

STRATEGIC PLAN

Faculty of Science
University of Zagreb

2022 - 2027



IMPRESSUM

Strategic Plan

Faculty of Science, University of Zagreb
for the period 2022 – 2027

Publisher

University of Zagreb, Faculty of Science (PMF)

W: www.pmf.unizg.hr

A: Horvatovac 102A, 10 000 Zagreb

T: +385 1 4606 000 (central)

M: dekanat@dekanat.pmf.hr

Coordinator

Marijana Đaković

The following contributed in the development of this document

Martina Jakovčić, Mladen Vuković, Ivana Ivančić Buće,
Hrvoje Buljan, Maja Telišman Prtenjak, Dubravka Spevec,
Dražan Balen, Biserka Prugovečki, Luka Grubišić

Layout, graphic design

Ivana Erdelez

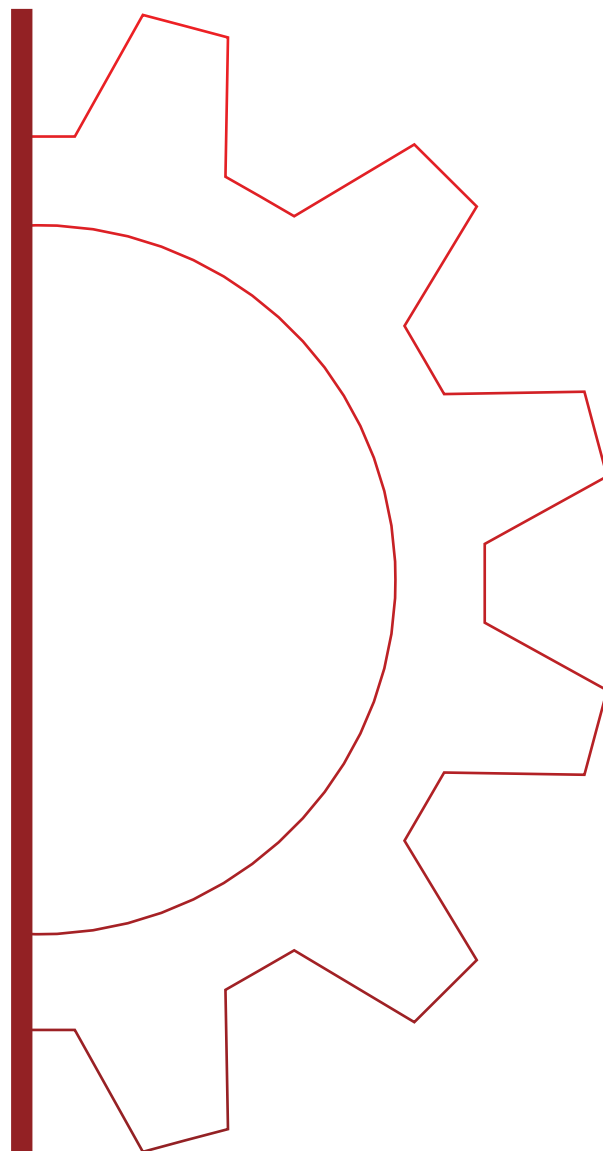


TABLE OF CONTENTS

I. A WORD FROM THE DEAN	4
II. ORGANISATION OF THE FACULTY OF SCIENCE	5
III. ACTIVITIES OF THE FACULTY OF SCIENCE	6
IV. TEACHING ACTIVITIES	7
V. SCIENTIFIC ACTIVITY OF THE FACULTY OF SCIENCE	9
VI. EXPERT WORK, TRANSFER OF KNOWLEDGE AND TECHNOLOGY	10
VII. INTERNATIONAL COOPERATION	11
VIII. POPULARISATION OF SCIENCE	12
1. Day and Night at PMF.....	12
2. Magic in Chemistry.....	12
3. Scientific Discussions at PMF.....	12
4. Career Day at PMF, <i>WorkIn' Science</i> , <i>WISe</i>	13
5. <i>Meet the Mathematicians</i> and <i>Meet the Biologist</i>	13
IX. PUBLISHING ACTIVITIES	13
X. MISSION AND VISION	14
XI. SWOT ANALYSIS	15
XII. FUNDAMENTAL STRATEGIC GOALS	24

I. A WORD FROM THE DEAN

Following the Development Strategy for the Faculty of Science, University of Zagreb for 2015–2020, and after the reaccreditation process for the faculty in 2021, the time has come to adopt the new Strategic Plan for the forthcoming period 2022–2027. A part of the strategy is the SWOT analysis that has been conducted for all areas of faculty operations. This strategy provides a detailed description of the fundamental strategic goals: improving teaching, quality of scientific research, expert work, transfer of knowledge and technology, faculty infrastructure, organisation and improving faculty visibility. The mission of our faculty is to change society through knowledge, while our vision is to be the leading school for mathematics, natural sciences and geography in the broader region, that will prove its strength through a high share of non-budgetary funding, a growing number of study programmes offered in English, the number of foreign students, and a significant share of competitive scientific projects and projects created in cooperation with the business sector. We want to be strongly connected through our infrastructure and science that acts synergistically as a driver of change through innovation to position Croatia as a country with strong and widely available education that is the foundation for creating new products and services.

I am certain that by achieving the set strategic goals, we will further strengthen the reputation of our faculty and that the adoption of this strategy is an important step forwards in the development of the Faculty of Science, University of Zagreb.



II. ORGANISATION OF THE FACULTY OF SCIENCE

The following departments of the Faculty of Science (PMF) are registered in the composition of the faculty as organisational units that operate as faculty branches:

- Department of Biology
- Department of Physics
- Department of Geophysics
- Department of Geography
- Department of Geology
- Department of Chemistry
- Department of Mathematics.

The Department of Biology also includes the Botanical Garden and Vrlika Ecological Station. The Department of Geophysics includes the Seismological Survey, which is organised to perform seismology tasks in accordance with special laws.

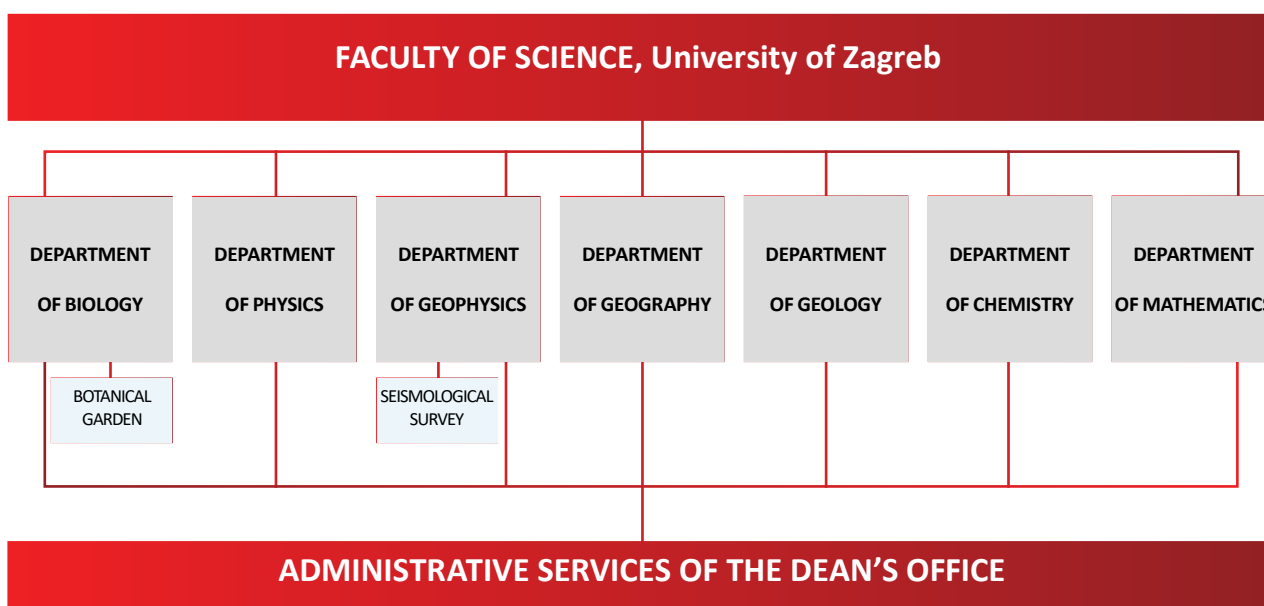


Figure 1. Organisational structure of the Faculty of Science

III. ACTIVITIES OF THE FACULTY OF SCIENCE

PMF Activities are:

1. Organisation and delivery of the university study of mathematics, physics, chemistry, biology, geology, geography, geophysics and computer science,
2. Scientific research activities,
3. Development of scientific and expert projects, technical documentation, analysis, attestations and expertise,
4. Expert tasks in environmental protection,
5. Expertise, standardisation of measurement procedures, measurements and quality control,
6. Library activities for the scientific and teaching needs of mathematics, physics, chemistry, biology, geology, geography and geophysics,
7. Organisation and delivery of different forms of ongoing or short-term training of students and participants,
8. Breeding of laboratory animals, and keeping experimental and wild animals, plants and mushrooms, plant and animal cell cultures, or microorganism cultures,
9. Performing experiments on animals for the purpose of teaching and scientific research work,
10. Organising and holding scientific and expert conferences,
11. Organising and holding workshops, professional practice sessions, symposia and seminars to support the fundamental activities of the faculty,
12. Publishing and information activities for the purposes of teaching, scientific or expert work,
13. Sale of textbooks and other printed materials needed for the performance of faculty activities,
14. Conducting expert assessments for the appropriate activities in mathematics, physics, chemistry, biology, geology, geography, geophysics and computer science,
15. Provision of services for companies and other organisations when this serves the development of the core activities and implies the rational use of space and equipment,
16. Adult education and life-long learning in the fields of mathematics, physics, chemistry, biology, geology, geography, geophysics and computer science,
17. Performance of expert studies and teaching in the fields of mathematics, physics, chemistry, biology, geology, geography, geophysics and computer science,
18. Aerial photography,
19. Information society services.

PMF also performs other activities that contribute to better use of the spatial and personnel capacities of the faculty.

IV. TEACHING ACTIVITIES

PMF is the central institution for the education of teachers in STEM fields and geography in the Republic of Croatia. PMF delivers study programmes at the undergraduate, graduate, integrated and post-graduate levels.

PMF currently offers the following:

- 9 three-year undergraduate university study programmes (180 ECTS points)
- 8 five-year integrated undergraduate and graduate university study programmes (300 ECTS points)
- 18 two-year graduate university study programmes (120 ECTS points)
- 7 three-year post-graduate university study programmes (180 ECTS points)
- 1 two-year post-graduate specialist study programme (120 ECTS points)

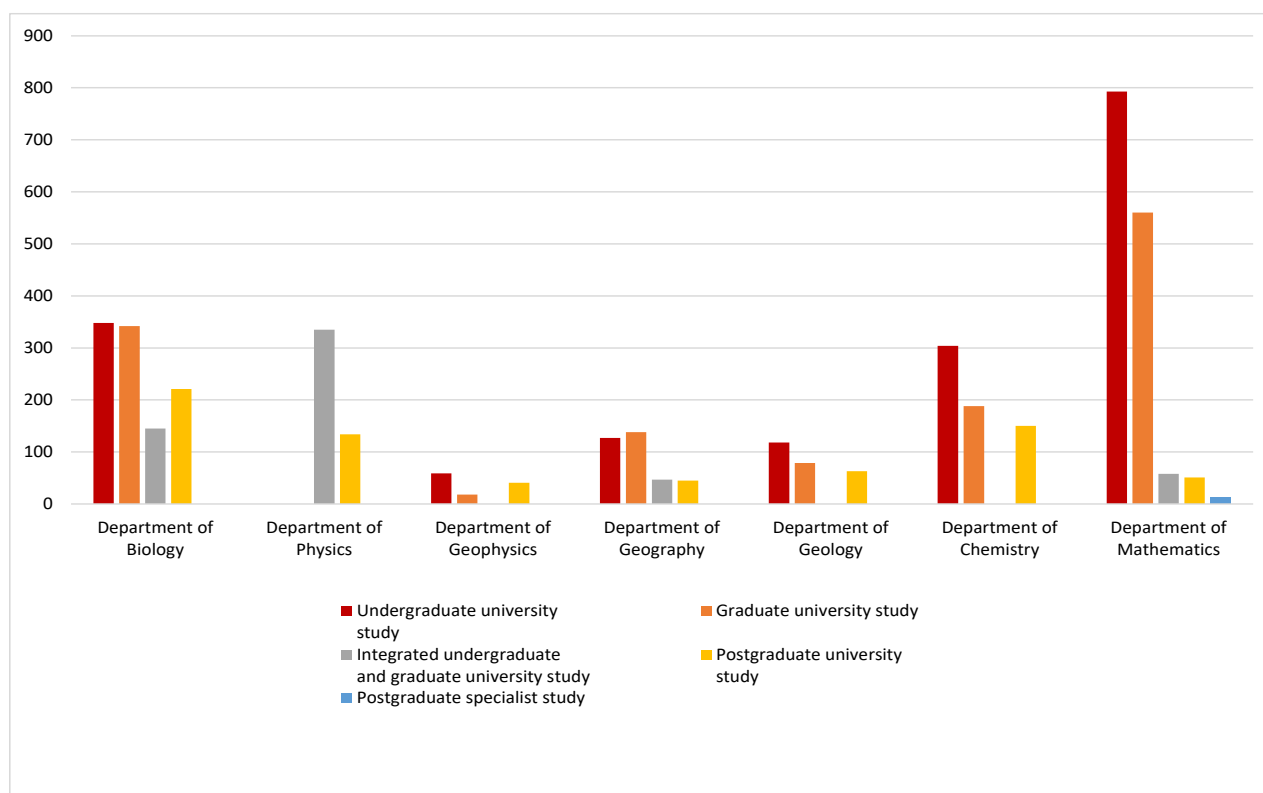


Figure 2. Total number of students enrolled by study level and departments in the 2019/20 academic year.

Strategic plan of the Faculty of Science

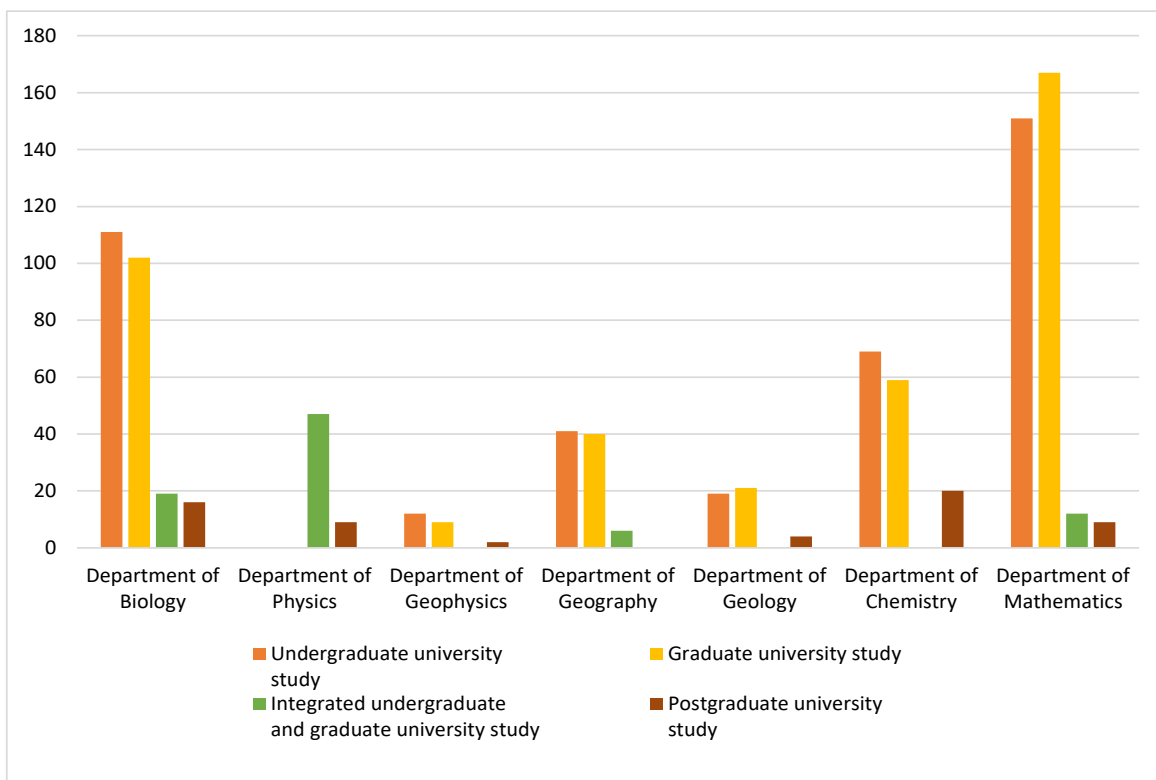


Figure 3. Total number of students completing study programmes by study level and departments in the 2019/20 academic year.



V. SCIENTIFIC ACTIVITY OF THE FACULTY OF SCIENCE

The scientific activities of PMF staff unfold in the areas of natural sciences (within the fields of Mathematics, Physics, Chemistry, Biology and Geophysics) and in interdisciplinary areas of science (field of Geography). In the past five years, more than 2300 scientific papers of the highest category have been published, of which 86% are papers that are the result of cooperation with other higher education institutions and scientific organisations in Croatia and abroad. These papers have been published in the leading scientific journals, including *Science*, *Nature*, *Nature Communication*, *Nature Biotechnology*, *Nature Physics*, *Science Advances*, *Angewandte Chemie Int. Ed.*, *Earth Science Review*, *ACS Central Science*, *Progress in Retinal Eye Research*, *International Journal of Engineering Science*, *Bulletin of the American Meteorological Society*, *SIAM Journal on Scientific Computing*, *Journal of the European Mathematical Society* and many others.

Scientific activities currently take place within 131 projects, of which 47 are scientific and development projects that are financed in whole or in part from international sources, and 84 are financed with national funding (including 27 bilateral projects). The aim is to further advance these scientific activities, particularly those financed from international sources.

Table 1. Scientific productivity of PMF

Type of paper	Total number of papers in the last 5 years
Scientific papers of the highest category pursuant to the Ordinance on conditions for appointment to scientific titles (grade)	2315
Books	17
Book chapters	121
Book editors	21
Expert papers	111
Total number of citations	18, 454 (WoS)
Total h-index	50 (WoS)

Table 2. Number of published papers in 2019/20

Type of paper	Total number of papers in 2019/20 academic year
Scientific papers of the highest category pursuant to the Ordinance on conditions for appointment to scientific titles (grade)	546
Books	10
Book chapters	32
Book editors	5
Expert papers	45

VI. EXPERT WORK, TRANSFER OF KNOWLEDGE AND TECHNOLOGY

The professional activities at PMF are reflected in the many expert projects underway, particularly those in the fields of sustainable development, environmental protection, cooperation with local self-government units, industry, and the general economy or business sector. Cooperation with industry and the economy enable the stronger application of research and technology transfer. PMF also stimulates investments into patents and start-up companies aimed at spurring the application of research.

Over the past five years, professional activities have unfolded within the framework of 67 expert projects.

VII. INTERNATIONAL COOPERATION

International cooperation at PMF takes place within inter-university cooperation, joint international projects, and direct contacts with professors from foreign universities and research institutions.

Table 3. Total student mobility in the last five academic years

	Number of students in international exchange	
	Up to 3 months	More than 3 months
Outgoing mobility	83	421
Incoming mobility	21	157

Table 4. Total mobility of teachers and associates in the last five academic years

	Outgoing mobility		Incoming mobility	
	Up to 3 months	More than 3 months	Up to 3 months	More than 3 months
Teaching	128	32	110	1
Professional	1985	42	107	2
Scientific	1892	32	370	26

In the past five years, the PMF staff have participated in the organising committees of 217 conferences.

VIII. POPULARISATION OF SCIENCE

1. Day and Night at PMF

Biology Night, Physics Today, Chemistry Open Door Day, Geology Open Door Day, Geophysics Live, Geography Open Door Day and Mathematics Open Door Day have all been combined into a single one-day festival of the natural sciences, geography and mathematics. The aim is to present the departments, science and professions to youth and citizens, and the event is open to everyone, from preschoolers to seniors.

2. Magic in Chemistry

The theatrical play Magic in Chemistry is a project developed by the Department of Chemistry and is intended for preschool children and lower grade school children with the aim of popularising chemistry and the natural sciences. The play Magic in Chemistry presents chemistry to children as a fun scientific discipline, a transition from the world of imagination and the impossible towards knowledge, and that seemingly unexplainable things can be understood and predicted. The first meeting with chemistry and the scientific way of thinking and doing research can be decisive in building the child's attitude towards science, a selection of career, and looking critically at the world surrounding them. In this way, children are prepared to have a positive attitude towards chemistry during their education.

3. Scientific Discussions at PMF

Scientific discussions are conceived as an interactive series of lectures and discussions with some of the leading scientists of our time. Every year, PMF hosts eminent scientists from Croatian and other European countries to speak in this popular science event.

Within the departments, scientific seminars are also held, and some have special names and traditions of inviting eminent foreign experts, such as the Sibe Mardešić Colloquium of the Department of Mathematics.

4. Career Day at PMF, WorkIn' Science, WISe

This is an event that brings together employers and students in one place. WISe gives employers the opportunity to present their company from different fields of work to students, as possible future employees, offering them opportunities to work during and after their studies. In addition to presenting employers, each of the seven departments also organises its own round table featuring successful alumni.

5. Meet the Mathematicians and Meet the Biologist

Meet the Mathematicians and Meet the Biologists are events aimed at connecting interested students and employers, and it has been held since 2019. The event includes two parts. The first is a short presentation of employers, while the second is conceived to be Career Speed Dating with employers, intended for the exchange of general information and setting up professional practice or a future job interview. These events are exceptionally successful, as they are oriented on creating very specific agreements, and surveys have shown the high satisfaction of all those participating.

IX. PUBLISHING ACTIVITIES

The publishing activities of PMF are performed in cooperation with professional organisations. PMF participates in the publication of six scientific and four professional journals. PMF staff also write and publish scientific monographs, textbooks and handbooks, both as PMF publications and with other reputed domestic and foreign publishers, and they also write and publish textbooks for primary and secondary school.

X. MISSION AND VISION

Changing society through knowledge!

The mission of PMF is to promote and develop the natural sciences, mathematics and geography at the University of Zagreb and beyond, through participation in internationally relevant and competitive fundamental, applied and development research, to deliver and improve innovative teaching programmes based on research, and to contribute with its overall scientific, teaching and professional activities to the science and education systems of the Republic of Croatia, European Union, and beyond.

The vision of PMF is to continue to be an internationally recognisable and relevant centre of excellence for scientific, teaching and professional work in the fields of the natural sciences, mathematics and geography, in which our scientists, teachers, associates and students are equal participants in the European research space.



XI. SWOT ANALYSIS

1. Strengths

Management and visibility

1. Long-standing tradition and reputation of PMF in university education, scientific research and expert work in the fields of the natural sciences and mathematics.
2. Scientific excellence and international recognition of individual researchers, competitive research groups and the results of their research.
3. Status as a national and regional centre of scientific research and teaching work, and since its inception has been one of the leading scientific institutions in Croatia.
4. Unique interdisciplinary aspect of PMF at the national and regional levels.
5. PMF has proven to have a high capacity to acquire revenues from other sources (extra-budgetary) with great progress achieved in recent years.

Surroundings, infrastructure and equipment

1. Proximity to other University of Zagreb constituents and public scientific institutes, which ensures a stimulatory environment for scientific, teaching and expert work.
2. Establishment of strong connections at the local and regional levels in cooperation with public institutions in the areas of sustainable development and information science.
3. Active inclusion in the daily life of the citizens of the City of Zagreb and Republic of Croatia (Seismological Survey, Botanical Garden, etc.).
4. Dialogue and acceptance of the needs of different Croatian regions (Osijek, Split, Dubrovnik, etc.) to expand natural science studies, primarily their development in the scientific fields and teaching activities.
5. Performance of scientific research work in attractive STEM fields that are in high market demand.
6. Performance of activities to popularise science.
7. Possession of excellent equipment and resources, especially in the new facilities of the Department of Mathematics, Department of Physics (especially after start of the EU project CeNIKS) and Department of Chemistry (especially after start of EU project CluK).

Study programmes

1. Wide selection of study programmes.
2. Highly motivated, dedicated and conscientious students at all levels of study.
3. Large number of excellent students interested and highly motivated to continue their education towards receiving a doctoral degree.
4. Ability to deliver classes remotely, with possibilities for improvement.

Human resources

1. Intellectual potential of a large number of highly competent and motivated staff in scientific, teaching and associate positions, and a favourable ratio of teachers to students.
2. Favourable ratio of teaching to non-teaching staff.
3. Highly motivated individuals who are active in attractive financing and who represent excellent potential for the transfer of knowledge, experience and motivation to a broader circle of scientists in all PMF departments.

Scientific activities and projects

Connections at the national and international level, with a substantial number of national and international scientific projects, and the accompanying scientific infrastructure, library fund and periodicals.

4. Scientific research projects in a wide range of scientific fields.
5. High scientific productivity of the majority of staff, who regularly publish their work in leading international scientific journals having a high impact factor.

Significant improvements to the quality and scope of possible research among PMF staff and students, and increased attractiveness of the Departments of Physics, Chemistry and Mathematics for students, researchers and professors from abroad following the implementation of the projects CluK and CeNIKS, financed from the EU structural funds, and implementation of top quality research as part of the Scientific Centre of Excellence (SCE) for quantum and complex systems and representations of Lie algebras.

International cooperation and cooperation with the economy

1. Numerous research groups in all departments are connected with leading international groups and institutions in research and the development of new technologies.
2. Experiences to date in cooperating with the economy form a solid foundation for establishing integral strategies for economic cooperation, and long-term strengthening of this cooperation on the basis of the adopted strategy.

2. Weaknesses

Management and visibility

1. Insufficient reliance on international sources of funding, particularly international projects.
2. Complex organisation causes multiplication of procedures.
3. Irrational, cost and time ineffective and non-transparent organisation of administrative services (partly due to their dislocation).
4. Quality of project administration is not at an appropriate level.
5. Existing organisational structure does not enable proper project management and tracking project and scientific activities.
6. Inadequate engagement in the public promotion of PMF, from the website to presentation of results of PMF researchers in the Croatian media.
7. Insufficient international recognisability of PMF and consequentially unused potential for international cooperation.
8. The distribution of resources ultimately reduces connections between fields and scientific areas, which largely hinders the implementation of common standards and criteria, and negatively reflects on the indicator effects (quality), stimulating interdisciplinary study, and establishing joint research in the natural sciences.
9. Insufficient (virtually negligible) revenues from donations.
10. Suboptimal organisation of library operation (largely due to dislocation).

Surroundings, infrastructure and equipment

1. Existing spatial fragmentation and inappropriate spatial housing of parts of the natural sciences seriously hinders the performance of scientific and teaching activities, and adequate administrative support, leading to losses in efficiency in resources and time.
2. Completely inadequate condition of building and resources for the geoscience and bioscience departments (buildings are partly unsuitable for use, too small and spatially too dislocated). Additionally, these buildings were damaged in the March 2000 earthquake.
3. Lack of an efficient and up-to-date information system for monitoring scientific research activities and project work.

Study programmes

1. Inadequate interest of candidates for enrolment into scientific teaching study programmes.
2. Non-alignment between departments with regard to study programmes, resulted in irrational organisation of classes.
3. Weak links and insufficient cooperation between departments in the delivery of study programmes.
4. Student workload (and teacher workload) is unclear and uneven between different study programmes, both in the sense of testing and of teaching, and of other requirements. Need to rationalise and increase transparency.

Human resources

1. Insufficient number of scientific-teaching and junior researcher positions, and post-doctoral positions, which causes staff to be overburdened with teaching and administrative obligations.
2. Inappropriate validation of the creation of internationally recognisable groups of researchers, with large project sources of financing, particularly those financed with European Union funds.
3. International and domestic projects, in all phases from winning projects to their implementation and reporting, lack the necessary personnel (project) support, at both the department and faculty levels.
4. Libraries in all departments are understaffed.
5. Administrative services are understaffed, regardless of the large number of employees in administrative positions (decentralised administration).

Scientific activities and projects

1. Insufficient number of good foreign post-doctoral candidates (partly due to the fact that post-doc salaries from domestic sources of financing are listed in the national standard) foreign doctoral candidates and project heads/researchers.
2. Lack of cooperation between departments means there are weak opportunities for interdisciplinary and multidisciplinary research.
3. Lack of motivation and focus of scientists to apply for EU and other international projects.
4. Lack of institutional support in drafting international project applications.
5. Ambiguity of the strategy pertaining to expert and market-based projects, different positions among departments concerning implementation of such projects.
6. Unused potential of the interdisciplinary nature of PMF. Departments act as closed units and other than rare participation, there is no interaction between them.

International cooperation and cooperation with the economy

1. Insufficient inclusion in international projects, with large differences between the departments. The unutilised potential is massive.
2. Portfolio of international projects is too small, which does not secure a stable and constant financial inflow from the EU and other international sources of financing.
3. Lack of a strategy concerning cooperation with the economy.
4. Lack of connections with the economy which, on the one hand, is the result of an insufficient understanding of economic needs and, on the other, the economy does not have information about how it could cooperate with PMF (for its needs and for its benefits).
5. There is no transfer of knowledge and experience gained in the implementation of international projects between departments.
6. International mobility (longer stays) of employees and students is not satisfactory.
7. Too few courses are delivered in English, and there is insufficient interest of domestic students to attend classes delivered in English.
8. Lack of an alumni club and with that lack of connections with former students who successfully completed their studies at PMF.

3. Opportunities

Management and visibility

1. Positively assessed reaccreditation of PMF (in 2021) and individual doctoral study programmes at PMF (in 2018).
2. Priorities of the new Multi-year financial framework (2021–2027) and goals of the Cohesion Policy (2021–2027).
3. Alignment with European higher education systems, and internationalisation and increasing competitiveness of educational programmes at the international level.
4. Financing research projects and doctoral candidates through funding of the Croatian Science Foundation.
5. Financing research projects through funding from the EU funds and joint applications of projects with other Croatian or foreign institutions.
6. Support of the Ministry of Science, Education and Sport for STEM areas allows for the reduction of student participation in the costs of studies.
7. Participation in proposing and monitoring new legislative proposals relating to higher education and scientific activities.

Surrounding, infrastructure and equipment

1. Attractiveness of the geographic position of PMF for foreign researchers and students.
2. Improvement of the scientific infrastructure through the application of projects for European structural funds and joint applications of projects with industry.
3. Establishment of functional connections with other stakeholders in the education system, economy and media.
4. Uniting the research capacities in the natural sciences, mathematics and biomedicine in the areas of the North Campus of the University of Zagreb.

Study programmes

1. Modernisation of teaching and scientific programmes, and balancing of the existing enrolment quotas with the contemporary achievements and needs of society.
2. Launching new study programmes and reshaping existing programmes to meet the needs of the economy.

Human resources

1. Maximum unloading of administrative and teaching obligations of the most productive faculty scientists, in line with the valid regulations and laws.
2. Introduction of quality criteria and improving opportunities to reward lecturers and scientific productivity, and introduce a quality policy into advancements into higher scientific and teaching titles (grades).
3. Inclusion of teaching staff into the evaluation process for projects in EU programmes.

Scientific activities and projects

1. Active inclusion in international projects.
2. More intensive scientific connections with other domestic and foreign scientific and academic institutions.
3. Connections with successful scientists – former PMF students as part of the PMF Alumni club.
4. Establishment of centres of excellence.
5. Connecting departments with the aim of implementing interdisciplinary research.

International cooperation and cooperation with the economy

1. Increasing incoming and outgoing mobility of students and faculty at the university, national and international level.
2. More intensive partnerships with economic entities in developing their innovations.
3. More intensive partnerships with economic entities in joint research as part of EU projects.
4. More intensive connections with international research institutions and inclusion in international research projects.
5. Greater accessibility of international scholarships and stipends.

4. Threats

Management and visibility

1. Reductions in funding from the state budget and lack of funds from non-budgetary sources.
2. Insufficient level of use of financing for research from European Union funds can cause a weaker position of PMF in comparison with scientific organisations in the surrounding countries.
3. Inadequate legislative framework for the development of research work.
4. Further significant reductions to the budgets of Croatian universities, particularly in the parts pertaining to research, as a consequence of the financial crisis affecting Croatia.

Surroundings, infrastructure and equipment

1. Spatial inequality of the fields of Biology, Geology and Geography within the central Horvatovac location.
2. Inadequate investments from the state budget for maintaining the existing infrastructure.
3. Delays to the project to build the North Campus of the University of Zagreb.
4. Insufficient earmarking of funds from state and private funds and foundations for science.

Study programmes

1. Loss of interest for the study of the natural sciences and the unattractive and poor social status of teaching professions.
2. Depopulation – fewer students.
3. Non-alignment of individual study programmes with the needs for knowledge-based social development.

Human resources

1. Brain drain of high quality personnel leaving the Republic of Croatia.
2. Non-approval of new development work posts by the Ministry of Science and Education.
3. Lack of a rewards system for the best applicants to international competitions.
4. Limited possibility for advancement to scientific-teaching work posts has a demotivating effect.
5. Non-competitiveness of employment in research work at PMF in relation to employment in other sectors. This also pertains to other work posts (project offices, procurement) and increased activities in international projects demands more competent staff.
6. Greater attractiveness of research work abroad.

Scientific activities and projects

1. Insufficient number of new scientific-teaching and assistant positions and post-doctoral positions.
2. Rigid labour legislation and a lack of financial resources significantly hinders the employment of foreign researchers.
3. Inadequate legislative framework for the development of research work.

International cooperation and cooperation with the economy

1. Unfavourable economic structure – lack of knowledge-based stimulation of the economy
2. Low interest of the business sector for research projects.
3. Economic crisis has reduced the research activities of the economy.

XII. FUNDAMENTAL STRATEGIC GOALS

1. Improving course quality and promoting the significance of the education process

PMF will continually improve the existing and develop new innovative university study programmes based on the newest scientific discoveries and will develop life-long learning education. These programmes will offer top quality university education in the field of the natural sciences, mathematics and geography as the foundation of future development of science and society as a whole.

2. Improving the quality of scientific research

PMF will support excellence in scientific research as the basis for attracting financing from competitive national and international sources, and ensure the equal inclusion of its faculty members in the European Research Area. PMF will prepare and apply for EU structural projects to improve and modernise the experimental basis for competitive scientific research.

3. Improving the quality of expert work, transfer of knowledge and technology

PMF will stimulate the improvement of the quality of expert work and the transfer of knowledge and technology into the economy, and their broader applications through a series of new and already tested activities, so as to enable the Faculty scientists, through their expertise and expert work, to continually contribute to resolving a diverse range of issues in different aspects of society in the Republic of Croatia.

4. Advancing infrastructure, organisation and management and the self-assessment system

Advancing all types of infrastructure, particularly spatial capacities, remains one of the main goals of the Faculty. PMF will continue to repair the damages caused by the earthquakes in March and December 2020, and to compile the necessary documentation for construction of the new building (BGG building) and start its construction, and construct the required infrastructure for the Seismological Survey. Further development of internal procedures and activities of the Faculty will continue towards reorganising the work of the administrative services and improving overall effectiveness.

5. Increasing influence on the development of society as a whole and accepting social responsibility

Social participation is an important role of PMF, and the Faculty will actively work to implement scientific and expert findings with the aim of further technological advancement, conservation of the environment, and improving the quality of life and work in the Republic of Croatia.

6. Increasing visibility of the Faculty in the public sphere and in the social community

Visibility of the Faculty in the public sphere and in the social community is of exceptional importance for the further development of PMF and to retain its leading role in the development of society. Therefore, the Faculty will work to increase its visibility through clear communications of its activities, its mission and vision, and the results of its scientific, research and teaching work.

1. Improving course quality and promoting the significance of the education process

PMF will continually improve the existing and develop new innovative university study programmes based on the newest scientific discoveries and develop life-long learning education. These programmes will offer top quality university education in the field of the natural sciences, mathematics and geography as the foundation of future development of science and society as a whole.

In order to improve course quality and to promote the significance of the education process, PMF will focus on:

1.1. Aligning existing and develop new study programmes

The constant changes on the labour market demand an integral approach to researching the needs of employers and adapting existing and developing new study programmes. Through ongoing communication with employers, it is necessary to monitor their needs, and to alter the existing study programmes accordingly.

This goal will be achieved through the following activities:

- A.1.1.1.** Aligning and adapting course content at the department and faculty levels.
- A.1.1.2.** Improving existing study programmes.
- A.1.1.3.** Developing new study programmes (modular approach).
- A.1.1.4.** Drafting the Standard of Professions and Standard of Qualifications.

1.2. Improving the quality assurance system for teaching and ongoing implementation of external evaluation and self-evaluation

Ensuring a quality assurance system for teaching implies monitoring, analysis and reporting on the success of studying for individual generations of students. Further, monitoring and analysing the employability of students completing their students enables PMF to align its existing study programmes with the demands of the labour market.

This goal will be achieved through the following activities:

- A.1.2.1.** Monitoring success of students during and after study.
- A.1.2.2.** Monitoring the rate of employment of students after graduation.
- A.1.2.3.** Conducting student surveys.
- A.1.2.4.** Establishing the PMF Alumni Club, which includes activities of Alumni clubs of individual professions.
- A.1.2.5.** Increasing the integration of scientific research and the education process.
- A.1.2.6.** Establishing a rewards system for excellence in teaching.

Monitoring the success of students during their studies implies tracking passing rates and completion of individual study programmes, including semestral monitoring of the passing rates of certain course.

For each study programme, measures will be defined to remove issues with low passing rates.

1.3. Increasing mobility among PMF staff and students

Stimulating foreign mobility creates the assumptions for improving the quality of teaching and scientific work of the PMF staff. In order to increased outgoing mobility of students, a more transparent system of recognising mobility and student commitments must be achieved. With the aim of increasing the mobility of incoming students, more courses must be offered in English.

This goal will be achieved through the following activities:

A.1.3.1. Increasing the availability of information for PMF staff and students, and students, teachers and researchers from abroad.

A.1.3.2. Increasing the international exchange of PMF staff and students and students, teachers and researchers from abroad.

A.1.3.3. Increasing the number of courses available in English, and develop and implement study programmes that are executed entirely in English.

A.1.3.4. Modifying enrolment quotas in line with the surroundings.

1.4. Establishing a sustainable system of life-long learning

PMF should play a key role in conducting professional development of teachers in elementary and secondary schools, and also in the transfer of new knowledge and findings for other sectors of the labour market. There is currently a system of synergy between the faculty departments and the relevant agencies for conducting professional education for teachers in elementary and secondary schools through expert councils, seminars and workshops. A sustainable system should be designed for the life-long learning of other experts (masters) of individual fields.

This goal will be achieved through the following activities:

A.1.4.1. Implementing professional development for primary and secondary school teachers, doctoral students, and scientific-teaching staff.

A.1.4.2. Recognising talented pupils in primary and secondary schools and their inclusion in advanced workshops, summer schools and preparations for international competitions.

1.5. Improving teaching infrastructure

PMF must take significant steps in the application of new technologies in teaching, and strengthen the application of e-learning. Further investments are required to ensure an adequate number of textbooks, scientific and expert literature, and to encourage the publication of textbooks in Croatian, with the aim of strengthening the Croatian nomenclature.

This goal will be achieved through the following activities:

- A.1.5.1.** Analysing and monitoring the application of e-learning and implementation of modern technology in teaching at PMF.
- A.1.5.2.** Supporting e-learning for students and staff at PMF.
- A.1.5.3.** Increasing the fund of textbooks, scientific and expert literature.
- A.1.5.4.** Equipping facilities for exercise labs and exercise classes.

2. Improving the quality of scientific research

PMF will support excellence in scientific research as the basis for attracting financing from competitive national and international sources, and ensure the equal inclusion of its faculty members in the European Research Area. PMF will prepare and apply for EU structural projects to improve and modernise the experimental basis for competitive scientific research.

In order to improve the quality of scientific research, PMF will focus on:

2.1. Raising the level of quality and the number of high quality scientific journals

In the forthcoming period, PMF will support excellence in scientific research and the publication of scientific papers in journals with a high impact factor.

This goal will be achieved through the following activities:

A.2.1.1. Rewarding and highlighting scientists with exceptional research results.

A.2.1.2. Analysing and monitoring the position of PMF scientific disciplines on relevant global rankings (e.g., Shanghai, Leiden).

2.2. Stimulating the further establishment and affirmation of internationally recognized scientific groups

The international recognisability of PMF is one of the main objectives of the faculty, and PMF will actively work to increase international visibility and recognisability of scientific groups and the faculty as a whole.

This goal will be achieved through the following activities:

A.2.2.1. Supporting the establishment and work of scientific groups

A.2.2.2. Analysing and monitoring of PMF applications for scientific projects from EU funds

A.2.2.3. Improving systematic support during the application process and implementation of projects

A.2.2.4. Cooperating with scientists from relevant global research centres.

2.3. Increasing interdisciplinary and multidisciplinary aspects of scientific research

Contemporary scientific research demands a multidisciplinary approach and findings, and PMF will encourage the cooperation of professions within the faculty and cooperation with other fields of sciences.

This goal will be achieved through the following activities:

A.2.3.1. Stimulating and tracking applications for competitive projects jointly filed by at least two PMF departments.

A.2.3.2. Jointly planning the development of deficit areas with strong interdisciplinary potential (e.g., computer science, educational research in the fields covered by PMF, medical physics, etc.).

A.2.3.3. Organising interdepartmental scientific colloquia.

A.2.3.4. Strengthening connections between doctoral study programmes at PMF.

2.4. Establishing the Central project office

Establishing the Central project office will allow for the provision of administrative support in the preparation of applications, assistance in seeking partners in projects, stimulation of cooperation between departments, and the timely exchange of relevant information, knowledge and experience.

This goal will be achieved through the following activities:

A.2.4.1. Establishing the Central project office.

A.2.4.2. Hiring the required staff.

A.2.4.3. Providing information to support project work and communications.

A.2.4.4. Ensuring a stimulating work environment and working conditions.

2.5. Developing and maintaining contemporary and advanced scientific infrastructure

PMF will develop and maintain scientific infrastructure in all fields of research, using the available structural funds and other sources of financing.

This goal is planned to be implemented through activities to improve the infrastructure as outlined under Strategic goal 4. Improvement of infrastructure, organisation and management, and self-evaluation systems.

3. Improving the quality of expert work, transfer of knowledge and technology

PMF will stimulate the improvement of the quality of expert work and the transfer of knowledge and technology into the economy, and their broader applications through a series of new and already tested activities, so as to enable Faculty scientists, through their expertise and expert work, to continually contribute to resolving a diverse range of issues in different aspects of society in the Republic of Croatia.

In order to improve the quality of expert work, transfer of knowledge and technology, PMF will focus on:

3.1. Increasing the number of expert projects

In providing administrative and technical support, PMF will continue to encourage the cooperation of its scientists with the private sector and public sector.

This goal will be achieved through the following activities:

- A.3.1.1.** Analysing and tracking applications for PoC projects.
- A.3.1.2.** Analysing and tracking applications for IRI projects.
- A.3.1.3.** Automating the approval process for cooperation of staff with economic entities in the transfer of knowledge and experience of staff.

3.2. Stimulating the protection of intellectual property, copyrights and other real rights

PMF recognises the importance of innovative research results, and the significance of these results for the development of society as a whole. PMF will actively work towards and support the transfer of knowledge and technology ensuing from scientific research activities.

This goal will be achieved through the following activities:

- A.3.2.1.** Analysing activities associated with the procedures to protect intellectual rights at PMF.
- A.3.2.2.** Encouraging Faculty scientists in entrepreneurial activities.
- A.3.2.3.** Drafting a rulebook on the transfer of intellectual property (IP) to spin-off companies co-owned by the Faculty, and researchers who contributed to the development of IP.
- A.3.2.4.** Analysing activities to establish spin-off companies in which PMF would be in the ownership structure.

3.3. Increasing the visibility of research, development and innovation activities of PMF

PMF will work towards stimulating all activities aimed at improving research, development and innovation activities, and will systematically promote its scientific activities and findings in the media.

This goal will be achieved through the following activities:

- A.3.3.1.** Developing a system of connection and cooperation in project implementation through the creation of an expertise portal.
- A.3.3.2.** Establishing a system of presentations “Examples of business success”.
- A.3.3.3.** Drafting a rulebook to recognize excellence in expert work.

4. Improving infrastructure, organisation and management, and self-assessment systems

Advancing all types of infrastructure, particularly spatial capacities, remains one of the main goals of the Faculty. PMF will continue to repair the damages caused by the earthquakes in March and December 2020, and to compile the necessary documentation for construction of the new building (BGG building) and start its construction, and construct the required infrastructure for the Seismological Survey. Further development of internal procedures and activities of the Faculty will continue towards reorganising the work of the administrative services and improving overall effectiveness.

In order to improve infrastructure, organisation and management, and self-assessment systems, PMF will focus on:

4.1. Post-earthquake rebuilding of infrastructure

PMF infrastructure in the Zagreb city centre was significantly damaged in the earthquakes that occurred in 2020. Damaged structures will be rebuilt thanks to funds from the European Solidarity Fund and the Recovery and Resilience Mechanisms and the Croatian state budget.

This goal will be accomplished through the following activities:

A.4.1.1. Rebuilding the buildings damaged in the earthquake at Rooseveltov trg 6, Marulićev trg 19, Marulićev trg 20 and Marulićev trg 9a.

4.2. Constructing new spatial infrastructure (BGG building at Horvatovac)

The spatial dislocation of PMF at five locations in Zagreb largely hinders scientific research work, studying, administrative operations and mutual cooperation and the use of available scientific equipment. Furthermore, two dislocated departments, Biology and Geography, are housed in very old and inadequate buildings. Therefore, one of the main priorities is to accelerate the construction of the planned BGG complex at Horvatovac.

This goal will be accomplished through the following activities:

A.4.2.1. Applying for EU structural funds.

A.4.2.2. Completing the main project plans.

A.4.2.3. Constructing the BGG building.

4.3. Constructing the infrastructure for the Seismological Survey (seismology network station)

The earthquakes that occurred in Zagreb and Petrinja indicated the need to build new infrastructure for the Seismological Survey. The existing seismology infrastructure will be supplemented with the construction of new infrastructure that includes the construction of a seismology network station.

This goal will be achieved through the following activities:

- A.4.3.1.** Securing financing through the National Recovery and Resilience Plan (NRRP).
- A.4.3.2.** Developing the project for the seismology station.
- A.4.3.3.** Constructing and installing the seismology station.

4.4. Improving infrastructure capacities of the faculty

With the aim of maintaining and improving the existing spatial capacities, it is necessary to compile a list of priorities for infrastructure investments. This list will contain requests for necessary maintenance, and also investments to improve capacities and the better use of current infrastructure, to reduce utility costs (such as installation of renewable energy sources), and other investments to strengthen scientific infrastructure.

This goal will be achieved through the following activities:

- A.4.4.1.** Establishing a Committee for Infrastructure.
- A.4.4.2.** Planning the current maintenance of infrastructure and priority infrastructure investments.
- A.4.4.3.** Improving infrastructure through applications to calls for infrastructure projects.

4.5. Improving self-control systems

PMF will conduct self-evaluation cycles and monitoring of the implementation of action plans, and work towards further improvement of the self-evaluation systems.

This goal will be achieved through the following activities:

- A.4.5.1.** Aligning existing rulebooks.
- A.4.5.2.** Conducting Internal and external evaluations.
- A.4.5.3.** Analysing external evaluation results.

5. Increasing influence on the development of society as a whole and accepting social responsibility

Social participation is an important role of PMF, and the Faculty will actively work to implement scientific and expert findings with the aim of further technological advancement, conservation of the environment, and improving the quality of life and work in the Republic of Croatia.

In order to expand its influence on the development of society as a whole and to accept social responsibility, PMF will focus on:

5.1. Regulating work on commercial studies for the purposes of the economy and local self-government units (expert and scientific projects, court expertise, hiring consultants, etc.)

PMF will stimulate the expert work of its staff that contributes to strengthening the social role of the faculty.

This goal will be achieved through the following activities:

A.5.1.1. Adopting a rule book that regulates work on commercial studies.

A.5.1.2. Developing the database of Faculty experts and consultants having specific knowledge and practice needed for the labour market.

5.2. Establishing activities to stimulate start-up companies

PMF stimulates the scientific development and inclusion of students and young scientists onto the labour market through systematic assistance in the development and actualisation of the best new ideas.

This goal will be achieved through the following activities:

A.5.2.1. Designing a system to connect students with mentors from the business sector.

A.5.2.2. Monitoring the system from idea to actualisation.

5.3. Improving programmes for life-long learning and expertise

With continuous work to improve life-long learning of teachers in primary and secondary schools, PMF will secure a stronger role in the provision of life-long learning of masters in different professions through the accreditation of programmes of life-long learnings in different professions. Increasing the share of standardised procedure and the accreditation of laboratories will ensure the recognisability of PMF and strengthen cooperation with the labour market.

This goal will be achieved through the following activities:

A.5.3.1. Accrediting programmes for life-long learning in specific professions (for the purpose of obtaining work licences).

A.5.3.2. Increasing the ratio of shares of standardised procedures and commercial procedures, especially in laboratory and field research.

A.5.3.3. Accrediting laboratories.

6. Increasing visibility of the Faculty in the public sphere and in the social community

Visibility of the Faculty in the public sphere and in the social community is of exceptional importance for the further development of PMF and to retain its leading role in the development of society. Therefore, the Faculty will work to increase its visibility through clear communications of its activities, its mission and vision, and the results of its scientific, research and teaching work.

In order to increased its visibility in the media sphere and in the social community, PMF will focus on:

6.1. Promoting PMF and its activities in the media and society

PMF systematically monitors and reports on its scientific research activities and the results achieved.

This goal will be accomplished through the following activities:

A.6.1.1. Adopting the PMF public communication strategy.

A.6.1.2. Ensuring presence in means of public information and on social media.

6.2. Ongoing organisation of and participation in popular science events

Improving the promotion of and visual identity of PMF will contribute to increasing the attractiveness of study programmes for future students. Meanwhile, participation in and organising popular science events contributes to increasing PMF's social role.

This goal will be achieved through the following activities:

A.6.2.1. Ongoing organisation of and participation in popular science events.

A.6.2.2. Improving self-promotion and visual identity.