Evaluation of Mathematics, ICT and Technology 2023-2024
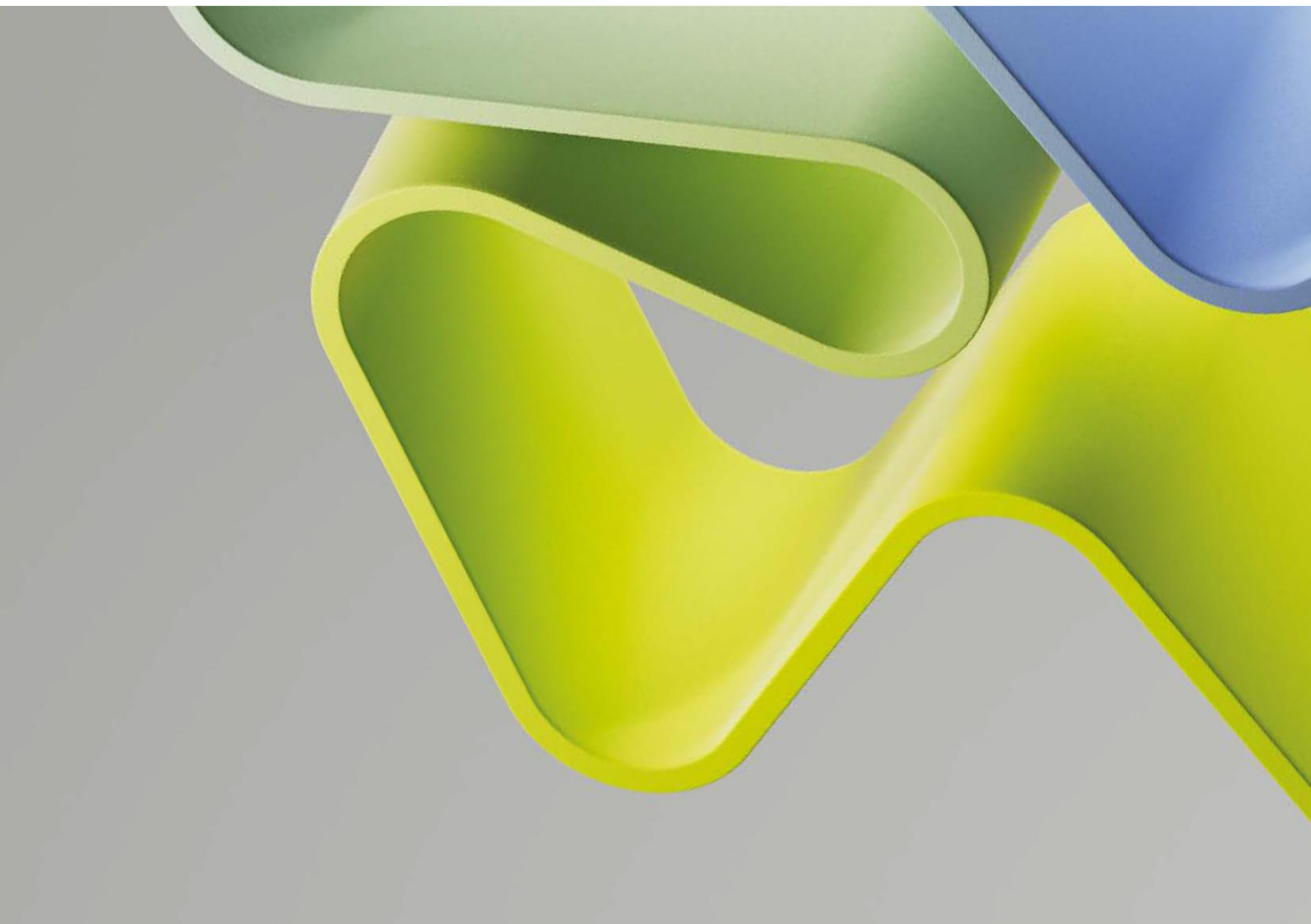
Evaluation Report for Administrative Unit

Administrative Unit: **Department of Computer Science**

Institution: **Oslo Metropolitan University (OsloMet)**

Evaluation Committee Higher Education Institutions 2

December 2024

Contents

Statement from Evaluation Committee Higher Education Institutions 2

The members of this Evaluation Committee have evaluated the following administrative units at the higher education institutions within Mathematics, ICT and Technology 2023-2024 and has submitted a report for each administrative unit:

- Department of Computer Technology and Computational Engineering (IDBI), UiT The Arctic University of Norway
- Department of Automation and Process Engineering (IAP), UiT the Arctic University of Norway
- Department of Electronic Systems (IES), Norwegian University of Science and Technology (NTNU)
- Department of ICT and Natural Sciences, Norwegian University of Science and Technology (NTNU)
- Department of Information Security and Communication Technology (IIK), Norwegian University of Science and Technology (NTNU)
- Department of Engineering Cybernetics (DeptCybernetic), Norwegian University of Science and Technology (NTNU)
- Department of Information Systems (IIS), University of Agder (UiA)
- Department of Computer Science, Oslo Metropolitan University (OsloMet)
- Faculty of Science and Technology (REALTEK), Norwegian University of Life Sciences (NMBU)
- Department of Science and Industry Systems (IRI), University of South-Eastern Norway (USN)
- School of Economics, Innovation and Technology (SEIT), Kristiania University College

The conclusions and recommendations in this report are based on information from the administrative units (self-assessment), digital meetings with representatives from the administrative units, bibliometric analysis and personnel statistics from the Nordic Institute for Studies of Innovation, Research, and Education (NIFU) and Statistics Norway (SSB), and selected data from the National survey for academic staff in Norwegian higher education and the National student survey (NOKUT). The digital interviews took place in the autumn 2024.

The members of the Evaluation Committee are in collective agreement with the assessments, conclusions and recommendations presented in this report. None of the committee members has declared any conflict of interest.

The Evaluation Committee consisted of the following members:

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University of Hamburg

Description of the Administrative Unit

The Department of Computer Science is an administrative unit belonging to Oslo Metropolitan University (OsloMet). They cover a wide range of research topics, ranging from use of ICT in private and public sectors to quantum computing. The department itself has its roots in early engineering education, dating back 150 years, though OsloMet received its status as a university on January 12th, 2018, and is thus a young university. The organisational structure of the Department of Computer Science includes multiple roles that are actively engaged in the development of research. The key roles are; programme leaders (education programmes); academic group leaders (resource planning); research group leaders (research group funds and direction); activity leaders (other important responsibilities); thesis coordinators (bachelor and master projects and contracts); and an internationalisation coordinator (student exchange). Regarding the department's personnel, 86% of labour time is on a permanent contract, whereas 14% comes from temporary positions (excluding PhDs and postdocs). The department employs professors (13.4 FTE), associate professors (24.2 FTE), assistant professors (14.6 FTE), researchers (2 FTE), research fellows (17 FTE), technical staff / engineers (3 FTE) and academic management (3.5 FTE). Per category, women make up between 15% (for professors) and 56% (for assistant professors) of staff. There is no administrative staff at the department level, but the faculty has administrative support within RnD, finance, HR, management support, and study administration. The administration has 65,7 FTE shared for the whole faculty (293,25 FTE).

In 2019, the department was reorganised into five academic groups (not to be confused with research groups): Cloud computing, cybersecurity and software engineering; Mathematical modelling; Artificial Intelligence; Human-computer interaction and universal design of ICT, and; Innovation, digital transformation and sustainability. Employees were allowed to choose their own group affiliation when the groups were established. The academic groups closely relate to the main research and teaching areas of the department, and to the established research groups (but are not identical in composition). The four research groups at the department are: Autonomous Systems and Networks (ASN); Applied Artificial Intelligence (AI); Mathematical modelling (MM), and; Universal Design of ICT (UD- ICT). The research and innovation activities at the department are mainly initiated by individual researchers and subgroups within the research groups. Each research group consists of a research group leader, staff members, post docs, PhDs, and master and bachelor students.

The overarching department strategy for research and innovation over the 10-year period from 2012 to 2022 has been to develop a culture of research that over time will place value in conducting and communicating scholarly research at an international level of quality expected from a university. This strategy has been partly driven by institutional strategies, but also by bottom-up initiatives. There has not been a tradition to have a written department-level research and innovation strategy, as these have been at the faculty and institution level. Specifically, the department has employed an informal strategy to "hire excellent people and give them freedom to commit to excellent teaching and research". Even so, the development of research groups, annual goals, and KPI measures have been important strategic drivers.

The department's focus has been on applied and practical research and education. The researchers in their AI-lab are bridging the gap between theory and applications in society, working directly on innovative solutions to major challenges like dementia, reproduction/IVF, and climate change. Their research areas also include mobile networks, cloud, and internet of things. The department also has expertise in human-computer interaction and assistive- and welfare technologies and develops ICT systems in collaboration with users to ensure

universal design. The department is engaged in increasing competence in universal design in the public and private sectors, which has a direct societal impact. Finally, the department engages in research on physics, pure mathematics and applied mathematics covering topics such as natural hazards and epidemiology.

The department has close ties with industry and the public sector in Oslo through the applied focus of their educational programs, and they organise an annual Relevance Seminar for staff, students and contacts from industry, the public sector, and other organisations. This keeps both their research and educational programs relevant to society and aids their mission to provide society with candidates that can influence societal development. Candidates educated from the department report having a high level of employability in relevant jobs after graduating.

Prior to 2019, the department had several bachelor level educational programs within IT, and one master level education in Universal Design of ICT, as well as one master level program in Network and System administration in collaboration with the University of Oslo (where the University of Oslo was the degree awarding institution). The extensive research and teaching experience among staff at the department has been instrumental when developing the PhD program in engineering science (2019), the ACIT (applied computer information technology) master program (2019) and the newly established engineer bachelor program in mathematical modelling and data science (2023) at OsloMet. Since 2021, the department has also been involved in creating a second PhD program at their faculty, "Innovation for sustainability", which is designed to contribute to sustainable development and welfare for all through human-centered and cultural research and innovation strategies. The first candidates started at this program in the Fall 2023.

The innovation experience of the department is still in an early phase, and the culture for innovation is being built up. However, there are already some results in the case of DOFIs and patenting, and awareness of innovation is increasing. This is both in terms of OsloMet's awareness of the importance of innovation, and of the policies of the department's financial resources (RCN, EU and others).

The future goals of the department are to cultivate the existing research and innovation activities and successfully compete for the top-level grants such as ERC, SFF, and similar. The department already has some promising results (both ERC and FRIPRO top-level grants) to build upon and is strategically working towards the large centre applications.

Overall Assessment

OsloMet gained national public university status in 2018, following its evolution from two University Colleges, and the Department of Computer Science was formed through mergers of applied sciences institutions. This probably explains why this Au still needs to perform actions to better organise its research strategy. The Department of Computer Science's research strategy is based on two principles: recruiting staff for excellence and offering freedom in selecting research topics. This approach is practical, aiming to address societal challenges and align with industry needs, with an emphasis on student-active learning and close ties to professional practice. One the one end it promotes creativity, innovation, and scientific progress by allowing researchers to explore diverse areas while ensuring teams consist of highly skilled individuals. On the other end, a more systematic procedure for identifying promising research areas, and focusing the activities of the different research groups on these directions, should be adopted for ensuring that the department's research efforts are effectively aligned with emerging trends and societal needs. Attention should be given not only to individual research excellence but also to creating a conducive environment for group-level synergy and productivity. The international visibility is still moderate and can be enhanced by searching for more international collaboration, by regularly participating in international conferences and events and by attracting highly qualified researchers and students. This can further elevate the department's academic standing and impact. As regard the resources available, these should be exploited more for the recently started PhD program to attracts high-level students, providing them with the necessary resources, and supports to obtain a lasting impact on the department's research productivity. Indeed, it is needed to increase the PhD positions with respect to permanent staff and this should be done with the goal of obtaining a larger uniformity among the research groups. The Department of Computer Science makes an effort to have a diverse, international staff and promotes an inclusive work environment.

According to the NIFU report, the Department of Computer Science has shown good publication numbers, with open access publications increasing although citations metrics need be increased to be competitive with other national AU. Due to the relatively small size of the research groups, the department's current impact is limited, with substantial potential for growth in several areas. These include attracting high-quality doctoral and post-doctoral students, directing research towards technologies with strong national and international industrial relevance, and expanding external collaborations to secure additional funding.

The Evaluation Committee recommends optimising the teaching resources to enable more consistent and attractive research activities

The Terms of Reference for the administrative unit is attached to the report.

Recommendations

The main recommendations from the Evaluation Committee to the OsloMet-Department of Computer Science are to:

1 **Identify Promising Research Areas Systematically:**
   - Define a structured approach to prioritising promising research areas.
   - Stimulate synergies among different research groups to enhance the overall impact and relevance of the in the academic community.
2 **Enhance the Organisational Environment and Increase International Visibility:**
   - Create Synergies Among Research Groups to enhance the visibility and engagement of their infrastructure.

- Structure an organisational environment that supports staff activities to obtain more impactful research outcomes.
- Implement specific actions aimed at raising the international profile of the department.

3 Organise Research for Underperforming Groups
- Implement initiatives aimed at developing attractive research topics and improving their overall performance and impact
- Promote further active partnerships and collaborations with new institutions worldwide.

4 Redistribute Funding Priorities:
- for supporting and strengthen the recently started PhD program, to attract highly qualified national and international students
- ensure a robust pipeline of researchers who can contribute to future advancements.

5 Strengthen External Collaborations:
- Increase efforts to collaborate with external researchers, especially in promising research fields.
- Address the limited industrial interest in existing research activities, by analysing industrial attraction of research activities and take proactive steps to enhance collaboration.
- Structure existing collaborations effectively: move beyond generic collaboration agreements by structuring partnerships to enhance the outcomes of collaborative efforts.

6 Stimulate International Collaboration:
- Activate initiatives, such as PhD student exchanges, visiting professors which can lead to enhanced synergies and increased social impact of research collaborations.
- Participate more in international conferences and EU networks for collaborations.

7 Enhancing Research Group Dynamics
- Ensure that all research groups can achieve adequate external visibility.
- Organise public engagement events to showcase the department research groups work and contributions.

These recommendations aim to support OsloMet-Department of Computer Science in enhancing its research capabilities, fostering collaborations, and aligning its structure to achieve long-term success.

1. Strategy, Resources, and Organisation of Research

The Department of Computer Science emphasises a flexible research strategy centered on recruiting excellent staff and allowing researchers to choose their topics. While this encourages creativity, it faces challenges due to a lack of formal metrics for assessing research impact and resource allocation. It uses also internal evaluations which offer useful feedback, but success criteria and quantitative measures need refinement. There's a disconnect between some research areas and industrial needs, highlighting few impact cases. To enhance relevance, the department should identify ways to reinforce the collaboration with national and international research entities and with national industries. Moreover, an imbalance between PhD candidates and permanent staff limits research capacity. The department should increase PhD enrollment through targeted recruitment and funding opportunities.

1.1 Research Strategy

The Department of Computer Science's research strategy is not governed by specific, rigid rules or protocols. Instead, it is built on two core principles: selecting staff based on excellence and providing a high degree of freedom in choosing research topics. This approach aims to foster creativity, innovation, and scientific advancement by allowing researchers the autonomy to explore diverse areas of interest while trying to ensure that the teams comprise individuals of exceptional skill and expertise. The department's research is structured into four primary groups: Autonomous Systems and Networks (ASN), Applied Artificial Intelligence (AI), Mathematical Modeling, Universal Design of Information and Communication Technologies (UD-ICT). Each group is led by a designated leader, with a modest annual budget allocation to support their activities. However, the tradition of providing stable funding for each group has recently been interrupted, which may affect the long-term continuity of some research initiatives.

At present, the department lacks formalised metrics or systems to systematically assess the impact or outcomes of its research activities to efficiently allocate funding and resources. This absence of evaluation tools makes it difficult to track progress against specific objectives or benchmark performance across different groups. Furthermore, the allocation of time for research and teaching is flexible and based on the ongoing needs of the department, such as the availability of active research projects or external funding opportunities. This approach on the one end allows for an active adaptation to emerging research needs and changing project dynamics, on the other end can lead to shortcomings in both sectors and should be governed, for example by including clear definitions of minimum and maximum tolerances relative to what was initially planned. The department also conducts internal evaluations of its research groups. These evaluations are generally considered fair and provide useful insights into the strengths and weaknesses of the research groups' activities. However, there is room for improvement in these evaluation processes, particularly in terms of refining the criteria for success, incorporating more quantitative measures, and establishing clearer benchmarks for long-term progress.

For some research areas, there appears to be a gap between the research conducted and the interests or needs of the society or of industrial partners, this is also reflected by the few numbers of impact cases provided. The AU should conduct a thorough analysis to identify the specific barriers or challenges that may be contributing to this limited engagement and carry out a communication campaign to the most closely related industries. In this way, the department can take targeted actions to bridge the gap and enhance the relevance and applicability of its research to the industrial sector. To strengthen the connection between academic research and industry, the department should take proactive steps to promote its various research groups to both local and international research sectors. sectors.

Currently, there appears to be an imbalance between the number of PhD candidates and the permanent academic staff, which could limit the department's ability to expand its research capacity and foster a strong academic community. The department should implement a strategy to increase the number of PhD by identifying funding opportunities, either through national grants, or private sector partnerships; additionally, a strategy to attract high-quality PhD candidates through targeted recruitment and outreach efforts should be developed.

Recommendations to the administrative unit:

The Evaluation Committee recommends identifying more systematically the promising research areas and focusing the activities of the different groups in those directions so that they can start having a clearer impact.

The Evaluation Committee recommends promoting its research groups to both local and international research sectors.

The Evaluation Committee recommends improving the organisational environment with the goal of improving the research quality of the different groups and the publication quality and quantity.

The Evaluation Committee suggests putting in place actions to increase the international visibility of the whole department and to ensure that each research group is attractive not only for national funding but also for international opportunities.

The Evaluation Committee recommends redistributing the available fundings, prioritising the recently started PhD program.

1.2 Organisation of Research

The AU has designed several roles to organise the research and academic activities, assigning official responsibilities. It has appointed research group leaders, thesis coordinators, international coordinators, and they are also supported by the administrative staff to help with the preparation of proposals. The overall activity is controlled by the head of department. Other coordinators are foreseen for the educational aspects. However, in the self-assessment report it is admitted that the structure of responsibility remains sometimes unclear and causes some inefficiencies. The department puts some effort into disseminating their research results and organises PhD seminars to encourage collaboration among students, possibly enabling joint research activities. The idea of transferring research knowledge inside academic courses is implemented.

Recommendations to the administrative unit:

The Evaluation Committee recognises and appreciates that a plurality of positive actions are put in place and recommends that the AU establish clear KPIs of the efforts to being able to check the effectiveness of the procedures adopted.

The Evaluation Committee recommends a greater effort in organising research for those groups that are performing less well both in terms of national and international visibility and in terms of the ability to develop research topics that are attractive to organisations outside OsloMet.

The Evaluation Committee recommend strengthening collaboration with external researchers to and to focus on the most promising research fields results

1.3 Research Funding

The self-assessment report states that the level of funding dedicated to research has increased significantly in the reporting period, but it mainly comes from government fundings. External funding comes from the EU and is about 30% of the public funding. It is noteworthy among the latter that ERC starting grant has been acquired. Notably, the department leads the Nordic Centre for Sustainable and Trustworthy Artificial Intelligence Research (NordSTAR) and is a core partner in the Centre for Intelligent Musculoskeletal Health (CIM). Additionally, the department is a key player in the OsloMet Quantum Hub, a collaborative effort aimed at advancing research in quantum technologies. Weak aspects that should be improved are the limited number of collaboration contracts with national industries that may increase in the next future due to facilities that the department can count on. Furthermore, attention should be given to the overall number of research groups within

the department, as the self-assessment indicates that only a small subset of these groups actively engages in fostering external partnerships and collaborations with industry.

Recommendations to the administrative unit:

The Evaluation Committee recommends analysing the reasons why the developed research activities have limited attraction from industrial research. The recommendation is to increase external collaboration.

The Evaluation Committee recommends activities to promote the various areas externally to increase the attractiveness of the groups towards the R&D sectors of local and non-local industries.

1.4 Research Infrastructures

The administrative unit is not involved in any international infrastructures, though it does participate in the eX3 and Sigma2 belonging to the E-infrastructure areas where the Department has adopted HPC facilities, which is good considering the topics they intend to address in future, such as AI and Quantum computing. The department is active in implementing the FAIR principles and has set up a policy for research data management, currently implemented by maintaining an open digital archive for scientific publications, which is good for both internal dissemination of research activities and for enhancing the impact to the society and at the international level. It is also active in maintaining a procedure to ensure that research outputs, including data, are managed. There is limited evidence of the Department capacity in attracting external fundings and in encouraging external collaborations. Indeed, it is suggested to convert general agreement for activities in more specific themes with clear timelines. On the contrary putting more effort into these activities will increase the Au attractivity from both industries and new young professionals such as PhD students. The research subjects have a lot of potentialities to be of interest for local and non-local industries.

Recommendations to administrative unit:

The Evaluation Committee recommends that the department implement a clear strategy to promote better the applied research findings of its research groups and for this should engage them in a more constructive way to show the effective capabilities of their infrastructures.

The Evaluation Committee recommends that the groups create more synergies to make the exploitation of their infrastructure more visible and engaging.

The Evaluation Committee recommends that the groups put efforts into analysing which research or industrial entities could be involved for further exploiting their achievements.

When it comes to coordination for HPC infrastructure, the Evaluation Committee recommends deciding if a local or shared infrastructure is the best choice.

1.5 National and international collaboration

The computer science department, in their self-assessment report, has presented 10 national and 5 international collaborations of various sorts based on either a project development or an agreement involving both research and education activities. Most of the institutions with which they collaborate are of Academic nature. Some of them are institutions located in close proximity, which allows for an almost seamless integration of staff in the two institutions. There are relatively few international collaborations within the organisation, and most of these collaborations stem primarily from participation in consortiums formed under

the framework of funded projects. In these cases, the collaborations are often driven by the specific requirements and objectives of the funding agreements, rather than by long-term, strategic international partnerships. As a result, it is difficult to clearly identify or measure the tangible outcomes or impacts of these international collaborations. The lack of distinct, measurable goals outside of the project-specific context makes it challenging to evaluate the broader, long-term benefits that might arise from such partnerships. With respect to national collaborations, the research group which works on AI has been able to participate and interact with the main national institutions on AI. Currently, the outcomes of the collaborations are mainly related to research products.

Recommendations to the administrative unit:

The Evaluation Committee recommends that the Administrative Unit increases the impact of national and international collaborations by participating more in international events such as conferences and EU networking.

The Evaluation Committee recommends structuring collaborations more effectively than a generic collaboration agreement, by fixing precise outcome to be developed and the relative timeframes.

The Evaluation Committee recommends that international collaboration be stimulated, including promoting exchanges of PhD students between institutions to strengthen the synergies and social impact of collaborations.

The Evaluation Committee recommends making efforts to ensure that all research groups can acquire adequate external visibility.

1.6 Research staff

As of December 2022, the Department of Computer Science has 74.75 man-years across 91 employees, broken down as follows: Administration (department head + academic group heads): 3.7 man-years Engineers: 2 man-years Teaching and research staff: 69.05 man-years with the following balance: Assistant Professors: 14.55 man-years, Associate Professors: 23.2 man-years, Professors and Docents: 12.7 man-year, Ph.D. Candidates: 17 man-year, Researchers: 1 man-year. Regarding gender distribution, 69.6% of employees are male, and 30.4% are female. The Unit presents a good balance for the different roles of the staff except for the PhD program where the candidates is still very limited compared to an optimum potential, especially for some research groups that struggle to attract this type of employment. The Department of Computer science shows that it pays attention to creating a gender balance, which is still below the threshold but better than other similar realities, also at an international level. The AU provides seed funding for young researchers, which is good and should be continued strengthened. This is not uniformly true with respect to the different research groups. The activities are strongly unbalanced towards teaching. The involvement of young people, such as PhD students, is quite limited. Supporting research careers at the department is through the leader group, which actively tries to support young staff members with advice on building their CVs, involving them in strategic opportunities, and connecting them with the institution.

The department of computer science has also had an informal mentoring programme for new staff, in which a more senior staff member has been allocated some hours to help some of the new staff member with both practical and career advice. The mentoring program effectiveness. could improve if it was carried out in a more systematic way.

The Evaluation Committee recommends that the department should develop a strategy to increase the PhD positions with respect to permanent staff and should work to obtain a larger uniformity among the research groups.

The Evaluation Committee recommends optimising the teaching resources to enable more consistent and attractive research activities.

1.7 Open Science

OsloMet's institutional approach to Open Science shows a clear commitment to open access, research data management, and the FAIR principles. The ongoing project to map research infrastructure to meet the Findable, Accessible, Interoperable, and Reusable (FAIR) principles reflects a forward-thinking approach that will further enhance the accessibility and usability of research data. Furthermore, the department is in the process of developing a comprehensive policy for research data management, with a dedicated project currently underway to establish and implement best practices in this area, in compliance with both institutional policies and Open Science principles. Its successful implementation will be crucial in ensuring that these practices are consistently applied across all research projects and actions for monitoring the impact on all the research groups should be put in place. However, the entire procedure is not fully finalised yet and the mandate for making research available in the Open data base is a strong policy for maintaining the integrity and comprehensiveness of the university's open access efforts, that need be systematically monitored.

Overall, OsloMet's Open Science policies are well-structured and align with global best practices. The department activity in promoting open access and research data management is commendable, and it has the potential to enhance the visibility and impact of its research outputs on a national and international scale.

Recommendations to the administrative unit

The Evaluation Committee recommends disclosing both internally and externally the methods of usage of the proposed database and its compliance with the FAIR principles.

2. Research production, quality and integrity

The Administrative Unit follows the OsloMet's ethical frameworks and policies. Its Ethical Board addresses research misconduct ensures compliance with ethical standards and promotes responsible research practices. The department emphasises ethical supervision through guidelines and training courses for supervisors. Procedures are in place for addressing research misconduct.

The research areas of the Department of Computer Science are

- **Applied Artificial Intelligence**: Focuses on real-world applications of AI, including machine learning, robotics, and bio-inspired computation.

- **Autonomous Systems and Networks**: Explores IoT, cloud infrastructures, machine learning, and cybersecurity, with a strong industry background.

- **Mathematical Modelling**: Conducts research in mathematics, quantum computing, physics, and statistics, contributing to fields like medicine and biology.

- **Universal Design of ICT**: Focuses on designing ICT systems for diverse users, including those with disabilities and seniors.

Considering the available numbers in the NIFU report, OsloMet Department of Computer science has a good publication number as reported in Figure 1.1, but the trend has been slowing down in the last few years. Most of the publications are in informatics with very few in multidisciplinary technologies. The publication venues include organisations such as IEEE and ACM, but the majority are for secondary venues. Open access (green and gold) publications have been steadily increasing, but there are still many publications not fulfilling open access requirements. Citation parameters are fair compared to other national administrative units, but internationally, they need to be improved. Given the department's consistent number of research staff and the timely, high-impact themes being explored, the potential for improving the quality of its publications is considerable. The department is engaged in research areas that are highly relevant both to the academic community and to industries that are currently undergoing rapid transformation, particularly in fields such as artificial intelligence, machine learning, and data science.

The interdisciplinary nature of some of the department's projects, coupled with international collaborations, will likely result in high-quality publications in peer-reviewed journals.

2.1 Research quality and integrity

Research group Mathematical modelling research group (MatMod) overall assessment

The group comprises 13 members, incl 1 PhD student, hence it is relatively small. Furthermore, the group established relatively recently in 2015. Hence their time to develop and perform remains limited. Overall, the research contributions are limited but clearly increasing in quantity and quality and the 4 full professors are making a name for themselves. There is a strong focus in the group challenges related to quantum problems but given the size of the group, the research activities appear uncoordinated and dispersed. While there appear to be substantial external collaborations, the extent of these remains unclear from the self-evaluation. Collaborations within the groups appear limited. The majority of the effort of the group since its creation has focused on educational programs through the development of a master program and support for master projects. The host organisation offers some reasonable support for the group through support for financial matters, general administrative tasks and reward support, as well as general legal and security advice. External funding of the group has until recently been very limited but with more success during the last few years. All external funding is from RCN with the exception of a minor grant from EU in '22.Goals for future activities focuses on educational activities. The gender balance of the group is problematic with only 1 female researcher in a group of 13.

Research group Autonomous Systems and Networks (ASN) overall assessment

The ASN group has an adequate composition and level of infrastructure to conduct high quality research. Some group members are involved in other groups and with the private sector. This could be a strength, but it has not yet been demonstrated. The amount of PhD students is low considering the number of senior team members. Funding from national and international sources is good, but the resulting research results, such as the quality of publications and impact, are modest. Contribution to teaching at all levels is very good. Societal and knowledge transfer activities are limited.

Research group Universal Design of Information and Communication Technologies (UD-ICT) overall assessment

The group is aiming to establish a higher rate of quality publications as well as increase RCN funding. There are efforts to increase collaboration with other departments and faculties. The

UD-ICT collaborates and uses facilities of the Interaction laboratory equipped with multiple touch tables, eye-tracking devices, assorted sensors, Augmented and Virtual Reality equipment, 3D printer, and tools and devices for simulating disabilities and aging. This lab is a shared resource across multiple research groups, which may hinder the group's potential for growth. The UD-ICT group publishes in venues that are relevant to UD as well as for the application domains of their projects, though some with limited research visibility. They serve as reviewers at well-known international conferences in HCI. The number of PhD fellows is low. The potential for societal impact of UD-ICT is quite significant. The group actively engages with a multitude of activities centred around disseminating as well as training diverse public and private organisations for the value of UD. Examples include podcasts, raising awareness among academic and administrative staff, organised seminars for teachers as well as group members developing software tools for accessibility and assistive technology. It is very positive that the educational resources produced are open. The group's focus on UD in ICT is important. The UD-ICT group has the potential to strengthen the international dimension of their societal activities but also balance its time towards strengthening research activities overall. Collaboration with UD interest groups is encouraged, nationally and internationally, to maximise impact.

Research group Applied AI research group (AI2) overall assessment

Overall, AI2 is a good size (23 people) and has healthy funding condition that is spread across national and international grants. However, for the number of faculty members, the Expert Panel considers the number of the corresponding PhD students rather low. The research group seems to have a good management structure and culture that allows the open discussion of new ideas and directions. The research group has a good publication track record; however, this is not in the top journals in the field and the group should increase the overall publication impact. The group has invested in research infrastructure, but it seems that the current capacity is rather limited for the size of the group (1 user per time). The societal contributions (newspapers, pop science, training events) are considered very good. Finally, the research group has good internationalisation activities, with many members of the group acting in international committees and a rather limited industrial collaboration that could significantly increase. The research group has not specified clear benchmarks in its self-assessment report with regards to research, education, funding and publications for the evaluation of its activities.

3. Diversity and equality

The Department of Computer Science at OsloMet is home to staff members from all over the world, creating a highly international community. The department fosters an inclusive work environment that generally supports diversity. While OsloMet as a whole boasts the highest proportion of female professors, the department, like the broader STEM science fields, remains underrepresented in terms of female staff).

Discrimination, whether among staff or towards students, is not tolerated at OsloMet. The university has established standard procedures for reporting and addressing such incidents.

OsloMet has a dedicated role focused on diversity initiatives, with the Programme Director for Culture and Diversity serving as chair of the university's diversity committee. This interdisciplinary committee is engaged in providing guidance to senior management on diversity-related matters, offering consultation on issues of diversity and equality and co-managing the implementation of the university's diversity action plan

4. Relevance to institutional and sectorial purposes

OsloMet, gained the university status in 2018 only and is still building its innovation efforts which are not yet the first priority of OsloMet TDK but there are already some evidence of patenting although the academic staff is more involved in other commitments.

Initially TDK offered several bachelor's programs in IT, and masters in Universal Design of ICT, and in Network and System Administration in collaboration with the University of Oslo. But in the PhD program in engineering science (2019), ACIT master program (2019), and the new bachelor's program in Mathematical Modelling and Data Science (2023) were developed. Faculty members played a key role in shaping the ACIT program, contributing to 6 of its 8 specialisation tracks. The department's high-quality research is central to the PhD program, with most PhD candidates active in the department and projects. The establishment of the AI lab, Quantum Hub, and NordSTAR Centre of Excellence has created a supportive and inspiring environment for candidates. These initiatives foster significant collaborations within OsloMet and with other institutions

5. Relevance to society

The Department of Computer Science is dedicated to activities that have the potential to be among the strategic ones in Norway (and outside) such as research, teaching, and innovation across technology, natural sciences, and digitalisation. At the moment, probably due to the limited size of the groups, the impact is limited and has a lot of margin to be enhanced in many directions such as: attracting valid doctoral or post-doc students, focusing the technologies developed in specific areas of national and international industrial interest, increasing external collaborations to attract also external fundings.

Two impact cases have been presented that are both interesting and well described, providing a solid overview of the research outcomes and their potential relevance to broader societal or industrial contexts. However, there remains some ambiguity regarding the actual, tangible impacts these cases have had to date. While the cases outline the theoretical or expected contributions of the research, it is not entirely clear how these contributions have translated into measurable, real-world effects.

5.1 Impact cases

Comments to impact case 1: Artificial intelligence - a novel tool in assisted reproduction technology

This case study concerns a project for improving the chance of pregnancy by using AI to improve the methods for selecting sperms and Embryos and has been funded by RCN. In the long term this method promises to reduce the number of trials and the costs of the entire procedure. The methodology is based on deep learning models for better selecting the embryos stages and the sperm motility.

The research project has a high level of interdisciplinarity involving different research structures such as the Department of Life Sciences and Health, OsloMet, and the Department of Computer Science at OsloMet, Simula Metropolitan Centre for Digital Engineering - SimulaMET, and the fertility clinic Volvat Spiren and Fertilitetssenteret (Mette Stenersen). OsloMet deeply involved a PhD candidate.

This case study has produced a database (VISEM) to be further used by other clinics and the related publication id very well cited. Indeed 6 papers have been published mainly in the

medical area, The research group states that the dataset contains more samples and far more attributes per participant than any sperm dataset openly available today.

This case study is a very relevant demonstration of multidisciplinary use of current computer science trends in the field of machine learning.

Comments to impact case 2: Quantum Computing

This case study is developed in one of the most challenging research areas still explored by a limited number of researchers. Even though Quantum Computing Technology is not yet mature, and many technological obstacles are still unsurpassed, its potential is truly enormous. The research group with this project has become a reference in Norway and has been able to bring two quantum computers during an event in Norway. The group has already allowed some students to experiment with an application in the field of transportation. Activity in Quantum Computer has been proposed annually to groups of students for about five years.

The project involves OsloMet in collaboration with National entities, such as Simula, Sigma2, and SINTEF. Furthermore, the material is available on online sources to enhance the impact.

This case study, which still presents very high risks of failure, highlights that the group knows how to get involved in facing difficult challenges that could make it a point of reference in this very relevant field. However, the evidence of the results achieved is limited.

Methods and limitations

Methods

The evaluation is based on documentary evidence and online interviews with the representatives of the Administrative Unit.

The documentary inputs to the evaluation were:

- Evaluation Protocol that guided the process
- Terms of Reference
- Administrative Unit's self-assessment report
- Administrative Unit's impact cases
- Administrative Unit's research groups evaluation reports
- Bibliometric data
- Personnel and funding data
- Data from Norwegian student and teacher surveys (only for HEIs)

After the documentary review, the Committee held a meeting and discussed an initial assessment against the assessment criteria and defined questions for the interview with the Administrative Unit. The Committee shared the interview questions with the Administrative Unit two weeks before the interview.

Following the documentary review, the Committee interviewed the Administrative Unit in an hour-long virtual meeting to fact-check the Committee's understanding and refine perceptions. The Administrative Unit presented answers to the Committee's questions and addressed other follow-up questions.

After the online interview, the Committee attended the final meeting to review the initial assessment in light of the interview and make any final adjustments.

A one-page summary of the Administrative Unit was developed based on the information from the self-assessment, the research groups' evaluation reports, and the interview. The Administrative Unit had the opportunity to fact-check this summary. The Administrative Unit approved the summary with minor adjustments.

Limitations

The Committee judged that the Administrative Unit self-assessment report was insufficient to assess all evaluation criteria fully. However, the interview with the Administrative Unit filled in gaps in the Committee's understanding, and the information was sufficient to complete the evaluation.

List of administrative unit's research groups

Institution	Administrative Unit	Research Groups
Oslo Metropolitan University (OsloMet)	Department of Computer Science	Mathematical modelling research group (MatMod)
		Applied AI research group (AI2)
		Autonomous Systems and Networks (ASN)
		Universal Design of Information and Communication Technologies (UD-ICT)

Terms of Reference (ToR) for the administrative unit

The board of Faculty of Technology, Art and Design (TKD), Oslo Metropolitan University (OsloMet) mandates the evaluation committee appointed by the Research Council of Norway (RCN) to assess the Department of Computer Science (ICT) at the Faculty of Technology, Art and Design based on the following Terms of Reference.

Assessment

You are asked to assess the organisation, quality and diversity of research conducted by the Department of Computer Science as well as its relevance to institutional and sectoral purposes, and to society at large. You should do so by judging the unit's performance based on the following five assessment criteria (a. to e.). Be sure to take current international trends and developments in science and society into account in your analysis.

   a) Strategy, resources and organisation
   b) Research production, quality and integrity
   c) Diversity and equality
   d) Relevance to institutional and sectoral purposes
   e) Relevance to society

For a description of these criteria, see Chapter two of the mathematics, ICT and technology evaluation protocol. Please provide a written assessment for each of the five criteria. Please also provide recommendations for improvement. We ask you to pay special attention to the aspects in the next section in your assessment.

Concerning the establishment of OsloMet as a University.

OsloMet – Oslo Metropolitan University was established with status as a national public University on 1. January 2018. Prior to the University status, the institution was the largest University College in Norway, known as Oslo and Akershus University College. Oslo and Akershus University College was again a result of previous mergers of educational institutions of applied sciences over several decades.

The Faculty of Technology, Art and Design (TKD) was established in 2011, when Oslo University College and Akershus University College were merged. The faculty consist of artistic research, applied art, art in education and design, in addition to the engineering and technology departments (Department of mechanical-, electronic- and chemical engineering, Department of information technology and Department of built environment).

The recent establishment of OsloMet as a University and its context is relevant for assessing the conditions as research performing organization. The development, based on its history, is with an emphasis on developing applied education for professional occupations. The research focuses on the professions that are part of the faculty study program portfolio. In addition to research on working life and professions in general. Our research has a practical approach to meet the needs of society and employers, and our research ambitions are to have a close relation with professional practice and up-to-date, student-active forms of learning. Ideally our research will be relevant and capable of solving future societal challenges, and our graduates will be educated with relevant expertise in their respective fields.

In this context we ask you to pay a particular attention to the following aspects:

   1. Are the financial instruments in Norway adequate for us as a professional university of applied sciences?

2. Is our research at our departments suitable to support a research-based Ph.d. program in engineering science?
3. Is our research-collaboration with the society relevant, or are there other types of actors that we should seek to increase collaboration with?
4. What part of our research activity can be perceived as interdisciplinary, and how can we make better use of interdisciplinary possibilities?
5. Is our research sufficiently integrated in our education portfolio, and vice versa? Are we able to increase the quality of our research from our educational practice, and are we able to increase our educational practice from our research?
6. Does the structure and composition of our research activities (i.e., research groups) support our research activities, and what are the opportunities for improvement with regards to the structure and organization of the research groups?

In addition, we would like your report to provide a qualitative assessment of the Department of Computer Science as a whole in relation to its strategic targets. The committee assesses the strategy that the administrative unit intends to pursue in the years ahead and the extent to which it will be capable of meeting its targets for research and society during this period based on available resources and competence. The committee is also invited to make recommendations concerning these two subjects.

Documentation

The necessary documentation will be made available by the mathematics, ICT and technology secretariat at Technopolis Group.

The documents will include the following:

- a report on research personnel and publications within mathematics, ICT and technology commissioned by RCN
- a self-assessment based on a template provided by the mathematics, ICT and technology secretariat
- OsloMet strategy 2017-2020
- OsloMet Strategy 2020-2024
- R&DI strategy at TKD 2020-2024

Interviews with representatives from the evaluated units

Interviews with the Department of Computer Science will be organised by the evaluation secretariat. Such interviews can be organised as a site visit, in another specified location in Norway or as a video conference.

Statement on impartiality and confidence

The assessment should be carried out in accordance with the Regulations on Impartiality and Confidence in the Research Council of Norway. A statement on the impartiality of the committee members has been recorded by the RCN as a part of the appointment process. The impartiality and confidence of committee and panel members should be confirmed when evaluation data from the Department of Computer Science are made available to the committee and the panels, and before any assessments are made based on these data. The RCN should be notified if questions concerning impartiality and confidence are raised by committee members during the evaluation process.

Assessment report

We ask you to report your findings in an assessment report drawn up in accordance with a format specified by the mathematics, ICT and technology secretariat. The committee may suggest adjustments to this format at its first meeting. A draft report should be sent to the Department of Computer Science and RCN]. The Department of Computer Science should be allowed to check the report for factual inaccuracies; if such inaccuracies are found, they should be reported to the mathematics, ICT and technology secretariat within the deadline given by the secretariat. After the committee has made the amendments judged necessary, a corrected version of the assessment report should be sent to the board of Faculty of Technology, Art and Design (TKD) and the RCN no later than two weeks after all feedback on inaccuracies has been received from the Department of Computer Science.

Appendices

1.   Description of the evaluation of EVALMIT
2.   Invitation letter to the administrative unit including address list
3.   Evaluation protocol
4.   Template of self-assessment for administrative unit (short-version)