
EXPERTISE
RESEARCH
INNOVATIONS

In 2015 the world was celebrating the 100-year anniversary of the General Theory of Relativity. As a result of the revolution touched off by Albert Einstein, science has begun to exert a greater influence than in previous epochs on all facets of human life – from philosophy and politics, to art and pop-culture. The past century could indeed rightly be called the age of the explosion of science.

The rapid change in the perception of reality, with space and time becoming key concepts, has also had a certain very beneficial effect (thanks to the huge fame that Einstein and his theory enjoyed): as a result, scientists have gained a kind of social authority, becoming credible mediators considered crucial for resolving the problems of the modern age.

It was midway through this extraordinary century that the Polish Academy of Sciences (PAS) was created. What function do we serve today?

We try to satisfy the urge to seek the truth, a desire deeply rooted in our culture, to expand the horizon of knowledge beyond the current limits, and to be actively involved in shaping reality. By presenting systematic data gathered through observation, experimentation, and deduction, we respond to the human yearning to better understand both the world around us and the mechanisms that govern the inner world of the human mind.

Sharing knowledge is one of the most important challenges we face nowadays. To meet it, we strive to make effective use of new means of communication,

in a way that ensures that such modern-day tools benefit all generations of researchers by promoting Polish research and opening up new inroads for science to enter the business, cultural, and social realms.

Our mission is thus to act, but also to encourage others to act. We want to inspire and motivate people – both young people and those already a bit older – to seek answers for themselves. We stimulate their sense of engagement, encourage them to commit themselves to learning and education, to the pursuit of knowledge, to working for the common good, and also to enjoy themselves at science festivals, exhibitions, and meetings with scientists organized throughout the country and beyond.

We work together with the entire research community. We try to integrate that community and, by setting standards of action, to facilitate public discussion of science-related issues, which in today's world must be cherished as a global good.

Our continued betterment and development as an institution is made possible by people – by the recipients of what we do, by the country's scientific cadre, and by collaborators throughout the world, with whom we engage in joint projects and jointly promote science. And also by a huge number of institutions, colleges and universities, organizations and companies, who share our passions and devotion.

Albert Einstein unleashed a revolution. We work hard, with a conviction that to some degree we are helping that revolution continue.

Our Mission

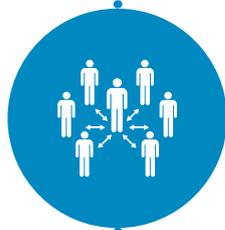
The Polish Academy of Sciences is a state scientific institution founded in Warsaw in 1952. Our mission is to work comprehensively to further the advancement of science, in the service of society and for the enrichment of Poland's national culture, while adhering to the highest standards of research quality and ethical norms. The Academy is an elected body of scholars, including national members (ordinary and corresponding members) and also foreign members. The number of national members is limited to a maximum of 350.

New members of the Academy are chosen by the General Assembly from among candidate scholars who have made outstanding contributions to their fields and command respect among the scientific community. Candidates must first receive recommendations from three Academy members, or from the scientific council of a research institute or of a university faculty that has the right to award DSc (habilitation) degrees, or from five well-recognized scientists with the title of professor (including one employed abroad).

In specific the Academy is tasked with the following:



pursuing advanced research at its scientific units, of strategic importance for the development of science and the economy



organizing large, frequently interdisciplinary research teams, involving the concentration of modern research hardware



integrating Poland's research community in close cooperation with universities and research units



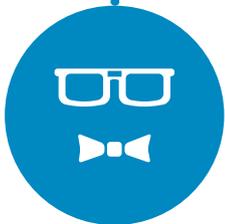
supporting various forms
of international research
cooperation



educating young scholars
in doctoral and post-graduate
programs and supporting those
just starting out on a career
in research



putting the results of scientific
research to innovative use,
including via cooperation
with the business community



formulating opinions
and producing expert studies
on science and policy issues
of fundamental importance



promoting greater public
awareness of science

The PAS General Assembly session,
Warsaw, 3 December 2015



The Polish Academy of Sciences is a state scientific institution

Legal footing:

The Act
on the Polish Academy of Sciences
(of 30 April 2010, as amended)

The Statutes
on the Polish Academy of Sciences
(of 24 November 2010, as amended)

Overseeing institution:
the Prime Minister of Poland

President

Jerzy Duszyński

Professor at the Nencki Institute of Experimental Biology (Laboratory of Bioenergetics and Biomembranes). A specialist in the field of energy metabolism and the molecular foundations of mitochondrial and neurodegenerative diseases.



Vice-Presidents

Stanisław Czuczwar

Professor at the Medical University of Lublin (Chair and Department of Pathophysiology) and at the Institute of Rural Medicine in Lublin (Department of Pathophysiology). A specialist in the field of antiepileptic drug interactions in developing treatment methods for drug-resistant epilepsy.



Elżbieta Frąckowiak

Professor at Poznań University of Technology (Institute of Chemistry and Technical Electrochemistry). A specialist in the storage and conversion of chemical energy into electrical energy, capacitors, fuel cells, and hydrogen electrosorption in carbon materials.



Stefan Malepszy

Professor at Warsaw University of Life Sciences (Department of Plant Genetics, Breeding and Biotechnology). A specialist in genetics and biotechnology – the fundamentals of genetic improvement in plants and factors in the use of genetic modifications.



Edward Nęcka

Professor at the Jagiellonian University in Kraków (Institute of Psychology). A specialist in the cognitive mechanisms underlying individual differences, especially creativity and intelligence.



Paweł Rowiński

Professor at the PAS Institute of Geophysics. A specialist in hydrodynamics and hydrology, especially mathematical modeling and experimental research into hydrological and hydrophysical processes.



Chancellor

Tadeusz Latała

Graduated from the Military Technical Academy in Warsaw, completed postgraduate studies in management. Experience gained as manager at ZUS (Social Security Institution), director at the National Depository of Securities and deputy director for general issues at the PAS Institute of Geophysics.



As a community of scientists, the Academy is structured into a set of Divisions, Territorial Branches, scientific and task-force committees, a Young Academy that promotes the research and development work of outstanding young scientists, a Science Ethics Committee, and an Audit Committee that oversees the financial and economic activity of the Academy. The affairs of these various Academy-level institutions are the responsibility of the Deans of the Divisions, whereas the research units themselves are overseen by the chair and deputy chair of the Council of Provosts of each Division.

The Academy's highest governing body is its General Assembly, a gathering consisting of all national members of the Academy. When the Assembly is not in session, responsibility for all strategic decisions is delegated to the Presidium of the Academy (led by the President).

The five Divisions of the Academy each draw together scholars representing a different, broad field of science – mainly national and foreign members of the Academy. The Divisions each oversee a set of research units situated throughout the country and coordinate their efforts, they represent the Polish research community in their respective fields and promote their achievements, and they facilitate cooperation with centers in Poland and abroad. They likewise supervise certain auxiliary scientific units, such as archives, research stations and centers. Each Division also embraces a set of scientific committees, task-force committees, and national committees.

The basic scientific unit of the Academy is the research institute, 69 of which are currently in operation. Most of them rank as leading institutions in their scientific or R&D activity, as is evidenced by the high marks they receive from the Evaluation Committee of the Polish Ministry of Science and Higher Education. Thirteen of the PAS institutes have proudly received the A+ classification, a cherished prize of Polish science. The heads of the research institutes together comprise a Council of Directors, currently chaired by Prof. Piotr Zielenkiewicz.

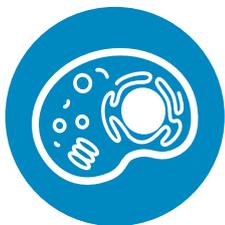
PAS institutes also form part of consortia and centers set up to carry out concrete research projects. Nine of the Institutes are involved in such units that have been granted the status of the Leading National Research Center (KNOW) by an international body of experts: the Institute of Mathematics, the Niewodniczański Institute of Nuclear Physics, the Haber Institute of Catalysis and Surface Chemistry, the Institute of Pharmacology, the Mossakowski Medical Research Institute, the Institute of Bioorganic Chemistry, the Institute of Geophysics, the Institute of Oceanology, the Hirszfeld Institute of Immunology and Experimental Therapy, the Institute of Genetics and Animal Breeding, and the Institute of Animal Reproduction and Food Research.

Since 2010, certain PAS institutes have been cooperating with one another as well as with other, non-PAS research centers and business entities, under the framework of collaborative research units. These include: the GEOPLANET Earth and Planetary Research Center, the Interdisciplinary Center for Physical, Chemical, and Medical Research (ICNFCM), the Centre for Advanced Materials and Smart Structures (CAMS2), and the SPINLAB National Center for Nanophysics and Spintronics.



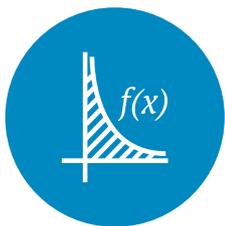
Division I Humanities and Social Sciences

Dean **Prof. Stanisław Filipowicz**
Chair of the Council of Provosts
Prof. Jerzy M. Brzeziński
Deputy Chair
of the Council of Provosts
Prof. Grażyna Borkowska



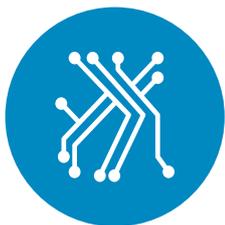
Division II Biological and Agricultural Sciences

Dean **Prof. Leszek Kaczmarek**
Chair of the Council of Provosts
Prof. Romuald Zabielski
Deputy Chair
of the Council of Provosts
Prof. Andrzej Jerzmanowski



Division III Mathematics, Physics, Chemistry, and Earth Sciences

Dean **Prof. Roman Micnas**
Chair of the Council of Provosts
Prof. Małgorzata Witko
Deputy Chair
of the Council of Provosts
Prof. Paweł Kulesza



Division IV Technical Sciences

Dean **Prof. Antoni Rogalski**
Chair of the Council of Provosts
Prof. Krzysztof Malinowski
Deputy Chair
of the Council of Provosts
Prof. Lucjan Pawłowski



Division V Medical Sciences

Dean **Prof. Witold Rużyłto**
Chair of the Council of Provosts
Prof. Tomasz Brzozowski
Deputy Chair
of the Council of Provosts
Prof. Grzegorz Opolski

Institute of Archaeology and Ethnology (Warsaw)

disciplines: historical sciences

fields of activity: archaeology, ethnology, and the history of material culture (pursued while additionally drawing upon history, cultural anthropology, zooarcheology, paleobotany, palynology, geophysics, and selected technical sciences) www.iaepan.edu.pl

Institute of Literary Research

(Warsaw)

disciplines: philological sciences

fields of activity: the history of Polish literature • Polish literary culture • the theory of literature • the methodology of literary research • scientific editing www.ibl.waw.pl

Institute of Philosophy and Sociology

(Warsaw)

disciplines: philosophical sciences, sociology

fields of activity: contemporary philosophy, Ancient philosophy, philosophy of science, philosophy of religion, logic, ethics in economic life, business ethics, philosophy of culture • sociology of social structure, sociology of culture, economic sociology, sociology of management, sociology of civil society, theoretical sociology, sociology of living standards, the methodology of sociological research, women and family studies www.new.ifispan.pl

Institute of History

(Warsaw)

disciplines: historical sciences

fields of activity: the formation of Polish society and the development of the modern Polish nation from the Middle Ages to the late modern period • comparative studies of the history of medieval and modern culture • political, social and cultural transformations in Central and Eastern Europe in the 19th and 20th century • the Baltic Region in the early and late modern period • bibliographical and biographic work, editing of sources, cartography, and historical geography www.ihpan.edu.pl

Institute for the History of Science

(Warsaw)

disciplines: historical sciences

fields of activity: the history of Polish and European science (with a specific focus on the analysis of historical sources from the European Middle Ages) • conditions for the development and reception of modern science • comparative studies of the history of education (environmental factors and general European relations) • the Polish intellectual elite • the contribution of Polish scholars to the development of modern science and technological thought • the reception of scientific theories in the context of social transformations and nation-building processes in Central and Eastern Europe www.ihnpan.waw.pl

Institute of the Polish Language

(Kraków)

disciplines: philological sciences

fields of activity: the Polish language (modern grammar and functions) • the history of the language (relations to neighboring languages) • the Polish lexicon • onomastics • the methodology of linguistic research, Polish lexicography (modern and historical) www.ijp-pan.krakow.pl

Institute of Mediterranean and Oriental Cultures (Warsaw)

disciplines: philosophical, theological, historical, and political sciences, fine arts, sociology, economics

fields of activity: studies of Ancient and modern civilizations stemming from non-European cultural and religious traditions • archeological excavations in Egypt, Sudan, Syria, Israel, and Cyprus • linguistic, religious, and cultural studies and the sociology of development of modern societies in Asian and African countries • the cultures of the Mediterranean, the Orient, and neighboring countries • studies on Mediterranean cultural heritage as a common good of special importance to united Europe • studies on Asian and African cultures from Antiquity to the modern period; studies on historical and modern Islam • studies on globalization in intercultural dialogue and confrontation www.iksio.pan.pl

Institute of Economics

(Warsaw)

disciplines: economics

fields of activity: modern theory of economics • the transformation of Poland's economic system • economic policy in times of political transformation • the adaptation of the Polish economy to the world's economy (including integration with Western Europe) www.inepan.waw.pl

Institute of Law Studies (Warsaw)

disciplines: legal sciences, sociology

fields of activity: international and European law (including the adaptation of Polish law to EU law) • the law of the market economy • Polish and European private law (including civil and commercial law) • labor law • constitutional law • local governments • human rights • administrative law • environmental protection • criminal law • criminological research • sociology of law

www.inp.pan.pl

Institute of Psychology

(Warsaw)

disciplines: psychology

fields of activity: social psychology, political psychology, personality psychology, ecological psychology, economic psychology • psycholinguistics • decision theory • social development of young people, cognitive psychology

www.psych.pan.pl

Institute of Rural and Agricultural Development

(Warsaw)

disciplines: economics, sociology

fields of activity: economic, social, and cultural conditions of rural and agricultural development • universal and individual characteristics of rural development in regional, national, and international settings • major rural development mechanisms and dilemmas stimulating the formulation of alternative strategies for the development of rural areas (as modern and inhabitant-friendly environments that satisfy the needs and aspirations of their inhabitants) www.irwirpan.waw.pl

Institute of Slavic Studies (Warsaw)

disciplines: philological and historical sciences

fields of activity: Slavic cultural heritage (including Polish cultural heritage) • issues of national identity with a specific focus on collective memory, myths and mythologems, symbolism, and linguistic problems • national, ethnic, and religious minorities, including issues related to cultural borderlands (including issues related to interactions between the Slavic-speaking communities and between Slavs and non-Slavs) • linguistics, including the needs of information society: semantics, cognitivism, computational linguistics (including multilingual electronic dictionaries), computational studies of the model of structures combining the lexicons and grammars of six selected Slavic languages • coordination of work in the field of international linguistic Slavic bibliographies • research in the field of modern methods of Slavic linguistic documentation www.ispan.waw.pl

Institute of Political Studies (Warsaw)

disciplines: historical and political sciences, sociology

fields of activity: political thought and political institutions, the late modern period of political history and the history of the Eastern Borderlands of the Second Polish Republic • political theory and philosophy • political and social systems and social structure • political parties, social movements, and voting behavior • political psychology and constitutional practice • social and political dynamics • the state's government and civil society institutions • the formation of the political, economic, and cultural elite • relations between politics and the economy • the cultural aspects of political transformations • European integration and international security systems • transformations in Central and Eastern Europe • political and social problems in Polish-German relations • socio-political transformations in the former USSR countries and Southeast Asia and their impact on relations with Poland www.isppan.waw.pl

Institute of Art (Warsaw)

disciplines: fine arts

fields of activity: Polish artistic culture (plastic arts, theater, film, television, music, folklore) in its historical and contemporary manifestations, including European and global relations www.ispan.pl

European Regional Center for Ecohydrology (Łódź)

disciplines: biology, environmental engineering and environmental protection, fisheries science

fields of activity: ecohydrology, ecology, and the application of ecosystemic biotechnologies for the protection and rehabilitation of reservoirs and river ecosystems • the role of water-land ecotones in protection, reduction in non-point pollution, and the regulation of biotic processes in rivers and reservoirs (reducing toxic cyanobacterial blooms in reservoirs, accelerating self-purification and increasing biodiversity in rivers) • biomanipulation in reservoirs aimed at improving the quality of water and boosting fish harvests • biomonitoring www.erce.unesco.lodz.pl

Institute of Agrophysics

(Lublin)

disciplines: agronomy, environmental engineering and conservation, agricultural technology

fields of activity: the physics of soil and plant materials in the context of quality improvement • the physical degradation of the agricultural environment and the protection of its resources and properties • the employment of physical methods in studies on the properties of agricultural materials and products and processes in the soil / plant / atmosphere and plant / machine / agricultural product systems • monitoring and modelling physical processes in the natural environment and in the technological cycle of agricultural production www.ipan.lublin.pl

Institute of Biochemistry and Biophysics

(Warsaw)

disciplines: biology

fields of activity: study of genomic organization, the structure and functions of genes at molecular level • mechanisms of mutagenesis, DNA repair, and replication • the structure and biosynthesis of nucleic acids and proteins • molecular and biochemical studies of the structure of enzymes • development of modern biotechnologies

www.ibb.waw.pl

Nencki Institute of Experimental Biology (Warsaw)

disciplines: biology, medical biology

fields of activity: neurobiology – physiological, biochemical, and molecular mechanisms of brain activity and plasticity, brain anatomy • biochemistry – structural and functional properties of contractile proteins and cell membranes, the bioenergetics of cellular processes, metabolic regulation • cell biology – the study of mechanisms of motor functions, membrane excitability, membrane transport, and the formation of new cellular structures • molecular biology – molecular and genetic mechanisms of cell excitation

www.nencki.gov.pl

Mammal Research Institute

(Białowieża)

disciplines: biology

fields of activity: research into the morphology, systematics, evolution, ecology, ethology, genetics, and conservation of mammals and biodiversity with a particular emphasis on the unique ecological conditions of the Białowieża Primeval Forest • environmental protection

www.zbs.bialowieza.pl

Institute of Botany (Kraków)

disciplines: biology

fields of activity: botany • biodiversity of floras in Poland and other regions of the world (particularly Europe, the Arctic, and Antarctica) • evolutionary taxonomy of vascular and non-vascular plants and fungi • phycology • bryology • lichenology • mycology • phytogeography • floristics • geobotany • ecology and ecotoxicology • paleobotany and paleoethnobotany

www.botany.pl

Institute of Bioorganic Chemistry

(Poznań)

disciplines: biology, informatics, chemical sciences

fields of activity: the synthesis and chemistry of modified nucleosides and nucleotides showing antiviral activity • the analysis of the correlation of structure and biological activity • the chemical and enzymatic synthesis of oligonu-

cleotides and nucleic acids • the analysis of protein-nucleic acid interactions • chemistry and biology of ribonucleic acids • the analysis of the structure and organization of the genes of higher plants with a particular emphasis on the Fabaceae family • symbiotic nitrogen fixation • plant transformation and regeneration • edible plant vaccines • molecular biology of oncogenes • molecular mechanisms of RNA recombination in viruses • phytochemical analysis of natural compounds and research in the field of their applications • applications of heteronuclear NMR spectroscopy and spectrofluorimetry in the conformational analysis of nucleic acids and their components • crystallographic analysis of proteins, nucleic acids, and their derivatives • computer modeling and computational techniques in molecular biology and chemistry • metabolomics and proteomics using mass spectrometry

www.ibch.poznan.pl

Institute of Dendrology (Kórnik)

disciplines: biology, forest sciences, gardening
fields of activity: research into tree and shrub genetics, physiology, acclimation, introduction, ecology, phytopathology, entomology, systematics and geography

www.idpan.poznan.pl

Institute of Animal Physiology and Nutrition (Jabłonna)

disciplines: biology, animal husbandry science
fields of activity: the nutritional physiology of animals – the development of the gastrointestinal tract, digestion, protein absorption and metabolism, the role and biology of rumen microorganisms • nutritional value of animal feed • energy transformations • energy and nutrient requirements in animals • the role of antinutrients • hormonal and neurohormonal regulation of development, growth, reproduction, lactation, and aging • the role of stress in neuroendocrine regulation in livestock

www.ifzz.pl

Institute of Plant Physiology (Kraków)

disciplines: biology, agronomy
fields of activity: the physiology of the development and growth of crop plants • factors regulating the photosyn-

thetic productivity of plants • the mechanisms of plant resistance to environmental stress • plant tissue growth and regeneration

ifr-pan.krakow.pl

Institute of Genetics and Animal Breeding (Jastrzębiec)

disciplines: biology, animal husbandry science
fields of activity: genetics and animal breeding • molecular genetics • cytogenetics • genome mapping in animals • embryology • biotechnology and biotechnics of embryos • stress biochemistry and physiology • animal behavior and ethology • animal genotyping and the adaptation of genotypes to the conditions and forms of animal usage

www.ighz.edu.pl

Institute of Plant Genetics (Poznań)

disciplines: agronomy, biology
fields of activity: classical and molecular genetics as well as cytogenetics of higher plants, including in particular model species and crop plants, in vitro cultures, genetic and physical mapping of plant genomes • functional and structural genomics • genome synteny • plant transformation • the genetics of plant resistance to pathogens and environmental stress factors • widening the scope of biodiversity • the employment of statistical and bioinformatic methods in genetics, genomics, and breeding

www.igr.poznan.pl

Institute of Nature Conservation (Kraków)

disciplines: biology
fields of activity: the strategy of the conservation of floras, faunas, and natural ecosystems • studies on selected and model plant and animal populations of different conservation statuses • developing an optimum system of territorial conservation, its functions and importance for the conservation of floras, faunas, and the inanimate natural environment, including in particular biosphere reserves in border areas • determining the degree of degradation of protected and human-exploited ecosystems under the influence of industrial emissions

www.iop.krakow.pl

Institute of Paleobiology

(Warsaw)

disciplines: biology, geology

fields of activity: paleontology • systematics • evolutionary biology • biogeology • biostratigraphy • paleobiogeography of microfossils • fossil vertebrates and invertebrates

www.paleo.pan.pl

Institute of Parasitology

(Warsaw)

disciplines: biology, medical and veterinary sciences

fields of activity: animal parasitism • faunistics • morphology • biology and ecology of parasites • parasite physiology and pathophysiology in the host-parasite systems • immunological defense mechanisms in parasitic diseases • the impact of medicines on parasites and animal productivity

www.ipar.pan.pl

Institute of Animal Reproduction and Food Research

(Olsztyn)

disciplines: veterinary sciences, food and nutrition technology, animal husbandry science

fields of activity: research into the chemical, physical, and biological properties of nutrients and non-nutrients in food products and the impact of their transformations on food quality • endocrinology, physiology, and pathophysiology of reproduction • developmental and experimental endocrinology with a particular emphasis on regulation mechanisms at molecular, local (organ), and central level

www.pan.olsztyn.pl

Institute of Systematics and Evolution of Animals

(Kraków)

disciplines: biology

fields of activity: systematics of fossil mammals, birds, reptiles, and amphibians coming from the Tertiary and Quaternary of Poland against the backdrop of the fossil fauna of the Palearctic • the ecology of the modern avifauna of Poland • systematics and zoogeography of some groups of Coleoptera, Lepidoptera, Hymenoptera, Apterygota • the terrestrial Mollusca in the Tertiary, Quaternary,

and modern period in Poland against the backdrop of the fauna of the Palearctic • genetics and karyology of selected groups of vertebrates and invertebrates • cytogenetics of Ciliata, especially the Paramecium

www.isez.pan.krakow.pl

Institute for Agricultural and Forest Environment (Poznań)

disciplines: biology, environmental engineering and conservation, forest sciences, environmental management

fields of activity: agroecology • ecological principles of the conservation and shaping of the agricultural environment • the flow of energy and matter in agricultural landscapes • the conservation of biological resources • principles of forest management and conservation of forests and woodlots

www.isrl.poznan.pl

Museum and Institute of Zoology

(Warsaw)

disciplines: biology

fields of activity: zoology, especially systematics, faunistics, zoogeography • research into the structure and spatial distribution of faunas in Poland against faunas in Europe aimed at explaining the genesis of the modern fauna in Poland and its evolution under the influence of transformations in the modern natural environment • systematics of animals, especially invertebrates • monographs describing the fauna of Poland

www.miiz.waw.pl



Cyathea sp., the PAS Botanical Garden - Center for Biological Diversity Conservation in Powsin

Auxiliary research units:

Botanical Garden – Center for Biological Diversity Conservation in Powsin (Warsaw)

disciplines: biology

fields of activity: the ex situ conservation of endangered plant species in Poland • biosystematics and plant biodiversity analysis • collecting and storing gene resources of native wild plants and crop plants and their applications in science and the national economy • in vitro cultures in plant biotechnology • plant growth and development in urban and industrial environments • biomonitoring of environmental pollution • comparative and functional anatomy of plants

www.ogrod-powsin.pl

Anthropology Unit (Wrocław)

disciplines: biology, medical and physical culture sciences
fields of activity: the biological and demographic consequences of social stratification in Poland and its changes over time • secular trends related to growth and maturation of children and youth depending on socio-economic conditions • research into the biological well-being of the modern population of Poland at different stages of ontogeny • adult mortality depending on socio-economic status, marital status, and territorial and social mobility • biological foundations of human behavior from the perspective of evolutionary psychology and behavioral ecology • the impact of lifestyle and environmental conditions on hormone levels in the menstrual cycle and reproductive functions in women • the biology of prehistoric populations on the basis of osteological material

www.antropologia.wroclaw.pl

Ichthyobiology and Aquaculture Unit (Gołysz)

disciplines: fisheries science, biology

fields of activity: ichthyobiology • fisheries science • aquaculture • ecology of pond ecosystems • fish genetics and immunology

www.golysz.pan.pl



Cyathea delgadii several-celled pro-embryo, the PAS
Botanical Garden – Center for Biological Diversity in Powsin

Copernicus Astronomical Center

(Warsaw)

disciplines: astronomy, physics

fields of activity: cosmology • high-energy astrophysics • stellar structure and evolution • stellar pulsations • physics of neutron stars • binary stars • stellar atmospheres and circumstellar matter
www.camk.edu.pl

Space Research Center (Warsaw)

disciplines: astronomy, geodesy and cartography, geophysics

fields of activity: physical processes in interplanetary matter and the outer layers of the Sun • the physics of the upper layers of the atmosphere of the Earth and other planets in the Solar System • geodesy and global geodynamic phenomena • remote sensing • the development and applications of space technology and equipment
www.cbk.waw.pl

Center of Molecular and Macromolecular Studies (Łódź)

disciplines: chemical sciences

fields of activity: chemistry, stereochemistry and physical chemistry of heteroorganic compounds (phosphorus, sulfur, silicon, and selenium derivatives) • the synthesis of biologically active compounds and natural products • bioorganic chemistry • low molecular weight regulators of cellular processes • phospholipids • oligonucleotide synthesis and structure • DNA structural polymorphism • protein bionengineering using recombinant DNA technology • polymer chemistry • organic chemistry and physical chemistry of polyreactions • kinetics and thermodynamics of polymerization • models of biopolymers and their properties • polymer physics • supermolecular structures in polymers • physical properties of polymers – optical, electric, and mechanical properties • methods of microanalysis of organic compounds and polymers, NMR spectroscopy in solids, mass spectrometry

www.cbmm.lodz.pl

Center for Theoretical Physics

(Warsaw)

disciplines: physics

fields of activity: theoretical physics • classical and quantum field theory • statistical physics • quantum optics • computational physics • theory of gravitation • cosmic phenomena
www.cft.edu.pl

Center for Polymer and Carbon Materials (Zabrze)

disciplines: physics, chemical sciences, chemical technology

fields of activity: producing new polymer and polymer-carbon materials and catalysts, examining their properties and functions, and their applications in biotechnology, microtechnology, environmental protection, and health protection
www.cmpw-pan.edu.pl

Institute of Physical Chemistry

(Warsaw)

disciplines: physics, chemical sciences

fields of activity: physicochemistry and quantum theory of solids • reactivity of solids under high-pressure conditions • statistical physics of condensed matter • thermodynamics of the liquid state • thermochemistry • calorimetry with biocalorimetry and dynamic calorimetry • the chemistry and physics of the surface of solids • studying reactivity to hydrogen using a wide range of electron spectroscopies • catalysis on metals • electrochemistry and electrochemical corrosion • electrode processes in molten salts • fundamentals of chemical engineering • theoretical and experimental chemical kinetics • laser photophysics and photochemistry • high-selectivity chromatography • supramolecular chemistry
www.ichf.edu.pl

Institute of Organic Chemistry

(Warsaw)

disciplines: chemical sciences

fields of activity: the synthesis and transformation of organic compounds • the synthesis, transformation, and isolation of biologically active compounds • physical properties and structural examination of organic compounds • spectroscopy of organic compounds

www.icho.edu.pl

Institute of Physics (Warsaw)

disciplines: physics

fields of activity: solid-state physics with a particular focus on the physics of semiconductors and magnetic materials • quantum optics and molecular physics • structural examinations of solids using X-ray methods • physics of superconductors • materials technology • optical spectroscopy and electron transfer methods (including experiments conducted at super-low temperatures and in strong magnetic fields) • molecular beam epitaxy, biological physics, spintronics
www.ifpan.edu.pl

Institute of Nuclear Physics

(Kraków)

disciplines: medical biology, electronics, physics, geophysics, informatics, environmental engineering and conservation, materials engineering, chemical sciences

fields of activity: experimental and theoretical research in the fields of particle physics and astrophysics, nuclear and strong interaction physics • research in the structure and dynamics of the condensed state of matter • interdisciplinary research, especially in the fields of geophysics, radiochemistry, medical physics, radiation and environmental biology, environmental physics and conservation, gas chromatography, dosimetry, materials studies, and econophysics
www.ifj.edu.pl

Institute of Molecular Physics (Poznań)

disciplines: physics

fields of activity: physics of magnetic and dielectric materials and solid-state radiospectroscopy • linear and non-linear electrical and spectroscopic properties of dielectrics and organic conductors • molecular interactions in liquids and liquid crystals • the theory of ferromagnetism • properties of magnetic materials • properties of crystalline and liquid-crystalline ferroelectrics • low temperature physics • computational physics • spintronics • nanostructures
www.ifmpan.poznan.pl

Institute of Geophysics (Warsaw)

disciplines: geophysics

fields of activity: studies of the deep structures of the Earth's crust and upper mantle using deep seismic sounding • studies of mining-associated seismicity, local earthquakes, and seismic hazards • studying deep geological

structure and seeking to detect earthquake precursors based on changes in the magnetic field • seismic monitoring, paleomagnetism, and studies of the magnetic properties of rocks • geophysical models of processes in areas of tectonic activity • geophysical studies in polar regions • analyzing the impact of anthropogenic factors on transformations in water resources, physics of surface water, control of water management systems, transport processes in the aquatic environment • studies of atmospheric ozone, solar radiation, mesoscale and macroscale processes in the atmosphere, and atmospheric electricity • the design of devices and measurement systems for seismological and Earth magnetism purposes
www.igf.edu.pl

Haber Institute of Catalysis and Surface Chemistry

(Kraków)

disciplines: chemical sciences, physics, environmental engineering and conservation

fields of activity: studies of phenomena in the phase transitions from gas to solid, from liquid to solid, and from gas to liquid • the theory of catalytic processes in heterogeneous, homogenic, and enzymatic systems (kinetics and reaction mechanisms) with a specific focus on the catalytic oxidation of hydrocarbons • the mechanism of oxide catalysts, including zeolites • the mechanisms of solid state reactions in oxide systems and the structure and thermodynamics of defects • transport phenomena in colloid systems • the mechanism of interactions and stability in dispersed systems • catalytic processes for the elimination of environmental pollution • the impact of environmental pollution on the condition of monuments
www.ik-pan.krakow.pl

Institute of Mathematics

(Warsaw)

disciplines: mathematics

fields of activity: algebra and algebraic geometry • differential equations and optimization • differential geometry • dynamical systems • foundations and philosophy of mathematics • functional analysis • functions of a complex variable • mathematical analysis • mathematical physics • number theory • numerical analysis • statistics • probability • topology
www.impan.pl

Institute of Geological Sciences

(Warsaw)

disciplines: geology

fields of activity: determining the origins of minerals, rocks, and groundwater • geochemistry of isotopes with a particular emphasis on geochronology • sedimentological and micropaleontological research aimed at the reconstruction of fossil sedimentary environments • the evolution of mountain chains formed in the Carpathians, Antarctica, and Spitsbergen during the Alpine orogeny • the geodynamic history of mountain ranges in the Sudetes formed during the Variscan orogeny • environmental changes in the Quaternary

www.ing.pan.pl

Institute of Low Temperature and Structure Research

(Wrocław)

disciplines: physics, chemical sciences

fields of activity: crystal and electron structure • phase transitions and properties of magnetic materials, metals, metal-hydrogen systems, and ferroelectrics • superconductivity • cryogenic equipment and materials • physics of crystallographic defects • structure of metallic catalysts and their activity • new laser materials • the structure and properties of d- and f-electron systems

www.intibs.pl

Institute of Oceanology

(Sopot)

disciplines: oceanology

fields of activity: marine chemistry, biogeochemistry, and biochemistry, marine chemical pollution • marine dynamics, air-sea interactions, oceanic circulation, modeling of hydrodynamic processes • marine ecology, plankton ecology, beach ecology, marine ecosystems • marine physics, marine optics, marine biooptics, marine remote sensing, marine acoustics • elements of marine biology, the genetics and physiology of marine organisms, computational biology

www.iopan.gda.pl

Institute of High Pressure Physics

(Warsaw)

disciplines: physics, materials engineering

fields of activity: GaN bulk crystal growth • the fabrication of semiconductor structures and devices on monocrystalline substrates • studies of the physical properties of bulk crystals, layered structures (quantum wells), and semiconductor devices • research in the impact of hydrostatic pressure and temperature on the properties of semiconductor lasers • ceramics and composites, superconductors, metals • the synthesis of nanocrystalline powders • sintering of nanoceramics and nanocomposites • the fabrication of nanocrystalline metals, alloys, and composites • studies of nanoscale-related physical properties • nanometrology – developing methods for the description of nanomaterials • protein aggregation and stability under high pressures • high pressure in food processing • research in cell disruption in microorganisms under high pressures • the development of new high pressure scientific methods

www.unipress.waw.pl

International Laboratory of High Magnetic Fields and Low Temperatures (Wrocław)

disciplines: physics

fields of activity: properties of superconductors • magnetic, galvanomagnetic, and thermal properties of poly- and monocrystals of metals, their alloys, and compounds in high magnetic fields and at low temperatures • developing methods of creating and measuring high magnetic fields

www.ml.pan.wroc.pl

Auxiliary research units:

Museum of the Earth (Warsaw)

disciplines: biology, geography, geology, environmental engineering and conservation

fields of activity: geodynamic phenomena and processes • fossil floras and faunas as a basis for promoting improved awareness of the Earth sciences • guidelines for evaluating the scientific and teaching value of inanimate natural monuments • sources for studying the history of geological sciences in Poland

www.mz.pan.pl

Systems Research Institute (Warsaw)

disciplines: automatic control and robotics, informatics

fields of activity: systems analysis • intelligent data analysis and knowledge discovery • fuzzy logic and its applications • optimization methods • systems modelling • computer decision support systems • operational research • stochastic methods in decision support • statistical quality control and the theory of reliability • mathematical methods in risk analysis and finance • applications of systems analysis in environment protection, regional modelling, management, and agricultural development strategy modelling www.ibspan.waw.pl

Institute of Biocybernetics and Biomedical Engineering (Warsaw)

disciplines: medical sciences, mathematics, chemical sciences, informatics, automatic control and robotics, electronics, biocybernetics and biomedical engineering, materials engineering, medical biology, biotechnology

fields of activity: application of cybernetic methods and measurements for analyzing and modeling biological structures and processes in living organisms • cell engineering • the construction of prototypes for biological, medical, and technological applications • measurement methods and systems for biological, medical, and technological applications • artificial internal organs • methods of technological support for diagnostics and medical treatment • biomechanics • methods of image recognition and digital image processing • information processing and control processes in living organisms www.ibib.waw.pl

Institute of Hydroengineering (Gdańsk)

disciplines: construction engineering, environmental engineering and conservation, mechanics, oceanology

fields of activity: inland and maritime hydroengineering • coastal engineering • hydrodynamics of rivers, reservoirs, and estuaries • geomechanics • geotechnics • natural environment mechanics www.ibwpan.gda.pl

Institute of Geography and Spatial Organization (Warsaw)

disciplines: economics, geodesy and cartography, geography, environmental engineering and conservation

fields of activity: geomorphology • hydrology • climatology • geocology • urban and population geography • economic, social, and political geography • agricultural and rural geography • spatial organization www.igipz.pan.pl

Mineral and Energy Economy Research Institute (Kraków)

disciplines: economics, power engineering, geophysics, geology, mining and engineering geology, environmental engineering and conservation

fields of activity: the distribution of mineral resources • methods of exploring for and documenting deposits of mineral resources • the rational use of resources • enriching and processing of mineral resources • optimizing the management of natural minerals and energy • forecasting energy demand • developing the fuel and energy sector • the rational use of energy • new sources of energy, especially sources of renewable energy (geothermal, wind, and solar biomass) • natural resources and energy policy www.min-pan.krakow.pl

Institute of Theoretical and Applied Informatics (Gliwice)

disciplines: automatic control and robotics, electronics, informatics

fields of activity: high performance computer networks • multimedia computer systems • communications and processing in distributed systems • statistical methods and evaluation of the performance of computer systems and networks • evolutionary systems • the theory and applications of machine vision systems • algorithms of knowledge representation and reasoning processes www.iitis.pl

Institute of Chemical Engineering

(Gliwice)

disciplines: chemical engineering, environmental engineering and conservation, chemical technology

fields of activity: engineering of chemical reactors and catalytic processes • mass and heat transfer • modern energy-saving separation methods (adsorption, membrane separation processes) • selected issues related to environmental protection, renewable energy sources, and bioprocess engineering www.iich.gliwice.pl

Institute of Fluid-Flow Machinery

(Gdańsk)

disciplines: machine building and exploitation, power engineering, mechanics

fields of activity: aerodynamics of turbines, boilers, and other energy devices • transonic flows • turbulent multiphase flows • cavitation, hydromechanics of water turbines • thermodynamic cycles • mass and heat transfer • microwave plasma sources, electrical breakdowns, industrial lasers • thermodynamics of heat-resistant steels • durability and vibration of power equipment • structural mechanics • tribology • bearings • identification of phenomena in plain bearings • diagnostics www.imp.gda.pl

Strata Mechanics Research Institute

(Kraków)

disciplines: geophysics, mining and engineering geology, environmental engineering and conservation, mechanics

fields of activity: research in unsteady fluid flows through networks and porous materials • metrology of liquids and gases • issues related to environmental protection • environmental engineering of mines • mechanic properties of rocks and their geometrical structure • states of tension and shifting in rock beds www.img-pan.krakow.pl

Institute of Metallurgy and Materials Science

(Kraków)

disciplines: materials engineering, metallurgy

fields of activity: modeling and examining the thermodynamic and physicochemical properties of alloys • materials for the aviation, transportation, and energy sectors • metallic materials for hydrogen storage • new lead-free solders • surface engineering • biomedical materials • the structure of materials • solar cells • magnetocaloric materials • non-destructive diagnostics and the texture of materials • forming processes www.imim.pl

Institute of Computer Science

(Warsaw)

disciplines: computer science

fields of activity: theoretical foundations of computer science • distributed computing • software and database engineering • knowledge acquisition and representation • computer methods of data analysis and unconventional algorithms • linguistic engineering • multiprocessor architectures • computer decision support www2.ipipan.waw.pl

Institute of Environmental Engineering

(Zabrze)

disciplines: environmental engineering and conservation, environment management

fields of activity: mechanics and physical chemistry of pollutants coming from industrial and power-generating installations with a particular focus on hazardous substances • physicochemical properties of primary and secondary aerosols as indicators of health and environmental impact • physical and chemical methods of exhaust gas purification • the impact of air pollution on climate change • air quality management on a local and regional scale • wastewater treatment and water purification for industrial applications • research in the recovery of biogenic substances from communal and industrial waste • the possibility of using fossils, natural resources, and waste as effective low-cost sorbents for heavy metals and organic pollutants in the remediation

of water, wastewater, and soil • physicochemical properties of waste in the context of the possibility of their neutralization and recovery, including engineering work and rehabilitation • the impact of non-point pollution, including landfill sites, on the environment • preventing the negative impact of waste on the environment • technological and biological rehabilitation of post-industrial land, including landfill sites • soil magnetometry as a gauge of the degree of pollution in an industrial area • harnessing the waste energy of discharge water from power-generating installations and geothermal waters to warm up soil for agricultural purposes www.ipis.zabrze.pl

Institute of Fundamental Technological Research (Warsaw)

disciplines: electronics, informatics, materials engineering, mechanics

fields of activity: fundamentals of designing, producing, and using processes, materials and structures • solid-state mechanics • gas dynamics • hydrodynamics • acoustics, biomechanics, ultrasounds • electromagnetic fields • mechanical systems • applied informatics • selected aspects of materials engineering and energy management www.ippt.pan.pl



Wave flume the PAS Institute of Hydroengineering

Institute of Medical Biology

(Łódź)

disciplines: medical biology, chemical sciences, pharmaceutical sciences, medical sciences

fields of activity: biomedical studies with a focus on fundamental molecular mechanisms of physiological and pathophysiological processes and medical biotechnology
www.ibmpan.pl

Institute of Pharmacology

(Kraków)

disciplines: biology, medical biology, pharmaceutical sciences, medical sciences

fields of activity: mechanisms of action of psychotropic drugs (antidepressants, anxiolytics, neuroleptics) • adaptive changes in the central nervous system after repeated use of neurotropic and psychotropic drugs • experimental models of depression, schizophrenia, and Parkinson's disease • pharmacological and molecular aspects of drug addiction • the role of endogenous systems and opioid receptors in nociceptive processes • the pharmacology of excitatory amino acids • the pharmacology of serotonin receptors • mechanisms of aging-associated movement disorders (Parkinson's disease) • the impact of selected steroid hormones on the functional condition of the central nervous system • pharmacological and neurochemical aspects of tremor phenomena • pharmacokinetics and metabolism of psychotropic drugs – pharmacokinetic interactions • synthesis of new chemical connections of potential serotonin receptor ligands • endogenous substances as neuroprotective and anti-addictive agents • isolation and identification of biologically active compounds from plants
www.if-pan.krakow.pl

Institute of Human Genetics

(Poznań)

disciplines: medical biology, medicine, medical sciences

fields of activity: human genetics • gene structure, functions, and expression in single-gene and multifactorial genetic disorders • genetic mechanisms and factors underlying classical genetic diseases, selected cancers, autoimmune diseases, and infertility • the structure and

function of nucleic acids in genetic disorders • molecular and cytogenetic investigations of genetic disorders • mutagenesis and carcinogenesis with genetic susceptibility to cancer • immunogenetic aspects of neoplastic diseases, autoimmune diseases, and infections • genetic testing in infertility • mechanisms of the pathophysiology of reproduction
www.igcz.poznan.pl

Hirszfeld Institute of Immunology and Experimental Therapy

(Wrocław)

disciplines: biology, medical sciences, medical biology

fields of activity: genetic factors behind immunological processes and their molecular and cellular foundations • mechanisms affecting the immune response of the organism in neoplastic processes • mechanisms of stimulating and inhibiting the immune response through biogenic and synthetic compounds • the role of humoral and cellular immunity in the pathogenesis of selected infections • mechanisms regulating the immune response • human leukocyte antigens • factors affecting the success of organ and tissue transplants • phage therapy

www.iitd.pan.wroc.pl

Mossakowski Medical Research Centre (Warsaw)

disciplines: medical biology, medicine, medical sciences

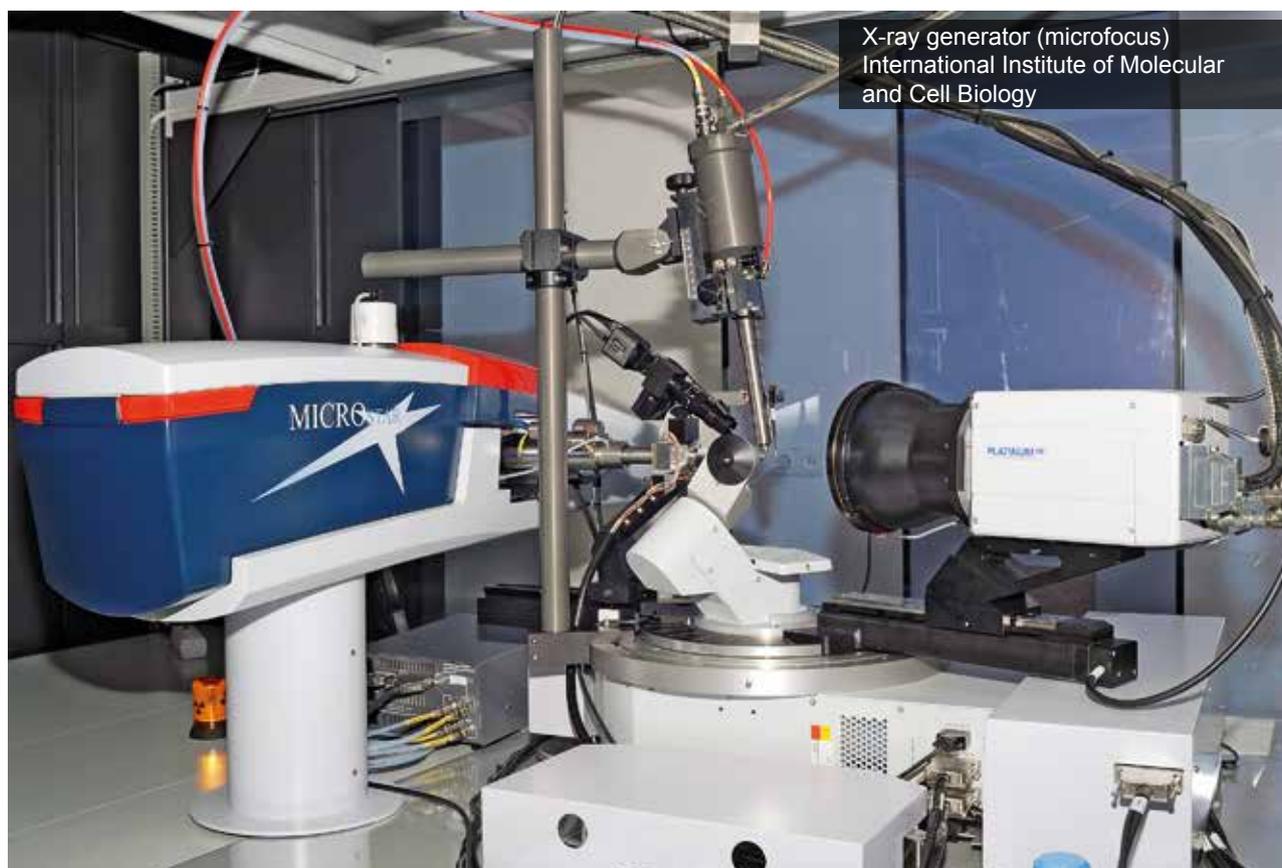
fields of activity: neural, humoral, and immunological mechanisms regulating the functional, metabolic, and structural homeostasis of the organism in healthy state and under selected pathological conditions • experimental surgery • tissue immunology • pharmacology and experimental therapeutics for brain disorders • clinical trials for neurological diseases involving volunteers and patients
www.imdik.pan.pl

Frąckiewicz Laser Processing Research Centre of Kielce University of Technology and PAS (Kielce)

disciplines: construction and operation of instruments
fields of activity: surface engineering • materials engineering • tribology • automatic control and robotics • laser technology
www.tu.kielce.pl

International Institute of Molecular and Cell Biology (Warsaw)

disciplines: molecular and cell biology
fields of activity: basic scientific research in molecular medicine (mechanisms of carcinogenesis and aging, the molecular basis of neurodegenerative diseases such as Alzheimer's disease and Parkinson's disease, resistance to antibiotics, immunology, and genome repair) • putting scientific achievements into practical applications and popularizing modern molecular medicine and biology
www.iimcb.gov.pl



X-ray generator (microfocus)
International Institute of Molecular
and Cell Biology

PAS Committees

The committees of the Polish Academy of Sciences serve as bodies representing various research circles and disciplines. Their members, elected by the research communities in specific fields (physicists, biochemists, sociologists, etc.) include national members of the Academy, researchers from non-PAS research institutes and universities, and also representatives of economic and social institutions and organizations. They serve in an advisory capacity on issues related to technology, engineering, biology, medicine, Earth sciences, social sciences, humanities, agricultural sciences, etc. They draw up position statements and expert studies for the needs of Polish public administration, and assist in resolving specific science-related issues. They also issue opinions on new legal regulations meant to affect science, its applications, and education. They likewise work to promote broader awareness of research findings and also support the development of specific fields.

The number of committees is not fixed, with new ones being set up in response to problems pertaining to the development of science or of the country, which the voice of scientists may prove helpful in deliberating.

Bodies representing the research community in specific scientific disciplines, integrating researchers across Poland

SCIENTIFIC COMMITTEES

Specially-selected teams of experts for addressing specific tasks

TASK-FORCE COMMITTEES

NATIONAL COMMITTEES

Bodies appointed to maintain and develop cooperative ties with international research organizations

Ethics in Science

Very strict professional demands are made of scientists, and they have an important duty to adhere to the highest standards. This has an impact not only on their own further achievements, but also on whether they are recognized by society as authorities, perceived as honest and credible.

“Research workers should constantly strive to broaden their knowledge, and their primary motivation should be a passion to investigate and a desire to advance the frontiers of science. Research workers respect the human right to truthful information and strive to bring that principle to bear in practice.” Since the early 1990s, the PAS Committee for Ethics in Science has created and updated a set of principles, recommendations, and standards that apply to all researchers working in Poland. They are expected to be conscientious, objective, thorough, critical, honest, concerned, and take responsibility for what they say. In 2011 the Science Ethics Committee was appointed within PAS structures. Its “Code of Ethics for Research Workers”, which the Academy put forward in 2012, also provides guidelines for the handling of research data, research procedures, publication practices, reviewing papers, etc.



Organizers of the *Young in Science* debate, including representatives of AMU.

The Polish Young Academy

The Polish Young Academy (AMU) was established in 2010 in order to promote research and development activities by the outstanding young representatives of Polish science. Its members are elected by the General Assembly of the Polish Academy of Sciences in a number not exceeding 35. At the time of selection, the Polish Young Academy members must not be older than 38 years and are required to hold a PhD degree.

The tasks of the Polish Young Academy focus on the community of young scientists and mainly include: providing statements, submitting programmes for science projects, organising debates and conferences to discuss significant scientific problems that occur in represented or related disciplines and also dissemination of their results, formulating opinions and scientific assessments concerning represented or related disciplines along with promoting ethical standards among young scientists.

Polish Scientific Networks conference



International Cooperation

The Polish Academy of Sciences collaborates with foreign partners and also participates in the activities of world research organizations.

Polish scientists conduct research from pole to pole: the Institute of Biochemistry and Biophysics, Department of Antarctic Biology, maintains a year-round research station and monitors the environment of East Antarctica, while the Institute of Geophysics conducts research at Hornsund Polish Polar Station on Spitsbergen.

Apart from being active participants of the collaboration resulting from the PAS international cooperation agreements, the PAS research units also conduct their own cooperation with foreign partners. They collaborate with more than 1,500 different foreign partners, pursuing more than a thousand joint research projects.

Moreover, there are three high-caliber research institutes functioning within the structure of the Polish Academy of Sciences: the European Regional Center for Ecohydrology in Łódź, the International Institute of Molecular and Cell Biology in Warsaw, and the International Laboratory of High Magnetic Fields and Low Temperatures in Wrocław.

Each year, around 1,000 Polish scholars from the PAS research units travel abroad under bilateral research coop-

eration agreements. A similar number of foreign scholars come to pursue their research at Polish institutes and universities.

Cooperation also takes place under the framework of nearly 100 international organizations, including the International Council for Science (ICSU), the European Academies' Science Advisory Council (EASAC), and the Inter-Academy Panel: the Global Network of Science Academies (IAP).

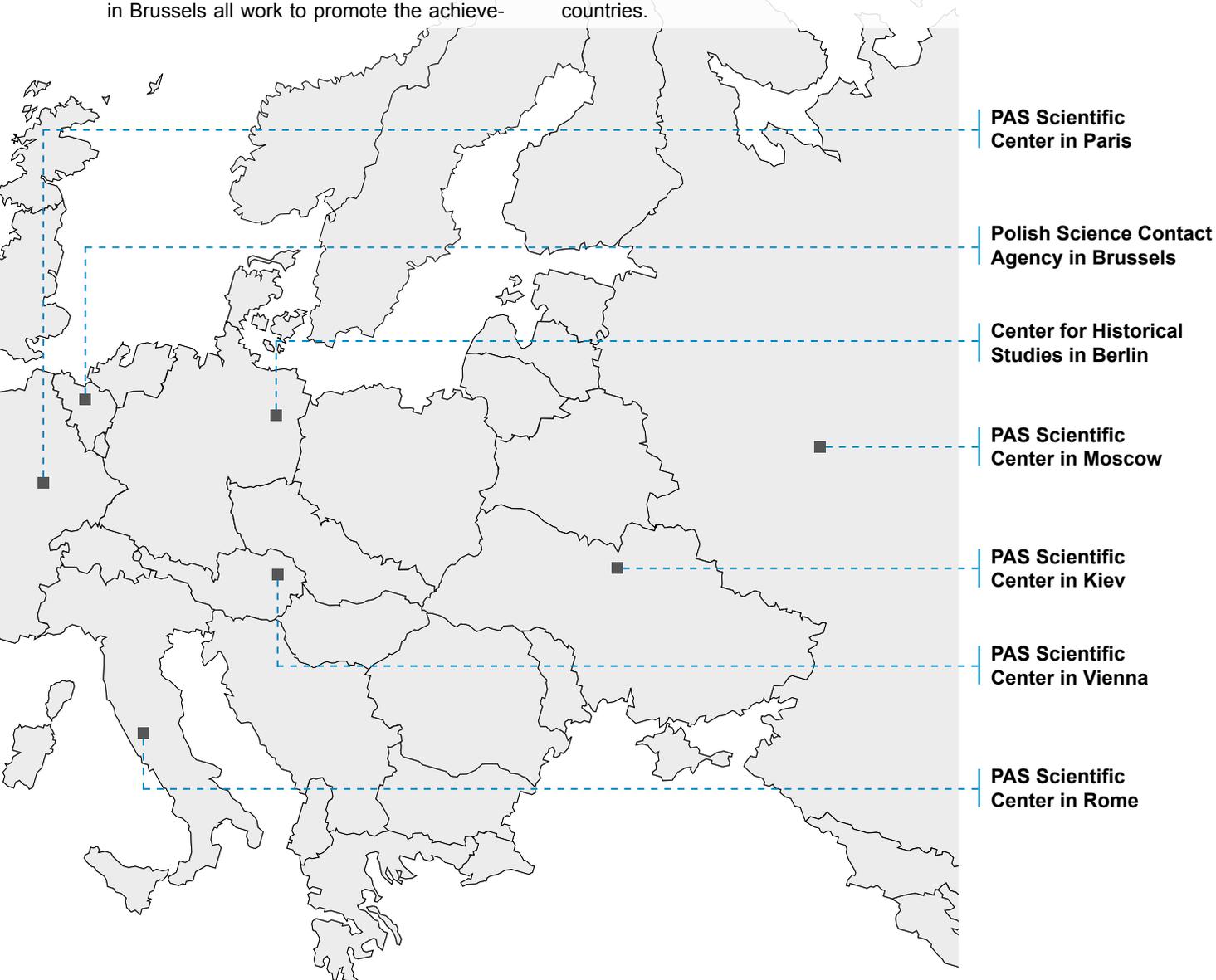
The Polish Academy of Sciences is proud to collaborate with more than 70 foreign academies of science and equivalent organizations from Europe, Asia, North America, and Africa.



Foreign Scientific Centers

The Academy's foreign scientific centers in Kiev, Moscow, Paris, Rome, Vienna, the Center for Historical Studies in Berlin, and the Polish Science Contact Agency in Brussels all work to promote the achieve-

ments of Polish science abroad. They organize meetings, seminars, lectures, exhibitions and conferences. They also collaborate with the research communities in their host countries.

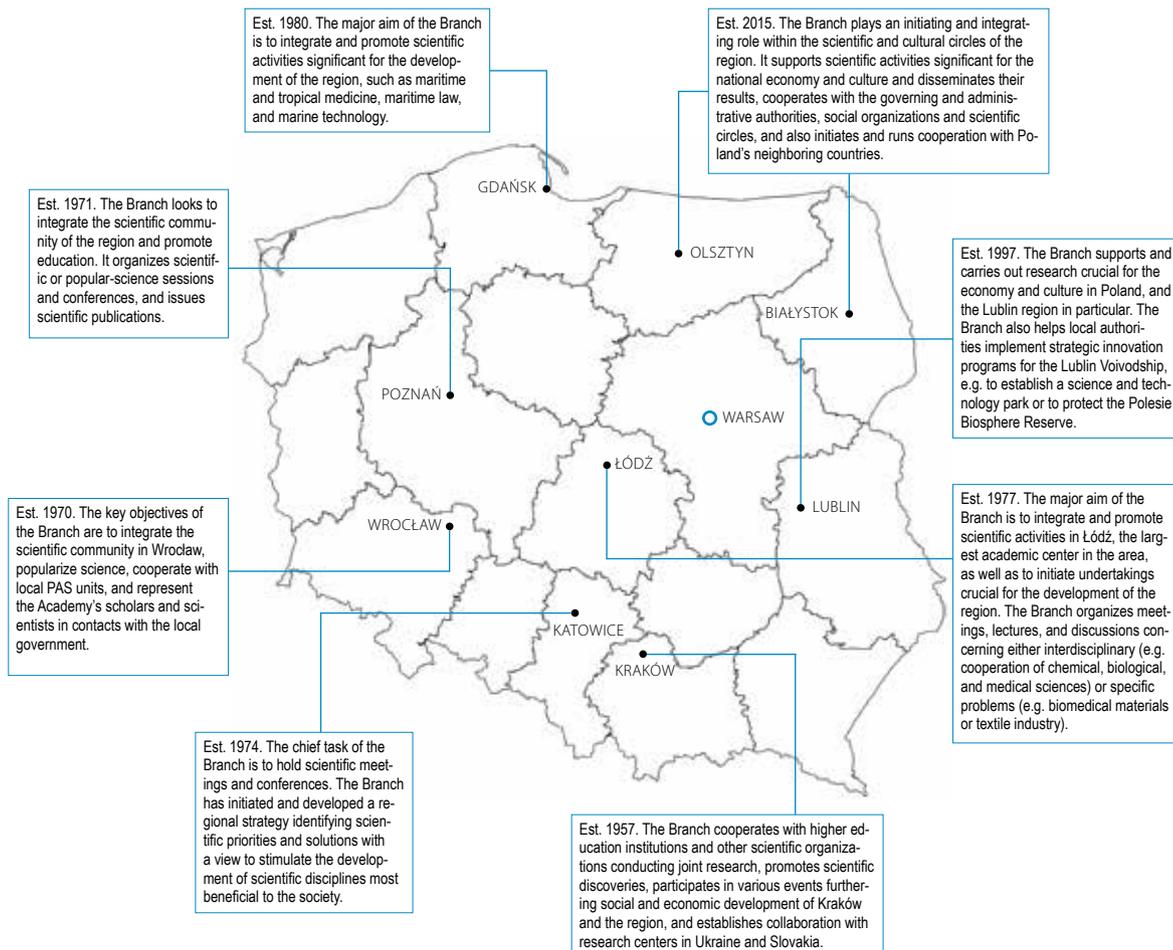


Territorial Branches

The Territorial Branches of the Polish Academy of Sciences integrate the research community within a given region of Poland and also act on the Academy's behalf in contacts with the bodies of state administration, local government, and NGOs. Each Branch is

composed of the national members of the Academy who reside within the given region.

The most recent addition is the Olsztyn and Białystok Branch (headquartered in Olsztyn), created in 2015.



Publications

In terms of publishing activity, the Academy ensures the continued issuing of the most important research journals and series in most disciplines, as well as scientifically sound, high-calibre publications documenting the activity of the PAS research communities. Various PAS series and periodicals, published in English and foreign languages, have a scientific and/or popular-scientific profile, highlighting the links between science and economic processes, illustrating current trends in international cooperation, providing information about all the Academy's fields of activity, and also promoting the Academy's image.

The research institutes, scientific committees, task-force committees, and territorial branches of the Academy publish a grand total of about 600 books and periodical volumes per year in print form and also accessible electronically. Many of them are available in open-access on PAS website.

Some of the publications are issued by the Chancellery of the Academy on an ongoing basis, including:

Academia – the Magazine of the Polish Academy of Sciences (quarterly, in English and Polish)

Annual Report – a publication in English presenting the most significant scientific achievements and events, as

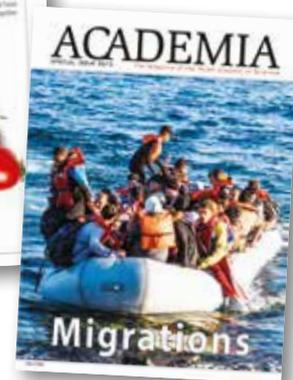
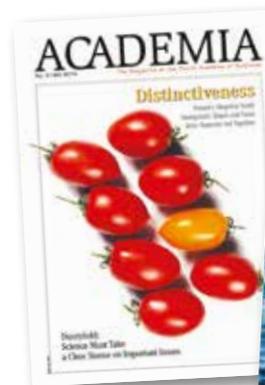
well as selected statistics from the given reporting period

Directory – an illustrated scientific guide to the Polish Academy of Sciences in English presenting basic information about the structure of the Academy's Authorities. It is published every four years, once for every term of office of the Academy's authorities

Members of the Polish Academy of Sciences – informational guidebooks on members of the Academy, published every four years (in Polish)

Nauka (Science) – a quarterly devoted to the problems of the Polish scientific community (in Polish)

Sprawozdanie PAN (Report of the Polish Academy of Sciences) – an annual report prepared by the Academy's divisions and the Chancellery. It contains current information about the Polish Academy of Sciences, its achievements, and research capacities of the scientific community (in Polish)



Education

More than 1,500 students work internships at PAS units every year. More than 600 master's-level students prepare thesis projects under the guidance of PAS research staff. And we are currently educating 2,500 doctoral students.



Popularizing Science

The Academy and its numerous units organize a wide array of national-scope and local events promoting public awareness of science: festivals and picnics, museum nights, open-house days, book fairs, seminars, conferences, meetings and lectures, at which outstanding researchers guide participants into the fascinating world of science.

The longest tradition has Wsztechnica – open lectures series event, where experts present the newest scientific achievements and results of projects conducted in the Polish Academy of Sciences units. Lectures are held in the neo-classical Staszic Palace in Warsaw along with



its live transmission in the Internet. Also the Science Meetings – Wszecznicza, organized once a year during the Warsaw Book Fair at the National Stadium in Warsaw, has gained public's favour.

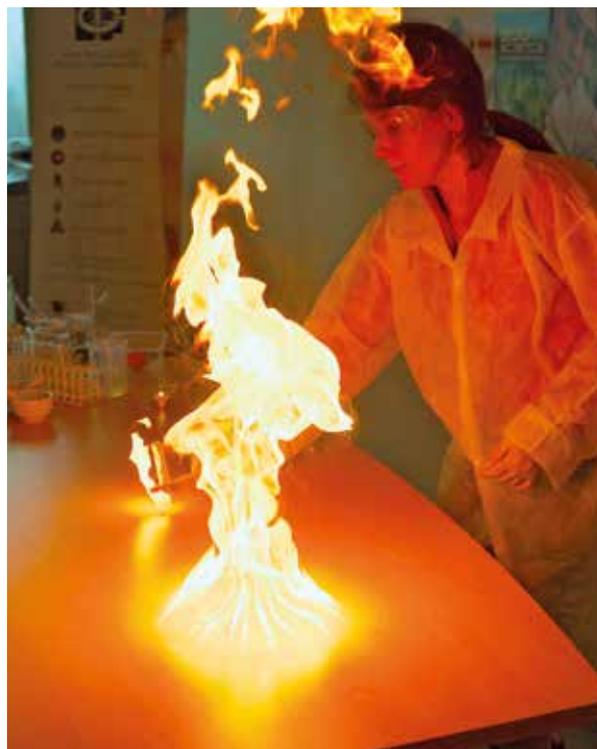
The Warsaw Wszecznicza popularity encouraged the Academy Lublin Branch to start the same activity in 2010 in this eastern region.

Also outside the capital city, The Council for the Promotion of the Public Understanding of Science of the Polish Academy of Sciences organizes science cafés, participates in local science festivals and scientific events with its lectures and workshops.

The above events belong to a larger structure called 'science promotion activity'. Near 6 million PLN are spent yearly on performing tasks, especially those related to the publishing and expert activities, scientific workshops and conferences, cultural reserves promotion, databases creation and maintenance.



Hands-on science discovery at the EDUSCIENCE event (the PAS Institute of Geophysics)



Museums and Exhibitions

Museum exhibits and lectures are held by the Museum of the Earth in Warsaw, the Geological Museum (of the Institute of Geological Sciences) in Kraków, the Museum of Evolution (of the Institute of Paleobiology) in Warsaw, the Museum and Institute of Zoology in Warsaw, and the Botanical Garden – Center for Biological Diversity Conservation in Powsin, Warsaw.



A 11th-century *kaptorga* (neck-worn reliquary) excavated at Bodzia



Minerals at the PAS Museum of the Earth in Warsaw



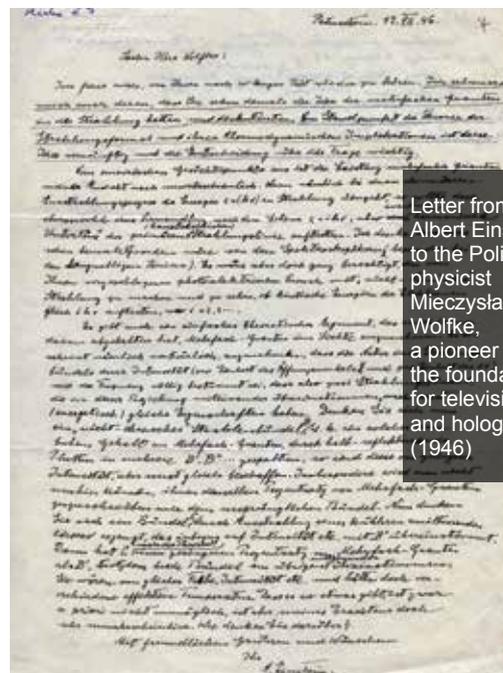
Libraries and Archives

Precious archive materials are held and made publicly available by the PAS Archives in Warsaw and the joint Science Archives of the Polish Academy of Sciences and Polish Academy of Arts and Sciences in Kraków. Unique collections are held by the Gdańsk Library of the Polish Academy of Sciences (founded in 1596 as Bibliotheca Senatus Gedanensis, i.e. the library of Gdańsk City Council), the Kórnik Library (founded in 1829 by Count Adam Tytus Działyński), and the joint Scientific Library of the Polish Academy of Arts and Sciences and Polish Academy of Sciences in Kraków.



Map from PAS Kórnik Library collections

Museum night at the PAS Gdańsk Library



Letter from Albert Einstein to the Polish physicist Mieczysław Wolfke, a pioneer laying the foundations for television and holography (1946)

Selected Achievements

Each year, PAS staff members win grants from competitive EU research programs and from private foundations. The most prestigious grants are those awarded by the European Research Council (ERC), whose priority is to promote research pushing the limits of our existing state of knowledge.

Every year the Council opens up competitions for Starting Grants (for up-and-coming researchers), Consolidator Grants (for those consolidating their own team or program), Advanced Grants (for well-established independent leaders), and also Proof of Concept Grants (extra funding for existing grant-holders). More recently, it has also offered Synergy Grants for research groups doing interdisciplinary work. Of the dozen-odd beneficiaries from Poland who have won ERC grants to date, seven are from the Polish Academy of Sciences. In 2016 in the PAS Chancellery a new Excellence in Science Department has been established in order to help Polish scientists to win ERC grants.

2013–2018



2012–2016



2011–2015, 2013



2012–2017



2010–2016



2009–2013



2016–2021



• • • • • **Andrzej Dziembowski**, PAS Institute of Biochemistry and Biophysics – *Regulation of Gene Expression by non-canonical poly(A) and poly(U) polymerases*

• • • • • **Piotr Garstecki**, PAS Institute of Physical Chemistry – *Microfluidic Combinatorial On Demand Systems: a Platform for High-Throughput Screening in Chemistry and Biotechnology*

• • • • • **Janusz Bujnicki**, International Institute of Molecular and Cell Biology – 2011–2015: *Breaking the Code of RNA sequence-structure-function Relationships: New Strategies and Tools for Modelling and Engineering of RNA and RNA-Protein Complexes*, 2013: *Engineered Sequence-Specific RNases: New Reagents for RNA biotechnology*

• • • • • **Marcin Nowotny**, International Institute of Molecular and Cell Biology – *Structural Studies of Nucleotide Excision Repair Complexes*

• • • • • **Maciej Konacki**, Copernicus Astronomical Center (PAS) – *Eclipsing Binary Stars as Cutting Edge Laboratories for Astrophysics of Stellar Structure, Stellar Evolution and Planet Formation*

• • • • • **Tomasz Dietl**, PAS Institute of Physics – *Functionalisation of Diluted Magnetic Semiconductors*

• • • • • **Piotr Nowak**, PAS Institute of Mathematics – *Rigidity of Groups and Higher Index Theory*

Simons Grant for the Institute of Mathematics

In 2015, the PAS Institute of Mathematics won a prestigious five-year grant for research institutions dealing with mathematics and physics, awarded by the private foundation of the American billionaire, mathematician, and financier James Simons. This was the first time the grant was awarded to an institute from Central-Eastern Europe. Worth \$907,200, the grant will be used to fund a program of “Simons Semesters at the Banach Center.” The project has also received comparable co-financing from the Polish Ministry of Science and Higher Education.

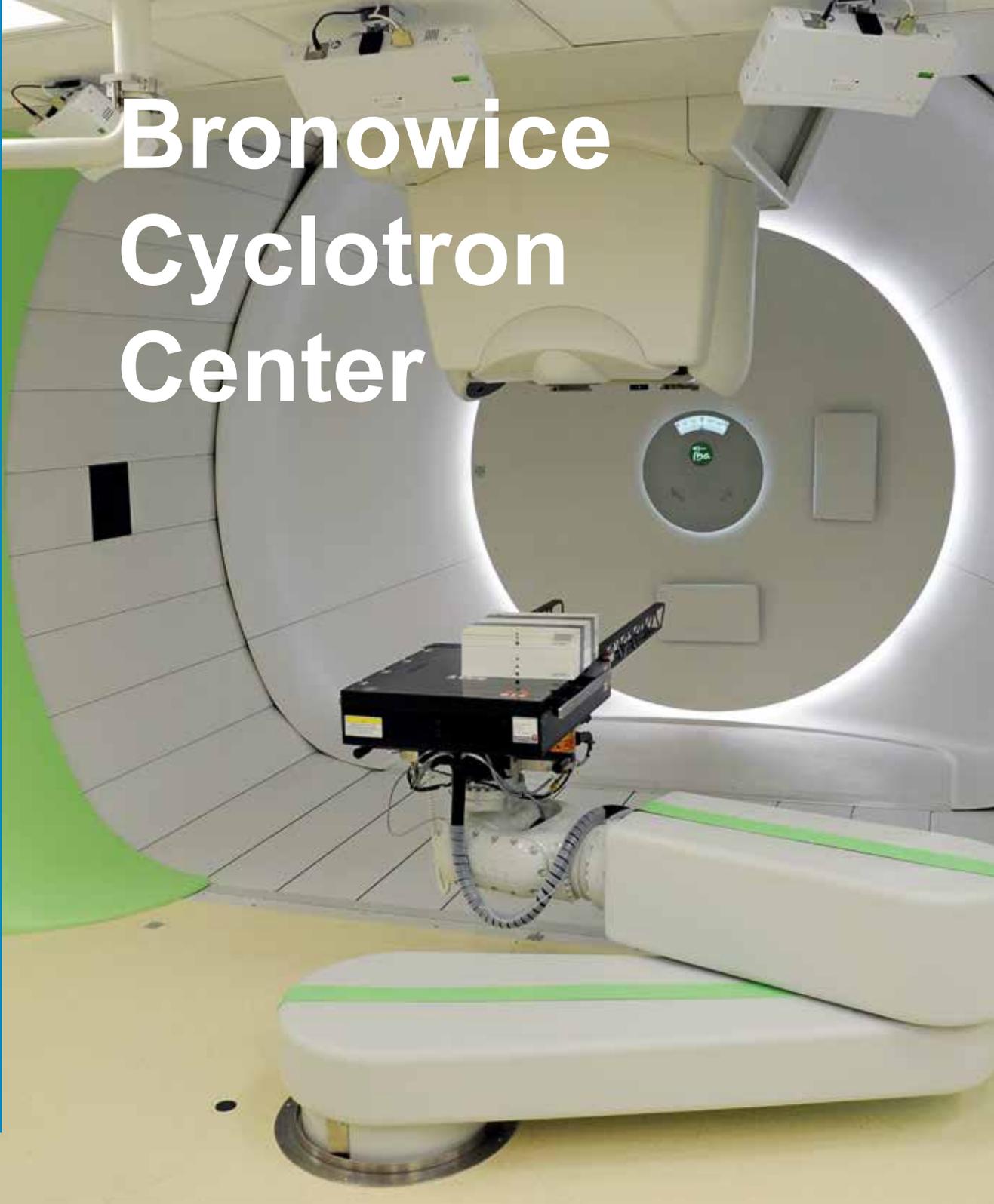
Collaborating with a Nobel laureate

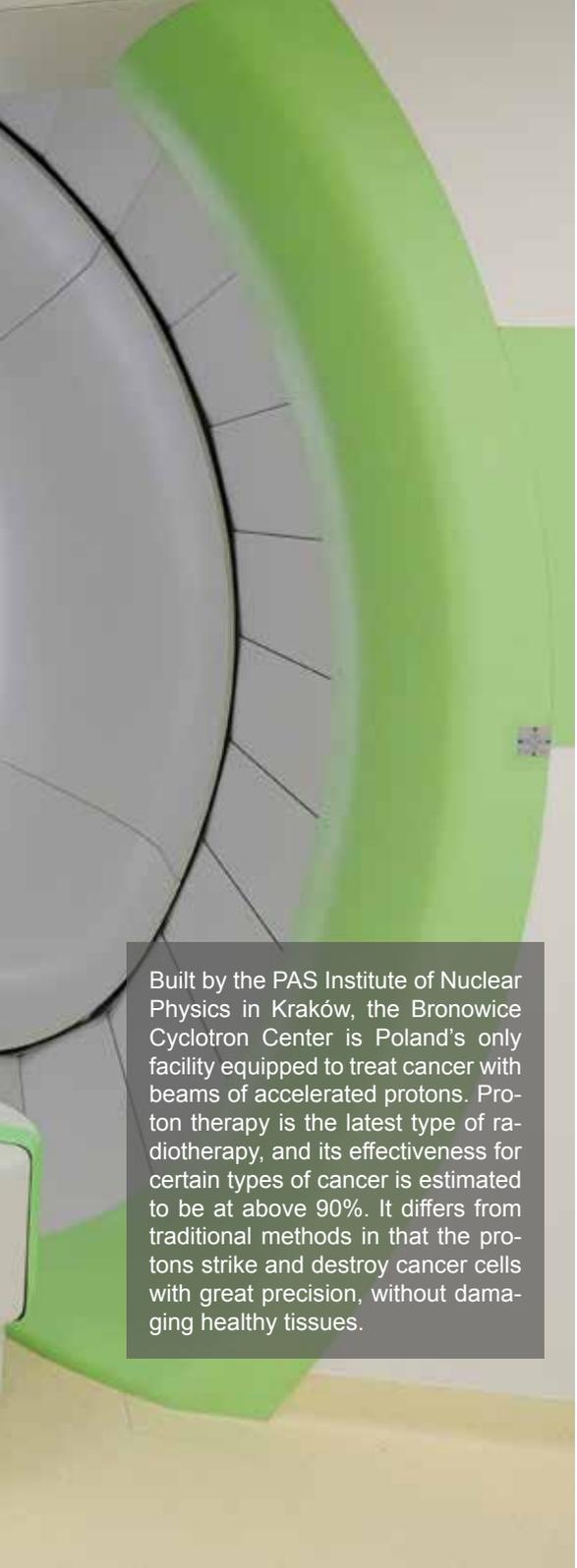
Professor Michał Leszczyński is working with Nobel Prize winner Prof. Hiroshi Amano from Japan and Prof. Vaclav Holy from the Czech Republic on improving the laser diode technology of the future. This is one of the 5 projects chosen for the V4–Japan Grant scheme (out of 59 submitted), which supports cooperation between the Visegrad Group countries and Japan. The project is conducted in collaboration with the PAS Institute of High Pressure Physics, Nagoya University, and Charles University in Prague.

Polish researchers are pioneers in the technology of creating laser diodes based on gallium nitrate, which find applications in optoelectronics and photovoltaics, especially in the manufacture of televisions, LED displays, and smartphones, as well as in the data transmission sector and motor industry.



Bronowice Cyclotron Center



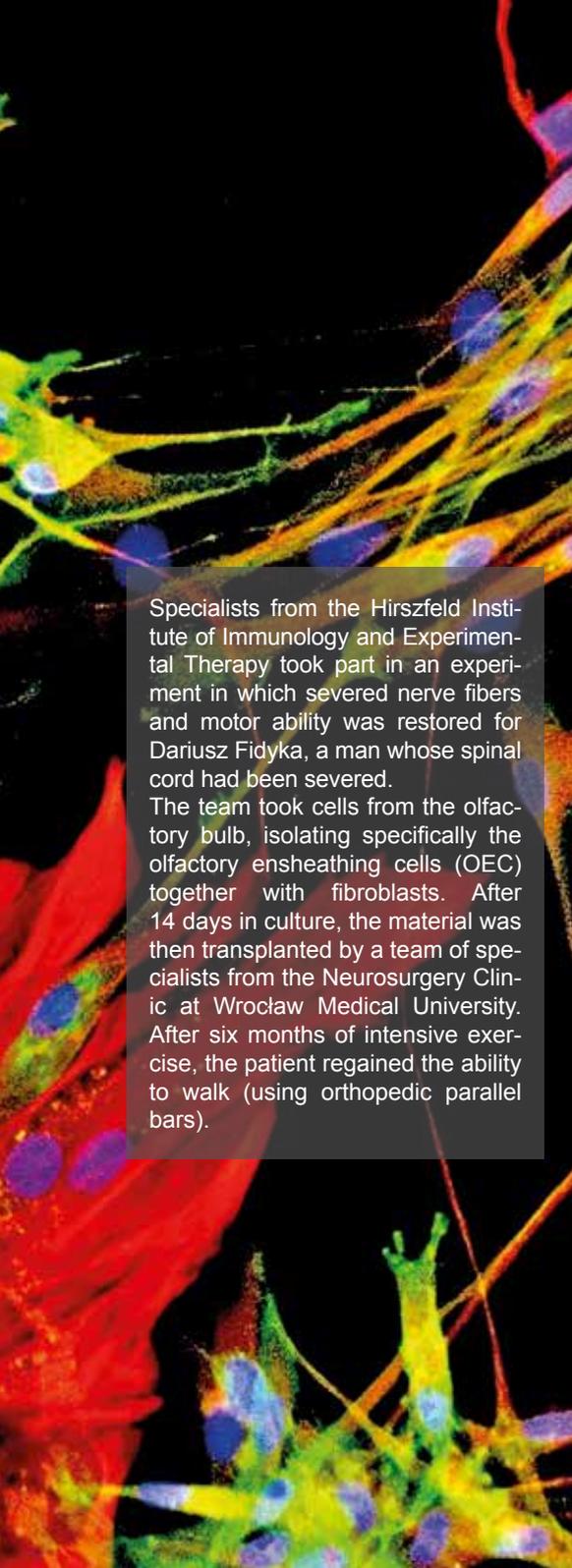


Built by the PAS Institute of Nuclear Physics in Kraków, the Bronowice Cyclotron Center is Poland's only facility equipped to treat cancer with beams of accelerated protons. Proton therapy is the latest type of radiotherapy, and its effectiveness for certain types of cancer is estimated to be at above 90%. It differs from traditional methods in that the protons strike and destroy cancer cells with great precision, without damaging healthy tissues.



Successful spinal cord regeneration





Specialists from the Hirszfeld Institute of Immunology and Experimental Therapy took part in an experiment in which severed nerve fibers and motor ability was restored for Dariusz Fidyka, a man whose spinal cord had been severed.

The team took cells from the olfactory bulb, isolating specifically the olfactory ensheathing cells (OEC) together with fibroblasts. After 14 days in culture, the material was then transplanted by a team of specialists from the Neurosurgery Clinic at Wrocław Medical University. After six months of intensive exercise, the patient regained the ability to walk (using orthopedic parallel bars).

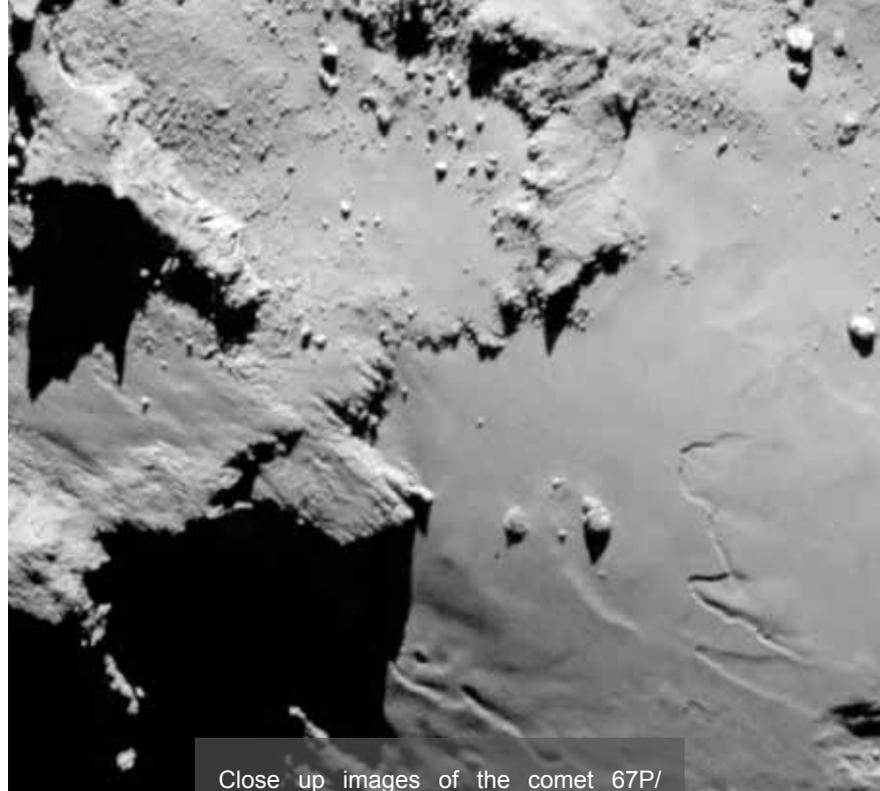


MUPUS penetrator for the Rosetta mission

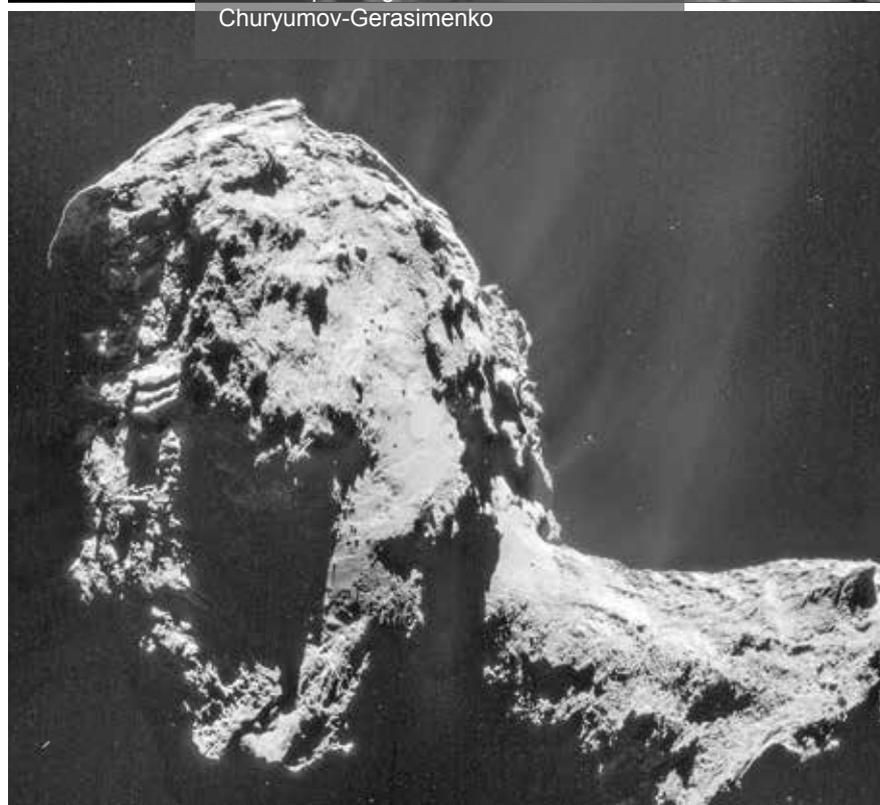
The MUPUS penetrator, an instrument equipped with a hammering device and a 40 cm rod carrying measuring devices, was constructed by a team from the Space Mechatronics and Robotics Laboratory at the PAS Space Research Center (the strongest center in the world making specialist devices of this sort).

The instrument is part of the European Space Agency's Rosetta mission, underway since 2004.

After 10 years in flight, MUPUS landed on the comet 67P/Churyumov-Gerasimenko, attached to the Philae lander. It penetrated the comet's surface and is sending measurement data back to Earth. This is the first space research of its kind carried out by European scientists.



Close up images of the comet 67P/
Churyumov-Gerasimenko



The Polish-constructed
MUPUS penetrator device



PAS Research Center for Energy Conversion and Renewable Energy Sources

This new initiative is the largest and most state-of-the-art center of its kind in Poland, studying renewable energy technologies, and one of three such facilities in Europe. It is meant to be a place for scientific research as well as for developing applications in the field of “plus-energy” technologies for homes, settlements, hospitals and schools, which will enable them to generate more energy than they themselves consume. The project coordinator is the Institute of Fluid-Flow Machinery, PAS, in Gdańsk.



European Social Survey



The European Social Survey (ESS) is one of the largest and most important European research projects in the social sciences. In Poland it is carried out by the PAS Institute of Philosophy and Sociology. Under the EES project, a unique research method has been developed, making it possible to create maps illustrating shifts in social attitudes on key issues, the modification of value systems and human behavior. The survey provides a reliable source of information about the residents of the European Union. The data is available free-of-charge at www.europeansocialsurvey.org.



Selected Achievements

Poland's first research satellites



The PAS Space Research Center, Poland's only unit dealing with human activity in space, developed and assembled the subcomponents of Lem and Heweliusz – the first Polish research satellites, which are now in Earth orbit.

The satellites form part of the Bright Target Explorer (BRITE) international consortium, making precise measurements of the brightest stars in our galaxy.



Polar Research (PolarPOL)

Hornsund Polish Polar Station is situated on the bay of Isbjørnhamn in the fiord of Hornsund (in the southern portion of the Norwegian island of Spitsbergen, part of the Svalbard archipelago).

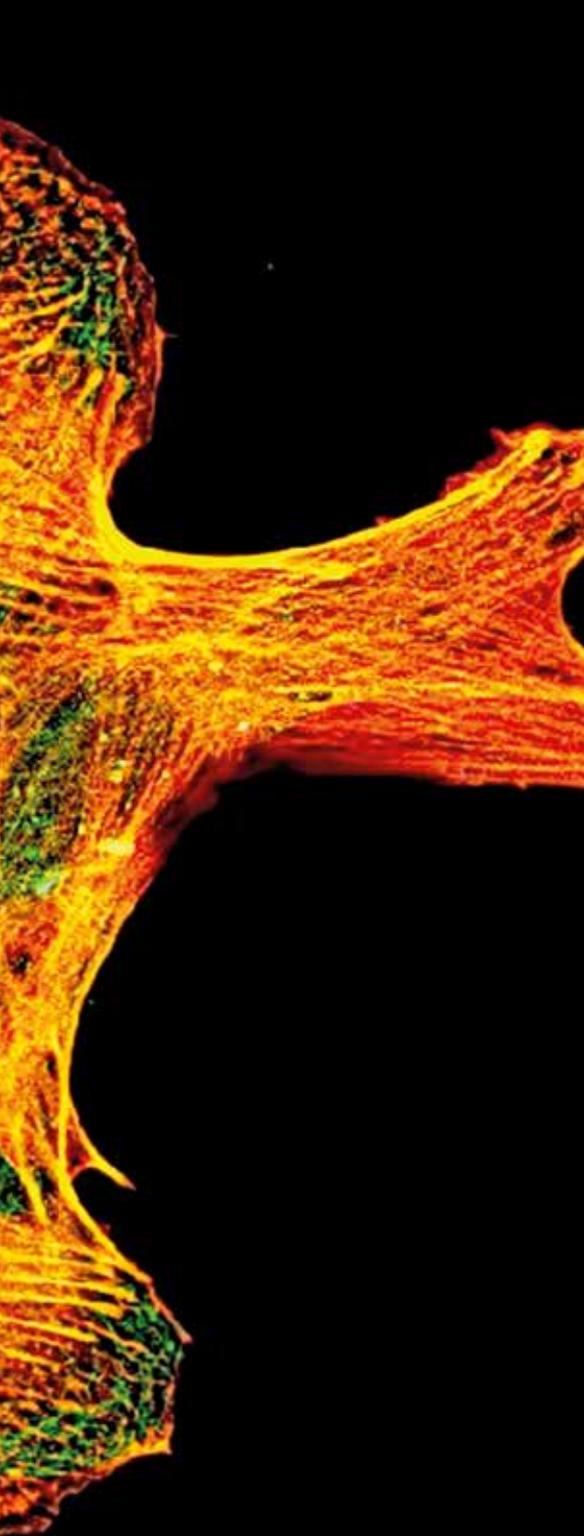
Managed by the PAS Institute of Geophysics in Warsaw, the station conducts scientific research year-round and is proud to be Poland's northernmost research institution.

Together with Poland's research vessels (including the "Oceania" research vessel of the PAS Institute of Oceanology), it forms the basis for the Polish Interdisciplinary Laboratory of Polar Research (PolarPOL). One of its objectives is to help identify the causes and effects of such global phenomena as climate change and to help counteract their negative consequences, through the sustainable use of water, natural resources, and preserving biological diversity.



National Bioimaging Center

In the years 2011-2014, the Nencki Institute of Experimental Biology carried out the BIO-IMAGINE project (“BIO-IMAGING in research INnovation and Education”). Its objective was to bolster the Institute’s research potential related to bioimaging, and its main task was to foster optimal conditions for creative research work. The project has given rise to new ideas in research on cells, the brain, and cancers, to cooperative projects with outstanding researchers and the world’s best research institutions, and to new hardware better able to image tissues and cells.



Mechanisms of DNA repair





One of the projects at the International Institute of Molecular and Cell Biology in Warsaw studies the mechanisms of DNA repair, the role of which is to prevent the distortion of genetic information. The DNA molecule, which encodes information about how each cell and the whole organism are built and function, undergoes chemical damage, either spontaneously or under the influence of external factors (radiation, carcinogens etc.). Staff members of the Institute's Laboratory of Protein Structure use protein crystallography, which allows them to determine the three-dimensional architecture of molecules and further elucidate their mechanism of action. The Laboratory has discovered, for example, the way the *UvrA* protein detects various DNA lesions and initiates repair. Another achievement involved elucidating the mechanism of the *RuvC* enzyme, which participates in a repair pathway in which a damaged region of DNA is fixed using a correct copy thereof. The team also determined the first structures of another important DNA repair enzyme – *Slx1*.



Edited by:

Polish Academy of Sciences
Communications and Science Promotion Department

Graphic design:

Piotr Szuszkiewicz

Photos:

Jakub Ostałowski (p. 6, 7, 30, 31, 36, 37, 42, 43, 44, 45)

Adam Wiciński (p. 14)

Anna Bielec (p. 25)

Żaneta Reliszko (p.25)

NASA (p. 40, 41)

Fajna Sztuka (p. 46, 47)

Witold Kaszkin (p. 48, 49)

Joanna Szczepanowska (p. 50)

Marcin Nowotny, Roman Szczepanowski (p. 52, 53)

archives of PAS institutes

press kits

Translated by:

Daniel Sax

© Polish Academy of Sciences 2016

Contact

Polish Academy of Sciences

Palace of Culture and Science

pl. Defilad 1

00-901 Warsaw

phone: 48 22 182 60 00

fax: 48 22 182 70 50

e-mail: akademia@pan.pl

www.english.pan.pl

