

# Faculty of Science Strategy

Approved by the University Executive Board on December 20, 2022

20  
30

A photograph of a petri dish containing a bacterial culture. The culture shows numerous circular colonies of varying sizes and colors, including black, yellow, and white, growing on a light-colored agar surface. The petri dish is held by a gloved hand, and the background is a blue, perforated surface, likely a biosafety cabinet. The numbers '20' and '30' are overlaid on the left side of the image.

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# Executive Summary



As an innovative institution focusing on research and teaching in the natural sciences, the Faculty of Science at the University of Bern aims, with its Strategy 2030, to chart a course towards a promising future.

To this end, the faculty intends to pursue the following five long-term strategic goals:

1. **Comprehensive university:** Through its coverage of the natural sciences, the faculty will engage in interdisciplinary and interfaculty teaching and research, thereby strengthening the position of the University of Bern as a comprehensive university.
2. **Research:** The Faculty of Science will consolidate its leading position at the University of Bern as well as its excellence in fundamental research with regards to both scientific output and teaching.
3. **Teaching:** With a diverse and innovative study program, the Faculty will strive for outstanding, subject-specific, but also interdisciplinary and research-based teaching via a combination of classroom teaching and digital teaching/learning formats.
4. **Digitalization:** With mathematics, statistics and computer science, the Faculty represents the three basic Data Science disciplines and will thereby assume a leading and central role in the digitalization of the University of Bern.
5. **Focuses:** Focuses in research and teaching will be evaluated, promoted and further developed on an interdisciplinary basis.

These long-term, strategic goals are supplemented by six functional strategic goals.

1. **Processes and organization:** Research and teaching are to be strengthened with improved processes and organization at both the faculty and university level by optimizing administrative processes.
2. **Promotion of early career researchers and career development:** The appeal of the Faculty for early career researchers and up-and-coming academics from both Switzerland and abroad is to be increased with the advancement of talented people and the improvement of promotion opportunities for associate professors.
3. **Internationalization and networking** are essential for an attractive research/teaching environment as well as for achieving excellence in these areas, and should be supported accordingly.
4. **Sustainable development:** The Faculty will contribute to the strategic focus of the University of Bern through both outstanding research and its range of study programs. Through its specialist knowledge and its own activities, the Faculty will also support operational sustainability.
5. **Gender equality and equal opportunities:** The Faculty will support unreservedly equal opportunities, gender equality, inclusion and diversity at all levels.
6. **Quality assurance:** The Faculty will ensure quality in both research and teaching through regular efficient, low-key evaluations.

1.

# Introduction





This strategy document of the Faculty of Science at the University of Bern will set forth the vision, mission and long-term goals that the Faculty has set itself for the coming years. This strategy was developed during the spring semester and beginning of the fall semester 2022 with broad-based representation of all organizational units. The “Faculty of Science Strategy 2030” operationalizes and elaborates on the new [Strategy 2030 of the University of Bern](#).

The Faculty of Science consists of the organizational units mathematics, statistics and computer science; physics and astronomy; chemistry, biochemistry and pharmacy; biology and geosciences. The Faculty is characterized, through its organizational units, by interdisciplinarity, which is reflected in its research competence centers, national research programs and interfaculty research cooperations. More than 80 professors and a large number of lecturers, assistants and other staff members in the institutes/departments of the Faculty’s organizational units are responsible for imparting to students the latest research in natural sciences and research-based training on uninhabited and inhabited regions around the world. The approximately 2,000 students in the Faculty of Science benefit from the Faculty’s high standards of research and teaching, and also gain an insight into the diversity of the Faculty and its position at the forefront of international research.

The Faculty contributes to each of the five focuses named in the University’s Strategy 2030: The Faculty conducts excellent inter- and transdisciplinary research and teaching in the field of sustainability (incl. climate sciences, biodiversity, material cycles). Through its outstanding research in matter and the universe (space research, basic research on the formation, behavior and transformation of matter, etc.), the Faculty makes a central contribution to the comprehensive university. Through its research and teaching in the fields of pharmacy, biochemistry, molecular biology, physics, mathematics, statistics and computer science, the Faculty contributes to consolidating and furthering Bern’s position as an internationally renowned center for medicine and the life sciences. Through its research and teaching in the fields of gender, historical dimensions of climate change, man and the environment, sustainability as well as collaboration in research and teaching with international partners, the Faculty supports the focus of intercultural knowledge. The Faculty is also active in the field of politics and administration, for example, via transdisciplinary research, the outreach and communication of research results to the general public. Hence it makes an important contribution to raising the profile of the comprehensive university in the Bern area.

2.

Starting point





The Faculty is excellently positioned and networked in terms of research and teaching, both nationally and internationally. Changing conditions, such as steadily rising student numbers with unchanged funding, increasingly difficult conditions for successfully acquiring external funding, and greater administrative burdens pose a threat to the success of the Faculty in the medium term. To substantiate this and identify strengths and opportunities, a SWOT analysis was conducted by the Echo group in the three main areas of research, teaching/training and governance/administration. The following sections describe the results of this analysis.

## 2.1 Assessment of the current situation

Important *strengths* of the Faculty are the outstanding research, which enjoys great international acclaim, substantial success in acquiring external funding, a large publication output and an associated high impact, strong networking at international, national and university levels, as well as a major media presence. In teaching, the strengths are to be found in a diverse portfolio of attractive degree programs, and the associated thematic diversity as well as a great range and variety in the didactic methods applied (classical courses, lab work, internships, field trips/excursions, promotion of the highly gifted, continuing education at a certified level – CAS).

The following points were identified as the greatest *weaknesses*: Changing conditions, such as steadily rising student numbers with unchanged funding, increasingly difficult conditions for successfully acquiring external funding, and greater administrative burdens. Furthermore, there are too few permanent positions for intermediate staff and the associated promotion of early career researchers could be more targeted.

*Threats* include the uncertainty with regard to the middle- and long-term financing of the research platforms. The bureaucratization of the University as a whole and the associated lengthy consultation processes and increasingly complex procedures are a threat in terms of the time and resources spent on them.

The Faculty will address these weaknesses and threats and strategically counter the resulting challenges. These are described in the next section.

**KNOWLEDGE  
CREATES  
VALUE.**

## 2.2 Conclusion and central challenges

Taking into account the strengths, weaknesses, and threats stated above, the following challenges may be identified, to be addressed in this strategy document:

- The Faculty is excellently placed in research. It is essential to maintain and build on this strength.
- Research opportunities through interfaculty collaboration and cooperation with industry, the public sector, NGOs, etc., should be further developed.
- A highly modern research infrastructure is critical for the maintenance of excellent research. There are weaknesses here that need to be addressed.
- Teaching is conducted with a high level of quality, motivation and diversity, and allows for interdisciplinary connections. It is essential that this strength is maintained and further developed. In particular, it is important to address the risk of rising student numbers with the same amount of funding.
- The Faculty must compete nationally and internationally for research funding and hiring top researchers.
- The administrative burdens on academic staff are increasing and the procedures (in administration, research and teaching) are becoming ever more complex. There is thus a need for improvement in terms of administration and governance.

The strategy process is an important instrument for addressing the challenges named and steering them in a positive direction with suitable strategic steps.

# SPECTRAL MEASURE

3.

Strategic

principles

$$V(z_j, z_k; \theta) = \frac{1}{z_j} \Phi \left\{ \frac{a(\theta)}{z} \right\} - \frac{1}{a(\theta)} \Phi \left\{ \frac{a(\theta)}{z} \right\} \quad := m_j$$

$$V_j = \frac{\varphi(m_k)}{a(\theta) z_j^2} + \frac{\varphi(m_j)}{a(\theta) z_j z_k} - \frac{\Phi(m_k)}{z_k}$$

$$V_k = \frac{\varphi(m_k)}{a(\theta) z_k^2} + \frac{\varphi(m_j)}{a(\theta) z_j z_k} - \frac{\Phi(m_k)}{z_k^2}$$

$$V_{jk} = \frac{m_j \varphi(m_j)}{a(\theta)^2 z_j^2 z_k} + \frac{m_k \varphi(m_k)}{a(\theta) z_j z_k^2} - \dots$$

$$\frac{\partial \theta}{\partial a} = \frac{\partial \{m_j, \varphi(m_j)\}}{\partial a} a(\theta)^2 - 2a(\theta) \dots$$

$$\frac{\partial \{m_j, \varphi(m_j)\}}{\partial a} = -m_j^2 \varphi(m_j) \frac{\partial m_j}{\partial a} + \varphi(m_j) \dots$$

The strategic principles are derived from the University's overall strategy. The vision, mission and values defined there remain unchanged for the Faculty. They are specified and supplemented in selected areas as follows.

### **3.1 Vision and mission**

For the Faculty of Science, disciplinary, interdisciplinary and transdisciplinary research all play a central role. This applies to both basic and applied research. The vision focuses on providing transformative knowledge to meet the complex academic, social and economic challenges of our modern society.

The mission of the Faculty is to take on a leading role in scientific research, both at a national and international level. Through its activities, it aims to make a contribution to tackling key challenges facing society. Through its diverse range of mathematical and scientific subjects, the Faculty aims to contribute significantly to the strategy of the comprehensive university. While maintaining its range of subjects, the Faculty will position itself by focusing on selected areas with excellent performance in research and teaching.

### **3.2 Self-image**

The Faculty of Science is characterized by high-quality teaching and internationally acclaimed research. It is the driving force behind scientific research at the University of Bern and responsible for the teaching program in this area. The Faculty will continue to be successful in teaching and research, set itself new goals and react to social and academic challenges.

The Faculty of Science recognizes its responsibility to the University of Bern as well as to society and science. In its five organizational units – mathematics, statistics and computer science; physics and astronomy; chemistry, biochemistry and pharmacy; biology and geosciences – it focuses on basic research in each of the disciplines. The five organizational units are comprised of departments, institutes and working/research groups. These work in existing research fields and shape new ones and offer degree programs and services. Interdisciplinary, multidisciplinary research also takes place within strategic research centers and interfaculty research cooperations. The Faculty thus creates space for innovative scientific approaches and takes new research directions.

Teaching at the Faculty of Science is characterized by a wide range of degree programs. These degree programs include Bachelor's, Master's and doctoral programs as well as interfaculty graduate schools. They are closely linked to the research interests of the Faculty. When designing its courses, the Faculty takes into consideration the increasing intertwining of educational and professional phases, as well as the significance of life-long learning. The Faculty thus offers a wide range of continuing education programs and postgraduate degree programs.

### 3.3 Values

The independence of scientific research and teaching is one of the Faculty's central values.

The Faculty is embedded in both the University of Bern and the Swiss research landscape, and networked with international institutions. Innovation and creativity are the characteristics of all our activities in research and teaching as well as in terms of services.

The academic staff at the Faculty of Science are some of the leading academics in the world. Excellence in research, high quality of teaching, and scientific integrity are values upheld and maintained by the Faculty. At the same time, we are geared towards sustainability, creativity, diversity and flexibility. Early career researchers are the future of the Faculty which is why such value is attached to the ongoing promotion of early career researchers, with a particular focus on increasing the proportion of female members of the Faculty.

The Faculty represents the values of openness and acceptance. It strives for inclusion, diversity and equal opportunities. It fosters a working climate in which the employees and students can develop individually, feel esteem for one another, and work in an atmosphere of collegiality. Gender equality, inclusion, equal opportunities, diversity and tolerance are upheld as cultural norms.



4.

# Long-term strategic goals of the Faculty





The following section explains and details the Faculty's long-term strategic goals (designed to cover 10 years) in the form of six sub-strategies.

#### 4.1 Contribution to a comprehensive university

The Faculty is a **central component of the comprehensive university**, representing the scientific disciplines and providing interfaculty teaching opportunities. It strengthens the comprehensive university with its great diversity of subjects and interdisciplinary and interfaculty collaboration.

- Scientific topics are widely represented in research and research-based teaching at the Faculty. This thematic range must be consolidated and expanded.
- Theoretical and experimental disciplines are represented at the Faculty and have different requirements of the research infrastructure. This diversity needs to be taken into account.
- The Faculty plays a central role in the University's research competence centers and interfaculty cooperation projects. The centers are anchored within the disciplines through the Faculty. Intra- and interfaculty collaboration of the Faculty with the centers and interfaculty research cooperations in all key areas defined in the University's Strategy 2030 must be consolidated and expanded.

#### 4.2 Basic research

The Faculty of Science will consolidate its **leading position at the University of Bern in basic research in terms of research** performance and research-based teaching.

- The Faculty promotes the setup and development of necessary state-of-the-art research and technology platforms as well as core facilities. These must be developed, expanded and put on a solid basis with long-term financing from the University of Bern.
- Excellent scientific research depends on good spatial and technical infrastructure. Spatial proximity is also important for a flow of knowledge and the emergence of innovations. This must be consolidated and expanded with support from the University of Bern.
- Strengthening the research culture, opportunities and collegiality, e.g. through careful consideration of the DORA criteria, the promotion of scientific integrity and publicizing and implementation of the Better Science Initiative.



### 4.3 Teaching

It is our goal to **educate students** who will develop creative and interdisciplinary approaches to future challenges and be critical thinkers and valued members of society. For this purpose, the Faculty offers a **diverse study program** that relies on a range of innovative forms of teaching and learning. It strives for **outstanding, research-based teaching** in all study programs.

- Teaching is viewed integrally. It comprises classroom teaching, digital teaching and provides an appropriate learning environment. Furthermore, it should very much be based on research.
- Face-to-face teaching is crucial for the quality of degrees and student learning outcomes. It is the preferred form of communicating scientific content and is specifically supported with other forms of teaching.
- The encouragement of a scientific way of thinking and critical reflection is an integral component of teaching at the Faculty.
- The variety of teaching and learning formats (lectures, seminar, field work, internships, lab, etc.) in the Faculty is to be maintained and expanded.
- In teaching, the Faculty offers a range of service lecture courses and is thus central to basic scientific studies for students at the University of Bern.
- Digitalization is to be further developed and expanded appropriately in terms of methodology and content in teaching.
- Inter- and transdisciplinary teaching is promoted with innovative combinations of faculty and interfaculty major and minor programs. Existing potential synergies will be actively exploited.

## 4.4 Digitalization

The Faculty takes on a **central role in digitalization at the University of Bern**. In coordination and with the support of the relevant stakeholders of the University of Bern, it is constantly further developing the area of **Data Science** in research and teaching.



- The Faculty provides fundamental expertise for the implementation and further development of the digitalization strategy of the University of Bern.
- The existing Faculty digitalization strategy is continuously adapted to current and future needs and developments.
- The Bern Data Science Initiative will be developed as a central mechanism for intra- and interfaculty collaboration in research and teaching in the area of digitalization, and its scope within the comprehensive university will be extended further.
- The Faculty proactively contributes the scientific perspective into the implementation of the university digitalization strategy and the University's Strategy 2030.
- The structuring and expansion of relevant core research infrastructures as well as the creation of further infrastructures, such as high-performance computing and storage facilities and data analyses, is to be driven forward with support from other faculties and the University Executive Board.

## 4.5 Thematic focuses

The Faculty continues to develop thanks to the **promotion of the existing special areas**. It creates processes via which the **new interdisciplinary focuses** can be recognized and developed.

- The Faculty strengthens the University's Strategy 2030 in all key areas.
- The Faculty builds on a variety of excellent and established research topics, and promotes the development of new priority areas in a bottom-up approach. In this way, it retains academic freedom, enables flexibility and can quickly adapt to new research fields and directions.
- Through the use of strategic faculty funds, bottom-up initiatives and projects are encouraged, the groundwork is laid for new priority areas, and cross-departmental and interdisciplinary momentum is generated.
- The Faculty continues to take on a central role in the University's research competence centers and interfaculty research cooperations. It ensures that collaboration is strengthened through associations and professorship planning.

5.

# Functional strategies



The functional strategies form the central prerequisites for the realization of the strategic goals. Based on the challenges identified, six functional strategies have been defined.

## 5.1 Processes and organizational structure

**Strategic objective:** The Faculty supports research and teaching by improving processes and organizational structure.

- The Faculty increases the coordination between faculty and interfaculty centers as well as research cooperations.
- The Faculty strengthens the structuring and use of research platforms and core facilities.
- The Faculty further deepens the discussion on and the testing of models to improve institute structures (e.g. creation of higher-level departments, schools, etc.).
- The Faculty is committed to revising the appointment processes with the aim of shortening these processes while at the same time increasing the quality.
- The Faculty is committed to reducing unnecessary bureaucratic processes at faculty and university level.

## 5.2 Promotion of early career researchers and career development

**Strategic objective:** The Faculty aims to enhance its appeal for outstanding early career researchers from Switzerland and abroad at all levels and specifically target talented people. It wants to create an improved and more transparently communicated path, for associate professors to be promoted.

- The Faculty ensures support for early career researchers through the Commission for the Promotion of Early Career Researchers.
- Start-up funding is provided to help new professors make a good start to a successful academic career at the Faculty.
- Instead of limiting the number of promotions per year, the Faculty wants to establish clear and transparent promotion criteria and processes together with the University Executive Board.
- Excellence is to be promoted in all its diversity.
- The Faculty strives to improve the situation of intermediate staff.

### 5.3 Internationalization and networking

**Strategic objective:** The Faculty continues to position itself as a networked, international research and education institution which appeals to qualified early career researchers from Switzerland and abroad.

- The Faculty maintains and promotes cross-border research collaborations and the international recruiting of students and researchers. In doing so, it actively uses university networks and memberships in research associations.
- The collaboration with other higher education institutions in Switzerland (e.g. through BeNeFri, bilateral, project-based collaboration with ETHZ and EPFL) will continue to be expanded and consolidated.
- The Faculty promotes access for international students and researchers.

### 5.4 Sustainable development

**Strategic objective:** The Faculty meets the requirements of sustainable development in all areas and makes an active contribution to a climate-neutral university. Faculty expertise should be taken into consideration at the professorship level in the implementation of the sustainable development goal.

- The latest findings from research in the field of sustainable development should be communicated actively beyond the Faculty and thus have an impact on everyday life at the University and in society.
- In the area of teaching, specific degree programs are offered, and the topic of sustainable development is embedded in appropriate introductory and in-depth courses.
- Members of the Faculty take their responsibility to society seriously in their everyday professional lives, in the planning and implementation of research and teaching projects, and in all travel activities, and act sustainably.

## 5.5 Gender equality and equal opportunities

**Strategic objective:** Diversity, equal opportunities, gender equality and inclusion are embedded sustainably in the Faculty. The Faculty strives to promote gender equality and equal opportunities at all levels and in all areas.



- The Faculty’s measures, planned and approved in 2020 (Action Plan Gender Equality), will be implemented.
- In the case of appointments and promotions, aspects such as net academic age, part-time positions, dual career and care responsibilities are taken into consideration accordingly.
- Diversity is the basis for academic excellence as innovative ideas can be developed from a range of perspectives in a diverse academic culture.
- The Faculty evaluates the measures at a strategic level and implements corresponding initiatives, e.g. in terms of family friendliness.

## 5.6 Quality assurance

**Strategic objective:** The Faculty continues to ensure the quality of teaching and research in an efficient and effective way.



- The Faculty has QAD Guidelines which govern quality assurance in the areas of teaching and research. The QAD action plan describes the measures. The Faculty strives for lean, purposeful and efficient processes in the QAD area.
- The employees are aware of the established instruments for evaluating teaching. The Faculty sees the teaching evaluation as a way to improve teaching and not as an instrument of control.
- The relevance of the research infrastructures is checked at regular intervals.
- Study programs are regularly verified and, if necessary, adapted.
- The Faculty follows the DORA Declaration carefully and wholeheartedly supports the Better Science Initiative.



6.

Strategy

implementation



The Faculty of Science is developing an action plan based on the short- and medium-term goals. The action plan will describe in detail measures and responsibilities for implementing the strategy. The implementation of the action plan will be verified every year, first of all by the Strategy Committee and then by the Faculty Committee, in terms of the preparation of the strategy discussions. Where necessary, targets and measures in the action plan will be adapted. The Faculty Council will be informed on a regular basis by the Dean and the Strategy Committee. The Faculty is committed to ensuring that the financial support required to achieve the strategic goals is provided by the University Executive Board. In this respect, planning certainty for strategic funds is of great importance.

## Impressum

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