

STRATEGY 2018–2025

FACULTY OF NATURAL SCIENCES

Norwegian University of Science and Technology – NTNU
Approved by the Faculty Board 2 March 2018



Guide to readers

The strategy of the Faculty of Natural Sciences (NV) has three elements.

Part 1 describes our vision, values, social mission, key challenges and main objectives.

Part 2 deals with the NV Faculty's core tasks. These are education and the learning environment, research, innovation, dissemination and outreach.

Part 3 addresses themes that cut across our core tasks. These include interdisciplinary collaboration, career and skills, the work and study environment, campus and organizational development, as well as the Faculty's capacity for change and development.

Finally, there is a section on realizing the strategy.

Parts 2 and 3 cover the strategy. They describe the preferred state for NV at the end of the strategy period. In addition, they specify development goals of particular importance for NV in each area.

The strategies and related development goals are intended to help realize the Faculty's main objectives as they are described in the section "Main objectives – NV 2025."

Detailed academic strategies are described in the strategic plan for each department in the Faculty, and in the action plans.

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VISION

VALUES

SOCIAL MISSION

OVERVIEW OF CHALLENGES

MAIN OBJECTIVES

01



OUR VISION:

**NATURAL SCIENCES
AND TECHNOLOGY FOR
A SUSTAINABLE FUTURE**

Knowledge and technological development provide opportunities to find answers to major questions and challenges. They are also essential for achieving environmental protection, sustainable value creation, enough food, energy, and better health.

Through the United Nations, the world has agreed on 17 Sustainable Development Goals, and the Faculty of Natural Sciences (NV) focuses its contribution on

- goal 2 Zero hunger**
- goal 3 Good health**
- goal 4 Quality education**
- goal 7 Affordable and clean energy**
- goal 9 Innovation and infrastructure**
- goal 12 Responsible consumption and production**
- goal 13 Climate action**
- goal 14 Life below water**
- goal 15 Life on land**

We will achieve this by providing relevant study programmes, developing high-quality research-based knowledge and contributing to sustainable management of natural resources and technological value creation. Through our graduates, NV aims to shape the society of tomorrow and solve current and future global challenges.

OUR VALUES

The Faculty of Natural Sciences bases its activities on NTNU's values, which are: to be creative, critical, constructive and respectful.





CREATIVE

Academic freedom is the basis for our activities. We take on challenging questions and tasks, and seek innovative solutions based on our academic breadth. NTNU supports the development of disciplines, people and cultures. We value and encourage innovation among students and staff as well as innovative teaching, research and artistic activities.

CRITICAL

Our activities build on fundamental democratic values and we represent an unprejudiced and independent voice. Hallmarks of our academic culture are debate, critical reflection, fact-based knowledge, impartiality and high ethical awareness. We challenge conventional ideas and solutions.

CONSTRUCTIVE


We engage in an open and solution-oriented dialogue with the outside world and emphasize both external and internal collaboration. We take social responsibility and we influence, advice and develop each other and our environment through dialogue and dissemination of knowledge. NTNU emphasizes co-determination and active involvement by students and employees.

RESPECTFUL

Every employee and student has a responsibility to contribute to a work and study environment characterized by respect and consideration. We facilitate personal growth and development of skills. We contribute to diversity and equal opportunity in society and in our own activities. We promote equality and tolerance. At NTNU, we show respect for varying attitudes and opinions.

OUR MISSION





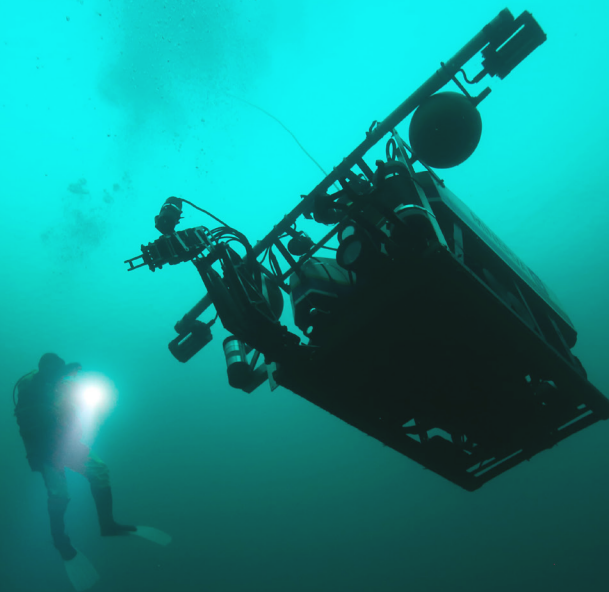
Our core tasks are research and education. Our social mission involves equal responsibility for covering the foundation disciplines of biology, physics and chemistry and for developing technological skills building on and extending these disciplines. Expertise in the natural sciences and technology will together provide a basis for sustainable social development and value creation, where protection of the environment and effective resource management are in focus.

NV is responsible for programmes of professional study as well as education in the natural sciences and in technology. In some areas we are Norway's only educational institution, such as the Master of Science in Chemical Engineering and in Materials Science and Engineering, as well as bachelor's and master's programmes in food technology.

In our areas of expertise, the Faculty has a national responsibility for conservation and development of the cultural heritage and skills through education, research, dissemination, outreach and innovation.

OVERVIEW OF CHALLENGES IN 2018

Our activities are long-term. At the same time, national and global social changes are rapid and wide-ranging, and some of their effects are unpredictable. Developments in society drive a growing need for scientific and technical knowledge combined with interdisciplinarity. We have identified two specific areas of challenge that will be important for NV in the strategy period until 2025: Society's needs for skills in sustainable development, and our ability to develop our activities continuously to improve the quality and relevance of education and research.



Contribute to sustainable development of business and society

The world is facing major environmental and social challenges, specified in the UN's Sustainable Development Goals. NV will contribute by creating knowledge, skills and sustainable technological solutions. The Faculty must also contribute to broad basic competence and critical thinking ability in society. This will prepare us for future challenges and opportunities. Close and effective partnership with the working world is mutually essential, both to ensure relevance in research and education, and to develop and implement tomorrow's solutions. NV must lead the way in our disciplines. In addition, a culture of cooperation and innovation must be an integral part of our research and education activities.

Quality at all levels and development

To educate graduates who can achieve the shift towards a greener world and to provide research and innovation supporting the UN's Sustainable Development Goals, NV and NTNU must continuously improve quality. This applies to the quality of student and staff recruitment, the study environment and teaching, research, administrative procedures and the work environment. Today, there is improvement potential in the establishment of good study environments, the benefits of pooling resources and co-location after the merger, as well as digitalization and standardization of administrative work. We can expect more intense competition for research funds and the brightest minds. Accelerating change in the world around us will require us to change faster than before. For us to succeed in the competition for research and learning environment excellence, and to be an attractive partner, we must improve our activities further. Through well designed, inclusive processes, we must take advantage of our combined resources by setting clear priorities and extending our use of new technology. Sound knowledge of global technology development will influence the potential for technological growth nationally and locally. This requires creative employees with strong skills in their discipline as well as an organization willing to change.

MAIN OBJECTIVES **NV 2025**





In 2025, NV is a sought-after actor in international research and teaching programmes in science and technology. NV is an attractive workplace for ambitious researchers and teaching staff from all over the world. Through the skills of our graduates as well as our research and innovation, we make a significant contribution to the shift towards a greener world. NV is the natural first choice for young Norwegians who are keen to study disciplines in our subject areas. Our master's programmes attract highly qualified international applicants, and our graduates are preferred by employers in Norway. We offer relevant programmes of high quality in continuing and further education, with a strong component of active student involvement and digital learning methods. NV has a close partnership with the working world within research, innovation, education and lifelong learning. NV's PhD programmes are at a high international level, with doctoral graduates who have a good international network, skills in research ethics, health, safety and the environment (HSE), dissemination, outreach, and innovation, in addition to being at the top level in their field of research.

NVE has robust research groups, and all our departments have academic communities proven to be at a high international level in at least one of their core areas. The links between the professional, technological and discipline-based programmes of study mutually strengthen quality, and the academic expertise in these environments will be applied across boundaries. NV has learning environments characterized by close teamwork between students in each study programme as well as close contact between students and the academic community. NV has a generous and inclusive organizational culture that unifies the Faculty in working towards common goals. We are leaders in the use of digital solutions for administration, to support learning, and as research tools. Our management communicates clearly and has a unifying approach, contributing to goal achievement at all levels. NV is characterized by continuous efforts to improve quality in all parts of the organization. In 2025, we have developed NV's infrastructure in line with the requirements, with a well-functioning HSE programme emphasizing HSE training of students and employees.

CORE TASKS

EDUCATION AND LEARNING ENVIRONMENT

RESEARCH

INNOVATION

DISSEMINATION AND OUTREACH

02





EDUCATION AND LEARNING ENVIRONMENT



THE THREE PILLARS OF OUR EDUCATION AND LEARNING ENVIRONMENT STRATEGY ARE:

Education of internationally outstanding graduates

Quality of education

Development of an excellent learning environment

DEVELOPMENT GOALS

NV will:

Develop a sense of identity and social affiliation in the programmes of study through the development of identity spaces and student workspaces

Support research-based development of teaching methods by promoting systematic development of educational skills, flexible support for teaching, and spaces adapted to teaching with active student involvement

Increase the quality and relevance of the academic portfolio through collaboration with working life, programme design, coordination and concentration

Develop the portfolio of lifelong learning programmes in cooperation with working life

Draw students into research and innovation work, especially through centres and large projects. NV's study programmes are an attractive choice for national and international students with a strong background in their discipline. Effective recruitment, gender balance and follow-up of students ensure low dropout rates and high completion rates

NV's study programmes are highly internationalized in terms of student exchange, with balanced numbers of incoming and outgoing students. NV is the natural choice for continuing and further education in our subject areas. We offer nationally leading educational pathways with a strong foundation in a high-quality academic community that has a national and international focus. NV's quality initiatives are based on both didactic and disciplinary research. NV has realized the benefits of the merger through collaboration and transfer of best practices in didactics and research between different environments and traditions. NV uses international benchmarking. We have well-functioning coordination, quality systems and allocation of resources between programme councils and departments, ensuring high quality in the implementation and development of study programmes and courses.

The Faculty's study programmes educate graduates with critical thinking skills at bachelor's, master's and PhD level. Our graduates fulfil the need for expertise in sustainable production and development in Norwegian business and industry, public administration, research and education. Our graduates are sought-after in working life and well qualified for a professional career in a dynamic job market – both nationally and internationally. Our graduates are involved in shaping the development of society and their own area of expertise throughout their careers. This requires advanced digital and innovation skills as well as the ability to implement new knowledge and technology. Students have strong skills in teamwork across disciplines, ethical reflection, and assessment of sustainable social development related to their own profession.

The learning environment at NV is characterized by close cooperation between students, effective cooperation between teaching staff and students, and good follow-up of students. This is achieved through good organization of learning spaces, clear expectations of the students, close follow-up throughout the period of study, as well as relevant learning activities and forms of assessment.

RESEARCH



Foto: Geir Mogen/NTNU

THE THREE PILLARS OF OUR RESEARCH STRATEGY ARE:

Development of talented researchers and excellent research environments

Quality improvement throughout our activities

Research within and across disciplines

DEVELOPMENT GOALS

NV will:

Give priority to research addressing the UN's Sustainable Development Goals, and contribute to responsible research and innovation

Strengthen outstanding research groups to increase success rates in national and international arenas of competition

Develop our collaboration with SINTEF and other key partners in infrastructure and joint research projects

Boost research groups at NV that can take an active leadership role in national and international initiatives/calls for proposals as well as interdisciplinary collaboration and active participation in research policy arenas

Ensure high quality and relevance in PhD education

Research at NV helps to solve global challenges, and we emphasize challenges described in the UN's Sustainable Development Goals. We work together across subject areas nationally and internationally, and NV is an attractive partner for the private and public sectors. Fundamental knowledge must be created to solve the greatest challenges of our time. Much of the research at NV is basic and takes advantage of interdisciplinary opportunities. All research has a high ethical standard. NV has good and strategic research collaboration with other universities, SINTEF, other research institutes, the business community and the public sector.

Quality is a hallmark of our experimental, computational and theoretical research. NV has general and highly specialized research laboratories with modern scientific equipment, available to all relevant users. We have highly qualified technical staff and workshops serving the research laboratories. We take advantage of our modern laboratories through extensive interdisciplinarity as well as national and international cooperation. NV's researchers are active users of large-scale infrastructure. We initiate and support curiosity-driven basic research of high quality. A significant part of our research is conducted through large programmes in the Research Council of Norway and the EU framework programmes, and many of our research groups make their mark in national and international competitive arenas. All academic groups at NV are active in research, and students are drawn into research projects. Our research data are stored and made available in line with the research policy in effect. All publishing is open access.

The PhD candidates at NV are a vital part of our research. Doctoral education at NV maintains a high international level. We recruit talented, highly motivated candidates nationally and internationally. NV focuses on good supervision and close follow-up of PhD candidates, and the completion rate is excellent.

■ INNOVATION



Foto: Geir Mogen/NTNU

THE THREE PILLARS OF OUR INNOVATION STRATEGY ARE:

Collaboration with **established business**

Collaboration with the **public sector**

Helping to **create new business**

DEVELOPMENT GOALS

NV will:

Increase our contribution to sustainable skills in creating value and innovation for society through our research and our study programmes

Realize the potential in the research from academic groups, centres and strategic research areas for innovation in society

Increase the proportion of bachelor's and master's theses carried out in cooperation with regional, national, and international partners

Employees and students help to identify new business opportunities and inventions as well as innovative improvements in existing processes. They see their own fields of study in a larger social context. NV's centres and research projects contribute to innovations in and outside NTNU. The Faculty is a professional research and collaborative partner that consciously safeguards the interests and rights of all parties.

NV's education and research in science and technology are vital to sustainable development and innovation in our society. NV has strong academic communities which, through cooperation with various actors in society, have insight into the needs for skills that must be met.

NV has a conscious approach to scaling its activities in relation to these needs.

Students at NV face issues that are relevant to working life, and they learn to use tools that are important for innovation. In this way, NV's graduates become attractive employees, contributing to development and agility in existing and new workplaces.

■ DISSEMINATION AND OUTREACH



THE THREE PILLARS OF OUR DISSEMINATION AND OUTREACH STRATEGY ARE:

Dissemination of results from research and artistic development to the research community and to students

Outreach and communication to share knowledge with the public

User-oriented communication of research aimed at specific groups who can apply the knowledge and technology in their work practice

DEVELOPMENT GOALS

NV wil:

Increase our participation in fact-based public debate through op-ed articles, features, editorial contributions and expressions of opinion

Develop the dissemination and communication skills of students and staff by integrating dissemination activities in study programmes / work assignments

Increase interest in and recruitment to science and technology through dissemination of our knowledge

Strengthen NTNU as a brand nationally and internationally by showcasing our research results and outstanding academic groups to society and decision-makers

NV contributes to a knowledge-based dialogue in society, communicates new insights and gives the public an understanding of the importance of knowledge based on science. We help NTNU to make its mark in public debate on important social issues and global challenges through goal-oriented communication of scientific and technological knowledge.

Through high quality in our dissemination and communication activities, NV contributes to strengthening NTNU's reputation and the visibility of its academic environments. We are a visible and attractive partner for business and knowledge institutions, and we attract talented staff and students.

In the NV culture, communication aimed at the public and relevant users is regarded as an important and natural aspect of our activities. Our students and graduates is important ambassadors for our programmes of study, our values and our scientific and technological knowledge.

We disseminate research, education and innovation through relevant channels.

SELECTED PRIORITY AREAS

INTERDISCIPLINARY COLLABORATION

CAREER AND SKILLS

WORK AND STUDY ENVIRONMENT

CAMPUS AND ORGANIZATIONAL DEVELOPMENT

NV'S CAPACITY FOR CHANGE AND DEVELOPMENT

03



INTERDISCIPLINARY COLLABORATION

NV values and encourages interdisciplinarity in education and research, and paves the way for cooperation and a culture of sharing within the Faculty, with the rest of NTNU, and with external partners. Collaboration with businesses and the public sector helps to ensure relevance in education and research, in addition to meeting the needs of society for innovation and interdisciplinary skills

DEVELOPMENT GOALS

NV will:

Ensure relevance in our education programmes by working together with the working world and being familiar with its needs for skills in the future

Work actively to lower barriers, both organizational and financial, and to remove barriers to the use of infrastructure

Use incentives and reward systems that promote transparency and openness combined with a culture of sharing

CAREER AND SKILLS

The Faculty's most important resource is our employees and students. NV creates a platform for developing employees' skills to meet the Faculty's changing needs as well as the attributes, situation and wishes of each employee. Strategic human resource planning and employee development plans are important tools for realizing the strategy.

DEVELOPMENT GOALS

NV will:

Have an active human resources policy that contributes to good work and learning environments, emphasizing recruitment, development of employees, gender equality and diversity

Work with a long-term perspective to enable our own employees in recruitment positions to succeed in an academic career

Motivate and develop employees so that they can take on a leadership role

Use both adjunct positions and permanent appointments as an instrument to ensure the professional experience that we need from working life

Provide good guidance and create the basis for well-being and mastery for all students

Present equivalent career path alternatives for academic staff, and develop a predictable human resources policy



WORK AND STUDY ENVIRONMENT

NV has motivated, dedicated and skilled employees and students. NV creates the conditions for a good, health-promoting environment for work and study characterized by sharing, high quality and dedicated work. The study environment is important for NV, and the Faculty works in partnership with the students in this connection. Managers take a particular responsibility for the work environment and work systematically with health, safety and the environment (HSE). Employees and students are ensured opportunities for active participation in important processes through information channels, representative forums, permanent councils and committees, ad hoc committees and employee appraisal interviews.

DEVELOPMENT GOALS

NV will:

Ensure that respect, generosity and inclusion characterize our culture, and give priority to time and resources for this

Follow up work environment surveys through good collaborative processes with a high level of participation and accountability

Have a good, safe physical work environment in laboratories, offices and fieldwork, as well as a professional and well-functioning HSE culture

Develop a culture and an environment for work and learning that inspire staff and students to make their best effort in accordance with the Faculty's goals

CAMPUS AND ORGANIZATIONAL DEVELOPMENT

NV's academic communities are co-located in a suitable way. This helps us to realize all the synergies of the merger, and to achieve optimal cooperation within and between departments, and between students and academic environments. Equipment and infrastructure are important pillars for the Faculty's activities, and strategic plans for procurement and operation of equipment and infrastructures form the basis for applications to various funding sources for equipment funding.

DEVELOPMENT GOALS

NV will:

Strive for a functional positioning for all our academic environments that lowers barriers, facilitating cooperation and interdisciplinarity

Work towards the best possible co-location of the Department of Materials Science and Engineering and the Department of Biotechnology and Food Science

Work to bring the Trondheim Biological Station and Sealab together in one location

Ensure that infrastructure in the form of laboratories and equipment meets the needs of the core activities effectively

Ensure an optimal balance between academic, technical and administrative employees at the Faculty

NV'S CAPACITY FOR CHANGE AND DEVELOPMENT

NV prioritizes its resources to fulfil its social mission and ensure high quality in education, research, innovation and dissemination. The Faculty is characterized by a culture of improvement and development to achieve the goals we have set for ourselves. NV contributes to the efficiency of NTNU's administration and has user-friendly support systems. Our students and staff are trained in and use forward-looking digital tools. NV has robust systems to meet the need for information security, emergency response capacity and protection of privacy.

DEVELOPMENT GOALS

NV will:

Have resource management that contributes to increased productivity and ensures room for manoeuvre in terms of strategic priorities and renewal at faculty and department levels

Adopt digital tools; standardize procedures and work processes

Continuously develop NV's research and educational provision to meet the challenges of the future and offer a high international level of quality



FROM VISION TO REALITY

2018–2025

NTNU's vision and strategies will be specified in more detail in the departments' own strategies and priorities. Individual action plans will be developed with a horizon of one year at a time. These will include specific initiatives and policies that apply across the Faculty. In the middle of the strategy period we will evaluate the status, and whether any adjustments to the strategy are needed.