

# OPERATIONAL PLAN 2023-2025



UMEÅ UNIVERSITY  
FACULTY OF SCIENCE & TECHNOLOGY

Operational Plan 2023-2025  
Faculty of Science and Technology, Umeå University  
Dnr FS 1.3.1-1823-22  
Established 2022-09-28

# Nationally leading and internationally respected

**The Faculty of Science and Technology has around 3,200 full-time students and almost 1,000 staff, of whom around 240 are doctoral students, working in our eleven departments, centres and work units. Our staff and students are the Faculty's strongest assets, whose expertise and ambition give us the confidence and hope to address today's and tomorrow's societal challenges.**

**THE BREADTH OF OUR FACULTY** is our strength and we aim to provide the highest quality education, research, support and collaboration. Recruitment of qualified staff and students is essential for us to stand up well in national and international competition. A key to recruitment is that we can offer an attractive working and learning environment with good opportunities for long-term personal and professional development.

The Faculty has identified a number of challenges and over the next three years we will build on our strengths to continue to develop in a positive direction.

The Faculty's Operational Plan 2020-2022, the Vision for Umeå University, the State's values, the United Nations (UN) Agenda 2030 with the 17 Sustainable Development Goals and our quality systems form the basis for our work.

## Departments

- Applied Physics and Electronics
- Chemistry
- Computing Science
- Ecology and Environmental Sciences
- Mathematics and Mathematical Statistics
- Molecular Biology
- Physics
- Plant Physiology
- Science and Mathematics Education
- Umeå Institute of Design
- Umeå School of Architecture

## Centres/Work units

- Centre for Biomedical Engineering and Physics - CMTF
- Centre for sustainable cement and quicklime production - CHECK
- Climate Impacts Research Centre - CIRC
- European CBRNE centre
- High Performance Computing Centre North - HPC2N
- Industrial Doctoral School for Research and Innovation
- Umeå Marine Research Centre - UMF
- Umeå Mathematics Education Research Centre - UFM
- Umeå Plant Science Centre- UPSC



# 1. A FACULTY WHICH ATTRACTS AND EVOLVES

**Faculty staff and students are our most important resource.**

**THE FACULTY'S MOST IMPORTANT RESOURCE** is our employees. Good health and well-being are fundamental factors in our employees' ability to provide the highest quality education and research, and to provide effective technical and administrative support. We strive to be an effective organisation where professional and committed staff and managers are given the opportunity to develop in their work.

We conduct systematic work environment management where we strive to ensure that all employees and students enjoy their daily lives and appreciate their working and studying conditions. Our workplace and learning culture should be inclusive and free from harassment, sexual harassment and discriminatory treatment. For us, equal opportunities and gender equality are a matter of course and critical factors for our competitiveness and credibility nationally and internationally. We therefore strive for gender balance in all employment categories and management positions as well as within the student groups of our educational programmes.

The future of the Faculty is determined to a large extent by the employees we have and succeed in hiring in the future. We must therefore have an efficient and fair recruitment process that attracts well-qualified national and international applicants. In order to make the most of the skills of new employees, we work actively with the introduction of new employees and the development of skills through, for example, training in Swedish, mentoring programmes and targeted efforts towards different employment categories. Skilled employees are one of the keys to attracting students to our programmes.

Our resource allocation systems should be transparent. Our activities depend on grants and contributions from government and private funders, and we have a strong responsibility to use these resources efficiently and responsibly to pursue education and research of the highest quality.

Sustainable development is one of the greatest and most important challenges of our time. As a university, we have a special obligation to lead the transformation of society, and sustainable development must permeate our personal actions as well as our education and research.



## **GOAL 1.1**

**The Faculty has a good working and learning environment and is characterised by professionalism, quality, equality and equal opportunities.**

The Faculty will work to ensure that all staff and students thrive on campus. During the three-year period 2023-2025, we will therefore work actively and collectively on equal opportunities and work environment issues to promote a good working and learning culture. We will provide our managers and employees with training and opportunities for development in order to maintain a good working environment and a professional organisation.

### **1.1 Priority areas**

1. An inclusive and equal work and learning culture.
2. Skills development for all employees.
3. Gender balance among staff and students.
4. Responsible and efficient use of financial resources.

### **1.1 Indicators**

1. Outcome of employee surveys.
2. Outcome of surveys carried out under the education quality system.
3. Number and proportion of staff given opportunities for professional development.
4. Participation of teachers in pedagogical professional development.
5. Gender balance of staff and students.
6. Gender distribution of persons in management positions at the faculty.
7. Annual financial outturn and agency capital.

## **GOAL 1.2**

**The Faculty has qualified applicants for its positions and our recruitments have a balanced gender distribution.**

To further improve the recruitment of qualified staff, the Faculty will advertise positions that attract a large number of qualified applicants with high skills, and have active recruitment processes that attract top-ranked candidates to accept the positions.

Skilled teachers and technical and administrative staff are crucial to the competitiveness and success of the Faculty. We will continue the special investment in associate professors to renew and strengthen teaching and research.

The proportion of women among new professors is still below the University's target and has also decreased slightly in recent years. We need to address this imbalance through various activities. The Faculty should offer attractive positions with good development opportunities. To ensure that we recruit highly qualified staff with the right skills, we will work to broaden the recruitment pool, with more applicants from under-represented groups.

## 1.2 Priority areas

1. Jobs that are attractive to the target group.
2. A recruitment process that promotes strategic skills supply.

## 1.2 Indicators

1. Number of applicants per advertised permanent post.
2. Gender balance of applicants and interviewees for our teaching posts.
3. Gender balance of newly recruited staff.
4. Time between the closing date for applications for an advertised post and the signing of the contract for a teaching post.
5. Percentage of interrupted recruitment processes.

## GOAL 1.3

### **Sustainable development is reflected in all the Faculty's activities.**

Education and research are the Faculty's most important contribution to the sustainable transformation of our society. The sustainability perspective is a central component of our education (see Chapter 2). Our research is conducted in a number of subject areas and in many cases has a direct bearing on the development towards a more sustainable society; for example, research in digitalisation, artificial intelligence (AI), energy supply and resource use (see chapter 3). Furthermore, it is of utmost importance that the University conducts its activities in such a way that we can carry out our mission with responsible resource use with the aim of reducing our climate footprint, for example, through the way we choose products and services. Umeå University is one of 26 higher education institutions that have signed the Climate Framework, where we commit to reducing our emissions by 2045 in accordance with the Paris Agreement.

An environmental impact analysis of Umeå University shows that the two largest climate emissions within the university are generated by business travel and facilities, which in 2019 accounted for 27 percent and 23 percent of total emissions, respectively. In addition to these areas, we are working to increase the inclusion of sustainability aspects in education and research, which will be discussed in the next chapter.

## 1.3 Priority areas

1. Changing the culture of travel and meetings to promote sustainability.
2. Responsible and efficient use of facilities.

## 1.3 Indicators

1. CO2 emissions from business travel/full-time employee.
2. Utilisation rate of premises.





## 2. EDUCATION

**The Faculty educates critically thinking students who, with knowledge and skills of the highest quality, solve future societal challenges.**

**STUDENTS ENTERING UNIVERSITY TODAY** will be active and professional citizens for many decades to come. They need the tools to tackle our future societal challenges, not least the social, economic and environmental ones, as they relate to sustainable development and the UN's Agenda 2030 of the 17 Sustainable Development Goals. In addition to obvious subject knowledge of the highest quality, our students need to develop skills to improve our society and shape our future. Examples of these basic generic skills are critical thinking, problem solving, communication, collaboration, creativity, innovation and digital literacy. Students also need opportunities to reflect on their own learning through student-centred teaching.

Umeå University's quality system for education is the basis for the Faculty's systematic approach to ensuring the quality of education. The quality system is based on nine activities (see Figure 1) and six general perspectives (research linkage, internationalisation, gender equality, collaboration and work-life linkage, sustainable development, and student engagement and student-centred learning). A prerequisite for high-quality education is pedagogically skilled teachers with solid subject knowledge to support student learning. Teachers need to be empowered to drive the development of courses to adapt them to a changing world. It is important to harness and further develop the lessons learnt about digital tools and their pedagogy for education in the wake of the pandemic. As part of its quality assurance efforts, the Faculty will continue to support the professional development of our teachers and their opportunities to develop courses and programmes.



Figure 1. The nine activities in Umeå University's quality system.

Learning environments, which consist of physical premises but also take the form of dynamic meeting places for students and teachers where learning takes place, are important infrastructures in education, which we want to safeguard and develop. In order for our students to make the most of their education, it is important that they are active in their learning through a high level of ambition and strong commitment.

The application pressure for some of the faculty's programmes is currently not satisfactory. The Faculty will therefore continue to work to attract more applicants with interest, ambition and sufficient qualifications to our programmes. We therefore need to work on marketing activities nationally and internationally. We want to reach new student groups through broader recruitment that attracts people who, despite good prospects, have not previously applied to our programmes. In this respect, the foundation-year programme, a qualifying programme at pre-university level, is one of several important sources of recruitment to our programmes.

Many students at Swedish higher education institutions, including Umeå University, leave their studies before graduation. It is problematic to lose students who, with additional support, could complete their studies and obtain a degree. The Faculty therefore wishes to continue developing various support measures to reduce dropouts and increase throughput.

The demand from the labour market for the students we educate is high, both locally, regionally, nationally and internationally. One example is the enormous industrial investments now being made in northern Sweden linked to the green transition, with a great need for skills supply. The vision for Umeå University states: 'By combining our own and the region's strengths, challenges and needs, we continue to develop northern Sweden as a knowledge region'. We therefore need to collaborate with external actors to ensure that our programmes are relevant, both for students and future employers.

Lifelong learning, where professionals continually return to the university for further education, is becoming increasingly central. The government's commitment to lifelong learning and the clarification in the Higher Education Act clearly indicate that universities and higher education institutions are responsible for this lifelong learning. The Faculty's work to enable and make visible education for professionals will therefore increase.

## **GOAL 2.1**

### **The Faculty's programmes are attractive to students and teachers.**

To be attractive, programmes need to be up-to-date, relevant and adding value, and to be conducted in an environment that clearly links education with research and external stakeholders.

We want faculty members to take pride in working in both education and research, which contributes to an inspiring and attractive learning environment for our students. Through broader recruitment and participation, we attract, among others, those who have not previously applied to the Faculty's programmes.

It is important that the Faculty offers relevant and flexible programmes that meet the needs of a changing working life and enable lifelong learning. In light of the global challenges we face, it is also important to increase the sustainable development elements of our programmes and strengthen internationalisation.

## 2.1 Priority areas

1. Recruitment and marketing of our programmes.
2. Strengthened internationalisation.
3. Strengthening the sustainable development component of our education.
4. Lifelong learning to meet the needs of society.
5. Strengthened collaboration with external partners.

## 2.1 Indicators

1. Information on student recruitment from our administrative systems.
2. Internationalisation indicators such as numbers of incoming and outgoing students and teachers, and active exchange agreements.
3. Reporting on sustainability and cooperation perspectives in programme activity reports.
4. Number of lifelong learning courses.

## GOAL 2.2

### We provide education of the highest quality.

Umeå University's quality system for education is the hub of the Faculty's quality work. The quality system's nine activities and six general perspectives, as well as the competence of the teachers, form the basis for systematically monitoring and improving the Faculty's education both in terms of content and implementation.

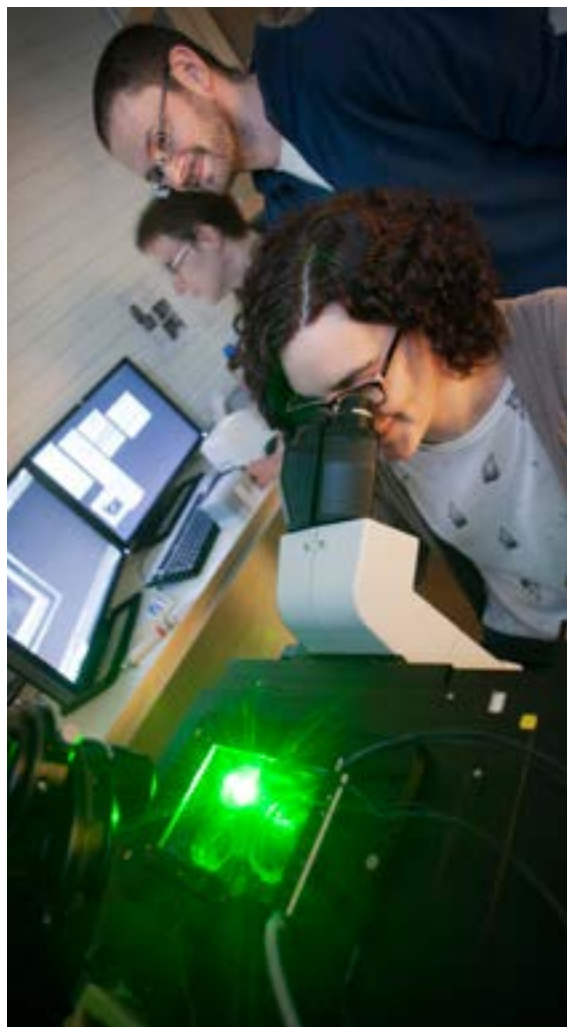
Digital tools and digitalisation, if used correctly, contribute to improved quality. In order to increase the student-completion rate of our programmes, we will work with relevant student support, student-centred learning and student involvement, such as course evaluations.

## 2.2 Priority areas

1. Attractive learning environments using relevant digital tools to improve quality.
2. Increased course and programme student-completion rates.
3. Student-centred learning and student influence.

## 2.2 Indicators

1. Course and programme pass rates.
2. Proportion of students graduating.
3. Percentage of students experiencing good mental health according to quality system student surveys.
4. Well-functioning student representation in programme councils, departmental education bodies, the Education Committee and working groups set up by the faculty to include students.



## 3. RESEARCH

**The Faculty provides the conditions for innovative, ground-breaking and world-leading research.**

UMEÅ UNIVERSITY'S VISION är is that we have a strong position in Sweden and in the world where our cutting-edge research makes us world leaders in several fields of science and generates results that benefit society through innovations and applications. Analyses of our current activities show that although much of our research is of high quality, we are not fully living up to the vision. We will therefore actively work to strengthen our competitiveness through strategic decisions. We also have a particular responsibility to conduct research in a wide range of subject areas to meet society's challenges and to ensure that our education programmes have a good link to research. These perspectives are central to our strategic decisions. Resources are allocated according to transparent processes based on excellence. These processes also take into account other important perspectives. These include, for example, our contribution to the transition to a sustainable society, synergies between education and research, and the potential for increased collaboration across disciplines and harnessing the breadth of the University.

The quality of research is assessed according to quality standards that are developed and maintained collegially within the international scientific community. The number of papers published, the channels through which papers are published and the impact of the research are important indicators of research quality. Faculty teaching staff (assistant professors, associate professors and professors) should publish mainly in reputable outlets and also publish in the most prestigious journals. The so-called Norwegian list (The Norwegian Register for Scientific Journals, Series and Publishers) is a database that categorises scientific publishing channels into levels 0, 1 or 2. Scientific publications from our faculty should normally be in journals of at least category 1, all departments should have at least 20 percent of their publications in category 2 journals and this proportion should increase. Another measure is the number and proportion of publications that have a high impact and are published in the very best journals. We should publish in these channels at the same or higher rate than other similar institutions.

We believe that research of the highest quality is carried out by researching teachers who have good and stable conditions that also promote good research practices. The Faculty therefore operates a performance-based system for the allocation of research time that allows competitive teachers to have a high proportion of research in their appointments and that research time is largely grant-funded. As this is central to our activities, we are continuously developing the evaluation tools, and have processes in place to ensure that the system is stable over time. Research of the highest quality also requires access to adequate infrastructure and equipment. We therefore have processes that are constantly being improved to meet these needs.

External grants are an important part of our funding and it is crucial for our competitiveness that our faculty apply for and receive grants at the same rate as other comparable institutions. External grants come from a wide range of funders such as government research councils, the European Research Council (ERC), companies, private and public foundations and organisations. In particular, grants received from government research councils and ERC can also be seen as verifications of the high quality of the research. Historically, faculty members show low activity in applying for and obtaining grants from European level funders such as the ERC. Furthermore, we will strive to ensure that Umeå University is the lead partner in major research collaborations.



Our teachers should work in stimulating research environments where they have the opportunity to develop their activities in the best possible way. In these environments, all staff should be encouraged to engage in innovative research and collaboration, not least to address the 17 UN Sustainable Development Goals. Peer support is an important component to best develop activities where access to strong networks increases the impact of research. As the world is constantly changing, our research environments must be characterised by constant evolution and renewal, and we must create processes through which this can happen. An important part of this renewal is the successful recruitment of competitive faculty and their retention.

The Faculty's teachers participate in various collaborative projects with companies, government agencies and other parties outside the academy, for example through the Industrial Doctoral School for Research and Innovation. Furthermore, our research results in projects within the innovation system and the creation of new companies. The Faculty believes that collaboration will become an increasingly important component of our activities and we will continue to work to strengthen our position as a collaborative partner, not least to contribute to the green transition and development towards a sustainable society.

## **GOAL 3.1**

### **We conduct research of the highest quality.**

Monitoring and reviewing our own activities, together with external monitoring and collaboration help us to develop our activities. We analyse the quality of research through various indicators and compare how these change over time and how they compare with other universities. These analyses are then used to optimise our quality-driven resource allocation systems in order to manage our activities effectively.

The Faculty should have a good chance of increasing its external research funding, particularly from ERC and European research programmes. We also aim for our research leaders to act more as coordinators in major national and international research projects.

### 3.1 Priority areas

1. First-class research infrastructure, its funding and accessibility.
2. Publication of research results in the best channels.
3. Increasing external research funding.

### 3.1 Indicators

1. Number and proportion of articles published in channels at the respective level of the Norwegian list.
2. Number of articles published in the most prestigious journals.
3. Number and size of external grants awarded.
4. Number of applications to and grants awarded from ERC, and other grants awarded exceeding 15 million with lead applicants from our faculty.

## GOAL 3.2

### The Faculty enables the renewal and development of research

In order to strengthen our research, we are actively working to develop a quality-driven culture in which staff receive support and possibilities to develop research. Interaction between teachers working in different disciplines provides the conditions for new collaborations and research areas to emerge.

To achieve this, we work according to the University's and Faculty's framework for quality assurance and quality development of research. A key to this is recruiting, developing and retaining the right skills, with mentoring programmes for younger staff being an important piece of the puzzle. Much of our research is developed and strengthened by being part of local, national or international environments.

### 3.2 Priority areas

1. Competence development and maintenance to strategically recruit, develop and retain research staff.
2. A quality-driven research culture that promotes good research practice and enhances our competitiveness.
3. Strategic renewal of our research to meet future needs and challenges.

### 3.2 Indicators

1. Total amount of staffed faculty-funded research time for assistant professors, associate professors and professors in our departments.
2. Proportion of new professors who are women.
3. Number of departments that have procedures in place to support the writing of research proposals.
4. Number of departments that have research meetings and seminar series with internal and external lecturers.

## 4. DOCTORAL STUDIES

**We educate doctors who play a key role in the future development of science and society.**

**THE FACULTY'S DOCTORAL STUDENTS** will play a key role in addressing major global challenges such as sustainable development and resisting phenomena such as increasing fact resistance and conspiracy theories. It is therefore more important than ever that doctoral education, in addition to imparting subject knowledge at the highest level, also embeds this knowledge in a broader perspective. A doctor trained in Umeå should be a mature and highly competent researcher and citizen who can identify problems and work with others to advance science and social development in a creative, yet critical, way.

The Faculty currently has a well-functioning doctoral programme. Many doctoral students participate in collaborative projects where both academia and business are represented, for example, in the Industrial Doctoral School for Research and Innovation, where the Faculty has several doctoral students. The educational environments vary in size and composition, but the survey carried out in the framework of the previous operational plan showed that all environments provide opportunities for stimulating and diverse interactions for doctoral students. In our Faculty, most research environments are international, with students and staff from many different countries. However, many subjects are characterised by an uneven gender balance among both students and staff. One exception to this is the doctoral programme: in recent years, the proportion of women among our doctoral students has increased from 41 percent in 2019 to 47 percent in 2022. Within the same time period, the proportion of women employed as postdocs has been declining from 45 percent to now only 33 percent.

The Faculty's regulations for doctoral studies require all supervisors to undergo supervisor training. This is an important instrument to ensure the quality of postgraduate training. However, it needs to be complemented by additional efforts because one course cannot provide young supervisors with the necessary experience, while experienced supervisors need further training to keep up to date with changes in the conditions and rules for doctoral education.

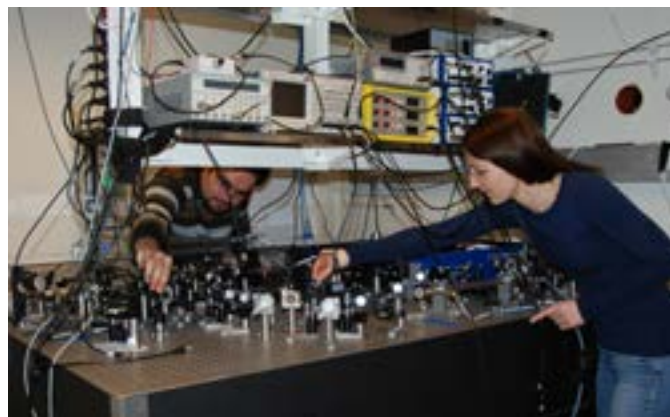
The majority of the Faculty's doctoral students establish themselves outside academia after graduation. This contrasts sharply with the fact that during their training, doctoral students are mostly informed about career paths within academia; they know little about their opportunities outside academia. As a result of the work on the last operational plan, the Faculty now has an alumni database. This database and other interfaces between the Faculty and potential employers should now be used to give doctoral students the opportunity for better networking and greater insight into possible career paths after their doctoral degree.

Since 2019, Umeå University has a quality system for education that includes doctoral studies. Part of the work on the last operational plan was to implement this quality system. This has been done and we can now say that the work with the quality system has become a natural part of the Faculty's operations. An important component is the regular peer reviews of our doctoral subjects.

Unlike education on basic and advanced levels, doctoral studies at the Faculty of Science and Technology is conducted in a highly decentralised manner, because there are major differences between the conditions and traditions of the subjects. Therefore, the challenges are also different and departments should set their own objectives and priority areas for improvement.







## **GOAL 4.1**

### **Faculty doctoral students and supervisors work collectively to improve the conditions and quality of education.**

Doctoral studies are individual and require a functioning interaction between the doctoral student and the supervisor. To ensure that all doctoral students and supervisors receive the support they need, well-functioning doctoral student and supervisor collectives are required, where people learn from each other through an open exchange of knowledge and experience.

New supervisors need support from more experienced colleagues, not least for the sake of their doctoral students, while experienced supervisors need to update their knowledge and contribute to the further development of doctoral studies. Doctoral students in turn need to interact with each other, including across disciplinary boundaries. This contributes to the education of critically thinking citizens who are prepared to take a leading role in shaping the society of the future.

In view of the changes in society and the new demands placed on doctoral studies, such as knowledge of sustainability issues, the faculty-wide elements of doctoral studies also need to be reviewed and, if necessary, adapted.

#### **4.1 Priority areas**

1. Exchange of knowledge between supervisors within and across disciplines.
2. Communication channels between faculty-wide functions and departments for continuous discussion of graduate-training issues.
3. Active participation of doctoral students in interdisciplinary activities and further development of doctoral studies.
4. Development of the faculty-wide components of doctoral studies.

#### **4.1 Indicators**

1. Number of departments that have implemented a system to provide first-time supervisors with formalised support from an experienced supervisor.
2. Number of primary supervisors who have attended at least one Faculty Supervisor Day in the last three years.
3. Number of doctoral students participating in the Faculty's doctoral days.
4. Completion rate in doctoral studies.

## **GOAL 4.2**

### **Faculty doctoral students are well informed about the needs of society and their future career prospects.**

Doctoral graduates of the Faculty have a very high level of knowledge in key areas for the future of society. However, in order to realise their potential and be as attractive as possible to both the academic and non-academic labour markets, planning, contacts with prospective employers, and knowledge of both the needs of society and their own opportunities are required. Skills and knowledge of the conditions for entrepreneurship and innovation offer additional career opportunities.

Activities that are already part of the faculty's activities include doctoral days and courses such as Innovation and Utility and Career Planning. However, these activities need to be complemented by opportunities to exemplify possible career paths, discuss current societal issues and provide opportunities for networking between doctoral students, faculty and external partners.

It may be of particular interest for doctoral students to interact with postdocs, while postdocs in turn may be interested in being included in doctoral studies arrangements as a way of approaching a future supervisory role. In addition, measures to improve the network of contacts for doctoral students and their awareness of their future opportunities can have a positive impact on gender equality inside and outside academia.

#### **4.2 Priority areas**

1. Strengthening collaborative aspects of doctoral studies.
2. Events showcasing and discussing career opportunities.
3. Opportunities for post-docs to participate in research education activities.
4. Strengthening internationalisation to enhance the quality of our doctoral studies.

#### **4.2 Indicators**

1. Number of faculty events that:
  - a. discuss societal challenges,
  - b. demonstrate career opportunities or
  - c. aim to broaden and improve the network of contacts of doctoral students.
2. Number of doctoral students and post-docs participating in such events.
3. The number of external participants in such events.



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