2024
Annual Report

of the Czech Academy of Sciences

Top research in the public interest

Czech Academy of Sciences






Foreword by the President of the Czech Academy of Sciences

Dear Readers,

It is my pleasure to present the 2024 Annual Report of the Czech Academy of Sciences, which provides concrete information about our main activities in 2024. It was not an easy year, most of all because we – like all of Czech society – had to cope with the impacts of economic stagnation, high energy prices and high cumulative inflation. These factors adversely affected the budgets of all the institutes of the Czech Academy of Sciences (CAS), which may have a negative impact on the quality and scope of their research in the years ahead. It is important to note that – particularly in the labour market for scientific and professional staff – Czech research institutions, including the CAS, compete with other institutions around the globe, even those in the most scientifically advanced countries.

It is crucial that sufficient funding becomes a real government priority and that measures are taken to ensure the long-term stability and growth of the sector. If science and research are not sufficiently funded, we run the risk of losing talented professionals and our research institutions will be unable to reach their full potential.

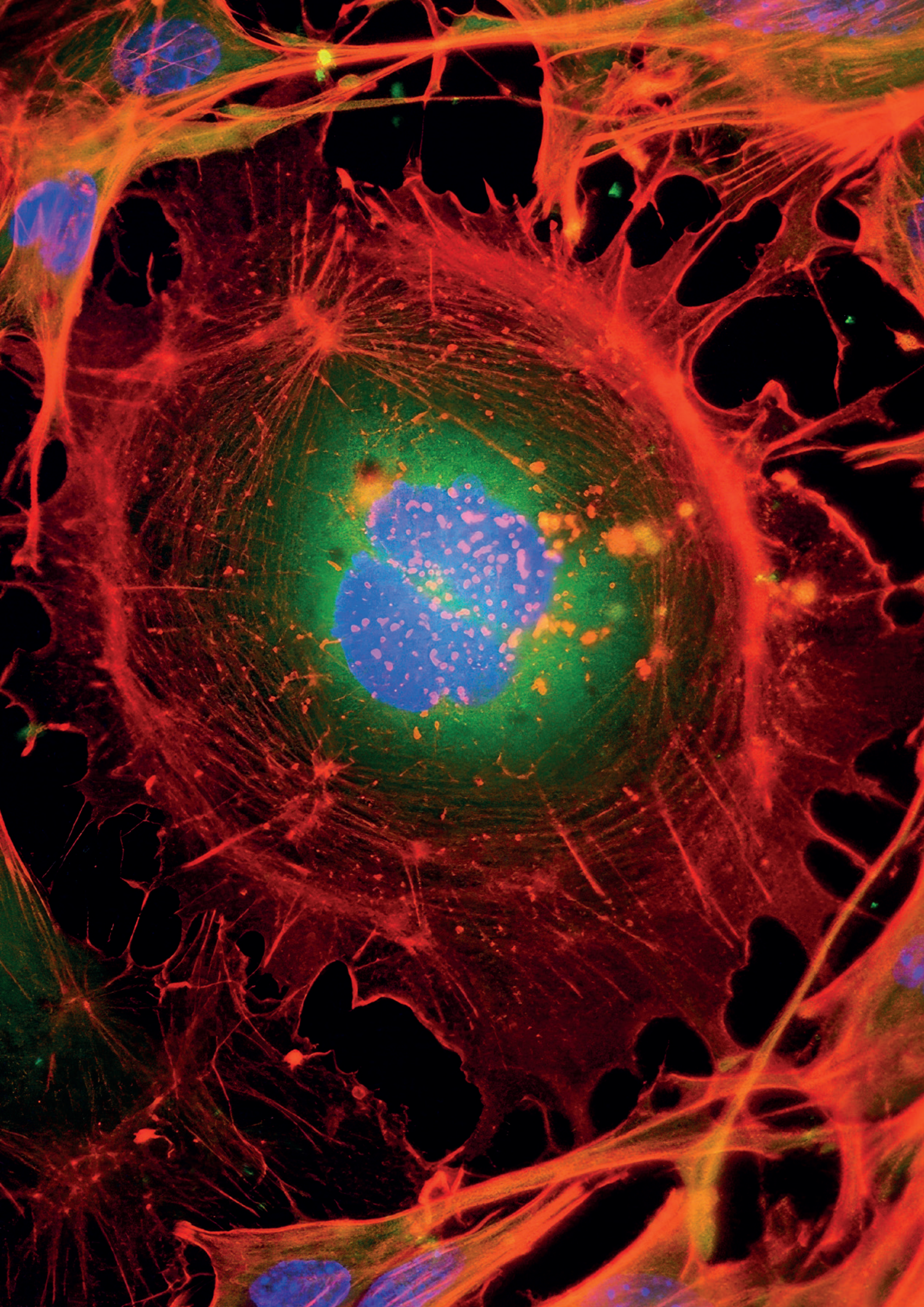
Despite all of the issues it faced, the Czech Academy of Sciences continued to maintain its position as the highest-performing Czech scientific research institution. According to data for 2018-2023 from the Research, Development and Innovation Council (R&D&I Council), the CAS produced almost 36% of excellent scientific research results in the Czech Republic on average per Methodology M17+, even though the CAS has less than 12% of the country's full-time equivalent research staff. In the esteemed Nature Index, the CAS has consistently ranked among the world's top twenty government-supported institutions, and highest among similar institutions in Central Europe in recent years – further proof of the quality of CAS research. In fact, in 2024, it ranked tenth globally, higher than some institutions with much more robust funding, such as the National Aeronautics and Space Administration (NASA) or Los Alamos National Laboratory in the US. Another indication of the CAS' high level of performance is the plethora of awards received by CAS researchers. One noteworthy example is Professor Tomáš Jungwirth from the CAS Institute of Physics, who received the Czech Government's National Czech Head Award for 2024. These examples as well as many other data – detailed in the specific chapters of this Annual Report – leave no doubt that the CAS strives to use public funds as effectively as possible and to multiply their value.

Let me single out one of the many topics that is traditionally included in our annual reports: Chapter 8 on Practical application of research. I am happy to report that in recent years the CAS has made great strides in developing knowledge transfer projects, which are primarily supported through the Programme for Development of Applications and Commercialisation (PADC) managed by the CAS Technology Transfer Office (TTO). The Academy Council has approved 33 transfer projects to date and supported preparations for the establishment of nine spin-off companies at CAS institutes. Transfer projects are linked to the priorities of our Strategy AV21 programmes. We introduced a new excellence programme - Academy of the Future - that was developed within the national Concept of Institutional Support for Excellence at Selected Universities and within the Czech Academy of Sciences and is expected to receive funding starting in 2026. This newly developed excellence support tool focuses on further strengthening research quality and excellence at CAS institutes and is designed to be complementary to existing excellence programmes.

In 2024, we celebrated the 240th anniversary of the establishment of the Royal Czech Society of Sciences (1784). This organisation, along with the Czech Academy of Sciences and Arts, became the foundation of the Czechoslovak Academy of Sciences in 1952 and later of the present-day Czech Academy of Sciences. Although scientific institutions have an even longer history in the Czech lands – stretching back to 1746, when the first enlightenment society, *Societas incognitorum*, was founded in Olomouc – 1784 marked a key milestone in the long trajectory of the development of modern Czech science. On 3 November of that year, an imperial decision enabled the establishment of the society, thus confirming the standing of the Czech educated elite, which had been striving to create a national research institution for years. To commemorate the anniversary, the CAS issued an AVex expert opinion titled "Non-university Research: An Integral Part of World-Class Science", which outlines the key position and role of non-university research abroad and in the Czech Republic.

In this context, I would like to emphasise that it is the symbiosis between non-university institutes and universities that builds a stable foundation for the enhancement of the quality of science and the educational system and is also a key factor in increasing the economic prosperity and quality of life of the citizens of the Czech Republic. Yet it is evident that only stable educational and scientific institutions with predictable funding can respond effectively to the socio-economic and political challenges and various types of crises that we currently face. It is thus essential to strengthen the role of science and education in society and to capitalise on their educational, cultural, economic and social potential: as the past and present have shown, this is one of the best and most effective investments in our future that we can make.

Prof. RNDr. Eva Zažímalová, CSc., dr. h. c.
President of the Czech Academy of Sciences



Mission and Structure

of the Czech Academy of Sciences

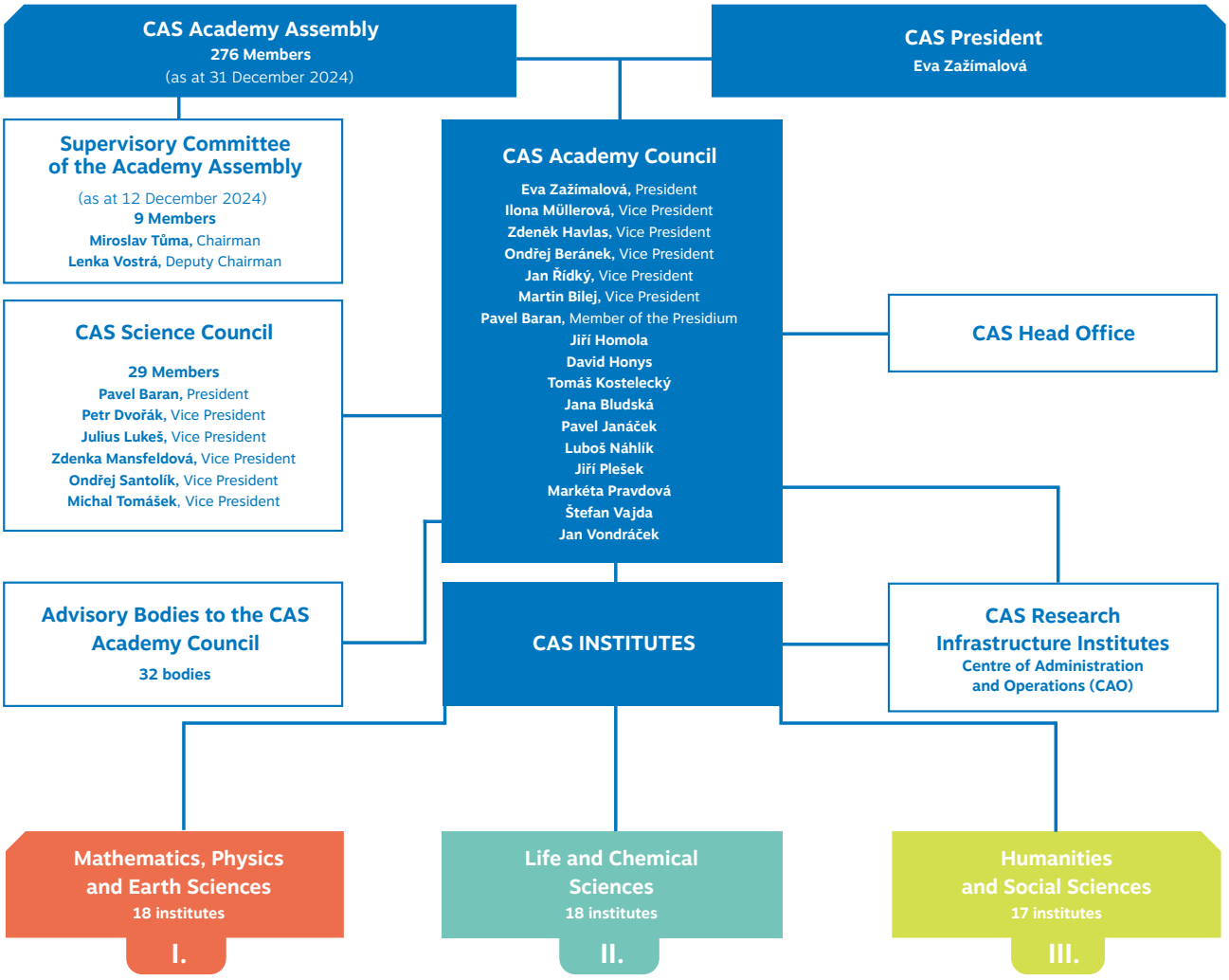
The Czech Academy of Sciences (CAS) was established by Act No. 283/1992 Coll. The CAS conducts research through its institutes which are established as public research institutions. More than 11,000 employees work at the Academy, over 7,000 of whom are university-educated.

The primary mission of the CAS and its institutes is to conduct research in a broad spectrum of natural, technical and social sciences and the humanities. This research, whether highly specialised or interdisciplinary in nature, aims to advance the development of knowledge at an international level while responding to the current needs of Czech society and culture.

CAS institutes support education, primarily by educating young researchers in doctoral study programmes, as well as through university teaching conducted by CAS researchers.

The CAS also develops collaborations with applied research and industry. The Academy's numerous joint international projects and exchanges of researchers with partner institutions abroad reinforce the integration of Czech science into the international context.

The structure of the CAS is illustrated on the following page.



Section 1
of Mathematics, Physics and Computer Science

Astronomical Institute
Institute of Physics
Institute of Mathematics
Institute of Computer Science
Nuclear Physics Institute
Institute of Information Theory and Automation

Section 2
of Applied Physics

Institute of Photonics and Electronics
Institute of Physics of Materials
Institute of Plasma Physics
Institute of Scientific Instruments
Institute of Theoretical and Applied Mechanics
Institute of Thermomechanics

Section 3
of Earth Sciences

Institute of Geophysics
Institute of Geology
Institute of Atmospheric Physics
Institute of Geonics
Institute of Hydrodynamics
Institute of Rock Structure and Mechanics

Section 4
of Chemical Sciences

Institute of Analytical Chemistry
Institute of Inorganic Chemistry
J. Heyrovský Institute of Physical Chemistry
Institute of Chemical Process Fundamentals
Institute of Macromolecular Chemistry
Institute of Organic Chemistry and Biochemistry

Section 5
of Biological and Medical Sciences

Institute of Biophysics
Institute of Biotechnology
Institute of Physiology
Institute of Microbiology
Institute of Experimental Botany
Institute of Experimental Medicine
Institute of Molecular Genetics
Institute of Animal Physiology and Genetics

Section 6
of Biological-Ecological Sciences

Biology Centre
Institute of Botany
Institute of Vertebrate Biology
Global Change Research Institute

Section 7
of Social and Economic Sciences

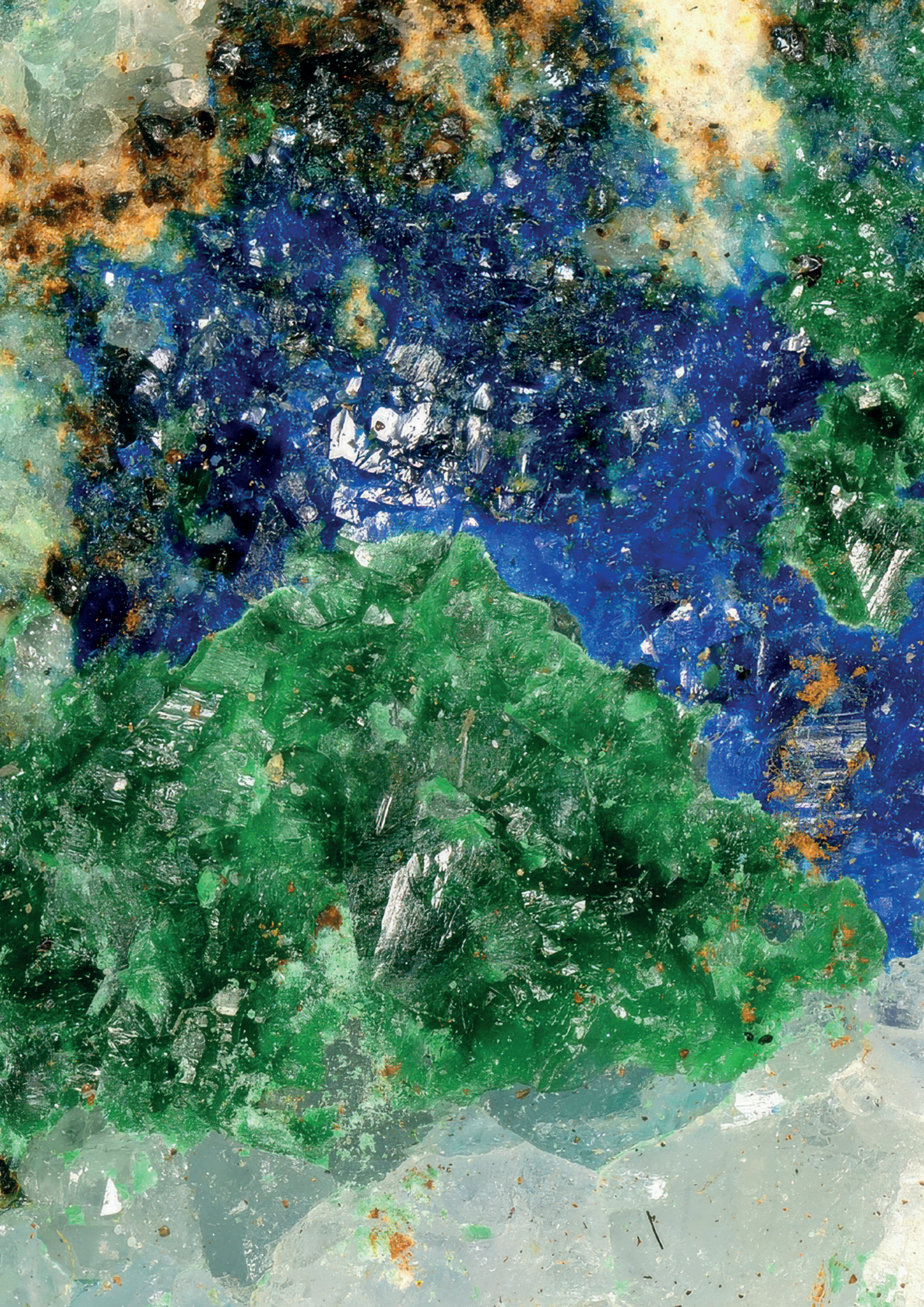
Library of the CAS
Economics Institute
Institute of Psychology
Institute of Sociology
Institute of State and Law

Section 8
of Historical Sciences

Institute of Archaeology, Brno
Institute of Archaeology, Prague
Institute of History
Masaryk Institute and Archives
Institute of Art History
Institute of Contemporary History

Section 9
of Humanities and Philology

Institute of Ethnology
Institute of Philosophy
Oriental Institute
Institute of Slavonic Studies
Institute of Czech Literature
Czech Language Institute



The Czech Academy of Sciences

in the System of Research, Development and Innovation

The Czech Academy of Sciences (CAS) is part of a Czech tradition of scientific institutions that dates back almost 300 years and began with the founding of the first enlightenment society, *Societas incognitorum*, in Olomouc (1746), continued with the Prague-based Private Society of Sciences (1769), which was the basis for the Royal Czech Society of Sciences (1784), and led finally to the founding of the Emperor Franz Josef Czech Academy for Science, Literature and Art (1890–1952), the direct predecessor of the contemporary CAS.

In 2024, in the spirit of the cultural legacy of its predecessors and in accordance with its long-term development concept, the Czech Academy of Sciences continued to engage in rigorous research and educational, popularisation and cultural work. Although the CAS – like all of Czech society – had to grapple with the consequences of economic stagnation, high energy prices and high cumulative inflation, it continued to maintain its position as the highest-performing Czech scientific research institution, making numerous valuable contributions to society. According to data for 2018-2023 from the Research, Development and Innovation Council (R&D&I Council), the CAS produced almost 36% of excellent scientific research results in the Czech Republic on average per Methodology M17+, even though the CAS has less than 12% of the country's full-time equivalent research staff. Although the CAS encompasses only part of the Czech Republic's research capacity, it has long been the most effective generator of significant research results in the Czech environment and the institution with the most fruitful outcomes in the transfer of scientific knowledge into practice. Specific results are detailed in subsequent chapters of this report.

The CAS dedicated considerable efforts to supporting education and advancing partnerships with universities in relation to teaching and above all to guiding doctoral students, an area in which the CAS plays a very significant role in many disciplines. In this regard, in November 2024, the Chamber of Deputies of the Parliament of the Czech Republic approved a draft amendment to the Higher Education Act, which, among other things, takes into account the position of CAS institutes in educating doctoral students. The amendment also allows guaranteed doctoral income to include income from intellectual work related to dissertation development that doctoral students may perform as employees of legal entities such as the CAS which collaborate on a given doctoral programme. Based on this change, the CAS is preparing extensions to existing agreements with specific universities to address financing of doctoral studies. In anticipation of rising costs at institutes that teach doctoral students, it can be expected that once the amendment is approved, it will also be necessary to begin discussions about the creation of a specific item in the CAS budget to support doctoral students, in order to continue ensuring the high quality of doctoral studies and sufficient funding of doctoral students working at CAS institutes.

The CAS also continued collaborating with the business sector by seeking symbiotic contacts, supporting knowledge and technology transfer to social and economic practice, and creating an enabling organisational and legal environment. The CAS' transfer efforts were supported primarily through the Programme for Application Development and Commercialisation (PADC), which is administered by the Technology Transfer Office (TTO). The main objective of this strategy is to streamline implementation and commercialisation of research results, particularly in the Czech Republic, and thus support disciplines with a high added value of knowledge and highly qualified human resources for the Czech economy. The Academy Council has approved 33 transfer projects to date and supported preparations for the establishment of nine spin-off companies at CAS institutes. In 2024, negotiations on 17 licence agreements with industrial partners were held, illustrating the growing significance of CAS transfer initiatives.

In interdisciplinary and interinstitutional collaboration, the CAS uses the full potential of Strategy AV21 programmes, which focus on multidisciplinary solutions to socially relevant topics. Strategy AV21 programmes have gained extraordinary acclaim in the political sphere and business sector and among the broad public. CAS institutes have forged fertile collaborative ties based on Strategy AV21 programmes with many academic, commercial and public entities and further strengthened their engagement in grant and international scientific partnerships. Strategy AV21 research programmes have also become more closely linked to existing national strategies, above all to the Innovation Strategy of the Czech Republic 2019-2030, National RIS3 Strategy, National Research, Development and Innovation Policy of the Czech Republic 2021+ (NRDIP 2021+) and the National Economic Strategy of the Czech Republic.

Building on its previous successful efforts, the CAS achieved significant progress in cooperation with both chambers of the Parliament of the Czech Republic and the Government of the Czech Republic. The aim is to provide Parliament, the Government and other state and regional administrative authorities with qualified expertise to improve the quality of decision-making processes, e.g. through AVex expert opinions. In 2024, the CAS issued three expert opinions. The first, "New Paths from Renewable Energy Sources to Fossil-Free Fuels", outlines changes to the Czech energy strategy and the development of new energy storage technologies. The second Avex, "Archaeological Heritage in the 21st Century. The Need for New Legislative Protection", points out problems related to the old monument law, proposes ways of improving the legislation and outlines new options for protecting archaeological findings. The third AVex, "Non-university Research: An Integral Part of World-Class Science", highlights the importance and position of non-university research on a global scale and in the Czech context. Additional AVex expert opinions are forthcoming.

In 2024, the CAS and its representatives actively engaged in the preparation and implementation of a number of conceptual documents of fundamental importance for research, development and innovation (R&D&I).

The key documents include the following:

- National Research, Development and Innovation Policy of the Czech Republic 2021+ (NRDIP 2021+)
- National Priorities of Oriented Research
- National RIS3 Strategy
- National Recovery Plan in the context of the Economic Strategy of the Czech Republic
- Innovation Strategy of the Czech Republic 2019–2030
- National Methodology M17+

- Amendment to Act No. 341/2005 Coll., on Public Research Institutions
- Amendment to Act No. 111/1998 Coll., on Higher Education
- Preparation of a new law on research, development, innovation and knowledge transfer
- Development of the Czech state budget for 2025–2027
- Memorandum on Support of Research, Development and Innovation in the Czech Republic

National Research, Development and Innovation Policy of the Czech Republic 2021+ (NRDIP 2021+)

The NRDIP 2021+, inspired by the United Nations 2030 Agenda, is an overarching national-level document for research, development and innovation, which plays an important role in the development of the state R&D&I budget. It is also a strategic framework for development of all components of the R&D&I system and sets out measures for the effective functioning of the system. It contains five strategic objectives, which are further elaborated into specific objectives. The CAS, which is actively engaged in the implementation of all relevant sections of the policy, participated in an interim implementation evaluation questionnaire survey in early April 2024. The CAS focuses in particular on the implementation of Measure no. 27, which aims to redefine research priorities to increase the resilience of Czech society to global threats such as climate change, environmental degradation, migration processes, the energy crisis, food shortages, civilisation and infectious diseases, population ageing, etc. The CAS rigorously addresses these issues through Strategy AV21 programmes, which respond to current societal challenges in accordance with the CAS vision of conducting "top research in the public interest".

National Priorities of Oriented Research

The National Priorities for Oriented Research, Development and Innovation (NPOR) complement the NRDIP 2021+ by directing part of national R&D&I, at the interface of basic and applied research, into areas that will help address major current and foreseeable future societal problems and challenges of the Czech Republic. These guidelines are linked to key societal needs and are determined through a top-down analysis and consultation process. Their purpose is to promote interdisciplinary research, strengthen collaboration between different R&D&I system actors and ensure a coordinated approach to supporting the system. A political decision was made to accelerate the development of new NPOR, despite the fact that the existing NPOR are valid until 2030. CAS staff actively engage in the formulation of NPOR and implementation preparations by participating in relevant expert panels, which were established in early February 2024.

National RIS3 Strategy

The National Research and Innovation Strategy for Intelligent Specialisation of the Czech Republic 2021-2027 (National RIS3 Strategy) is one of the implementation tools of the NRDIP in regard to applied research in the Czech Republic. Priority themes are based on identified market opportunities, build on strengths and are determined through a bottom-up consultation process. The National RIS3 Strategy focuses mainly on supporting promising sectors and transforming them to highlight higher added value activities, through e.g. greater emphasis on support for digitalisation, nanotechnologies, biotechnology, photonics, artificial intelligence, advanced materials, etc. It is also an essential prerequisite for EU cohesion policy R&D&I interventions. CAS staff took part in the development of the document. A total funding allocation of EUR 4.7 billion was approved for RIS3 priorities in the Czech Republic in 2021-2027.

National Recovery Plan in the context of the Economic Strategy of the Czech Republic

The CAS plays an active role in the implementation of the National Recovery Plan (NRP), which is part of the Economic Strategy of the Czech Republic under component 5.1 Excellent research and development in priority public interest areas in healthcare, which is overseen by the Ministry of Education, Youth and Sports (MEYS). Under this component, the Ministry of Education, Youth and Sports' Exceles programme supported the establishment of the National Institute of Virology and Bacteriology (NIVB), whose main coordinator is the Institute of Organic Chemistry and Biochemistry. Other supported projects in which CAS institutes participate include the National Institute for Cancer Research (NCRI), National Institute for Neurological Research (NINR), National Institute for Metabolic and Cardiovascular Diseases Research (CarDia) and the National Institute for Research of the Socioeconomic Impacts of Diseases and Systemic Risks (SYRI). Another science and research component has been proposed - 5.3 Strategically managed and internationally competitive research, development and innovation ecosystem - which should contain measures to harmonise the methodological environment for the provision of support for research, development and innovation from public funds and to reduce the administrative burden. The measures are to be prepared under the auspices of the Research, Development and Innovation Council. CAS staff are closely monitoring developments in this area with the aim of involving CAS institutes in measures implemented under this component.

Innovation Strategy of the Czech Republic 2019–2030

The Innovation Strategy of the Czech Republic is a key document aimed at supporting research, development and innovation to make the Czech Republic one of the most innovative countries in Europe. The CAS played an important role in the preparation and overall conceptual development of the Strategy. It consists of nine interconnected pillars, including research funding and evaluation, innovation centres, start-ups and spin-offs, polytechnic education, digitalisation, mobility, intellectual property protection, smart investments

and marketing. The Strategy anticipates an annual increase of 0.1% of GDP for science and research funding starting in 2020 to reach 2.5% of GDP in 2025 and 3% of GDP in 2030 (of which 1% from public sources and 1.5% from business sources in 2025 and 2% in 2030). The fulfilment of objectives from the National R&D&I Policy and Innovation Strategy of the Czech Republic is also supported by essential documents concerning the financial stabilisation of science and research in the Czech Republic, and the Czech government's commitment to systematically increase institutional support for long-term conceptual development of research organisations by at least 4% per year.

National Methodology 2017+

Since 2017, the evaluation of research organisations at the national level has been carried out in line with the Methodology of Evaluation of Research Organisations and Evaluation of Programmes of Special Purpose Support for Research, Development and Innovation. The 2024 Methodology 2017+ evaluation confirmed the CAS' position as a high-performance component of the national R&D&I system. In recent years, there have been discussions about optimising Methodology 2017+ to capture the true quality of science and research as best as possible and to follow international research evaluation trends. The CAS played an important role in these discussions. Following the CAS' suggestions in 2023 to improve Methodology 2017+, a new Methodology 2025+ was developed over the course of 2024 by the Research, Development and Innovation Council, its internal working groups and the Commission for Evaluation of Research Organisations and Completed Programmes. In early December 2024, the draft Methodology 2025+ was submitted to the inter-ministerial commenting procedure, to which the CAS filed more than 20 essential comments. The CAS is poised to work with other R&D&I entities to improve the quality of the national evaluation system in line with international best practice.

Amendment to Act No. 341/2005 Coll., on Public Research Institutions

An amendment to Act No. 341/2005 Coll., on Public Research Institutions, came into force on 1 January 2024. The wording of the amendment fully respects the powers of the CAS Academy Assembly and unique position of CAS institutes. Public research institutions founded by the CAS cannot be dissolved, merged, consolidated or divided without the approval of the given Institute Board. Likewise, changes to the founder cannot be implemented without the approval of the given Institute Board. The Act introduces only two substantive changes: namely, new legal provisions on appointment and dismissal of institute directors and on the transfer of budget approval powers to institute directors. The CAS announces and arranges selection processes for institute directors. Based on the results of these processes, the CAS President, after discussion in the CAS Academy Council, has the power to decide whether or not to appoint a director, without approval from the given Institute Board. However, the amendment sets forth important protection of Institute Boards' powers, for although the founder appoints selection committees for institute directors, the given Institute Board nominates at least half of the committee members. The Act also provides the CAS President with symmetrical power to dismiss an institute director at his or her own discretion after prior discussion in the CAS Academy Council as stipulated by internal regulations, in order to limit reputational damage and minimise reputational costs to the CAS in crisis situations.

Amendment to Act No. 111/1998 Coll., on Higher Education

CAS staff played an active role in the development of the amendment to the Higher Education Act, which is closely linked to the CAS' interests. In the final phase of discussions about the proposed amendment, they honed in on the issue of financing doctoral studies and specifically on the legal provision pertaining to doctoral student income. CAS officers worked collaboratively on development of the text of the amendment with representatives of universities (namely the Czech Rectors' Conference and Council of Universities) and members of the Committee on Science, Education, Culture, Youth and Sports of the Chamber of Deputies of the Parliament of the Czech Republic. The objective was to ensure that the relevant provisions on doctoral study income enable income of doctoral students working at CAS institutes or other collaborating entities to be included in their guaranteed doctoral study income. This amendment was approved at the 119th session of the Chamber of Deputies of the Parliament of the Czech Republic on 20 November 2024, thus resolving a problematic point in the amendment that could have potentially jeopardised the CAS' collaboration with universities in regard to teaching of doctoral students.

Preparation of a new law on research, development, innovation and knowledge transfer

The preparation of a new law on research, development, innovation and knowledge transfer is of crucial importance to the future of the CAS and the R&D&I system. The draft act was prepared in line with the government's programme statement, particularly because the existing Act on R&D&I support has already been amended 22 times and during discussions on amendments the Legislative Council of the Government working committees repeatedly called for a new law to replace the existing act. In accordance with the opinion of the Legislative Council of the Government, a concept paper was not drawn up. The draft act was prepared by the legislative team of the Ministers for Science, Research and Innovation, initially in cooperation with a working group composed of representatives of all providers, including CAS officers.

The CAS submitted a number of substantial comments to the draft act during the inter-ministerial commenting procedure; some were not duly addressed. The most

problematic parts of the new law are the provision requiring that the provider granting institutional support set research focus conditions which the recipient must meet, and provisions regulating the conceptual documents of the provider, including the CAS, which are to be approved by the Government of the Czech Republic. This mechanism could, under certain circumstances, be employed as a substantial tool of governmental and political influence over scientific research directions. In the upcoming period, it will be essential to focus on implementation practices to ensure that the new law effectively supports science, research and innovation while respecting the autonomy of scientific institutions. Other passages of the new law, e.g. sections pertaining to coordination of international cooperation and to evaluation, will also require heightened attention.

The new law does introduce some generally positive elements, such as the elimination of the need to apply the entire Administrative Code to some of the provider's decisions and deletion of the robust concept of a single information system for research, development and innovation, which will reduce the administrative burden for all science and research entities. One major beneficial development for the CAS is that providers determining institutional support allocations will now be able to take into account evidence other than just the national evaluation of institutes. This will enable more efficient allocation of funds and further improvement of the quality of research at CAS institutes. Another positive step is the law's introduction of systemic support, including specification of the CAS' powers in this area. A vital point is that provision of systemic support for CAS activities is now explicitly specified in the explanatory report and that in addition to CAS's own activities it includes support for CAS institutes, the Learned Society of the Czech Republic and the scientific societies associated in the Council of Scientific Societies of the Czech Republic. The CAS is the systemic support provider for these entities.

The draft act was discussed by the Government of the Czech Republic on 18 December 2024 and submitted on 30 December 2024 to the Chamber of Deputies of the Parliament of the Czech Republic, where it is registered as Chamber Document No. 885: Draft Act on Research, Development, Innovation and Knowledge Transfer and No. 886: Draft Act Amending Certain Acts in Connection with the Adoption of the Law on Research, Development, Innovation and Knowledge Transfer. This amending act contains an amendment to Act No. 341/2005 Coll., on Public Research Institutions, which now regulates the disposal of property (including licences) of public research institutions but does not yet introduce the possibility of establishing a public research institution focused on infrastructure activities.

Development of the Czech state budget for 2025–2027

The R&D&I Council approved draft R&D&I funding from the 2025 state budget of the Czech Republic with a mid-term outlook to 2026-2027 at its 395th session on 24 November 2023. CZK 7,642 million was proposed per year for the CAS budget chapter for 2025-2027, i.e. the proposed allocation stagnated at the approved 2024 budget level. The CAS expressed objections to this proposal and demanded that it be revised. As a result, at its 401st session on 31 May 2024, the R&D&I Council approved a new proposal for R&D&I funding from the state budget of the Czech Republic, which allocated CZK 8,151 million for the CAS budget chapter for 2025, CZK 8,054 million for 2026 and CZK 8,188 million for 2027.

Subsequently, on 27 June 2024, the Minister of Finance of the Czech Republic sent instructions to compile a draft state budget for 2025 for the CAS budget chapter state budget for 2025 and mid-term outlook for 2026-2027 with an annual allocation of CZK 7,462 for 2025-2027. Although the CAS was aware of the difficulties associated with drafting the state budget, it expressed fundamental objections to this proposal.

After complicated budgetary negotiations, on 25 September 2024 the Government of the Czech Republic adopted a resolution approving CZK 7,952 million for the CAS budget chapter for 2025 and the same annual allocation for the mid-term outlook for 2026-2027. CZK 50 million was allocated for the new excellence support programme Academy of the Future in 2026 and CZK 100 million for this programme in 2027. Subsequently, on 3 December 2024, the Chamber of Deputies of the Parliament of the Czech Republic approved the Act on the State Budget of the Czech Republic for 2025, effective from 1 January 2025.

Memorandum on Support of Research, Development and Innovation in the Czech Republic

The financial stability of the scientific research environment is one of the main prerequisites for the successful development of CAS institutes and other research organisations operating in the R&D&I system. Sufficient basic institutional funding will enable CAS institutes to concentrate on conceptual scientific and educational work and on effective performance of their primary functions. To this end, the CAS participated in elaboration of the Memorandum on Support of Research, Development and Innovation in the Czech Republic, in which it made a commitment to effective fulfilment of the objectives of the Innovation Strategy of the Czech Republic, while the government committed to an increase in institutional funding of at least four percent per year for the long-term conceptual development of research organisations. The long-term goal is to increase direct institutional support to key actors in Czech science and research – the Czech Academy of Sciences and universities – up to 80% of their total budgets. For these reasons, this document should be annually applied during the process of developing the state budget for R&D&I, during which the CAS will strive to ensure that it is updated, also in view of persistently high cumulative inflation.

Organisational Measures

Prof. Eva Zažímalová's second four-year term as CAS President ends on 24 March 2025. At its 64th session on 10 December 2024, through a secret ballot vote, the Academy Assembly nominated Prof. Radomír Pánek for appointment as CAS President for the upcoming term of office, i.e. 2025-2029.

Other key topics in 2024 included the continued preparation of the evaluation of the research and professional activities of CAS institutes for 2020-2024, support for CAS knowledge and technology transfer and the CAS' involvement in the preparation of the amendment to the Act on Higher Education Institutions and the draft Act on Research, Development, Innovation and Knowledge Transfer.

Sessions of the Academy Assembly in 2024

In 2024, two regular sessions of the CAS' highest body – the Academy Assembly – were held, along with one per rollam vote of the Academy Assembly.

The **63rd session of the CAS Academy Assembly** was the body's fourth session in the ninth term of office of 2022-2026. It was held on 16 April 2024 at the National House Vinohrady with the participation of 212 members (77%). The Academy Assembly approved all the submitted materials, including the 2023 Annual Report of the CAS, 2023 CAS financial report, an excerpt from the 2023 CAS closing account, and the new Code of Ethics for Scientific Research at the CAS, which replaced the existing Code of Ethics for Researchers at the Academy of Sciences of the Czech Republic. The new Code reflects the current social context and modifies the list of frequently mentioned topics in suggestions addressed to the Scientific Integrity Committee of the CAS.

On 27-29 November 2024, the Academy Assembly held per rollam vote no. 5, by which it approved the draft programme of the 64th Session of the Academy Assembly and a proposal to specify the procedure for secret ballot voting for nominees for the position of CAS President for the 2025-2029 term of office. It also noted the appointment of a new Secretary of the Elections Committee of the Academy Assembly for the remainder of the 2022-2026 term.

The **64th session of the Academy Assembly** was the fifth session in the ninth term of 2022-2026. 253 members (92%) took part in the session, which was held on 10 December 2024 at the National House Vinohrady. The session agenda included a secret ballot vote for nominees for the position of CAS President for the 2025-2029 term of office. In accordance with the Statutes of the CAS, the Assembly of Researchers of CAS Institutes nominated five candidates by the deadline. The secret ballot vote was held via the election application and in compliance with the Statutes of the CAS and the Rules of Procedure and Rules of Elections of the CAS Academy Assembly for the 2022-2026 term of office. During the first round of secret ballot voting, the Academy Assembly resolved to nominate Prof. RNDr. Radomír Pánek, Ph.D., who received votes from 128 (52.9%) of the 242 voting members of the Academy Assembly (which is 87.7% of all 276 Academy Assembly members). The Academy Assembly instructed the CAS Academy Council to take measures to appoint Prof. Pánek as the CAS President for the 2025-2029 term of office in accordance with the Act on the CAS and the CAS Statutes. The Academy Assembly approved all the submitted materials, including the 2024 CAS financial report and draft 2025 CAS budget.

A new Academy Council approved excellence support programme called Academy of the Future, which includes specific support for scientists returning to research after a parental break, was also presented to the Academy Assembly at the 64th session. The programme has three priority axes: (i) Internships (inter alia, support for early career scientists to engage in internships and dissemination of good practices in institutional support for excellence), (ii) Returns (inter alia, support for scientists returning after parental leave or from abroad and their integration into the CAS environment) and (iii) Research groups (inter alia, support for the development of excellent research groups and establishment of new research groups, i.e. scientific incubators).

Renewal of bodies of CAS institutes

The CAS President appointed two new CAS institute directors in 2024, based on the results of selection processes and nominations from the boards of the relevant CAS institutes.

Due to expiring mandates or termination of employment, the Academy Council appointed 18 new chairpersons, 5 vice chairpersons and 10 members to CAS institute supervisory boards in 2024.

Contracts

In 2024, the CAS concluded more than 50 contracts, including 13 contracts with CAS institutes. Most were of an operational or administrative and technical nature.

CAS cooperation with academic and public sector partners

The CAS Academy Council consistently emphasises the importance of R&D collaboration between various institutions on the national and international levels. In 2024, the CAS initiated collaboration with new key partners.

As part of its collaborative efforts with universities, the CAS concluded a Memorandum of Cooperation with Charles University and Palacký University in Olomouc on institutional resilience. As part of its international collaboration with universities, the CAS forged cooperative ties with Chungnam National University in Korea.

To further cooperation with the government and public administration, the CAS concluded a Memorandum on Cooperation with the Ministry of Foreign Affairs of the Czech Republic. In regional cooperation, the CAS concluded a Memorandum of Cooperation on Support for the TOPTEC Research Centre with the Institute of Plasma Physics, the Liberec Region and the City of Turnov.

In international cooperation, the CAS entered into an agreement with Luxembourg's Tensor Ventures Fund I SCSp in 2024 and also updated or extended a number of older agreements. In addition, the CAS concluded a Memorandum of Cooperation with the IOCB Tech Foundation on collaboration regarding calls from the Massachusetts Institute of Technology (MIT).

In accordance with archaeological heritage preservation duties, in 2024 the Czech Academy of Sciences concluded four agreements with organisations authorised to conduct archaeological research pursuant to the state monument preservation law.

Actions related to CAS internal regulations

In 2024, approvals included one regulatory resolution of the CAS Academy Assembly (i.e., approval of the Code of Ethics for Scientific Research at the CAS at the 63rd session on 16 April 2024), 14 internal regulations approved by the Academy Council and 18 orders from the CAS President or the Director of the CAS Head Office.

In connection to the approved Code of Ethics for Scientific Research at the CAS, in May 2024 the CAS Academy Council issued Guideline No. 6/2024 on the CAS Code of Conduct. The guideline explains fundamental concepts such as respect, workplace violence and gender-based violence and sets out principles of appropriate behaviour in the CAS environment.

In November 2023, the Academy Council approved an intention to amend CAS internal regulations in relation to the amendment to Act No. 341/2005 Coll., on Public Research Institutions, contained in the "consolidation package". In accordance with this intention, in early 2024 several regulations were approved and issued that transpose the amendments into CAS internal regulations. The main regulations included the new Guideline of the Academy Council of the CAS on Directors of Institutes of the Czech Academy of Sciences (regulating e.g. selection processes for candidates for CAS institute directorships, and procedures for appointing, dismissing and remunerating directors of CAS institutes) and Instruction No. 4, which amended the Instruction of the Academy Council of the CAS on Supervisory Boards of Institutes of the Czech Academy of Sciences (the amendment e.g. expands CAS institute supervisory boards' discussion agenda to include the founder's intentions to appoint or dismiss the institute director and sets forth e.g. procedures for approving the institute's annual report and financial report and for providing essential information on the public research institution's work and management to the founder). Following the publication of the amended model rules of procedure for CAS institute supervisory boards, and on the proposal of supervisory boards, the Academy Council subsequently discussed and approved amendments to these CAS institute internal regulations over the course of 2024. On 3 April 2024, an informational session about how the amendment would affect CAS and CAS institute internal regulations was held for the chairs and secretaries of CAS institute boards and supervisory boards and CAS institute directors.

Several key orders were issued by the CAS President during 2024. CAS President Order No. 10/2024 was issued in April 2024, with a new outline of the CAS internal control system. In October 2024, CAS President Order No. 11/2024 was issued setting forth document circulation and electronic registration procedures (primarily taking into account current needs stemming from electronisation and digitisation processes). CAS President Order No. 12/2024 was also issued, regulating the conclusion of contracts to comply with requirements related to the contract registry and the CAS public procurement process, and consolidating provisions contained in several existing internal regulations of the CAS Head Office. In November 2024, CAS President Order No. 13/2024 was issued, governing business trips of CAS Head Office employees and travel allowances.

In December 2024, CAS President Order No. 14/2024 was issued to reflect the requirements of the outputs of external audits and the CAS internal audit and restructure grant provision powers and processes at the CAS, in particular further electronisation of the grant provision process and codification of the provision of institutional support for the long-term conceptual development of research organisations.

In 2024, the Director of the CAS Head Office issued orders governing e.g. the details of the grant provision process at the CAS following on CAS President Order No. 14/2024, management principles for the CAS cultural and social needs fund in response to changes stemming from the adoption of the consolidation package setting forth new rules for the creation and use of cultural and social needs funds in the organisational units of the state, the code of expense areas and other matters related to e.g. calculation of meal allowances for domestic business trips in 2024, electronic timesheets in the OKbase system and the periodic inventory of assets and liabilities at the CAS.

Expansion and support of Strategy AV21 research programmes

The Academy Council continued to devote considerable energy to the expansion and support of Strategy AV21 research programmes. In April 2024, the Academy Council approved the Strategy AV21 Council's statement on the final and interim reports of the research programmes and the draft budget of the 2024 Strategy AV21 grant programme. In November 2024, on the proposal of the Strategy AV21 Council and the recommendation of the CAS Science Council, the Academy Council approved the establishment of five new Strategy AV21 research programmes (AI: Artificial Intelligence for Science and Society, Sustainable Food Production and Consumption, The Power of Objects: Materiality between Past and Future, Epicentres of Civilization – Intelligent Households, Technology and Society and Future of Assisted Reproduction (ART)), which will run from January 2025 for a period of five years, and also appointed the new programmes' coordinators.

Activities of the CAS Science Council

The CAS Science Council provided conceptual support in matters of science policy development and implementation and regularly submitted its suggestions and recommendations to the Academy Council. The most important support was the Science Council's active involvement in the development and assessment of two pieces of legislation: the draft Act on Research, Development, Innovation and Knowledge Transfer, and the amendment to the Higher Education Act.

In line with its programmatic document, in 2024 the Science Council focused on programmes to support excellence at CAS institutes and engagement of CAS scientists in ERC grant calls, particularly given that Lumina quaeruntur fellowships ended. In cooperation with the Expert Group for Supporting ERC Applicants and Charles University and with the support of the Technology Centre Prague, the Science Council organised "ERC Day" on 9-10 April 2024 at the CAS Conference Centre in Třešť. The event was primarily designed for junior researchers wanting to learn about ERC grants and consideringapplying for them in the future. The Science Council also invited the coordinator of the Expert Group for Supporting ERC Applicants, Zdeněk Strakoš (from the Faculty of Mathematics and Physics of Charles University) and Jana Bludská, member of the Academy Council responsible for the agenda of CAS excellence support programmes, to attend its meetings. The Science Council submitted specific comments and recommendations about support for excellence at CAS institutes and informed the Academy Council about them.

In the spring of 2024, the Science Council was intensively engaged in the preparation of a draft amendment to the Code of Ethics for Researchers in the Academy of Sciences of the Czech Republic, which it discussed with the Presidium of the Science Council and submitted to the Scientific Integrity Committee of the CAS. The Academy Assembly assessed the draft amendment at its 63rd session on 16 April 2024 (see Sessions of the Academy Assembly in 2024).

In 2024, the Science Council discussed ten nominations for "Research Professor" degrees and decided to award the degree to all ten nominated researchers.

The Science Council also dedicated considerable effort to the preparation of the evaluation of research and professional activities of CAS institutes for 2020-2024, e.g. by recommending experts to serve as evaluators and commissioners, sending comments and suggestions on the draft Methodology for the Evaluation of Research and Professional Activities of CAS Institutes and familiarising itself with the Methodology for the Evaluation of the Professional Activities of Research Infrastructure Institutes of the CAS for 2020-2024.

In 2024, the Science Council discussed fifteen new proposals for Strategy AV21 research programmes and recommended that six receive funding.

In the autumn of 2024, the Science Council took note of the proposal for a new programme named Academy of the Future and submitted comments and suggestions on this proposal to the Academy Council.

On 24-26 September 2024, the Science Council held the multidisciplinary conference "Scientific Integrity and the Role of Science", which featured speakers from CAS institutes, universities and other institutions. The conference spanned three days and included nine sessions covering topics such as academic freedom and its application in practice, the dangers of scientific prejudice and dishonesty, the impacts of evaluation and funding systems on scientific work, collaboration between science and the application sphere, the pitfalls of new technologies in science and research, and the consequences of unethical research practices. The round table on the last day of the conference summarised the views expressed on the specific issues that had been discussed.

In 2024, the Science Council discussed a total of 28 nominations for the recipients of medals of the Czech Academy of Sciences submitted by CAS institute directors and the Academy Council. The Science Council had submitted one of the nominations itself and did not support two medal nominations.

The Science Council was also introduced to a new bibliometric application by Štěpán Jurajda (from the Economics Institute) that enables comparison of the performance of non-university research sectors in Germany, France and the Czech Republic.

Evaluation of research and professional activities of CAS Institutes

In 2024, the CAS continued to prepare for the internal evaluation of the research and professional activities of CAS institutes for the 2020-2024 period. In February, the Academy Council approved further recommendations made by the CAS Research Evaluation Committee, an advisory body of the Academy Council for the preparation of the evaluation, concerning the criteria for Phase II of the evaluation and the application form for the evaluation and the final report.

In May 2024, the establishment of a Coordination Board of Evaluation as an auxiliary body of the Academy Council was approved. The Board's primary role is to oversee the evaluation process and adherence to evaluation principles. The Board's first tasks included developing recommendations on proposals for the division of the 52 CAS research institutes into scientific teams for evaluation purposes. The Academy Council subsequently made comments on the Board's recommendations.

During this process, the Academy Council successively approved the final list of 408 scientific teams from 52 research institutes to take part in the evaluation.

The Methodology for the Evaluation of Research and Professional Activities of CAS Research Institutes for 2020-2024 was approved by the CAS Academy Council on 3 October 2024. The methodology was largely prepared on the basis of previously approved documents – called "key elements" – which had been approved by the Academy Council starting in 2022 after discussion and recommendations by the CAS Research Evaluation Committee. The methodology as a whole has been discussed by the CAS Research Evaluation Committee and the CAS Science Council.

Starting in autumn 2024, the CAS asked experts to participate in the 52 international evaluation panels for CAS research institutes. The Academy Council subsequently began appointing experts to these panels.

In November 2024, the Academy Council approved the Methodology for the Evaluation of the Professional Activities of Research Infrastructure Institutes of the CAS for 2020-2024. The CAS Library and the CAS Centre of Administration and Operations will be evaluated according to this methodology.

Involvement in international initiatives related to the evaluation of research and professional activities

In connection with the CAS' membership in the CoARA (Coalition for Advancing Research Assessment), the CAS developed and published an Action Plan for Research Assessment Reform which takes into account the upcoming evaluation. The CoARA subsequently opened a call for small one-year science assessment projects and the CAS took the opportunity to submit a project proposal in June 2024 through the CAS Head Office. Support was awarded to the project New Assessment Tools for Internal Programs of the Czech Academy of Sciences, which aims to create assessment tools for existing and new programs that reflect CoARA principles.

Support for knowledge and technology transfer at the CAS

In relation to Academy Council Guideline No. 6/2023 of 2 May 2023 on the Programme for Application Development and Commercialisation (PADC), in April 2024 the Academy Council discussed the summary final report on the first call of the programme, PADC I. In June 2024, it approved a proposal to include another 12 projects into the PADC in the second half of 2024. In November 2024, it discussed the summary final report on the second call of the programme, PADC II. It also approved the draft budget of the CAS Technology Transfer Office (TTO) and the PADC Programme for 2025 and 2026, including the 2025 TTO activity plan. This ensures funding for TTO for the upcoming period (in line with the Strategy for Knowledge and Technology Transfer in the CAS Environment approved by the Academy Council on 29 November 2022). The approved 2025 plan builds on TTO activities carried out in 2023 and 2024 and continues laying the groundwork for successful knowledge and technology transfer at CAS institutes.

In 2025 and 2026, the TTO will focus on early identification and assessment of CAS intellectual property and its application potential, development of knowledge and technologies at the CAS for practical application, and transfer of knowledge and technologies from the social sciences and humanities as well. In the first year (i.e. in 2025), the TTO will concentrate above all on developing a professional transfer office and the PADC programme, facilitating use of external providers' financial instruments for transfer, and providing targeted support on establishment of spin-off companies and licensing.

In November 2024, the Academy Council also approved a new CAS Knowledge Transfer and Valuation Concept, which stresses the potential of the social sciences and humanities.

Supervision of the management of CAS institutes' assets

In 2024, the Academy Council, in accordance with the CAS Guideline on Procedure when Issuing Founder's Prior Consent and for Other Disposal of Assets, granted a number of prior approvals as defined by the Act on Public Research Institutions. Most were purchases of scientific instruments and equipment serving the main purposes of CAS institutes, largely in Research areas I and II. The Academy Council also discussed the conclusion of contracts to establish easements (especially for power and telecommunication networks), including contracts on future contracts, and gave consent for several CAS institutes to join associations and similar legal entities and for acquisition of additional components for the COMPASS-U project (Tokamak).

Based on a recommendation from the Property Commission of the CAS, the Academy Council approved the conclusion of two new contracts on a defined portfolio to manage property owned by the Institute of Organic Chemistry and Biochemistry, as well as amendments to two earlier contracts modifying the portfolio structure.

The Property Commission of the CAS discussed several amendments to the contract for work for the ongoing reconstruction of the Hybernská building. These amendments were concluded in order to obtain additional funding (beyond the CAS budget) for specific parts of the reconstruction project (e.g. repair and restoration of facades, windows, a retention tank and roof insulation of buildings E, F and G), to which the previously approved

method and schedule of payments for the construction works had to be adapted.

The Institute of Archaeology, Brno, submitted an intention to sell real estate – namely a historical building and related land parcels in the municipality of Dolní Věstonice – due to the poor technical condition, high energy consumption and low practical usability of the building for the institute's research. This intention was submitted to the founder through the Property Commission of the CAS for consideration. Similarly, the Institute of Plasma Physics submitted an intention to sell historical buildings and related land parcels in the municipality of Turnov that are operated by the institute's branch office. The intention stems from the upcoming construction of the new TOPTEC centre.

In order to commercialise the results of CAS institutes' research, the Property Commission of the CAS, and subsequently the Academy Council, discussed applications for the founder's prior approval to engage in legal negotiations leading to the establishment of spin-off companies (e.g. the Institute of Geonics' development and design of nozzles generating high-pressure water jets, the J. Heyrovsky Institute of Physical Chemistry's design and construction of highly specialised spectroscopic and mass spectrometric instruments, the Institute of Scientific Instruments' processing of neurological data to create a tool for efficient organisation of data and simple team collaboration on large data). The Property Commission of the CAS also supervised preparations for the establishment of a spin-off company of the J. Heyrovský Institute of Physical Chemistry that aims to use a new patented method that uses a new catalyst to convert methane to produce methanol (Czech patent) and the resulting patents and patent applications, and the dynamically developing collaboration between the Institute of Nuclear Physics and the German company Eckert & Ziegler AG on use of Actinium 225 for cancer treatment.

Public procurement

In 2024, the CAS entered into an agreement with the Ministry of Finance of the Czech Republic on centralised procurement, under which the Ministry of Finance provides procurement procedures for the CAS for agreed commodities (e.g. printer paper, computers). In addition, a public contract was awarded for the "Upgrade, future development and maintenance of a filing service and related services". LE CLAVERA, s. r. o.'s bid was selected and the contract was concluded at the end of 2024.

Inter-ministerial commenting procedures

In 2024, the CAS took part in inter-ministerial commenting procedures by assessing and making statements on 222 government documents submitted by ministries or other state bodies via the eKLEP Legislative Process Electronic Library. The CAS submitted comments in 20 proceedings (9%), including essential and recommendation comments in nine proceedings, essential comments in seven proceedings and recommendation comments in four proceedings.

Addenda to the founding documents of CAS institutes

In 2024, five addenda to the founding charters of CAS institutes were issued and took effect in 2024 (Addendum No. 1 - Institute of Physics, Addendum No. 1 - Institute of Plasma Physics, Addendum No. 2 - Institute of Scientific Instruments, Addendum No. 1 - Institute of Thermomechanics, Addendum No. 2 - Institute of Experimental Botany). These addenda responded to shifts in CAS institutes' work stemming from transformative changes in the relevant scientific disciplines. The addenda also introduced provisions governing CAS institutes' performance of other activities and provision of accommodation services. Some of the addenda were issued with an effective date in 2025. Addendum No. 4 to the founding charter of the Economics Institute changed the institute's name (in Czech) to the Economics Institute as of 1 January 2025.

Personal data protection

The CAS continued to pay great attention to thorough protection of personal data in accordance with the General Data Protection Regulation (GDPR) and Act No. 110/2019 Coll., on the Processing of Personal Data.

Processing of requests for information pursuant to Act No. 106/1999 Coll.

Over the course of 2024, the CAS received 13 requests for information pursuant to Act No. 106/1999 Coll., on Free Access to Information. The requests were processed in compliance with the law. Seven requests were processed by providing information through disclosure pursuant to Section 4a(2)(a) of the Act, by providing a copy of the requested document pursuant to Section 4a(2)(b) of the Act, or by providing a data file containing the requested information pursuant to Section 4a(2)(c) of the Act. Four applications did not fall within the jurisdiction of the CAS and were deferred under Section 14(5)(c) of the Act. Two requests were processed by a combination of both procedures, i.e. part of the request was deferred and the information was provided for the remaining part.

Intellectual property protection

The CAS holds 12 trademarks, which it maintains; there were no changes in 2024.

Litigation

In 2024, one labour law case was initiated and lawfully concluded.

Patronage of the CAS President

The President of the CAS bestowed patronage on 12 science and research events in 2024.

Support of Open Science

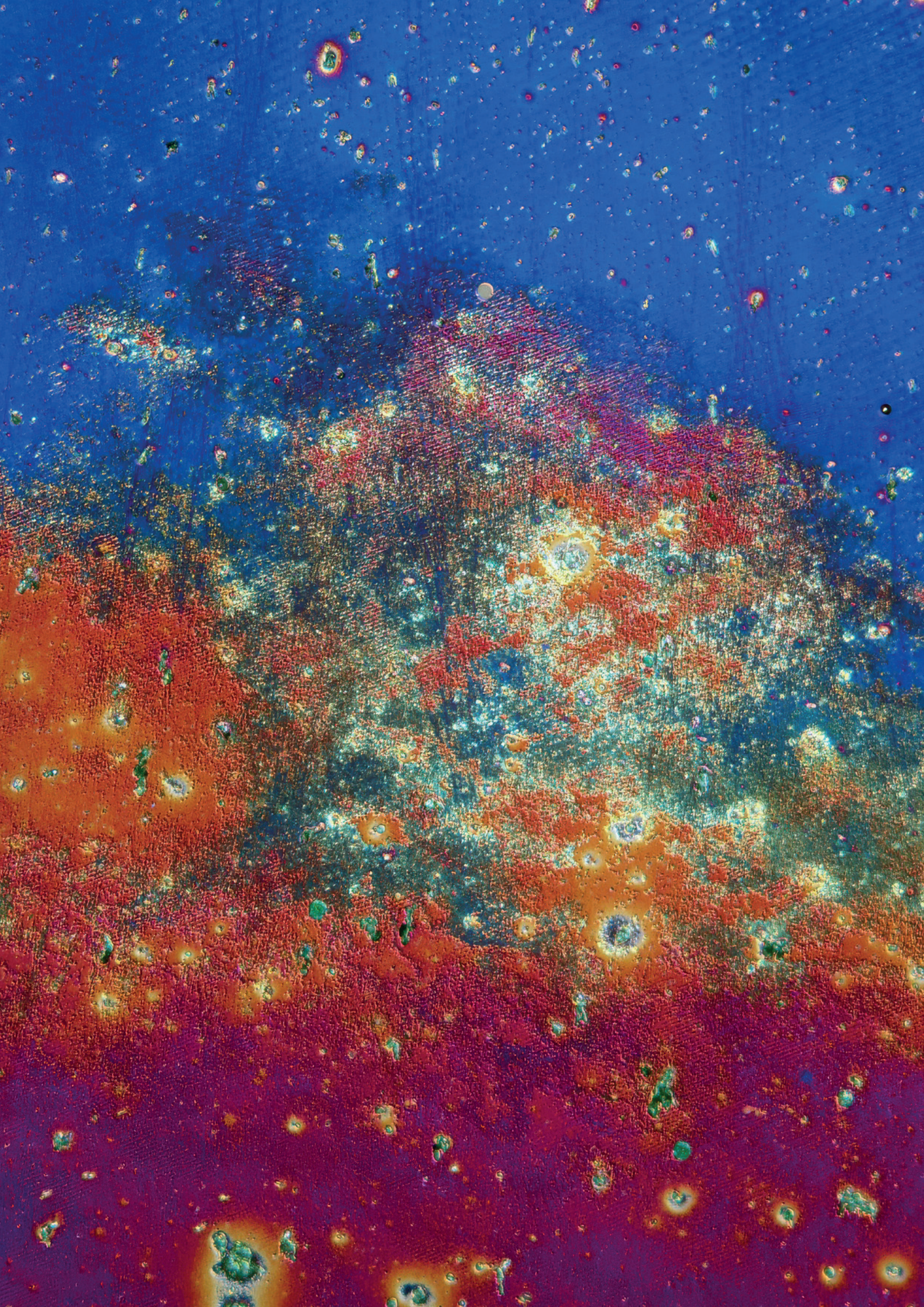
During 2024, the Academy Council continued to pay great attention to the Open Access and European Open Access Cloud initiatives, which process information and activities related to open access to scientific data in both the Czech Republic and across Europe.

In May 2024, an informational seminar on Open Access and Transformation Agreements was organised for the management of CAS institutes in cooperation with the National Technical Library and the CAS Library, which provided a summary of the main information and news on Open Access publishing and the scientific publishing system currently being developed. The seminar also offered a useful discussion forum to participants from CAS institutes, as well as opportunities to receive support from sources beyond the CAS.

On 26 November 2024, the CAS management approved the document CAS Principles of Open Science, which contains a set of recommendations for CAS research institutes. The document sets forth a common framework for implementing principles of open science at CAS institutes and recommendations for the uniform handling of open scientific knowledge. It also stresses the need to protect intellectual property.

Increasing the CAS' institutional resilience against the influence of foreign powers

Following on Academy Council Instruction No. 3/2022, issued in October 2022 for the purpose of setting up internal processes at the CAS to increase the institutional resilience of the CAS against the influence of foreign powers, in 2024 the CAS management paid heightened attention to increasing the institutional resilience of the CAS. The CAS concluded a Memorandum of Cooperation with Charles University and Palacký University in Olomouc on ensuring institutional resilience.



Selected Results

All 54 research institutes of the CAS, which operate as public research institutions, contributed to the scientific results achieved in 2024. CAS institutes are grouped into three main research areas: the first area comprises physical sciences, the second area covers life and chemical sciences, and the third area focuses on the humanities and social sciences. CAS scientific research produced many positive results in 2024. This chapter features nine of the most fascinating outcomes from the three research areas.

SELECTED SCIENTIFIC RESULTS FROM RESEARCH AREA I. INSTITUTES

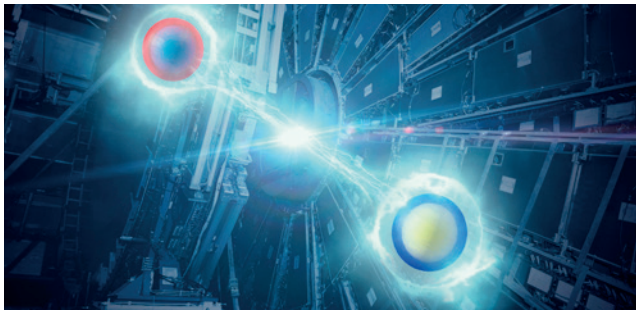
OBSERVATION OF QUANTUM ENTANGLEMENT WITH TOP QUARKS AT THE ATLAS DETECTOR

Institute of Physics

Quantum entanglement – where the states of two particles are tied to each other, regardless of how far apart they are – is one of the most intriguing phenomena in quantum physics. It has no analogue in classical physics. The highest energy observation of quantum entanglement in the pair production of top quarks, the heaviest fundamental particles, took place at CERN's Large Hadron Collider (LHC), using correlations of their spins in the ATLAS experiment. This is just the beginning of further measurements of fundamental quantum physics concepts at the LHC.

Bibliographic references:

Aad, G., et al. (ATLAS Collaboration, from the Institute of Physics: Chudoba, J., Federicova, P., Hejbal, J., Jacka, P., Kepka, O., Kroll, J., Kupčo, A., Latonova, V., Lokajíček, M., Lysák, R., Marčišovský, M., Mikeštíková, M., Němeček, S., Šícho, P., Staroba, P., Svatoš, M., Taševský, M.) Observation of quantum entanglement with top quarks at the ATLAS detector, Nature 633 (2024), pp. 542-547



Artistic visualisation of top-quark quantum entanglement
The line between the particles emphasises the inseparability of the top-quark pair, which is produced by LHC collisions at CERN and recorded by the ATLAS detector.

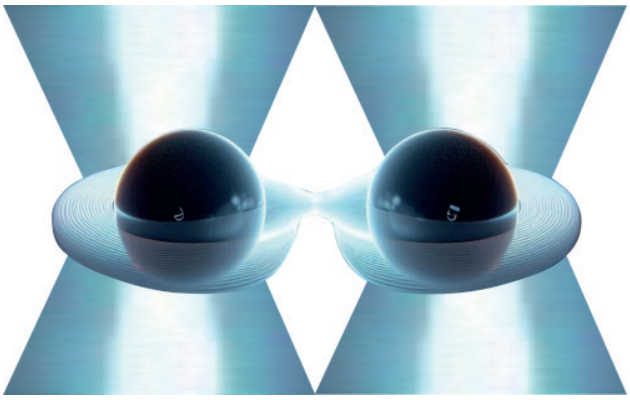
A VERSATILE TOOL ENABLING DYNAMIC CHANGES TO THE NATURE OF LIGHT INTERACTION BETWEEN NANOPARTICLES AND OBSERVATION OF THE BEHAVIOUR OF AN OPEN (NON-HERMITIAN) SYSTEM

Institute of Scientific Instruments

Scientists at the Institute of Scientific Instruments have developed a versatile tool based on nanoparticles optically levitating in a vacuum, which makes it possible to dynamically change the nature of the light interaction between nanoparticles and observe the nonlinear behaviour of an open (non-Hermitian) system. A practical understanding of these nanosystems, which interact with their environment, is also crucial for further technological advances, e.g. in energy exchange, increasing the sensitivity of sensors or developing quantum technologies.

Bibliographic references:

Liška, V., Zemánková, T., Jákl, P., Šiler, M., Simpson, S. H., Zemánek, P., Brzobohatý, O. Pt-Like Phase Transition And Limit Cycle Oscillations In Non-Reciprocally Coupled Optomechanical Oscillators Levitated In Vacuum. Nature Physics. 2024, ISSN 1745-2473. E-ISSN 1745-2481



Nanoparticles levitating in optical traps
An experimental system with two glass nanoparticles levitating in light beams. The nanoparticles form miniature oscillators that are coupled together by scattered photons.

CAUSES OF EXTREME EVENTS REVEALED BY RHENIUM INFORMATION TRANSFER

Institute of Computer Science

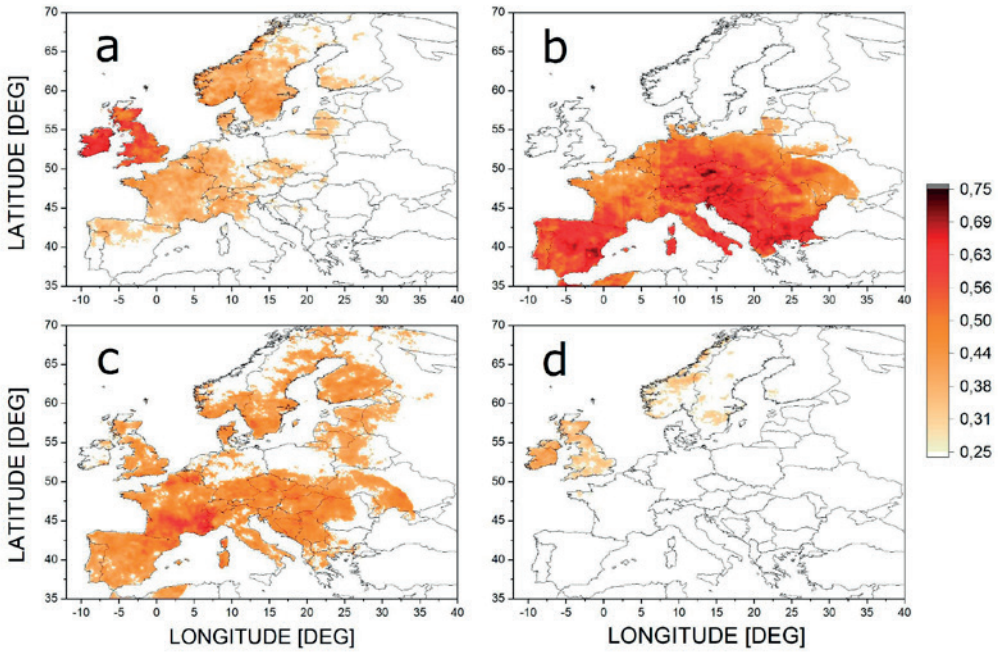
A generalisation of Granger causality principle using information theory tools was redefined in the framework of Rényi entropy. This approach provides an effective tool for identifying the cause variable responsible for the occurrence of extreme values in an effect variable. The proposed mathematical and computational method was tested in numerical simulations and applied to meteorological data analysis; for example, the cause of spring frosts that threaten the harvest of French wine growers was revealed.

Bibliographic references:

Paluš, M., Chvosteková, M., Manshour, P. Causes of extreme events revealed by Rényi information transfer. Science Advances. 2024, 10(30), eadn1721. E-ISSN 2375-2548

Spring frost

Sudden cooling at the beginning of the growing season threatens orchards and vineyards. Can we identify the atmospheric circulation events that are responsible?



Map of temperature extremes

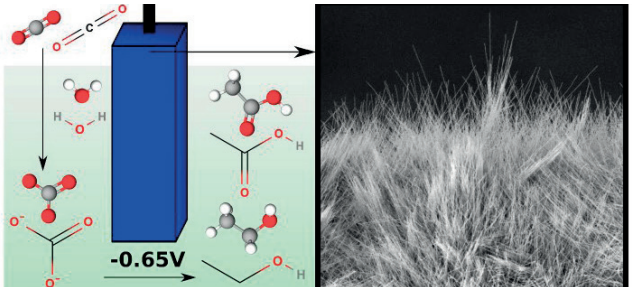
The portions of cold extremes explained by (a) the North Atlantic Oscillation NAO, (b) "atmospheric blocking" events, (c) Siberian SH pressure high, and (d) the NAO and non-SH conditions.

SELECTED SCIENTIFIC RESULTS FROM RESEARCH AREA II. INSTITUTES

ROBUST AND HIGH-PERFORMANCE COPPER SILICIDE CATALYST FOR ELECTROCHEMICAL CO_2

Institute of Chemical Process Fundamentals

A copper-based catalyst was prepared using chemical vapor deposition (CVD). It exhibited large specific areas, owing to the presence of grown nanostructures such as nanowires. The catalytic performance remained stable even after 720 hours of continuous operation. The porous and thick catalyst layer on the substrate significantly increases the residence time of intermediates during the electrochemical CO_2 reduction. High selectivity of reduction of CO_2 towards EtOH in neutral electrolytes and towards CH_3CO_2H in alkaline electrolytes was observed.



CO_2 reduction using an optimised catalyst
The left side of the figure shows the reaction scheme of the reduction process leading to organic products and the right side shows the nanostructured surface of the catalyst.

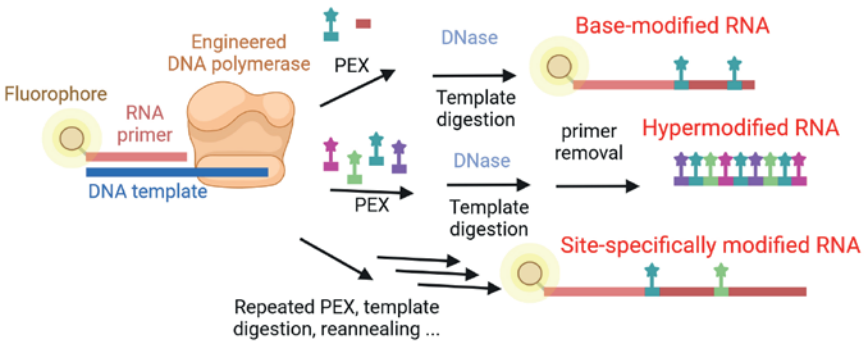
Bibliographic references:

Dřínek, V., Dytrych, P., Fajgar, R., Klementová, M., Kupčík, J., Kopeček, J., Svora, P., Koštejn, M., Jandová, V., Soukup, K., Beránek, R. A robust and high-performance copper silicide catalyst for electrochemical CO2 reduction. Materials Advances. 2024, 5(7), pp. 2917-2925. E-ISSN 2633-5409

DEVELOPMENT OF SITE-SPECIFIC NUCLEOBASE-MODIFIED RNA SYNTHESIS USING ENGINEERED THERMOPHILIC DNA POLYMERASES

Institute of Organic Chemistry and Biochemistry

The research team developed a strategy for enzymatic synthesis of modified RNA using engineered DNA polymerases SFM4-3 and TGK. The method enables preparation of RNA with single or multiple modified bases and site-specific introduction of fluorophores and other functional groups at precisely defined positions in RNA molecules, including structured or long mRNA. Some specific modifications showed positive effects on translation efficacy, offering new possibilities for the development of mRNA therapeutics.



Schematic of modified RNA preparation using DNA polymerase
Schematic representation of the synthesis of various types of modified RNA using engineered DNA polymerase. Based on the DNA template and RNA primer, RNA containing either one or two modified bases at specific positions (top), fully modified RNA with all modified nucleotides (middle), or RNA with several different modifications at predetermined positions (bottom) can be prepared.

Bibliographic references:

Brunderová, M., Havlíček, V., Matyašovský, J., Pohl, R., Poštová Slavětínská, L., Krömer, M., Hocek, M. Expedient production of site specifically nucleobase-labelled or hypermodified RNA with engineered thermophilic DNA polymerases. Nature Communications. 2024, 15(April), 3054. ISSN 2041-1723. E-ISSN 2041-1723.

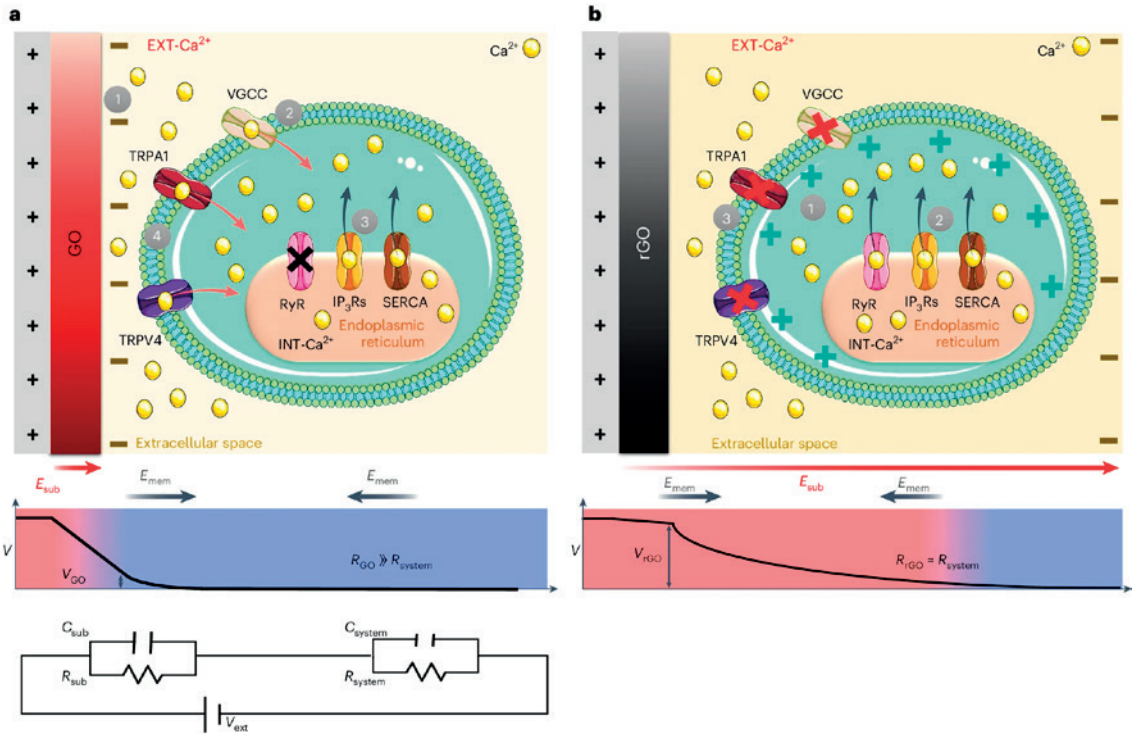
GRAPHENE OXIDE ELECTRODES ENABLE ELECTRICAL STIMULATION OF DISTINCT CALCIUM SIGNALLING IN BRAIN ASTROCYTES

Institute of Institute of Experimental Medicine

The study examined the potential of graphene-based electrodes to stimulate calcium signalling in astrocytes, offering key insights for neurological disorder treatments. The results show that graphene oxide and the reduced variant induce distinct changes in intracellular calcium, enabling selective control of astrocyte functions. The findings advance our understanding of astrocytic signalling and suggest novel neuromodulatory approaches for conditions like ischemia and epilepsy.

Bibliographic references:

Fabbri, R., Scidá, A., Saracino, E., Conte, G., Kovtun, A., Candini, A., Kirdayova, D., Spennato, D., Marchetti, V., Lazzarini, Ch., Konstantoulaki, A., Dambruoso, P., Caprini, M., Muccini, M., Ursino, M., Anděrová, M., Treossi, E., Zamboni, R., Palermo, V., Benfenati, V. Graphene oxide electrodes enable electrical stimulation of distinct calcium signalling in brain astrocytes. Nature Nanotechnology. 2024, 19(9), pp. 1344-1353. ISSN 1748-3387. E-ISSN 1748-3395



Bioelectrical model of GO/rGO-astrocyte interface

(a), (b) Schematic representation of the proposed mechanism that takes place during GO (a) and rGO (b) stimulation and the resulting cellular response. Upper panels: a) In the case of GO, charge accumulation at the GO-cell interface (1) causes membrane depolarisation that promotes VGCC or TRPA1 opening and Ca2+ influx from the external environment (2). (3) Ca2+ entry leads to further calcium release from intracellular stores via IP3 or SERCA, but not RyR. (4) The IP3 path potentiates TRPV4-mediated Ca2+ influx via the calcium-induced calcium increase mechanism. The entry of additional external Ca2+ into the cell causes a steady increase of cytoplasmic Ca2+ (S-type signal). TRPA1 might be involved in this process as a cooperative channel promoting either maintenance of basal Ca2+ levels or potentiation of the Ca2+ influx over time. IP3Rs, IP3 receptors; b) In the case of rGO, charge accumulation occurs at the cell-solution interface, inducing depolarisation of the cell membrane at the electrolyte-cell interface (1), which might directly electrically/mechanically stimulate the endoplasmic reticulum (2), causing the release of INT- Ca2+ from intracellular stores. (3) The above-mentioned electric field may repel cations at the cell-electrolyte interface, thus hampering mediation of Ca2+ influx by the EXT channel. Lower panels: the potential drop across the substrate - GO, a), and rGO, b) - and the direction of the electric fields generated by the potential applied to the substrate (Esub). The electric fields generated on the cell walls by the membrane potential (Em), directed inwards into the cell, are also shown. Bottom panel: Schematic of the equivalent electrical circuit as described in the text.

SELECTED SCIENTIFIC RESULTS FROM RESEARCH AREA III. INSTITUTES

EAST-TO-WEST HUMAN DISPERSAL INTO EUROPE 1.4 MILLION YEARS AGO

Institute of Archaeology, Prague, Institute of Nuclear Physics, Institute of Geophysics, Institute of Archaeology, Brno
(Joint research result)

The earliest known human settlement in Europe is located near the town of Korolevo in western Ukraine. Until this discovery, the earliest inhabited site was thought to be a site in Spain. The findings, published in Nature, also show that early humans took advantage of warm interglacial cycles to colonise Europe from south-east to west. The precise dating of the Korolevo samples was made possible by recent advances in mathematical modelling combined with applied nuclear physics.

Bibliographic references:
Garba, R., Usyk, V., Ylä-Mella, L., Kameník, J., Stübner, K., Lachner, J., Rugel, G., Veselovský, F., Gerasimenko, N., Herries, A. I. R., Kučera, J., Knudsen, M. F., Jansen, J. D. East-to-west human dispersal into Europe 1.4 million years ago. Nature. 2024, 627(8005), pp. 805-810, ISSN 0028-0836, E-ISSN 1476-4687

Korolevo, Ukraine
The archaeological site Korolevo I (Gostry verkh) in 2023

The first possible waves of settlement in Europe
A map showing the routes the first humans may have taken to Europe with radiometrically dated sites in Spain, France, Turkey, Georgia and the Middle East, including the Korolevo site in Transcarpathian Ukraine.

CHURCH SLAVONIC AND THE ROMANIAN-SPEAKING LANDS I-III

Institute of Slavonic Studies

This three-volume monograph offers the first concise account of the history of medieval Slavonic culture in the regions of present-day Romania and the Republic of Moldova. Drawing on primary sources and the latest scholarly literature from diverse countries and traditions, it introduces a novel methodology for analysing Church Slavonic texts. The work also examines previously overlooked documents, shedding new light on this understudied cultural heritage.

Bibliographic references:

Knoll, V. Church Slavonic and the Romanian Speaking Lands I: Origins. Prague: Institute of Slavonic Studies 2024. Works of the Institute of Slavonic Studies. New Series, vol. 54/I; ISBN 978-80-86420-77-6.

Knoll, V. Church Slavonic and the Romanian Speaking Lands II: Blossom. Prague: Institute of Slavonic Studies 2024. Works of the Institute of Slavonic Studies. New Series, vol. 54/II; ISBN 978-80-53003-00-1.

Knoll, V. Slavonic and the Romanian Speaking Lands III: Decline. Prague: Institute of Slavonic Studies 2024. Works of the Institute of Slavonic Studies. New Series, vol. 54/III; ISBN 978-80-53003-01-8.

Example of a Church Slavonic manuscript
described in the trilogy Church Slavonic and the Romanian-Speaking Lands: Folio 9a from the 1614-1617 Tetraevangelion commissioned by Anastasie Crimca, Metropolitan of Moldavia (Polish National Library, 12690 IV). The manuscript is one of four similar books compiled in the Romanian-speaking area in the 16th-17th centuries, which contain over 300 miniatures and belong to a group of manuscripts related to a richly illustrated 11th century Byzantine manuscript (BNF Grec 74).

BULLYING, PEER EXCLUSION AND TEACHER ATTITUDES

Institute of Psychology

This research outcome consists of a set of six articles and one contribution upon request from the Ministry of Education, Youth and Sports. Researchers at the Institute of Psychology examined bullying and exclusion among adolescents and ways of addressing these problems. A randomised controlled trial showed promising trends for the KiVa anti-bullying program (1) and enabled validation of a questionnaire to measure bullying (2). The research also clarified the longitudinal effects of exclusion on school motivation (3), mapped links between exclusion and bullying (4), and identified the limits of teachers' attitudes towards bullying targeting students with minority ethnicity (5) and towards inclusive education (6).

Bibliographic references:

(1) Klocek, A., Kollerová, L., Havrdová, E., Kotrbová, M., Netík, J., Pour, M. Effectiveness of the KiVa anti-bullying program in the Czech Republic: A cluster randomized control trial. Evaluation and Program Planning. 2024, 106 (October), 102459. ISSN 0149-7189. E-ISSN 1873-7870.

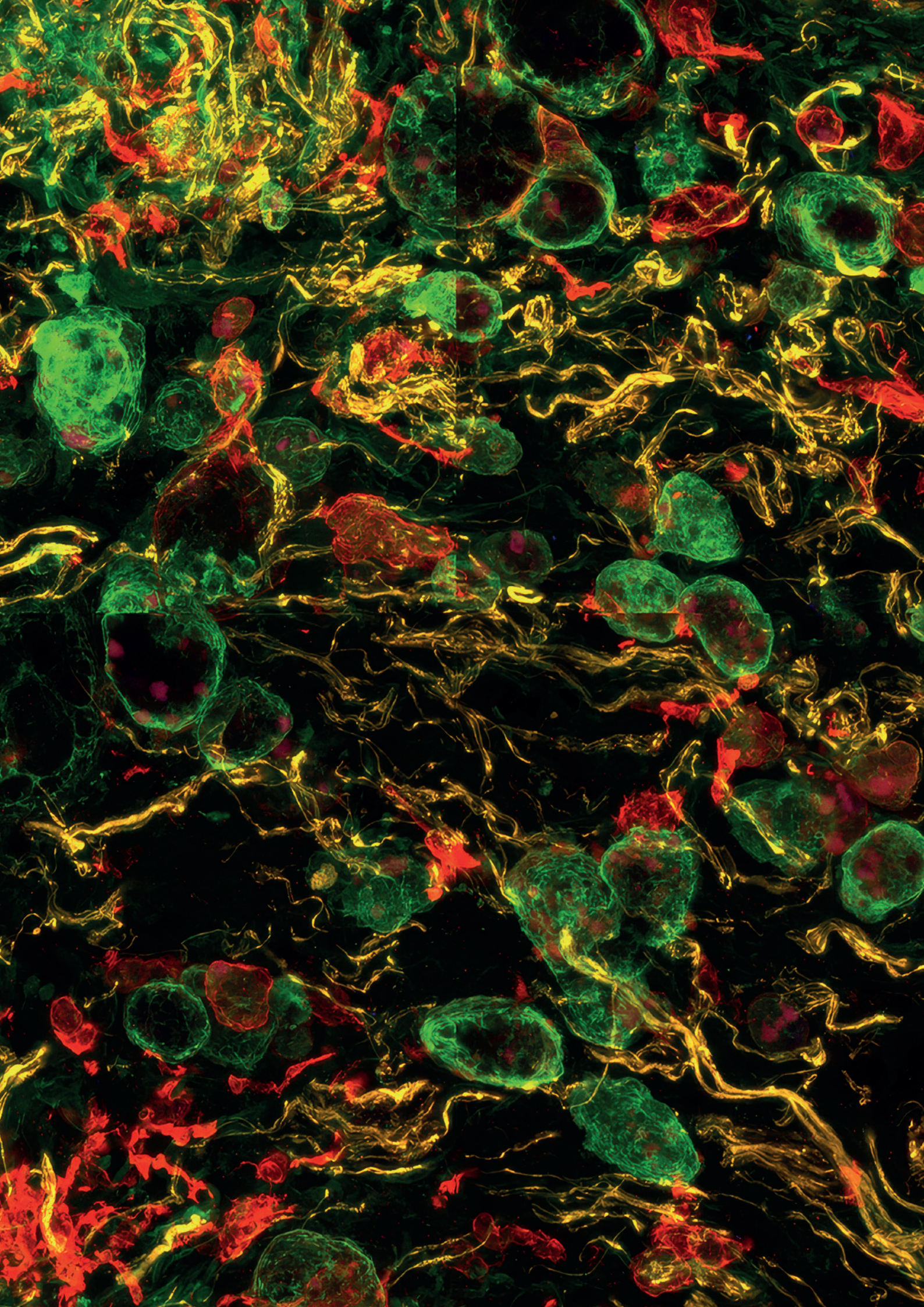
(2) Klocek, A., Kollerová, L., Netík, J., Havrdová, E. Florence Bullying-Victimization Scales: Validation study and victimization associations with well-being and social self-efficacy. Journal of Psychoeducational Assessment. 2024, 42(8), p. 969–987. ISSN 0734-2829. E-ISSN 1557-5144.

(3) Kollerová, L., Sweet, T. M., Lee, J.-J., Bardach, L., Klocek, A., Killen, M. Peer dislike and future school adjustment in early adolescence: Recognizing consequences for both boys and girls. Child and Youth Care Forum. 2024, November. ISSN 1053-1890. E-ISSN 1573-3319.

(4) Vorlíček, R., Kollerová, L. Being disliked and bullied: A case revealing interplay between peer status and bullying. Children and Society. 2024, 38(2), p.419-435. ISSN 0951-0605. E-ISSN 1099-0860.

(5) Kollerová, L., Soukup, P., Strohmeier, D., Caravita, S. C. S., Killen, M. Teacher evaluations of interethnic bullying of an Arab student: The role of perceiving refugees as a threat or benefit. Social Psychology of Education. 2024, 27(6), p. 3329–3352. ISSN 1381-2890. E-ISSN 1573-1928.

(6) Vorlíček, R., Kollerová, L. Non-inclusive teaching of students with special educational needs in a socioeconomically disadvantaged neighbourhood. International Journal of Inclusive Education. 2024, September. ISSN 1360-3116. E-ISSN 1464-5173.



Strategy AV21

Top research in the public interest

Strategy AV21, approved by the CAS Academy Assembly in 2014, is the result of the CAS' ongoing efforts to help address contemporary societal problems. It is aptly characterised by the motto "Top research in the public interest", which was registered as a CAS trademark in 2021. Strategy AV21 research programmes focus on current issues that are crucially important to society. These issues require broad--based, interdisciplinary research and inter-institutional synergy, both between CAS institutes and with other relevant external partners. Strategy AV21 research programmes masterfully employ the wide range of research concentrated within the CAS, which gives them the opportunity to create exceptional connections between findings from the natural, technical and social sciences and the humanities. Strategy AV21 goals are closely aligned with the goals of the National Research and Innovation Strategy for Intelligent Specialisation of the Czech Republic (RIS3).

> In the spirit of the motto "Top research in the public interest", Strategy AV21 seeks to respond to current societal demand through well thought-out collaboration between experts across scientific disciplines.

Strategy AV21 consists of 15 research programmes (RPs). In 2024, three new research programmes were launched: RP31 Space for Humankind, which built on the eponymous programme completed in 2023, RP32 Identities in the World of Wars and Crises and RP33 Fungi - New Threats and Opportunities. Five research programmes were completed, namely RP19 Foods for the Future, RP20 Water for Life, RP21 Landscape Conservation and Restoration, RP22 Society in Motion and Public Policy and RP23 The City as a Laboratory for Change: Construction, Historical Heritage and Place for Safe and Quality Life.

STRATEGY AV21

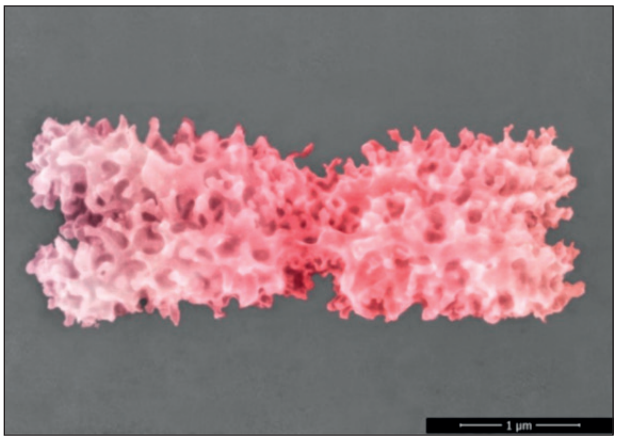
Top research in the public interest

Systematic monitoring of research programme consortia's success in national and international grant calls was initiated in 2024. The first data, compiled in 2023 reports, confirmed a success rate of over 70% for the topics addressed in Strategy AV21 across all provider types.

Strategy AV21 was effectively presented at the CAS Science Fair in Prague-Letňany through Science Point popular science lectures, which conveyed the results of specific research programmes to interested members of the public. In a fun and easy-to-understand way, these lectures presented an array of topics, from light pollution to the risks and potential associated with the development of new drugs using microscopic fungi, and the ethics of military robots. Visitors could also watch the documentaries *Water for Life: Drinking Water*, *Extreme Weather* and *The Search for a Painful Christ*.

The annual Strategy AV21 Conference, subtitled "Top research in the public interest", was held on 14 October 2024. The conference includes presentations on three research programmes (one from each of the research areas) whose research has been completed or is close to completion. In 2024, RP16 Space for Humanity, RP19 Foods for the Future and RP22 Society in Motion and Public Policy were presented, attracting substantial interest from both the professional community and decision-makers. Videos of the presentations were posted on YouTube.

Significant research outcomes from Strategy AV21 include e.g. the world's first imaging of an entire chromosome in its native state by scientists from the Institute of Experimental Botany and Institute of Scientific Instruments working on RP19 Foods for the Future. Using the newly developed A-ESEM (Advanced Environmental Scanning Electron Microscopy) method, the scientists were able to examine unmodified plant cells and also to some extent animal cells.



Scientists captured images of the surface of a chromosome in its native state for the first time.
They showed that instead of a smooth surface, the structure of the chromosome is articulated with protrusions. This discovery has potential implications for fields like medicine and agriculture.

The RP25 Virology and Antiviral Therapy consortium participated in an international tick-borne encephalitis research project that explored why some patients experience the infection without any complications, while in others it leads to severe brain damage or even death. The researchers were able to show that patients with severe cases of tick-borne encephalitis have autoantibodies that neutralise type I interferons, i.e. proteins that form the

body's first line of defence. This discovery has important implications for clinical practice. Testing for interferon autoantibodies could help identify patients at higher risk of severe tick-borne encephalitis.

The Invasion workshop, co-organised by the Institute of Botany and Institute of Contemporary History on 6 December 2024 with the support of RP32 Identities in the World of Wars and Crises, was an illustrative example of interdisciplinary collaboration. By exploring "invasion" in social, historical and ecological contexts, the workshop provided unique perspectives on this phenomenon.

A new species of pathogenic fungus was discovered under the bark of walnut trees near Brno. The fungus is spread by alien bark beetles that have been found on walnut trees in Europe for the past 15 years. Scientists have confirmed that this fungus can severely weaken and damage the trees. The results of the study supported by RP33 Fungi - New Threats and Opportunities will be used by institutions involved in plant protection and pest monitoring.

The Institute of Soil Biology and Biogeochemistry of the Biology Centre, in collaboration with other institutes, has studied spontaneous processes that can be applied in revitalisation of post-mining sites for many years. With the support of RP21 Landscape Conservation and Restoration, researchers conducted an extensive investigation of natural reclamation, i.e. succession, of spoil heaps from open cast mines. The research showed that in the vast majority of cases, areas left to spontaneous succession are important islands of biodiversity containing many rare or endangered species, including species not commonly found in the surrounding landscape.

The scarce swallowtail: an example of an endangered species that finds refuge on spoil heaps

These findings can contribute to the implementation of international and national environmental protection policies.

Researchers in RP24 Resilient Society forged fruitful collaborative ties with the public sector. With the support of this research programme, the Institute of Sociology and the Ministry of Justice of the Czech Republic co-organised an expert workshop on Strengthening Social Resilience against Corruption in order to develop and update the Anti-Corruption Action Plan for 2025-2026.

With the support of RP20 Water for Life, scientists from the Institute of Hydrodynamics, in collaboration with the Institute of State and Law, examined the quality of legislation governing water resource protection zones. The purpose of protection zones for groundwater and surface water sources of drinking water is to safeguard water

Cover of the publication

Water Resource Protection Zones: Drought, Law and Practice

source areas. The collaboration between the two institutes resulted in a Strategy AV21 brochure – "Water Resource Protection Zones: Drought, Law and Practice" - which presents an assessment of the qualities and shortcomings of legislation on water resource protection zones to the public.

The Strategy AV21 motto "Top research in the public interest" was also embodied in an outcome from RP22 Society in Motion and Public Policy. Economics Institute researchers carried out a detailed cost-benefit analysis of

public financing of pre-school capacities. They showed that securing sufficient places in pre-schools is an investment that can positively affect public budgets and also help parents reconcile parental and working life, increase fertility rates and enhance families' financial stability. The expert study detailing the results attracted considerable attention from the public, public sector and the media.

In 2024, the Institute of Geonics was granted a patent for a compressed air energy storage system. Unlike existing methods, this new approach to storing and releasing energy does not rely on heating air with fossil fuels, making it completely environmentally friendly. Compressed air energy storage enables efficient use of alternative sources of electricity, such as photovoltaic panels and wind turbines, whose operation depends on the weather and time of day. Researchers in RP30 Dynamic Planet Earth developed a model of the system to test how closely the system's behaviour aligns with the mathematical model in the patent application.

Compressed air energy storage system model
The research results attracted the interest of industrial partners and led to a collaborative proposal submission to the Czech Technology Agency.

Through RP29 Gene and Precision Therapy: a New Hope in the Treatment of Human Diseases, the Czech Centre for Phenogenomics of the Institute of Molecular Genetics launched the Rare Disease Factory (RD-Factory) research programme, which engages the public in scientific research in an intriguing way. The programme invites members of the scientific community and the lay public to help contribute to developing mouse models for research into specific rare diseases.

Under RP23 City as a Laboratory of Change: Construction, Historical Heritage and Place for Safe and Quality Life, a mobile application called Prague Castle Archaeology was launched, which guides visitors through inaccessible parts of Prague Castle. The application was developed through a multi-year collaboration between the Institute of Archaeology, Prague, and the Office of the President of the Republic.

Researchers at the Institute of Plasma Physics created a series of popular science videos about nuclear fusion through RP27 Sustainable Energy. The first video focused on matter, antimatter and the mysteries that drive the Sun. It was published on YouTube in late 2024 and has recorded several thousand views.

With support from RP31 Space for Humanity, LASARsat, a mission by Czech high school students from the LASAR Crew team, launched a satellite in late 2024 to test the potential of laser technology to address one of the biggest challenges in space exploration today - space debris. The project, carried out with significant professional and technological support from Czech scientific institutions, in particular the HiLASE Centre of the Institute of Physics and the Astronomical Institute, is an outstanding illustration of linkages between young people and cutting-edge Czech science.

The exhibition "Queens, Noblewomen and Burgher Women: The Cultural Life of Medieval Women" was a collaborative effort by the Institute of Art History and Institute of Czech Literature in RP28 Anatomy of European Society, History, Tradition, Culture, Identity. The exhibition presented medieval women as influential figures in art, politics and power and featured rich imagery, supplemented by written descriptions informed by current research. The academic community as well as members of the lay public of all ages showed great interest in the exhibition. Visitors could also listen to period music, performed according to medieval scores, which added a novel interdisciplinary dimension to the exhibition.

In RP26 Breakthrough Technologies for the Future, researchers from the Institute of Information Theory and Automation created the lecture Words as a Tool: How AI Enters Our Lives. The scientists developed the lecture as a way of informing the public about the potential of artificial intelligence and how it can impact our daily lives and society as a whole. The lecture has already been presented to representatives of the private sector as well as high schools and universities.

Another important output of Strategy AV21 are expert opinions for legislative bodies, known as AVexes. Three were released in 2024: "New Paths from Renewable Energy Sources to Fossil-Free Fuels", "Archaeological Heritage in the 21st Century. The Need for New Legislative Protection", and "Non-university Research: An Integral Part of World-Class Science". Six expert brochures were published by Academia Publishing House in the Strategy AV21 series: "Patients' Rights Guide", "From Ecosystem Functions to Nature's Benefits to Human Society", "Water Resource Protection Zones: Drought, Law and Practice" (detailed above), "The Czech Academy of Sciences and Steps Towards Digitising the Czech Business Sector", "European Space Missions Involving Czechs" and "The Oldest Iris Varieties".

Czech Academy of Sciences

STRATEGY AV21

List of Strategy AV21 research programmes

AND COORDINATORS

RP19
Foods for the Future
Prof. Ing. Jaroslav Doležel, DrSc.
Institute of Experimental Botany
01/01/2020 – 31/12/2024

RP20
Water for Life
Assoc. Prof. RNDr. Martin Pivokonský, Ph.D.
Institute of Hydrodynamics
01/01/2020 – 31/12/2024

RP21
Landscape Conservation and Restoration
Prof. Mgr. Ing. Jan Frouz, CSc.
Biology Centre
01/01/2020 – 31/12/2024

RP22
Society in Motion
Assoc. Prof. Ing. Daniel Münich, Ph.D.
Economics Institute
01/01/2020 – 31/12/2024

RP23
The City as a Laboratory of Change: Construction, Historical Heritage and Places for Safe and Quality Life
PhDr. Adéla Gjuričová, Ph.D.
Institute of Contemporary History
01/ 01/ 2020 – 31/ 12/ 2024

RP24
Resilient Society for the 21st Century. The Potential of Crisis and Effective Transformation
Assoc. Prof. Mgr. Martin Nitsche, Ph.D.
Institute of Philosophy
09/02/2021 – 31/12/2025

RP25
Virology and Antiviral Therapy
Assoc. Prof. RNDr. Daniel Růžek, Ph.D.
Biology Centre
09/02/2021 – 31/12/2025

RP26
Breakthrough Technologies for the Future – Sensing, Digitalisation, Artificial Intelligence and Quantum Technologies
Prof. Ing. Josef Lazar, Dr.
Institute of Scientific Instruments and Institute of Physics
01/01/2022 – 31/12/2026

RP27
Sustainable Energy
Assoc. Prof. Miroslav Chomát, CSc.
Institute of Thermomechanics and Institute of Plasma Physics
01/01/2022 – 31/12/2026

RP28
Anatomy of European Society, History, Tradition, Culture, Identity
Mgr. Jana Maříková Kubková, Ph.D.
Institute of Archaeology, Prague
01/01/2022 – 31/12/2026

RP29
Towards Precision Medicine and Gene Therapy - A New Hope in the Treatment of Human Diseases
Assoc. Prof. Dr. Radislav Sedláček, Ph.D.
Institute of Molecular Genetics
01/01/2022 – 31/12/2026

RP30
Dynamic Planet Earth
RNDr. Aleš Špičák, CSc.
Institute of Geophysics
01/01/2023 – 31/12/2027

RP31
Space for Mankind
RNDr. Jiří Svoboda, Ph.D.
Astronomical Institute
01/01/2024 – 31/12/2028

RP32
Identities in the World of Wars and Crises
PhDr. Martin Klečacký, Ph.D.
Masaryk Institute and Archives
01/01/2024 – 31/12/2028

RP33
Fungi - New Threats and Opportunities
Mgr. Miroslav Kolařík, Ph.D.
Institute of Microbiology
01/01/2024 – 31/12/2028

Strategy AV21 Supporting Activities
Ing. Tomáš Wencel, MBA
Centre of Administration and Operations of the CAS
01/01/2024 – 31/12/2024

Projects from Operational Programmes

of EU Structural Funds

In 2024, CAS institutes took part in projects under operational programmes co-financed by the European Structural and Investment Funds within the 2021-2027 programming period, where grant programmes are divided into national operational programmes, cross-border cooperation programmes and supranational and interregional cooperation programmes. Over the year, CAS institutes also continued to work on projects supported by the Jan Amos Komenský Operational Programme (OP JAK) managed by the Ministry of Education, Youth and Sports and the Operational Programme Technology and Application for Competitiveness (OP TAC) managed by the Ministry of Industry and Trade. CAS institutes also submitted applications to newly announced operational programme calls during 2024. Implementation of newly supported projects will start in upcoming years.

In 2024, CAS institutes were involved in 75 projects falling under EU Structural Funds operational programmes.

> Operational programmes are a very effective tool for supporting high-quality research at CAS institutes that is focused on enhancing the Czech Republic's competitive edge.

In 2024, CAS institutes were involved in 75 projects falling under EU Structural Funds operational programmes. CAS institutes served as coordinators or beneficiaries of 55 projects in 2024, of which 40 were launched, 14 were ongoing and one was completed during the year. Table 1 provides an overview of CAS institutes' participation in projects during the 2021-2027 programming period, categorised by operational programme. Table 2 shows more detailed information about the 2021-2027 programming period projects launched in 2024, which have a total approved funding allocation of CZK 6,945,435,000.

Table 1: Participation of CAS institutes in operational programme projects in 2024

OPERATIONAL PROGRAMME	Projects launched	Projects ongoing	Projects completed	TOTAL
OP Jan Amos Komenský	39	13	1	53
OP Technologies and Application for Competitiveness	1	1	0	2
TOTAL	**40**	**14**	**1**	**55**

Table 2: Operational programme projects launched in 2024

Beneficiary coordinator	PROJECT	Total approved project support in thousands of CZK
OP Jan Amos Komenský		
Institute of Archaeology	Archaeological Information System of the Czech Republic - Upgrade and extension of hardware capacities	**8,732**
Biology Centre	BudDiag - New bioanalytical tools for comprehensive metabolic analysis and personalized clinical diagnostics	**27,170**
Institute of Botany	Understanding cold acclimation as a key process affecting species survival in a changing climate	**4,822**
Institute of Physics	The future of Czech participation in the Pierre Auger Observatory III	**23,291**
Institute of Physics	European support for Czech participation in the construction of the CTA Observatory III	**12,688**
Institute of Physics	Innovative laser and scintillation materials for modern applications	**82,040**
Institute of Physics	CERN-CZ VI Investments	**32,205**
Institute of Physics	MSCA Fellowships CZ Institute of Physics III	**56,395**
Institute of Physics	Sensors and detectors for future information society	**499,689**
Institute of Physics	Teraferroics for ultra-high capacity, speed and energy efficiency of information technology	**450,652**
Institute of Physics	Research into the basic building blocks of matter using cutting-edge technologies	**474,945**

Institute of Microbiology	Talking with microbes - understanding microbial interactions within the One Health framework	**414,698**
Institute of Microbiology	MSCA Fellowship CZ No. 3	**19,584**
Institute of Microbiology	PHOTOMACHINES - Reorganisation of photosynthetic cells for high production of therapeutic peptides	**373,026**
Institute of Czech Literature	Upgrade of Czech Literary Bibliography research infrastructure	**575**
Institute of Photonics and Electronics	Breakthrough laser technologies for smart manufacturing, space and bio-tech applications	**438,867**
J. Heyrovský Institute of Physical Chemistry	Biophysical properties of lipid droplets and their implications in Gaucher disease and Parkinson's disease	**3,709**
J. Heyrovský Institute of Physical Chemistry	Advanced multiscale materials for key enabling technologies	**456,068**
J. Heyrovský Institute of Physical Chemistry	Upgrade and modernisation of VVI nanomaterials and nanotechnologies for environmental protection and a sustainable future	**101,042**
Institute of Plasma Physics	COMPASS-RI 3	**385,064**
Institute of Plasma Physics	PALS-RI 3	**47,500**
Institute of Chemical Process Fundamentals	ACTRIS-CZ RI 3	**53,753**
Institute of Chemical Process Fundamentals	Life cycle of new energy sources	**78,547**
Institute of Computer Science	Brain dynamics	**229,333**
Institute of Computer Science	Does white matter matter?	**3,709**
Institute of Nuclear Physics	Laboratory for Antiproton and Ion Research - Participation of the Czech Republic - OP III	**32,102**
Institute of Molecular Genetics	Modernisation of the National Infrastructure of Chemical Biology 2024	**178,843**
Institute of Molecular Genetics	Modernisation of VVI Czech-BioImaging	**468,815**
Institute of Molecular Genetics	System wide Omics analysis of retinoic acid signalling in vertebrate development	**6,191**
Institute of Molecular Genetics	Upgrade of Large Research Infrastructure CCP III	**169,574**
Institute of Organic Chemistry and Biochemistry	ELIXIR CZ: Capacity extension	**89,505**
Institute of Organic Chemistry and Biochemistry	Institute of Organic Chemistry and Biochemistry MSCA PF Mobility II	**9,744**
Institute of Organic Chemistry and Biochemistry	Institute of Organic Chemistry and Biochemistry MSCA PF Mobility III	**3,356**
Institute of Organic Chemistry and Biochemistry	RNA for therapy	**474,659**
Institute of Scientific Instruments	Quantum engineering and nanotechnology	**470,450**
Institute of Thermomechanics	Ferroic multifunctionalities	**470,186**
Institute of Thermomechanics	Metamaterials for extremely thermally stressed machine components (METEX)	**94,025**
Oriental Institute	Nomadic spirituality: fluid Buddhist identities in East Asian borderlands	**4,229**
Global Change Research Institute	CzeCOS-Boost: Modernisation and boosting of large research infrastructure CzeCOS	**55,796**

OP Technologies and Application for Competitiveness		
Institute of Plasma Physics	TOPTEC Innovation Centre for Optical Systems and Measurement	**139,856**

Practical Application of Research

In 2024, a wide range of activities related to practical application of research from CAS institutes was carried out. The CAS Technology Transfer Office played a key role in providing targeted support to research teams and in creating a transfer-friendly environment. CAS institute directors also dedicated considerable efforts to application of research results, many by expanding institutes' activities and utilising the CAS' new transfer initiatives.

The most popular initiative in 2024 was the Programme for Application Development and Commercialisation (PADC), which provides funding to help institutes and researchers accelerate application of their inventions. By the end of 2024, over 70 projects had applied for the programme and the best 33 were awarded support. Another set of projects was selected to receive support in the first half of 2025.

> The Programme for Application Development and Commercialisation (PADC) helps grow the portfolio of exciting, practically applicable technologies emerging from CAS institutes, and visibly increases scientists' drive to transfer research results to practice.

Supporting institutes in preparing research results for practical application

The CAS Technology Transfer Office supports application of scientific research results that bring about economic and social changes in Czech society. These primarily include the introduction of new technologies and services, efficient use of natural resources, creation of new jobs, legislative support, development of relevant public policies and other direct and indirect development of the social and cultural environment.

The CAS has created a comprehensive system of knowledge and technology transfer support that it continues to develop over the long-term. These support mechanisms maintain a high level of quality. In 2024, the main focus, in line with the Strategy for Knowledge and Technology Transfer in the CAS Environment, was supporting institutes in preparing research results for practical application. Another key focal area is developing and arranging funding sources for technology development and knowledge transfer in close cooperation with application partners.

The CAS knowledge and technology transfer support system is grounded in the professional technology transfer office, which ensures unified coordination and management and carries out clearly defined tasks to support transfer in institutes and research teams. The priority focus areas of the Strategy for Knowledge and Technology Transfer in the CAS Environment include early identification and assessment of intellectual property and application potential and development of related knowledge and technologies for practical application.

To support knowledge and technology transfer (KTT) and coordination at the CAS, the Academy has established two advisory bodies: the Council for the Cooperation of the CAS with the Business and Application Sphere and the Council for Use of Intellectual Property of the CAS. Both bodies and their members actively engage in addressing current issues related to development of KTT within the CAS' scope of activity.

The internal Programme for Development of Application and Commercialisation (PADC), which supports commercialisation of research results, is also a steadfast part of the KTT system. The programme is primarily aimed at directly supporting research teams that aspire to concentrate on transfer of research results.

In 2024, there were major advances in the systematic application of results from CAS social science and humanities institutes, with the CAS Academy Council's development of a concept for the use of knowledge from social science and humanities institutes that contains clear objectives and implementation and development measures. This strategic initiative will further expand collaboration between CAS institutes and decision-makers in the Czech Republic and highlight concrete benefits of such collaboration.

Practical aspects of transfer

The range of KTT activities implemented by the Technology Transfer Centre (TTO) at CAS institutes continues to expand. During 2024, the staffing capacity and expertise of relevant expert teams increased significantly. The number of transfer projects supported directly by the TTO grew significantly in a wide array of institutes spanning all three CAS research areas.

The trend of development and application of research results through business activities has continued. This is seen in the rising number of new spin-offs established by CAS institutes in conjunction with the given inventors and private investors. Several new spin-off companies were approved and established in 2024. The quality of these spin-offs is demonstrated by their success in securing sizable funding for further development from private sources and from competitive public support programmes such as the CzechInvest Technology Incubator.

The PADC described above is yet another successful strategy to support the application of CAS institutes' research results. By the end of 2024, i.e. in the programme's first 18 months, more than 70 unique

results from CAS institutes with considerable application potential had been assessed in the PADC. The PADC awarded a total of CZK 14 million to 33 selected projects. In November 2024, a PADC Innovation Forum was held to present supported projects that have already achieved concrete results thanks to the PADC.

CAS staff members are actively involved in cultivating the environment for the application of research results in the Czech Republic. CAS Academy Council Vice-President Ilona Müllerová, as a member of the Research, Development and Innovation Council until November 2024, led many initiatives to improve the quality of transfer procedures in the Czech Republic. A Transfer working group continues to operate at the R&D&I Council, which focuses on the technical aspects of facilitating KTT in the Czech Republic.

In 2024, the Czech Academy of Sciences forged new collaborative ties with entities in the financial and investment sector. The CAS signed a Memorandum of Cooperation with the new Tensor Ventures investment fund, which is a joint venture between the Ministry of Industry and Trade of the Czech Republic and the European Investment Fund.

Development of competences and deepening expertise

The CAS Technology Transfer Office has a long history of carrying out comprehensive educational activities for CAS institutes. TT Boost, a time-tested programme for transfer specialists, was innovated to highlight practical skills. In 2024, a number of educational and awareness-raising events were held on topical issues such as trends in use of artificial intelligence, how investors assess technology potential, and current transfer programmes and challenges.

The TTO's intensive half-day courses on transfer issues, organised for specific CAS institutes and attended by a wide range of staff (including management, scientists, technical and administrative staff), were sought after and constructive.

Outlook for the upcoming period

The key priorities are continued support and implementation of KTT at CAS institutes and provision of funding for the preparation of research results for practical application. In 2025, the PADC budget will be increased. There is a need to actively identify and develop new funding sources and to focus on increasing the technological readiness of results based on proof-of-concept projects.

Substantial advances in the establishment of spin-off companies are anticipated. New organisational formats will need to be developed to support targeted establishment of spin-offs and financing of the spin-off start-up phase. The experience of established European academic organisations can be useful in this process.

Selected examples of research results for practical application

Institute of Physics

The Institute of Physics signed a number of licensing agreements for the new version of the JANA2020 crystallographic computing system. Licensing partners include e.g. US-based Boehringer Ingelheim Pharmaceuticals and branches of Rigaku in Poland, Japan, Germany and the USA.

Institute of Geophysics

The Institute of Geophysics, in conjunction with other organisations (the Institute of Rock Structure and Mechanics, Institute of Geonics, Charles University Prague and the Institute of Earth Physics of Masaryk University Brno), joined the Czech Regional Seismic Network for monitoring of seismic activity through the CzechGeo/EPOS infrastructure project. This monitoring network is further integrated into a fully automated real-time exchange of broadband seismic data with the European ORFEUS Data Center, the global IRIS Data Management Center in Seattle, USA, and a number of national data centres across Europe.

Institute of Geology

The Institute of Geology works with the Bohemian Switzerland National Park Administration on long-term monitoring of atmospheric precipitation in the national park. The monitoring includes e.g. assessment of concentrations of ecologically and ecotoxically significant substances in precipitation, atmospheric deposition and substance flows in open areas and forested areas of the national park.

Institute of Photonics and Electronics

The Institute of Photonics and Electronics developed a thermo-optic spatial light modulator, patented in Japan under JP-7469465-B2. It was licensed under a 2022 patent application.

Institute of Atmospheric Physics

The Institute of Atmospheric Physics, in cooperation with partners ESC Aerospace s.r.o. and the National Central University, Taiwan, and with funding from the

Czech Technology Agency through the programme GNSS Accuracy in Dependence on Ionospheric Dynamics and Presence of Disturbances, developed algorithms and a program for calculation of TEC and navigation signal delay using an IRI model. In addition, a final report was produced that summarises experimental data verifying the impact on GNSS accuracy when medium scale traveling ionospheric disturbances (MSTIDs) are present in the ionosphere. The data indicate the suitability of implementing various ionospheric disturbance indicators in GNSS receivers. The joint research project also resulted in the technical report "Evaluation of Factors Influencing GNSS Positioning Accuracy", which describes a new approach to estimating the effect of medium-scale ionospheric variability on autonomous positioning by GNSS receivers (GPS, Galileo, etc.), mainly due to medium-scale traveling ionospheric disturbances (MSTIDs).

Institute of Physics of Materials

The Institute of Physics of Materials, in cooperation with partner UJP Praha a.s. and with funding from the Czech Technology Agency, presented the effect of hydrogen on creep resistance of zirconium nuclear fuel claddings. The effect of hydrogen on creep behaviour of modified Zr1%Nb alloy under simulated operating conditions in a VVER light water-cooled nuclear reactor was described.

Institute of Computer Science

Nuclear Physics Institute, in collaboration with partner organisations, the Faculty of Education of Charles University and CERMAT as application partners and funding from the Czech Technology Agency, developed a collection of procedures and tools for improving the development of educational tests using psychometric models.

Nuclear Physics Institute

The Institute of Nuclear Physics concluded a contractual research agreement with ADVACAM s.r.o. The research, carried out in collaboration with other organisations supported by the European Space Agency, concerns the testing and calibration of cosmic ray detectors used in satellites and facilities in LEO and GEO orbits.

Institute of Hydrodynamics

The Institute of Hydrodynamics has contractual engagements on environmental monitoring and water management with public administration authorities, namely the Czech Hydrological Institute, KRNAP Administration and the Šumava National Park and Protected Landscape Area Administration. The contractual collaboration concerns the operation of a common monitoring network and data sharing.

Institute of Scientific Instruments

The Institute of Scientific Instruments concluded a contractual research agreement with IQS nano s.r.o. on development of physical graphic and optical structures, based on diffractive optics, by means of electron lithography in silicon or glass plate recording material.

The Institute also conducts contractual research with the Faculty of Medicine of Masaryk University in the application and use of diffusion and spectroscopic magnetic resonance imaging for observation of neurodegenerative changes in the animal phenotype of Parkinson's disease induced by intranasal administration of rotenone in laboratory mice.

The Institute is also engaged in contractual research with Raith GmbH on measuring systems for lithographers. This project involves the design and implementation of an optical Head for the 637 nm wavelength, which has an input adapted to the FC/PC fibre connector.

Institute of Rock Structure and Mechanics

The Institute of Rock Structure and Mechanics is carrying out contractual research with ČEZ, a.s. related to monitoring of seismic activity at the Tušimice power plant. The monitoring results were summarised in a report for the contracting entity.

Institute of Theoretical and Applied Mechanics

The Institute of Theoretical and Applied Mechanics, in cooperation with the Office of the President of the Czech Republic as a partner organisation and with funding from the Czech Technology Agency, prepared a diagnostic report on the state of the archaeological sites at Prague Castle including proposed sustainability measures. The project objectives were to identify problematic areas; set up optimal monitoring practices; propose a custom solution for each site as well as general rules for long-term monitoring of the areas and proposals for minor interventions.

Institute of Information Theory and Automation

The Institute of Information Theory and Automation, in collaboration with Schlenk metallic pigments GmbH, carries out metallic pigment measurements.

Institute of Thermomechanics

The Institute of Thermomechanics was granted US patent no. 121,151,275 B2. The patent describes a method and device for strengthening the surfaces of metal work pieces through the impact of small projectiles. The invention is industrially applicable e.g. in the aerospace industry for the manufacture of mechanically highly stressed components.

Institute of Biophysics

Through its Soil Microbiome Analysis contractual research project, the Institute of Biophysics developed a metagenomic analysis approach that makes it possible to accurately characterise the species composition of the complete microbiome in soil samples. The results of the analysis can serve as the basis for soil quality improvements. The analysis was applied to 72 samples from nine sites.

Biology Centre

The Biology Centre developed a bioinsecticide based on the fungus *Beauveria bassiana* that can suppress pests in the soil, in potatoes as well as in other crops such as fruit, vegetables and ornamental plants. The functional sample, created through a project funded by the Ministry of Agriculture, was implemented in collaboration with the Potato Research Institute Havlíčkův Brod, s.r.o., Crop Research Institute, and the Advisory Association.

In a project funded by the Czech Technology Agency and carried out with application partners, the Biology Centre developed a method of preserving strawberry and raspberry viruses in their host plants using cryopreservation. This technology can be practically applied to preserve infected samples for research, diagnostic purposes and breeding programmes aimed at developing healthy and resistant crops in changing climatic conditions.

In another Biology Centre project funded by the Czech Technology Agency and carried out in collaboration with MycoTech s.r.o., a strain of the fungus *Beauveria pseudobassiana* CCM 9191 was discovered. This strain has the ability to attack and kill spruce and northern sycamore leaf beetles. The fungus was isolated directly from infected leafhoppers and can now be applied as a forest-protection bioinsecticide via a solution containing spores in an aqueous suspension. The research result was patented.

Institute of Biotechnology

The Institute of Biotechnology developed plasmid vectors carrying genes encoding the phage endolysins PetLys, DMULys and YMCLys that lyse the bacteria *Acinetobacter barmanii* and used them to prepare proteins through molecular cloning. These recombinant endolysins lyse planktonic cells of Gram-negative pathogens (*Acinetobacter baumannii*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa)*. Recombinant phage endolysins are being used in the preparation of an antibacterial product developed by DYNTEC spol. s r.o. as an alternative to antibiotics that will be used for targeted eradication of biofilm-associated multidrug-resistant bacterial pathogens. The result was produced in a project funded by the Czech Technology Agency in collaboration with Dyntec spol. s r.o. and Fagofarma s.r.o.

Institute of Botany

The Institute of Botany developed a proprietary preparation to mitigate the effects of Covid-19. The preparation is in an aqueous or aqueous-alcoholic extract of root biomass from a species of sedge *(Carex lepidocarpa)* that contains about 3% of a mixture of trans-ε-viniferin and miyabenol C, which is about 30 times higher than the published concentration data for vine shoots. This mixture contains two important substances that act against SARS-CoV-2 and inhibit cathepsin L. Another advantage is the possibility of growing the sedge year-round in hydroponics, another way of obtaining root biomass to produce the preparation. The extract can be used to develop applications such as nasal sprays, mouthwashes or gargles.

Institute of Microbiology

The Institute of Microbiology developed a method to optimise the translational phase of proteosynthesis using altered tRNAs. The invention relates generally to a novel method of using altered tRNAs with a 4bp long anticodon strain to optimise the elongation phase of proteosynthesis during stop codon reading. An international patent application was filed under PCT/CZ2024/050003.

Institute of Analytical Chemistry

The Institute of Analytical Chemistry and a consortium of partner organisations, i.e. Sintef Digital, Sintef Industry (Norway) and Watrex Praha, s.r.o., in a project supported by the Czech Technology Agency, designed and produced a functional sample and a proven electrospray interface technology that allows separation techniques (liquid chromatography, capillary electrophoresis) to be combined with mass spectrometric detection. Both results were validated by bioanalyses of the three main groups of analytes and will be used in further development aiming for a commercially viable product.

The Institute of Analytical Chemistry, in collaboration with its partner organisation Elphogene, s.r.o., and with funding from the Czech Technology Agency, designed and manufactured a functional sample of a device for separation of tumour and non-tumour components of free circulating DNA fragments. The device enables the simultaneous preparation of up to eight samples based on gel electrophoresis and electrodialysis extraction. The reusable body of the 3D-printed device is made from HD PLA, and a membrane with the required cut-off value is woven into it. The applicability of the research result was verified in preparative separation of short DNA fragments from blood plasma and serum and in preparative separations of fragments varying in size from 300 and 50 bp.

Institute of Inorganic Chemistry

The Institute of Inorganic Chemistry, in collaboration with project partners Research Centre Řež, ÚJV Řež, a.s., and the Faculty of Science of Charles University, and with funding from the Czech Technology Agency, developed a functional sample of low-alkaline concrete construction material for nuclear power plants. The technical report documents its potential use in nuclear power plants, which is supported by experiments and calculations. The material has been offered to the State Office for Nuclear Safety for nuclear repositories.

Institute of Chemical Process Fundamentals

The Institute of Chemical Processes Fundamentals, in collaboration with partner organisations Termizo a.s. and Dekonta, a.s., in a project funded by the Czech Technology

Agency, developed equipment to extract salts and metals from process water flue gas scrubbers of waste-recovery power plants. This modern equipment very efficiently converts heat contained in otherwise unusable municipal waste into electrical and thermal energy that can be supplied to the public grid.

The Institute of Chemical Processes Fundamentals also published a research report, "Basic Characteristics of Sulphide Catalysts for Direct Decomposition of H2S", enabling synthesis of hydrogen from secondary feedstock, in cooperation with partner organisations ORLEN Unipetrol a.s. and ORLEN UniCRE a.s. and with funding from the Czech Technology Agency.

Institute of Experimental Botany

The Institute of Experimental Botany was granted a Certificate of Plant Breeding Right for the variety UEB 6481 in Switzerland. The right was registered under number CH 24.3164. This certificate allows access to the intellectual property protection of this research result through a licence agreement for the propagation and sale of UEB 6481 apple trees in the European Union. The Institute of Experimental Botany will retain ownership of the variety and will make financial gains from provision of the licensed rights.

Institute of Experimental Medicine

The Institute of Experimental Medicine developed new N-methyl-D-aspartate (NMDA) receptor antagonist compounds and a method for preparation of these compounds and identified their therapeutic uses. They are used in the preparation of drugs for the treatment of dementia and neurodegenerative diseases, as well as other NMDA receptor dysfunction diseases. The research result is patented in the Czech Republic.

Institute of Macromolecular Chemistry

The Institute of Macromolecular Chemistry developed a proven technology for membrane separation of flue gases by using separated CO_2 in waste material pyrolysis processes. The verified technology was developed in partnership with MemBrain s.r.o., MEGA a.s., the Institute of Chemical Process Fundamentals and the Institute of Plasma Physics in a project supported by the Czech Technology Agency.

Institute of Molecular Genetics

The Institute of Molecular Genetics was granted a unitary patent on carborane compounds and on the method of their use. The work was supported by the Ministry of Education, Sports and Youth and the Ohio State Innovation Foundation under the National Research Infrastructure Program.

Institute of Animal Physiology and Genetics

With funding from the PADC, the Institute of Animal Physiology and Genetics is establishing a spin-off company to produce, characterise, preserve and distribute embryos from important equine breeds worldwide. The company will utilise the potential of the growing market for assisted equine reproduction methods.

Institute of Archaeology, Brno

From January to August 2024, field surveys were carried out in the vicinity of the Dukovany nuclear power plant, specifically on sites slated for construction of the planned nuclear power plant in coming years. The investors were ČEZ and EDU II. More than 220 hectares with varying landscape character were surveyed. Four types of prospecting were conducted: surface collection and detector surveys, geophysical prospecting, microprobe surveys and drone remote sensing.

Institute of Ethnology

The Institute's staff served on the following expert advisory bodies: the Czech Commission for UNESCO, National Council for Traditional Folk Culture, Interministerial Working Group for the Prevention and Solution of Homelessness, etc. The Institute also produced a report for the European Food Safety Authority (EFSA) that formed the basis for binding recommendations for the European Union on combatting African swine fever.

Institute of Philosophy

On 4 November 2024, the conference "Disinformation and Hate Speech in the Online World: Challenges of the Current Information Environment" was held in the Hrzánský Palace. The conference was co-organised by the Institute of Philosophy and the Office of the Government of the Czech Republic. The Institute also trained approximately 6,000 people in administrative ethics for the Ministry of the Interior of the Czech Republic's civil service.

Masaryk Institute and Archives

The Institute provided ongoing professional consultations during the transformation of the file service of the Health Insurance Fund of the Ministry of the Interior of the Czech Republic, in accordance with current legislation and in preparation for the deployment of a new electronic file service system. The Institute also conducted an analysis of minor issues identified in the process of modifying the filing service and bringing it into line with current legislation.

Economics Institute

The Institute's researchers lent their expertise to a number of expert bodies, such as the Government Council for Gender Equality and the Digital Team of the Czech Republic.

Oriental Institute

The Institute's researchers provided various trainings for the state administration, e.g. sessions on "Islam and

current events in the Middle East" as part of the Czech Republic's participation in the Multinational Observers project in the Sinai Peninsula, and on the socio-political level of China's influencer efforts in the Czech Republic for the Ministry of the Interior.

Institute of Psychology

The Institute developed software for advanced diagnosis of graphomotor difficulties and shared its expertise with a number of bodies, such as the Minister of the Interior's working group for the support of the population's mental health during emergencies and the working group for updating the methodological recommendations for the diagnosis of mild intellectual disability.

Institute of Sociology

The Institute contributed to many expert reports for various Czech and European organisations, e.g. an expert report for the European Fundamental Rights Agency (FRA) under the contract "Data collection and Research Services On Fundamental Human Rights Issues". The Institute's experts also participated in various working groups (e.g. at the Ministry of the Interior on the Methodology for Controlling Equal Remuneration for Women and Men, at NERV on household economics, and at the Ministry of Industry and Trade on the issue of radioactive waste storage sites at the Ministry of Industry and Trade).

Institute of Art History

The Institute assisted in determining the value of works of art for the West Bohemian Gallery in Pilsen and the Prague City Museum, and its experts participated in the work of the Ministry of Culture of the Czech Republic's Commission for Declaring Objects of Cultural Value as Cultural Monuments, Guarantee Council for the National Gallery in Prague, Commission for Classical Music of the Ministry of Culture of the Czech Republic, etc.

Czech Language Institute

The Institute's staff provided linguistic expertise for various purposes such as assessing the language level of selected programmes for Czech Television. This included assessment of phonetic, grammatical, syntactic and textual levels, taking into account the specific genre or type of analysed programme.

Institute of State and Law

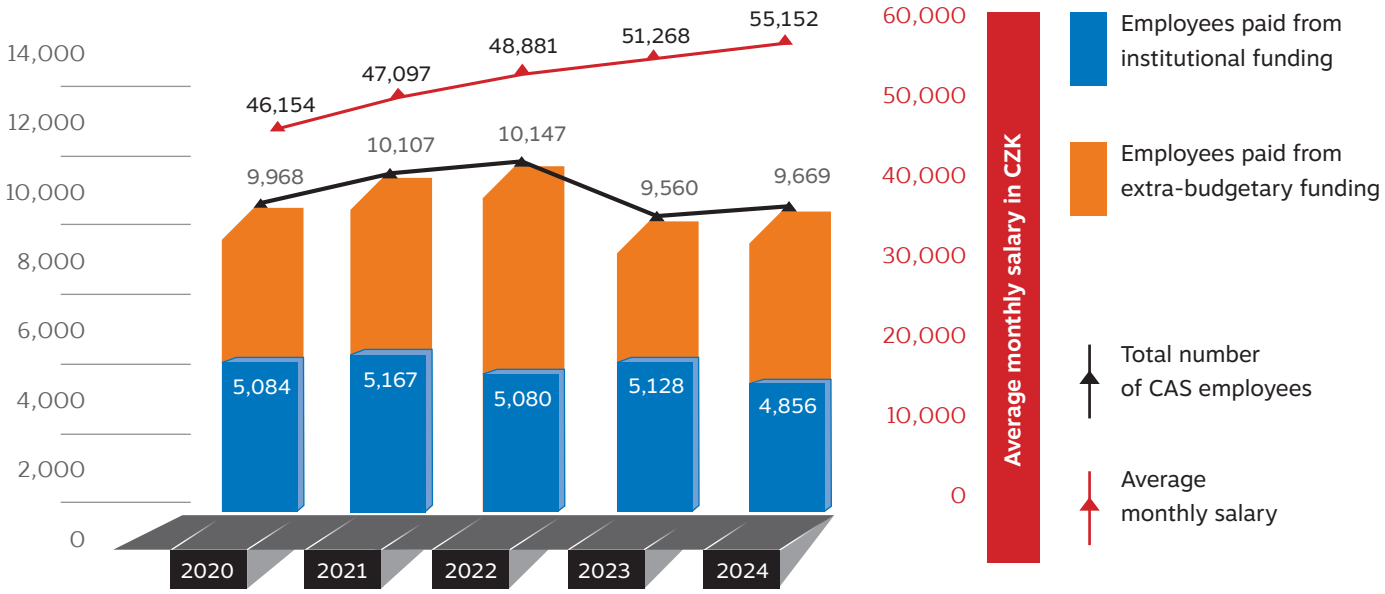
The Institute's experts took part in the work of the Science Council of the Ministry of Labour and Social Affairs, Committee for Artificial Intelligence of the Ministry of Trade and Industry, Commission for Private Law of the Legislative Council of the Government of the Czech Republic, Committee for Human Rights and New Technologies of the Government Council for Human Rights and the Ethics Committee of the Czech Medical Chamber.

Employees and Salaries

The total number of CAS employees (listed as the average number of employees calculated in Full Time Equivalent – FTE) increased year-on-year from 9,560 in 2023 to 9,669 in 2024. A total of 4,813 employees were paid through extra-budgetary allocations (which equalled 49.78% in 2024 compared to 46.35% in 2023). The number of research institute employees with university degrees who have passed arduous attestations pursuant to the Career Development Rules for CAS Employees with a University Degree and have been classified in the relevant qualification levels grew year-on-year from 5,913 to 5,978.

> The Czech Academy of Sciences and its institutes expended a total of CZK 6,399,177,000 on salaries and wages and CZK 167,790,000 for other payments for work (OON). The total average monthly salary at the CAS was CZK 55,152 with year-on-year growth of 7.58% from 2023.

Chart 1: Number of employees and average monthly salary at the CAS



The following table provides a more detailed look at the number of CAS employees by showing separate figures for employees of the CAS Head Office and for employees of all CAS research institutes.

Table 3: Number of CAS employees (FTE)

Year	2020	2021	2022	2023	2024
CAS public research institutions	9,893	10,037	10,080	9,494	9,601
CAS Head Office	75	70	67	66	68
CAS TOTAL	**9,968**	**10,107**	**10,147**	**9,560**	**9,669**

At the CAS Head Office, CZK 53,403,619 was expended for 67.75 employees recalculated as average FTE (of which CZK 43,687,342 for salaries and CZK 9,716,277 for other payments for work performed). Unused funds of CZK 135,014 (of which CZK 8,951 for salaries and CZK 126,063 for other payments for work carried out) were transferred to claims from unspent expenditures to 2025. The average monthly salary of CAS Head Office employees in 2024 was CZK 53,736.

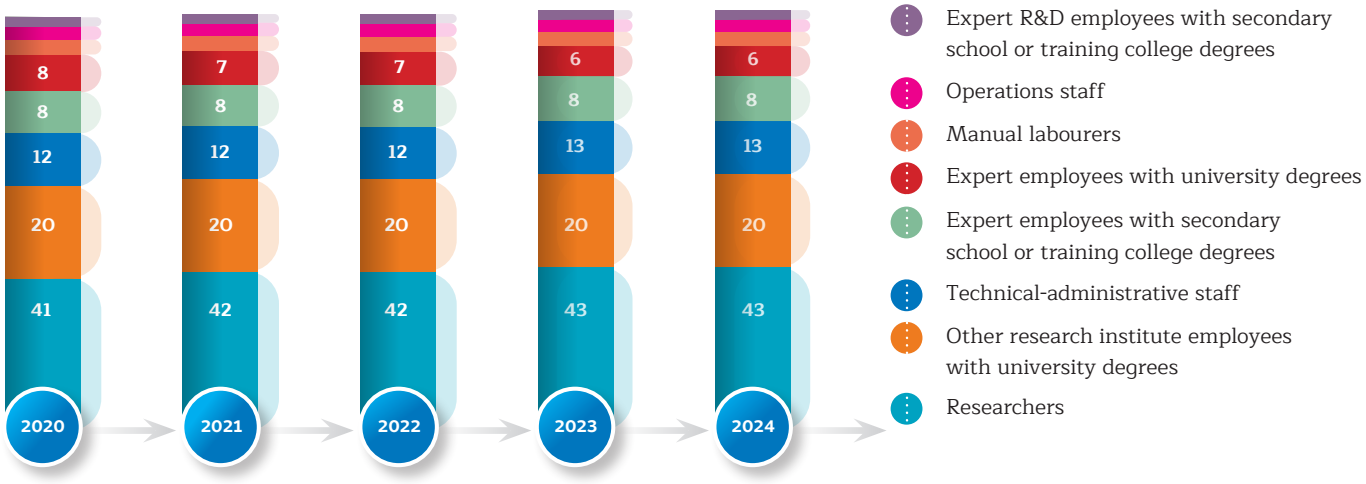
In 2024, CZK 6,355,489 was expended on salaries and CZK 158,073,000 for other payments for work performed for 9,601 employees across all CAS institutes (public research institutions). The average monthly salary of employees of CAS public research institutions equalled CZK 55,162.

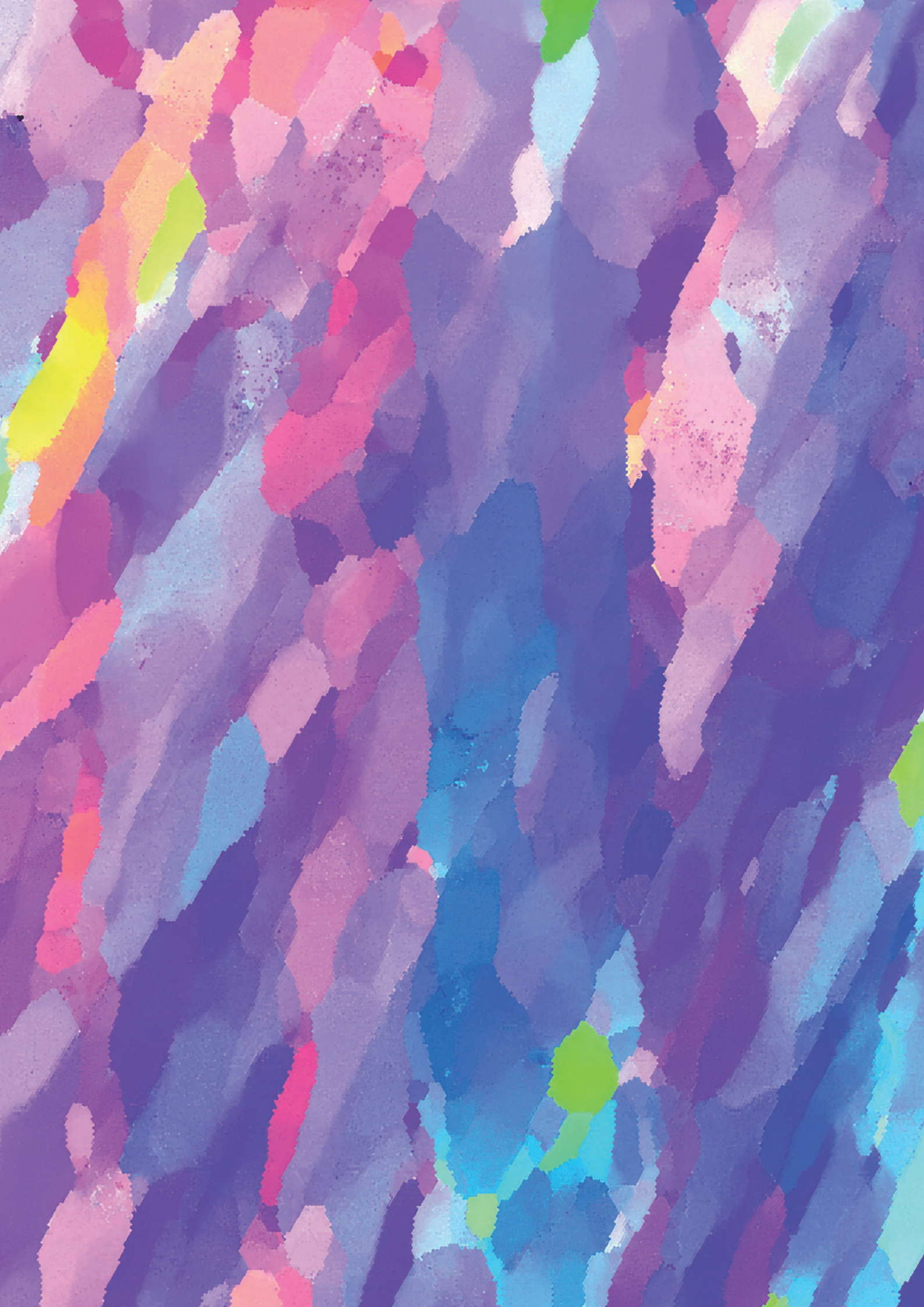
The table below provides a more detailed look at average monthly salaries at public research institutions (including all funding sources – institutional and extra-budgetary) for each employee category.

Table 4: Number of employees and average monthly salary per category for 2024

Category	Average recalculated number of employees	Average monthly salary in CZK
Researchers	4,100	67,720
Other research institute employees with university degrees	1,878	43,048
Expert employees with university degrees	762	53,140
Expert employees with secondary school/training college degrees	583	41,386
Expert R&D employees with secondary school/ training college degrees	217	42,097
Technical and administrative staff	1,221	56,567
Manual labourers	437	34,004
Operations staff	403	33,355
Total	**9,601**	**55,162**

Chart 2: CAS research institute employee categories (in %)

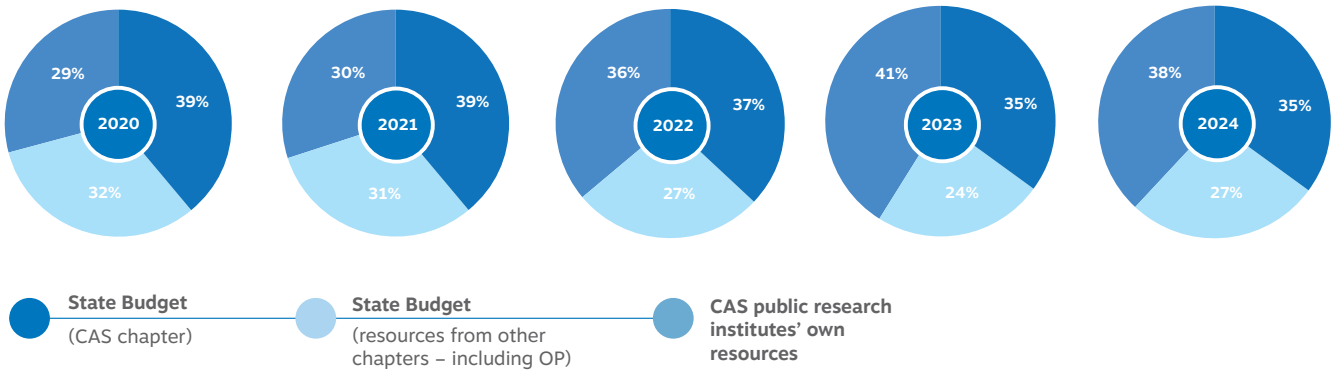




Financial Resources and Their Use

In 2024, the Czech Academy of Sciences managed a total of CZK 21,684.19 million, of which CZK 7,560.01 million came from the CAS chapter in the state budget (SB). This state budget CAS chapter funding equalled 35% of the CAS' total financial resources in 2024.

Chart 3: CAS Financial resources (in %)



Financial resources (for the entire CAS) originating from the CAS budget chapter, grants from other budget chapters and the CAS' own resources are summarised in the following table.

Table 5: Structure of financial resources of CAS institutes (actual) in mil. CZK

Type of expenditure	Non-investment resources	Investment resources	TOTAL
Resources from the CAS budget chapter	**5,986.84**	**1,573.17**	**7,560.01**
Grants from other budget chapters	**4,879.38**	**926.11**	**5,805.49**
GA CR projects	1,831.16	11.00	
TA CR projects	468.90	0.00	
Operational programmes	1,027.76	845.67	
Projects managed by other ministries	1,338.20	62.85	
Foreign providers	213.36	6.60	
Public research institutes' own resources	**8318.69**		**8318.69**
Revenue	5,205.56		
of which: Publication sales	106.01		
Conference fees	33.89		
Licenses	4,299.26		
Commissions related to main activity	766.40		
Other income	921.73		
Other income (fines, penalties,	73,97		
written-off receivables)	73.97		
Interest	654.97		
Exchange rate gains	192.79		
Settlement of funds	639.86		
Reserve Fund (RF)	16.62		
Asset Replacement Fund (ARF)	3.97		
Earmarked funds	557.72		
of which: Earmarked funds from abroad and monetary donations	294.71		
Social Fund (SF)	61.55		
Other income (excluding depreciation of assets acquired from grants)	1,546.85		
Proceeds from the sale of assets, securities, shares and materials	**4.23**		
Contributions received	**0.46**		
Total resources	**19,184.91**	**2,499.28**	**21,684.19**

The following expenditures statement should be taken as preliminary, given that CAS institutes are managed as public research institutions within the system of non-governmental organisations, they are permitted to close their accounts by 30 June of the following year and CAS institutes' financial statements must be verified by an auditor.

As of 31.12.2024, CAS institutes had a gain of CZK 2,293.03 million. Income of CAS institutes (public research institutions) totalled CZK 19,184.91 million (including depreciation of assets acquired from grants equalling CZK 1,365.63 million). The total expenditures of CAS institutes amounted to CZK 16,891.88 million. A detailed breakdown of the expenditures of CAS institutes is provided in the following table.

Table 6: Structure of non-investment expenditures of CAS institutes (in mil. CZK)

TYPE OF EXPENDITURE	2023	2024	Coefficient
Purchase of materials (small tangible assets, purchase of other materials)	1,103.39	1,183.69	1.07
Purchase of power and water	574.4	564.29	0.98
Goods sold	47.33	45.4	0.96
Repairs and maintenance	324.13	288.91	0.89
Travel expenses	243.49	264.82	1.09
Purchase of services (representation costs, technical evaluation of intangible assets, postage, telephone and internet services, purchase of intangible assets, rent, IT services, guest staff living expenses, conference fees and training, other services)	2,226.17	2,681.69	1.20
Personnel costs	8,048.91	8,729.23	1.08
Statutory social costs	301.57	248.45	0.82
Other social costs	39.45	45.88	1.16
Taxes and fees	9.58	12	1.25
Other costs (insurance, other operating costs, earmarked funds, fines, losses, damages, interest, write-off of receivables, donations, etc.)	726.66	470.45	0.65
Exchange rate losses	200	117.84	0.59
Depreciation and amortised cost of fixed assets sold	1,778.94	1,688.89	0.95
Securities and shares (sale of)	1,422.67	0	0.00
Material sold	0.05	0	0.00
Creation and use of provisions and allowances	20	16.51	0.83
Inventory change - own performance	-21.21	-3.12	0.15
Activation of material, goods, services and property	-69.21	-77.14	1.11
Grants provided	2.74	3.12	1.14
Corporate income tax	538.91	610.97	1.13
CAS institutes expended a total of	**17,517.97**	**16,891.88**	**0.96**

The main sources of investment funding are institutional and targeted grants from the state budget and foreign grants. These funds are used primarily to acquire or improve buildings and equipment, or to maintain and repair buildings and equipment.

Table 7: Investment resources of CAS institutes (in mil. CZK)

Type of expenditure	2023	2024	Coefficient
Resources from the CAS chapter of the state budget	1,005.3	1,573.2	1.56
Resources from other ministries, including operational programmes	331.9	926.1	2.79
Depreciation	255.3	255.4	1.00
Revenue from sale of fixed assets	34.6	2.3	0.07
Other	205.4	105.4	0.51
Total	**1,832.5**	**2,862.4**	**1.56**

Table 8: Use of investment resources by CAS institutes (in mil. CZK)

Type of expenditure	2023	2024	Coefficient
Funding of construction	891.5	1,015.3	1.14
Acquisition of instruments and equipment	943.3	1,610.4	1.71
Maintenance and repairs	7.2	5.1	0.71
Other	80.0	126.2	1.58
Total	**1,922.0**	**2,757.0**	**1.43**

Resource generation in 2024 equalled CZK 2,862.4 million and CAS institutes used a total of CZK 2,757.0 million in 2024. The asset reproduction fund increased by CZK 105.4 million.

Controlling

The CAS controlling system is based on the applicable legislation and on requirements related to decision-making and management processes of CAS bodies.

The Division of Public Administration Control (DPAC) carries out public administration control of grant recipients and above all controls the management of public funds and assets of CAS institutes. In particular, it verifies that the controlled entities manage funds and assets compliant with the relevant legal regulations, including verification of the functionality and effectiveness of the internal control system set up at each CAS institute.

Division of Public Administration Control

The Division of Public Administration Control prepares and carries out its controlling tasks in a manner fulfilling the requirements set forth for the given public administration area, which arise in particular from the Act on Financial Control and other regulations governing the performance of public administration control and financial control.

Controls are carried out on the basis of the approved annual plan and in accordance with the given thematic focus. Primary attention is always paid to the fulfilment of duties within the defined scope and structure, with the aim of verifying due use of public funds, particularly state budget funds disbursed by the CAS as the administrator of the science and research budget chapter. Appropriate attention is paid to compliance with budgetary rules and to management of assets acquired with public funds.

Accordingly, in 2024, the DPAC verified the controlled entities' compliance with the statutory conditions for the use of budgetary funds and with each provider's conditions for the use of grants and maintenance of proper accounting records.

When controlling compliance with budgetary rules and other legal regulations governing the management of public entities, the control teams focused on adherence to the procedures set out in the applicable legislation and internal rules for the preparation, implementation and funding of investments, and compliance with the legal provisions for tenders, including compliance with the terms of the register of contracts. They also assessed whether rules governing due diligence in property management had been breached.

In the case of asset management, the control teams focused on the proper exercise of property rights in regard to intangible assets. In 2024, the Division of Public Administration Control primarily verified whether asset records were properly maintained and whether the principles of economy, efficiency and effectiveness were followed in the use of funds and assets of the controlled entities.

In relation to supplier-customer relations, attention was focused on the fulfilment of the EU Guideline conditions for economic and non-economic activities, as well as on controlling whether there had been any violations of the conditions of the Act on Public Research Institutions pertaining to financial or asset transactions carried out without adequate prior written consent from the competent bodies (i.e. whether the management of the relevant entities was affected by the consequences of entirely invalid legal acts).

Another standard area of examination was labour relations, in particular the fulfilment of Labour Code conditions, including the handling of employee liability for loss events at the workplace, and whether all related transactions were properly recorded in the accounts.

The control teams also paid heightened attention to the functionality of the internal control system at each controlled CAS institute, assessing system efficacy both in regard to the setting of the system and the result of controlling in all controlled areas.

When a control detected a case of non-compliance with applicable legal regulations, the case was subsequently analysed in more detail to ensure that issues identified by the control could be generalised and processed appropriately for the benefit of all CAS institutes, as a way of preventing the recurrence of the detected irregularities in the future.

Public administration and financial controls were carried out at six CAS institutes, including the following public research institutions:

- Institute of Chemical Process Fundamentals,
- Institute of Biophysics,
- Oriental Institute,
- Institute of Macromolecular Chemistry,
- Institute of Contemporary History,
- Institute of Information Theory and Automation.

In addition, the considerable scope of the extraordinary public audit of the management of the CAS Centre of Administration and Operations ordered by the CAS President in August 2023 was completed.

The results of controls at each of the institutes listed above were discussed with the management of the given institute. The directors of the controlled entities subsequently adopted appropriate measures to remedy the identified deficiencies. The Division of Public Administration Control will continue to monitor the implementation of these measures. All of the control reports and conclusions were also submitted to the President of the CAS and relevant members of the Academy Council Presidium for discussion at Academy Council sessions. Each control report was also forwarded to the chair of the supervisory board of the controlled institute.

In 2024, the DPAC also verified the drawdown and accounting of grants provided in 2023 through the CAS budget chapter for research, education and similar activities to eight scientific societies associated within the Council of Scientific Societies of the Czech Republic, namely the:

- Czech Arachnological Society,
- Czech Association for Social Anthropology,
- Czech Society of Criminology,
- Czech Pedagogical Society,
- Czech Society for Mechanics,
- Czech Scientific Society for Mycology,
- Literary Society,
- Society for Economic and Social History.

In 2024, the DPAC controlled the allocation, drawdown and accounting of grants provided from the state budget through Chapter 361 by the Czech Academy of Sciences to CAS institutes and scientific societies associated in the Council of Scientific Societies of the Czech Republic in the total amount of CZK 751,790,706. Of this total, the public administration control carried out at CAS institutes verified funds equalling CZK 751,112,706 and the control of scientific societies verified grants totalling CZK 678,000.

In addition, on the basis of requests from CAS institutes, the DPAC carries out audits of accounting of funds provided to the given institute for EU Framework Programme projects. In 2024, a final audit was carried out of EU Framework Programme project funds totalling EUR 7,350,045.44.

The Division of Public Administration Control is also responsible for processing complaints and suggestions sent to CAS bodies and the CAS Head Office. The DPAC handles some of the cases directly. It also keeps records of complaints processed by other departments, monitors their processing and in some cases participates in their subsequent resolution. In 2024, the Division of Public Administration Control dealt with or registered ten complaints and suggestions for investigation. Due care was taken to verify every case and to provide adequate supporting documentation. Eight complaints were refuted after review and one was found to be partially justified. These cases can be considered closed. One case is still pending.

In addition to public administration and financial control, audit verification of accounting of funds for EU Framework Programme projects, record-keeping and resolution of complaints, one of the Division of Public Administration Control staff members was appointed as secretary of the Supervisory Committee of the Academy Assembly to handle the administrative and organisational aspects of the Committee's sessions.

Internal audit

The CAS Internal Auditor's work is governed by the requirements of the Act on Financial Control and other regulations setting forth internal audit performance. This ensures and fulfils the internal auditor's obligation to submit audit-based recommendations to the CAS President aiming to improve the management of operational and financial tasks and the internal control system and to prevent or mitigate risks.

In 2024, internal audits were carried out in line with the approved annual plan, which identifies the audit focus areas for the given period. As planned, three internal audits were carried out, one of which will be completed in early 2025. In addition to auditing tasks, the internal auditor also provided consulting and advisory services to CAS bodies and organisational units of the CAS Head Office.

The objective of the first internal audit was to verify the efficacy of the internal control system with a detailed review of the performance of selected duties pursuant to the Act on Financial Control. Based on the audit results, the Internal Auditor issued an opinion stating that the internal control system creates conditions enabling the fulfilment of the CAS' objectives and tasks, is undergoing

gradual improvement and is adequate and effective, but requires minor improvements. The auditor recommended specifying management control procedures and establishing responsibility for conducting these controls. Other recommendations were directed towards ensuring a sufficient audit trail of financial operations and related controls.

The second internal audit entailed verifying the system of providing grants from the CAS budget chapter, with a review of grant management, administration and registration of provided funds and the performance of management control in the provision of support. Based on the audit, the auditor found that overall the structure of the grant provision system complies with the Act on Budgetary Rules, Administrative Code and the Support of Research, Experimental Development and Innovations Act, and that procedures were applied in line with internal regulations. However, the auditor identified areas requiring minor improvements and measures against potential risks. The auditor recommended modifying internal regulations, defining the procedures of selected parts of the grant provision process and modifying the conditions of decisions awarding grants.

The subject of the third audit is verification of the physical security system in the CAS building at Národní 3 and the occupational health and safety system. This audit is still underway.

The conclusions of the internal audits, including the auditor's recommendations, were discussed with the Director of the CAS Head Office and the CAS President. Based on the auditor's findings and recommendations, measures related to the recommendations and identified deficiencies were carried out by the applicable implementation deadlines. The Academy Council was informed about the status of the implementation of the measures.

Support of Excellence

The scientific policy of the Czech Academy of Sciences includes support of excellent research at its institutes. The CAS provides this support in various ways. One well-known avenue is the Academic Premium (Praemium Academiae) for scientists working on excellent research. The CAS also provides support through the Otto Wichterle Award for selected promising young researchers and the Lumina Quaeruntur Research Fellowship, which supports outstanding young scientists, including those from other countries. The CAS also provides targeted support to researchers through two additional programmes: the Programme to Support Prospective Human Resources and the Josef Dobrovský Fellowship. Each year, the prestigious Czech Academy of Sciences Awards recognise notable scientists for their outstanding scientific achievements.

PRAEMIUM ACADEMIAE – ACADEMIC PREMIUM

The Academic Premium is the Czech Academy of Sciences' most eminent support for scientific excellence. It is awarded to brilliant scientists who excel in their fields, providing them with financial and moral support for further scientific work at a globally comparable level. The Academic Premium award funding of up to CZK 5 million per year helps recipients cover their research costs for a period of six years and, over the longer term, to develop their research both by building their own research teams and by acquiring needed new instruments or laboratory materials.

THE 2024 ACADEMIC PREMIUM AWARD-WINNERS ARE:

Mgr. Petr Pravec, Ph.D.

Astronomical Institute

Petr Pravec has achieved extraordinary success in studying the physical properties of asteroids. He became interested in the small bodies of the Solar System during his doctoral studies and has been studying them for over thirty years. He founded his own research group at the Astronomical Institute and is a member of several space mission research teams.

His research soon changed our understanding of asteroids. He discovered that many near-Earth asteroids are not actually single bodies, but in fact a system of two bodies orbiting a common centre of gravity. These bodies are called binary asteroids. He also developed a method for detecting binary asteroids using photometric observations that has become a common element of asteroid observations.

Dr. Pravec is the discoverer or co-discoverer of several hundred asteroids and their moons. They include the Didymos asteroid satellite, which he detected in 2003 and was later chosen by NASA for its Double Asteroid Redirection Test (DART) mission to test technology for deflecting dangerous asteroids from colliding with Earth. Dr. Pravec's team played a crucial role in the mission. Using photometric measurements of the binary asteroid Didymos, they determined the orbit of its Dimorphos satellite. It is one of Czech astronomy's greatest achievements. With his team, Dr. Pravec plans to study potentially dangerous asteroids that could approach Earth in the next six years. He is also involved in the European Space Agency's Hera mission. He is interested in asteroid clusters, their properties and their formation and evolution processes. He has developed a statistical method capable of identifying genetically related asteroid pairs based on the similarity of their heliocentric orbits. He also studies asteroid rotation. The asteroid 4790 Petrpravec, discovered by American astronomer Eleanor F. Helin in 1988, is named after him.

RNDr. Ivo Starý, CSc.

Institute of Organic Chemistry and Biochemistry

Ivo Starý specialises in organic chemistry, catalysis, chirality and nanoscience. He leads the Functional molecular chemistry group at the Institute of Organic Chemistry and Biochemistry, which is engaged in innovative research on chiral molecular structures and their physical-chemical and material properties.

Dr. Starý's team focuses primarily on mirror symmetry broken non-trivial Pi-electron carbon compounds. These objects are not identical to their mirror image, which can lead to unique behaviours in many fields of chemistry, physics, biology and materials science. The team's research aims to develop smart molecular devices that undergo chemical transformations or energy conversion in a chiral environment. These may include e.g. the preparation of chiral compounds by asymmetric catalysis, emission of circularly polarised light, self-assembly of chiral molecules, or charge/spin transport through chiral molecules. The Academic Premium award, accompanied by significant financial support, will enable Dr. Starý's group to embark on interdisciplinary projects.

In May 2024, Dr. Starý became Vice-Chairman of the Learned Society of the Czech Republic. He has co-edited a book on helicenes, is a Rudolf Lukeš Prize recipient and teaches reaction mechanisms at Charles University.

RNDr. Pavel Krejčí, Ph.D.

Institute of Animal Physiology and Genetics

Achondroplasia, the most common genetic bone growth disorder, results in short stature and associated health issues. In the Czech Republic, 4 to 5 children are born with this disorder every year. It is caused by a mutation of the FGFR3 receptor gene, which leads to increased fibroblast factor activity in growing bone. Pavel Krejčí from the Institute of Animal Physiology and Genetics has been researching growth factors critical for intercellular communication for over 20 years. During his career, in addition to many papers published in leading scientific journals, he has also contributed to three major, very practical outcomes: he established a clinical registry for patients with achondroplasia and participated in the development of two treatments for achondroplasia. The first of these treatments, vosoritide, has been available to Czech children since 2022. The second treatment is currently in the second phase of clinical trials in Japan. Dr. Krejčí's international team, composed of scientists from the Czech Republic, Japan and the USA, discovered that the growth problems associated with achondroplasia can be reversed by using a synthetic ribonucleic acid molecule called RNA aptamer, which blocks the FGFR3 receptor trigger signal and prevents its activation.

After earning his PhD, Dr. Krejčí spent 13 years in the USA, working at Cedars-Sinai Medical Center and the University of California, Los Angeles. After returning to the Czech Republic, he opened a laboratory at Masaryk University and the International Clinical Research Center in Brno. He also focuses on the molecular pathology of previously undescribed genetic growth disorders. In collaboration with colleagues at the University of California, Los Angeles, he studies cilia cell biology and genetic disorders which lead to fatal growth defects in humans.

In 2019, Dr. Krejčí established a laboratory at the Institute of Animal Physiology and Genetics. With the Academic Premium award, he plans on continuing to delve into the mechanisms of cellular communication in eight sub-projects that include, e.g., development of new treatment options for growth disorders and of tools for the precise manipulation of complex intercellular communication systems at the level of the whole organism.

> “The purpose of excellence support programmes at the Czech Academy of Sciences is to financially and morally support top research at CAS institutes.

Academic Premium and Lumina Quaeruntur Fellowship award-winners

LUMINA QUAERUNTUR FELLOWSHIP

The Lumina Quaeruntur Fellowship provides financial aid to promising researchers, enabling them to set up their own research team and fund its work for up to five years. To be eligible, the fellow must submit a project proposal to the European Research Council (ERC) or a similar international grant agency during the fellowship. Both Czech and foreign researchers are eligible for the fellowship.

IN 2024, SIX SCIENTISTS FROM DIVERSE CAS INSTITUTE DISCIPLINES WERE AWARDED LUMINA QUAERUNTUR FELLOWSHIPS:

Ing. Ivo Šulák, Ph.D.

Institute of Physics of Materials

Ivo Šulák, from the Institute of Physics of Materials, leads a team that aims to develop composite nanomaterials based on superalloys suitable for additive manufacturing, which will be usable in future hydrogen power plants, such as high-pressure turbine blades.

Masafumi Imai, Ph.D.

Institute of Atmospheric Physics

Masafumi Imai's research will focus on planetary radio emissions. Knowledge of the plethora of phenomena on Jupiter that are associated with radio emissions remains limited. According to Masafumi Imai, for example, we don't know if radio emissions tied to Jupiter's auroras vary throughout its orbit around the Sun, nor do we have a full understanding of where lightning is most prevalent on the planet. Imai and his new team at the Institute of Atmospheric Physics will seek answers to these and other questions.

MUDr. Mgr. Vít Hubka, Ph.D.

Institute of Microbiology

The Lumina Quaeruntur Fellowship will enable Vít Hubka to establish a research team on medical mycology of filamentous fungi, which had been absent to date at the CAS. His team will study emerging zoonotic fungi that cause skin infections in humans as well as opportunistic fungal infections that pose serious threats to immunocompromised individuals. Vít Hubka also plans to bridge the clinical and veterinary spheres more closely to improve prevention of fungal transmission from pets to humans and increase awareness of these pathogens.

MSc. Danny Haelewaters, Ph.D.

Biology Centre

Scientist Danny Haelewaters will lead a new team that will focus on monitoring biodiversity and on building a complete "tree of life" for fungi, i.e. mapping the evolutionary pathways and branching of different fungi species over time.

Dr. phil. Jan Vondráček, Ph.D.

Masaryk Institute and Archives

The Lumina Quaeruntur Fellowship will enable Jan Vondráček to build a team of excellence combining Czech and international expertise in the dynamically developing field of digital technologies and artificial intelligence in historical sciences. The Masaryk Institute will thus establish a centre of excellence for research in this field that will aspire to prominence in the international context.

Mgr. Vladislav Knoll, Ph.D.

Institute of Slavonic Studies

With the Lumina Quaeruntur Fellowship, Vladislav Knoll will establish a team at the Department of Paleoslavonic Studies and Byzantine Studies. The research team will examine the emergence of written languages in the context of multilingualism and cultural contacts in medieval and early modern Europe. The first axis of the research will be theoretical and methodological research and the second will focus on less studied aspects of the emergence of new written languages in specific areas of Central and Eastern Europe.

In 2024, two Lumina Quaeruntur Fellows achieved significant international success by winning prestigious ERC Consolidator Grants to support further research:

Martin Fotta, Ph.D.

Institute of Ethnology

Martin Fotta was awarded a grant for the project RAW: Romani family in an Age of War. The project examines how Romani kinship structures are transformed by armed conflicts through research among Romani from Ukraine, Iraq, Syria and the former Yugoslavia. It concentrates on how Romani mobilise their kinship networks and customs as a means of coping with the impacts of war and how wars are inscribed into the form kinship takes.

Elisabeth Hehenberger, Ph.D.

Biology Centre

Elisabeth Hehenberger's work focuses on the evolution of photosynthesis. Her research will use unique marine algae that engage in kleptoplasty as a model, i.e. which "steal" the photosynthetic organelles (plastids) of their prey and use them for their own benefit. The name of her project, KLEPTOS, also alludes to this process, which she will explore to answer questions about the origins of photosynthesis.

OTTO WICHTERLE AWARD

This award is intended for selected, extraordinarily talented, promising CAS scientists up to 35 years of age. The award bears the name of Professor Otto Wichterle, an outstanding world-class Czech chemist, who was appointed President of the Czechoslovak Academy of Sciences after the Velvet Revolution in November 1989. The aim of the Otto Wichterle Award is to encourage young CAS scientists whose excellent results contribute to the development of their scientific disciplines. In 2024, CAS President Eva Zažímalová bestowed the Otto Wichterle Award on the following 20 young scientists:

I. MATHEMATICS, PHYSICS AND EARTH SCIENCES

RNDr. Lenka Kubíčková, Ph.D.
Institute of Physics
RNDr. Orsolya Molnárová, Ph.D.
Institute of Physics
Ing. Jan Pinc, Ph.D.
Institute of Physics
Dr. Shelja Sharma
Institute of Plasma Physics
Mgr. Ľubica Vetráková, Ph.D.
Institute of Scientific Instruments

II. LIFE SCIENCES AND CHEMICAL SCIENCES

Mgr. Štěpán Timr, Ph.D.
J. Heyrovský Institute of Physical Chemistry
Ing. Erik Andris, Ph.D.
Institute of Organic Chemistry and Biochemistry
Ing. Daniel Bím, Ph.D.
Institute of Organic Chemistry and Biochemistry
RNDr. Jana Škerlová, Ph.D.
Institute of Organic Chemistry and Biochemistry
Mgr. Dmytro Didukh, Ph.D.
Institute of Animal Physiology and Genetics
Maria-Cecilia Chiriac, M.Sc., Ph.D.
Biology Centre
Galina Prokopchuk, M.Sc., Ph.D.
Biology Centre
Mgr. Tomáš Štětina, Ph.D.
Biology Centre
Mgr. Vojtěch Tláskal, Ph.D.
Biology Centre
Mgr. Zuzana Štípková, Ph.D.
Global Change Research Institute

III. HUMANITIES AND SOCIAL SCIENCES

Kristýna Bašná, MSc., Ph.D.
Institute of Sociology
JUDr. Eva Balounová, Ph.D., LL.M.
Institute of State and Law
PhDr. Michaela Žáková, Ph.D.
Institute of History
PhDr. Mgr. Kristýna Kaucká, Ph.D.
Masaryk Institute and Archives
Mgr. Martin Zach, Ph.D.
Institute of Philosophy

PROGRAMME TO SUPPORT PROSPECTIVE HUMAN RESOURCES – POSTDOCTORAL FELLOWS

at CAS institutes is intended for starting post-graduate students (within two years of the defence of their Ph.D. dissertation or equivalent, or four years in the case of long-term study abroad or parental leave).

Under the 2024 Programme call, 30 fellows were supported in the 22nd call and 27 fellows in the 23rd call (with funding commencing on 1 January 2024, or 1 July 2024).

JOSEF DOBROVSKÝ FELLOWSHIP PROGRAMME

This programme helps young foreign researchers who need to study the historical, cultural, artistic, linguistic, geographical or natural context in the Czech Republic for their scientific research. In 2024, total funding of CZK 910,000 was provided for 23 study visits at seven CAS institutes.

Mgr. Stipica Grgić, Ph.D.
(Institute of History)
Mgr. Natalia Woszczyk
(Institute of History)
Mag. Martina Schmidinger
(Institute of History)
Prof. Wiktoria Kudela-Świątek, Ph.D.
(Masaryk Institute and Archives)
Prof. Richard Anderson
(Institute of Art History)
Dr. Dániel Molnár
(Institute of Art History)
Priv. Doz. Dr. Risto Pekka Pennanen
(Institute of Art History)
Dr. Nicola Usula
(Institute of Art History)
Francesca Bonini, Ph.D.
(Institute of Philosophy)
Prof. Dr. Márton Szentpéteri, Ph.D.
(Institute of Philosophy)
Assoc. Prof. Dr. Francesco Tava
(Institute of Philosophy)
Mgr. Andrej Perdih, Ph.D.
(Institute of Slavonic Studies)
Mgr. Erma Ramić-Kunić, Ph.D.
(Institute of Slavonic Studies)
MA Irene Elmerot
(Institute of Czech Literature)
Mgr. Ivana Hostová, Ph.D.
(Institute of Czech Literature)
BA Neža Kočnik
(Institute of Czech Literature)
Dr. phil. Jana Marková
(Institute of Czech Literature)
Dr. hab. Aleksandra Pajak-Głogiewicz
(Institute of Czech Literature)
Mgr. Adam Zygmunt
(Institute of Czech Literature)
Mgr. Stella Ondrejčiková, Ph.D.
(Czech Language Institute)
Zsófia Ludányi, Ph.D.
(Czech Language Institute)
Prof. Dr. Florence Oloff
(Czech Language Institute)
Assoc. Prof. Nina Pahor
(Czech Language Institute)

CZECH ACADEMY OF SCIENCES AWARDS

Each year, the Czech Academy of Sciences bestows these awards on outstanding researchers for exceptional research results focused on societal priorities, which have strengthened the competitive edge of Czech science in the international arena and whose initial publication or implementation took place within the last five years.

IN 2024, THE CZECH ACADEMY OF SCIENCES AWARD FOR OUTSTANDING RESULTS OF GREAT SCIENTIFIC SIGNIFICANCE WAS BESTOWED BY CAS PRESIDENT EVA ZAŽÍMALOVÁ UPON THE FOLLOWING RESEARCHERS:

- **Ing. Miroslav Kárný, DrSc.**, nominated by the Institute of Information Theory and Automation, for the research result "*General Prescriptive Theory of Dynamic Decision Making Under Uncertainty and Incomplete Knowledge*"

- **Prof. PhDr. Jan Županič, Ph.D.,** nominated by the Institute of History, for the research result "*Habsburg Nobility. The Transformation of the Elites of the Danube Monarchy in the Long 19th Century*"

Scientific “Research Professor” Degree

The scientific title “Research Professor” was established by a decision of the 21st CAS Academy Assembly on 18 December 2002 and has been repeatedly confirmed by resolutions of the Government of the Czech Republic on the Statutes of the Czech Academy of Sciences, most recently by Resolution No. 614 of 24 May 2006. The awarding of the scientific degree is governed by the provisions of Art. 62 of the Statutes of the Czech Academy of Sciences. In order to implement this provision, the Academy Council has adopted the Rules for Granting the “Research Professor” Degree by the Czech Academy of Sciences.

> The Czech Academy of Sciences awards the scientific degree of "Research Professor" in recognition of outstanding, far-reaching and original scientific work that contributes to the advancement of research in a specific scientific field and characterises the awardee as a scientist of distinguished stature. The CAS Science Council decides on the awarding of degrees.

At its 10th session on 30 January 2003, the CAS Science Council established a Committee for the Research Professor Degree as an auxiliary and advisory body for matters related to the awarding of the "Research Professor" scientific degree. The Science Council decides on the awarding of scientific degrees solely on the basis of nominations made by the Committee for the Research Professor Degree and the results of scientific degree award proceedings, which take place in one of the 33 standing committees for the disciplines in Research areas I, II and III.

There are 36 dissertation defence committees which currently have a total of 385 members, including 168 from CAS institutes, 192 from universities and 25 from foreign universities and scientific institutions.

IN 2024, THE FOLLOWING 10 RESEARCHERS WERE AWARDED THE "RESEARCH PROFESSOR" DEGREE:

Assoc. Prof. Ing. et Ing. Vilém Neděla, Ph.D., Res. Prof.
Institute of Scientific Instruments
Dissertation: *"Advanced environmental scanning electron microscopy"*
Commission: Electrical Engineering, Electronics and Photonics
Scientific degree awarded: "Research Professor in Technical Sciences"

Prof. Ing. Štěpán Jurajda, Ph.D., Res. Prof.
Economics Institute
Dissertation: *"Estimating causal relationships using historical data from 20th-century wars"*
Commission: Economics
Scientific degree awarded: "Research Professor in Social and Human Sciences"

Assoc. Prof. PhDr. Michal Bauer, Ph.D., Res. Prof.
Economics Institute
Dissertation: *"Anti-social Behaviour and Discrimination: Selected topics"*
Commission: Economics
Scientific degree awarded: "Research Professor in Social and Human Sciences"

RNDr. Gabriela Pavlínková, Ph.D., Res. Prof.
Institute of Biotechnology
Dissertation: *"Molecular mechanisms in the development and function of auditory neurons"*
Commission: Biomedicine
Scientific degree awarded: "Research Professor in Molecular-Biological and Medical Sciences"

The "Research Professor" degree ceremony held on 22 May 2024 in the hall of the Library of the CAS.

Ing. Jiří Brus, Dr., Res. Prof.
Institute of Macromolecular Chemistry
Dissertation: *"Structure and Dynamics of Multicomponent Macromolecular and Supramolecular Solids at Atomic Resolution: From Separation of Local Fields and 1H Spin Diffusion Analysis to Domain-Selective NMR Crystallography"*
Commission: Macromolecular Chemistry
Scientific degree awarded: "Research Professor in Chemical Sciences"

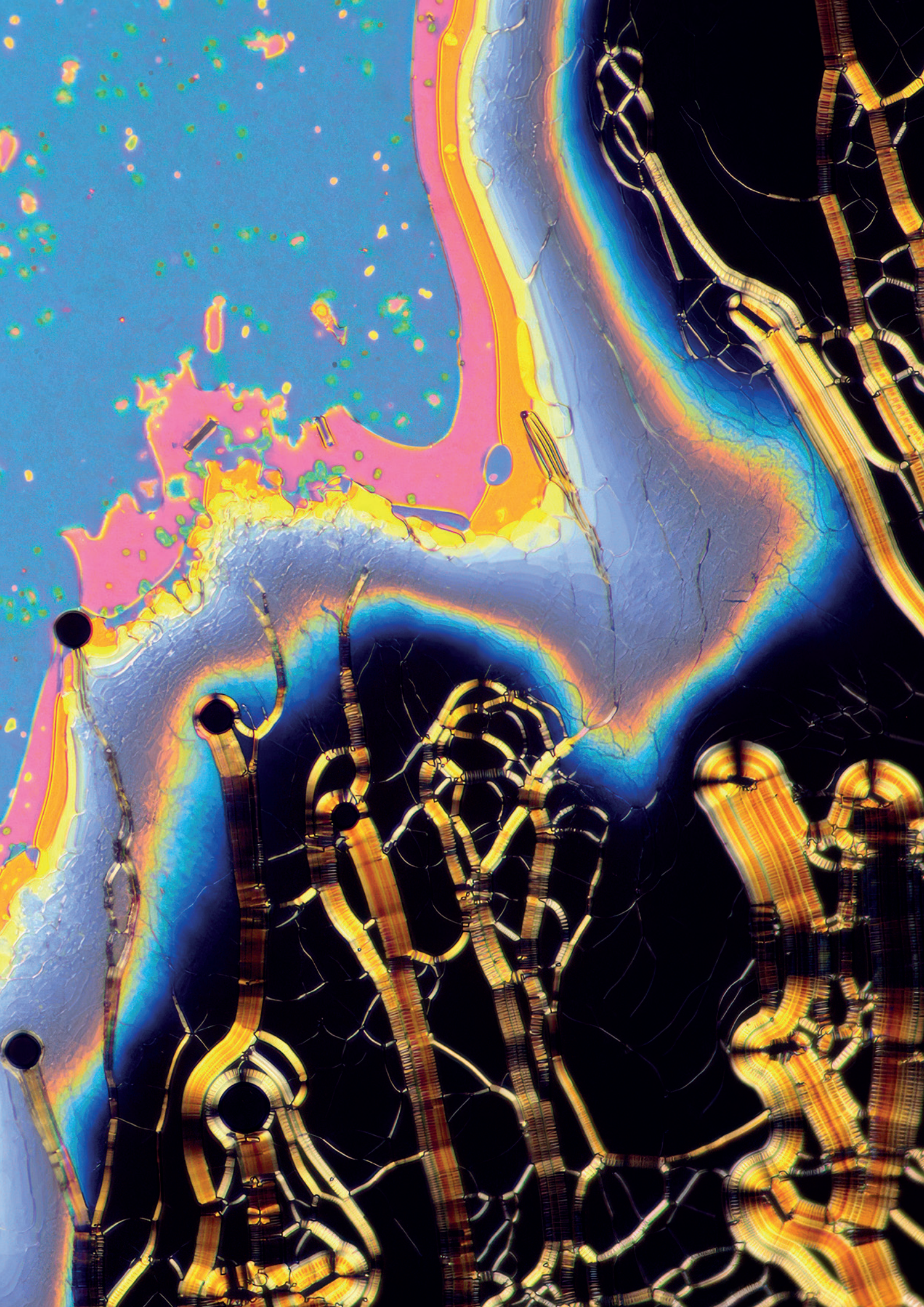
RNDr. Martin Srnec, Ph.D., Res. Prof.
J. Heyrovský Institute of Physical Chemistry
Dissertation: *"Proton-Electron Transfer Reactivity of Enzymatic and Biomimetic Transition Metal Complexes"*
Commission: Physical Chemistry
Scientific degree awarded: "Research Professor in Chemical Sciences"

Mgr. Ing. Oleg Heczko, Dr., Res. Prof.
Institute of Physics
Dissertation: *"Magnetically Induced Reorientation New physical effect providing giant magnetic-field-induced strain"*
Commission: Physics of Condensed Matter Systems
Scientific degree awarded: "Research Professor in Physico-Mathematical Sciences"

PhDr. Michal Přibáň, Ph.D., Res. Prof.
Institute of Czech Literature
Dissertation: *"There is strength in diversity. Exile Sixty-Eight Publishers and Index"*
Commission: Bohemistics
Scientific degree awarded: "Research Professor in Philological Sciences"

Ing. Petr Beier, Ph.D., Res. Prof.
Institute of Organic Chemistry and Biochemistry
Dissertation: *"The development of synthetic methodology for the preparation and reactivity of fluorinated organic azides"*
Commission: Organic and Bio-organic Chemistry
Scientific degree awarded: "Research Professor in Chemical Sciences"

Assoc. Prof. MUDr. Antonij Slavchev, CSc., Res. Prof.
Institute of Clinical and Experimental Medicine, Prague
Dissertation: *"Analysis of immunological risk factors of T-cell and antibody-mediated rejection after organ transplantation"*
Commission: Immunology
Scientific degree awarded: "Research Professor in Molecular-Biological and Medical Sciences".



International Cooperation

International cooperation, especially at the European science policy level, was a key theme in 2024. Like other EU Member States and international alliances and organisations, the CAS, in cooperation with Czech stakeholders, focused on assessing existing tools supporting science, research and innovation within the EU, and also took part in an inter-ministerial collaborative effort to develop a national position paper on the upcoming EU Framework Programme, which will be launched in 2028. In bilateral and multilateral cooperation, the CAS continued to strengthen the integration of CAS institutes into global research organisation networks through CAS programmes that promote mobility, especially of young scientists, and research excellence, and contribute to the development of new skills and the building of lasting scientific contacts. As every year, the CAS engaged in activities related to membership in relevant international non-governmental organisations and networks and, last but not least, supported activities in research security and scientific diplomacy.

> The CAS supported the second round of the Researchers at Risk Fellowship, expanding it to other countries and providing assistance to dozens of scientists in need.

In 2024, a number of international events were organised and attended by CAS staff and officers. In January, the CAS held a convening with The Royal Society (United Kingdom) on "Epigenetic Therapy of Serious Human Disease, Including Cancer, Neurodegenerative and Lifestyle Diseases" and "Sustainable Agriculture in a Climate Change Era". In May, the management teams of the CAS and the Slovak Academy of Sciences held their traditional annual meeting in Třešť. Topics of discussion included e.g. science and policy with respect to academic freedoms including human rights, codes of ethics and scientific integrity, the Programme for Application Development and Commercialisation, Strategy AV21 and the evaluation of institutes. The opening ceremony of the first three Dioscuri Centers in the Czech Republic took place in May 2024 at the CAS headquarters. Two will be based at the Institute of Physics.

The CAS also hosted a meeting of the CEFRES Science Council. The annual Academic Prague event, where the CAS meets with representatives of foreign embassies in Prague, ministries and major Czech universities and other prominent guests, was held in June. Seventy guests attended the reception at Villa Lanna, including representatives of embassies from 32 countries. In October, the CAS organised the annual meeting of the academies of sciences of the V4 countries at Villa Lanna. The group discussed topics such as women in science, security in international research, knowledge transfer and ways of engaging in KTT, and research evaluation. The Young Researcher Awards ceremony was part of the event. The 2024 awards focused on research on modern social and economic history. The CAS award was bestowed upon Kristýna Kaucká of the Masaryk Institute and Archives. In November, the CAS and the Saxon

Academy of Sciences held a joint symposium in Liblice. The symposium themes included energy, sustainable agriculture and resilient society.

The CAS received a number of prominent foreign visitors in 2024. During the year the CAS was visited by representatives of several foreign embassies in Prague. Courtesy meetings were held with e.g. the ambassadors of the Republic of Argentina, the Republic of France, Japan and the Republic of Korea, as well as with the French scientific attaché. In February, chess grandmaster Garry Kasparov, who is also a leading figure of the Russian opposition, visited the CAS. In March, the CAS leadership received the Taiwanese Vice President-elect Hsaio Bi-Khim during her first official trip abroad, as well as representatives

of the Taipei Economic and Cultural Office (TECO). In October, the CAS held a meeting with representatives of Taiwan's Industrial Technology Research Institute (ITRI), which cooperates with the Institute of Thermomechanics and the Institute of Physics, and with Yoichiro Matsumoto, Science and Technology Advisor to the Minister for Foreign Affairs of Japan. In October, a delegation from the Ministry of Education, Research, Development and Youth of the Slovak Republic came to Prague and met with the CAS management. In 2024, the CAS also held talks with, for instance, the Director of The Royal Society of Canada and representatives of Korea Planning & Evaluation of Industrial Technology (KEIT) and the Turkish Academy of Sciences (TÜBA).

In order to strengthen scientific collaboration and forge new contacts, CAS officers made several trips abroad. In March, at the invitation of the Ministry of Foreign Affairs of the Czech Republic, a CAS representative participated in a delegation to South Africa, where he visited local research institutions. In April, CAS officers joined a delegation of the Senate of the Parliament of the Czech Republic to Zambia, where they discussed collaboration at local universities. The CAS President was part of the President of the Czech Republic's delegation to Jordan in May. In June, CAS officers took part in Senator Jiří Drahoš' delegation to Taiwan. CAS staff and officers also undertook working trips to Germany, the UK and Slovakia in 2024 to attend conferences and discuss ways to strengthen collaboration.

In regard to membership in international non-governmental organisations, the CAS continued to develop collaborative ties with ALLEA (All European Academies), EASAC (European Academies Science Advisory Council), IAP (InterAcademy Partnership) and UAI (Union Academique Internationale). The CAS participated in the calls of the European Union initiatives such as SAPEA (Science Advice for Policy by European Academies) and made significant contributions to European groups such as ENRIO (European Network of Research Integrity Offices). Eva Fialová from the Institute of State and Law was delegated to the new "AI in Healthcare" EASAC working group and Pavel Rössner from the Institute of Experimental Medicine joined the new SAPEA working group on Cross sectoral evidence-based governance for one health in the EU. He also contributed to the SAPEA report "One Health Governance in the European Union", which served as the basis for the corresponding scientific opinion of the European Commission's Group of Chief Scientific Advisers (GCSA). The CAS President and two other GCSA members co-led the process to prepare the scientific opinion. Over the course of 2024, CAS staff and officers also participated in person or online in panels, working groups, general assemblies and conferences. At the request of the IHRN (International Human Rights Network of Academies and Scholarly Societies), the CAS President sent an appeal urging the leaders of Egypt, Iran and Turkey to end the prosecution and incarceration of unjustly accused and imprisoned scientists.

At the end of June, the annual meeting of young scientists with Nobel Prize winners took place in Lindau. The theme of the 2024 gathering was physics. The CAS, as the guarantor for the Czech Republic, nominated six candidates to attend the meeting. The Lindau Committee selected four of them. Petr Veřtát from the Institute of Physics participated on behalf of the CAS.

In relation to research security, CAS representatives regularly participated in meetings of the inter-ministerial working group on combating illegitimate interference in the higher education and research environment and contributed to the preparation of methodological materials, which the Ministry of Education and Science presented at an open seminar on developments in international security in June 2024.

Bilateral and Multilateral Collaboration

In 2024, the CAS continued to collaborate with both European and non-European partners on bilateral and multilateral international projects through joint research programmes. It continued to update contractual documents, extended existing collaborative ties and entered into new bilateral agreements on scientific collaboration. The CAS signed a new trilateral agreement on scientific cooperation with Chungnam National University, Korea (CNU) and Charles University. The CAS' scientific cooperation agreement with the Academy of Scientific Research & Technology (ASRT) of Egypt was updated. In addition, the CAS supported the Czech Republic's ongoing collaboration with the Massachusetts Institute of Technology (MIT) by entering into a new agreement with the IOCB Tech Foundation (IOCB Tech), which provides funding for selected teams from the Czech Republic. This followed the signing of a cooperation agreement between IOCB Tech and MIT covering the next three years. The fourth call for project proposals with MIT research teams was open from early September to mid-December 2024. Researchers from research institutions across the Czech Republic were eligible to apply. In scientific diplomacy, the CAS reinforced its cooperation with the Ministry of Foreign Affairs of the Czech Republic by concluding a Memorandum of Cooperation, which served to codify and expand the existing relationship between the two entities and provide a basis for engagement of scientific expertise in national and international policymaking.

Overall, the CAS supported bilateral projects with total funding of CZK 11.7 million in 2024. 138 proposals were submitted to new tenders for projects supporting researcher mobility; support was awarded to 44 projects from 11 countries.

In 2024, the first round of the international Researchers at Risk Fellowship, which supports scientists in crisis, was evaluated. A second round of this programme was also announced, with a continued focus on Ukraine and the addition of other countries where scientific work may be at risk. In the second round of the Researchers at Risk Fellowship, 39 fellowships were granted to researchers from seven different countries. Fellowships could begin in April 2024. During 2024, 36 scientists began their fellowships with financial support of CZK 12.6 million. The remaining three researchers declined the fellowship for various reasons.

The CAS' multilateral cooperation efforts in 2024 included continued support for two three-year ongoing projects co-funded by the European Commission via the CHANSE programme: SMARTUP (Institute of Sociology) and TIMED (Institute of Philosophy). The CAS also participated in two other CHANSE programme calls with new financial conditions: selected projects are funded only by national providers without any co-financing from the European Union. The theme of the humanities call was "Crisis" and the theme of the social sciences call was "Enhancing Well-being for the Future". Following the evaluation process, three projects involving CAS teams were recommended for funding in the "Crisis" call and one in the "Enhancing Well-being for the Future" call. After assessing the financial allocations pledged by the given national funding authorities, only one CAS project, which was under the "Crisis" call, was supported. A team from the Institute of Ethnology is participating in the project, which is called Times in Crisis, Times of Crisis: Temporalities of Europe in Polycrisis. The total project budget is EUR 1,497,381 for a 36-month period. The Czech contribution is EUR 196,350.

On 6-7 May 2024, the CAS hosted the NORFACE meeting in Prague.

The year 2024 was the final year of the Institute of Microbiology's Antiviralfun project under the Southeast Asia-Europe Joint Funding Scheme for Research and Innovation (SEA-Europe JFS), of which the CAS is a part. CZK 530,000 was expended on the project in 2024. The 8th SEA-Europe JFS call, thematically focused on "Circular Economy" and "Clean, Accessible and Secure Energy Supply", was finalised in autumn 2024. Two projects with engagement of CAS teams were awarded support. They will begin in January 2025. They are the Institute of Physics' project Circular Economy for Waste to Energy Conversion: Local Plastic Waste Upcycling to Multifunctional Catalysts for Green H2 Generation (Wplast2H2) and the Institute of Botany's project Dual Action of Natural Enemies: Utilisation of the Fungal Pathogen in Controlling the Invasive Water Hyacinth and Promoting Bio-Circular Economy (DANE).

None of the CAS institutes submitted proposals to the EIG CONCERT-Japan 11th Joint Call: Digital Transformations and Robotics in Sustainable Agriculture. The CAS and the Ministry of Education, Youth and Sports co-organised the regular meeting of EIG CONCERT Japan in late October 2024. The convening included a kick-off workshop for projects selected in the 10th Joint Call on Solutions for Carbon-Neutral Cities. Scientists from the Institute of Inorganic Chemistry also presented their PHOTOMOS H2O project.

ERA Cooperation

The CAS continuously strives to engage in activities supporting the European Research Area (ERA) and takes advantage of the opportunities offered by Horizon Europe, an EU framework programme supporting research and innovation. In addition to direct involvement in research initiatives at EU level, CAS representatives also participate in the development of European science policies.

In 2024, CAS institutes worked on two ongoing projects under the 7th Framework Programme with a total European Commission funding contribution of EUR 90,000. Another 84 Horizon 2020 projects also continued, for which the CAS received a total of EUR 5.74 million. In the subsequent Horizon Europe framework programme, CAS institutes worked on a total of 127 projects with a total funding volume of EUR 9.20 million.

In 2024, six researchers from CAS institutes succeeded in the enormously competitive international selection process for ERC grants. Ondřej Novák from the Institute of Experimental Botany won a Synergy Grant, Paulo Paioti from the Institute of Organic Chemistry and Biochemistry won a Starting Grant, and four scientists won Consolidator Grants: Elisabeth Hehenberger from the Biology Centre, Tomáš Pluskal from the Institute of Organic Chemistry and Biochemistry, Karel Žídek from the Institute of Plasma Physics and Martin Fotta from the Institute of Ethnology.

Systematic support for ERC grant applicants at national level continued in 2024 through various training and consultation activities conducted by an expert group run collaboratively by Charles University, the CAS and the Technology Centre Prague. This initiative's joint pilot project in 2024 was a networking event for junior researchers called "ERC Day", which took place in April at the CAS conference centre at the Třešť Castle. The purpose of the meeting was to offer an informal space where young emerging scientists from various research institutions in the Czech Republic could talk with ERC and ERC CZ grant investigators and project evaluators. About sixty young researchers participated in the event. In 2024, the CAS also continued to financially support ERC project applicants

through its own incentive grants, awarding total funding of CZK 900,000 to nine applicants.

During 2024, CAS representatives participated in several meetings of the inter-ministerial working group on the planned 10th EU Framework Programme for Science and Innovation 2028-2034 (FP10) and related roundtables, all coordinated by the Ministry of Education, Youth and Sports of the Czech Republic. The purpose of the meetings was to create a space for discussion of proposals and suggestions with representatives of ministries, providers and research institutions, leading to the formulation of a national position through a process of consensus. To this end, the CAS submitted its own position paper to the Ministry of Education, Youth and Sports, in which it summarised recommended key focal points for FP10. These included the promotion of excellence, a balance between basic and applied research, bi-directional approaches to research (i.e. top-down and bottom-up), an emphasis on interdisciplinary approaches to addressing globally important topics, and support for innovation and new disruptive technologies. The position paper also listed specific areas that should be supported through FP10, such as ERC, the Marie Sklodowska-Curie Actions, research and technological infrastructures and specific research areas. The paper also mentions the need to increase funding for FP10 and to simplify the rules for participation. These priorities were contained in the final version of the Czech national position paper, which was published by the Ministry of Education, Youth and Sports in mid-December 2024.

In March 2024, the CAS joined the declaration of support for science and research addressed to candidates for the European Parliament 2024, which was initiated by the national academies of science of France, Germany, Italy, the Netherlands and Poland. The declaration stressed the role of science, research and innovation as a cornerstone of the EU's competitiveness, prosperity and resilience, and the associated need for adequate investment in science and education. Last but not least, it called for the integration of scientific knowledge into global problem solving and policy making.

In September 2024, the CAS organised the 6th annual networking meeting of representatives of project departments of CAS institutes. The meeting was thematically focused on internal CAS programmes and grants. In addition, the CAS also worked to strengthen participation in European Research Area activities and regularly informed its institutes about the wide range of research opportunities offered by the EU Horizon Europe Framework Programme and other European initiatives.

CEFRES platform cooperation

The French-Czech CEFRES Platform – which oversees cooperation between the CAS, the French National Centre for Scientific Research (CNRS), Charles University and the French Embassy in the Czech Republic – saw the completion of a two-year project in 2024. The project Home Beyond Species: More-Than-Human Dwelling in the Age of Crises was led by researchers Peter Gibas (Institute of Sociology) and Chloé Mondémé (École Normale Supérieure de Lyon, CNRS) and concluded on 31 January 2024. A two-year project by Martin Ďurďovič (Institute of Sociology) and Gilles Lepesant (CNRS), titled Contested Energy Transitions. Conflicts and Social Innovations in the Czech Republic, Slovakia, Germany, and France, was launched on 1 March 2024. It will receive support of CZK 1.2 million. In 2024, on the 10th anniversary of the signing of the Agreement that established the CEFRES Platform, the second amendment to the CEFRES Platform Agreement for the upcoming five-year period was signed.

Regional Cooperation

The Czech Academy of Sciences helps Czech regions and microregions improve their quality of life through jointly funded research and application projects. The year 2024 saw the commencement of 27 new joint projects, funded according to agreements between CAS institutes and their regional partners.

> Collaboration between CAS institutes and regional partners in the Czech Republic – such as regions, micro-regions, municipalities, contributory organisations and companies – focuses on addressing social, economic, ecological, natural and cultural issues through basic research and application projects.

In 2024, institutes from eight of the nine CAS sections – namely from the sections of Mathematics, Physics and Computer Science; Applied Physics; Earth Sciences; Chemical Sciences; Biological and Medical Sciences; Biological-Environmental Sciences; Socio-Economic Sciences and Historical Sciences – engaged in joint projects with regional partners. Projects focused on issues such as mapping of historical roof trusses in Jihlava, documentation and presentation of fine arts in the Svratka River area, fisheries management at the Lipno reservoir, documentation and visualisation of a wooden mining ventilator from Kutná Hora, research and restoration of the oldest photographs from the collection of the Polná City Museum, and Czech-German-Jewish coexistence in Třešť during the Second World War.

These collaborative efforts were rooted in agreements concluded successively with the Association of Municipalities of Orlicko (2003), South Moravian Region (2008), City of Brno (2008), Prague 1 Municipal District (2009), Pardubice Region (2013), Hradec Králové Region (2013), Vysočina Region (2014), Zlín Region (2015), Ústí nad Labem Region (2015), Central Bohemian Region (2016), Karlovy Vary Region (2016), Olomouc Region (2017), South Bohemian Region (2018), Pilsen Region (2019), Šumava National Park Administration (2019), Liberec Region (2020), Moravian-Silesian Region (2020) and the Capital City of Prague (2022).

In 2024, implementation began in 27 new joint projects, which are funded according to agreements between CAS institutes and regional partners. Seven of these projects fall under the project Central Bohemian Mobility Programme for Excellence in Research, Innovation and Technology (MERIT), which is co-financed by the MSCA-COFUND grant, the budget of the Central Bohemian Region and the host organisations.

Work on these joint projects includes a regular annual meeting, where representatives of the CAS, regional authorities and municipalities exchange information, find inspiration and engage in discussion. These meetings are held alternately in Prague and Brno and attended by representatives of the CAS and of the regions of the Czech Republic. Six joint projects completed in 2023 were selected by the CAS Regional Cooperation Committee for presentation and evaluation at the 2024 annual meeting, which took place in Prague on 4 June 2024. They included:

1. Geophysical Skills at the Skalná Primary School Geophysical Institute, Municipality of Skalná,

2. Critically Endangered Endemic Species of the Czech Steppe: Scientific Data for the Conservation of the Czech Jewel Beetle, Biology Centre; Ústi nad Labem Region,

3. Development of the Ground Segment of Space Missions, J. Heyrovsky Institute of Physical Chemistry; Hvězdárna Valašské Meziříčí observatory,

4. Gold from Opava, Institute of Archaeology, Brno; Museum in Bruntál,

5. Between the Municipality and the State. The Phenomenon of District Self-Government in the Czech Lands 1848-2002, Masaryk Institute and Archives; Museum of Podblanicko,

6. Exhibition of Medieval Art at Rychmburk near Skutec Castle, Institute of Art History; Regional Museum in Chrudim.

Section of Applied Physics

- Jihlava's Historical Trusses [Jihlava]
- Steping – Spatio-Temporal Evolution of Air-Borne Pollutants in the Near-Field: Application of Tools From Computational Geometry [Nový Knín]
- Nonlinear Methods for the Analysis of Complex Dynamics of Neural Networks and Turbulent Systems in Physics [Brno]

Section of Mathematics, Physics and Computer Science

- Eclipse – Exploring Compact Stellar Remnants and Their Impact on Star Clusters Evolution [Ondřejov]
- Unravelling the History of the Young Local Milky Way: Connecting Molecular Clouds and Stellar Populations [Ondřejov]
- Isema – Impact of Self-Consistent Stellar Evolution Models in Astrophysics [Ondřejov]
- Hotdragon [Dolní Břežany]
- Development of Thin-Disk Deep-Ultraviolet Laser System [Dolní Břežany]

Section of Biological and Ecological Sciences

- Soil Zoological Research of the Na Skřivánku Locality in the Place for Life Programme [Jihlava]
- Fishery Management of a Large Reservoir in Changing Climate and Nutrient Conditions [Boršov Nad Vltavou]

Section of Earth Sciences

- Identifying the Potential of the Svornost Mine for the Purpose of Development of Application of Non-mining Technologies in the Mining Environment [Jáchymov]
- From Paintings to Nature - Tracing the Footsteps of Painters in Svratka and the Surrounding Area [Svratka]
- The Impact of Drought on the Water Cycle of the Polabska Lowlands in the Cadastre of Velký Osek [Velký Osek]
- Compressed Air Energy Storage [Příbor]

Section of Chemical Sciences

- Stellar Observational and Laboratory Spectroscopy - Ariel Space Telescope Support [Valašské Meziříčí]
- Monitoring of Biologically Active Substances of Selected Plant Species of the Asteraceae Family – Chamomile and New Genotypes of the Genus *Echinacea* [Brno]

Section of Biological and Medical Sciences

- Patterns of Genome Rediploidization in Neopolyploids of Cobitids, Botids, and Cyprinids [Liběchov]

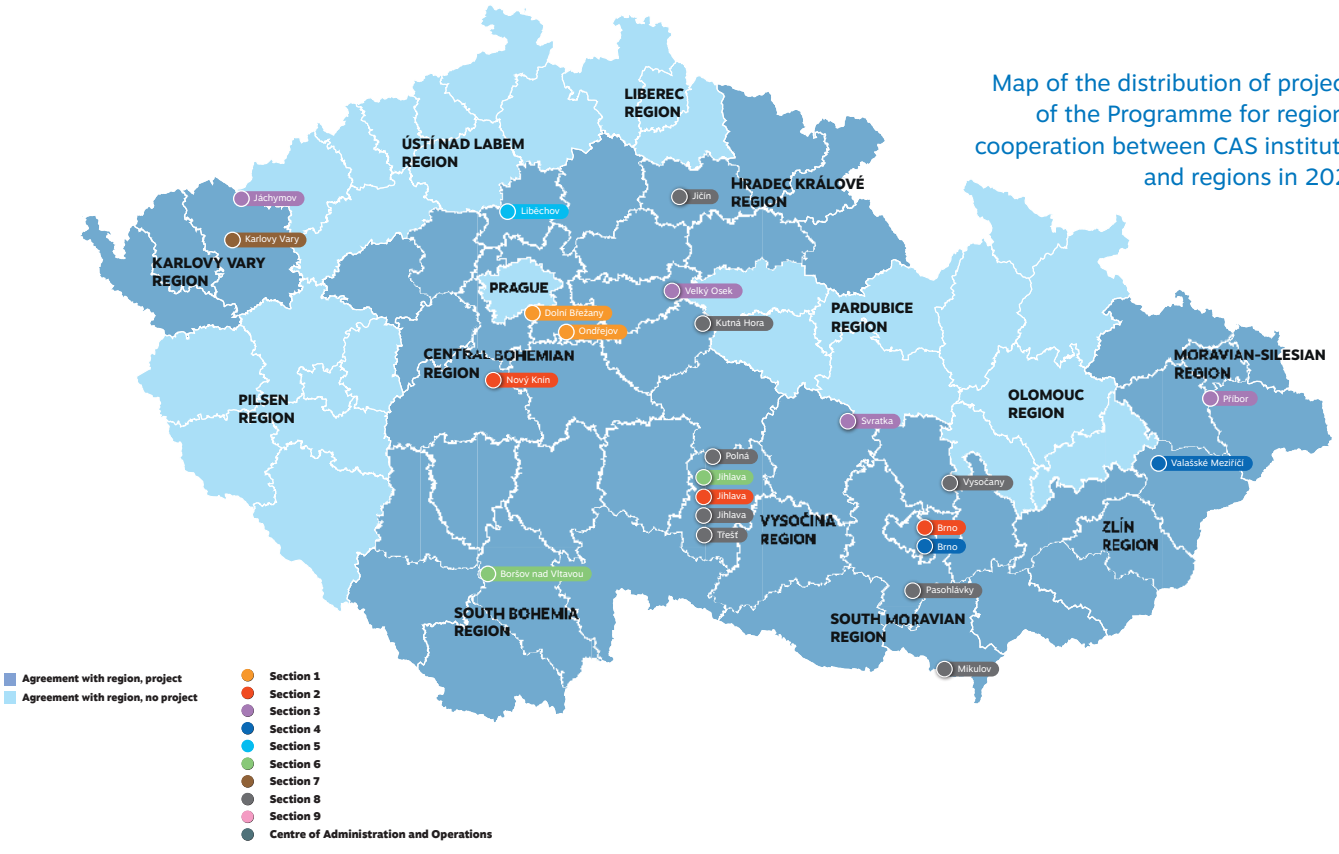
Section of Socio-Economic Sciences

- Social and Spatial Access to Secondary Schools in the Karlovy Vary Region (Karlovy Vary)

Historical Sciences

- Central Pojihlaví Area as Part of the Historical Trail Connecting the Bohemian-Moravian Highlands with the South Moravian Valley [Jihlava]
- Czech-German-Jewish Coexistence in Třešť 1939-1945. Nazi Dictatorship in the Memorial Space of a Small Town [Třešť]
- The Oldest Photographs in the Polná Municipal Museum: Preservation, Research, Accessibility [Polná]
- Museum Associations Yesterday and Today II. Conference on the 160th Anniversary of the Founding of the Museum and "Včela Čáslavská" Local History Association [Kutná Hora]
- Lost, Forgotten and Discarded. Research and Multilevel Presentation of the Phenomenon of the Moravian Gravettien Mammoth Bone Deposits [Mikulov]
- A Medieval Path Through the Heart of the Drahanská Vrchovina [Vysočany]
- All Roads Lead From Rome? Mušov as a Destination of Roman Military Expansion into Our Territory and a Key Junction of Land and River Routes of the Roman Era [Pasohlávky]
- Exploration of the Češovské Valy Hillfort [Jičín]
- Mine Ventilator from Kutná Hora and Its Restoration [Kutná Hora]

Map of the distribution of projects of the Programme for regional cooperation between CAS institutes and regions in 2024



Environment and Sustainable Operations

in Scientific Research and Research Infrastructure

In 2024, the Czech Academy of Sciences continued to focus on socially crucial topics related to sustainability and environmental protection. The Academy Council's permanent advisory bodies for these issues are the Commission for the Environment and the Committee for Energy Research. The committees are composed of leading experts in their respective fields. Through Strategy AV21 research programmes, CAS institutes delve into research on current issues such as: Landscape Conservation and Restoration, Foods for the Future, Water for Life, Sustainable Energy and Resilient Society for the 21st Century. The Potential of Crisis and Effective Transformation. The Commission for the Environment addresses key current issues. In 2024, it organised a seminar about the amendment to the Forest Law and a seminar on the impacts of the war in Ukraine that looked at possible revitalisation and ecological restoration of the affected areas.

> The Czech Academy of Sciences contributes to sustainable development by researching aquatic and forest ecosystem biodiversity and by ensuring that climate data is available to help society adapt to changing conditions.

Biology Centre

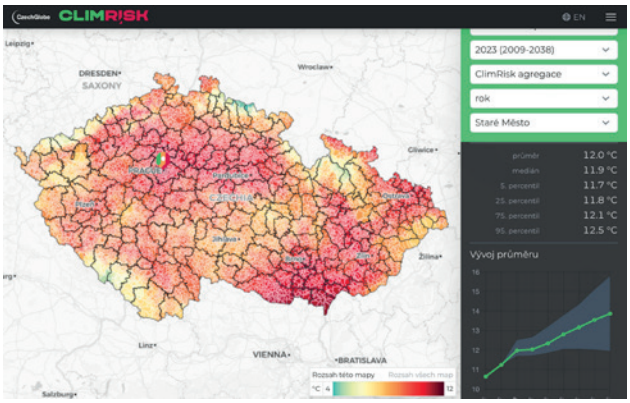
Temporal changes and interactions of reservoir microbial communities

The Římov reservoir is a crucial source of drinking water for South Bohemia. Biology Centre scientists have conducted meticulous long-term field research leading to a number of discoveries which have gained global recognition. Their current research involves detailed sampling, exhaustive analyses of environmental parameters and advanced molecular genetic methods for studying aquatic microorganisms. Forty new freshwater viruses were discovered in 2024. The first virus that the team isolated and described in detail was named Budvirus in honour of the South Bohemian capital, České Budějovice. It is a giant virus that is completely harmless to humans and attacks only unicellular algae of the genus *Rhodomonas*, the dominant component during the spring phytoplankton peak. By eliminating *Rhodomonas* algae from the aquatic environment, Budvirus significantly affects the quantity and composition of phytoplankton, thereby playing an active role in maintenance of seasonal succession and ecological balance in the aquatic ecosystem. Intensive field sampling approximating microbial generation times (ca. a few days) in combination with advanced sequencing methods is a unique approach that makes it possible to discover previously undescribed organisms, determine their significance in the aquatic environment, reveal previously unknown interactions, and describe their life cycle and responses to seasonal changes in conditions or sudden disturbances that may be triggered by e.g. floods. This new knowledge also clarifies mechanisms that we need to understand in order to maintain high water quality in reservoirs.

Římov water reservoir

Global Change Research Institute

ClimRisk.cz web application: A significant contribution to climate change adaptation



The website www.climrisk.cz illustrates how research results can be used to address environmental sustainability and, more specifically, climate change adaptation. ClimRisk ensures availability of data that is required for mandatory climate risk screening of economic activities under Regulation (EU) 2021/1060 of the European Parliament and of the Council.

ClimRisk provides climate data for assessment of anticipated future climate risks. The data, which are the output of the methodology developed through the project, summarise the most recent projected climate data and are a cross-section of available climate models and scenarios. They depict the most probable future Central European climate conditions and outline the uncertainties inherent in any future outlook.

ClimRisk informs the work of public administration bodies charged with formulating policies and specific adaptation measures and enables businesses, especially those in the financial, energy, construction and forestry sectors, to meet assessment requirements related to the environmental sustainability and climatic resilience of business investments. It is a tool for anyone who needs data for professional or purely personal interests.

ClimRisk displays outputs in two spatial domains. The first is the Czech Republic, with data based on a very detailed resolution of 500 m. The second domain is the Central European region, where the data is based on a resolution of about 10 km. The data are derived from four basic socio-economic scenarios that describe projected future global evolution. They were calculated using seven CMIP6 global climate models, which are a robust representation of the much larger pool of models

(over 20) that were tested. The available data includes basic meteorological characteristics (air temperature, precipitation, wind speed, humidity, sunshine and radiation) and derivative indices, including indices describing extreme events (e.g. number of tropical days, number of days with snow cover, characteristics of drought, etc.). A major advantage of the data is that it expresses the uncertainty of the prediction for the given area. This provides data users with candid information, both about the mean value and about the possible range of values so that they can incorporate it into decision-making about the climate vulnerability of an investment.

Users can find climate data for a selected location using a simple map interface. They can download the mean climate projection for the applicable future thirty-year period or the selected scenario projection. For the Czech Republic, data are immediately available for cadastres and level-four river catchments. For Central Europe, data are available at the level of territories of municipalities with extended competencies. When more detailed resolution or aggregation for a larger area is needed, data can be ordered through the app.

Institute of Botany

Global maps of current and projected forest disturbance agents

Forests are constantly disturbed by fires, wind, pests and diseases, and landslides. These disturbances have a major impact on the carbon cycle, forest species diversity and water supplies. Moreover, ongoing climate change is bringing about changes to the frequency and intensity of various types of disturbances. Knowledge of forest disturbance agents and contexts is crucial for the development of strategies to mitigate and adapt to climate change impacts. A team from the Institute of Botany created maps of current and projected forest disturbance agents. The maps will enhance forecasting of projected shifts in forests around the world.

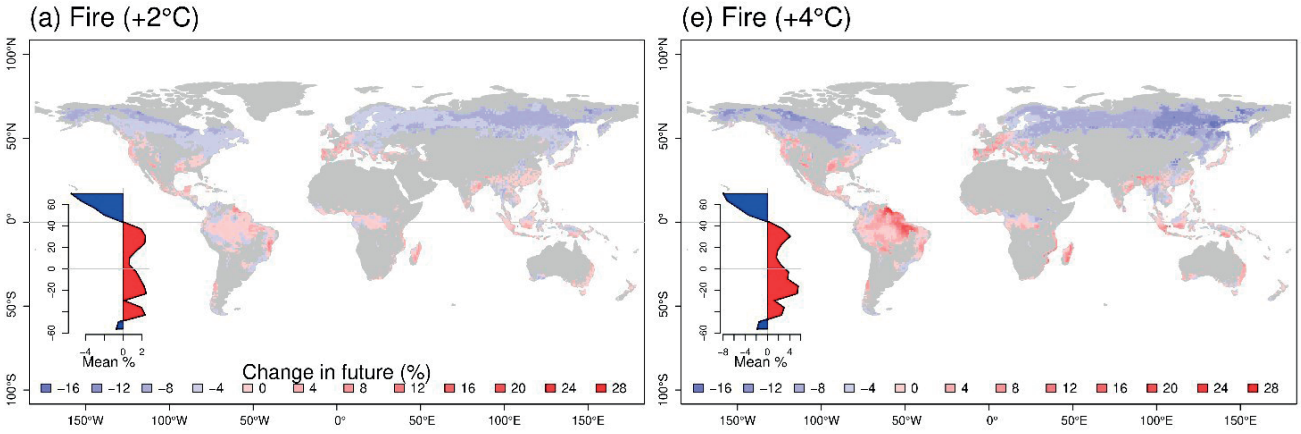
There had been no previous global mapping of the role of different types of disturbances in various regions of the world; knowledge had been fragmentary and based largely on short-term observations of small areas. The researchers sought to collect data and identify the different combinations of climatic, geographical, and forest characteristics that drive the distribution of disturbance agents globally. Utilising data from all continents and biomes, which they obtained by studying several hundred previously published papers, they compiled a risk map for each type of disturbance. Incorporating climate projections, they then modelled future shifts at global, continental, biome, and country scales.

In the future, wind storms may play a smaller role in northern regions than today, but a greater role in tropical regions. The photo shows trees uprooted by Typhoon Bolaven in South Korea's Hallasan National National Park in August 2012. *Photo: J. Altman*

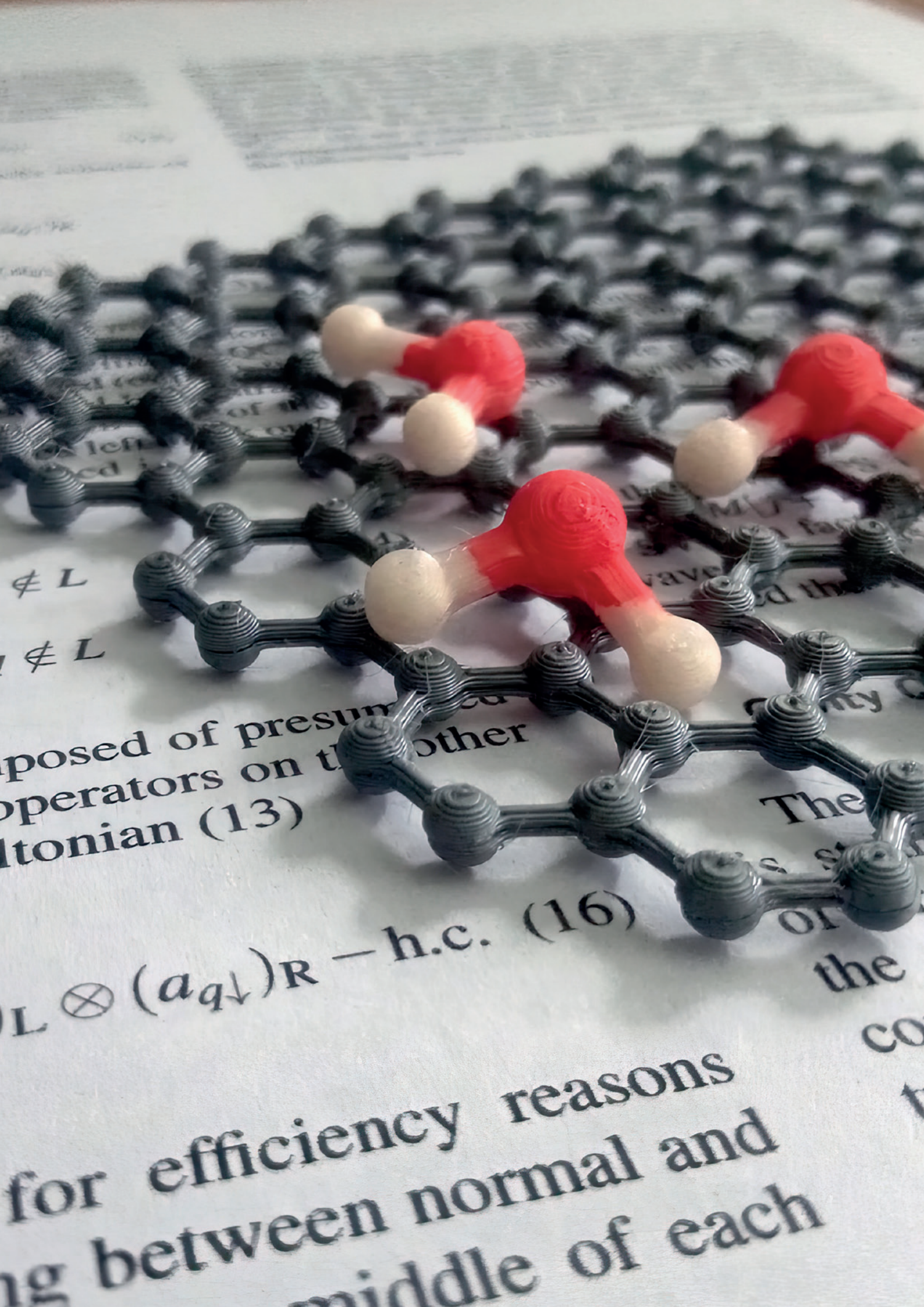
They worked with two global warming scenarios: +2 °C and +4 °C. The scientists' results illustrate the rates of disturbance shifts under climate change and provide high-resolution, standardised data for experts developing strategies to mitigate forest dieback due to climate change.

Bibliographic references:

Altman, Jan & Fibich, Pavel & Trotsiuk, Volodymyr & Altmanová, Nela. Global pattern of forest disturbances and its shift under climate change, Science of the Total Environment, 2024.



Projected changes in the potential spread of fires under a warming climate (two scenarios: +2 °C and +4 °C)



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Educational Activities

Educating young scientists and improving the quality of the education system at all levels are important elements of research at the Czech Academy of Sciences and a cornerstone of the Czech Academy of Sciences' mission in society. CAS' educational efforts are grounded in cooperation with universities, with particular attention on educating students in doctoral programmes. CAS employees are also directly and extensively involved in teaching and supervising university students, while also taking part in a variety of educational and training programmes for secondary school students and teachers.

COOPERATION WITH UNIVERSITIES

> “The Czech Academy of Sciences dedicates special effort to collaboration with universities, secondary and primary schools. It places particular emphasis on the education of doctoral students.

Act No. 111/1998 Coll., on Higher Education Institutions requires that doctoral programmes implemented by institutes in cooperation with universities be accredited by the National Accreditation Bureau. A mandatory part of the accreditation application is an agreement between the Czech Academy of Sciences and the relevant university on cooperation on implementation of the given doctoral programme. The CAS has signed agreements with 16 universities and negotiations with other universities continue in an atmosphere defined by trust and due procedure. The CAS continues to pro-actively seek out other opportunities to collaborate with universities throughout the Central European region.

In relation to the forthcoming amendment to Act No. 111/1998 Coll., CAS representatives held intensive negotiations with officers of universities and university rectors in 2024 to put forth an amendment to the Higher Education Act that would take into account CAS institutes' role in the education of doctoral students. This amendment, currently being discussed by the Parliament of the Czech Republic, would allow guaranteed doctoral income to include income from intellectual work related to dissertation development, which doctoral students may perform as employees of legal entities such the CAS that collaborate on a given doctoral programme.

Relations between the CAS and universities are monitored and coordinated by the Council for Cooperation with Higher Education Institutions and the Preparation of Scientific Employees of the CAS, which is an advisory body to the CAS management. The Council convened at two in-person meetings during 2024. The Council meeting in April included discussion of the latest developments in the preparation of the draft amendment to the Higher Education Act, which has major impacts on the work of doctoral students at the CAS. This was followed by a series of meetings with representatives of universities and members of the committee responsible for discussing the amendment to the Higher Education Act in order to promote the aforementioned change to strengthen cooperation between universities and CAS institutes. The Council's second meeting was held in October 2024 and addressed current developments regarding the amendment to the Higher Education Act and its impact on many students working at CAS institutes, study programme completion rates, and financial relations between faculties and CAS institutes.

CAS officers met multiple times with representatives of Charles University (which has the largest number of doctoral students at the CAS) to discuss the planned changes in the funding of doctoral students. A joint document supporting further collaboration between the two institutions in doctoral student education is being prepared.

Academy Council members visited the Silesian University in Opava and discussed possible cooperation. In October, the university sent specific proposals and topics for collaboration in astronomy, mathematics and sociology.

CAS institutes and employees participate extensively in student education at both public and private universities. In 2024, CAS staff provided more than 4,000 individual semester series of lectures, practicals or seminars with a total scope of more than 73,000 hours. CAS institutes thus contribute significantly to student education and supervision of students' qualification work. In 2024, employees of CAS institutes trained 2,076 doctoral students and also participated in the

Table 10: Overview of the most significant forms of cooperation with universities

	2018	2019	2020	2021	2022	2023	2024
Doctoral students trained at CAS institutes	1,995	2,046	2,161	2,312	2,259	2,117	2,076
Newly admitted doctoral students	376	384	427	395	344	318	365
Number of completed doctoral dissertations	264	242	181	228	199	220	255
Number of semestral series of lectures, seminars and practicals	5,247	6,909	6,479	6,101	4,556	5,036	3,884
Number of hours lectured	71,335	73,086	69,518	68,176	71,903	74,635	73,494

supervision of bachelor and master programme students. A total of 255 doctoral students trained at CAS institutes successfully completed their studies in 2024.

The CAS has supported the general education of doctoral students for many years through its week-long Course on scientific research basics. The course is intended for doctoral students in various disciplines. The main objective of the course is to cultivate the skills students need to thrive in the fiercely competitive international environment. Courses are held in Prague and in Brno. In 2024, 91 students took part in three combined courses in Prague, and 152 students participated in four in-person courses in Brno. Students trained at other institutions also seek out the courses. The lecturers include renowned and experienced experts, mainly CAS employees, and lecture content is chosen to be useful for doctoral students across all disciplines. The main subjects include scientific methodology, ethical principles in scientific work and bioethics, evaluation of scientific work, scientific communication and its written genres, suitable presentation of research results, editorial aspects of publishing in journals, scientific writing techniques, rhetoric and the culture of the spoken word, lecturing skills, current information resources for science, research and education, research funding options and grant proposal development, intellectual property rights and commercialisation, technology and knowledge transfer, professional writing skills in English, and more. The import and significance of these courses is evidenced by student feedback, which is collected and evaluated on an ongoing basis.

ENGAGEMENT AT SECONDARY AND PRIMARY SCHOOLS

CAS' engagement in secondary and primary school education centres around teaching and a diverse array of lectures. Through the Open Science project, the CAS also offers summer science camps for secondary and primary school natural science teachers, the School of the Czech language and literature for teachers, and courses for promoters of science.

OPEN SCIENCE PROJECT

The CAS offers students of secondary, higher vocational and higher education institutions the opportunity to participate in scientific work through one-year internships at CAS institutes under the guidance of experienced teachers. The Open Science project has been operating since 2005 and is fully funded by the Czech Academy of Sciences. The internships are one year long with a minimum of eight hours per month. Travel costs are also covered for students who commute. Internships for high school students culminate in the fall when they present their research results at a student science conference. A jury assesses the student projects and awards prizes to the best projects. Students can also submit their research projects to other Czech and international competitions.

The Open Science student science conference took place on 7-8 November 2024 in the CAS building at Národní 3 in Prague.

Media Communications and Promotion

Communicating scientific topics through the media and holding high quality science outreach events for the general public have always been important elements of the Czech Academy of Science's work. Scientists and science promoters strive to spark public interest in scientific work. They do their utmost to explain research and its purpose and long-term benefits for societal development to non-scientists. Scientists' expert commentaries on current events or issues elucidate complex phenomena for the public, highlight potential solutions, and have the power to set important public agendas.

THE CZECH ACADEMY OF SCIENCES AS A MEDIA PARTNER

An essential part of CAS media communications involves working with public service media, namely Czech Television, Czech Radio and the Czech Press Agency. Throughout 2024, CAS scientists were regularly invited to take part in Czech Television and Czech Radio broadcasts and asked for interviews to clarify various current topics. For both journalists and the public, CAS scientists are a source of verified information in a wide range of scientific disciplines.

In 2024, there were 43,148 media outputs mentioning the CAS and variations of its name, with 49.3% on the internet, 25.5% in radio, 13.5% in printed media, 6.2% in television news, 3.9% in Czech Press Agency news desks which other media use as a source, and 1.5% in podcasts, social networks and YouTube videos. According to Newton Media, the keyword Academy of Sciences appeared in the monitored media an average of 3,595 times per month. The vast majority of media reporting about the CAS had a positive overtone.

The work of the CAS, across all of its scientific disciplines, figured prominently in the media in 2024. Accordingly, only a few brief examples of the notable impact of CAS media communications can be shared below.

> “The Czech Academy of Sciences has always dedicated great effort to communicating with the public, particularly through the media. In 2024, there were 43,148 media outputs about the CAS in monitored media.

CAS research topics

Tomáš Jungwirth from the **Institute of Physics** attracted strong media interest with his research on altermagnetism, a new form of magnetism which he had described theoretically in 2019. He published the first direct evidence of altermagnetism in *Nature* in February 2024, followed by the first microscopic images of this revolutionary phenomenon. Tomáš Jungwirth, one of the most highly cited scientists in the world, was also awarded a 2024 Czech Head Award.

One theme that appeared throughout the year was the harmfulness of “forever chemicals”. Tomáš Cajthaml and Jaroslav Semerád from the **Institute of Microbiology** made multiple statements on this issue, which was also included in one of the panel discussions at the CAS Week Festival.

The media has always been interested in space missions: in 2024, for example, the CAS was involved in the preparation of the LISA mission, funded by the European Space Agency. A consortium of four CAS institutes - the **Astronomical Institute**, **Institute of Physics**, **Institute of Atmospheric Physics** and **Institute of Thermomechanics** – are developing a mechanism for switching between laser beams in each spacecraft. Researchers from the **J. Heyrovsky Institute of Physical Chemistry** and **Institute of Geophysics** are involved in the development of instruments for the European EnVision probe, which is scheduled to launch to Venus in 2031.

A press release about the imaging of a chromosome structure in its native state, using a revolutionary method collaboratively developed by scientists from the **Institute of Scientific Instruments** and the **Institute of Experimental Botany**, received favourable media attention.

Social science research results also had a significant media footprint. Unique research on corruption that included insiders’ perspectives, conducted in six sectors of public life by Kristýna Bašná’s team at the **Institute of Sociology**, was reported in the media.

The grand opening of a new laboratory for Actinium-225 radionuclide production testing at the **Nuclear Physics Institute** in Řež was also widely covered by the media. The official ribbon-cutting ceremony at the entrance to the hot chambers featured Czech Prime Minister Petr Fiala and CAS President Eva Zažímalová.

The media paid considerable attention to news about the opening of a branch of the **Institute of Organic Chemistry and Biochemistry** in Boston and an agreement on an industrial partnership with the US manufacturer Lockheed Martin, involving the HiLASE Center of the Institute of Physics, to acquire 24 F-35 fifth-generation aircraft for the Czech army.

In late 2024, the media followed the CAS presidential elections. Radomír Pánek, elected by the Academy Assembly in the first round of voting, will take over the CAS leadership at the end of March 2025.

The AVex expert opinion on the extreme harmfulness of fireworks was widely quoted in the media in the context of New Year's Eve celebrations. A video about the extremely high level of toxicity in pyrotechnics, especially amateur fireworks, received a large number of views on Facebook and Instagram. The CAS has succeeded in increasing media visibility of this crucial topic since late 2022.

The media also covered events that the **Centre of Administration and Operations** organised for the CAS: Brain Week, the Science Fair, which most of the national and regional media announced prior to the event itself, CAS Week, Photogenic Science, etc.

CAS in current news

CAS scientists also regularly explained, analysed and commented on current events and the context of important historical anniversaries, etc. Climate change issues have long been part of the CAS' communication content. Miroslav Trnka, Jakub Hruška, Pavel Zahradníček and Aleš Farda from the **CzechGlobe - Global Change Research Institute** repeatedly spoke in the media about the rise in global temperature and its impacts. Aleš Urban, Radan Huth and Ondřej Lhotka from the **Institute of Atmospheric Physics** also made statements on climate change. Eva Balounová and Hana Müllerová from the **Institute of State and Law** commented on and explained climate change with respect to Czech and European law.

News about archaeological discoveries attract considerable public interest. A story about the oldest known human settlement in Europe near the town of Korolevo in western Ukraine literally caused a media whirlwind. The results of a four-year study by Roman Garba's team at the **Nuclear Physics Institute** and **Institute of Archaeology in Prague**, published in *Nature*, also attracted the interest of a number of foreign daily newspapers and servers.

Other popular news stories included reporting about the 100th anniversary of the start of archaeological excavations at Vyšehrad, the unexpected discovery of 2,000 medieval silver coins in the Kutná Hora region, which the **Institute of Archaeology, Prague** was involved in processing, and excavations associated with the construction of new motorways. The media also repeatedly cited a report by the **Institute of Archaeology, Brno**, about a replica of a Roman rowing boat, which was on display at the Nové mlýny reservoir near the Mušov Visitor Centre - Gateway to the Roman Empire during the summer.

Astronomical phenomena have traditionally attracted media interest. Scientists from the **Astronomical Institute** commented on e.g. aurora that can be seen in the sky above the Czech Republic, a partial lunar eclipse, the launch of the HERA probe, the passage of comet C/2023 A3 Tsuchinshan-ATLAS around the Earth, etc.

An increase in cases of whooping cough, especially in the spring, was a major media issue, with explanations offered by e.g. Peter Šebo from the **Institute of Microbiology**.

AVex expert opinions

AVex expert opinions provide lawmakers, selected ambassadors and Members of the European Parliament with independent and apolitical scientific information about concrete, current societal problems and potential solutions. Three expert opinions were published in 2024: The **J. Heyrovsky Institute of Physical Chemistry** complied an opinion titled "New Paths from Renewable Energy Sources to Fossil-Free Fuels". The AVex "Archaeological Heritage in the 21st Century. The Need for New Legislative Protection" was developed by teams from the **Institutes of Archaeology** in Prague and Brno. The CAS published the third AVex, "Non-university Research: An Integral Part of World-Class Science", to commemorate the 240th anniversary of the founding of the Royal Czech Society of Sciences – the oldest predecessor of today's CAS – in November 1784. AVexes are also available on the CAS website and are widely used by the media.

Short videos

In 2024, the CAS also used short videos featuring scientists speaking on a current topic or about new press releases to introduce topics studied at the CAS. The videos, which are about 10 minutes long, are produced by the Division of External Relations Press Section of the Centre of Administration and Operations, which posts them on social media (in shorter approximately 1.5-minute versions) and sends them to journalists as material for reporting. Media editorial offices either use the videos directly in their broadcasts or news reports or prepare their own report or video with the help of the respondent. The Division of External Relations Press Section produced forty short videos in 2024.

SCIENCE PROMOTION

through the CAS Centre of Administration and Operations

> The Czech Academy of Sciences considers the popularisation of research results and the dissemination of scientific knowledge to the general public to be an integral part of its mission.

The CAS service office - the Centre of Administration and Operations - has always played an important role in systematic promotion of CAS research results among the public. It manages a diverse spectrum of promotional activities through the Division of External Relations.

VELETRH VĚDY

SCIENCE FAIR

The 2024 Science Fair took place from 30 May to 1 June 2024 at PVA EXPO PRAHA in Letňany and attracted a record 58,000 visitors. Forty-seven CAS institutes, universities, science centres and innovation companies took part. Some of the most popular attractions were improvised laboratories and interactive exhibits where visitors could try out experiments promoting scientific research. Science Point offered interesting discussions on topics from the Strategy AV21 programme as well as live broadcasts of popular science podcasts, including the CAS Podcast and CHEmic.

CAS WEEK

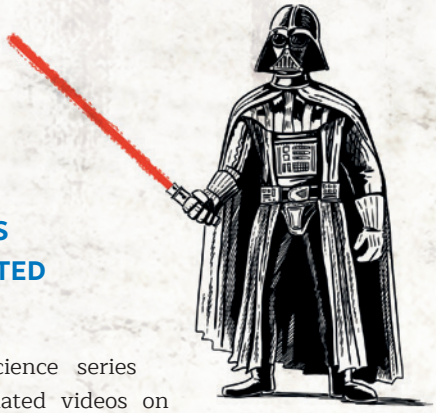
The fourth annual CAS Week Festival took place from 4 to 10 November 2024. The core theme was Strategy

AV21 programmes with the motto "Top research in the public interest". Scientists presented the latest results of Czech science and research through open door days at CAS institutes and a lecture series in the CAS building in Národní street. The CAS Week Festival also included a student science conference to commemorate the 20th anniversary of the Open Science programme.

PHOTOGENIC SCIENCE

Each year, the Photogenic Science competition is organised jointly by the CAS Centre for Administration and Operations and the Science Alive Forum!. In the main category, the jury recognised the three best photos and an additional three other photographs from Research areas I, II and III. The 2024 competition included a secondary category focused on Intergenerational Science and a special category for Analog Photography. The jury selected 38 photos for the

Photogenic Science 2024 exhibition. The public could also vote online for the best image on the CAS Facebook page. The exhibition was held from December 2024 to February 2025 in the Science and Art Gallery in the CAS building in Národní street.



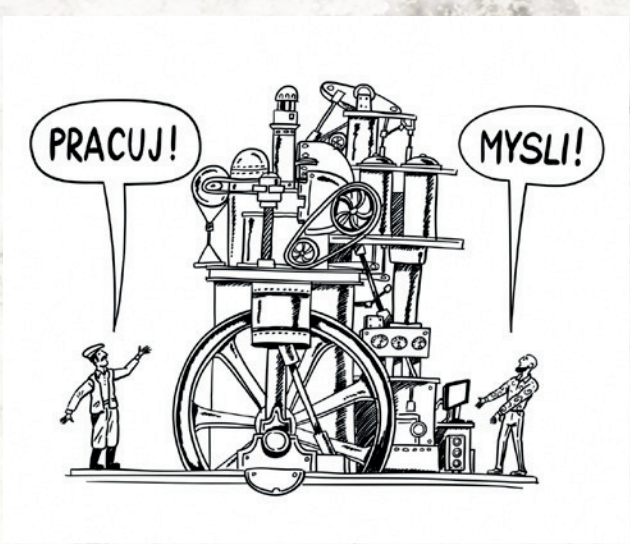
NEW EPISODES OF UNDISTORTED SCIENCE

The Undistorted Science series features short animated videos on a spectrum of topics from the world of science - from physics and chemistry to biology and social sciences. The ninth series in 2024 covered topics such as critical thinking, photovoltaics, etc. Each episode is subtitled in both Czech and English, making the series accessible to international and hearing impaired audiences.

EXHIBITIONS AT THE SCIENCE AND ART GALLERY

Four exhibitions were held at the Science and Art Gallery in 2024. The exhibition “Secrets of Floral Development under Scrutiny” was created in cooperation with the Institute of Biophysics and the Institute of Scientific Instruments. The “Fascinating World of Animals” exhibition, featuring photos taken by scientists from the Institute of Vertebrate

Biology, commemorated the Institute’s 70th anniversary and highlighted current research topics. The “Journey into History” exhibition was developed as a collaborative effort between the Institute of History and the Institute of Archaeology, Prague. It used contemporary technology to present modern historical science and research results. CAS scientific teams helped create 3D models, reconstructions and visualisations which could be viewed via a mobile app. The “Photogenic Science” exhibition presented a selection of the best photographs from the competition.



OPEN SCIENCE 2024

In 2024, the Open Science project once again made it possible for secondary school students from across the entire country to participate in science internships. A total of 819 high school students from all over the Czech Republic submitted 1,483 applications. Altogether, 214 high school students took part in 117 internships at 37 CAS institutes led by 112 expert instructors. The internships culminated in a student conference, held on 7 to 8 November 2024 at the CAS building in Národní street, where student interns presented the results of their year-long research efforts.

ON BOARD WITH SCIENCE

In 2024, the science promotion project On Board with Science continued providing its acclaimed popular science lectures. Through the project, young scientists make in-person visits and give online lectures to secondary school and grammar schools across the country. The aim is to render the world of contemporary science and research accessible to young people to inspire them to pursue a career in science. In 2024, a total of 43 lectures were held through the On Board with Science project, including 27 that were delivered in-person and 16 online. Grammar and secondary schools from all over the Czech Republic are involved in the project and some schools have expressed interest repeatedly.

SCHOOL OF CZECH LANGUAGE AND LITERATURE FOR TEACHERS

The School of Czech Language and Literature for Teachers is the CAS' popular educational course for teachers. The 12th annual training course took place from 30 September to 2 October 2024 in Prague. Fifty-six Czech language teachers took part, including a majority of secondary school teachers and a smaller number of primary school teachers. The course is organised by the Czech Academy of Sciences in cooperation with the Czech Language Institute, Institute of Czech Literature and the CAS Centre of Administration and Operations.

CAS BRAIN WEEK

Brain Week, a festival about the latest discoveries and trends in brain research and neuroscience, is part of Brain Awareness Week (BAW), a global campaign to raise public awareness of brain research. From 11 to 17 March 2024, the 25th annual Brain Week festival took place, with more than 60 lectures, workshops and exhibitions in Prague and in larger cities across the country. Brain Week 2024 explored topics including stroke, fear of animals, the effect of DNA transposons on brain development and aging, the use of modern technology and artificial intelligence to treat Alzheimer's disease, and how a newborn's brain tunes to its native language. The festival also looked at practical health topics.

CAS MEDIA

In 2024, four issues of the official quarterly journal of the CAS *A / Magazine* (formerly *A / Science and Research*) were published. The main theme of the March issue was evolution, the June issue focused on the phenomenon of retro trends, the September issue explored light and the December issue examined scents. Two issues of the popular science magazine *A / Easy* (formerly *AΩ / Science for Everyone*) were also published. The theme of the spring issue was magic and the autumn issue focused on money. The year 2024 saw the launch of a pilot English-language issue of the official quarterly *A / Magazine*, whose main theme was light.

In 2024, as in previous years, *A/Magazine* won recognition in the PR industry. It took first place in the external customer magazine category of the business marketing Fénix Awards. The Czech Academy of Sciences podcast took third place in the branded podcast category and the CAS LinkedIn profile was awarded third place in the academic category. CAS popular science projects were also recognised in the Zlatý středník competition. *A / Magazine* took second place in the external print magazine category and the Czech Academy of Sciences podcast won third place in the podcast category.

In 2024, the *A / Z Akademie* section on the CAS website provided information to CAS institute staff about internal news and events. The *A / Z Akademie* e-mail newsletter highlights current information. Twenty newsletters were issued in 2024.

News from the Czech Academy of Sciences and its institutes is consistently promoted through the main CAS website, avcr.cz, and social networks, where CAS fan numbers continue to grow. Facebook remains the most followed social network (over 66,000 followers), followed by Instagram (24,000), X (14,000) and LinkedIn (7,000). In December, the Czech Academy of Sciences joined the Bluesky social network.

AUDIOVISUAL PRODUCTION

The Czech Academy of Sciences also promotes science through its audiovisual production. In 2024, the Audiovisual Technology Division of the Centre of Administration and Operations provided streaming, technical support for important events, vignettes of prominent scientists, videos presenting specific institutes or their concrete achievements, etc. Videos describing publications from the Academia Publishing House were also made. Collaboration with the Institute of Hydrodynamics continued on the documentary series *Water for Life*. One of the episodes of this series was presented at the Academia Film Olomouc 2024 International Festival of Popular Science Films. The year 2024 also saw the completion of the documentary film *The City as a Laboratory of Change*, which was co-created with the Institute of Contemporary History. New videos were produced in 2024 for the Scout YT channel, which offers popular science content designed for young people.

Publications

The Czech Academy of Sciences supports the publication of selected scientific and popular science publications from all scientific disciplines through the Academia publishing house, which is part of the Centre of Administration and Operations, and other CAS institutes. Books by CAS scientists are also published by other prominent Czech and international publishing houses.

> By supporting the publication of high-quality publicly accessible scientific and popular science publications, the Czech Academy of Sciences helps disseminate scientific research results and advance knowledge.

Greek Myths in Literary and Artistic Tradition, Volumes 1 and 2
A. Hadravová

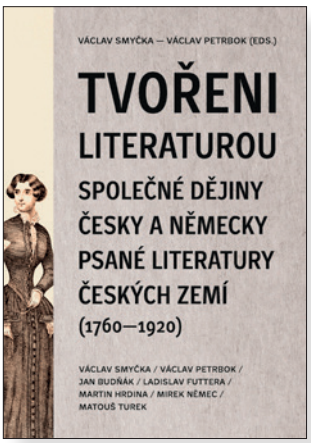
In compliance with CAS Guideline No. 13/2018 on Support of Publication Activities, the CAS supports proposals for publication of original scientific work, critical editions of important sources and significant commemorations, translations of important scientific or popular science works, and popular science publications detailing original research results.

In 2024, through the Publishing Support Programme, and based on recommendations from the Committee for the Support of CAS Publishing Activities, the Czech Academy of Sciences supported publishing at the following 11 institutes: the Institute of Archaeology in Brno, Institute of Archaeology in Prague, Institute of History, Masaryk Institute and the Archives, Institute of Art History (Artefactum Publishing House), Institute of Contemporary History, Institute of Philosophy (Filosofia and Oikoymenh publishing houses), Institute of Slavonic Studies, Institute of Czech Literature, Institute of State and Law and the Centre of Administration and Operations (Academia Publishing House).

This support of CZK 18.2 million enabled the publication of 113 books, 50 of which were published by Academia Publishing House and 63 by CAS institutes. Publication of another 130 books is forthcoming.

In 2024, the Publishing Support Programme supported the publication of notable scientific works such as Alena Hadravová's *Greek Myths in Literary and Artistic Tradition* (Academia), a two-volume monograph of over 1,000 pages; the voluminous and impressive *History of the Czechoslovak Academy of Sciences II 1963–1970* (Academia, Masaryk Institute and Archives of the CAS), prepared by a team of authors led by Martin Franc and Věra Dvořáčková;

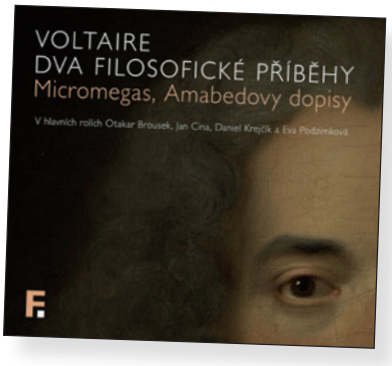
History of the Czechoslovak Academy of Sciences II. 1963 – 1970.
M. Franc, V. Dvořáčková et al.



Created by Literature

V. Smyčka,
V. Petrbok (eds.)

and the innovative and scientifically very stimulating *Created by Literature. A Common History of Czech and German Written Literature of the Czech Lands. 1760-1920* (Institute of Czech Literature) by Václav Smyčka and Václav Petrbok (eds.); Lubomír Šebela and Antonín Přichystal's *Silicite Daggers in the Czech and Slovak Republics* (Institute of Archaeology, Brno),



Two Philosophical Stories

Voltaire

an audiobook of Voltaire's two exceptional novellas *Two Philosophical Stories. Micromegas, The Letters of Amabed* (Philosophy); and a richly illustrated ethology textbook *Ethology. Mechanisms, Ontogeny, Function and Evolution of Animal Behaviour* (Academia) by Marek Spinka, Jan Havlíček, Iveta Štolhoferová and Daniel Frynta (eds.).

Silicite daggers in territory of the Czech and Slovak Republics

L. Šebela, A. Přichystal

Ethology. Mechanisms, Ontogeny, Function and Evolution of Animal Behaviour

M. Špinka,
J. Havlíček,
I. Štolhoferová,
D. Frynta (eds.)

which synthesises the authors' many years of research; the exhibition catalogue *The Struggle for the Small Town (1900-1960). Stories of Historical Monuments and Their People* by Jakub Bachtík, Michal Kurz and Kristina Uhlíková (eds.) (Artefactum, Masaryk Institute and Archives of the CAS);

The Academia Publishing House is the largest CAS publishing house and a leader among Czech publishers. In its editions programme it publishes works from all scientific disciplines - original scientific monographs and works by Czech scientists, classic scholarly writings, translations of foreign books, popular-educational literature, non-fiction literature, encyclopaedias, dictionaries, language textbooks, manuals and university textbooks, the popular-educational magazine *Živa* and high-quality Czech and translated foreign fiction.

In 2024, the Academia Publishing House published a total of 93 books, five new brochures in the *Science Around Us* series and six new brochures in the *Strategy AV21* series. The Strategy AV21 programme supported the publication of three monographs.

The Struggle for the Small Town (1900-1960)

J Bachtík, M. Kurz,
K. Uhlíková (eds.)

Cooperation with Scientific Organisations

The Czech Academy of Sciences is a long-standing supporter of the activities of scientific societies in the Czech Republic. Scientific societies link renowned experts from universities, the Czech Academy of Sciences and ministerial research institutes, as well as students and other individuals interested in the given scientific disciplines. Many scientific societies are interdisciplinary in nature and some focus on specific disciplines that are not represented in academic or other scientific institutions. Most of the societies are members of international associations in their field that operate on a global or European level. In 2024, the CAS supported 129 projects in collaboration with the Council of Scientific Societies of the Czech Republic.

> The Czech Academy of Sciences is a long-standing supporter of the activities of scientific societies, including the Learned Society of the Czech Republic and scientific societies associated in the Council of Scientific Societies of the Czech Republic. In 2024, the CAS supported 129 projects in collaboration with the Council of Scientific Societies of the Czech Republic.

The CAS provides systematic, long-term support to scientific societies associated in the Council of Scientific Societies of the Czech Republic. Since 2019, the Council of Scientific Societies has operated as an independently registered association, affiliated with the CAS Academy Council through the Committee for Cooperation with Scientific Societies. The Council of Scientific Societies currently brings together 91 scientific societies with more than 30,000 members. There were no new membership applications to the Council of Scientific Societies in 2024.

In 2024, the societies published a total of 31 internationally noted journals, six of which had an impact factor, i.e. *Preslia* (Czech Botanical Society – IF 4.4), *Fottea* (Czech Phycological Society – IF 2.2), *Plant Protection Science* (Czech Society for Plant Pathology – IF 1.7), *Journal of Geosciences* (Czech Geological Society – IF 1.4), *Geography* (Czech Geographical Society - IF 0.9) and *Chemické listy* (Czech Chemical Society - IF 0.6). The societies also published 36 national professional journals, 12 web-based journals (many of the previously listed journals have web-based versions) and 37 newsletters or bulletins, reporting mainly on news from the societies and the field.

Scientific societies published a total of 20 book monographs and 54 compendiums in 2024. They include, for example, the following noteworthy books: *The Economic Rise of the Czech Lands. I., From the 1750s to the End of World War I* by Zdeněk Jindra et al. (Society for Economic and Social History of the Czech Republic) and *Czechoslovak Exile and the Committee for Free Europe by Martin Nekola et al.* (Edvard Beneš Society).

Scientific meetings and conferences - the most frequent "showcase" for the societies' activities at both international and national level - numbered 380 in 2024. Some of the most important were the: "33rd International Congress of Psychology – ICP 2024" (Czech-Moravian Psychological Society), with 3,900 participants from 95 countries and over 3,100 contributions (including posters), "ESCAMPIG 2024 50th International Conference on Basic and Applied Research on Plasma, Atomic and Molecular Physics of Ionized Gases", organised by the Union of Czech Mathematicians and Physicists in collaboration with Masaryk University Brno, and the "20th International Conference on Polysaccharides and Glycoscience" (Czech Chemical Society). The "Geography for Just Transformations Conference" (Czech Geographical Society) at the Jan Evangelista Purkyně University in Ústí nad Labem – a notably interdisciplinary convening – looked at just transformation processes of coal regions in their transition to a low-carbon economy.

A number of regular international and Czech-Slovak conferences on natural sciences took place, such as the "53rd Jírovec's Protozoological Days" (Czech Society for Parasitology), "55th International Congress of the Czech Anatomical Society" (Czech Anatomical Society), "58th Advances in Organic, Bioorganic and Pharmaceutical Chemistry" (Czech Chemical Society), "Morphology 2024", "60th Lojda Symposium on Histochemistry" (Czech Society for Histo- and Cytochemistry) and the "11th European Conference on Residual Stresses (ECRS-11)" (Czech and Slovak Crystallographic Association). Social science convenings included e.g. the "9th COHA International Conference: Oral History in the 21st Century: Interview and Its Future" (Czech Oral History Association), "Slavica Iuvenum Conference" (Czech Society for Slavonic, Balkan and Byzantine Studies), "8th Congress of Czech Art Historians" (Czech Association of Art Historians) and the "13th Biennial Conference of the CES" (Czech Economic Society).

Scientific societies actively supported elementary, secondary and university education through more than 200 events such as mathematics, chemistry, geography, natural science and astronomy knowledge competitions and specialised field courses for secondary school and university students and teachers, which often also included members of the public. Some events for university students are even part of the regular curriculum of courses (e.g. floristics courses (Czech Botanical Society) are included in course offerings at three universities - Charles University, Masaryk University and the University of South Bohemia), or comprise a study programme (Phytopathology - Czech Phytopathological Society). There is an increase in didactic and publishing activities, with the Union of Czech Mathematicians and Physicists leading the way with its traditional journals *Maths Teacher*, *Mathematics-*

Physics Perspectives and Advancements in Mathematics, Physics and Astronomy, and events such as the "Competition for University Students in Mathematical Research and Didactics and the "Physics Teachers' Inventions Fair." Turnout has been high at popular science events for the broad public, such as "Chemistry at the Silesian Ostrava Castle" (Czech Chemical Society), "ScienceFest" (Society for Biochemistry and Molecular Biology) and the "Science Fair", in which many societies played an active role. There is a noticeable predominance of natural science disciplines, but there are also events with practical disciplines, e.g. the "Experts to Schools" event (Czech Economic Society) focused on economic and legal topics. Almost half of the scientific societies recognise both teachers and students for publications or teaching.

Most scientific societies are also involved in lecturing and science promotion for the public. In 2024, societies organised over 450 of these activities. One noteworthy exhibition was the co-organisation of the unusual exhibition "The World of Oldřich Kulhánek's Banknotes" (Society for Economic and Social History). The Ornithologist on the Line (Czech Ornithological Society) is a highly successful web application.

Records of all activities of scientific societies affiliated with the Council of Scientific Societies are available in the database rvs.paleontologie.cz. In 2024, 1,950 records of distinct events were entered into this database.

The Learned Society of the Czech Republic (hereinafter the "Society") connects prominent scientists from all disciplines. Its goals are to encourage freedom in the cultivation of science in all its manifestations, foster a drive for knowledge and joy from the quest for knowledge, disseminate scientific findings among the public, help improve educational quality and support development of a creative, rational and humanely responsible environment in Czech society. Prof. Libor Grubhoffer was the Chair of the Society until 21 May 2024. At the 30th General Assembly, Prof. Martin Loebl was elected to lead the Society for another two-year period. The Society had 111 regular fellows, 48 international fellows and 16 emeritus fellows at the end of 2024.

The Society organised lectures on current scientific and educational issues and organised eleven lectures at regular plenary sessions open to the public. In addition, it organised a retreat on "Modern Diagnostics and Cancer Treatment", which included five lectures and was organised in cooperation with Masaryk University in Brno and the RECETOX research centre. It organised a conference with a panel discussion in cooperation with the Senate of the Parliament of the Czech Republic on "Science Policy and Long-term Challenges for the Development of Science in the Czech Republic" with four speakers. Five lectures were given at the 30th General Assembly, and two by foreign speakers. The Society held eight working meetings and organised a retreat in cooperation with the Biology Centre, the Institute of Parasitology of the Biology Centre and the University of South Bohemia, where three lectures were given. Prof. Stein Ringen (University of Oxford) spoke as part of the Palacký Lecture series. The Learned Society also organised a symposium called "Franz Kafka Differently" in collaboration with the Czech Centre of the International PEN Club to commemorate the centenary of the death of the illustrious Prague-based writer Franz Kafka. Six lectures were delivered. The Society organised an excursion for the members of the Learned Society to the Mělník and Kokořín regions, during which two expert lectures were given.

On 14 March 2024, the Learned Society of the Czech Republic unveiled a memorial plaque to Prof. Rudolf Zahradník, the first President of the Czech Academy of Sciences and the founder and first President of the Learned Society of the Czech Republic. The ceremony was attended by members of the Learned Society, representatives of the City of Prague and family, friends and colleagues of Prof. Zahradník. The plaque was installed on the facade of the building at 37 Heřmanova Street in Prague 7, where Prof. Zahradník and his wife Milena lived for many years.

The Learned Society of the Czech Republic awarded one prize in the Junior scientific researcher category. It also recognised three teachers for promoting interest in science and research in primary and secondary schools, creating an enabling environment for individual student work and outstanding student work in competitions. It also awarded ten prizes to high school students. The Learned Society established a new award - the Jiřina Michlová Prize for doctoral students - and presented it to two doctoral students. It also awarded one Via Chimica prize, which is awarded jointly by the Learned Society of the Czech Republic and the Experientia Foundation. The awards are funded by the Science Support Foundation of the Learned Society of the Czech Republic. Some of the most significant prizes that the Society awarded in 2024 were three medals of the Learned Society of the Czech Republic, *Societas Scientarium Bohemica, Ad Laudem et Honorem*, for merit in the development of science. The Learned Society of the Czech Republic and the United Nations Information Centre in Prague jointly awarded the Climate Change Communication Prize; several talks on environmental topics were made at the awards ceremony.

The Society's website at www.learned.cz and its Facebook, Twitter and YouTube accounts provide information about the Society's activities and its members. Lectures or lecture presentations, as well as statements by the Society on current scientific and public issues, are also posted on the website. The Learned Society cooperated with the Czech Academy of Sciences, Charles University, Masaryk University, Institute of Chemical Technology in Prague, Experientia Foundation, UN Information Centre in Prague, IOCB Tech Foundation, Czech Centre of the International PEN Club and other organisations.


PhDr. Daniele Hod

CAS AWARDS

Each year the Czech Academy of Sciences recognises outstanding scientists for excellent research results which focus on societal priorities, have reinforced the international standing of Czech science and were first published or implemented during the past five years. In 2024, CAS researchers and science promotion staff received many prizes, medals, honours and other awards for their efforts, both from the CAS as well as from other Czech and international organisations and institutions. The following pages provide an overview of the most important awards.

AWARDS OF THE CZECH ACADEMY OF SCIENCES

The CAS President presented the following awards in 2024:

The Award of the Czech Academy of Sciences for outstanding results of research, experimental development and innovations, achieved in the following research projects

- **Ing. Miroslav Kárný, DrSc.,** Institute of Information Theory and Automation, for the research result *"General Prescriptive Theory of Dynamic Decision Making Under Uncertainty and Incomplete Knowledge"*
- **Prof. PhDr. Jan Županič, Ph.D.,** Institute of History, for the research result *"Habsburg Nobility. The Transformation of the Elites of the Danube Monarchy in the Long 19th Century"*

The Award of the Czech Academy of Sciences for young researchers for outstanding results of research, experimental development and innovations achieved in research tasks supported by the CAS until the age of 35 years

- **MSc. Iris Sammarco, Ph.D.,** Institute of Botany, for the research result *"Environmentally Induced Epigenetic Variability Is Heritable and Allows Plants to Adapt to Changing Natural Conditions"*
- **Mgr. Jaroslav Bartík, Ph.D.,** Institute of Archaeology, Brno, for the research result *"Prehistoric Exploitation and Workshop Area at Brno - Stránská Skála"*
- **PhDr. Michaela Žáková, Ph.D.,** Institute of History, for the research result *"Poor Aristocrats? Strategies Used by Noble Ladies to Preserve their Social Status in the 'Long' 19th Century"*

The Award of the President of the Czech Academy of Sciences for promotion or popularisation of research, experimental development and innovations

- **Assoc. Prof. Ing. Slavomír Entler, Ph.D.,** Institute of Plasma Physics

HONORARY MEDALS AWARDED TO CZECH AND FOREIGN RESEARCHERS IN 2024

The Honorary Medal of the Czech Academy of Sciences

De scientia et humanitate optime meritis

- **Prof. Ing. Jiří Drahoš, DrSc., dr. h. c. mult.,** Senate of the Parliament of the Czech Republic
- **Prof. Michael Grätzel, Ph.D., dr. h. c. mult.,** École Polytechnique Fédérale de Lausanne, Switzerland
- **Prof. Peter Hänggi,** University of Augsburg, Germany
- **Prof. Allen M. Hermann,** University of Colorado at Boulder, USA
- **Prof. RNDr. Julius Lukeš, CSc.,** Biology Centre
- **Dr. John C. Mather,** NASA Goddard Space Flight Center, USA
- **Prof. Ing. Milan Pospíšil, CSc.,** University of Chemical Technology Prague
- **Prof. RNDr. Pavol Šajgalík, DrSc.,** Slovak Academy of Sciences, Slovakia
- **RNDr. Václav Špička, CSc.,** Institute of Physics
- **Prof. MUDr. Helena Tlaskalová-Hogenová, DrSc.,** Institute of Microbiology
- **RNDr. Alice Valkárová, DrSc.,** Faculty of Mathematics and Physics, Charles University

The Ernst Mach Honorary Medal for Merit in the Physical Sciences

- **Assoc. Prof. RNDr. Oldřich Semerák, Ph.D., Res. Prof.,** Faculty of Mathematics and Physics, Charles University

The Jaroslav Heyrovský Honorary Medal for Merit in Chemical Sciences

- **Prof. Kohji Maeda Dr.,** Kyoto Institute of Technology, Japan
- **Prof. Ing. Ivo Šafařík, DrSc.,** Biology Centre
- **RNDr. Petr Štěpánek, DrSc.,** Institute of Macromolecular Chemistry

The Gregor Johann Mendel Honorary Medal for Merit in the Biological Sciences

- **Prof. RNDr. Tomáš Herben, CSc.,** Institute of Botany
- **RNDr. Petr Kopáček, CSc.,** Biology Centre
- **Prof. RNDr. Josef Komenda, CSc., Res. Prof.,** Institute of Microbiology
- **Prof. RNDr. Jan Lepš, CSc.,** Faculty of Science, University of South Bohemia, Biology Centre
- **Prof. RNDr. Tomáš Scholz, CSc.,** Biology Centre
- **RNDr. František Moravec, DrSc.,** Biology Centre

The Josef Dobrovský Medal of Honour

- **Prof. PhDr. Pavel Janoušek, CSc., Res. Prof.,** Institute of Czech Literature
- **Univ.-Prof. i. R. Dr. Johannes Reinhart,** Universität Wien, Vienna, Austria

The František Palacký Honorary Medal for Merit in the Historical Sciences

- **Univ.-Prof. DDr. i. R. Gerhard Ammerer,** Universität Salzburg, Salzburg, Austria
- **Prof. PhDr. Roman Holec, DrSc.,** Institute of History, Bratislava, Slovakia
- **Prof. Nancy Wingfield,** Northern Illinois University, USA
- **Prof. PhDr. Milan Hlavačka, CSc.,** Institute of History
- **Prof. PhDr. Jiří Pešek, CSc.,** Faculty of Humanities, Charles University

The Vojtěch Náprstek Medal of Honour for Merit in the Popularisation of Science

- **PhDr. Dana Hašková,** Institute of Slavonic Studies

The Medal of Honour for Merit for the Czech Academy of Sciences

- **Ing. Július Štuller, CSc.,** Institute of Computer Science

SIGNIFICANT AWARDS GIVEN TO CAS RESEARCHERS BY OTHER INSTITUTIONS

The Czech Head Awards

- **Prof. Tomáš Jungwirth, Ph.D.,** Institute of Physics - National Czech Head Award for 2024

- **RNDr. Jakub Podgorný, Ph.D.,** Astronomical Institute - VEOLIA Prize, Doctorandus Prize for Natural Sciences
- **Ing. David Vojna, Ph.D.,** Institute of Physics - IDEA StatiCa Prize, the Doctorandus Prize for Technical Sciences

The Award of the Minister of Education, Youth and Sports for Outstanding Results in Research, Experimental Development and Innovation
- **Prof. Mgr. Tomáš Čižmár, Ph.D.,** Institute of Scientific Instruments

The František Běhounek Award for the promotion and popularisation of science and for spreading the good name of the Czech Republic in the European context
- **Prof. RNDr. Ondřej Santolík, Dr.,** Institute of Atmospheric Physics

The Honorary Medal For Merit for Czech Archival Science, awarded by the Minister of the Interior of the Czech Republic
- **PhDr. Luboš Velek, Ph.D.,** for lifetime achievement

The Karel Kramář Medal, the highest award given by the Prime Minister of the Czech Republic
- **PhDr. Jiří Padevět,** Centre for Administration and Operations

The Minister of Health Award for Medical Research
- **Ing. Elena Tomšík, Ph.D.,** Institute of Macromolecular Chemistry

The Award of the Minister of Agriculture for Young Scientists
- **Mgr. Alena Nehasilová, Ph.D.,** Institute of Microbiology

The Neuron Foundation Award for Promising Scientists
- **RNDr. Tomáš Slanina, Ph.D.,** Institute of Organic Chemistry and Biochemistry, in the field of chemistry
- **Mgr. Kateřina Rohlenová, Ph.D.,** Institute of Biotechnology, in the field of medicine
- **Mgr. Martin Schwarzer, Ph.D.,** Institute of Microbiology, in the field of biology
- **Prof. Mgr. Sylvie Graf, Ph.D.,** Institute of Psychology, in the field of social sciences

The Werner von Siemens Prize for the best basic research result
- **RNDr. Tomáš Slanina, Ph.D.,** Institute of Organic Chemistry and Biochemistry

The Rector's Award of the University of Wrocław for scientific achievements
- **Prof. RNDr. Petr Heinzel, DrSc.,** Astronomical Institute

The Silver Medal of St. Vojtěch - awarded by His Excellency Mons. Jan Graubner, Archbishop of Prague and Primate of the Czech Republic, for lifetime scientific work
- **PhDr. Vladimír Vavřínek, CSc., Dr. h. c.,** Institute of Slavonic Studies (in memoriam)

The Silver Commemorative Medal of the Brno University of Technology for outstanding achievements that contributed to the development of BUT in the areas of teaching, research, development and innovation and intellectual work
- **Prof. Ing. Ivo Dlouhý, CSc.,** Institute of Physics of Materials

The Visegrad Group Academies Young Researcher Award
- **PhDr. Mgr. Kristýna Kaucká, Ph.D.,** Masaryk Institute and Archives

The L'Oréal UNESCO for Women in Science
- **Mgr. Kateřina Kopalová, Ph.D.,** Institute of Botany
- **Ing. Monika Kučeráková, Ph.D.,** Institute of Physics
- **Mgr. Kateřina Sam, Ph.D.,** Biology Centre

The Josef Hlávka Commemorative Medal
- **PhDr. Martin Steiner,** Institute of Philosophy

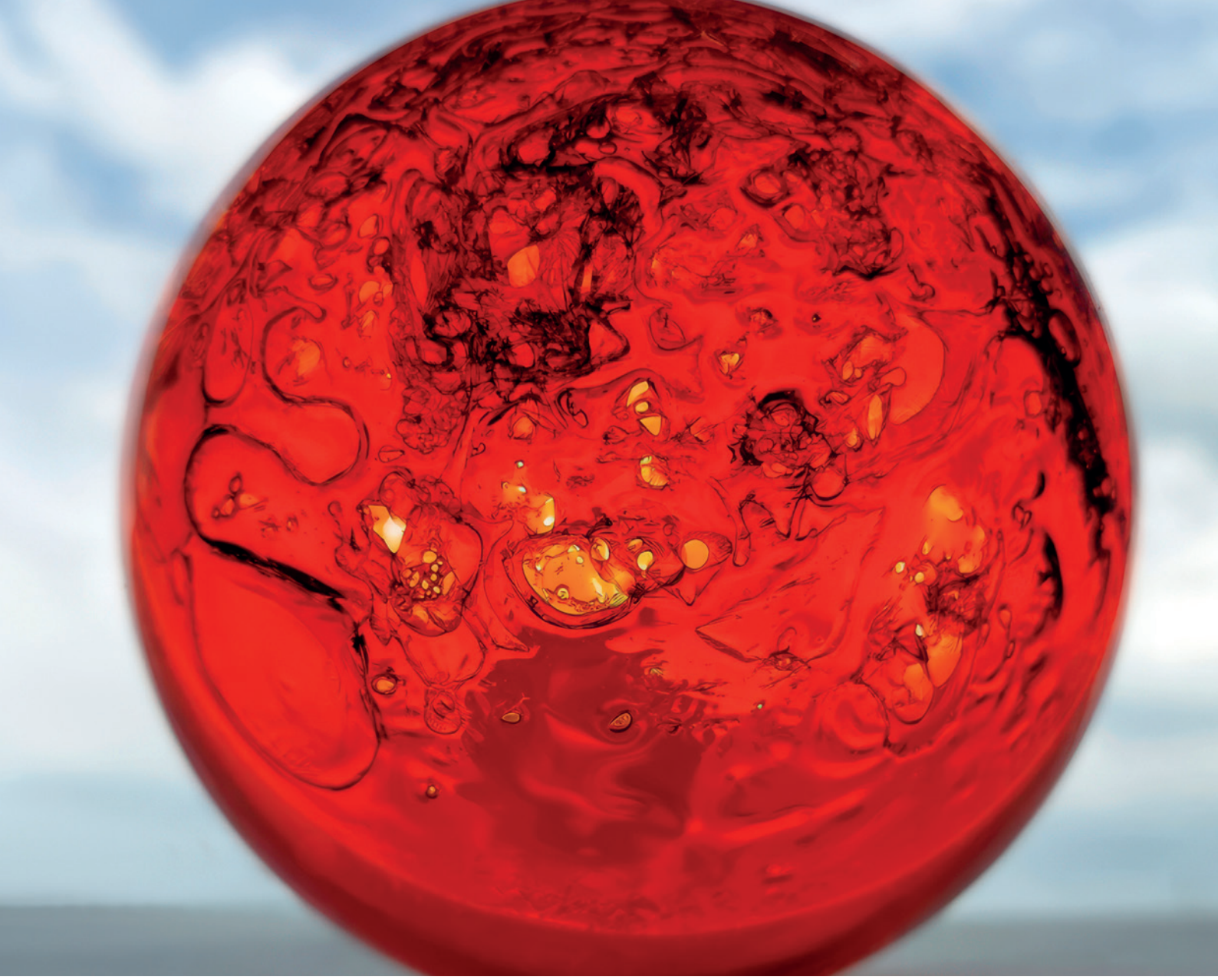
The Josef Hlávka Prize for Scientific Literature
- **Prof. PhDr. Jan Županič, Ph.D.,** Institute of History

The Czech Science Foundation President's Award for Outstanding Results Achieved in Basic Research Grant Projects
- **Prof. Ing. Hanuš Seiner, Ph.D., Res. Prof.,** Institute of Thermomechanics, in technical sciences
- **Mgr. Petr Pravec, Dr.,** Astronomical Institute, in inanimate sciences
- **Assoc. Prof. PhDr. Julie Chytilová, Ph.D.,** Economics Institute, in social sciences and humanities
- **RNDr. Martin Volf, Ph.D.,** Biology Centre, in agricultural and biological-environmental sciences

The Technology Agency of the Czech Republic Award for Achievements in Applied Research in the Partnership Category
- **Ing. Ilona Müllerová, DrSc.,** Institute of Scientific Instruments, and other members of the team from the following CAS institutes: Biology Centre, Institute of Physics, Institute of Photonics and Electronics, Institute of Plasma Physics, Institute of Macromolecular Chemistry in the project Centre for Electron and Photon Optics

The Technology Agency of the Czech Republic Award for Achievements in Applied Research in the Company Category
- **Prof. Ing. Blahoslav Maršálek, Ph.D.,** Institute of Botany, for the project Unique technology for wastewater purification

The Magnesia Litera Prize for Scientific Literature
- **RNDr. František Krahulec, CSc., RNDr. Sylvie Pecháčková, Ph.D., and RNDr. Hana Skálová, CSc.,** all from the Institute of Botany



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The Annual Report of the Czech Academy of Sciences for the provision of information pursuant to Act No. 106/1999 Coll., on Free access to information, as amended, for the period from 1 January until 31 December 2024

(a)	Number of submitted requests for information	13
	Number of decisions issued rejecting an application	0
(b)	Number of appeals lodged against a decision rejecting an application	0
(c)	Number of court judgments on review of legality of a decision rejecting an application	0
(d)	Number of exclusive licences granted	0
(e)	Number of complaints filed under Section 16a of the Act on Free access to information, as amended	0

List of abbreviations used

CAS	Czech Academy of Sciences
CTU	Czech Technical University in Prague
ERC	European Research Council
EU	European Union
GA CR	Czech Science Foundation
KAV CR	CAS Head Office
MEYS	Ministry of Education, Youth and Sports of the Czech Republic
R&D&I Council	Research, Development and Innovation Council
TA CR	Technology Agency of the Czech Republic
UK	Charles University
R&D	Research and Development
R&D&I	Research, Experimental Development and Innovation

The names of the institutes of the CAS appear in abbreviated form and do not contain the letters “CAS, v. v. i.”.

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