

The Czech Academy of Sciences



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of Sciences

History and structure

The Czech Academy of Sciences (CAS) emerged as a successor of the Czechoslovak Academy of Sciences after the dissolution of Czechoslovakia in 1993. CAS history reaches back to the Royal Czech Society of Sciences established in 1784 by the Emperor Franz Josef I and to the Czech Academy of Sciences and Arts founded in 1890 thanks to generous financial support by a prominent Czech architect and builder Josef Hlávka, whose legacy remains apparent within CAS until today.

At present, the Academy Assembly as the main decision-making body together with the Academy Council, the executive body, and the Council for Sciences, the main advisory body, represent the key managerial bodies of CAS. Members of these bodies, as well as the President of CAS, are appointed for four-year terms. Organisational and administrative support to their respective agendas is provided by the CAS Head Office.

CAS administers a system of 53 research institutes with over 8000 employees carrying out research in all academic disciplines and making CAS the largest non-university research institution in the Czech Republic.

CAS research institutes are grouped into three research areas:

- **Mathematics, Physics and Earth Sciences**
- **Life and Chemical Sciences**
- **Humanities and Social Sciences**

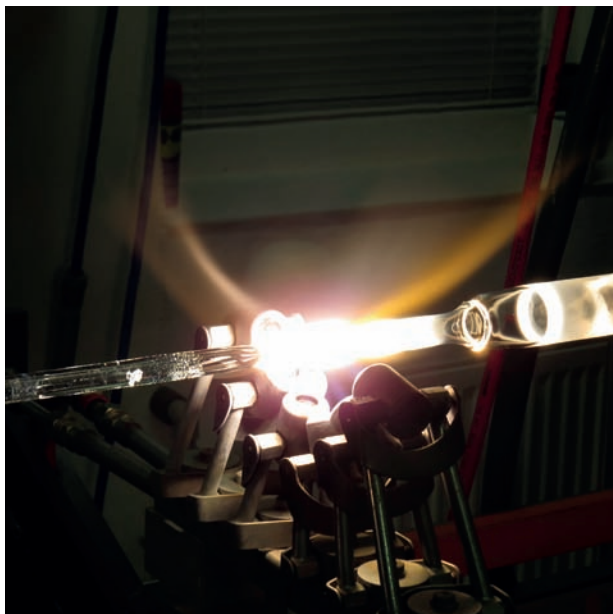


Mission

The mission of the Czech Academy of Sciences is to conduct high-quality research in all academic disciplines, to promote the cooperation in science, and to transfer the results of research to practice. The network of CAS institutes provides excellent conditions especially for multi- and inter-disciplinary research, for interactions with universities, industry and society, as well as for developing international cooperation. Education and training of young generation of scientists through close cooperation with universities and other academic institutions is largely supported. Students and postdocs are continuously encouraged to pursue their research using the CAS facilities and infrastructure.

CAS also plays a key role in representing the Czech science among international research organisations and associations as well as in creating conditions for new opportunities for international scientific collaboration. At national level, CAS serves as an important advisory body to the decision-making authorities and participates in preparation of national strategies.

Mathematics, Physics and Earth Sciences



1. Section of Mathematics, Physics and Computer Science

2. Section of Applied Physics

3. Section of Earth Sciences

1. Section of Mathematics, Physics and Computer Science

Astronomical Institute

www.asu.cas.cz

Institute of Computer Science

www.ustavinformatiky.cz

Institute of Information Theory and Automation

www.utia.cas.cz

Institute of Mathematics

www.math.cas.cz

Institute of Physics

www.fzu.cz

Nuclear Physics Institute

www.ujf.cas.cz

In the Section of Mathematics, Physics and Computer Science, methods of mathematics and informatics have been developed. The research in physics gains knowledge of natural laws in micro and macro world, the behaviour of physical systems at extreme conditions, and the possibilities of practical utilisation of new discoveries. The investigated topics include research on condensed matter systems with unique physical properties, exploration of properties, structure and interactions of matter on subatomic level, and study of classical, particle, quantum and nonlinear optics. Astrophysical and astronomical laboratories investigate the nature and behaviour of matter and radiation from the upper parts of the Earth's atmosphere to the farthest corners of the Universe.

2. Section of Applied Physics

Institute of Hydrodynamics

www.ih.cas.cz

Institute of Photonics and Electronics

www.ufe.cz

Institute of Physics of Materials

www.ipm.cz

Institute of Plasma Physics

www.ipp.cas.cz

Institute of Scientific Instruments

www.isibrno.cz

Institute of Theoretical and Applied Mechanics

www.itam.cas.cz

Institute of Thermomechanics

www.it.cas.cz

The focal point of the Section of Applied Physics is the research on the properties of ionic environments and laser plasma, photonics, generation and diagnosing of plasma, transmission phenomena in liquid systems and hydrosphere, mechanics of ductile objects and biomechanics, dynamics of liquids, thermodynamics, properties of high voltage electromagnetic systems, new concepts of energy conversion, new sensors, and transmission and processing of signals as well as the material research and exploration of the properties of advanced materials in relation to their microstructure. Supported is also the development of new physical methods, special technologies, and instrumentation principles.

3. Section of Earth Sciences

Institute of Atmospheric Physics

www.ufa.cas.cz

Institute of Geology

www.gli.cas.cz

Institute of Geonics

www.ugn.cas.cz

Institute of Geophysics

www.ig.cas.cz

Institute of Rock Structure and Mechanics

www.irsm.cas.cz

The institutes integrated in the Section of Earth Sciences investigate the planet Earth with its immediate and distant vicinity. The priority here is assigned to the study of inner structure of the Earth and to the research on the development of lithosphere, biosphere, and environment from the oldest geological eras to the present including also the human-induced processes in lithosphere. For the area of industrial applications, important parts are the exploration of geodynamic processes in the upper layer of the Earth's crust, investigation of hydrological processes influencing the environment, and ecologically responsible management of raw materials.

Life and Chemical Sciences



4. Section of Chemical Sciences

5. Section of Biological and Medical Sciences

6. Section of Bio-Ecological Sciences

4. Section of Chemical Sciences

Institute of Analytical Chemistry

www.iach.cz

Institute of Chemical Process Fundamentals

www.icpf.cas.cz

Institute of Inorganic Chemistry

www.iic.cas.cz

Institute of Macromolecular Chemistry

www.imc.cas.cz

Institute of Organic Chemistry and Biochemistry

www.uochb.cz

J. Heyrovsky Institute of Physical Chemistry

www.jh-inst.cas.cz

The research in the Section of Chemical Sciences is directed towards targeted synthesis and the structural and functional characterisation of new inorganic and organic compounds. Another priority, rendering a theoretical basis for applications, is the research of the relations between the structure, properties, and reactivity of materials. A substantial part of activities is devoted to the study of chemical principles of biological phenomena in biomedicine and ecology and to the development of new chemotherapeutic agents, biologically active substances, and polymeric biomaterials for targeted therapeutic applications. Advanced technologies are the ultimate objective of the research focused on the processes in multiphase reactive systems, molecular engineering, and processes important for environmental decontamination and protection. The development of instrumental, analytical, and bioanalytical methods is an integral part of chemical research.

5. Section of Biological and Medical Sciences

Institute of Animal Physiology and Genetics

www.iapg.cas.cz

Institute of Biophysics

www.ibp.cz

Institute of Biotechnology

www.ibt.cas.cz

Institute of Experimental Botany

www.ueb.cas.cz

Institute of Experimental Medicine

www.iem.cas.cz

Institute of Microbiology

www.mbcas.cz

Institute of Molecular Genetics

www.img.cas.cz

Institute of Physiology

www.fgu.cas.cz

The Section of Biological and Medical Sciences focuses on research of the processes in living systems. Special attention is paid to the development of genomics, proteomics, and system biology. Biomedical research is focused on the function and disorders of the nervous, immune, cardiovascular, and reproductive systems, on the study of gene expression and its signal path, on the genetic bases of diseases and human evolution, and on the development of new pharmaceuticals. Emphasis is placed on obtaining knowledge applicable in the prevention, diagnostics and therapy of serious diseases. Research in biology includes physiology and the pathologic processes in animals, genetics and molecular bases of the development of plants, and biodegradation of xenobiotics.

6. Section of Bio-Ecological Sciences

Biology Centre

www.bc.cas.cz

Global Change Research Centre

www.czechglobe.cz

Institute of Botany

www.ibot.cas.cz

Institute of Vertebrate Biology

www.ivb.cz

The institutes of the Section of Bio-Ecological Sciences are focused on mutual relations between organisms and on organism-environment relations, as well as on the functional mechanisms in ecosystems with respect to the anthropogenic effects. The aim is the use of gained knowledge in medical, biotechnological, veterinary, and agricultural practices. The research is also focused on animal biodiversity, on the investigation of the evolution, structure, and ecological role of plant biodiversity, and on the study of the insect as a biological model and pest. Other areas of interest are the interactions of parasitic and symbiotic organisms, organism communities in the soil ecosystems, the functioning of the ecosystems of valley dams and lakes, the global carbon cycle, flows of energy and materials through ecosystems, and ecology of a landscape influenced by human interaction.

Humanities and Social Sciences



7. Section of Social and Economic Sciences

8. Section of Historical Sciences

9. Section of Humanities and Philology

7. Section of Social and Economic Sciences

Economics Institute

www.ei.cerge-ei.cz

Institute of Psychology

www.psu.cas.cz

Institute of Sociology

www.soc.cas.cz

Institute of State and Law

www.ilaw.cas.cz

Library

www.lib.cas.cz

The institutes of the Section of Social and Economic Sciences address a range of societal issues. Research in psychology examines the conditions enabling optimal development of human beings in various life situations. Research in economics investigates the transformation of global society, focusing for instance on the study of so-called dynamic global games, which can be helpful for analysing various economic processes. Sociological research explores the long-term social processes that shape society in the Czech Republic and its social and cultural capital; it also explores short-term developmental trends. Research in the field of law investigates key questions of legal philosophy and the legal aspects of contemporary social problems.

8. Section of Historical Sciences

Institute of Archaeology, Brno

www.arub.cz

Institute of Archaeology, Prague

www.arup.cas.cz

Institute of Art History

www.udu.cas.cz

Institute for Contemporary History

www.usd.cas.cz

Institute of History

www.hiu.cas.cz

Masaryk Institute and Archive

www.mua.cas.cz

The institutes in the Section of Historical Sciences focus on topics underpinning the formation of cultural and national identity in the Czech historical region since the Early Middle Ages. Archaeology accentuates the protection of monuments and methodological advancement, particularly by applying the methods developed in the natural sciences. The history of fine art and music in the Czech lands is also investigated. Research in these disciplines focuses primarily on the Central-European context. Considerable attention is paid also to the information infrastructure, namely to the development and implementation of the resource databases.

9. Section of Humanities and Philology

Institute of the Czech Language

www.ujc.cas.cz

Institute of Czech Literature

www.ucl.cas.cz

Institute of Ethnology

www.eu.avcr.cz

Institute of Philosophy

www.flu.cas.cz

Institute of Slavonic Studies

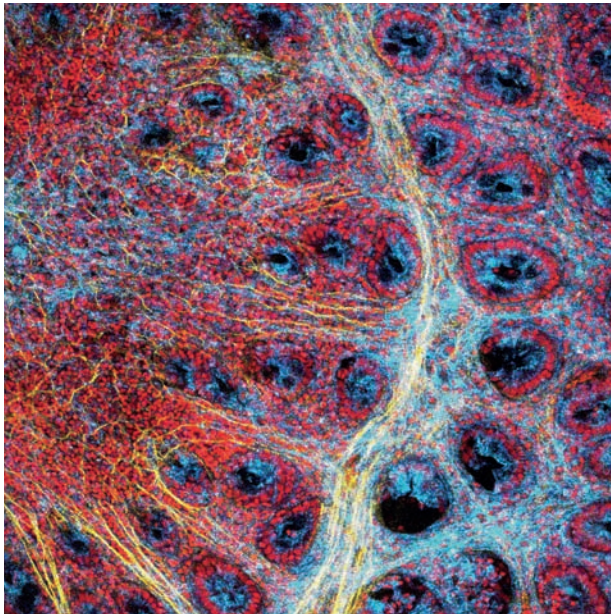
www.slu.cas.cz

Oriental Institute

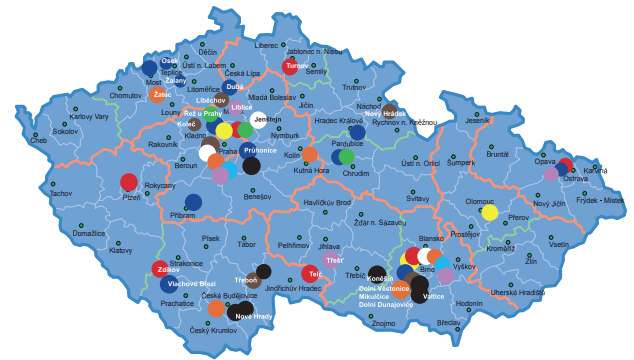
www.orient.cas.cz

The institutes in the Section of Humanities and Philology investigate varied topics. Philosophy concentrates on the general aspects of democracy and the plurality of cultures by exploring the sources and traditions of European thinking, logics, theory of science, and classical and medieval studies. Ethnology analyses life modalities of diverse social and ethnic groups, both in the Czech lands and beyond. A spectrum of Bohemistic, linguistic, and literary research programmes expand knowledge of the national language and thus help to shape national identity. Czech Slavonic and Oriental studies investigate “other” languages, histories, and cultures. All the disciplines in this section conduct also infrastructural activities that involve publishing critical lexicographic editions and producing electronic data and information sources.

Regional location of institutes and support of regional cooperation



Map of the regional location of CAS institutes



- 1. section
- 2. section
- 3. section
- 4. section
- 5. section
- 6. section
- 7. section
- 8. section
- 9. section
- Centre of Administration and Operations of AS CR, v. v. i.

Despite the historical and persisting concentration of research facilities of the Czech Academy of Sciences (CAS) in Prague and its immediate vicinity (over 60 % of CAS institutes are located in the area), CAS constantly strives to increase its potential in other regions and micro-regions of the Czech Republic. Cooperation between CAS and its regional partners is focused predominantly on solving social, economic, ecological, natural, and cultural issues through high-quality research and applications of its results. Such cooperation with local authorities or academic institutions contributes to improving the quality of life in respective regions.

High quality of regional projects is ensured by CAS while local authorities guarantee their support based on specific territorial requirements. In order to raise awareness and distribute information regarding regional projects, representatives of CAS and respective local authorities meet together once a year to present and assess the results and to discuss future prospects of their collaboration. Project outcomes are regularly published through local and national media as well as through scientific publications and conferences.

Cooperation with universities and training of researchers



Cooperation with universities and training of researchers

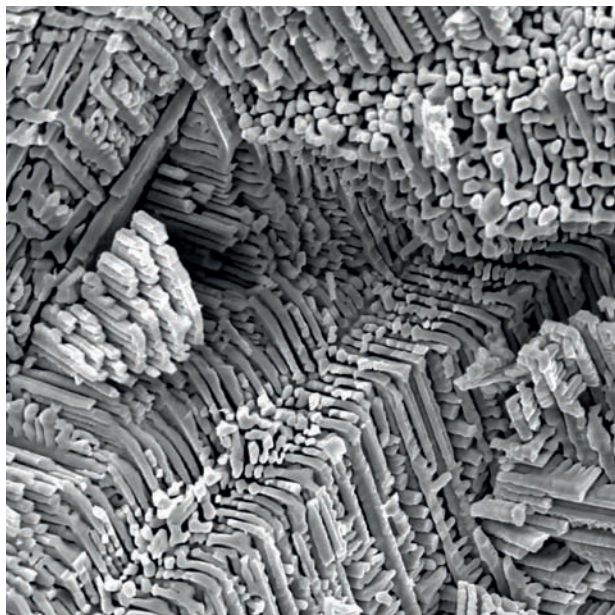
Quality of education, its development and propagation belong to the main objectives and activities of the Czech Academy of Sciences (CAS). Many university programmes are based on cooperation with CAS institutes and many students are benefiting from their research infrastructure and equipment. Collaboration with the universities enables smooth and immediate implementation of new scientific knowledge in the educational system and contributes to the promotion of science.

Based on 22 framework agreements on cooperation with the leading Czech universities, CAS provides every year access to its facilities and supervision to about 2.000 doctoral students and to more than 1.300 students of bachelor's and master's degree programmes, offering them opportunities to broaden their fields of interest or focus on highly specialized topics.

CAS also largely contributes to the improvement of education at secondary school level via direct teacher training, knowledge dissemination through summer schools and publications, and other professional activities. CAS also promotes science among young generation, allowing for talented high school students to take part in scientific internships at its institutes and organizing scientific competitions for students in acquired research skills and knowledge (e.g. Open Science or Week of Science and Technology).



Collaboration with the industry



Collaboration with the industry

An important component of the mission of the Czech Academy of Sciences (CAS) is the transfer of results of high-quality research into practice which assumes the necessity of direct cooperation with partners from business sector and other users of research results through contracts or collaborative projects. Cooperation between science and industry has always been systematically encouraged and has proved to be highly productive over time. Such collaboration opens up new possibilities for all fields of research whose results then contribute to innovations not only in industry but also in many other areas, such as agriculture, environmental protection, or even culture and public health.

The CAS institutes develop methodologies as well as testing and diagnostic methods and provide data for the assessment of technical standards and guidelines. They also perform measurements, analyses, characterisation of materials, and laboratory tests and develop localised software.

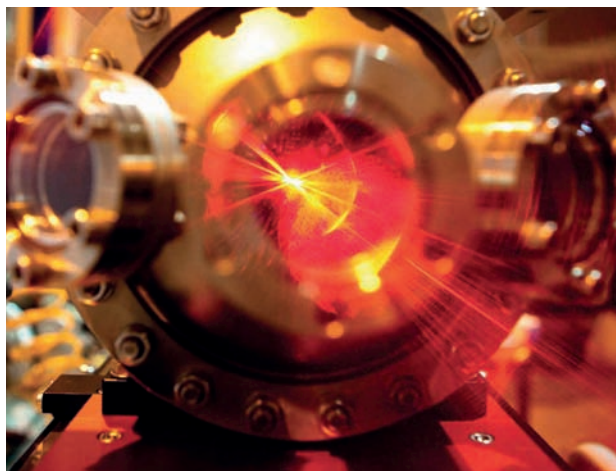
In order to maximize the effectivity of the efforts to improve cooperation with the industry and other partners the Council for Cooperation of the CAS with Business and Application Sphere was established, whereby CAS brings colleagues from technology transfer offices of its institutes together with researchers possessing relevant experience and with partners from the business sector.



Strategy AV21

“Top Research in the Public Interest” is the motto of the new strategy of the Czech Academy of Sciences (CAS), which presents itself more strongly as an institution conducting high-quality research focused on the problems and challenges faced by contemporary society. Themes, such as the energy future of the Czech Republic, the health of citizens, or the quality of public policies represent complicated areas of problems, the solution of which requires broad-based interdisciplinary research.

CAS has therefore adopted new strategy entitled Strategy AV21, the base of which forms a set of coordinated Research Programmes utilizing interdisciplinary and inter-institutional synergies to identify the problems and challenges of our time and to harmonize the research efforts of the institutes of CAS towards their solutions. From the beginning the CAS Research Programmes are open to partners from universities, business sector, and institutions of state and regional administration as well as to foreign research groups and organizations. The framework of the strategy was approved by the Academic Assembly in December 2014, leaving open the possibility for new relevant programmes to be proposed in the future, depending on the identified societal needs and attained level of knowledge.



The launched Research Programmes are as follows:

- **Hopes and Risks of the Digital Era**
- **Systems for Nuclear Power Industry**
- **Efficient Energy Conversion and Storage**
- **Natural Hazards**
- **New Materials Based on Metals, Ceramics and Composites**
- **Diagnostic Methods and Techniques**
- **Wellbeing in Health and Disease**
- **Foods for the Future**
- **Diversity of Life and Health of Ecosystems**
- **Molecules and Materials for Life**
- **Europe and the State: Between Barbarism and Civilisation**
- **Memory in the Digital Age**
- **Effective Public Policies and Contemporary Society**
- **Forms and Functions of Communication**

Research performed within long-term interdisciplinary Research Programmes focused on contemporary problems and challenges as well as emphasis on practical application of research results in economically and socially important areas constitute a substantial part of the CAS mission. An important component of the strategy is the operation of the CAS Application Laboratories, whose aim is to expand the direct collaboration of the CAS institutes with the application sector. At the same time, Strategy AV21 respects the crucial role of basic research, which is at the core of development of all scientific disciplines.

The Research Programmes are proposed and formulated in close collaboration of the CAS top management with the directors of the participating institutes, taking into consideration the trends in science, social relevance, and the *National priorities of oriented research, experimental development and innovation*. The Research Programmes can further be adjusted depending on the interim achieved results.

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

International Cooperation

Cooperation with foreign research organizations offers indisputable advantages for both the research itself and for society at large. The Czech Academy of Sciences (CAS) develops international cooperation with the aim to promote involvement of research teams from the CAS institutes in important international projects and to enable their long-term access to unique research infrastructures and databases. CAS also belongs to significant contributors to the development of strategic documents in the fields of research and development policy and implementation of Cohesion policy in the area of research and development, both at national and EU level.

CAS representatives actively contribute to European integration and further development of the European Research Area through their involvement with major European organisations, such as the European Academies Science Advisory Council (EASAC) and All European Academies (ALLEA), and also participate in organisations with global impact, for example in the International Council for Science (ICSU) and the International Union of Academies (UIA). CAS institutes are involved in activities of many scientific societies and committees and organize a few hundreds of international congresses, conferences, meetings and workshops annually.

Basic facts overview:

- CAS has concluded more than 60 bilateral agreements with partners from 40 countries mainly within Europe, but also from Asia, Latin America and Africa
- Main CAS partner organisations are associations of research institutions and funding agencies (science foundations, research councils), learned societies, and government agencies
- Most intensive is CAS cooperation with partners in V4 countries as well as in Germany, Italy, and France
- Fruitful cooperation has been established also with partners outside Europe, for example from USA, Japan, India, and China

Forms of cooperation:

- Bilateral joint research and mobility projects, as well as participation of CAS teams in multilateral projects (e. g. ERA-NETs)
- Secondment of young researchers or study visits at top international research institutions
- International courses, workshops and summer schools for young researchers organized by CAS institutes
- Exchange of experience in organizing and evaluating international cooperation in research, development and innovation with partner institutions at the management level.

