65 years of PAN
POLISH ACADEMY OF SCIENCES
The mission of the Polish Academy of Sciences consists in multifaceted activities involving the development of science and setting top standards of research quality and ethical norms. This is to serve the society and expand national culture. The Academy’s research units conduct advanced studies of strategic importance for the growth of science, society and the economy as well as compile expert opinions on significant matters contributing to national development. One of the Academy’s priorities is to support versatile forms of international scientific cooperation and educating scientific staff, in particular by means of PhD studies and organizing postdoctoral internships. Another crucial area of operation is popularizing science. We wish to encourage active approaches to academic work, provide inspiration and motivate by means of our participation in scientific festivals and exhibitions as well as meetings with scientists, organized both domestically and abroad.

Legal basis:
- Act of 30 April 2010 on the Polish Academy of Sciences (as amended)
- Statute of the Polish Academy of Sciences of 24 November 2010 (as amended)

Supervisory body:
- Prime Minister of the Republic of Poland
In 2017, the Polish Academy of Sciences is celebrating its 65th Anniversary. During the 1st National Congress of Science (held between 29 June and 2 July 1951), almost 2,000 scientists passed the resolution on creating the Polish Academy of Sciences. This took final shape in the Act passed by the Sejm of the Republic of Poland of 30 October 1951. On 9 April 1952 the President of the Republic of Poland nominated first Academy members and its Presidium. Numerous scientific and task-force committees were then set up, affiliated with the Presidium of PAS and its divisions, and gathering representatives of all areas of science and academic circles. The divisions expanded a network of scientific and auxiliary units: institutes, departments and teams. In the early years of operation, the authorities and administration of the Polish Academy of Sciences were located at Staszic Palace in Warsaw. In mid-1955, the Palace of Culture and Science became the Academy’s official seat.
First Academy units

Museum of the Earth draws on the tradition of the Museum of the Earth Society, set up in Warsaw as a social initiative in 1932 with a clearly defined goal of creating a geological museum in the capital city of the Republic of Poland. First museum collections were compiled already in 1933, and in 1959 the Museum of the Earth was taken over by the Polish Academy of Sciences, as per the postulates of the 1st National Congress of Science.

In 1974, creating the Botanical Garden, as an independent PAS scientific unit, came as culmination of over 40 years of efforts on the part of botany experts striving to set up a modern botanical garden in Warsaw. In July 1952, the following four scientific units were handed over to the Academy by means of a resolution by the Council of Ministers: the Institute of Literary Research, Nencki Institute of Experimental Biology, State Institute of Mathematics and the Department of Dendrology and Pomology in Kórnik.

In 1957, the first Branch of the Academy was set up in Kraków. The photo presents the "Kreczykowska" Tenement House at ul. św. Jana 28, which has been the seat of the PAS Branch in Kraków since March 1993. Photo from the Branch’s archives.

Nencki Institute, 1974, photo from the Institute’s archives

1st National Congress of Science

The 1st National Congress of Science in 1951 saw the passing of a resolution on creating PAS. Jan Dembowski, the first President of PAS, chaired the Organizational Committee. Professor Irène Joliot-Curie, daughter of Marie Skłodowska-Curie, participated in the Congress.

Photo: PAS Archives

Medal commemorating the 20th Anniversary of Marie Skłodowska-Curie’s death, designed by Krystyna Wolnian-Domadziarska and minted by PAS, 1954
Initially, the Polish Academy of Sciences authorities were seated at Staszic Palace (from 1952). Since mid-1955 until present day, the Academy’s authorities and administration have been located at the Palace of Culture and Science.

Staszic Palace in Warsaw before World War II. Henryk Poddębski – Warszawa stolica Polski, Społeczny Fundusz Odbudowy Stolicy [Warsaw, the capital city of Poland, Social Fund for Reconstruction of the Capital City], 2nd edition, Warsaw 1949

PAS authorities seat

Paintings from early 20th century, on display at Staszic Palace today, presenting Polish scientists.
The Academy’s governing bodies include: the PAS General Assembly, its chief organ, participated in by all Academy members, the President of PAS as well as President of PAS and the Chancellor of PAS. Their term of office is 4 years. The corporate structure includes divisions, branches, scientific and task-force committees, the Polish Young Academy, the Science Ethics Committee and the Audit Committee. The Academy includes five divisions: Division I: Humanities and Social Sciences, Division II: Biological and Agricultural Sciences, Division III: Mathematics, Physics, Chemistry and Earth Sciences, Division IV: Engineering Sciences, and Division V: Medical Sciences. Among other activities, the divisions coordinate the operations of 69 scientific institutes and supervise auxiliary scientific units: archives, libraries, museums and the botanical garden. PAS scientific and task-force committees also operate with the structure of the Academy. 13 task-force committees and 78 scientific committees were appointed for the 2015–2018 term. The Academy is also involved in field work, domestically through its Branches in Gdańsk, Katowice, Krakow, Lublin, Łódź, Olsztyn and Białystok (with seat in Olsztyn), Poznań and Wrocław, and abroad, through its international scientific centers.

PAS authorities (from left to right):
T. Latała, S. Malepszy, P. Rowiński, J. Duszyński, E. Frąckowiak, E. Nęcka, S. Czuczwar
Session of the PAS General Assembly
Staszic Palace in Warsaw, photos by J. Ostałowski (3)
The subject was completed at the Institute of Archaeology and Ethnology, PAS, in the years 2015–2017, by Grzegorz Śnieżko, MA, under the supervision of Professor Stanisław Suchodolski, PhD, DSc. Research was financed with funds from the National Science Centre, granted under the Preludium 7 competition (project No 2014/13/N/HS3/04588).

For centuries, issuing coins has served as a physical manifestation of monetary policy, being a significant attribute of power for practically all rulers. It was also followed by one of the most celebrated rulers of Poland – Bolesław Wrymouth (reign: 1102–1138), as evidenced by the coins preserved. Despite significant recognizability of this Piast ruler, his minting activities have not been the subject of detailed research to date. Although Bolesław III was not the first Polish ruler to issue his own coins, it was during his reign that they started to be seen both in economic categories and as a tool for creating internal policy. In the very same era, domestic coins started to dominate in domestic circulation, pushing out foreign ones, for the very first time. It cannot be ruled out that this was largely due to the development of the Polish manufacturing of silver. In order to determine the elemental composition of the alloys to be found in Bolesław Wrymouth’s coins, numerous spectral analyses were conducted during the project. The results of such research are a major contribution to discussion on the resources and origins of silver in the Piast state.
Ancient residences of Nea Paphos

The oldest remains of the ancient city of Nea Paphos in Cyprus have been discovered recently by an archaeological team led by Henryk Meyza, PhD, from the Institute of Mediterranean and Oriental Cultures, PAS. Fragments of walls and floorings, dating as far back as 2.3 thousand years ago, are located on the site of luxury residential buildings, constructed later and uncovered in the course of earlier excavations by the Polish scientific center. Nea (i.e. New) Paphos is one of the most important archaeological sites in Cyprus, having served as the island’s capital city in the Hellenistic and Roman periods. It was founded in late 4th century BC, when the city of Palea (i.e. Old) Paphos, which was a thousand years its senior and boasted the famous temple dedicated to Aphrodite, lost its port due to excessive sedimentation. With the remains being of such historical importance, the municipal complex together with its auxiliary functions have been entered into the UNESCO world heritage list.

Nubian fortresses

A project entitled “Emergence of Early Medieval States in the Middle Nile Valley. Archaeological Sources” has been conducted at the Institute of Mediterranean and Oriental Cultures, PAS, under the leadership of Bogdan Zurawski, PhD, DSc, for a year now. It assumes inter alia extensive documentation of Nubian fortresses from the period of the 4th–7th century. Field research in Sudan is conducted on the basis of a professorial subsidy granted as part of the “Master” program of the Foundation for Polish Science. Using state-of-the-art technologies, a dozen or so three-dimensional models have been prepared of the most important fortifications to be found between the third and sixth cataract on the Nile. The first year of the project was dedicated to findings of crucial significance for further studies of the emergence of early medieval states in the Middle Nile valley. It was determined, among others, that many fortifications from the period of early Christian kingdoms were used as refuges, where the local population sought shelter during enemy invasion. Once immediate threat ceased, people would return non-fortified settlements in close proximity of farmland, which provided for more comfortable livelihood.
Kaiser Joseph’s map of Galicia (otherwise known as Von Mieg’s map) is an excellent source, compiled shortly after the first partition of Poland, but nevertheless providing insights on the Old Poland landscape of the vast area ranging from Cieszyn Silesia to the Zbruch River. It comprises 413 large sheets, drawn in a scale of 1:28,800, along with detailed descriptions of the land, forming six volumes. The map is kept at the War Archive (Kriegsarchiv) in Vienna. This valuable material, significant from a historical research perspective but also useful for studies conducted in many other fields, has been the subject of an editorial program launched in 2008. The program has been conducted by researchers from five cooperating centers: the Institute of Archaeology and Ethnology, PAS, Institute of History, PAS, the PAS Scientific Center in Vienna, the Pedagogical University of Krakow and the University of Rzeszów. The edition, comprising 15 volumes (each in turn comprising 2–3 physical books), is being prepared gradually with the aid of the National Program for the Development of Humanities and shall be completed in 2020.

European Social Survey

This is one of the largest and most important research projects in the field of social sciences conducted by the Institute of Philosophy and Sociology, PAS. A unique research method has been developed as part of the ESS, allowing to create maps of changes in attitudes towards key problems, modifications of systems of values and human behaviors. The survey constitutes a reliable source of knowledge on EU residents. For more data, go to www.europeansocialsurvey.org
Seeds form the basis of our civilization as a source of food for the majority of people in the world. The ability to produce seeds allows plants to populate new land and survive in a form of the seed, under conditions that do not foster development. This result inter alia from the fact that seeds are able to ignore short periods that encourage germination to wait for conditions allowing to complete a full development cycle. Research conducted at the Institute of Biochemistry and Biophysics, PAS, at the laboratory of Szymon Świeżewski, PhD, has contributed to learning about new mechanisms of regulating this phenomenon.

Photo from the archives of the Institute of Biochemistry and Biophysics, PAS
Latest discoveries in cell nucleus architecture

The human genome comprises over three billion pairs of nucleotides, i.e. specific nitrogenous bases. Surprisingly enough, genes – that is, protein-coding fragments – account for only 2% of this pool. Geneticists have been fascinated by this phenomenon for years. With the data obtained using state-of-the-art DNA sequencing method, researchers from Jackson Laboratories (USA) made a discovery of three-dimensional chromatin structure that will contribute significantly to solving the above-mentioned riddle. As part of Polish-American collaboration, the task of the Laboratory of Molecular and Systemic Neuromorphology at the Nencki Institute of Experimental Biology, PAS, was to verify these results by means of using ultra-sensitive fluorescence microscopy technologies and advanced computer image editing. Research conducted at the Institute confirmed the validity of observations made by the American researchers.

Unique method of regulating gene expression and mitochondrial transformation in humans and animals

Developed at the Institute of Bioorganic Chemistry, PAS, this method constitutes a novel and unique means of analyzing gene functions in the mitochondria, where some pathologies are coded. It is based on a specific system of intracellular transport of ribonucleic acids (RNA), which manifest catalytic properties. A carefully designed RNA, which includes a nucleotide sequence necessary for export to the mitochondria, a sequence responsible for catalytic properties and a ribozyme sequence, manifests activity towards any mitochondrial mRNA of choice. The strategy developed is of universal character and may be used for direct transformation and studying any mitochondrial gene, both in basic research (as a tool for studying gene functions) as well as in biotechnology of plants and genes significant for agricultural production. It can also aid in hampering development of neurodegenerative diseases in the future.
Fertility programming over generations

A child’s level of nutrition and state of health depends to a large extent on the mother’s nutritional status before and during pregnancy as well as in the period of breastfeeding. Research conducted at the Institute of Animal Reproduction and Food Research, PAS, under the leadership of Professor Monika Kaczmarek, focused on explaining why what mothers eat during lactation is crucial for maintaining fertility for the generations to come. To date, a mouse model has allowed to evidence that subjecting mothers to a restrictive diet during lactation leads to irregularities in development of reproductive functions in their offspring, despite introducing healthy diet in a later period. The mouse’s sexual maturity came delayed and they experienced a number of disorders affecting their fertility. The effects of improper diet in nursing females were detectable even in the second generation, that of grandchildren. The subject of this research is of significance due to the increasingly frequent disorders in widely understood fertility combined with the growing number of nutritional abnormalities in humans, the effects of which can be transferred over generations.

New fruit and vegetable waste bioproducts

Cell walls in fruit and vegetables and in their waste from the food processing industry constitute a valuable sources of pectins, cellulose and hemicellulose. Such polysaccharides can be modified in order to obtain new bioproducts useful in the industry. TexAp®, a new natural additive improving food product texture, has been developed at the Institute of Agrophysics, PAS. TexAp® effectively thickens food products by means of using innovative micronization and drying methods and by using modified pectins along with other natural dietary fibers from fruit and vegetables. TexAp® is produced solely from natural components of cell walls and may serve as a substitute for the additives currently used in the food industry. Research continues with the goal of obtaining nanocellulose from fruit and vegetable waste. The results so far allow to determine that waste is a rich source of nanocellulose, and obtaining it from fruit and vegetables does not entail massive consumption of energy as compared with conventional sources.
<table>
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<th><strong>AUXILIARY RESEARCH UNITS</strong></th>
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<td>European Regional Center for Ecohydrology, Polish Academy of Sciences <a href="http://www.erce.unesco.lodz.pl">www.erce.unesco.lodz.pl</a></td>
<td>Institute of Bioorganic Chemistry, Polish Academy of Sciences <a href="http://www.ibch.poznan.pl">www.ibch.poznan.pl</a></td>
<td>Committee on Agronomic Sciences, Polish Academy of Sciences <a href="http://www.kna.pan.pl">www.kna.pan.pl</a></td>
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<td>Institute of Agricultural and Forest Environment, Polish Academy of Sciences <a href="http://www.isrl.poznan.pl">www.isrl.poznan.pl</a></td>
<td>Institute of Botany, Polish Academy of Sciences <a href="http://www.botany.pl">www.botany.pl</a></td>
<td>Committee on Biotechnology, Polish Academy of Sciences <a href="http://www.kbiotech.pan.pl">www.kbiotech.pan.pl</a></td>
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<td>Institute of Agrophysics, Polish Academy of Sciences <a href="http://www.ipan.lublin.pl">www.ipan.lublin.pl</a></td>
<td>Institute of Dendrology, Polish Academy of Sciences <a href="http://www.idpan.poznan.pl">www.idpan.poznan.pl</a></td>
<td>Committee on Environmental and Evolutionary Biology, Polish Academy of Sciences <a href="http://www.kbsie.pan.pl">www.kbsie.pan.pl</a></td>
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<td>Institute of Animal Physiology and Nutrition, Polish Academy of Sciences <a href="http://www.ifzz.pl">www.ifzz.pl</a></td>
<td>Institute of Genetics and Animal Breeding, Polish Academy of Sciences <a href="http://www.ighz.edu.pl">www.ighz.edu.pl</a></td>
<td>Committee on Food and Nutrition Sciences, Polish Academy of Sciences <a href="http://www.knnoziz.pan.pl">www.knnoziz.pan.pl</a></td>
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<td>Institute of Biochemistry and Biophysics, Polish Academy of Sciences <a href="http://www.ibb.waw.pl">www.ibb.waw.pl</a></td>
<td>Institute of Paleobiology, Polish Academy of Sciences <a href="http://www.paleo.pan.pl">www.paleo.pan.pl</a></td>
<td>Committee on Molecular Biology of the Cell, Polish Academy of Sciences <a href="http://www.kbmk.pan.pl">www.kbmk.pan.pl</a></td>
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<td>Institute of Parasitology, Polish Academy of Sciences <a href="http://www.ipar.pan.pl">www.ipar.pan.pl</a></td>
<td>Institute of Plant Genetics, Polish Academy of Sciences <a href="http://www.ipg.poznan.pl">www.ipg.poznan.pl</a></td>
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<td>Institute of Systematics and Evolution of Animals, Polish Academy of Sciences <a href="http://www.isez.pan.krakow.pl">www.isez.pan.krakow.pl</a></td>
<td>Committee on Zootechnics and Aquaculture, Polish Academy of Sciences <a href="http://www.knzi.pan.pl">www.knzi.pan.pl</a></td>
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<td>Mammal Research Institute, Polish Academy of Sciences <a href="http://www.ibs.bialowieza.pl">www.ibs.bialowieza.pl</a></td>
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First direct registration of the gravitational wave signal by detectors on Earth

14 September 2015 saw the detection of a gravitational wave from the merging binary black hole. The gravitational wave signal was registered on Earth for the first time and, likewise, a merging of two black holes into one has never been observed before. The signals were registered by laser interferometers at the American LIGO observatory. The discovery was made by the consortium of LIGO Scientific Collaboration and Virgo Collaboration, by using the data collected by the two LIGO detectors. Polish POLGRAW-Virgo team participated in the Virgo project, with Professor Andrzej Królak from the Institute of Mathematics, PAS, as leader. The POLGRAW members’ contribution to the discovery consisted in compiling the basis for numerous algorithms along with the methods to be used for detecting and estimating parameters of gravitational waves from binary systems, modeling the signal of a gravitational wave from a binary system, and simulations evidencing that binary black holes are the most detectable sources of gravitational radiation for the LIGO-Virgo detectors.
The PAS Space Research Centre, the only unit in Poland to be concerned with human activity in space, has developed and put together the subsystems of Lem and Heweliusz – the first Polish scientific satellites to enter the Earth’s orbit. They also form part of the international Bright Target Explorer (BRITE) consortium, which performs the most precise measurements of the brightest stars in our galaxy.

In cooperation with the National Medicines Institute, scientists from the Institute of Physical Chemistry, PAS, have developed a new technique for prompt diagnosis of bacterial infections from cerebrospinal fluid. The method developed uses the phenomenon of light dispersion on the samples studied (Raman spectroscopy). Novel polymer mat bases were used, ensuring strengthening of the Raman signal of the bacteria studied, as well as allowing to filter the bacteria out of the fluid and to immobilize them effectively during measurements. The analyses conducted have allowed to correctly identify three species of bacteria causing meningitis: Neisseria meningitidis, Streptococcus pneumoniae and Haemophilus influenzae. In 95% of cases the species was identified with certainty approaching 98%. When compared with the methods known to date, the newly proposed method for detection and identification of bacteria has a number of advantages: it requires small amounts of cerebrospinal fluid and eliminates the necessity of time-consuming multiplication of bacteria, while measurement automation guarantees a high level of security and the result becomes available within minutes. The price is another crucial argument: to buy the equipment necessary to conduct the analysis, the maximum to be spent is a few dozen thousand dollars.

The Cyclotron Center in Bronowice forms part of the Institute of Nuclear Physics, PAS, in Krakow. This is the only center in Poland to be equipped with devices allowing to treat neoplasms with accelerated proton clusters. Proton therapy is the most modern method of radiotherapy, whose effectiveness for some types of tumors is estimated at over 90%. It differs from the traditional one in that the protons hit the cancer cells very precisely and destroy them without damaging healthy tissue.

Proteus C–235 cyclotron, photo from the archives of the Institute of Nuclear Physics, PAS
The Stanisław Siedlecki Polish Polar Station is located on the Isbjørnhamna bay by the Hornsund fjord on the Norwegian island of Spitsbergen. The unit conducts all-year scientific research and is the farthest-north permanent Polish scientific institution. The Station celebrates its 60th anniversary this year and is managed by the Institute of Geophysics, PAS. The Station and the Polish research ships (including the SY Oceania research vessel, belonging to the Institute of Oceanology, PAS) form the basis of the Polish Multidisciplinary Laboratory for Polar Research (PolarPOL), whose goals include inter alia to recognize the causes and effects of global phenomena such as climate change, and to prevent their negative effects by means of sustainable usage of water and natural resources combined with maintaining biodiversity.

Selected achievements

Developed at the Institute of Fluid-Flow Machinery, PAS, in Gdańsk, this home ORC micro CHP station is a device allowing to simultaneously generate heat and power on a small scale. Using a renewable source of power in the form of biomass combined with an ecological boiler and an oil-free ORC micro turbine makes this solution highly innovative. As such, it meets current needs and solves social problems. Researchers from IFFM PAS would like such devices to replace traditional heaters in the future. The micro CHP station developed has been protected by the Patent Office of the Republic of Poland as a utility model since 2015, and has been awarded at the TECHNICON INNOWACJE Industrial Technology, Science and Innovation Fair. Work on the micro CHP station had been financed under key project No. POIG.01.02.00-016/08.
Determining the content of methane in coal beds is of crucial significance for occupational safety at black coal mines in Poland and worldwide. The CREM digital methane emission recorder, developed and built at the Strata Mechanics Research Institute, PAS, following many years of research on the processes of accumulation and releasing of methane from coal, allows to determine the methane content. With this device the measuring process becomes quick and simple. Results are available within 24 hours and the measurements themselves are made regularly by trained mine staff. CREM is fully automatic and has had a microprocessor applied in order to steer the device and perform extrapolation of results. The method has been patented at the Patent Office of the Republic of Poland as: “A method of recording desorbing gas emissions and an analyser of desorbing gas emissions.”
Implant-distractor

As part of the "Developing a manufacturing technology for implant-distractors – an innovative solution for dental prosthetics. Material, model and processing methods research" project (PBS2/A6/18/2014), new types of dental implant-distractors (ID) were developed. They may prove useful in fixing dental prostheses in combination with reconstructing the patient's bone tissue. This concerns in particular the cases when a long time has passed since tooth extraction. All parts of the ID are made of pure titanium while enhanced mechanical properties have been obtained through modification of microstructure in the process of hydrostatic pressing. Frequently used yet unhealthy alloying additives such as aluminum and vanadium were thus eliminated. Patent notification No. P.416 895, Distraction implant, authors: Z. Machynia, K. Koynov, K. Sztwiertnia, was awarded with the Platinum Medal at the International Exhibition of Economic and Scientific Innovations, Katowice 2016.

Figure. Subsequent stages of fixing one of the implant-distractor (so-called “push in” ID) variations: a) installation stage; b) distraction stage; c) final stage, root implant ready for fixing the tooth crown. The lower part made of sintered titanium powder, all types of screws and the top part made of hydrostatically pressed titanium.

Parameters images (entropy distributions) superimposed over an ultrasound image for A) a benign change (fibroadenoma) B) a malignant change (carcinoma cribriforme)
Research conducted at the Clinical Research Team for Molecular and Cellular Nephrology of the Mossakowski Medical Research Centre, PAS, aims at getting to know the mechanisms underlying disturbed functioning of renal glomeruli in diabetic kidney disease, i.e. chronic renal function failure caused by diabetes. A key role in the development of this complication is assigned to abnormalities in the structure of podocytes – the renal glomerulus cells to be found in the filtration barrier. Their vitality and filtration function are maintained by constant removal of faulty proteins and non-functional intracellular organelles that can be produced during long-term exposing of podocytes to elevated glucose concentrations. This process, consisting in cell self-purification, is known as autophagy. Its fundamental significance for cell life was confirmed by awarding the Nobel Prize 2016 in medicine and physiology for discovering mechanisms of autophagy to Yoshinori Ohsumi.
Attention switching test at psychopharmacology laboratory

Cognitive disturbances that accompany schizophrenia are poorly elucidated and do not respond well to treatment. Pre-clinical tests play a vital role in the search for new effective therapies. The card sorting test, used in patients, has been adapted for laboratory rodents in the form an attentional set shifting task. It has been evidenced at the Institute of Pharmacology, PAS, that some compounds imitating symptoms of psychosis (e.g. ketamine) disturb attention shifting, while popular antipsychotic drugs and new compounds with such potential effects improve it. This may contribute to emergence of new therapies.

Phage therapy – fighting antibiotic immunity with bacterial viruses

The problem of bacteria’s increasing immunity to popular antibiotics is one of the most important challenges faced by contemporary medicine. Discovered 100 years ago, bacteriophages, i.e. bacterial viruses, can effectively destroy dangerous bacteria (the photo presents a Petri plate with growing Staphylococcus aureus and the “bald patches” which result from multiplying a specific bacteriophage in bacteria and destroying them). For over 60 years, the Hirszfeld Institute of Immunology and Experimental Therapy, PAS, has been conducting intensive research on their biology and application in treating bacterial infections immune to antibiotic therapy. Based on one of the largest therapeutic bacteriophage collections in the world, the Institute conducts experimental treatments using those at the Phage Therapy Unit – the only such center in the European Union.
Searching for new evaluation markers of invasiveness in colorectal and rectal cancer

Increased mortality in colorectal and rectal cancer results inter alia from shortage of markers that would allow to decidedly evaluate the risk of potential metastases and to select relevant therapy in postoperative diagnostics, without putting unnecessary burdens on the patient. At the Institute of Medical Biology, PAS, in Łódź, as part of research on colorectal cancer cells, we have described the changes in the expression of genes in more invasive cells. Along with changes in the presence of known markers, we have observed elevated levels of neuromedin U (NMU), a protein that had not been previously associated with this type of cancer. We have provided evidence for NMU’s involvement in early stages of colorectal cancer cells becoming malignant. This opens up a path for research on evaluating the usefulness of NMU as a new marker of potential metastases, which may contribute to decisions on further therapy.

Childhood acute lymphoblastic leukemia: studying the genetic origin to personalize treatment

The Institute of Human Genetics, PAS, conducts research on acute lymphoblastic leukemia, which is the most common cancer in children. We focus predominantly on the T-ALL variety (derived from T-cells). This is an aggressive and highly heterogeneous type of leukemia of varied genetic origin, which translates into practical clinical problems (varied course of the disease and treatment combined with a lack of reliable genetic factors allowing to determine prognosis and adjust treatment). The goal of the research conducted at the Institute of Human Genetics, PAS, is to characterize this leukemia in detail by means of using inter alia next-generation sequencing (NGS) and in vitro functional studies on leukemia cell lines. Most importantly, our research is concerned with identifying mutations occurring in T-ALL and the expression profile for miRNA (small RNA molecules involved in regulating gene expression). The results of such research not only allow to learn about the genetic origin of this type of leukemia, but also to indicate potential genetic factors of prognostic significance that can contribute to personalizing its treatment.
RESEARCH UNITS

Hirszfeld Institute of Immunology and Experimental Therapy, Polish Academy of Sciences
www.iitd.pan.wroc.pl

Institute of Human Genetics, Polish Academy of Sciences
www.igcz.poznan.pl

Institute of Medical Biology, Polish Academy of Sciences
www.imbpan.pl

Institute of Pharmacology, Polish Academy of Sciences
www.if-pan.krakow.pl

Mossakowski Medical Research Centre, Polish Academy of Sciences
www.imdik.pan.pl

SCIENTIFIC COMMITTEES

Committee on Clinical Sciences, Polish Academy of Sciences
www.kompai.pan.pl

Committee on Human Development, Polish Academy of Sciences
www.krc.pan.pl

Committee on Human Genetics and Molecular Pathology, Polish Academy of Sciences
www.komgen.pan.pl

Committee on Human Nutrition Science, Polish Academy of Sciences
www.knozc-pan.pl

Committee on Immunology and Etiology of Human Infections, Polish Academy of Sciences
www.immuno.pan.pl

Committee on Medical Physics, Radiobiology, and X-Ray Diagnosis, Polish Academy of Sciences
www.kfmrido.pan.pl

Committee on Neurobiology, Polish Academy of Sciences
www.kneurobiologii.pan.pl

Committee on Neurological Sciences, Polish Academy of Sciences
www.knn.pan.pl

Committee on Physiological and Pharmacological Sciences, Polish Academy of Sciences
www.knfp-pan.pl

Committee on Public Health, Polish Academy of Sciences
www.keizp-pan.pl

Committee on Rehabilitation, Physical Education and Social Integration, Polish Academy of Sciences
www.krkfs-pan.pl

Committee on Therapy and Drug Research, Polish Academy of Sciences
www.ktinol-pan.pl
The Academy has territorial branches in Gdańsk, Katowice, Krakow, Lublin, Łódź, Olsztyn and Białystok (with seat in Olsztyn) as well as Poznań and Wrocław. The Branches fulfill the Academy's tasks in the region and perform integration functions for its scientific activity, in particular in the scope of supporting and conducting scientific research of vast significance for national economy and culture as well as initiating and conducting international cooperation with EU Member State regions and with other countries neighboring on Poland. National PAS members residing in a given area work at every branch. The newest one is the Branch in Olsztyn and Białystok (with seat in Olsztyn), which started its operations in 2015, while the Krakow Branch, active since 1957, is the oldest one.
PAS TERRITORIAL BRANCHES

PAS Branch in Gdańsk
www.gdansk.pan.pl

PAS Branch in Katowice
www.katowice.pan.pl

PAS Branch in Krakow
www.krakow.pan.pl

PAS Branch in Lublin
www.pan-ol.lublin.pl

PAS Branch in Łódź
www.lodz.pan.pl

PAS Branch in Olsztyn and Białystok
(with seat in Olsztyn)
www.olsztyn.pan.pl

PAS Branch in Poznań
www.pan.poznan.pl

PAS Branch in Wrocław
www.wroclaw.pan.pl

Commemorative stamps for the “Lublin: city and its people. On the eve of the 700th anniversary” conference, organized by the Historical Commission, PAS Branch in Lublin

“Lower Silesian Nature”, publication by the PAS Branch in Wrocław

16th scientific conference “City-founders as well as patrons of science, culture and arts in the history of Katowice”, organized by the local PAS Branch in Katowice, September 2016

Meeting of the Presidium of the PAS Branch in Krakow with heads of PAS Institutes, 24 November 2016, photo by A. Jajszczyk

From left to right: “NAUKA też SZTUKA!” [SCIENCE is ART!] Scientific Picnic in Olsztyn, June 2016, photo by Ł. Jakubowski

Gala presentation of Awards for Outstanding Achievements Contributing to the Development of Science for Young Scholars Working in the Territory of the Łódź Voivodship, 2016 edition, photo by J. Jurczakowski

Lecture by Joanna Śliwowska, PhD, DSc, during the 8th Brain Awareness Week in Poznań, 2016, photo by K. Sobkowska

16th scientific conference “City-founders as well as patrons of science, culture and arts in the history of Katowice”, organized by the local PAS Branch in Katowice, September 2016

Commemorative stamps for the “Lublin: city and its people. On the eve of the 700th anniversary” conference, organized by the Historical Commission, PAS Branch in Lublin

“Lower Silesian Nature”, publication by the PAS Branch in Wrocław

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Tadeusz Kotarbiński Medal

Founded in 1997 by the Committee of Organization and Management Sciences, PAS, and awarded yearly to people and institutions from Poland and abroad that have contributed vastly to progress in organization and management as well as those outstanding because of their practical achievements in the sphere of organization and management and manifesting high economic and social effectiveness.

In 2017, the Tadeusz Kotarbiński medal was presented to Professor Stanisław Sudoł, Ewa Błaszczyk, Adam Nawałka with the Polish national soccer team and Polskie Wydawnictwo Ekonomiczne S.A. publishing house, photo by J. Ostałowski.

Polish Academy of Sciences Statuette

This Academy distinction is awarded by its President to PAS national members, its longstanding employees as well as other persons and institutions that, by means of their organizational activity, contributed to raising its scientific and social status.

Nicolaus Copernicus PAS Medal

Awarded by the Presidium of the Academy for outstanding scientific achievements to researchers not being Academy members that have contributed vastly to science in Poland. In 2016, the medal was presented to the POLGRAW research team. The researchers, led by Professor Andrzej Królak from the Institute of Mathematics, PAS, were awarded for their contribution to discovering the first source of gravitational waves.

Stefan Banach Medal

Awarded by the Presidium of the Academy to individuals in honor of their contribution towards development of mathematical sciences.

PAS Medal

This Academy distinction is awarded by the President to outstanding non-member representatives of the scientific circles and to representatives of other milieus and institutions for their particular contribution towards development of Polish and global science related to its social role.
For 420 years, the PAS Library in Gdańsk has continuously collected valuable handwritten and printed codes of law. In 2016, eight valuable volumes printed in the 15th century were returned to the library after a few dozen years of absence. Those include works by Jan Gerson from 1488, a Decretum Gratiani book from 1479 and theological works by Thomas Aquinas, published by a Nuremberg printing house in 1474.

For 200 years, the PAS Library in Kórnik – 200 years ago home to the grand, renowned Działyński and Zamoyski families, today – the Polish Academy of Sciences, with the unique historical bridge of the Museum and Popular University between them. These are parallel worlds where anyone can breathe in the atmosphere of 19th century elegance and opulence and where the treasury holds the manuscript of part III of Dziady by Adam Mickiewicz along with many other unique and priceless exhibits.
PAS Archives in Warsaw have branches in Poznań and Katowice. They collect, store, analyze and make available resources on the history of science in Poland. The Archives’ collection includes PAS files along with specialist scientific societies’ files and Polish scientists’ legacy, being organized on an ongoing basis. Other wide-scale activity aims at popularizing the collections gathered and the achievements of Polish science. PAS Archives participate in the Long Night of Museums, the Science Festival and Archival Picnic, and they are also a member institution of the International Council of Archives.

The Archive of Science of PAS and the Polish Academy of Arts and Sciences in Krakow is a profiled scientific archive whose statutory goals include collecting, analyzing, making available and publishing resources on the history of science and culture. The Archive of Science collection includes inter alia Krakow Scientific Society (1815−1872), the Academy of Learning (1872−1918) and Polish Academy of Learning (since 1918) files. The Archive of Science collaborates with national and foreign archives as well as with institutions of a similar scientific profile, such as e.g. Archives of the Czech Academy of Sciences and of Charles University in Prague.

Map of Krakow, before 1878, Zygmunt Wdowiszewski’s materials, PAS Archives, III–232, j. 106

Page (initial) from a commemorative volume (on the 25th professional anniversary of Professor Henryk Hoyer I. The book was a gift by thirty three physicians co-owning Gazeta lekarska magazine, presented on 20 December 1884 and issued in 145 copies by Karol Kowalewski’s printing house in Warsaw on 21 September 1884, photo by M. Włodek

Doctor of Medicine diploma from the University of Vienna with a relevant seal. The diploma was awarded to Józef Demetrykiewicz, Włodzimierz Demetrykiewicz’s father, Vienna, 21 April 1857, photo by R. Kalinowski

Construction of Kierbedź bridge, 1859, Julian Adam Majewski’s materials, PAS Archives, III–175, j. 33

Page (initial) from a commemoratives volume (on the 25th professional anniversary of Professor Henryk Hoyer I. The book was a gift by thirty three physicians co-owning Gazeta lekarska magazine, presented on 20 December 1884 and issued in 145 copies by Karol Kowalewski’s printing house in Warsaw on 21 September 1884, photo by M. Włodek

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Museum of the Earth, PAS, in Warsaw is a multidivisional museum unit with the chief mission of gathering collections and protecting geological heritage. Its other activities include research and documentary work as well as versatile operations in the scope of popularizing Earth sciences and knowledge of nature. At present the museum collections encompass over 180,000 exhibits. These include vast collections of minerals and rocks, meteorites as well as fossil flora and fauna originating from the territory of Poland and other regions of the world, along with precious archival resources on the subject of Earth sciences history. In particular, the Museum can boast vast collections of Baltic amber and other fossil resins, which are among the largest collections of this type in the world.

From top to bottom:
Pniewski Villa – Museum of the Earth, photo by M. Wierzbicki
Pułtusk meteorite – second largest in the world, photo by M. Wierzbicki
White Palace – Museum of the Earth, photo by M. Wierzbicki
Left:
Ammonite, photo by D. Nast
Brachycera Prohercostomus noxialis, photo by J. Kupryjanowicz
PAS Scientific Centers in Moscow, Paris, Rome and Vienna, the Representative Office in Kiev and the Center for Historical Studies, PAS, in Berlin as well as the PolSCA Science Promotion Office, PAS, in Brussels conduct versatile activities promoting the achievements of Polish science abroad. Their goal is predominantly to promote Polish researchers’ accomplishments, to initiate contacts with foreign partners and facilitate academic cooperation.

Left: Friendship for the sake of positive remembrance? 25 years of the Polish-German treaty of Good Neighbourship, meeting with Irena Lipowicz and Gesine Schwan, 27 June 2016, photo by O. Cinkajzl


PAS Scientific Centers abroad

PolSCA Science Promotion Office in Brussels,
Polish Academy of Sciences
www.polsca.pan.pl

Center for Historical Studies in Berlin,
Polish Academy of Sciences
www.cbh.pan.pl

Scientific Center in Moscow,
Polish Academy of Sciences
www.moskwa.pan.pl

Scientific Center in Paris,
Polish Academy of Sciences
www.academie-polonaise.org

Scientific Center in Rome,
Polish Academy of Sciences
www.romy.pan.pl

Scientific Center in Vienna,
Polish Academy of Sciences
www.viennapan.org

Representative Office in Kiev,
Polish Academy of Sciences
www.panukraina.pl

Left: PAS Scientific Center in Rome
“Languages, literature and culture of medieval Poland” – a panel discussion (organized on the 1050th anniversary of the baptism of Mieszko I) participated in by Prof. Ch. Augustynowicz, historian, Prof. A. Woldan, expert on literature, P. Deymowski, PhD, Polish philologist, Georg Holzer, linguist, and Prof. J. Doschek, historian of literature, PAS Scientific Center in Vienna, photo by A. Jaworski

“Effects of transformation. The capitalism that we built” conference, PAS Scientific Center in Moscow, November 2016, photo by I. Nowak
The PAS Botanical Garden – Center for Biological Diversity Conservation in Powsin is considered one of the leading gardens of this type in Europe. Its rich plant collections are used for research goals, protection of flora biodiversity as well as education and popularization of the knowledge of nature. Besides the section dedicated for visitors, almost 80 ha in space, the garden includes farming areas, field experiments spaces and nurseries used for plant propagation.
Polish Academy of Sciences

Created by the Act of 30 April 2010 on the Polish Academy of Sciences to promote scientific research and developmental works conducted by outstanding young representatives of Polish science. Polish Young Academy members are selected by the General Assembly of PAS. At the time of nomination they cannot be older than 38 years of age and they must hold a minimum scientific degree of a PhD. PYA includes 35 members, of whom 7 are women. The Academy’s tasks are concentrated on stimulating young scientist and researcher circles.

Polish Institute of Advanced Studies

The chief goal of the Polish Institute of Advanced Studies (PIASt), opened in March 2017, is to support the development of knowledge and innovation, and to promote scientific progress in Poland. The Institute’s activities are focused predominantly on completing a variety of projects in the sphere of humanities and social sciences, while remaining open to cross-sectional interdisciplinary projects. It also aids scientific and intellectual exchange while creating conditions for the emergence of an international and interdisciplinary community of researchers who would visit Poland to continue their own projects as well as provoke discussions and exchange views with other experts in their field.

International cooperation

Polish Academy of Sciences cooperates with foreign academies of sciences and international research organizations. It also participates in 60 international organizations, cooperating with more than 70 partner institutions in Europe, Asia, Northern America and Africa. Polish Academy of Sciences fulfills its goals by means of classic bilateral agreements as well as multilateral contracts. Such collaboration results in a growing number of international research projects conducted at PAS institutes combined with increased presence of international research units in Poland. PAS research institutes cooperate with almost three thousand foreign partners, completing in excess of a thousand international research projects a year.

Excellence in Science

Winning an ERC grant constitutes one of the top individual achievements for a researcher. In Poland this has happened only 21 times to date. The PAS Excellence in Science Department provides researchers with versatile support in the preparation and completion of ERC grants. It also assists potential applicants for ERC grants not only from the Polish Academy of Sciences but from all of Poland. The aid provided by the Department is free of charge and available to any researcher from the country. Workshops are organized in cooperation with foreign partners for persons interested in applying for a grant. Candidates that have successfully passed the first stage of Starting Grants competitions will secure participation in a trial panel for themselves.

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Cooperation and education

Top: Visit by the representatives of PAS to Sweden by the invitation of the Embassy of the Republic of Poland in Stockholm. One of the items on the visit agenda was a meeting with representatives of the Royal Swedish Academy of Engineering Sciences (IVA), photo from the PAS Archives

Right: “How to apply for ERC grants in humanities” workshop, October 2016, photo by J. Ostałowski

"DNA memory: how our cells store data", meeting with Professor Monika Kaczmarek as part of the Polish Young Academy’s Flying Scientific Cafes cycle, November 2015, photo by Ż. Reliszko

Professor Przemysław Uhrakczyk, head of the Polish Institute of Advanced Studies, photo by J. Ostałowski