



FACULTY OF SCIENCE
Palacký University Olomouc



Palacký University Olomouc

Palacký University is an integral part of the city of Olomouc – one of the most beautiful in the Czech Republic. This historic city, the sixth largest in the country, is situated in Central Moravia at the confluence of the Morava and Bystřice rivers. It serves as an important industrial city, transportation hub and a centre of culture and education. With its almost 100,000 inhabitants it is rightly called a university city, as it grows by more than 23,000 students during the academic year. The history of the local university, which is the second oldest in the Czech Republic, dates back to 1573. Nowadays it represents a modern educational and research institution offering a wide range of study programmes at eight faculties.



Faculty of Science

Faculty of Science of the Palacký University Olomouc is a research-oriented faculty. It offers Bachelor's, Master's, and Doctoral studies in various fields of Mathematics, Computer Science, Physics, Chemistry, Biology, Ecology and Environmental Sciences, and Earth Sciences, including programmes preparing future teachers of natural sciences. Currently there are approximately 3,900 students and over 800 employees at the faculty.

Locations and Facilities

Most faculty facilities, as well as the dormitories and the university canteen, are located in the complex of buildings close to the city centre. Biology and some Chemistry departments are situated in the campus in Olomouc-Holice. Thanks to European funding and successes in national grant competitions the faculty managed to build modern facilities with state-of-the-art equipment. Other essential faculty facilities include an interactive museum Fort Science and the Botanical Garden.

Reasons to study at the Faculty of Science

- Friendly and individual approach to students
- High-quality education in modern facilities
- Top experts with excellent scientific achievements
 - Students can participate in research
- Contacts with future employers during studies
 - Motivational scholarships
 - Support for international mobility
- Chance to participate in popularization of science
- Living in Olomouc, a university city with rich offer of cultural and sporting activities

Areas of Research and Study

Mathematics and Computer Science

- Universal algebra, ordered sets and algebraic models
- Mathematical analysis, differential geometry
- Numerical methods, optimization, industrial mathematics
- Applied statistics, data science
- Algorithms, programming, programming languages
- Computer networks, operating systems, databases, web
- Computer science, complexity of algorithms, logic
- Artificial intelligence, machine learning

Physics

- Quantum information transfer and processing
- Quantum and nonlinear optics, interaction of light and matter
- Advanced optical tomographic methods, Raman spectroscopy
- Modern measurement systems in applied physics
- Nanotechnology and nanomaterials
- International collaborations in the field of particle physics
- Study of the human voice production
- Study of reactive oxygen species in biological systems

Chemistry

- Nanomaterials in physical chemistry
- Computational chemistry of biomacromolecules
- Analytical chemistry, toxicological and forensic analysis

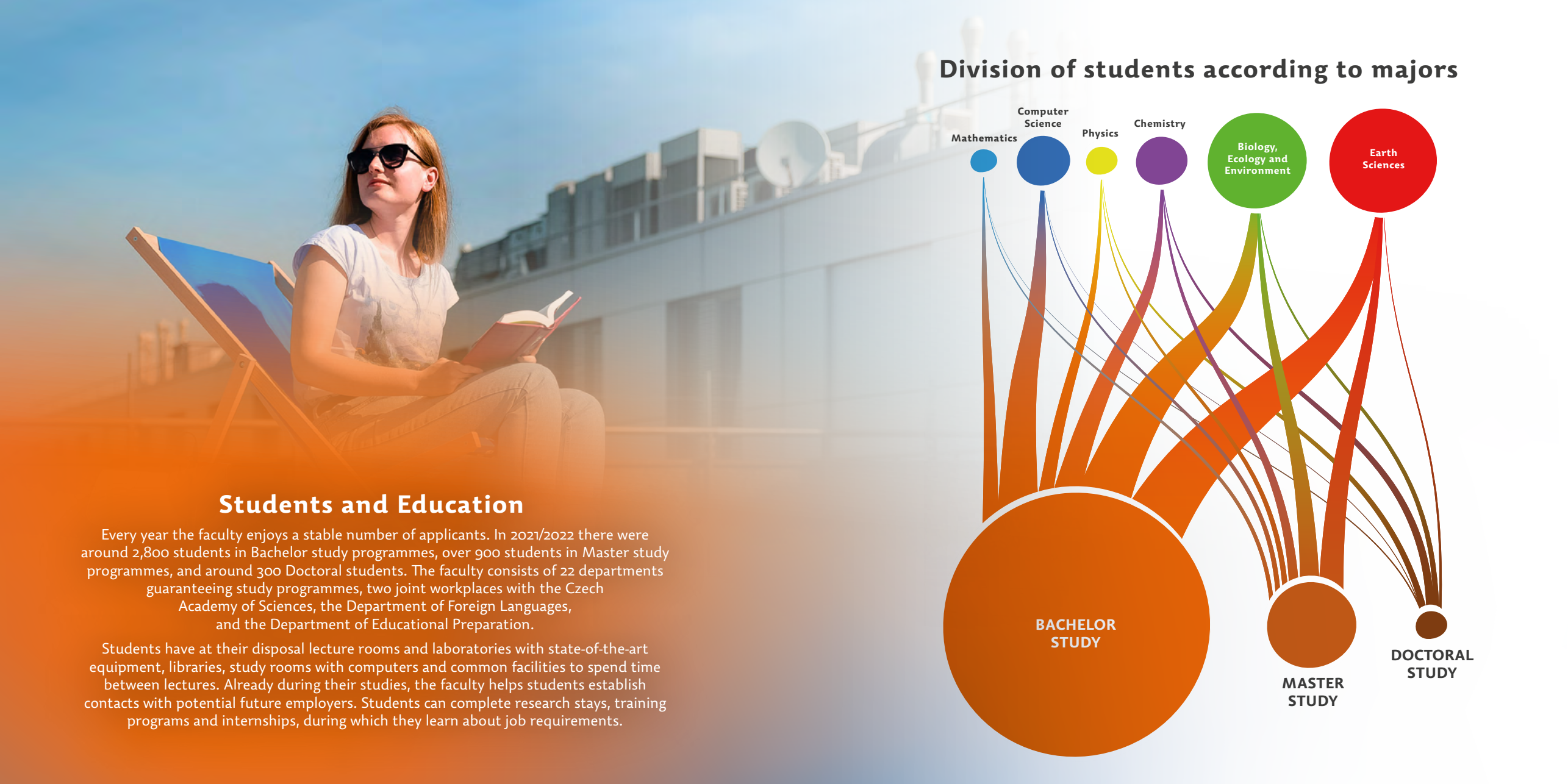
- Development of compounds with anticancer activity
- Preparation of materials with interesting magnetic properties
- Study of plant defence mechanisms and plant hormones
- Development of new methods of organic synthesis
- Protein biochemistry

Biology, Ecology and Environment

- Biosystematics of higher plants, algae, and fungi
- Plant biotechnology and genetics, phytopathology
- Systematics and phylogeny of animals
- Animal life strategies, evolutionary biology
- Ecology and behavioural ecology
- Hydrobiology, agroecology, and environmental protection
- Toxicology, molecular pharmacology, molecular biology
- Experimental plant, animal and human biology

Earth Sciences

- GIS, web cartography, spatial modelling
- Contactless landscape monitoring, atlas cartography
- Research on map reading using eye-tracking technology
- Mapping the landscape in the present and the past
- Study of spatial organization of urban systems, urban climate
- Sustainable development, global climate change
- Study of anthropogenic pollutants in the environment
- Applied research in geoarchaeology and petroarchaeology

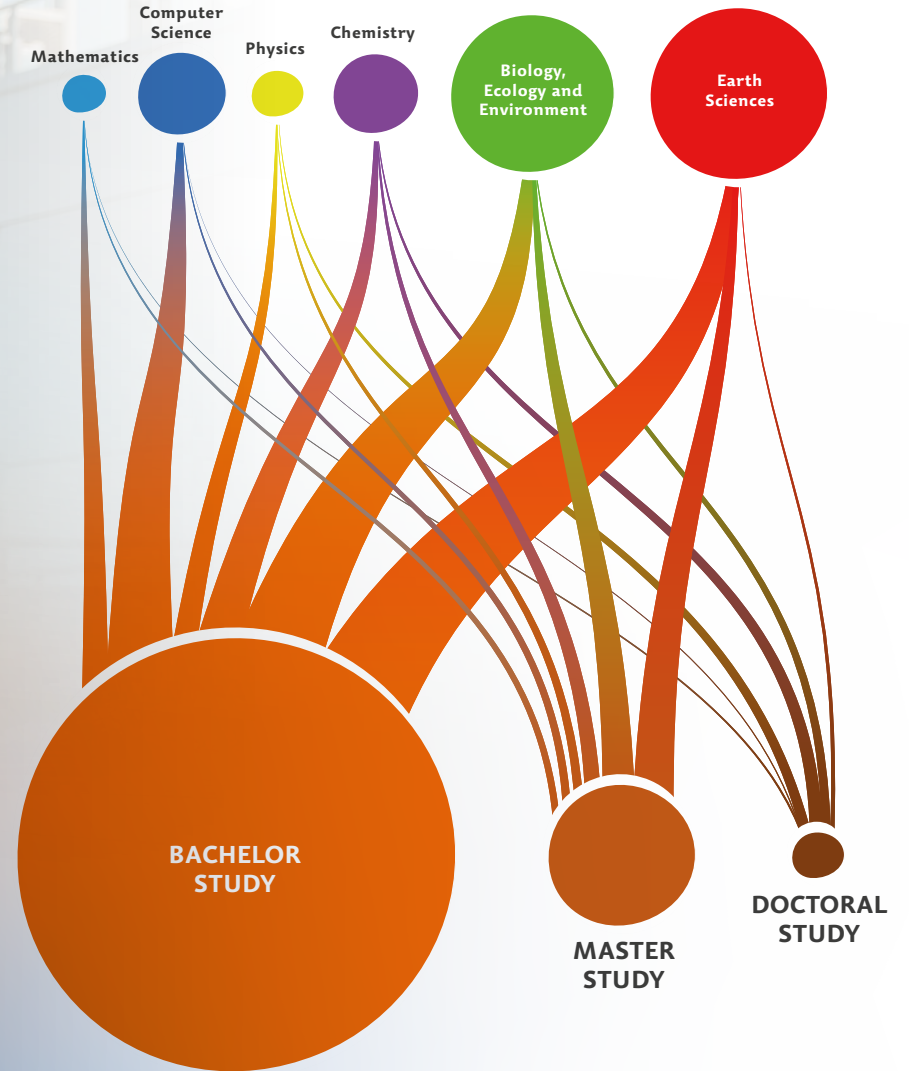


Students and Education

Every year the faculty enjoys a stable number of applicants. In 2021/2022 there were around 2,800 students in Bachelor study programmes, over 900 students in Master study programmes, and around 300 Doctoral students. The faculty consists of 22 departments guaranteeing study programmes, two joint workplaces with the Czech Academy of Sciences, the Department of Foreign Languages, and the Department of Educational Preparation.

Students have at their disposal lecture rooms and laboratories with state-of-the-art equipment, libraries, study rooms with computers and common facilities to spend time between lectures. Already during their studies, the faculty helps students establish contacts with potential future employers. Students can complete research stays, training programs and internships, during which they learn about job requirements.

Division of students according to majors



English Study Programmes

The Faculty of Science offers study in the English language for degree students in Doctoral (Ph.D.), Master's and Bachelor's programmes.

The widest offer of English programmes is in Doctoral degree programmes, which last 4 years. Furthermore, each year there are several scholarships available to support foreign doctoral students. The scholarship holders report on their results in an annual seminar.

In the follow-up Master's degree programmes, the faculty offers, among others, a two-year joint Master Programme (Erasmus Mundus Joint Master Degree) in Global Development Policy, which is based on cooperation among three universities: Palacký University, University of Clermont Auvergne (France) and University of Pavia (Italy).

Another offered programme is the Copernicus Master in Digital Earth, which is run in cooperation with University of Salzburg (Austria).

Within the Bachelor degree, the faculty offers three-year programmes Petroleum Engineering and Geoinformatics and Cartography.



Check our current offer on
prf.upol.cz/en/prospective-students





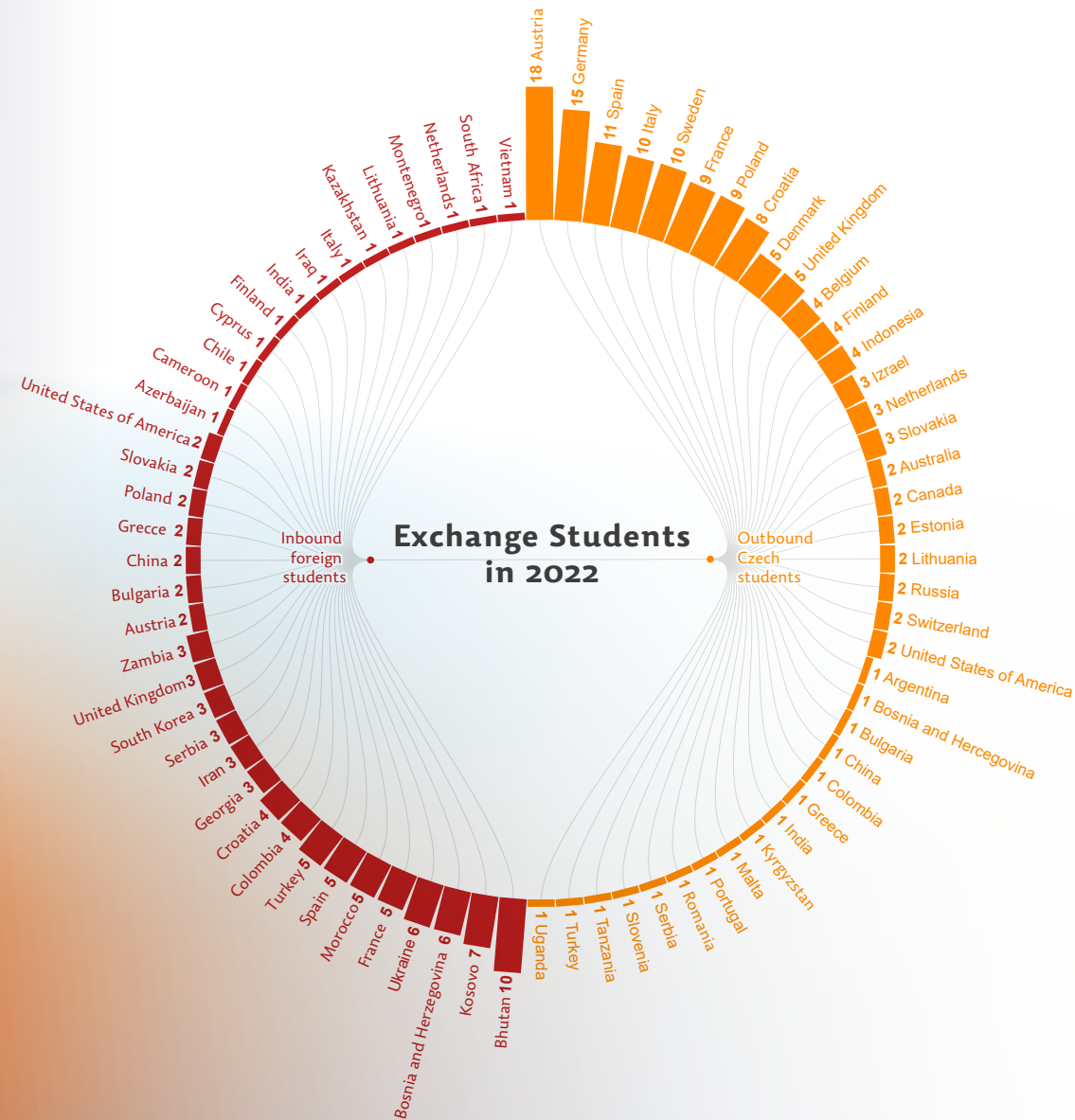
Internationalization

Faculty of Science emphasizes the systematic development of international cooperation with foreign institutions. Per the Internationalization Strategy for 2021+, our faculty is expanding opportunities for students and academic staff from foreign countries, offering study programmes and courses in the English language.

The faculty has a various offer of mobilities for students and staff within programmes Erasmus+, Erasmus+ ICM, and programmes like CEEPUS and Aurora Alliance Capacity Development Support Programme (CDS), of which Palacký University is a member. Students can also use agreements that are signed with non-European countries.

For instance, in 2022, there were 151 outgoing, and 103 incoming students.

Most of the faculty staff communicate in English, and information is available in both English and Czech. The faculty also employs many experts from abroad. Currently it is over 100 foreigners. Furthermore, the faculty cooperates with universities and research facilities from all over the world.



Univerzita Palackého v Olomouci

Přírodovědecká fakulta

geologie studijní odd.

katedra geologie
studijní oddělení děkanátu
seminární místnosti
vrátnice, podatelna
občerstvení

geografie, chemie

katedra geografie
katedra rozvojových studií
katedra anorganické chemie
katedra analytické chemie
aula, učebny

chemie

katedra organické chemie
katedra fyzikální chemie
katedra anorganické chemie
aula, učebny

fyzika

katedra experimentální fyziky
katedra optiky
laboratoře experimentální fyziky
laboratoře optiky

matematika, informatika

katedra algebry a geometrie
katedra informatiky
katedra matematické analýzy
a aplikací matematiky
učebny, počítačové učebny

děkanát

děkanát
centrální administrace
správa budov
pedagogické ústředí
učebny, učebny
kuchyně, jídelna
kuchyně, jídelna
kuchyně, jídelna
občerstvení

Trida 17. listopadu 12

Science and Research

The Faculty of Science contributes significantly to the scientific performance of Palacký University. It is successful in obtaining grant support in the field of basic and applied research. It has succeeded in the Horizon 2020, Horizon Europe, ERA-NET and other European and international projects, which make it possible to support high quality and successful research on an international scale.

Faculty departments actively cooperate in the form of contract research with dozens of regional and foreign companies and multinational partners. Academics are successful in registering national, European and US patents and utility models.

From 2018 to 2022 the researchers from the Faculty of Science published over 3,700 publications in impacted journals and registered 66 patents and utility models.

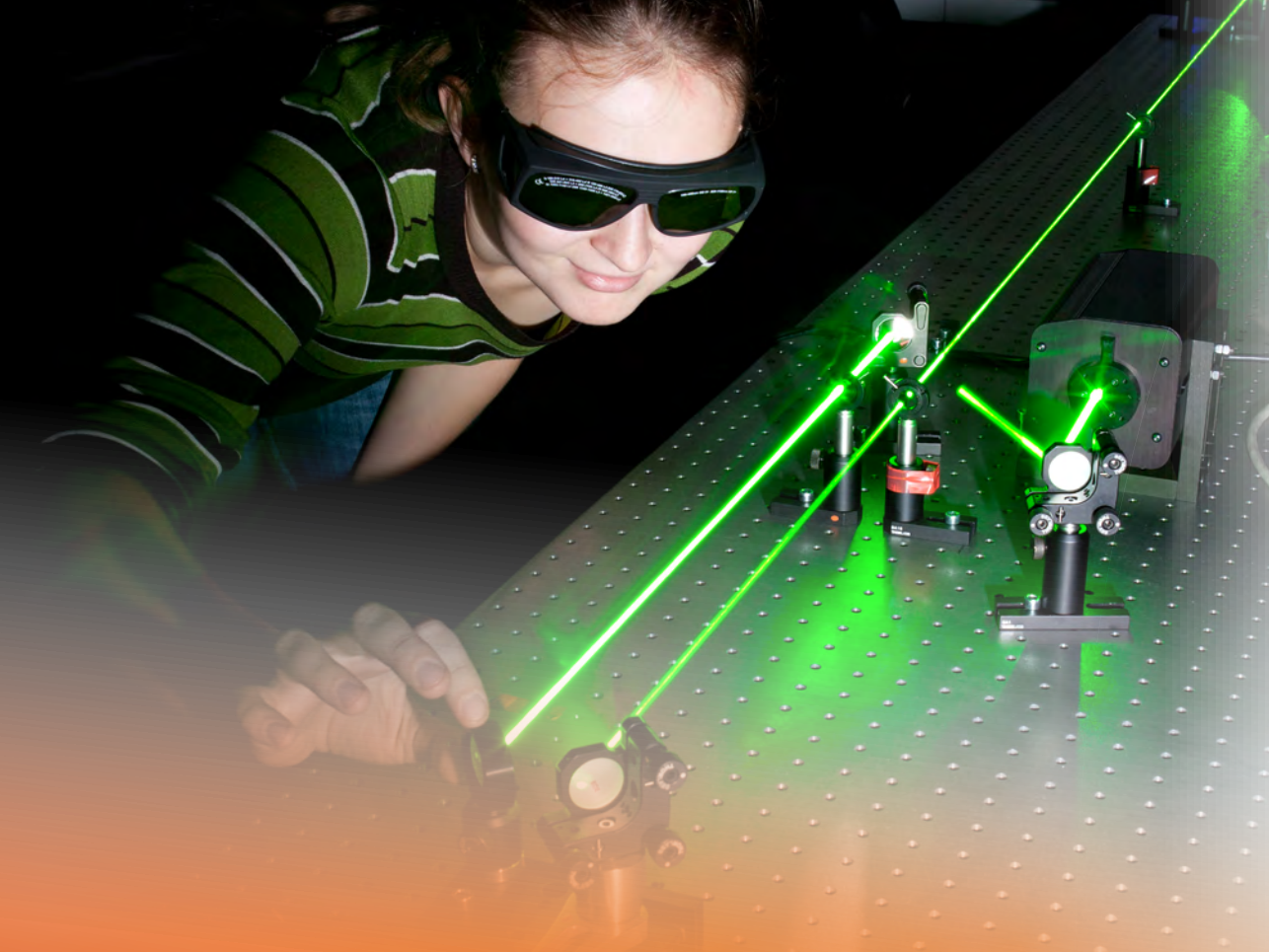
Mathematics and Computer Science

Research in mathematics focuses on theoretical and computational analysis of mathematical models, the development of structural theory of algebraic and geometric systems, and the use of mathematics and statistics in data processing from a wide range of applications.

Active research is conducted in the field of differential equations and dynamical systems, applied statistics, data optimization and approximation, differential geometry, or multivalued and quantum logic.

In computer science, research is focused on algorithms for challenging problems, computational complexity problems, logic, artificial intelligence and new methods for analysis and processing of relational data. In these areas, our departments are among the leading workplaces on an international scale.





Physics

In the field of physics, theoretical and experimental research is carried out in four complementary departments.

At the Department of Optics, primary focus is on basic research in the field of quantum optics, quantum information transfer and processing, and the interaction of light with atoms.

Furthermore, researchers deal with optical instruments, optical measurements, classical optics and optoelectronics.

The Department of Experimental Physics has long been devoted to nuclear spectroscopic methods, including Mössbauer spectroscopy, synthesis and characterization of nanomaterials, electron lithography, image information processing, and metrology, numerical simulations of physical processes and design of measurement systems.

It also offers the study of didactics of physics.

The Joint Laboratory of Optics concentrates its research on applied optics, quantum and nonlinear optics and wave optics. Researchers here develop special all-sky cameras and mirrors for telescopes for observatories monitoring the passage of energetic particles through the Earth's atmosphere, and participate in the ATLAS-CERN project for the study of elementary particle interactions.

The Department of Biophysics investigates the role of reactive oxygen species in living systems, the structure-function relationship of protein complexes, biophysical aspects of plant physiology and molecular and cellular pharmacology.



Chemistry

Research in chemistry is oriented in several directions. One of them is the development of methods for the preparation of advanced chemical compounds, conjugates and materials, with emphasis on potential applications in the form of drugs with antitumor, antibacterial, antituberculous, antileishmanial and other biological activity. The research also includes the study of molecular signaling with a view to a detailed understanding of e.g. the physiology of plant stress.

In addition to laboratory work, the so-called computational chemistry is used to study various drug interactions with DNA or cell membranes. Attention is also paid to applications in agriculture or industry closely linked to the development of new materials and technologies, for example in the field of the environment and carbon-neutral energy.

The chemistry departments also focus on the development of new catalysts based on inorganic and organic compounds. In another area, the optical and magnetic properties of substances are being studied, which can be used as storage media or sensors.

A significant part of the research is also carried out on living organisms at the molecular level, where the laws of metabolism, developmental processes, defence mechanisms and stress factors are revealed, using interactions of inorganic or organic low molecular weight compounds, advanced conjugates or nanomaterials. This knowledge is further applied in the breeding of new plant varieties, in the control of parasites and infectious diseases of bees, and in the development of new advanced biotechnological methods.

Pushing the limits of research is inherently linked to the development of new analytical methods. Primarily, chemical and physical processes useful for the analysis of chemical compounds are being studied. These findings are used to construct new analytical instruments in the field of mass spectroscopy or microscopic imaging methods. Analytical methods are applied, for example, to the measurement of pharmaceutical samples, disease markers, metabolites, drug detection, and analysis of archaeological samples and works of art.





Biology, Ecology and Environment

Biological and ecological fields encompass a wide range of research directions with interdisciplinary overlap.

Botanists are dedicated to taxonomy and ecology of plants, algae and cyanobacteria, biotechnological applications, plant genetics and the influence of stress and pathological factors, and research on the gene pool of selected groups of cultivated plants progenitors.

Zoologists show excellent results in the field of speciation and hybridization, diversity and phylogeny of beetles and Hymenoptera, evolution of nest parasitism and biodiversity, phylogeography and pathogens of herpetofauna.

In the field of ecology and the environment, research is being developed on the population dynamics of mammals, landscape ecology and processes in agricultural landscapes and soils, and in the conservation biology of invertebrates.

Cell biologists and geneticists study the mechanism of action of foreign substances on the human organism, inter-drug interactions and antitumor and anti-inflammatory effects of metabolites of the human intestinal microbiome. They also focus on the identification of unknown natural compounds and the preparation of new compounds useful for the therapy of serious human diseases; in particular, they focus on regulatory enzymes from the group of protein kinases.

Important are also works on plant hormones and their functioning at the molecular and cellular level. New derivatives generated in the field of natural substance and growth derivatives biology based on knowledge of physiological processes in plants find numerous applications in plant tissue cultures and in sustainable agriculture.



Earth Sciences

Earth Science researchers work on multidisciplinary projects in a wide range of geographic, geological and environmental disciplines. The main research directions include the study of the spatial distribution of ecosystems and landscapes on the Earth's surface, contactless environmental monitoring, modelling of geographical phenomena in GIS, geographical aspects of population migration, and research on sustainability indicators.

Geographers deal with the regional delineation and spatial interactions, issues of urban climate and green infrastructure in cities, renewable energy sources, spatial perception and historical landscapes.

Geoinformaticians are among the domestic leaders in atlas cartography.

They work on ecosystem services modelling, advanced applications of 3D printing, and research on map reading using eye-tracking technology.

For geologists, research on sedimentary rocks as an archive of information on climate, surface geological processes and pollutant transport is a key topic. Other areas of their research include the application of mineralogy and petrography in archaeology and regional geological research, economic geology and geophysical research, and the emerging field of natural hydrocarbon deposits.

Experts from the Department of Development and Environmental Studies focus on the issues related to ecological, economic and social pillars of sustainable development. The department's research directions include the analysis of assistance and measurement of sustainable development, geo-participatory spatial tools, and projects examining biocultural diversity and ecosystem forest services in the context of a changing climate.





Fort Science

Fort Science is a former military warehouse, which in 2015 was turned into an advanced science museum. Its aim is to entertain families with children, students, and the general public. Permanent exhibitions, created in collaboration with the university staff, make visitors acquainted with the adventures of scientific disciplines and directions of research and studies at the Faculty of Science. The knowledgeable student guides can take visitors on a historical tour through Olomouc, introduce them to the tiniest inhabitants of the local river, disclose to them the nerve system via model of the human brain, or let them try the so called gyroscope for pilots and astronauts.

Popularization of Science

An essential part of the faculty's activities is promoting science. We introduce science and the results of basic as well as applied research to elementary, high-school students, and the general public in an understandable and interesting way. We wish to show the world outside the university that science is useful, inspiring, and adventurous. We organize events such as Researcher's Night, Science Fair, Open Day, or Children's University.

Botanical Garden

Botanical Garden covers a spacious area near the city centre. There are over 1,500 local and exotic plant species. The garden serves educational as well as recreational purposes and is open to the public. The main research partner of the garden is the Department of Botany, but it is also used by ornithologists, geographers, or students of various schools in Olomouc. Information about plant species is available in the garden or online. The staff of the Botanical Garden are at your service and provide guided tours.

Faculty Buildings

FORT SCIENCE

**GEOINFORMATICS
ZOOLOGY**

**JOINT LABORATORY
OF OPTICS**

**MAIN FACULTY
BUILDING**

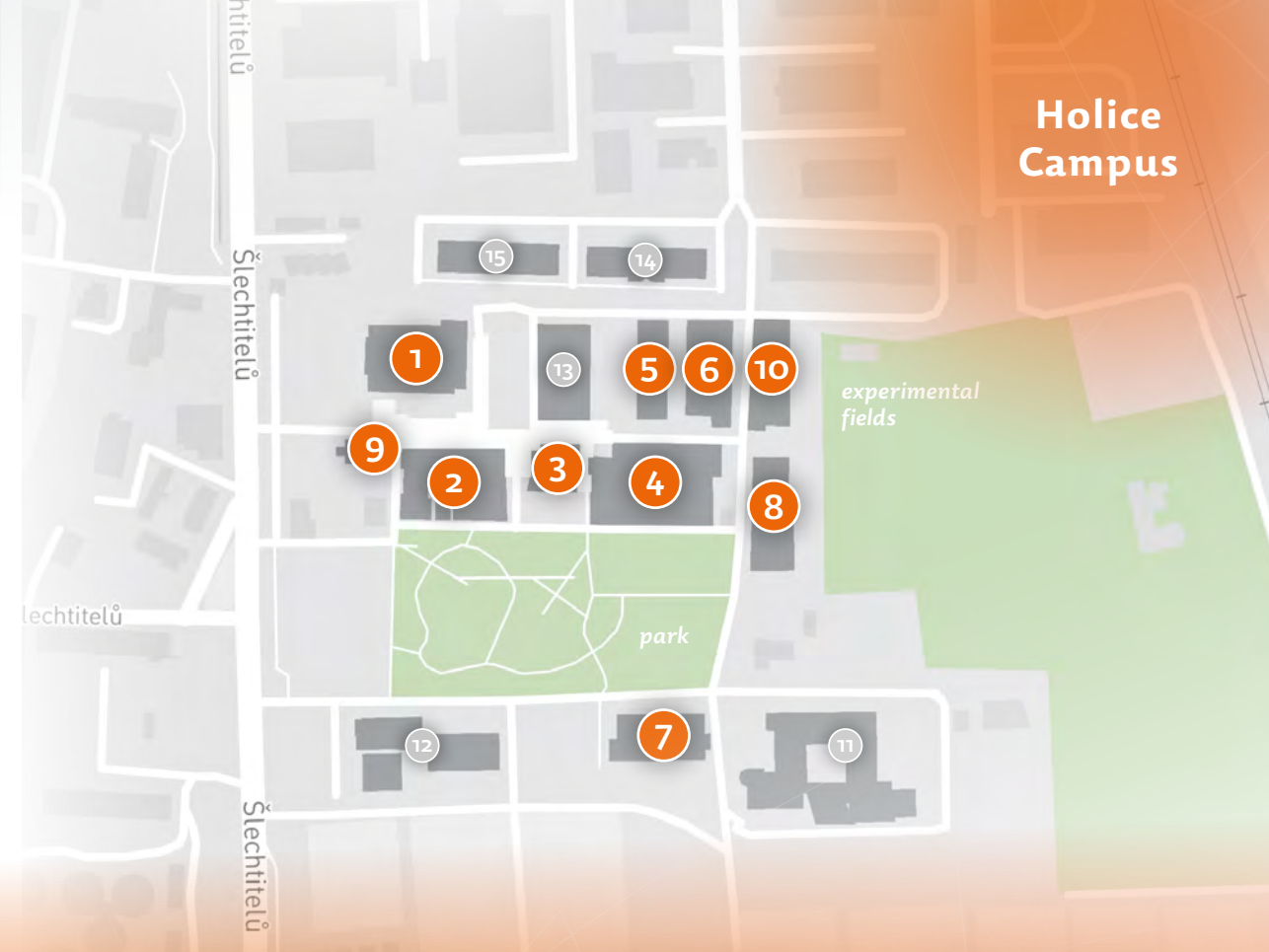
- 1F GEOLOGY
STUDENT AFFAIRS OFFICE
BISTRO
- 2F GEOGRAPHY
DEVELOPMENT STUDIES
AUDITORIUM
INORGANIC CHEMISTRY
ANALYTICAL CHEMISTRY
- 3F ORGANIC CHEMISTRY
INORGANIC CHEMISTRY
PHYSICAL CHEMISTRY
- 4F EXPERIMENTAL PHYSICS
OPTICS
- 5F ALGEBRA AND GEOMETRY
COMPUTER SCIENCE
MATHEMATICAL ANALYSIS
- 6F DEAN'S OFFICE
BISTRO, TERRACE
LIBRARY
DEPARTMENT OF
FOREIGN LANGUAGES
MAINTENANCE SERVICES

BOTANICAL GARDEN



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Holice Campus



- Experimental Physics (5)
 - Biophysics (5, 7)
- Analytical Chemistry (8)
 - Biochemistry (1, 5, 7)
 - Chemical Biology (6)
 - Biotechnology (6)
- Cell Biology and Genetics (4)
- Experimental Biology (1, 7)
 - Laboratory of Growth Regulators (1, 4, 7)
 - Botany (2, 4)
- Ecology and Environmental Sciences (1, 2)
- Cafeteria & Library (10)
 - Reception (9)
- Maintenance Services (3)
- Centre of the Region Haná (IEB CAS & CRI) (11, 12)
- Science and Technology Park (13, 14, 15)



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