This to secure practical exchange of experiences among the PhD candidates and secure interaction between old and new PhD candidates, and between international and Norwegian PhD candidates. The interviews expressed demands for making more cohort starts of candidates at the department level or at the MN-Faculty level. Such cohorts have already shown very good experiences with groups that can take care of each other from the start of the study to

create a more sustainable working atmosphere that in turn will lead to improved academic results.

The formal PhD project is presented already in the application for enrolment. The project description is therefore likely to be adjusted during the PhD study, and in some cases even adjusted several times. The departments seem to have different practices regarding how changes in the project descriptions are handled. The Panel acknowledges high flexibility regarding the project, but still recommends that the MN-Faculty define common regulations on modification of project descriptions.

4. Supervision

Supervisors must have a PhD degree to supervise. The main supervisors must have permanent employment at the MN-Faculty or be employed as amanuensis-II / professor-II at MN. The panel acknowledges the flexibility of MN, giving additionally temporary MN-employees and qualified employers from other institutions/companies responsibility as main supervisor, upon specific application. But such arrangement should not deprive the PhD candidates interaction with the university. The Panel also acknowledges that the MN-faculty recommends that at least one of the supervisors has prior experience in PhD-supervision, and that supervisors has main responsibility for at most six PhD candidates. The Panel acknowledges such limitations, but recommends that such a limit should be a general rule and not just a recommendation, to ensure adequate and qualified guidance to all PhD candidates.

The University (UiO) offers an on-line "course" for supervisors, including a number of important aspects (<https://studmed.uio.no/elaring/phd/veiledning.shtml>). These concern topics like expectations alignment, ethics, conflict handling, students' mental health, etc. The Panel finds the online text to be highly relevant and rather complete. The supervisors will gain important competences using this online guide. In the interview with the supervisors, they expressed major focus on the student welfare. Most have good knowledge of ForVei and other institutional entities that are highly appreciated, but it also became clear that some supervisors feel alone. Several experience little follow-up after they are employed and also find it difficult to know where to go to get advice on how to act as a supervisor. Supervisors expressed a desire to formalize a mentoring arrangement or similar for younger researchers or new hires, the Panel support such an initiative.

The PhD candidates express generally satisfaction with their supervisors and the supervision. Still, about 18 % of the PhD candidates are unsatisfied with their supervision. This is not necessarily a compromising fraction, but for future questionnaires it might be considered to ask the unsatisfied PhD candidates what the reason for their limited satisfaction are. In this way MN-Faculty may be able to improve satisfaction with supervision based on constructive measures. It is not clear from the reports, whether the local PhD coordinator (ph.d.-koordinator) or members of the local PhD committee get involved in conflict cases and which opportunities they have in such cases. The panel finds that the MN-Faculty must define clear plans for action when serious problems occur between PhD candidate and supervisor.

PhD candidates are to a large extent ignorant on who to contact to have problems solved, including problems with supervisor and supervision, problems within the research group, and others. The panel acknowledges the MN-Faculty initiative of ForVei, which is an offer to the PhD candidates with the aim to counteract stress, mental challenges and conflicts. ForVei is a resource that UiO must take care of and focus on. Some PhD candidates are aware of ForVei and other entities but are still unsure on which unit to address with a given problem, and how to access or who to contact depending on the problem. It should be ensured that ForVei is an offer that all candidates know about and can use.

Many external PhD candidates, as well as supervisors, experience very limited interaction and awareness of the related MN department. The external supervisors emphasize the importance of the departments having a permanent contact person that external parties and candidates can relate to and get help from, but the panel emphasize that the external supervisors also have the duty to be active within the university activities. In the PhD candidate survey, about 20 % of the PhD candidates express that they are not part of a research group. That is not acceptable.

Ethical Aspects

The Panel acknowledges that ethical awareness is met by various new initiatives. Since 2020, templates for the PhD-project descriptions addresses ethical aspects related to the project. The course, MNSES9100 - Science, Ethics and Society, addresses formal ethical issues. The course is mandatory but has in reality limited capacity according to the course homepage. Supervisor's seminars in research ethics have been initiated, consisting of both presentations and case discussions. The handling of ethics aspect concerning co-authorship is not specifically mentioned to the Panel, but it is in some aspects addressed in the "co-authorship form" filled out in relation to the theses.

Mental health

Mental health has become a big problem among young people. This also concern PhD candidates, who even may have additional stress and mental challenges related to their specific working condition. Some 58 % of interviewed PhD candidates are reported to answer that they have experienced mental health problems. This is a worrying high percentage but likely not very different from similar universities during the pandemic. A wide range of theories are forwarded for the bases for stress and related mental health problems, including the fact that personal initiatives have so limited effects on the world's critical situation, and the fact that youths to larger extend than before expect to be successful throughout their activities. The panel acknowledges that UiO offers many tools to avoid and help with mental health problems. These tools include the institutional anchored occupational health service "Bedriftshelsetjenesten" and "ForVei" that are easily accessible over the web and should be used in serious cases. Other tools to prevent mental health problems have informal character and include PhD-courses on stress, and social arrangements like the *PhD- and Postdoc Breakfast Club*, *Good morning MatNat* and *Christmas arrangements*. The Panel finds that these activities are excellent and very well targeted arrangements.

Duty work

Duty work can amount to 1650 hours, equivalent to one study year. One-year duty work is compensated with one more year of enrolment and may thereby to large extend explain the fairly long completion time. The panel propose that the effective completion time should exclude duty work, to make the time for completion internationally comparable. Rules for duty work and the balance between duty work and study program should generally be clarified at MN-Faculty.

According to the PhD candidate survey (Ph.d.-kandidatundersøkelsen 2021) 45% of the PhD candidates does not have duty work during their PhD study period. This probably reflects the fact, expressed by the PhD candidates, that international PhD candidates typically are not accepted to do the traditional PhD-teaching, which is on BSc-level and in Norwegian. International PhD candidates are accordingly often excluded from duty work. External supervisors argue in particular for duty-work beyond teaching, relevant for the external host-institution, but seems unclear to whom in such cases should pay the additional year. University-teaching for external PhD candidates can help integration in the university environment. Duty work seems in general quite causal and unevenly viewed/distributed

across the departments. Some PhD candidates are recommended to avoid duty work, while others are recommended to accept duty work to get the one more year. The Norwegian PhD candidates are generally happy with the offered duty work, but find that the requirement to fulfil the one-year teaching has increased over the years. The supervisors have generally little, if any, influence on the content of the duty work. These facts may cause major friction and possible conflicts and may generate lots of frustration and stressed working conditions. The Panel recommends initiating a faculty-wide discussion on how to homogenize the view on duty work.

5. Progress Management and Quality Assurance

The panel acknowledges the annual progress assessment reports (Årlig framdrifts-rapportering), and the mandatory third semester extended reporting. There are different routines among the departments, both concerning the reporting and how the reports are followed up. The third-semester report is supplemented with an oral presentation and a meeting where the PhD candidate meets with an appointed committee. The supervisors are present in parts of the latter meeting. These are valid instruments to secure satisfactory progress in the PhD study and will visualize required adjustment in the plans. The progress assessment reporting is to large extent managed by the departments and differ accordingly from one department to another. The Panel acknowledges such flexibility, but still the MN-Faculty should consider defining formal forms for the reporting, to ensure that all relevant points are addressed and agreed upon and ensure that problems that the PhD candidate and/or the supervisors experience are clearly addressed.

The panel acknowledges further the mandatory yearly employee development interview for the PhD candidates. It must be emphasized for the PhD candidates that this interview is not about professional subjects, but concern general social and professional interaction at the department, cooperation with supervisors and other PhD candidates etc. Only very few PhD candidates have the yearly employee development interview with the employer representative, which usually is the head of the department. Most interviewed PhD candidates having had such interview, had it with their supervisor. To secure that the PhD candidates is free to discuss possible problematic professional relationships, however, the panel recommend that the interview is not made by the supervisor.

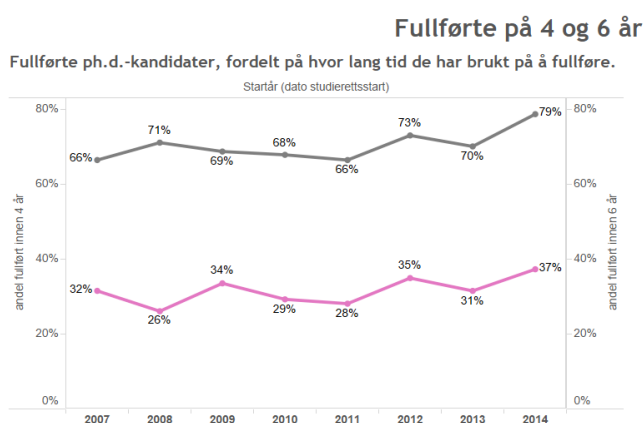
The Panel acknowledges that the Faculty Dean for Study has yearly meetings with the departments on education from the BSc to the PhD-level. The department management and PhD candidate representatives are present. The Panel would recommend that the Dean for Research, who is responsible for the PhD program, also is present.

6. Completion

The MN-Faculty has focus on the completion of PhD studies. The UiO PhD regulation require the 30-40 ECTS course program completed but has no strict rule for published articles or manuscripts to graduate. Still, some departments have the culture of "at least 3 articles". The MN-Faculty offers Completion Seminars for PhD-candidates approaching their final stage of the study program. The seminars give the candidates advise and tools for popular science writing and prepares them for trial lectures and defence.

The time taken to complete the study seems high to the Panel, considering that the program is designed for 3 years. Only about 35 % complete their PhD within four years. The panel observe, however, that the given time of completion include the one-year time for duty work, as discussed above, and approved leave-of-absence. The true completion-time is accordingly not as dramatic as the bare statistics may indicate. The panel acknowledge that the MN-Faculty has a six-years limit for the time to complete the PhD programme, even though six years seems high for a three-year program. The panel suggest that the reporting of time for completion should exclude duty-work and approved leave-of-absence from the PhD study, or at least that such statistics are maintained to enrich the reporting on completion time. Other reasons for the extended time for completion may be the mandatory course program for more than ½ year. In the discussion with the PhD supervisors, it was proposed that the MN-Faculty may consider reducing requirements to protect candidates, with the aim that they can complete in three years. The Panel recommends accordingly that the MN-Faculty considers the balance between the nominal three-year study period, the mandatory duty work and other obligations during the PhD study program. The Panel finds it very satisfactory that there is no bias in completion time with regard to gender or nationality.

The completion rate of the MN-PhD candidates is high in Norwegian context, and the final PhD degrees are of highest international standard. Still, approximately 20 % of the PhD-candidates does not complete their study at all. This fraction is realistically not very different from corresponding faculties nationally or internationally. The Panel still find the fraction high and recommend that the MN-Faculty investigate the reason for the 20 % non-completed PhD candidates.



7. The training component

PhD courses corresponding to 30-40 ECTS are a mandatory part of the PhD programme. The Panel acknowledges the MN-regulation that at least 20 ECTS must be within science, including up to 10 ECTS MSc level courses, and that a 5 ECTS Ethics-course is mandatory.

The Panel acknowledge the aim for a balanced portfolio between scientific and generic skills, including challenges in innovation. It is not clear to the Panel, however, how the course portfolio for MN-students represents a logical and integrated part of their study-program. Moreover, it appears that the rules are interpreted differently among the departments.

Both the PhD-candidates and the supervisors expressed much frustration concerning the mandatory training component and courses. The PhD candidates express generally satisfaction with the quality of offered UiO courses, but both PhD candidates and supervisors expressed a lack in the number of qualified courses. This also concern the number of transferable skills courses. Both PhD candidates and supervisors expressed significant difficulties in the choice of courses and having relevant courses approved. External courses appear in particular to be difficult to have approved. The PhD candidates expressed disappointment in the lack of trust in the MN-Faculty requirements, where all external coursework or seminars must have a formal exam to be approved. The supervisors expressed further wish to include other relevant topics in the training component, beyond traditional courses.

Attending Summer and Winter Schools, and participation in conferences and workshops are approved in some departments, but the regulations seem very different from one department to another. Some PhD candidates have summer/winter schools approved upon presentation of a seminar after attending the school, this to replace the mandatory exam for regular courses. Some departments approve also participation in conferences as a course activity. The Panel ask the MN-Faculty to discuss the rule in *Utfyllende regler til Forskrift for graden philosophiae doctor (ph.d.) ved MN-fakultetet (8.1.1)* where it is stated that "*alle emner som skal inngå i opplæringsdelen, må ha avsluttende eksamen med karakterfastsettelse.*" This rule creates obstacles for the above-mentioned activities to be approved as part of the training component.

The Panel recommends that the MN-Faculty evaluate how well the training component supports the learning outcome of the PhD Programme, and consider to open up for more activities to be included in the training component, especially related to generic skills. The Panel recommends that the MN-Faculty looks into the course portfolio at MN, and that the MN-Faculty takes the initiative to harmonize rules and practices for approving courses. MN should moreover ensure that national and international courses are visible to the PhD candidates. It may be useful with a dedicated webpage for courses, to presents available courses and whether they count as scientific PhD course, MSc course, or as generic PhD course. The MN-Faculty may also consider accepting a limited number of BSc courses, which may be most useful for PhD candidates who change their main subject from their MSc to the PhD study.

8. Outreach and Career Plan

Generic Skills and Career relevant to Industry and Labour Marked.

Generic skills have become a focus area at the MN-Faculty. The faculty arranges workshops and seminars focused on generic skills, but it should be made clear to both PhD candidates and supervisors that generic skills represent a focus area for the MN-Faculty. Generic skills and career planning should be clearly visible already in the PhD study program.

The Panel appreciates the MN-Faculty initiatives for PhD candidates' career planning. This includes workshops and web-based programs for PhD candidates and other young scientists, addressing aspects of both academic and non-academic careers. Since 2020, the MN-Faculty has further piloted individual career guidance for PhD candidates at the faculty. Some departments arrange industrial relevant activities for the PhD candidates. Some PhD candidates join the outreach forum organized for MSc students.

UiO has established 6 innovation clusters to facilitate strategic interaction with industry. The panel endorse this initiative. Especially, the panel finds that the idea of a 4th year for PhD participating in these clusters is an excellent idea. The Norwegian government is investing possibility to include mandatory internships in companies. Many PhD candidates like this possibility. Even though this is a national initiative, the MN Faculty could already make such initiative now, to accommodate PhD candidates and companies wishes.

The Panel acknowledges that The Career Support arranges online courses in career development. The courses focusing on guidance into academia, but newly started seminars include "managing transitions" where former candidates in the public or private sector are invited in and discuss their experiences.

Trial lecture:

The trial lecture is a mandatory part of the PhD program for Norwegian PhD candidates, testing both scientific and generic skills, the ability to critically gather information and prove independence. MN should make it clearer to both the PhD candidates and the trial-lecture assessment committee that generic skills must be tested as part of the lecture.

The MN-Faculty statistics gives no information on the number of PhD candidates who do not pass the trial lecture. It may be worth to make such statistics. Traditionally, the trial lecture is held the day before the defence. It may be considered if this is ideal, or whether the trial lecture should be moved to an earlier stage of the program.

9. Thesis

The Panel finds that the number of articles produced by the PhD candidates is very high. Almost all theses (94%) are based on manuscripts and peer reviewed articles. The quality of the manuscripts and articles are assessed by the final PhD-Assessment Committee. UiO has signed the "Declaration on Research Assessment (DORA)", which implies that articles must be evaluated based on content, and not in terms of formal impact factors. This leaves only a vague standard for the quality assessment of the PhD articles. The MN-Faculty should strive for more specificity, asking the PhD assessment committees to give statements on the quality that can be compared directly with international PhD degrees. The MN-Faculty may design a form for such quality statements.

The MN-Faculty demands Co-Author Declarations for all manuscripts and articles included in the thesis. The Co-Author Declarations gives generally very good indications of the PhD candidates' contribution to the work and must be approved by the MN-Faculty before the declarations are send to the PhD-assessment committee. The Panel acknowledges that the MN-Faculty makes a solid assessment of these declarations, as proved by the fact that only 5% are returned for improvements.

The theses are not systematically subjected to control for possible plagiarism, but some random reports are checked using *Original*. The results indicate that plagiarism is not a serious problem at the MN-Faculty.

Based on these facts, the Panel conclude that the PhD candidates educated at the MN-Faculty is of highest international competitive level. The theses, the publications and the prior PhD project has all high scientific quality.

Appendix 1 – Originalt mandat ekstern evaluering

Periodisk programevaluering av ph.d.-programmet ved Det matematisk naturvitenskapelige fakultet, Universitetet i Oslo:

Universitetet i Oslo innførte et nytt kvalitetssystem for utdanningsvirksomhet den 8. desember 2020. Kvalitetssystemet omfatter all utdanning som tilbys ved UiO inkludert ph.d.-utdanningen. Periodisk programevaluering av ph.d.-programmet skal gjennomføres hvert sjette år. Formålet er å legge til rette for kontinuerlig forbedring.

Periodisk programevaluering består av en egevaluering og en ekstern evalueringen. Ekstern evaluering koordineres av programledelsen og baserer seg på egevalueringen og evalueringsmaterialet som er samlet opp i perioden 2015-2021.

Mandat

Evalueringspanelet skal utarbeide en rapport der kvaliteten i ph.d-programmet evalueres og eventuelle behov for endringer og videreutvikling av programmet identifiseres. Den eksterne bedømmelseskomiteens primære oppgave er å vurdere den vitenskapelige kvaliteten på ph.d.-utdanningen i lys av internasjonale standarder.

Panelet bes spesielt:

- Vurdere kvaliteten på fakultetets interne periodisk programevaluering av ph.d.-programmet.
- Evaluere programmets samlede effektivitet, inkludert organisering, ledelse og kommunikasjon.
- Evaluere programmets gjennomføringsgrad og om tiltak som forbedrer rekruttering, forhindrer frafall og bedrer veilederkompetansen på fakultetet er tilstrekkelig.

Basert på egne erfaringer bes panelet komme med konkrete forbedringsforslag. Sentrale temaer i ph.d.-programmet er arbeidslivsrelevans, internasjonalisering, læringsmiljø, veilederopplæring, integrering av ph.d.-kandidater i nasjonale og internasjonale fagmiljøer, infrastruktur, ph.d.-kandidatenes gjennomføringsgrad, samt om ph.d.-programmet understøtter fakultets strategi (strategi 2030). Panelet har muligheten til å be fakultetsadministrasjonen om utfyllende statistikker og oppklarende tilleggsinformasjon ved behov

Evalueringspanelets medlemmer

- Professor emeritus Morten Pejrup, Københavns universitet (leder)
 - o mp@ign.ku.dk
- Professor Gunilla Svensson, Stockholms universitet
 - o gunilla@misu.su.se
- Åse Hestnes, ph.d.-kandidat, Universitetet i Bergen
 - o Ase.Hestnes@uib.no
- Dr. Lars Dahl, Norges Bank Investment Management
 - o Lars.Dahl@nbim.no
- Seniorrådgiver Reier Møll Schoder, Arkitektur- og designhøgskolen i Oslo, (sekretær)
 - o Reier.Moll.Schoder@adm.aho.no

Møter

Evalueringspanelet kan møtes virtuelt i løpet av arbeidet etter ønske og be om praktisk bistand fra fakultetsadministrasjonen etter behov. Når evalueringspanelet har satt seg inn i materialet inviterer fakultetet til institusjonsbesøk i Oslo.

Panelet skal få møte representanter fra ledelsen, administrasjonen og kandidatene. Panelet kan komme med innspill og ønsker til programmet.

Rapportformat og frister

Rapporten fra evalueringspanelet skal være på 10-12 sider og kan skrives på norsk eller engelsk etter ønske fra panelet. Rapporten skal være så konkret som mulig og i tillegg til hovedkonklusjoner skal den inneholde anbefalinger til forbedringer.

Rapporten skal leveres innen 15. september 2022.

Bakgrunnsmateriale

Filer i vedlegg:

1. Periodisk egevaluering (internt panel) av Ph.d.-programmet til Det matematisk-naturvitenskapelige fakultet, Universitetet i Oslo
2. Kort oversikt over ph.d.-programmets ledelse, struktur og innhold
3. Forskerutdanningsmelding (FORM), for 2017
4. Forskerutdanningsmelding (FORM), for 2018-2020
5. Ph.d.-kandidatundersøkelsen 2021
6. UiOs kandidatundersøkelse 2018 (Rambøll) (ph.d. ved MN-fakultetet)
7. Strategi 2030, MN-fakultetet, Universitetet i Oslo
8. Rapport fra karrierestøtteprogrammene ved MN-fakultetet 2020
9. Dialogmøter om studiekvalitet ved MN-fakultetet, agenda og sammendrag
10. Godkjente referater fra DOKA-nettverket (ph.d.-administrativt nettverk ved fakultetet)

Appendix 2 – Program institusjonsbesøk

Program institusjonsbesøk

Det matematisk-naturvitenskapelige fakultet, Universitetet i Oslo

21.-22. november 2022

Dag 1		
Ankomst Oslo		
Omvisning i de gamle universitetsbygningene ved Karl Johans gate	14.45-16.00	
Med Else Marie Lingaas, seniorrådgiver ved MN-fakultetet Oppmøte kl. 14.45 ved Bristol hotell, i resepsjonen, eller kl. 15.00 på Aulatrappa for de som vil være med.		
Oppmøte ved Bristol hotell, i resepsjonen, for de som vil slå følge ned til Tjuvholmen.	18.30	
Felles middag, ved Tjuvholmen Sjømagasin	19.00	
Representanter fra MN, UiO: <ul style="list-style-type: none">- Professor Bjørn Jamtveit, Prodekan for forskning og leder for Ph.d.-programrådet ved MN-fakultetet- Professor Rigmor Solberg, leder for Ph.d.-utvalget ved Farmasøytisk institutt- Professor Petter Nielsen, leder for Ph.d.-utvalget ved Institutt for informatikk- Professor Steven Wilson, utdanningsleder for Kjemisk Institutt og leder av den interne evalueringen av Ph.d.-programmet ved MN-fakultetet- Seniorrådgiver Jean-Raphael Martinez, MN-fakultetet- Seniorrådgiver Natalia Utkina, MN-fakultetet- Rådgiver Anniken R. Birkelund, MN-fakultetet		

Dag 2		
Sted: CCSEs store seminarrom, 4. etg, Fysikkbygningen, Blindern Sem Sælands vei 24, 0371 Oslo		
Felles taxi for komiteen fra hotellet til Blindern, oppmøte ved Bristol hotell, i resepsjonen, for de som vil være med	15 min	08.30-08.45

Arbeidsmøte evalueringskomiteen	30 min	09.00-09.30
Intervju med ph.d.-kandidater	90 min	09.30-11.00
- Gruppe 1 med interne kandidater	30 min	09.30-10.00
- Gruppe 2 med internasjonale kandidater	30 min	10.00-10.30
- Gruppe 3 med eksterne kandidater	30 min	10.30-11.00
Pause/Arbeidsmøte evalueringskomiteen	30 min	11.00 -11.30
Intervju med veiledere	60 min	11.30-12.30
- Gruppe 1 med interne veiledere	30 min	11.30-12.00
- Gruppe 2 med eksterne veiledere og/eller veiledere i professor II-stillinger	30 min	12.00-12.30
Lunsj	60 min	12.30-13.30
Tema: Mental helse, oppfølging av ph.d.-kandidater	50 min	13.30-14.30
- Ph.d.-rådgiverne presenterer	10 min	13.30-13.40
- ForVei, ved Linda T. S. Westgaard	10 min	13.40-13.50
Tema: Karriereutvikling ved Natasa Nikolic	10 min	14.20-14.30
Pause/Arbeidsmøte evalueringskomiteen	30 min	14.30-15:00
Intervju med programledelsen (Ph.d.-programrådet)	90 min	15.00-16.30
Arbeidsmøte evalueringskomiteen	90 min	16.30-18.00
Transport fra Blindern. Felles taxi til Oslo sentrum og flytog til Gardermoen.	-	Ca. 18.00