

Strategy AV21



The Czech Academy
of Sciences



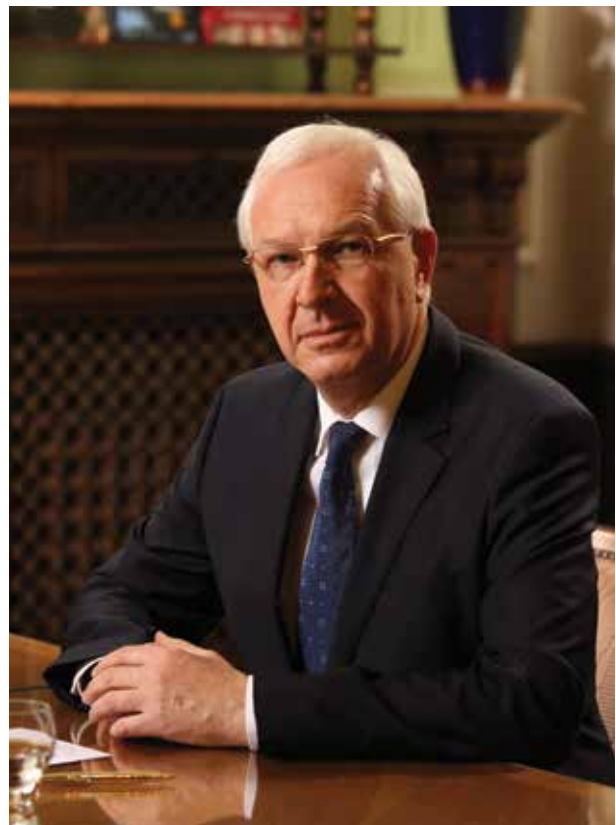
**The Czech Academy
of Sciences**

NEW STRATEGY OF THE CZECH ACADEMY OF SCIENCES

Top research in the public interest” is the motto of the new strategy of the Czech Academy of Sciences, which presents itself more strongly as an institution whose primary mission is high quality research focused on the problems and challenges faced by contemporary society.

The past twenty years have shown that the Czech Academy of Sciences is an important and irreplaceable part of the research, development and innovation system in the Czech Republic. It must continue to remain a guarantor of research quality, but for its further development it is necessary that it be able to identify important scientific and social issues, define problems, and propose their solutions based on the current level of knowledge. The Czech Academy of Sciences is ready to act not only as a renowned center of science and national culture, but also as an increasingly important economic factor.

Topics such as the future of energy in the Czech Republic, public health or the quality of public policies involve complex sets of problems, the solution of which requires broad-based interdisciplinary research. The Czech Academy of Sciences has therefore adopted Strategy AV21 based on a set of coordinated Research Programmes utilizing interdisciplinary and inter-institutional synergies in order to identify the problems and challenges of our time and to harmonize the efforts of research institutes of the Czech Academy of Sciences towards their solutions. The framework of the strategy was approved by the Academy Assembly in December 2014, leaving open the possibility for new relevant programmes to be proposed in future. From the beginning the Research Programmes of the Czech Academy of Sciences have been open to partners from universities, business sector, and institutions of national and regional governments as well as to foreign research groups and organizations. A necessary condition for the implementation of Strategy AV21



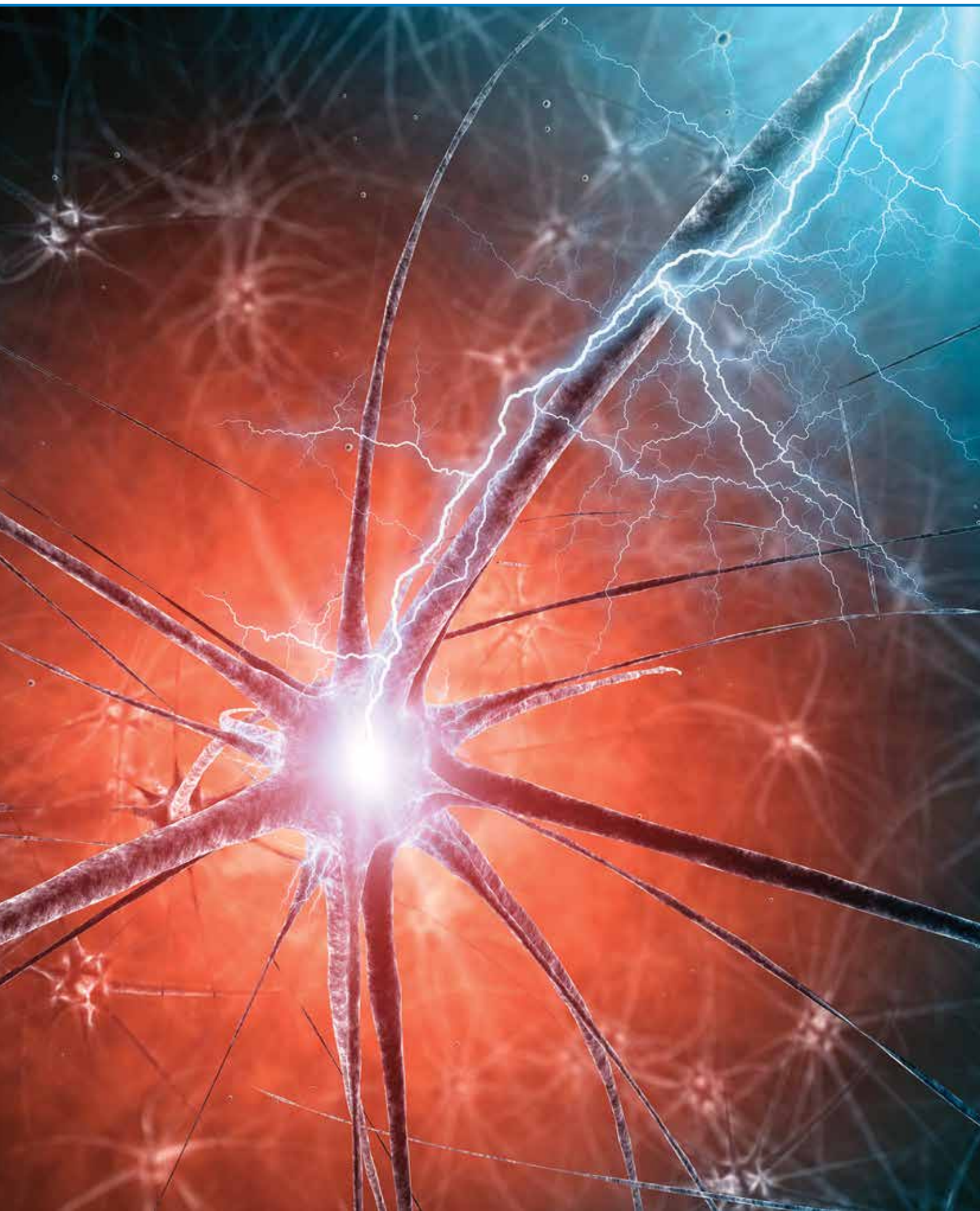
Jiří Drahoš
President of the Czech Academy of Sciences

is the long-term stability of the research, development and innovation system in the Czech Republic. I am convinced that the ability of the Czech Academy of Sciences and its institutes to implement the new strategy will be an important factor in the development of the Czech society and economy in the early part of the 21st century.

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The Czech Academy
of Sciences



FRAMEWORK OF STRATEGY AV21

Strategy AV21 is rooted in and implemented through a set of coordinated Research Programmes of the institutes of the Czech Academy of Sciences. An important part of the strategy is the operation of the Application Laboratories of the Czech Academy of Sciences, whose aim is to expand direct contacts and collaboration of the Czech Academy of Sciences with the application sector. Research carried out within long-term interdisciplinary Research Programmes focused on contemporary problems and challenges as well as emphasis on practical application of the research results in economically and socially important areas constitute an important part of the mission of the Czech Academy of Sciences. At the same time, Strategy AV21 respects the key role of basic research which is at the core of development of all scientific disciplines.

The Research Programmes are designed and formulated in close collaboration of the top management of the Czech Academy of Sciences with the directors of the participating institutes, taking into account the trends in science, social relevance, and the National priorities of oriented research, experimental development and innovation. Programme organization, the form of its coordination, the individual activities, and persons representing the programme are determined by agreement between the directors of the involved institutes and the top management of the Czech Academy of Sciences.

Directors of the participating institutes or authorized researchers serve as coordinators of the Research Programmes as well as contact persons for the public and the media. The coordinator searches for new, socially relevant research topics, performs synthesis of the state-of-the-art knowledge, and in collaboration with partner institutes coordinates the preparation of the Research Programme proposal. Administrative support for a given Research Programme is provided by the parent institute of the coordinator.

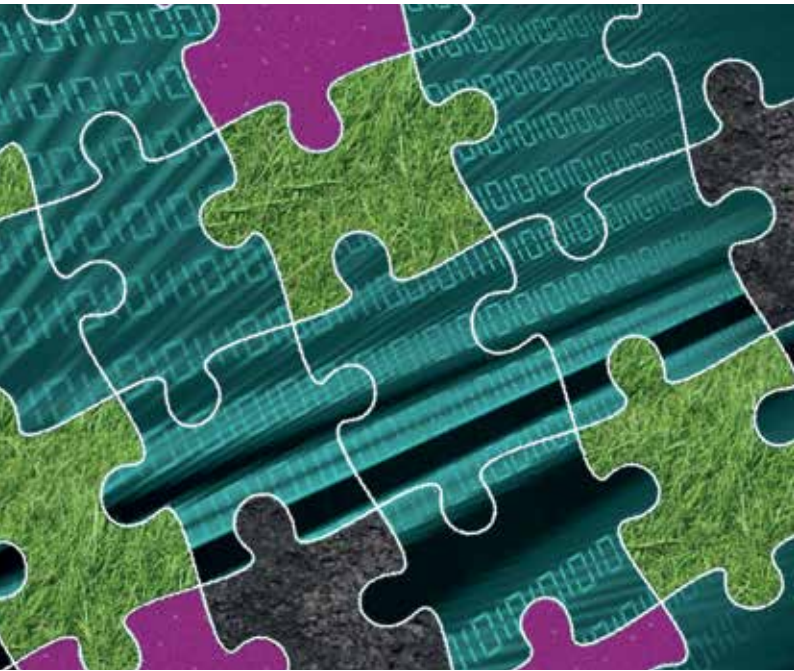
Research Programmes are approved by the Academy Council in collaboration with the Council for Sciences for a period of five years. The running Research Programmes can be adjusted depending on the interim achieved results and new programmes can be proposed depending on the identified societal needs and attained level of knowledge.

The Research Programmes are based on the long-term Research Areas of the Czech Academy of Sciences defined by the Academy Council in collaboration with the Council of Sciences, covering the whole spectrum of research activities of the Czech Academy of Sciences. The Research Areas are as follows:

- The Structure of Matter and the Universe
- Mathematics and Computer Sciences
- Cells and Organisms
- Human Health
- Society and Communication
- Memory and History
- Earth and the Environment
- Sources and Use of Energy
- New Materials
- Methods and Tools of Knowledge

Each Research Area is represented in the Academy Council by one of its members, who acts as a guarantor and a spokesperson for the Research Area and provides organizational support to the coordinators of the related Research Programmes. The guarantors also coordinate the preparation of the Research Area position papers. After approval by the Council of Sciences, these papers will be part of the general policy document of the Czech Academy of Sciences.

The Academy Council is responsible for the overall organization and coordination of the processes of the design and evaluation of the Research Programmes of the Czech Academy of Sciences.



RESEARCH PROGRAMME

HOPES AND RISKS OF THE DIGITAL ERA

The coming digital era is accompanied with the ever growing deluge of data collected and processed in the form of digital signals. Electronic communication, modern methods in medicine, and data for economic and sociological studies are all based on this principle. If the flood of data should not engulf us but, on the contrary, become an important source of knowledge enriching our lives, we need tools of mathematics and computer science which enable us to sort and analyze data more efficiently and search for inherent relationships, with the aid of which we can reliably predict future developments. Today we take it for granted that medical instruments determine the required support levels of vital functions, cellular phones try to guess users' intentions and give them hints, cars are being equipped with elements correcting drivers' imperfect decisions, intelligent buildings adapt themselves to the environment, and automatic systems look after distribution of water and energy. A significant portion of our life is connected with the Internet, from shopping to banking services to communication with the authorities. Computers control power plants, transportation systems and medical instruments. The general public's opinion is that the main key to further improvement of such equipment and systems is, above all, development of technology, including software. However, this idea is right only partly since technology is merely the means of delivery and the real key has to be looked for one level higher. Practical applications are based on mathematical models, and the latter can only describe a part of reality. Hence they have to be continuously verified and

refined. A necessary prerequisite for this process is development of new theoretical tools that extend the frontiers of knowledge and enable us to analyze, understand and model the natural and social phenomena and processes. As an example we can mention fluid flow, employed in a wide range of areas from meteorology to blood flow in veins, behavior of materials in machinery, design and operation of deep geological repositories of nuclear waste, creation of fast and reliable algorithms for data processing and coding, error estimates in technical computations, cryptography in Internet communications, as well as other methods for protecting information and revealing relationships in long series of data and phenomena. All of these, and others, inspire new findings in a number of sciences.

"Mathematics is a tool to describe, study and understand the world around us. Computer science helps us in processing data and solving extensive problems. No progress would be conceivable without them."



COORDINATOR

Jan Flusser

Institute of Information Theory and Automation of the CAS, v. v. i.

GOALS

- To develop new procedures in mathematical modeling of complex processes
- To develop algorithms for analysis of multidimensional signals and statistical data
- To research into and push forward the frontiers of computer capabilities
- To discover dependencies and causal relationships in time series

Participating CAS Institutes

Institute of Information Theory and Automation
Institute of Mathematics
Institute of Computer Science
Institute of Geonics
Astronomical Institute
Institute of Philosophy
Institute of Psychology
Institute of Physiology

Cooperating partners

Institut klinické a experimentální medicíny (IKEM)
Psychiatrické centrum Praha
Škoda Auto, a. s.
Cisco Systems, s. r. o.
Policie ČR
AVAST Software, a. s.
Czech and foreign universities and other institutes

TOPICS/RESEARCHERS

Mathematical modeling as a tool for efficient control of complex processes

Pavel Krejčí (Institute of Mathematics)

New methods in multidimensional data analysis and signal processing

Jan Flusser (Institute of Information Theory and Automation)

Pushing forward the frontiers of computer capabilities

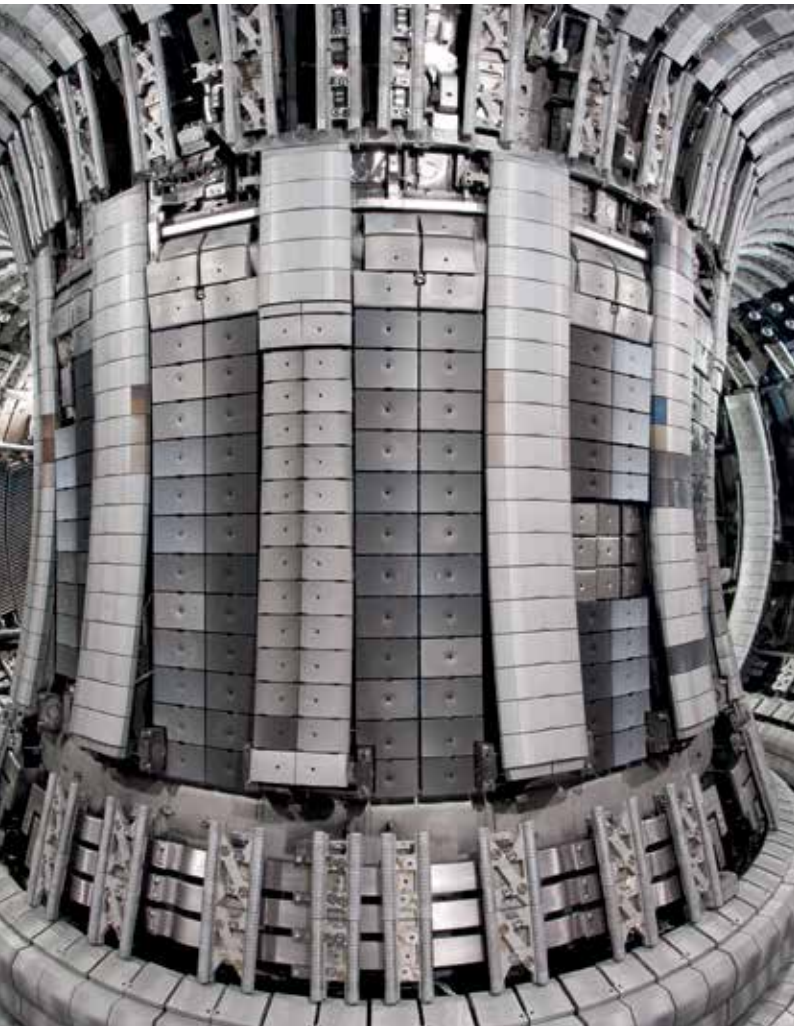
Petr Cintula (Institute of Computer Science)

Search in time variable data for causes and relations of events

Milan Paluš (Institute of Computer Science)

“Development of mathematical algorithms for technical, natural and social sciences”





RESEARCH PROGRAMME

SYSTEMS FOR NUCLEAR POWER INDUSTRY

Czech Republic in its long-term plan for energy supply security counts on nuclear energy as an essential component of the energy mix and defines the need for research in both advanced fission generation IV reactors, as well as in the field of controlled thermonuclear fusion. Many of the problems associated with the development of generation IV fission reactors with high passive safety is similar to problems associated with development of the fusion reactor, e.g. in terms of materials hardness to high neutron fluxes, low material activation etc. The difficulties and problems associated with the development of fusion reactor require joint efforts and resources not only within Europe but also worldwide. In accordance, *the National priorities of oriented research, experimental development and innovation* introduce a specific objective – participation in international R&D activities in the area of thermonuclear fusion. The character of the joint effort requires both the long-term strategy and the proper position of the Czech research at European and world scene with emphasis on those areas where our research institutions and industry can significantly contribute.

„Joint effort of our research institutes will contribute to the development and implementation of advanced nuclear technologies as the future safe and nearly inexhaustible source of energy for mankind.“



COORDINATOR

Radomír Pánek

Institute of Plasma Physics of the CAS, v. v. i.

GOALS

- To address key physical and technological problems associated with the implementation of the ITER reactor and future fusion devices
- To develop new materials, which can withstand extreme conditions in the generation IV reactors and fusion reactors
- To develop new methods for determination of seismic hazard of nuclear installations
- To determine missing data for nuclear reactions in advanced nuclear facilities
- To prepare the next generation of experts for research and operation of the future nuclear installations, especially in the area of nuclear fusion

Participating CAS Institutes

Institute of Plasma Physics
Nuclear Physics Institute
Institute of Physics of Materials
Institute of Rock Structure and Mechanics
Geoinstitute of Physics

Cooperating partners

Centrum výzkumu Řež, s. r. o.
Ústav jaderného výzkumu Řež, a. s.
Středoevropský technologický institut
CEITEC
NETME Centre (Nové technologie ve strojírenství)
Czech and foreign universities and other institutes

TOPICS/RESEARCHERS

Participation of the COMPASS tokamak in international project of nuclear fusion research

Radomír Pánek (Institute of Plasma Physics)

Development of materials for advanced nuclear reactors

Jiří Matějček (Institute of Plasma Physics)

Seismic hazard for nuclear facilities

Jiří Málek (Institute of Rock Structure and Mechanics)

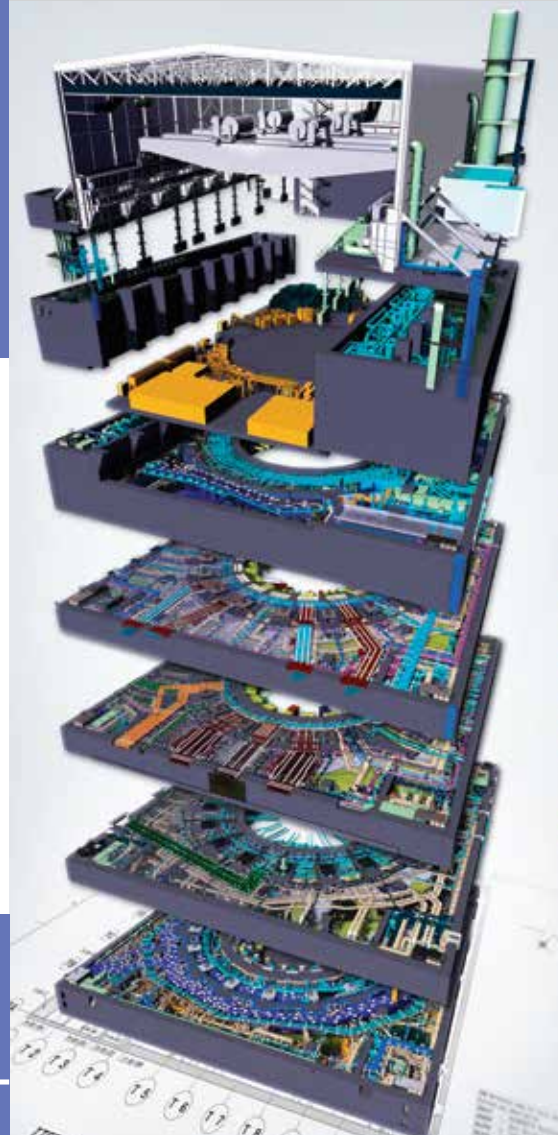
Nuclear data for fusion and advanced nuclear systems

Vladimír Wagner (Nuclear Physics Institute)

Preparation of experts for research and operation of nuclear facilities

Jan Stöckel (Institute of Plasma Physics)

“To solve the problems associated with implementation of the ITER reactor and future fusion devices”





RESEARCH PROGRAMME

EFFICIENT ENERGY CONVERSION AND STORAGE

The long-term self-sufficiency and security of the energy supply in the Czech Republic, an enhancement of the export potential for the Czech producers of energy and energy-related technology, and the reduction of the environmental burden – these are the most imminent societal challenges for the research of efficient conversion of various energy sources, energy storage, and smart energy distribution.

Numerous institutes of the Czech Academy of Sciences conducting relevant fundamental research strive to look for novel solutions and bring critical innovations to existing energy technologies. The research will focus on renewable energy sources and the associated increased demands on the distribution network and energy storage, on the geophysical conditions for wind, solar and geothermal power generation, on the development of nanostructured materials for conversion and storage of energy, as well as on significant innovations of thermal power stations (including fossil- and renewable-fuelled, and non-nuclear technologies for nuclear fuelled), which will likely remain an important source of power in the upcoming decades. Comprehensive research of fuel technologies will include the utilization of separated combustion products and the production of energy from waste. The progress of decentralization of power production requires the development

of smart power grids based on advanced statistical and dynamic models. The necessity of balancing the intermittent output of the renewable energy sources calls for adequate energy storage capacities. For example, the sodium-ion batteries, nowadays in the laboratory stage, might become a crucial development for the massive use of electric vehicles, overcoming the potential shortage of lithium in the future.

“Efficient coordination of the research within the Academy and a closer collaboration with other research institutions and industrial partners will provide novel solutions to the energy-related societal challenges.”



COORDINATOR

Jiří Plešek

Institute of Thermomechanics of the CAS, v. v. i.

GOALS

- To develop nanostructured materials for energy conversion
- To ensure efficient utilization of renewable energy sources
- To facilitate storage of energy from renewable energy sources
- To pursue research towards decentralized production and smart distribution of energy
- To develop new fuels for efficient and clean combustion
- To enhance efficiency and reliability of thermal power stations
- To develop methods for diagnostics and control of energy conversion processes

TOPICS/RESEARCHERS

- Nanostructured materials for energy conversion
Ladislav Kavan (J. Heyrovsky Institute of Physical Chemistry)
- Efficient utilization of renewable energy sources
Emil Pelikán (Institute of Computer Science)
- Storage of energy from renewable energy sources
Jan Hrubý (Institute of Thermomechanics)
- Decentralized production and smart distribution of energy
Sergej Čelikovský (Institute of Information Theory and Automation)
- New fuels for efficient and clean combustion
Miroslav Punčochář (Institute of Chemical Process Fundamentals)
- Enhanced efficiency and reliability of thermal power stations
Jan Hrubý (Institute of Thermomechanics)
- Diagnostics and control of energy conversion processes
Ota Samek (Institute of Scientific Instruments)

Participating CAS Institutes

Global Change Research Centre
Institute of Physics
Geolnstitute of Physics
Institute of Analytical Chemistry
Institute of Inorganic Chemistry
J. Heyrovsky Institute of Physical Chemistry
Institute of Atmospheric Physics
Institute of Physics of Materials
Institute of Plasma Physics
Institute of Geonics
Institute of Computer Science
Institute of Chemical Process Fundamentals
Institute of Rock Structure and Mechanics
Institute of Scientific Instruments
Institute of Theoretical and Applied Mechanics
Institute of Information Theory and Automation
Institute of Thermomechanics

Cooperating partners

AVIO S. p. A. (Italy), BRUSH SEM, s. r. o., České technologické centrum pro anorganické pigmenty, a. s., ČEZ Distribuce, a. s., ČEPS, a. s., ČKD Elektrotechnika, a. s., Doosan Škoda Power, a. s., GE Aviation Czech, s. r. o., GEODEZIE-TOPOS, a. s., GCell-G24 Power, Ltd. (United Kingdom), ITP S. A. (Spain), HE3DA, s. r. o., Honeywell, s. r. o., INASMET (Spain), JABLOTRON ALARMS, a. s., The City of Litoměřice, MOTORGAS, s. r. o., MTU Aero Engines GmbH (Germany), První brněnská strojírna Velká Bíteš, a. s., RETEGATE, s. r. o., Rolls-Royce, plc. (United Kingdom), RWE GasNet, s. r. o., RWE Plynoprojekt, s. r. o., Siemens Industrial Turbomachinery, Ltd. (United Kingdom), SINTEF Energy Research AS (Norway), Snecma (France), Turbomeca (France), ÚJP PRAHA, a. s., Ústav aplikované mechaniky Brno, s. r. o., Vamet, s. r. o., MTU Aero Engines GmbH (Austria), Ústav jaderného výzkumu Řež, a. s., Volvo Aero Corporation (Sweden), Wikov Industry, a. s., Czech and foreign universities and academic institutions

“Efficient utilization
of renewable
energy sources
and storage
of energy”





RESEARCH PROGRAMME

NATURAL HAZARDS

Earth's surface is permanently affected by the activity of natural exogenous and endogenous processes. Their dynamics and interactions lead to occurrence of dangerous natural phenomena, which endanger the human society at different scales and may eventually result in its decay or even downfall. Some phenomena (earthquakes, landslides, floods, geomagnetic storms) are in the scope of a permanent public interest. However, beside them there are many other processes and phenomena with less publicity, nevertheless capable of causing serious problems to the whole human civilization or its fundamental part. Extreme droughts, soil degradation or erosion, and water and atmosphere pollution can be named as examples. In the Czech Republic, generally a country with low occurrence of natural disasters, the direct property losses exceeded 113 billion CZK during last 20 years. Besides that, there were 509 casualties, and about 1.6 million people were affected by the consequences of natural disasters. And this excludes the indirect losses, which generally exceed the direct ones several times. However, no systematic and reliable inventory of indirect losses has ever been compiled. Our knowledge gradually gathered across individual scientific areas indicates that research of most processes and phenomena call for interdisciplinary collaboration between individual scientific areas, ranging from studies

of Earth's interior, through landscape formation processes to studies of cosmic influences. Therefore, this program is aimed on deeper and complex understanding of natural hazards and finding possibilities of their prediction in order to reduce considerably the negative impact on the human society.



“The way to protection against natural hazards leads only through their deep understanding, which cannot be achieved without modern multidisciplinary research.”

COORDINATOR
Josef Stemberk

Institute of Rock Structure and Mechanics of the CAS, v. v. i.

GOALS

- To acquire deeper and more comprehensive understanding of the processes in the Earth's interior, on the surface, and in the atmosphere and space, which lead to natural hazards and risks
- To explore possibilities for their predictions by broad-based interdisciplinary research
- To significantly reduce or completely mitigate their negative impact on the society

Participating CAS Institutes

Astronomický ústav
Global Change Research Centre
Geoinstitute of Physics
Institute of Geology
Institute of Psychology
Institute of Atmospheric Physics
Institute of Geonics
Institute of Hydrodynamics
Institute of Computer Science
Institute of Rock Structure and Mechanics
Institute of State and Law
Institute of Thermomechanics
Institute of Inorganic Chemistry

Cooperating partners

Arcadis CZ, a. s.
Český hydrometeorologický ústav Praha
Správa úložišť radioaktivních odpadů (SÚRAO)
AZ Consult, a. s.
Chemcomex, a. s.
Strix Chomutov, a. s.
Česká geologická služba, Geodis, a. s.
Czech and foreign universities and other institutes

TOPICS/RESEARCHERS

Earthquakes and seismic hazards

Jan Šílený (Institute of Geophysics)

Water and Atmosphere

Miroslav Tesař (Institute of Hydrodynamics)

Climatic changes and landscape evolution

Michal Filippi (Institute of Geology)

Man and changes of landscapes

Radim Blaheta (Institute of Geonics)

Space Weather

Dalia Burešová (Institute of Atmospheric Physics)

Assessment of hazards and consequences of collision of interplanetary body with the Earth

Jiří Borovička (Astronomical Institute)

“Deeper and more comprehensive understanding of a variety of processes leading to natural hazards and risks”





RESEARCH PROGRAMME

NEW MATERIALS BASED ON METALS, CERAMICS AND COMPOSITES

Human society has always been, still is and always will be critically dependent on materials. Engineering materials make a basis for progress of technology and development in all branches of industry: as from systems for efficient power generation, through the new generation of advanced high-strength steels for cars, high temperature superalloys for aeronautical engines, life-saving medical implants, nanomaterials with unique properties, up to functional materials and composites for the broadest applications in engineering practice. Sustainable progress cannot be reached without basic material research and without thorough understanding of relations between parameters of material microstructure and material behavior. Obviously, permanent attention is paid worldwide to the advancement of new materials and new processing technologies. The research often receives pronounced support at the governmental level in the advanced countries. Material research should be therefore considered as one of the crucial fields of the strategically oriented research in the Czech Academy of Sciences. It turns out that the complexity, interdisciplinary nature, and expensiveness of experimental work require coordination of the research within the groups of scientists in diverse institutes of the Czech Academy of Sciences. It is believed that this way can create sufficiently broad-based interdisciplinary research environment necessary for effective solving of new challenges in material science. Taking into account the extremely expensive experimental facilities for advanced

material research, the high-quality project of long-term targeting and enabling procurement of large investments are necessary in the Czech Republic. This project has to substantially exceed the short-term research projects supported by various grant agencies. This is, among others, one of the aims of this research program focused on metal-, ceramics-, and composit-based materials.

“Development of civilization is inseparably connected to the utilization of materials in the broadest sense. Plentitude of materials, their quality and properties are the limiting factors for development of human society. From the Research Programme I expect getting new basic knowledge on metal based materials, ceramics and composites which will help to maintain the sustainable growth.”



COORDINATOR

Ludvík Kunz

Institute of Physics of Materials of the CAS, v. v. i.

GOALS

- To develop new metal-, ceramics-, and composite-based materials
- To deepen the understanding of properties of materials in relation to their microstructure and engineering applications
- To increase the effectiveness of utilization of the existing and newly built research infrastructures

TOPICS/RESEARCHERS

Severely deformed materials with stabilized structure
Pavel Lejček (Institute of Physics)

Powder materials and their solidification
Tomáš Chráska (Institute of Plasma Physics)

Shape memory alloys with controlled response
Petr Šittner (Institute of Physics)

Surface treatment of materials
Danijela Rostohar (Institute of Physics)

Materials for extreme conditions
Pavel Hutař (Institute of Physics of Materials)

Materials for energy saving and sustainable growth
Aleš Kroupa (Institute of Physics of Materials)

Progressive nanocomposites
Anna Macková (Nuclear Physics Institute)

Theoretical investigation and mathematical modelling of properties of metal based materials, ceramics and composites
Martin Friák (Institute of Physics of Materials)

Participating CAS Institutes

Institute of Physics of Materials
Institute of Physics
Nuclear Physics Institute
Institute of Plasma Physics
Institute of Scientific Instruments
Institute of Thermomechanics
Institute of Macromolecular Chemistry
Institute of Geonics
Institute of Rock Structure and Mechanics

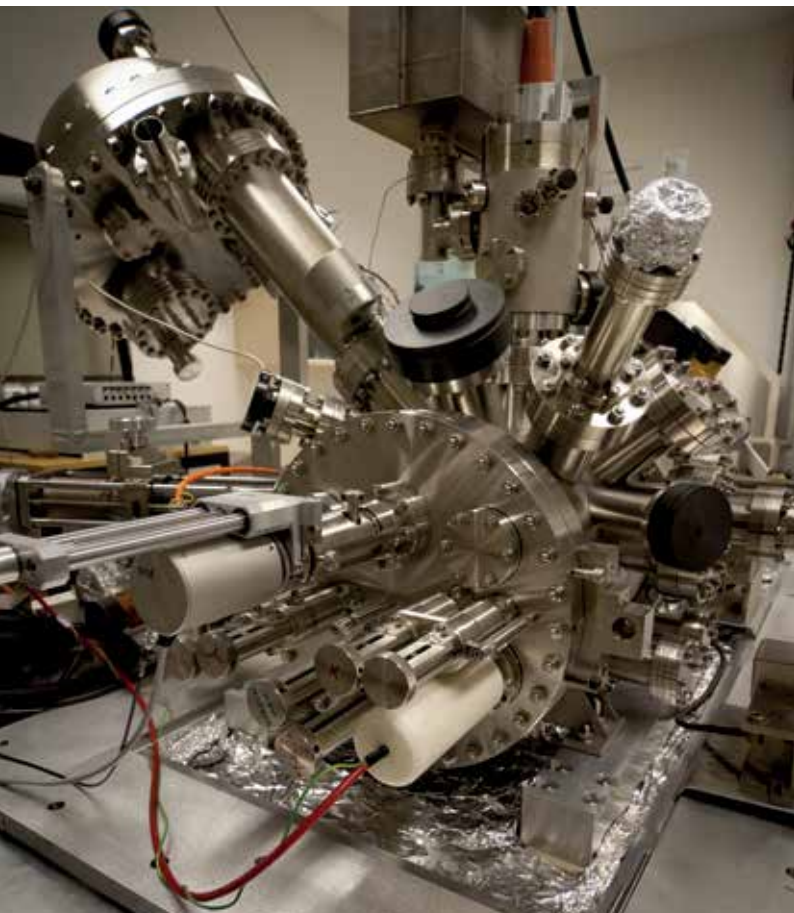
The program could make use besides the laboratories of participating research teams in the institutes of CAS also existing and new build research infrastructures like ELI, HILASE, CANM, CEITEC, I4T SAMFAT, FUNBIO, LNSM, COMPASS-RI, ALISI or EES for effective advanced material research

Cooperating partners

První brněnská strojírna Velká Bíteš, a. s.
Bonatrans, a. s.
Centrum výzkumu Řež, s. r. o.
Výzkumný a zkušební ústav Plzeň, s. r. o.
Výzkumné centrum tvářecích technologií Fortech
Medin, a. s.
VInstitute of Hydrodynamics Ž Dobrá, a. s.
DT-Výhybkárna a strojírna, a. s.
Czech and foreign universities and other institutes

“Integration of research community of CAS in the field of material investigation and close cooperation with industry, efficient utilization of large research infrastructures”





RESEARCH PROGRAMME

DIAGNOSTIC METHODS AND TECHNIQUES

Czech Republic has a long-standing tradition in the area of precise machinery, electronics, optics, special devices and corresponding advanced technologies. To make sure this tradition is upheld, extended into other areas and further developed at a cutting-edge level, it is necessary to seek new physical, chemical, imaging and diagnostics principles, new procedures and modern technologies, and to develop new methods for the study of microstructures and nanostructures of both living and non-living matter. Original theoretical results in natural and technical sciences are acquired during the evaluation of these principles, as are unique methodical procedures and device elements.

Progress nowadays is unthinkable without interdisciplinary approach, without intensive communication and cooperation among top specialists from a variety of disciplines. Often the time-tested procedures from one area cause a surprising breakthrough and further development in another area, if they are applied in a non-conventional way. The ultimate goal is their use in basic and applied research, predominantly in the areas of biomedicine and physics of materials, in industry and for the education of the next scientific generation.

“High-quality scientific work should blend together basic, experimental, and applied research.”



COORDINATOR

Ilona Müllerová

Institute of Scientific Instruments of the CAS, v. v. i.

GOALS

- To make the use of low temperature physics for biology and space research
- To develop advanced non-invasive diagnostics procedures for human and veterinary medicine and biology
- To apply electron, ion, and light beams to nanodiagnostics and creation of structures
- To develop advanced measurement methods and metrology for research and industry
- To develop special technologies for extremely precise and technically advanced applications

Participating CAS Institutes

Institute of Physics
Institute of Photonics and Electronics
Institute of Information Theory and Automation
Institute of Physiology
Institute of Organic Chemistry and Biochemistry
Institute of Experimental Medicine
Institute of Physics of Materials
Institute of Molecular Genetics
Institute of Inorganic Chemistry

Cooperating partners

FEI Czech Republic, s. r. o.
TESCAN ORSAY HOLDING, a. s.
DELONG INSTRUMENTS, a. s.
VIDIA, s. r. o.
Photon Systems Instruments, s. r. o.
MESING, s. r. o.
FOCUS GmbH
API Optix, s. r. o.
Research Centre Rez
Czech and foreign universities and other institutes

TOPICS/RESEARCHERS

Liquid matter systems and low temperature physics for biology and space research

Aleš Srnka (Institute of Scientific Instruments)

Advanced non-invasive diagnostics procedures for human and veterinary medicine and biology

*Pavel Jurák (Institute of Scientific Instruments), Jiří Homola (Institute of Photonics and Electronics),
Lucie Kubínová (Institute of Physiology), Pavel Dráber (Institute of Molecular Genetics)*

Nanodiagnostics of structures and their creation using electron, ion and light beams

*Tomáš Radlička (Institute of Scientific Instruments), Jan Lorinčík (Institute of Photonics and Electronics),
David Hradil (Institute of Inorganic Chemistry)*

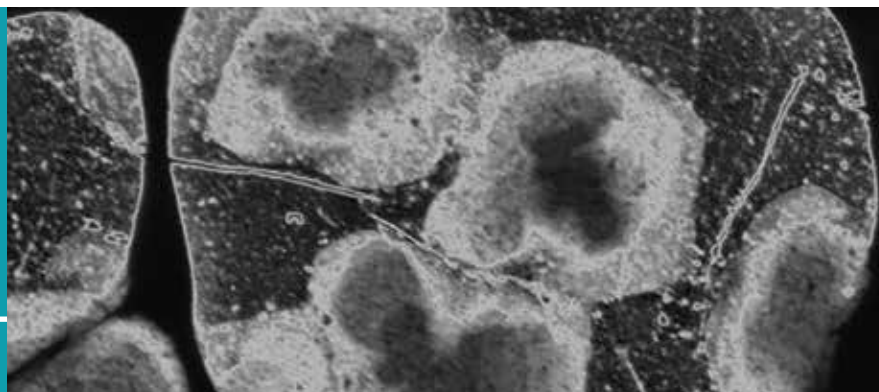
Measurement methods and metrology for research and industry

Josef Lazar (Institute of Scientific Instruments), Alexander Kuna (Institute of Photonics and Electronics)

Special technologies for extremely precise and technically advanced applications

Jaroslav Sobota (Institute of Scientific Instruments)

“Nanodiagnostics of structures and their creation using electron, ion and light beams”





RESEARCH PROGRAMME

WELLBEING IN HEALTH AND DISEASE

Health is conventionally defined as a state of complete physical, mental and social wellbeing, and together with economic and cultural factors it represents one of the main pillars of an individual's life. Severe illnesses can result in long-term or persistent decline in wellbeing for the individual and their social network/friends and family. In developed countries, diseases of modern civilization are the major health burden. They are predominantly consequences of over-consumption and a sedentary lifestyle and appear to increase in frequency as countries become more industrialized. Access to modern medical care and the availability of early treatment contributes to a longer life span in developed countries, but also increases the number of ageing, chronic disease sufferers. Successful management and reintegration of individuals with severe illness and disability into the community is one of the major challenges of contemporary medicine. Tackling the causes and understanding the mechanisms of severe illnesses to reduce their personal and social consequences requires an innovative, multidisciplinary program and integration of expertise from various research disciplines including; medicine, physics, engineering, social sciences and the humanities. This comprehensive approach will lead to novel discoveries about the molecular, cellular, systemic and epidemiological basis of these diseases and natural regenerative mechanisms, which are crucial prerequisites for the development of new treatments. Furthermore, this initiative encompasses the legal and ethical disciplines to promote the successful implementation of new therapies into clinical practice.

The main goal of the programme is to develop more effective strategies to prevent and treat lifestyle-choice related diseases. The programme aims to directly develop innovative diagnostic tools and therapies to prevent and treat diseases of modern civilization, minimize their consequences and promote faster recovery. In addition to restoring health, these strategies should also enhance the successful social integration of disease sufferers, their re-employment and ultimately improve the wellbeing of the patient and their carers. There will be added economical benefit of reducing both the direct health costs associated with the treatment, rehabilitation, and formal care and the indirect costs, resulting from the loss of productivity and social welfare payments.



"The Wellbeing in Health and Disease programme represents a collective effort across multiple research disciplines to fight serious illnesses and their consequences. Our joint initiative shall increase human wellbeing in all life conditions."

COORDINATOR

Jakub Otáhal

Institute of Physiology of the CAS, v. v. i.

GOALS

- To pursue multidisciplinary biomedical research
- To integrate and support the research groups within the programme research domain
- To focus research on the most important needs of contemporary healthcare

TOPICS/RESEARCHERS

Disorders of the nervous system during development and aging

Přemysl Jirůška (Institute of Physiology)

Chronic inflammation as a common cause of severe illness

Pavel Flachs (Institute of Physiology)

Cellular energetics – fueling a healthy life

Tomáš Mráček (Institute of Physiology)

Genetic factors leading to the development and progression of illnesses

Libor Macurek (Institute of Molecular Genetics)

Cutting-edge biotechnological tools for modern medicine

Stanislav Kozubek (Institute of Biophysics)

Regenerative medicine

Eva Syková (Institute of Experimental Medicine)

Age and gender as key factors underlying disease causes and their progression

David Sedmera (Institute of Physiology)

State of the art bioengineering tools for biomedical research

Jakub Otáhal (Institute of Physiology)

Ethical, legal and social impacts of diseases

Dana Hamplová (Institute of Sociology)

Participating CAS Institutes

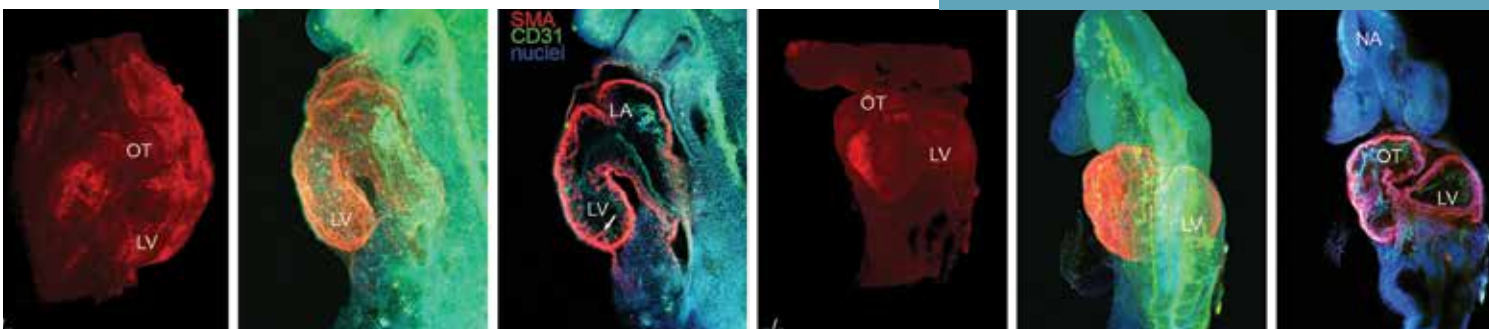
Institute of Biophysics
 Biology Centre
 Institute of Biotechnology
 Institute of Physiology
 Institute of Microbiology
 Institute of Psychology
 Institute of Sociology
 Institute of Physics of Materials
 Institute of Analytical Chemistry
 Institute of Vertebrate Biology
 Institute of Experimental Medicine
 Institute of Photonics and Electronics
 J. Heyrovsky Institute of Physical Chemistry
 Nuclear Physics Institute
 Institute of Macromolecular Chemistry
 Institute of Molecular Genetics
 Institute of Organic Chemistry and Biochemistry
 Institute of Contemporary History
 Institute of Scientific Instruments
 Institute of State and Law
 Institute of Rock Structure and Mechanics
 Institute of Information Theory and Automation
 Institute of Thermomechanics
 Institute of Animal Physiology and Genetics

The Wellbeing in Health and Disease programme provides a platform for integration of innovative research infrastructures (Biocev etc.) with the existing facilities and research teams of the participating organizations.

Cooperating partners

Fakultní nemocnice Motol, Ústřední vojenská nemocnice Praha, Institut klinické a experimentální medicíny (IKEM), Všeobecná fakultní nemocnice Praha, Unie pacientů, Czech and foreign universities and other institutes

“Effective transfer of research findings into practical outputs”





RESEARCH PROGRAMME

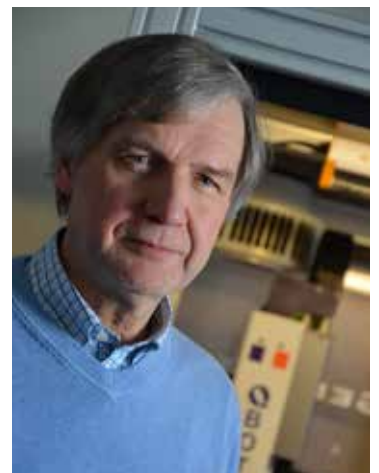
FOODS FOR THE FUTURE

Securing enough food for the growing human population is one of the biggest challenges for the near future. Apart from the human suffering, disturbing healthy growth and development of a new generation, a shortage of food brings political instability and worsens security. The food and feed should contain all necessary nutrients and must be free of pests and harmful compounds, including agents causing adverse reactions of the organism. Recently, a demand has been growing for food and nutritional supplements with increased proportion of beneficial compounds and microbes protecting human health.

A majority of food originates from plants, and plants are also used to feed farm animals. However, the crop plant and animal production are being endangered by a gradual loss of arable land and by the changing climate. A solution is to grow new cultivars and breeds, which are resistant against diseases and pests, abiotic stress and have increased yield and quality. A rich source of such traits is the genetic makeup of microalgae, wild crop relatives and wild breeds. However, tapping these resources has been hampered by the limited knowledge of the structure, function and transmission of hereditary information. The Research Programme Foods for the Future aims to respond to the danger of food shortage as an important socio-economic problem and comprises leading research teams from the Czech Academy of

Sciences. They will collaborate with teams from universities, applied research institutes and breeders. The new knowledge and biological materials will be utilized by enterprises engaged in the production and processing of plant and animal food products.

“Coordination of research activities and collaboration among the partners of the programme will contribute to the production of safe food in sufficient quantity in ecologically and economically sustainable farming systems.”



COORDINATOR

Jaroslav Doležel

Institute of Experimental Botany of the CAS, v. v. i.

GOALS

- To obtain new insights into the hereditary information of agricultural crops and farm animals
- To develop new markers for precision breeding crop plants and farm animals using molecular tools
- To characterize gut microflora and dynamics of its changes
- To prevent adverse reactions to food and diseases of gastrointestinal tract
- To promote the use of microalgae in the food and feed sector
- To prepare functional foods

Participating CAS Institutes

Institute of Experimental Botany
Institute of Animal Physiology and Genetics
Institute of Microbiology
Institute of Biophysics
Biology Centre
Institute of Botany
Institute of State and Law

Cooperating partners

Agritec, Ltd.
Agrotest fyto, Ltd.
Centre ALGATECH
Central European Institute of Technology CEITEC
Centre of the Region Haná for Biotechnological and Agricultural Research
Crop Research Institute
DLF-Trifolium Hladké Životice, Ltd.
Hop Research Institute Co., Ltd.
Milcom, a. s.
Oseva UNI, a. s.
Perník, Ltd.
Research and Breeding Institute of Pomology Holovousy, Ltd.
Research Institute of Animal Science
Research Institute of Food Industry Selgen, a. s.
Czech and foreign universities and other institutes

TOPICS/RESEARCHERS

Plant genomics and biotechnology for precise breeding

Jaroslav Doležel (Institute of Experimental Botany)

Molecular technologies for breeding farm animals, production, processing and use of food of animal origin

Jan Kopečný (Institute of Animal Physiology and Genetics)

The use of microalgae in nutrition

Ondřej Prášil (Institute of Microbiology)

Health safety of new and alternative raw food materials

Helena Tlaskalová-Hogenová (Institute of Microbiology)

“To prepare functional foods”





RESEARCH PROGRAMME

DIVERSITY OF LIFE AND HEALTH OF ECOSYSTEMS

Conservation of the quality of the environment is one of the major challenges faced by contemporary society. In some areas, the lack or decline in the quality of ecosystems' major components, such as soil or water, have already manifested themselves very negatively. Nevertheless, only healthy ecosystems can be the basis for the proper functioning of society and they are an essential condition for its development. The disturbance of natural variety of life – biological diversity (biodiversity) – and the weakening of basic ecosystem functions (ecosystem services) strongly increase the risks for the future of human society and its welfare.

The programme topics involve the study of biodiversity at the molecule, gene, species, community, and ecosystem levels as well as research targeted on the understanding of the key biogeochemical cycle mechanisms and flows of substances and energy among the components of the ecosystem. The hierarchical classification of biodiversity offers an extraordinary opportunity for interdisciplinary cooperation. The programme will also involve the study of co-evolution and interrelationships of species, the research of invasive species and their influence on native ecosystems, and the assessment of genetic variation in populations and speciation processes.

Methodologically, the programme combines biological, ecological, geological, and social disciplines with the ambition to bring an original and comprehensive understanding of biodiversity and its importance for human so-

ciety against the background of abiotic components of the environment as well as knowledge about the structure and functions of terrestrial and aquatic ecosystems.

The results will find their use in proposals of sustainable systems of plant protection and, more broadly, in agriculture, forestry, fishery, and other fields related to the ecosystem services. The output will also include both theoretical and practical approaches to environmental care, modern nature and landscape conservation, and other recommendations following the effective and sustainable use of natural resources by human society, providing a good quality of life as a result. An important part of the programme will be communication with the general public and the education of all target groups.

“Understanding of biological diversity is essential not only for sustainable exploitation of organisms, biological processes, and current ecosystem services but also for its protection and preservation for the future generations.”



COORDINATOR

Miloslav Šimek

Biology Centre of the CAS, v. v. i.

GOALS

- To deepen understanding of the processes of biodiversity and the origin of new species
- To extend understanding of the ecosystem structure and dynamics
- To Identify key mechanisms of co-evolution and inter-species relationships
- To clarify the dynamics of dispersal of invasive and introduced species
- To better understand the nature of stress responses that ensure the survival of organisms
- To understand the mobility and accumulation of environmentally significant trace elements
- To analyze the current landscape structure and the human interaction with it

TOPICS/RESEARCHERS

Biological collections, gene resource centres and databases – unique source of information

Jan Zima (Institute of Vertebrate Biology)

Biodiversity in time and space – the basis for understanding of biodiversity

Petr Petřík (Institute of Botany)

Co-evolution of organisms (pathogens, parasites and hosts)

Jan Štefka (Biology Centre)

Formation, dynamics and interactions of communities – functional ecosystems for sustainable development

František Krahulec (Institute of Botany)

Soil fauna – major factor of processes and ecosystem services

Dana Elhottová (Biology Centre)

Biogeochemical processes and interactions in ecosystems – the key to understanding ecosystem functions

Jiří Kopáček (Biology Centre)

Protection of ecosystems and territories – the ensuring of quality ecosystem services for the future

Tomáš Cajthaml (Institute of Microbiology)

Participating CAS Institutes

Biology Centre
 Institute of Botany
 Institute of Geology
 Institute of Microbiology
 Institute of Sociology
 Institute of Vertebrate Biology
 Institute of State and Law
 Institute of Animal Physiology and Genetics

Cooperating partners

Agentura ochrany přírody a krajiny ČR; Biopreparáty, spol. s r. o.; Centrum pro otázky životního prostředí UK; Centrum pro teoretická studia UK a AV ČR; Envisan-GEM, a. s., Rudolfovo; Ekovermes, s. r. o.; Eurovia CS, a. s.; Fakulta životního prostředí, Česká zemědělská univerzita; Hydro-Kov, s. r. o.; Lesnická a dřevařská fakulta, Mendelova univerzita; Lesy ČR, s. p., Hradec Králové; Magistrát města Olomouce; Magistrát města Plzně; Metrostav, a. s.; Městský úřad Tábor; Ministerstvo životního prostředí ČR; Palivový kombinát Ústí n. Labem, s. p., Všebořice; Povodí Labe, s. p., Hradec Králové; Povodí Moravy, s. p., Brno; Povodí Odry, s. p., Ostrava; Povodí Ohře, s. p., Chomutov; Povodí Vltavy, s. p., České Budějovice; Pöyry Environment, a. s., Brno; Propher, s. r. o., Březová u Zlína, Slušovice; Přírodovědecká fakulta, Jihočeská univerzita; Přírodovědecká fakulta, Masarykova univerzita; Přírodovědecká fakulta, UK; Rybníkářství Pohořelice; Sokolovská uhelná, a. s.; Správa Krkonošského NP; Správa NP a chráněné krajinné oblasti Šumava; Správa NP České Švýcarsko; Správa NP Podyjí; Vitens Evides International, Netherlands; Vodohospodářský rozvoj a výstavba, a. s.; Výzkumný ústav Silva Taroucy pro krajinu a okrasné zahradnictví, v. v. i.; Czech and foreign universities and other institutes

“Understanding of the processes of biodiversity and the origin of new species”



RESEARCH PROGRAMME

MOLECULES AND MATERIALS FOR LIFE

The program focuses on the research of new chemical technologies that would address contemporary challenges and needs of the society, emphasizing environmental protection and development of new medical preparations as tools for improving the quality of life. Increasing accents on the environmental protection require introduction of more efficient chemical technologies, in which selective catalytic systems would play a decisive role by decreasing the energy consumption and thus enable more efficient use of natural resources. Medicinal chemistry, taking advantage of detailed knowledge of structure-to-function relationships, will bring new, selectively active drugs. Progress in macromolecular chemistry and physics will afford well defined synthetic polymers, macromolecules with a capacity to self-organize in higher supramolecular structures and in a controlled manner interact with selected target molecules in cells and tissues of the organisms. New approaches will thus open ways for the development of targeted drugs, biomaterials supporting the regeneration of tissues or new tissue formation, as well as devices for selective medical diagnostics. The programme builds on an interdisciplinary effort, combining the approaches of medicinal and macromolecular chemistry on one side with those of inorganic and physical chem-

istry on the other, all the traditionally strong scientific disciplines in the Academy of Sciences. In addition to broad application potential in the fields of new compounds and materials for medicine or more effective catalytic systems for industry and environmental protection, the Research Programme will bring substantial progress in elucidation of mechanisms governing the self-organization of molecules and provide deeper understanding of structure-to-function relationships of new materials.

“Without the natural macromolecules, there wouldn’t be any life, without synthetic macromolecules – polymers, our daily life wouldn’t be so safe and comfortable.”



COORDINATOR
František Rypáček
Institute of Macromolecular Chemistry of the CAS, v. v. i.

GOALS

- To develop new catalysts for efficient chemical processes with lower energy requirements
- To prepare more selective biologically active compounds for modern medicine and better quality of life
- To develop new generation of polymers applicable as carriers for targeted drug delivery, biomaterials for tissue regeneration and engineering, and for selective diagnostics
- To elucidate mechanisms governing the self-organization of macromolecules into supramolecular structures and controlling of their interactions with target molecules in living cells and tissues

Participating CAS Institutes

Institute of Macromolecular Chemistry
J. Heyrovsky Institute of Physical Chemistry
Institute of Organic Chemistry and Biochemistry
Institute of Inorganic Chemistry
Institute of Chemical Process Fundamentals
Institute of Analytical Chemistry
Institute of Physiology
Institute of Microbiology
Institute of Molecular Genetics
Institute of Experimental Medicine

Cooperating partners

Institut klinické a experimentální medicíny (IKEM); Ústav molekulární a translační medicíny Lékařská fakulta UP Olomouc; Gilead Sciences, Inc.; Zentiva, a. s. (Sanofi Group); Wake, s. r. o.; Beznoska, s. r. o.; ELLA-CS, s. r. o.; VÚAnCh, a. s.; Euro Support Manufacturing Czechia, s. r. o.; Elmarco, s. r. o.; Pardam, Ltd.; Aqua obnova staveb, s. r. o.; Barvy a Laky Teluria, s. r. o.; Denas Color, a. s.; Advanced Materials-JTJ, s. r. o.; Czech and foreign universities and other institutes

TOPICS/RESEARCHERS

Nanostructured materials for catalysis and environmental protection
Ladislav Kavan (J. Heyrovsky Institute of Physical Chemistry)

Biologically active molecules

Michal Hocek (Institute of Organic Chemistry and Biochemistry)

Macromolecular Systems and Biomaterials for Modern Medicine

František Rypáček (Institute of Macromolecular Chemistry)

“New catalysts for efficient chemical processes”





RESEARCH PROGRAMME

EUROPE AND THE STATE: BETWEEN BARBARISM AND CIVILISATION

The programme studies the transformations of both historical and present form of the (Central) European state as a phenomenon. The focus is not on its historical development from primitive to complex types but on the historical oscillation between the positive and negative forms of an organisation that sometimes tyrannises society (barbarism) and other times brings it to humanity and culture (civilisation). The analysis of the role of the state seems to be useful for the public, which needs enough information and arguments to make qualified decisions on its attitude towards the state.

The Research Programme thus includes primary analyses of the state as an organisational and functional principle as well as of our society's perception of itself, its value systems, its own culture etc. A part of the research into the issues of the European state is to understand the complicated relations and conflicts introduced by the state – both in the present and in the course of history. Its aims are to study the tension between the European state and individuals, but also to analyse the normative concepts of the state as well as conflicts between the state and the culture of its society and to compare the European state with its non-Eu-

ropean models. The expected outcomes should contribute to the social discussion on both positive and negative aspects of the state and on the issues of social morality and ethics, which are closely associated with the form, status and function of the state. Another objective is to draw attention to the role of the humanities in society in defining social phenomena and interpreting their origin and function. The target group are also professionals active in the political sphere and public administration. Project outcomes will be handed over to the Parliament of the Czech Republic (particularly its committees) for discussions, in which the representatives of research topics of Strategy AV21 will also participate. The project also entails a broader discussion, the main part of which will rely on the cooperation with Czech Television, Czech Radio and the Press, since it belongs to the essential prerequisites for the functioning of contemporary society to explain and accept the role of the state and its positive as well as negative potential. The programme outcomes will be applicable to the area of education and schooling on various levels of social discussion and argumentation. Therefore, it will also be important to cooperate with museums and other memory institutions.

GOALS

- To elucidate the organisation of society and its tools
- To deepen the understanding of the civilisation process formation and destruction
- To clarify the legal, philosophical, ethical and religious reflections of the state
- To study the relations between culture, arts and the state
- To extend the understanding of the European state in non-European contexts

Participating CAS Institutes

Institute of Archaeology, Brno
Institute of Archaeology, Prague
Institute of Ethnology
Institute of Philosophy
Institute of History
Library AV ČR
Masaryk Institute and Archives
Oriental Institute
Institute of Slavonic Studies
Institute of Sociology
Institute of Art History
Institute of Czech Literature
Institute of the Czech Language
Institute of Contemporary History
Institute of State and Law

Cooperating partners

Parliament of the CR
Czech Television
Czech Radio
National Archives of the CR
National Museum
Moravian Museum
Czech and foreign universities and other institutes

TOPICS/RESEARCHERS

The State as a Form of Organisation: Violence or Freedom?

Eva Semotanová (Institute of History),

Jan Němeček (Institute of History)

Society and the State or Society Versus the State?

Oldřich Tůma (Institute of Contemporary History)

Philosophical Reflections on the Organisation of State Power

Jiří Chotaš (Institute of Philosophy)

Culture in the European State, the State in European Culture

Vojtěch Lahoda (Institute of Art History)

Europe in Non-European Context

Jaroslav Strnad (Oriental Institute)

“The relation between the European state and an individual.”

“The study of the state as a form of organisation of human society will bring a number of arguments for social discourse on the current role of the state and its historical roots.”



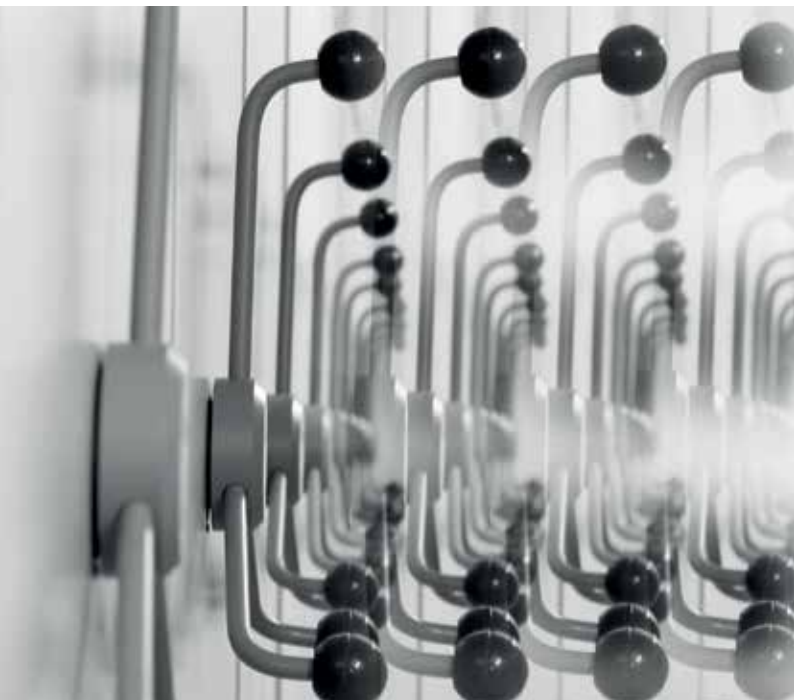
COORDINATOR

Petr Sommer

Institute of Archaeology of the CAS, Prague, v. v. i.

Institute of Philosophy of the CAS, v. v. i.





RESEARCH PROGRAMME

MEMORY IN THE DIGITAL AGE

Human memory – individual and collective – is one of the key research topics in the humanities and the social and natural sciences. Modern science is confronted with a phenomenon that has many layers as well as a sort of secrecy. Research on memory over the entire range of ways of its understanding and investigating is very important to society. Interdisciplinary methods can be used to study it and the institutes of the Academy of Sciences, thanks to their research potential, constitute a unique research center. The humanities and social sciences see memory primarily as something that creates culture, which is reflected in the complex and often traumatic history of the twentieth century and its interpretation.

Memory in and of itself is selective and subjective. Combined with the accelerated dynamics of progress, changes in the society and the family, as well as new technological possibilities, these aspects of human memory stand out and naturally or purposefully newly form (and deform) the cultural memory, the culture of remembering or purposeful “forgetting.” We lack an interdisciplinary platform to record and analyze memory processes, which would devote itself to research individual and collective memory in a complex way and would thus provide a space for the reflection of the general questions of how it works, how it’s formed and how it’s then transferred back into the thoughts of individuals and the society. Researching memory in its socio-cultural, psychological or cognitive forms is only one side of this coin. Just as

important are the questions and problems connected to the recording and accessibility of memory and the cultural memory of the society. The construction of relevant research infrastructure is part of this goal. The research outputs will be monographs, papers in journals, academic conferences, databases, web interfaces, expert methodology and reviews. They can be used in: a) research and development; b) education (in schools, museums and libraries); c) media (radio, television, film, educational publishing houses) and cultural industry (tourism, etc.); d) state administration (counseling and other collaboration with the departments of the Ministry of Education, Youth and Sports and the Ministry of Culture).

“Memory is often called the warehouse of our ideas. Today, we would like to organize this warehouse more systematically and make it more accessible to the public.”



COORDINATOR

Luboš Velek

Masaryk Institute and Archives of the CAS, v. v. i.

GOALS

- To pursue research into individual and collective memory
- To analyze the culture of remembering and “forgetting”
- To trace the transformations of traditional values and social structures
- To develop research infrastructures for the preservation and analysis of memory
- To make the historical memory accessible

Participating CAS Institutes

Institute of Archaeology, Brno
Institute of Archaeology, Prague
Institute of Ethnology
Institute of Philosophy
Institute of History
Library AV ČR
Masaryk Institute and Archives
Oriental Institute
Institute of Slavonic Studies
Institute of Sociology
Institute of Art History
Institute of Czech Literature
Institute of the Czech Language
Institute of Contemporary History
Institute of State and Law

Cooperating partners

National Archives
Ministry of the Interior of the Czech Republic
Czech Television
Czech Radio
National Museum
The National Gallery in Prague
National Library of the Czech Republic
The Ministry of Education, Youth and Sports of the Czech Republic
Ministry of Culture of the Czech Republic
Czech and foreign universities and other institutes

TOPICS/RESEARCHERS

Memory: its formation and transformation

Dagmar Hájková (Masaryk Institute and Archives)

Islands of reliable knowledge. The encyclopedic basis of the digital age

Karel Piorecký (Institute of Czech Literature)

Digital Humanities – access, preservation and saving sources in the digital age

Martin Lhoták (Library)

Treasures of memory: critical access and interpretation of Czech historical and cultural sources

Jiří Flaišman (Institute of Czech Literature)

“Tracing the transformations of traditional values and social structures”





RESEARCH PROGRAMME

EFFECTIVE PUBLIC POLICIES AND CONTEMPORARY SOCIETY

The programme aims to help the wider public, as well as the academic community, to understand the complex and rapidly changing 21st century society in which we live. The programme's interdisciplinary research projects will look for answers to key questions about how today's society and public policies function, for example: To what extent do taxes and benefits distort economic behaviour and lead to ineffectiveness? Have the latest advances in physics, evolutionary theory, and neuroscience shifted the boundaries of human freedom, and how? What are our attitudes to morality, ethics and the law, and how do those attitudes affect our behaviour? Has the concept of free will changed the meaning and purpose of responsibility in civil and criminal law, and the meaning and purpose of punishment? How extensive is the grey economy and to what extent is corruption slowing down business? What are the pros and cons of public support for home ownership and rental? Can social and housing policy successfully react to local and global crises? What do returns on education look like, how high are they, and how does education affect employment and long-term economic and social development? What effects does the minimum wage have? What threats and opportunities do immigration and emigration present? What social and economic phenomena does the ageing of our population bring about and how can public policy best react to them? Which forces keep heterogeneous societies together and which forces divide them?

The programme will place strong emphasis on public policy in numerous areas. The results of the research projects will therefore be appropriately communicated to the general public and to public policy makers in various ways. The knowledge gained through this research will provide independent feedback and evidence to support higher quality government in our democratic society. The programme will also contribute to training the next generations of researchers in the social sciences, who will become familiar with both Czech and international contexts, as well as with modern methodological approaches and standards in scientific research.

“Public policies, in tax, education, immigration, housing and many other areas, cannot be practiced well without being supported by knowledge gained through high quality empirical social science research. Our research programme will provide that knowledge to the state and to the general public.”



COORDINATOR
Daniel Münich
CERGE-EI

GOALS

- To investigate socio-economic, normative and philosophical factors and perspectives affecting public policy
- To provide an insight into the causes behind societal phenomena and processes
- To present research results and outcomes to the general public in a comprehensible manner
- To participate in and enrich public debate by contributing independent information and constructive criticism

TOPICS/RESEARCHERS

Education, educational policy and the labour market

*Daniel Münich (Economics Institute),
Jiří Večerník (Institute of Sociology)*

The ageing demographic

Daniel Münich (Economics Institute)

The effects of the tax and benefits system

Daniel Münich (Economics Institute)

Mobility: the movement of people, goods and information

Zdeněk Uherek (Institute of Ethnology)

Dynamics of change in Czech society

Pat Lyons (Institute of Sociology)

Poverty, wealth and the middle class

Jiří Večerník (Institute of Sociology)

Housing markets and their regulation

Martin Lux (Institute of Sociology)

Freedom, responsibility and their consequences for society

Tomáš Doležal (Institute of State and Law)

Contemporary ethics

Tomáš Hříbek (Institute of Philosophy)

Participating CAS Institutes

Institute of Ethnology
Institute of Philosophy
Economics Institute
Institute of Sociology
Institute of Contemporary History
Institute of State and Law

Cooperating partners

Ministerstvo práce a sociálních věcí ČR
a úřady práce
Česká správa sociálního zabezpečení
Důchodová komise
Ministerstvo školství, mládeže
a tělovýchovy ČR
Česká školní inspekce
Ministerstvo pro místní rozvoj ČR
Ministerstvo vnitra ČR
Ministerstvo spravedlnosti ČR
Ministerstvo zahraničí ČR
Technologická agentura ČR
Poradní orgány při Úřadu vlády
Veřejný ochránce práv
Svaz měst a obcí
Českomoravská komora odborových
svazů
Hospodářská komora
Svaz průmyslu a obchodu
Evropská komise
Rozvojová banka Rady Evropy
OECD
Mezinárodní měnový fond
Czech and foreign universities and other
institutes

*“Participate in and
enrich public debate
by contributing
independent
information and
constructive criticism”*





RESEARCH PROGRAMME

FORMS AND FUNCTIONS OF COMMUNICATION

The programme is focused on investigating the social, cultural and psychological functions of communication, the conditions of understanding among individuals and social groups, and the sources of communication failures. The subjects of the research will include the development of forms of communication and their function in generating, maintaining, and disrupting social structures, the role of communication in shaping personality and its contribution to the emergence of personality disorders, the possibilities of formal analysis and modelling the processes through which linguistic utterances are understood and language is acquired, the nature of communication among scientific disciplines and between the scientific community and society, the communicative functions of art, and the social conditions for its fulfilment. Each of the six main research topics is conceived as a basis for collaboration among representatives of various disciplines and Academic institutes. The planned outputs are collective monographs, thematic issues of journals, interdisciplinary (and in most cases international) conferences, etc.

In view of the key role played by communication in all spheres of social life, it can be expected that the research results will find relevant practical applications and will be of use to (among others): a) institutions

regulating the (potentially contentious) relations between social groups, including those whose participation in the social dialogue is for various reasons limited; b) institutions active in the sphere of education and edification; c) institutions responsible for directing scientific research, for creating the necessary conditions for its development and for the social applications of its results; d) institutions responsible for implementing state cultural policy and for creating favorable conditions for the social functions of art.

"I have never had the opportunity to communicate with such a broad interdisciplinary team—and if the research topic is communication itself, its possibilities and its failures, then that makes the challenge all the more attractive."



COORDINATOR

Petr Kořátko

Institute of Philosophy of the CAS, v. v. i.

GOALS

- To analyse the forms, tools and risks of public communication
- To investigate the role of communication and social interaction in the development of personality
- To demonstrate the historical forms and transformations of communication
- To propose new methods for the formal analysis and modelling of communication
- To analyse the possibilities and functions of interdisciplinary communication and of the dialogue between the scientific community and society
- To investigate the communicative potential of art

TOPICS/RESEARCHERS

Forms, tools and risks of public communication

Marek Hrubec (Institute of Philosophy)

The role of communication and social interaction in the development of personality

Marek Blatný (Institute of Psychology)

Historical forms and transformations of communication

Martin Holý (Institute of History),

Robert Novotný (Institute of Philosophy)

Structures of communication, language and thought

Ondřej Majer (Institute of Philosophy),

Juraj Hvorecký (Institute of Philosophy)

Science as a form of communication

Antonín Kostlán (Institute of Contemporary History),

Martin Franc (Masaryk Institute and Archives),

Vladimír Havlík (Institute of Philosophy),

Tereza Stöckelová (Institute of Sociology)

Art as a form of communication

Tomáš Winter (Institute of Art History)

Participating CAS Institutes

Institute of Ethnology
Institute of Philosophy
Institute of Physics
Institute of History
Masaryk Institute and Archives
Oriental Institute
Institute of Psychology
Institute of Sociology
Institute of Art History
J. Heyrovsky Institute of Physical Chemistry
Institute of Computer Science
Institute of Czech Literature
Institute of the Czech Language
Institute of Contemporary History
Institute of State and Law

Cooperating partners

Ministry of Foreign Affairs of the Czech Republic
Ministry of Education, Youth and Sports of the Czech Republic
Prague City Assembly
Association of Educational Psychology
Advisory Centre Employees (APPPP)
National Institute of Public Health (SZÚ)
Czech Television
Czech Radio
National Archives in Prague (NA ČR)
National Library of the Czech Republic
National Museum
Parliament of the Czech Republic
Government of the Czech Republic
National Gallery in Prague
Moravian Gallery in Brno
National Film Archives
Czech and foreign universities and other institutes

“To analyse the functions, tools, and risks of public communication”



LIST OF CAS INSTITUTES

Mathematics, Physics and Earth Sciences

Section of Mathematics, Physics and Computer Science

Astronomical Institute (www.asu.cas.cz)
Institute of Physics (www.fzu.cz)
Institute of Mathematics (www.math.cas.cz)
Institute of Computer Science (www.cs.cas.cz)
Nuclear Physics Institute (www.ujf.cas.cz)
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