



**Akademie věd  
České republiky**

**2016 ANNUAL REPORT OF THE CZECH ACADEMY  
OF SCIENCES**

# Contents

THE CZECH ACADEMY OF SCIENCES .....	3
FOREWORD BY THE PRESIDENT OF THE CZECH ACADEMY OF SCIENCES JIŘÍ DRAHOŠ .....	4
THE CZECH ACADEMY OF SCIENCES IN THE RESEARCH, DEVELOPMENT AND INNOVATION SYSTEM.....	5
EVALUATION OF CAS INSTITUTES .....	10
ORGANISATIONAL MEASURES .....	11
SELECTED RESULTS.....	13
STRATEGY AV21 .....	15
TECHNOLOGY TRANSFER .....	17
EMPLOYEES AND SALARIES.....	18
FINANCIAL RESOURCES AND THEIR USE .....	21
SUPPORT OF EXCELLENCE .....	27
INTERNATIONAL COOPERATION .....	30
REGIONAL COOPERATION .....	32
EDUCATIONAL ACTIVITY .....	33
MEDIA COMMUNICATIONS, PROMOTION AND PUBLIC EVENTS.....	35
AWARDS GRANTED BY THE CAS .....	36

# 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 8,000 employees work at the Academy, over half of whom are university-educated researchers.

*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 on an international level, while respecting the current needs of Czech society and culture.

CAS Institutes play a role in education, primarily by educating young researchers in doctoral programmes. CAS researchers also teach at universities.

The CAS also develops collaborative ties 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.

# FOREWORD BY THE PRESIDENT OF THE CZECH ACADEMY OF SCIENCES JIŘÍ DRAHOŠ

Dear Readers,

You have in your hands the Czech Academy of Sciences Annual Report, in which you will find specific information about the key activities we carried out in 2016. Despite the fact that institutional funding for the Czech Academy of Sciences (CAS) has stagnated over the past few years, covering roughly one-third of the Academy's total budget, the CAS remains the most efficient Czech scientific research institution.

In comparison with international standards, the level of institutional funding provided to the CAS is extremely low, a level unheard of in Western Europe countries with significant scientific capacities, particularly Germany. For example, the German Max Planck Society, a basic research institute, receives about 80% of its budget from institutional funding and the Helmholtz Association, which similarly to the Czech Academy of Sciences contributes to applied research, receives roughly 70% of its budget from direct institutional funding.

Despite these facts, high-quality research continued to be the core activity of the CAS and its institutes in 2016. We achieved a number of significant research results in various scientific fields. The most important results are highlighted in Chapter Four of this Annual Report, which is now designed to give lay readers a quick overview of all CAS activities. We trust that this approach, along with the pronounced shortening of various academic sections of text, will also help readers navigate more quickly through the report.

Of the many topics that comprise the standard body of our annual reports, I would like to draw attention to the chapter about implementation of Strategy AV21, which aims to more distinctly profile the CAS as an institution whose work addresses contemporary social problems and challenges. Hence the origin of the Strategy AV21 motto, "Top research in the public interest". The strategy's success is evidenced by e.g. positive feedback from the political and business sectors. The strategy has also been received very well internationally. I am honoured that the strategy was a direct inspiration for the Slovak Academy of Sciences, which has designed a set of nine socially applicable interdisciplinary programmes. We are also pleased that the Czech Prime Minister Bohuslav Sobotka has granted his personal patronage to Strategy AV21.

However, looking to the future is even more important than reflecting on the past. The best way to ensure the long-term economic prosperity of the Czech Republic is to support high-quality research. Unfortunately, science and research in the Czech Republic – including the CAS, which as the most important scientific research unit in the country has clearly demonstrated its efficacy and developmental capacity – suffers from persistent institutional underfinancing. Therefore, going forward we find it essential to continue appealing to the state administration and trying to jointly find a solution that will better respond to the interests of Czech society. I am certain that guaranteeing financial security for key actors in the research, development and innovation system will lead to more effective use of the existing potential of the entire science and research system for the benefit of the Czech Republic and its citizens.

# THE CZECH ACADEMY OF SCIENCES IN THE RESEARCH, DEVELOPMENT AND INNOVATION SYSTEM

In 2016, several key documents pertaining to the research, development and innovation system (R&D&I) were developed or completed with the active involvement of CAS representatives. The documents were the following:

- **Amendment to Act No. 130/2002 Coll. (the ‘Euro Amendment’)**
- **New Act on Support of R&D&I from Public Funds**
- **New research organisation evaluation methodology (Methodology 2017+)**
- **National R&D&I policy for 2016–2020**
- **Higher Education Act Amendment**

The first two documents are closely related to the consequences of *Commission Regulation (EU) No 651/2014* of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty Text with EEA relevance (hereinafter the “Regulation”), on regulation of R&D&I funding from the state budget. Since European Commission regulations generally take precedence over national legislation, the Research, Development and Innovation Council (RVVI), in collaboration with the Governmental Office for Research, Development and Innovation (SVVI), attempted to prepare an amendment to Act No. 130/2002 Coll. on Support of Research and Development from Public Funds in late 2014 to harmonize the legislation with the Regulation. It also commenced work on an entirely new law on R&D&I support from public funds that would take the Regulation into account and also profoundly change the unfavourable R&D&I system in the Czech Republic.

## **Amendment to Act No. 130/2002 Coll. (the ‘Euro Amendment’)**

The aim of this amendment was to bring Act No. 130/2002 Coll. into alignment with the aforementioned Regulation. From the outset of the amendment preparation process and subsequently during the interministerial commenting process, the CAS strove to advocate for simple wording of clause 7, which specifies how institutional funding is allocated to research organisations and is known as the ‘point grinder’ clause, i.e. as an ineffective evaluation mechanism overly focused on points, and which is furthermore incompliant with Article 5 of the same act. This proposal was rejected on the grounds that the matter is beyond the scope of the amendment and will be specified in the new law.

The Government passed the ‘Euro Amendment’ and submitted it to the Chamber of Deputies in May 2015. A group of deputies led by Ivan Pilný, Chair of the Economic Committee, then prepared an extensive amendment initiated by the Confederation of Industry and Transport of the Czech Republic, which sought to add e.g. a number of new R&D&I funding mechanisms explicitly set forth in the Regulation along with other, entirely new mechanisms such as the option of allocating state budget funding to science and research support funds. The CAS supported these modifications and upon agreement with the submitting party, the aforementioned change to clause 7 was

also added to the amendment. The Committee on Science, Education, Culture, Youth and Sport of the Chamber of Deputies, however, did not recommend adoption of this change (as well as a number of other proposed changes) at its session on 31 March 2016. Thus the approved wording of the act effective 1 July 2016 still contains elements of the ‘point grinder’. (Despite the fact that this provision had never been applied to the distribution of institutional funding to providers). The currently effective form of the law is an inadequate solution; but the new definition of eligible costs does not prevent, as some of the law’s critics claim, acquisition of assets with a long depreciation period from EU operational programmes, which is evidenced by the joint declaration of the SVVI and Ministry of Education, Youth and Sports<sup>1</sup>.

## **New Act on Support of R&D&I from Public Funds**

Opinions vary widely about the need for a completely new law on public funding support of R&D&I and, relatedly, the need for a new Ministry for Research and Development. It is thus pertinent to recall that the primary cause of the inadequate R&D&I organisational structure and funding we see today in the Czech Republic is the fact that three government agencies co-administer this sector, namely the:

- Ministry of Education, Youth and Sports (MEYS), which pursuant to the law outlining competencies is *“the central state administration body for preschool facilities, school facilities, primary schools, secondary schools and universities, for science policy, research and development, including international collaboration in this area”*,
- RVVI, which pursuant to Act No. 130/2002 Coll. is the *“government’s research, development and innovation expert and advisory body”*,
- SVVI, which does not have any statutory powers in science and research administration but is, in practice, the dominant entity today.

The disputed delineation of R&D&I administration competencies stems partially from the fact that the MEYS’ status delineated in S. 33 of Act No. 130/2002 Coll., *“The central administration authority responsible for research and development shall be the Ministry of Education, Youth and Sports with the exception of areas secured by the Research and Development Council pursuant to S. 35”*, is incompliant with the delineation specified in the law on competencies. Another factor is that the role of a central administration authority responsible for research and development in key matters such as proposals for expenditures for research, development and innovation in specific budget categories and the draft mid-term outlook for research, development and innovation support is de facto entrusted to an advisory body composed predominantly of representatives of interest groups (the CAS, universities, the business sector), which are recipients of research and development funding themselves.

Work on the new law began in late 2014 and a draft White Paper on the Act on the Support of Research, Development and Innovation (hereinafter the “White Paper”) became available in early 2016. The CAS commented on all versions of the White Paper and identified key flaws. The final wording of the White Paper, which was approved by

---

<sup>1</sup> See <http://www.vyzkum.cz/FrontAktualita.aspx?aktualita=797505>

the Government through Resolution No. 719 of 24 August 2016, introduces important changes in several areas:

- (i) Establishment of a **Ministry for Research and Development** (MRD) as the central state administration authority responsible for research and development. The MRD should secure all of the tasks that the RVVI executes today and assume some research and development competencies from the MEYS. The MRD should also coordinate research concepts from different providers and conduct universal evaluations, see below. The MRD, however, should not manage or provide institutional funding directly to any research organisation, and the powers of all R&D&I institutional support providers will remain unchanged. Both the Grant Agency of the Czech Republic and the Technology Agency of the Czech Republic will retain their status as state organisational units and their independence in awarding grants, but will fall under the MRD in the organisational structure. (The CAS does not have a strong opinion on this change.)
- (ii) Establishment of a **Science Council of the Czech Republic** as an independent expert body for science and research, which is to advise state bodies in key conceptual science and research development issues. This type of advisory body has been lacking in our R&D&I system and the CAS welcomes its establishment.
- (iii) New manner of preparing proposals for **R&D&I expenditures from the state budget** that eliminates the current direct link between institutional funding and evaluation of research organisations based on a Results evaluation methodology and introduces a standard procedure grounded in discussion between administrators of specific budget categories and the MRD, with due emphasis on the predictability of long-term institutional funding for specific providers' research organisations.
- (iv) **New manner of evaluating research organisations**, which will contain a shared basic framework for the three segments of research organisations: the CAS, universities and ministerial research organisations. This is described in greater detail in the section on Methodology 2017+.
- (v) Introduction of **institutional funding of research infrastructure**.

One of the key aspects of the new law, to which the CAS drew attention and which was understandably not clearly specified in the White Paper, is the systematic separation of the support mechanism governed by the Regulation from the support mechanism fully governed by the draft law. Overall, the CAS does not fundamentally object to any point in the White Paper. The wording of the new law should be completed by the end of Q1 2017.

## **New research organisation evaluation methodology (Methodology 2017+)**

Concurrently with preparation of the White Paper, the Research, Development and Innovation Council worked with the Governmental Office for Research, Development and Innovation on a new research organisation evaluation methodology (Methodology 2017+), which is intended to replace *Methodology 2013-2016*. The original aim was to implement the recommendations from the IPN project *Effective research organisation evaluation and funding methodology*, which ended in spring 2015.

However, because the recommended methodology did not respect the basic segmentation of research organisations in the Czech Republic (which the CAS had pointed out during the entirety of the IPN project), the SVVI rightly divided all research organisations into three segments that correspond to the different missions, funding mechanisms and organisational structures of various research organisations: the CAS, universities and ministerial research organisations. Methodology 2017+ outlines a shared framework for these three segments which encompasses a multi-criteria subject area evaluation of research organisations using bibliometric and peer-review assessment, an approach commonly used abroad. This evaluation should be conducted in its full scope once every five years. Its basic structure is very similar to the evaluation carried out by CAS Institutes and teams in 2015 and refers to it in several instances. SVVI staff sought feedback on the methodology from Prof. Eva Zažímalová and other members of the Academy Council during the preparation process. The CAS fully supported the version of Methodology 2017+ approved by the RVVI in November 2016. However, the materials settling the comments proceedings have yet to be submitted to the government for review.

The next step is to complete and specify Methodology 2017+ for each research organisation segment. The CAS considers this to be the correct approach. For the CAS, it will be necessary to devise the most efficient way of linking the Methodology 2017+ evaluation with the next round of CAS Institute evaluation planned for 2020.

### **National R&D&I policy for 2016–2020**

*The National Research, Development and Innovation Policy of the Czech Republic* (hereinafter the “NRDIP”) is a national strategic document that sets forth the main R&D&I directions and frames related strategic documents of the Czech Republic. In 2015, an update of the National Research, Development and Innovation Policy of the Czech Republic valid for 2009-2015 was initiated with a 2020 horizon. In early 2016, an interministerial commenting process was conducted during which the CAS submitted a number of key comments relating to the overall direction and structure of the document.

Above all, the CAS criticised the fact that the document focused almost exclusively on support of applied research for economic purposes and development of applied research for implementation of the central state administration’s tasks and needs. The CAS considers it unacceptable to reduce the goal of applied research to “*sectoral needs to support the competitiveness of the Czech Republic*” and clearly articulated this opinion in the comments.

Based on the CAS’ requirements, a paragraph was added to the introduction that emphasises that the fundamental goal of the NRDIP is to *ensure the development of all research and development components in the Czech Republic* – basic research, applied research and development, each of which has an irreplaceable role, and use their interconnectedness and synergies to support the economic, cultural and social development of the Czech Republic. An annex was also added to the document which includes the CAS’ opinions on a range of points that are missing from the NRDIP, primarily the following:

- (1) *The relationship between basic research, applied research and development*, which should be one of the main characteristics of the NRDIP,



- (2) *The role of the state and entrepreneurs in the support and implementation of innovation,*
- (3) *The tasks of and relationships between specific R&D&I actors, i.e. the state, public universities, public research institutions (both those established by the CAS and ministerial) and the business sector (the responsibilities of the state and of the business sector are not clear from the document even though most of the text pertains to applied research, where the business sector in principle plays a dominant role),*
- (4) *Delineation of the fundamental mission of the state contribution to the NRDIP, which should be identification of promising and strategically important long-term goals of state support to areas where business sector investments are unlikely,*
- (5) *Setting the appropriate ratio of institutional and targeted research and development funding.*

The NRDIP for 2016-2020 was approved through Government Resolution No. 135 on 17 February 2016.

### **Higher Education Act Amendment**

In May 2016, the Higher Education Act Amendment took effect after three years of preparation, during which the content of successive versions of the amendment had changed considerably. The CAS had a representative in the amendment preparation working group during the entire process. The most crucial change from the existing law is the introduction of a new way of accrediting study programmes. In its comments, the CAS focused primarily on ensuring that the legislation provides for involvement of CAS Institutes and staff in doctoral programmes under the new institutional accreditation conditions. This effort succeeded and the law stipulates that CAS Institutes are the only type of legal person that can act as a “collaborating legal person” in accreditation applications. To implement the new institutional accreditation framework, the CAS will have to conclude framework agreements with all applicable universities and CAS Institutes will have to conclude specific agreements with partnering university departments.

An important document that helps crystallise and reinforce the position of the Academy of Sciences in the research, development and innovation system of the Czech Republic is the **Concept for Development of the Work of the Academy of Sciences of the Czech Republic**, which was approved at the Academic Assembly’s XLIX<sup>th</sup> Session in December 2016.

## EVALUATION OF CAS INSTITUTES

One of the most important tasks of the CAS management and institutes is improving the quality of science and research. A key tool in this effort is periodic high-quality evaluation of scientific research. The CAS regularly conducts such evaluations, typically once every five years. The most recent Evaluation of Research and Professional Activities of the Institutes of the Czech Academy of Sciences for 2010-2014 was conducted in 2015 and finished in early 2016. The evaluation was carried out pursuant to Act No. 130/2002 Coll., on Support of Research and Development from Public Funds and on the Amendment to Some Related Acts (the Act on the Support of Research and Development), as amended, per S. 7(7) thereof: *“The provider may adjust the amount of support according to a detailed evaluation utilising internationally recognised methodologies, which shall be published along with the results of the detailed evaluation and rules governing adjustment of support, in advance of provision of such support.”*

The Evaluation was conducted in accordance with the document “Basic Principles of the Evaluation of Research and Professional Activities of the Institutes of the Czech Academy of Sciences for 2010-2014” approved by the Academy Council on 6 October 2014. The key goals were to:

- Obtain qualitative and quantitative information about the status of science at the CAS in the national, European and global context during the period of 2010-2014.
- Obtain information for the strategic management of the CAS as a whole, including funding of institutes as one subsidiary management task.
- Provide independent and comparable evaluation and feedback to inform the management of individual CAS Institutes and teams.

The evaluation results and documents were published on the CAS website (<http://www.avcr.cz/cs/o-nas/hodnoceni>) after the Academy Assembly session on 21 April 2016, at which the Evaluation implementation and results report was presented and accepted.

# ORGANISATIONAL MEASURES

## **Funding of CAS Institutes based on evaluation**

The results of the Evaluation of Research and Professional Activities of the Institutes of the Czech Academy of Sciences for 2010-2014 are reflected in the amount of institutional support provided to each institute for 2017, according to the principles approved at the 38th session of the Academy Council on 15 March 2016.

Funding for each CAS Institute for 2017 was adjusted with consideration of the:

- evaluation committee report, with an emphasis on the main focus of the work of the given team or institute,
- content of background materials submitted for evaluation,
- proposed institutional funding for 2017 submitted and justified by the director of the given institute,
- current level of institutional funding,
- availability and amount of extra-institutional resources raised for the given institute,
- the Science Council and Academy Council's opinions about which CAS areas to develop regardless of the current status, i.e. which areas are missing from CAS research programmes and should be developed in regard to current developments.

The allocation of institutional support to institutes for 2017 will remain the foundation of their funding until the next periodic evaluation of research and professional activities of CAS Institutes.

The allocation of institutional support to institutes for 2017 proposed by the Academy Council was approved by the Academy Assembly on 15 December 2016.

## **New concept of official CAS periodicals**

The Academy Council dedicates targeted and systematic attention to the CAS' media image. In its efforts to present CAS Institutes' scientific work in the best way, the Council approved, after long and difficult discussions, a new concept of official CAS periodicals. The basic periodical will be a quarterly titled A / Science & Research, which will inform readers about leading scientific research in an easy-to-understand way. The CAS will also publish an electronic monthly, the AB / Academic Bulletin, which will share internal CAS news on a regular basis. The third periodical will be a popular science magazine titled ABC / Science for Everyone, through which the CAS will target younger readers at events such as the Science Fair and CAS Week of Science and Technology and larger popular science events held by specific institutes.

## **Division of the Global Change Research Center**

Pursuant to Art. 14(f) of the CAS Statutes, the Academy Assembly approved the division of the Global Change Research Center into two successor institutes, the Global Change Research Institute and the Institute of Microbiology, effective 1 January 2016, for the purpose of connecting research implemented in Nové Hrády with research conducted by the Institute of Microbiology. The process was completed successfully,

mainly owing to the responsible approach of the management and researchers of the two institutes.

### **Violation of the Code of Ethics for Researchers of the Czech Academy of Sciences**

The Academic Council thoroughly addressed serious circumstances related to administration of stem cells to amyotrophic lateral sclerosis patients outside of clinical studies, which led to the resignation of Prof. Eva Syková as Director of the Institute of Experimental Medicine. The Council also immediately took other measures, including commissioning an in-depth audit of the institute's finances and appointing new members to its Supervisory Board. A new council was elected for the institute and an employee selection process for a new institute director was announced, which resulting in the naming of Dr. Miroslava Anděrová as the new Director of the Institute of Experimental Medicine.

## SELECTED RESULTS

Scientific research carried out by CAS Institutes led to many positive results in 2016. Six of the most fascinating results from the different research areas are featured on the following pages.

### **Was He Murdered or Was He Not? Multi-Elemental Analyses of Hair and Bone Samples from Tycho Brahe and Histopathology of His Bone** (Nuclear Physics Institute)

After proving that Tycho Brahe had not been poisoned with mercury, scientists from the Nuclear Physics Institute examined the content of other elements in his hair and bones. High concentrations of iron, arsenic, silver and gold found in the ends of his hair with decreasing quantities toward the hair roots show that, similarly to mercury, the excessive intake of these elements ceased about two months before his death. The excessive content of gold in his bones, however, is evidence of long-term exposure to this element. This anomaly apparently relates to the renowned astronomer's alchemy work but does not explain his sudden death.

### **Classification of Elements and Mixing of Components in Impacts of Large Extraterrestrial Bodies on the Earth's Surface** (Institute of Geology)

A new method describing fractionation and element mixing during tektite formation was developed through detailed comparison of rock chemistry at the impact site of an extraterrestrial body that created the Ries Crater in Germany 14.75 million years ago, and the chemistry of specific types of impacted glasses, particularly tektites, along with application of isotope methods. Other impact structures were also studied. For the Zhamanshin Crater in Kazakhstan, application of elemental and isotope geochemistry led to the first-ever identification of carbonaceous chondrite as a larger impactor.

### **Fluorescent Polymer Nanoparticles Releasing Drug in the Intercellular Space with a High Concentration of Reactive Oxygen Species** (Institute of Macromolecular Chemistry)

Reactive Oxygen Species (ROS) are important for regulation of normal cellular processes. Defects in ROS concentration regulation are one of the causes of some serious illnesses, including neurodegenerative diseases such as Parkinson's and Alzheimer's and tumours. In comparison with normal cells, tumour cells show a significantly higher ROS content, caused by faster metabolism. The higher ROS content makes these cells more susceptible to cell death from oxidative stress and can be used for selective diagnoses or tumour treatment.

Polymer nanoparticles developed by the Institute of Macromolecular Chemistry selectively release their drug cargo in an environment with ROS concentrations that are comparable to common intercellular concentrations in tumour cells. Fluorescence spectroscopy demonstrated that ROS concentrations can effectively control the release of active substances. As a result, ROS-sensitive nanoparticles release their drug cargo much more quickly in tumour cells than in healthy cells. ROS-sensitive nanoparticles are much more cytotoxic than their non-responsive counterparts. The newly developed nanoparticles may be thus considered promising candidates for biomedicine

applications as drug carriers or imaging agents in theranostics (including diagnostics and treatment), particularly for inflammatory illnesses and tumours. The research results were published in the prominent journal *Nanoscale* 2016, 8, 6958-6963.

***Pinus sylvestris* as a Forgotten Source of Nitrous Oxide and Methane in Boreal Forests** (Global Change Research Institute)

An international team of experts led by Dr. Kateřina Macháčová of the Global Change Research Institute discovered the secret behind missing sources of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) fluxes in northern boreal forests. CH<sub>4</sub> and N<sub>2</sub>O are important greenhouse gasses that contribute to global climate change. Both gasses may be released from soil and various parts of plants. However, data on these fluxes are insufficient. For example, the flow of these gasses from boreal forest trees have not been studied to date or considered in the overall ecosystem balance of greenhouse gasses, even though forests in this zone comprise 73% of the planet's coniferous forests. The research results were the first to prove that pine forests, typical species in boreal forests, release a substantial quantity of N<sub>2</sub>O and CH<sub>4</sub> into the atmosphere. This quantity, moreover, increases as soil moisture increases, which may play a significant role in future climatic scenarios that anticipate more frequent extreme rain events in these regions. The results, which were published in the journal *Scientific reports* 6, 23410 (2016), prove that estimates of N<sub>2</sub>O and CH<sub>4</sub> flows from forest ecosystems which are based solely on measurement of soil emissions are inaccurate and that taking into account CH<sub>4</sub> and N<sub>2</sub>O fluxes from trees leads to more precise calculation of the overall balance of the forest ecosystem-atmosphere greenhouse gas exchange.

**Essays on Animal Rights: “Us and Them” from the Philosophical, Ethical, Biological and Legal Points of View** (Institute of State and Law)

This book is the first in the Czech Republic to present an academic view of the concept of animal rights, which are usually addressed through activism, in an effort to grasp the issue objectively and knowledgeably. It is a collection of findings from several scientific disciplines and introduces entirely new ideas and ways of thinking into the Czech environment, from arguments about animals as members of the moral community and the theory of animal thought to consideration of animal rights within the legal system, particularly in relation to human rights.

*Müllerová, H. – Černý, D. – Doležal, A. et al. Essays on Animal Rights: “Us and Them” from the Philosophical, Ethical, Biological and Legal Points of View. Prague: Academia, 2016. 797 s. ISBN 978-80-200-2601-9.*

**The Benedictines. Baroque Ceiling Paintings in the Czech Lands** (Institute of Art History)

This extensive two-volume book, conceived by a team of art historians led by Dr. Martin Mádl, contains a detailed scientific inventory of 17<sup>th</sup> and 18<sup>th</sup> century frescoes in Benedictine monasteries, churches and residences in Bohemia and Moravia. It includes series of paintings in Břevnov, Broumov, Rajhrad, Kladruby, Sázava, Svatý Jan pod Skalou and other sites.

*Mádl, M. – Heisslerová, R. – Šeferisová Loudová, M. – Vácha, Š. – Babická, L. – Klinerová, A. – Rosenbergová, S. – Vondráčková, M. – Macurová, Z. The Benedictines. Baroque Ceiling Paintings in the Czech Lands. Two volumes. Prague: Academia, 2016. 1063 s. ISBN 978-80-200-2621-7.*

# STRATEGY AV21

In December 2014, the Academy Assembly approved Strategy AV21, which aims to more explicitly profile the CAS as an institution whose work addresses contemporary social problems and challenges and whose motto is, “*Top research in the public interest*”. The two years since that time have shown that Strategy AV21 has succeeded with its fundamental focus on socially pressing issues which must be addressed through broad interdisciplinary research and interinstitutional synergy. A specific characteristic of Strategy AV21 is the significant engagement of the social sciences and humanities in both natural science and technical programmes. The Strategy’s success is also evidenced by numerous responses from both Czech and international entities.

In 2016, the President of the CAS and other members of the Academy Council held three meetings with research programme coordinators, at which organisational aspects of research programmes were arranged. Information about the research programmes and associated activities, results and upcoming events are regularly published on the Strategy AV21 website <http://av21.avcr.cz/>. Research programme reports presenting the results of specific activities are published by the Strategy AV21 Editorial Board and the Academia Publishing House provides editing and printing services. Information about report content and availability may be found on the website <http://av21.avcr.cz/publikace/>.

Early 2016 saw the commencement of another research programme, *Global Conflicts and Local Interactions*, which had been approved by the Academy Council in late 2015 and which addresses key issues in our contemporary globalised world. The President of the CAS presented a preliminary report on the implementation and results of the first year of Strategy AV21 to the Academy Assembly in April 2016. At the end of August 2016, a letter was sent to all coordinators informing them that an evaluation of research programmes for the current period would take place in late October 2016. An e-mail was also sent to all CAS Institute directors inviting them to submit proposals for new research programmes. On 15 September 2016 a form for background materials about research programmes was sent to the coordinators with a submittal deadline of 17 October 2016. In the week of 17 October 2016, CAS Vice Presidents read the submitted reports and three proposals for new research programmes and prepared a draft of the evaluation of research programmes. The Academy Council took note of the report on evaluation preparation and results at its session on 1 November 2016. In subsequent weeks, the President of the CAS, the competent Vice President of the CAS and other members of the Academy Council spoke with research programme coordinators about their experience with Strategy AV21 to date as well as the evaluation results, which formed the basis for the final version of research programme evaluations, which are included in the body of information about their work. The next Strategy AV21 evaluation will take place in late 2018.

The evaluation process also included assessment of the proposals for new research programmes, which were submitted in compliance with the purpose of Strategy AV21 through the aforementioned call for proposals. The Academy Council approved three new research programmes on 29 November 2016:

- *Light at the Service of Society* (Coordinator Tomáš Mocek, Institute of Physics)

This research programme is focused on the development of progressive technologies in which the Czech Republic is already at a global level or for which it has the prerequisites to soon attain such a level.

- *Space for Mankind* (Coordinator Petr Heinzl, Astronomical Institute)  
The goal of this research programme is to strengthen cooperation between the scientific community and technical teams in the development and testing of new space research technology, particularly astronomical observation instruments for spacecraft.
- *Preclinical Testing of Potential Pharmaceuticals* (Coordinator Jan Kopecký, Institute of Physiology)  
This research programme aims to significantly advance commercialisation of basic research results, strengthen the CAS' position in negotiations with sponsors of follow-up clinical studies and seek opportunities for engagement in tenders for commercial contracts.

The Academy Council prepared a draft 2017 funding plan for all approved research programmes that was based on coordinators' requests, evaluation results and consideration of funding availability.

At this session of the Academy Assembly, a Report on Implementation of Strategy AV21 in 2015-2016 ([Zpráva o realizaci Strategie AV21 za období 2015–2016](#)), describing the work of individual research programmes, was presented; it is also available on the [CAS website](#). It contains detailed information about the composition of research programme teams, summaries of results and detailed descriptions of the key tasks of each research programme. The report also includes detailed information about the three new research programmes, which is also available on the Strategy AV21 website.

Two associated tasks are also important parts of Strategy AV21:

- **Analysis of research and development,**
- **Science support infrastructure,**

which are not research programmes but are closely related to research programmes' directions and goals. A separate chapter of the report describes the results of these two tasks. Experience with the research programmes to date clearly indicates that assistant coordinators, who organise research programme events, communicate with the public and update the Strategy AV21 website, play an important role in research programme efficacy. The Centre of Administration and Operations (CAO) conscientiously and consistently administers the website.

The fundamental goal of **Strategy AV21** is in line with the goals of the **National Research and Innovation Strategy for Smart Specialisation of the Czech Republic (RIS3)**, which strives to efficiently allocate European, national, regional and private funding to the most promising research and business areas. A secondary goal of the RIS3 is to create effective connections between the academic and business sectors. An update of the RIS3 was approved by the Czech government in July 2016. Most of the Strategy AV21 research programmes are thematically aligned with the topics of the RIS3 **National Innovation Platforms** (NIPs). During meetings with Deputy Prime Minister Pavel Bělobrádek, mutual interest was expressed in utilising the Strategy AV21 research programmes for specific implementation of NIP goals, e.g. by including coordinators of relevant research programmes in NIP teams.



# TECHNOLOGY TRANSFER

In 2016, the **CAS Technology Transfer Centre (CeTTAV)** officially began operating. The CeTTAV emerged through Strategy AV21 support as its cross-cutting component and is part of the CAO. The CeTTAV's main task is increasing CAS Institutes' technology and knowledge transfer capabilities.

Internal transfer of knowledge about technology transfer and deepening institutes' competencies is also the main goal of the project "*Academic Technology Transfer Office*", for which CeTTAV was awarded support in a MEYS call at the end of the year. The project aim is to analyse the needs of CAS Institutes and use the analysis to create a unique system of skill training sessions. It will give CAS Institute employees a chance to express, share and address practical questions and real experiences and increase their qualifications in this promising field.

The **CAS Intellectual Property Rights Council (IPR Council)**, newly established by the Academy Council and composed of internal and external technology transfer experts, worked with the CeTTAV to develop a white paper on systemic measures for management of CAS Institutes' intellectual property. The white paper draws on experience from other countries and was inspired by the transfer work of the Max Planck Society and Fraunhofer Gesellschaft. Based on the white paper, the Academy Council approved a *Concept for Management of CAS Institutes' Intellectual Property*.

The proposed concept focuses on identification and protection of CAS intellectual property. The goal is commercial and non-commercial, socially beneficial use of intangible assets. The IPR Council also identified the need to cultivate relationships between the academic and application sectors to ensure continued emphasis on the principles of equality and partners' social responsibility.

In the European scientific environment, R&D&I entities in the Czech Republic often encounter problems with interpretation of European legislation in the domestic legal environment. The ban on public support in particular creates uncertainty in the technology transfer field. The CAS, through the CeTTAV, Head Office Division of General Control and other units, and in collaboration with state administration bodies, strives for clear interpretation of these rules and transfer of related knowledge to CAS Institutes.

In 2016, CAS representatives also worked with the Technology Agency of the Czech Republic (TA CR) and took part in preparatory and evaluation meetings. The Chair of the TA CR participated in CAS Technology Transfer Council sessions, where various aspects of implementation of TA CR projects were discussed.

The CAS management also continued to hold a dialogue with the Confederation of Industry and Transport.

## 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 8,613 in 2015 to 8,759 in 2016. A total of 3,602 employees were paid through extra-budgetary allocations (which equalled 41.12% in 2016 compared to 42.26% in 2015). The number of research institute employees with university degrees who have passed attestations pursuant to the Career regulations of CAS employees with university degrees and have been classified in the relevant qualification levels grew year-on-year from 5,040 to 5,164.

The Czech Academy of Sciences expended a total of CZK 3,945,503,000 on salaries and wages and CZK 156,859,000 for other payments for work (OON). The total average monthly salary at the CAS was CZK 37,537 with year-on-year growth of 1.8% from 2015.

Chart No. 1: Number of employees and average monthly salary at the CAS

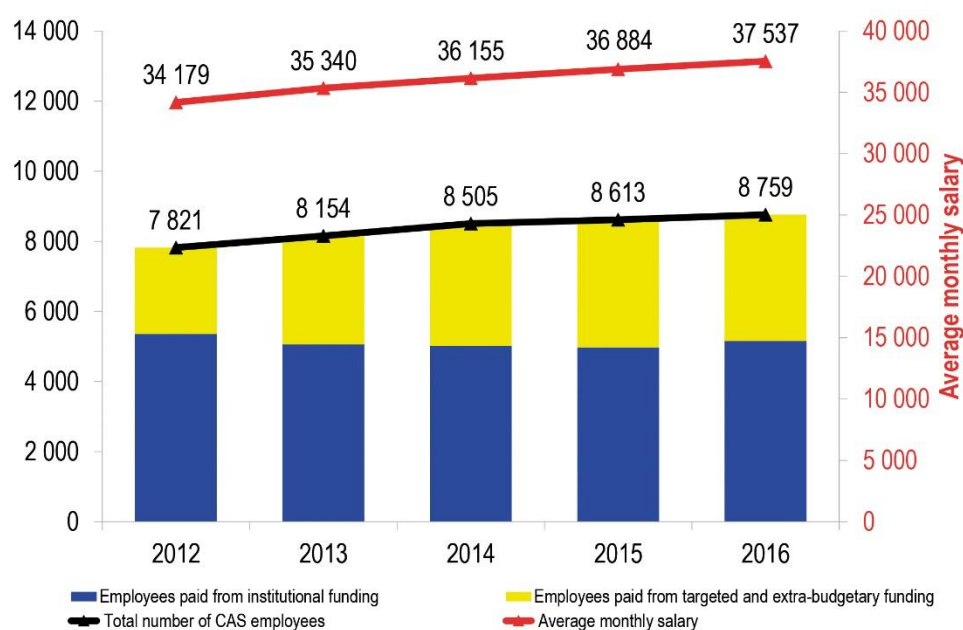


Table No. 1 provides a more detailed look at the number of CAS employees, categorised into employees of the CAS Head Office and employees of all CAS research institutes.

Table No. 1: Number of CAS employees

Year	2012	2013	2014	2015	2016
At CAS public research institutions	7,752	8,080	8,432	8,539	8,685
At the CAS Head Office	70	74	73	74	74
CAS total	7,821	8,154	8,505	8,613	8,759

At the CAS Head Office, CZK 41,562,000 was expended for salaries and CZK 1,135,000 for other payments for work performed by 74 employees, totalling CZK 42,697,000. The average monthly salary of CAS Head Office employees, excluding CAS elected

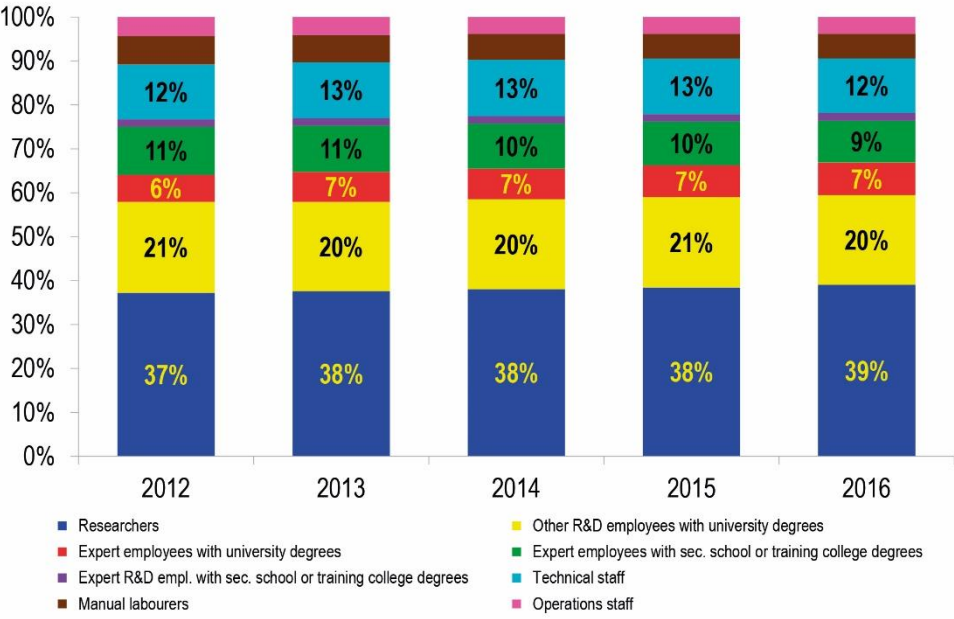
officials, was CZK 41,002 in 2016. Elected officials of the CAS (President, Vice Presidents and CAS Academy Council members) are also remunerated at the Czech Academy of Sciences pursuant to Government Regulation No. 564/2006 Coll., on the Salaries of Employees in Public Services and Administration. For this reason, elected officials are counted as CAS Head Office employees, and therefore the total average salary in the state organisational unit - CAS was CZK 46,646. The average salary rose by 5.3% from 2015, which was influenced primarily by the 5% increase in pay rates as at 1 November 2016 pursuant to Government Regulation No. 316/2016 Coll., which amended Government Regulation No. 564/2006 Coll., on the Salaries of Employees in Public Services and Administration.

The total spent across all CAS Institutes (public research institutions) in 2016 for 8,685 employees was CZK 3,903,941,000 for salaries and CZK 155,493,000 for other work performed, thus in sum CZK 4,059,434,000. The average monthly salary equalled CZK 37,460 with year-on-year growth of 1.7% from 2015. The table below provides a detailed overview of average monthly salaries at public research institutions (including all funding sources – institutional and extra-budgetary) by employee categories.

Table No. 2: Number of employees and average monthly salary per category for 2016

Category	Average recalculated number of employees	Average monthly salary in CZK
Researchers	3,391	48,846
Other research institute employees with university degrees	1,773	29,990
Expert employees with university degrees	644	37,381
Expert employees with secondary school or training college degrees	823	25,881
Expert R&D employees with secondary school or training college degrees <sup>161</sup>		28,069
Technical staff	1,074	37,619
Manual labourers	487	20,349
Operations staff	332	19,077
<b>Total</b>	<b>8,685</b>	<b>37,460</b>

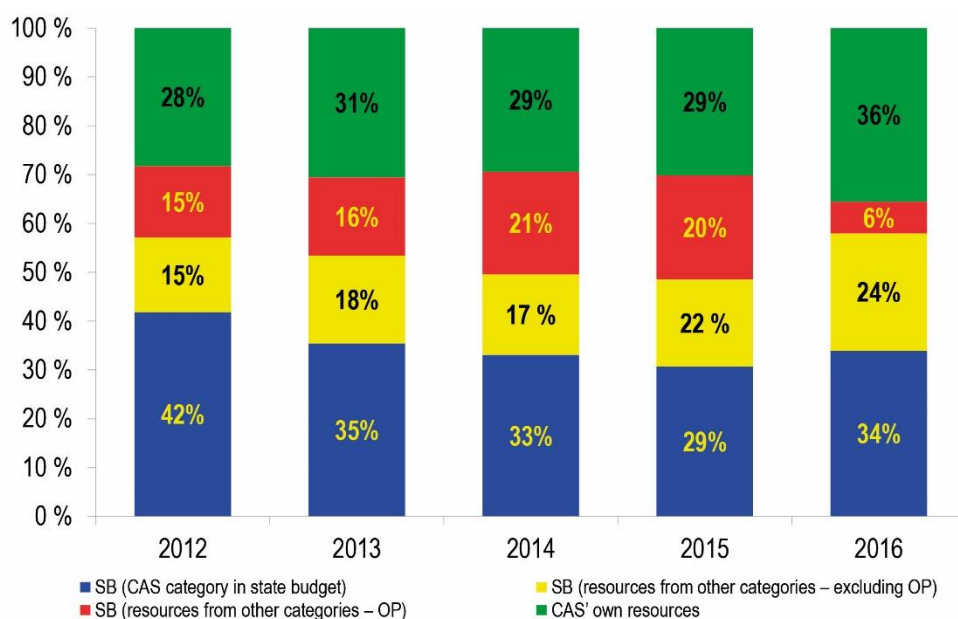
Chart No. 2: CAS research institute employee categories



## FINANCIAL RESOURCES AND THEIR USE

In 2016, the Czech Academy of Sciences managed a total of CZK 14,076.7 million, of which CZK 4,777.9 million came from the CAS category in the state budget (SB). The share of CAS-category state budget funding in the total financial resources of the CAS dropped from 42% in 2012 to merely 34% in 2016. The relative decrease in the share of CAS-category state budget funding was primarily caused by the increase in funding from other state budget categories (primarily operational programme funding) and growth in public research institutions' own resources (above all revenues from Institute of Organic Chemistry and Biochemistry licenses).

Chart No. 3: CAS Financial resources (in %)



**Financial resources** (for the entire CAS) originating from the CAS budget category, subsidies from other budget categories and the CAS' own resources are summarised in the following table.

Table No. 3: Structure of financial resources (actual) in millions of CZK

Financial resource	Non-investment resources	Investment resources	Total
<b>Resources from the CAS budget category</b>	<b>3,945.1</b>	<b>832.8</b>	<b>4,777.9</b>
<b>Subsidies from other budget categories</b>	<b>3,555.6</b>	<b>737.7</b>	<b>4,293.3</b>
GA CR grants	1,749.7	3.8	
TA CR projects	193.8	0.0	
Projects of other ministries	1,329.3	103.3	
Operational programmes	282.8	630.6	
<b>CAS' own resources</b>	<b>5,005.5</b>	<b>-</b>	<b>5,005.5</b>
Commissions relating to main activity	188.2		
Publication sales	101.4		
Rent	88.4		
Licenses	3,245.9		
Sale of goods and services	180.7		
Conference fees	17.5		
Interest, exchange rate profit	114.3		
Sale of material and securities	444.2		
Foreign grants and gifts	290.9		
Resources from CAS funds	209.4		
Other	124.6		
<b>Total resources</b>	<b>12,506.2</b>	<b>1,570.5</b>	<b>14,076.7</b>

CAS Institutes used CZK 10,475 million of their own revenues, which totalled CZK 12,425 million, to cover their own expenses and as at 31 December 2016 had a profit of CZK 1,950 million.

Given that CAS Institutes are managed as public research institutions in the system of non-governmental organisations and they therefore do not need to close their accounts until 30 June of the following year and that the institutes' financial statements must be verified by an auditor, the following expenditures statement should be taken as preliminary.

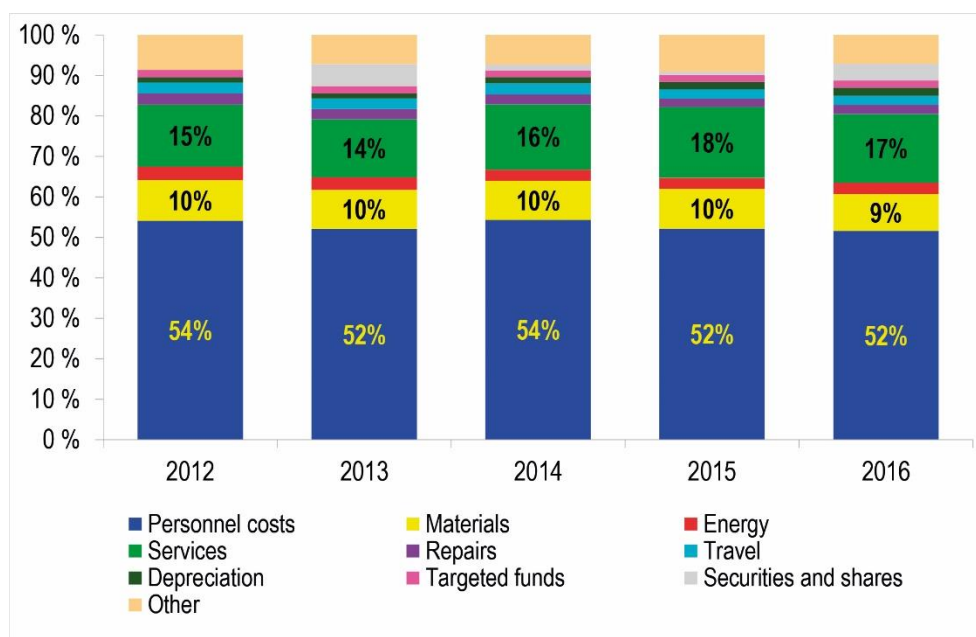
In comparison to 2015, the total expenditures of CAS Institutes (public research institutions) increased by CZK 450 million. A detailed breakdown of CAS Institute expenditures is provided in the following table.

Table No. 4: Structure of non-investment expenditures of CAS Institutes (in mil. CZK)

Type of expenditure	2015	2016	Difference
<b>Personnel costs</b> (wages, mandatory insurance paid by the employer, sickness insurance benefit reimbursements)	5,224	5,402	178
<b>Materials</b> (e.g. books, journals, small tangible assets, consumable supplies, protective gear)	991	957	-34
<b>Energy, water, fuel</b>	271	288	17
<b>Services</b> (postal services, small tangible assets, rent, conference fees, other services)	1,757	1,784	27
<b>Repairs and maintenance</b>	201	238	37
<b>Travel expenses</b>	234	232	-2
<b>Creation of targeted funds in total</b>	179	187	8
<b>Transfer to social funds and other social expenses</b>	168	178	10
<b>Taxes and fees</b>	377	419	42
<b>Depreciation of fixed assets</b>	183	210	27
<b>Exchange rate losses</b>	71	51	-20
<b>Securities and shares (sale of)</b>	77	426	349
<b>Other expenses (accident insurance, fines, damages)</b>	292	147	-145
<b>Inventory changes of own activity</b>	-	-5	-5
<b>Activation of material, goods, services and property</b>	-	-39	-39
<b>Total used by CAS Institutes</b>	<b>10,025</b>	<b>10,475</b>	<b>450</b>

Depreciation of assets acquired with subsidies amounting to CZK 1,323 million, which is an expenditure merely from the accounting perspective, is not included in this table; pursuant to Decree No. 504/2002 Coll., as amended, it does not constitute a source of the asset reproduction fund and does not influence profit/loss.

Chart No. 4: Use of non-investment resources (in %)



The comparison of non-investment resources expended by CAS Institutes during the monitored period of 2012 to 2016 shows that the ratios of the main categories have changed only minimally.

The main sources of investment resources are institutional and targeted subsidies from the state budget and foreign grants. They serve primarily for the acquisition or improvement of buildings and equipment, and secondarily for maintenance and repair of buildings and equipment.

Table No. 5: Investment resources of CAS Institutes (in mil. CZK)

Financial resource	2015	2016	Difference
Resources from the CAS category of the state budget	918.5	832.8	-85.7
Resources from other ministries, including operational programmes	3,235.7	737.7	-2 498.0
Depreciation	175.5	222.2	46.7
Transfer of additional profits	35.7	31.6	-4.1
Foreign grants and gifts	120.3	53.7	-66.6
Revenue from sale of fixed assets	13.1	8.7	-4.4
Aggregation of funds to acquire fixed assets	1.2	5.4	4.2
<b>Total</b>	<b>4,500.0</b>	<b>1,892.1</b>	<b>-2,607.9</b>

Table No. 6: Use of investment resources by CAS Institutes (in mil. CZK)

Type of expenditure	2015	2016	Difference
Financing of buildings	2,720.4	638.1	-2,082.3
Acquisition of instruments and equipment	2,865.8	1,155.0	-1,710.8
Maintenance and repairs	31.7	48.2	16.5
Other	178.2	133.9	-44.3
<b>Total</b>	<b>5,796.1</b>	<b>1,975.2</b>	<b>-3,820.9</b>



In 2016, CAS Institutes used CZK 1,975.2 million of the total investment resources to acquire long-term assets. The difference of CZK 83.1 million was settled by a decrease in the asset reproduction fund.

## **Controlling**

Controlling at CAS and CAS Institutes is provided by the Division of General Control (KO KAV), which reports directly to the President of the CAS. The CAS controlling system is based on requirements associated with the decision-making and management processes of CAS bodies and thus fulfils state administrative controlling conditions.

In 2016, the KO KAV verified whether the goals of the CAS and the institutes established by the CAS were fulfilled in compliance with valid legislation, CAS Statutes, decisions made by CAS bodies and internal regulations of the CAS and CAS Institutes. Special attention was also paid to verifying whether the financial and asset management of the CAS and CAS Institutes met requirements set forth by accounting regulations.

Public administration controls are performed pursuant to the approved annual plan. KO KAV controlling is defined by the financial control act and other regulations governing the performance of state administration controlling. This determines the content and practical implementation of the duty to verify management of state budget funding which the CAS disburses as the administrator of the science and research budget category.

As in previous years, inspection of the controlled entities focused mainly on relations to state budgets and verifying fulfilment of statutory requirements pertaining to utilisation, due record-keeping and reporting of budget funding. The KO KAV also inspected compliance with procedures for capital investment preparation, implementation and financing set forth by valid legislation and internal directives, and tender regulation legislation, including due diligence in property management.

Attention was likewise paid to compliance with labour relations regulations, particularly fulfilment of conditions stipulated by the Labour Code. As the efficacy and functionality of the internal controlling system significantly impact each institute's financial and asset management, particular attention was paid to contractual relations which have important financial and asset impacts on institutes' financial management.

Problems identified during controlling were subsequently analysed in detail. Financial and legally justified descriptions of the identified problems were used during discussions about the control findings with the management and responsible employees of the controlled entities, as well as for methodological work with the financial management departments of other CAS Institutes to prevent reoccurrence of identified inconsistencies.

Ten planned controls at CAS Institutes were conducted in 2016. Records of results of public administration controls of state budget funding management were intermittently submitted to and discussed at Academy Council sessions. Controls were conducted at the Institute of Sociology, Institute of History, Institute of Physics of Materials, Institute of Biophysics, Institute of Chemical Process Fundamentals, Institute of Organic Chemistry and Biochemistry, Institute of Theoretical and Applied

Mechanics, Institute of Thermomechanics, Institute of Czech Literature and the Institute of Molecular Genetics.

Two significant events intervened in the implementation of planned controlling in 2016. One was the CAS management's decision to execute an immediate, extraordinary control at the Institute of Experimental Medicine. Preparation and implementation of this control affected the KO KAV's work schedule significantly. The KO KAV's work was also affected by a justified request from the Director of the Institute of Molecular Genetics to postpone the control planned for this institute. As a result, the planned follow-up controls at the Institute of Botany will take place in early 2017, along with completion of the control begun at the Institute of Molecular Genetics.

Seven follow-up controls were conducted in 2016 to verify fulfilment of measures designed to eliminate problems identified in 2015 financial management controls.

The follow-up controls verified that problems identified in the financial management of three institutes had been completely eliminated, and partial insufficiencies remained at the other four institutes. The KO KAV will continue to monitor remediation of these problems in the next year. No problems were found at two institutes controlled in 2015, thus there was no reason to conduct follow-up controls in these cases.

The KO KAV also conducted controls at eight scientific societies, where use of grant funding in 13 projects was inspected. Audits of accounting in EU framework programme projects were also conducted. The volume of audited funding in 2016 equalled CZK 24,509,000.

# SUPPORT OF EXCELLENCE

## Praemium Academiae – Academic Premium

The [Academic Premium](#) is the most prominent means of supporting scientific excellence at the Czech Academy of Sciences. It enables outstanding scientists conducting research at a high international standard to use their potential fully and encourages them to pursue further research at a globally comparable level. The Academic Premium award money of up to CZK 5 million per year helps recipients cover their research costs for a period of six years and, in the longer term, to develop it both by building their own scientific teams and by acquiring needed new instruments or laboratory materials. The Academic Premium is comparable with European Research Council (ERC) grants in terms of its significance and prestige as well as the amount of financial support awarded. The 2016 Academic Premium award-winners include:

- **Ing. Pavel Jelínek, Ph.D.**, Institute of Physics
- **prof. RNDr. Ladislav Kvasz, Dr.**, Institute of Philosophy

**Dr. Pavel Jelínek** is a recognized expert in the study of physical and material nanostructures using a combination of theoretical simulations and experimental techniques, particularly raster microscopy. His work has elicited a high number of citations (over 2,500 citations, h-index 23). Since 2009, he has led the NANOSURF scientific group at the Institute of Physics.

**Prof. Ladislav Kvasz** is a world-renowned expert in the philosophy of science, particularly the theory of changes in scientific paradigms. He has formulated his own theory of scientific language changes, which has been recognized internationally (Fernando Gil International Prize for the Philosophy of Science).

On 21 November, 2016, Academic Premium award-winners for 2010–2016 Prof. Pavel Jungwirth of the Institute of Organic Chemistry and Biochemistry and Prof. Petr Pyšek of the Institute of Botany gave their [final public lectures](#) in the CAS building. Prof. Jungwirth's lecture was titled "Water, ions, electrons and biomolecules: What Hofmeister didn't know" and Prof. Pyšek's "A global view of plant invasions".

## J. E. Purkyně Fellowship

The aim of [this fellowship](#) is to bring outstanding scientists from other countries to CAS Institutes, including scientists of Czech origin who have been working abroad long-term as well as leading foreign scientists, generally younger than 40 years old, and to provide them with adequate funding at CAS Institutes for a period of up to five years. These scientists are expected to become leaders of creative teams in their respective institutes. In 2016, the CAS granted J. E. Purkyně fellowships to:

**Mgr. Jan Hrček, Ph.D.**, nominated by the Biology Centre for his scientific research into community ecology and molecular, experimental and evolutionary entomological ecology and associated symbiotic bacteria.

**Mgr. Ondřej Štěpánek, Ph.D.**, nominated by the Institute of Molecular Genetics for scientific research into molecular and cellular immunology with an emphasis on clarification of fundamental adaptive immunity mechanisms.

**Mgr. Petr Vodička, Ph.D.**, nominated by the Institute of Animal Physiology and Genetics for scientific research into the pathogenesis, biomarkers and potential treatment of Huntington's disease using advanced proteomic methods.

**Doc. Dr. phil. Holger Gutschmidt**, nominated by the Institute of Philosophy for scientific work in modern philosophy with a special emphasis on classical German philosophy.

## **Otto Wichterle Award**

[This award](#) is intended for selected, extraordinarily talented, promising CAS scientists who are under the age of 35 in the year of their nomination. The award bears the name of Professor Otto Wichterle, a globally-outstanding Czech chemist who became President of the Czechoslovak Academy of Sciences after November 1989. The aim of the Otto Wichterle Award is to encourage promising CAS scientists whose excellent results contribute to the development of their relevant scientific disciplines. On 30 May 2016, at Villa Lanna in Prague, President of the CAS Jiří Drahoš presented the Otto Wichterle Award to the following [11 young scientists](#):

### I. Mathematics, Physics and Earth Sciences

Ing. Prokop Hapala (Institute of Physics)

Mgr. Kamil Olejník, Ph.D. (Institute of Physics)

Ing. Štěpán Stehlík, Ph.D. (Institute of Physics)

Mgr. Jan Hladký, Ph.D. (Institute of Mathematics)

Ing. Michal Cifra, Ph.D. (Institute of Photonics and Electronics)

Mgr. Michael Komm, Ph.D. (Institute of Plasma Physics)

Ing. Hanuš Seiner, Ph.D. (Institute of Thermomechanics)

RNDr. Tomáš Příkryl, Ph.D. (Institute of Geology)

### II. Life and Chemical Sciences

RNDr. Martin Ferus, Ph.D. (J. Heyrovský Institute of Physical Chemistry)

Ing. Petra Cuřínová, Ph.D. (Institute of Chemical Process Fundamentals)

Mgr. Michal Behuliak, Ph.D. (Institute of Physiology)

RNDr. Katarína Smolková, Ph.D. (Institute of Physiology)

RNDr. Pavel Hrouzek, Ph.D. (Institute of Microbiology)

Mgr. Tomáš Jůza, Ph.D. (Biology Centre)

RNDr. Pavla Sojková, Ph.D. (Biology Centre)

Ing. Martin Šálek, Ph.D. (Institute of Vertebrate Biology)

### III. Humanities and Social Sciences

PhDr. Martina Mysíková, Ph.D. (Institute of Sociology)

Mgr. Vítězslav Sommer, Ph.D. (Institute of Contemporary History)

Mgr. Ota Pavlíček, Ph.D., Th.D. (Institute of Philosophy)

Filip Vostal, Ph.D. (Institute of Philosophy)

Mgr. Petr Plecháč, Ph.D. (Institute of Czech Literature)

## Support for Early Career Scientists

The Academy Council dedicates systematic and long-term support to promising human resources and the establishment of international cooperation with young scientists. In 2016, the successful CAS support programmes for early career scientists continued and new programmes were initiated.

**The Prospective Human Resources Support Programme** is one form of support. It provides payroll support for postdoctoral students at CAS Institutes (the PPLZ programme). It is intended for new postdoctoral students (within two years of the defence of their PhD thesis or equivalent, or four years in the case of long-term study abroad). In 2016, through two PPLZ Programme calls, 32 candidates were supported in the 6<sup>th</sup> call (commencing 1 January 2016) and 30 candidates in the 7<sup>th</sup> call (commencing 1 July 2016). The PPLZ Programme jury also used feedback from CAS Institutes to assess the usefulness of the programme for CAS Institutes.

Directors of CAS Institutes were asked to provide information about postdoctoral students who received payroll support from the PPLZ Programme in the given year through a questionnaire or Evaluation report. The data collection period was approximately one year after the given postdoctoral student's participation in the PPLZ Programme concluded. Almost 60% of the postdoctoral students are continuing to work in the given institute; 3% of them are already leading their own research teams, 31% are compiling such teams; 14% have received grants on their own and 54% are members of a grant project team; and 3% have left for another country. CAS Institutes stated that their expectations had been met for 94% of the postdoctoral students. In general (with one exception) the Institutes assessed this programme very positively.

Since 2015, another CAS priority in support for early career scientists and international collaboration has been **Research-educational activities** for young scientists and foreign students. Various CAS Institutes run such activities in order to establish contacts, educate and engage high-quality foreign participants in CAS Institute research. In 2016, CZK 1.2 million was expended to support 15 such activities.

2016 was the final year of implementation of the **CAS Internal Support for International Collaboration Projects Programme**. A total of CZK 297,000 was expended for this programme, which was partially replaced by the **CAS Support for International Collaboration of Early Career Scientists Programme**, which aims to support development of collaboration between CAS Institutes and major foreign institutes and enable fledgling scientists to engage in international collaboration independently. More than CZK 2 million was expended in 2016 for the first 17 projects.

The **Josef Dobrovský Fellowship 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 work. In 2016, total funding of CZK 360,000 was provided for nine study visits at three CAS Institutes.

## INTERNATIONAL COOPERATION

The CAS' international collaboration efforts are grounded in the **CAS Concept of Support of International Cooperation** approved in November 2014, which reflects global challenges and changes and is guided by the principle of free movement of researchers, knowledge and ideas. All of the international efforts supported by the CAS contribute to engagement of foreign partners in Strategy AV21 research programmes. The main goal is to create a more international milieu and improve the quality of CAS Institutes and teams through international collaboration and researcher mobility. To attain this goal, the CAS has introduced a number of new programmes directed primarily at supporting the mobility of emerging scientists.

The EURAXESS centre at the CAO facilitates reception and integration of foreign experts in the Czech environment. The Centre's primary tasks are providing information and expert assistance with legal and administrative matters associated with work stays in the Czech Republic.

On the European cooperation level, the CAS' priority is to further intensify integration into the European Research Area (ERA). By actively engaging in international projects, CAS Institutes have the opportunity to implement outstanding research and gain access to unique research infrastructures, instruments, platforms and scientific sources and data. The engagement of the Czech Republic in intergovernmental scientific organisations (e.g. CERN, EMBL and ESO) is a fundamental prerequisite for the development of some fields. The Czech Academy of Sciences takes advantage of opportunities offered by the EU Horizon 2020 framework programme for research and innovation and other EU R&D&I initiatives, both through engagement of CAS Institute teams in projects and involvement of CAS representatives in coordination of this area.

In 2016, CAS Institutes participated in research in 50 Horizon 2020 programme projects with funding totalling EUR 5.05 million. There were also 59 projects funded through the 7th EU Framework Programme for Research and Technological Development with a total budget of EUR 5.01 million. The CAS regularly applies for European Research Council (ERC) grants, which are awarded to support outstanding scholarly research directed beyond the bounds of knowledge in a given field. In 2016, two CAS researchers received ERC project support: a Starting grant was awarded to Doc. J. Kalbáčová-Vejpravová of the Institute of Physics, and a Consolidator grant to Dr. D. Doležel of the Biology Centre). Since 2014, when the Horizon 2020 programme was initiated, CAS Institutes have received almost half of all of the ERC grants awarded to researchers in the Czech Republic. The CAS is also involved in other Horizon 2020 activities such as Teaming. One specific successful example is the HiLASE CoE project, submitted by the HiLASE centre at the Institute of Physics, which was the only project from the Czech Republic to succeed in the Widespread-Teaming call.

Apart from efforts to obtain project support, CAS representatives prepare statements on EU R&D plans and programmes and are also actively engaged in the work of the Joint Research Centre (JRC) and the European Strategic Forum for Research Infrastructure (ESFRI), in which a CAS representative was elected as Vice Chairman in 2016. On 9-10 June 2016, an international conference on collaboration potential and involvement of Czech scientists in one of the seven JRC research sites, located in

Belgium, Germany, Italy, the Netherlands and Spain, was held at the CAS. The conference was attended by the JRC CEO Vladimír Šuchy.

The CAS was also engaged in the creation of a global science strategy through the work of international non-governmental organisations which strive to address pan-European and global research and development problems (e.g. the European Academies Science Advisory Council – EASAC, All European Academies – ALLEA, International Science Council– ISC, Inter Academy Partnership – IAP and European Network of Research Integrity Offices – ENRIO).

The CAS also paid close attention to structural funds, which are an important source of research funding in the current context. In 2016, CAS Institutes took part in eight EU Structural Funds operational programme projects. The first calls of new operational programmes were assessed and e.g. in the Research, Development and Education Operational Programme call, which supports excellent research teams, one-third of all supported projects were CAS Institute projects.

The CAS continued to strengthen bilateral and multilateral collaboration with research institutes, primarily from countries where research and development are of a high quality and intensity. The key aim of establishing new, and intensifying existing, collaborative efforts is to engage CAS Institutes and teams in the international research community, networks and platforms, including EU framework programmes and other international research programmes.

In 2016, scientific collaboration was implemented on the basis of bilateral contracts between the CAS and foreign partner organisations from 35 countries. In alignment with the international cooperation concept, the CAS continued transitioning from study visits to joint mobility projects that aim to share knowledge and use participating institutes' complementary methods and instruments to develop joint publications and articles. To this end, contractual documents with 12 partner organisations were updated and two new cooperation contracts were concluded. More than 400 foreign researchers were received at CAS Institutes and 350 CAS Institute researchers were sent to a partner organisation abroad in 2016 through CAS bilateral cooperation programmes.

In 2016, the CAS also took part in the KONNECT programme call for joint multilateral projects involving collaboration between EU countries, affiliated countries and the Republic of Korea. The aim of these projects is to strengthen collaboration in Europe and with selected third countries to give rise to new consortia that could apply for Horizont 2020 programme projects. In the “Resources and Sustainability” competition, two projects involving teams from the Institute of Physics and Institute of Plasma Physics were awarded support totalling over CZK 700,000 in 2016.

Under an extraordinary grant for development of cooperation with leading scientific research institutes in Israel, 51 activities were supported with total funding of almost CZK 3 million.

Another specific example of successful cooperation initiated in 2016 was the **signing of a Memorandum on cooperation with the Max Planck Society** to support joint research. The CAS also began working with the Fraunhofer Gesellschaft on technology transfer.

## REGIONAL COOPERATION

The Czech Academy of Sciences helps Czech regions and microregions improve the quality of life through jointly funded research projects and their application. This work is rooted in agreements concluded successively with the Association of the 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) and Karlovy Vary Region (2016). In 2016, most of these agreements were implemented through 21 joint projects which were financed according to agreements between CAS Institutes and their regional partners.

On the basis of a proposal by the **Regional Cooperation Committee**, the Academy Council awarded funding to projects in the first call at its 35<sup>th</sup> session on 1 December 2015 and approved grants for second call projects proposed by said committee at its 40<sup>th</sup> session on 10 May 2016.

In 2016, CAS Institutes from all nine CAS Institute sections – with the exception of the Mathematics, Physics and Information Technology section – took part in regional cooperation. As in previous years, projects addressed roughly these areas: research of landscape changes (monitoring and mitigation of drought, water reservoir cleanliness, lake management and meadow species diversity), regional health and economic issues (mosquitoes as a health hazard, volunteer organisations) as well as support of research and cultural-educational events (archaeological research and installation, conservation research of construction materials and medieval artwork, philosophy festival).

These joint projects include a regular annual meeting, held alternately in Prague and Brno, and attended by representatives of the CAS and regions of the Czech Republic. This meeting serves as an informational, inspirational and discussion platform for researchers and representatives of regional and local self-governments. The CAS Regional Cooperation Committee chose six of the 21 joint projects for presentation and evaluation of results at the meeting which took place on 14 March 2017 in Brno: 1. *Opening and making accessible the Goethe adit in the Komorní hůrka volcano*, GeoInstitute of Physics, Town of Františkovy Lázně, Muzeum Sokolov; 2. *Carbon balance of the urban ecosystem*, Global Change Research Institute, Statutory City of Brno; 3. *Why has Lipno Lake deteriorated? An analysis of fish stocks and fishing catches for the purposes of effective lake management*, Biology Centre, Czech Anglers' Union - South Bohemian Board, Povodí Vltavy, s. p.; 4. *Mosquitoes as a health hazard for inhabitants of the South Moravia region*, Institute of Vertebrate Biology, South Moravia region; 5. *Antonio Caldara in the context of his times*, Institute of Ethnology, Centrum barokní kultury, z. s., Baroque ensemble Hof-Musici; 6. *Volunteerism in the Pardubice region*, Institute of Sociology, Pardubice region.



## EDUCATIONAL ACTIVITY

A significant complementary element to the CAS' focus on scientific work is the development and intensification of educational quality, which the CAS considers a vitally important part of its social mission. The CAS thus places extraordinary significance on supporting quality education at all levels of the school system.

The CAS' educational activities centre around cooperation with universities, particularly in doctoral programmes. CAS employees are also directly involved in teaching and supervising university students, along with a variety of educational and training programmes for secondary school students and knowledge-building events for teachers.

### Cooperation with universities

Cooperation between the CAS and other educational, research and development institutions on a national level is based on close collaboration with universities. Relations between the CAS and universities are monitored and coordinated by the **Council for Cooperation with Higher Education Institutions and the Preparation of the Scientific Employees of the CAS**, which is an advisory body to the CAS management. Joint research institutes, which currently number in the dozens, provide significant opportunities for research and educational collaboration with universities.

CAS Institutes and employees participate extensively in student education at both public and private universities. In 2016, CAS employees provided more than 5,000 semester series of lectures, practical exercises or seminars with a total scope of more than 75,000 hours. CAS Institutes contribute significantly to student guidance and supervision of students' qualification work. In 2016, employees of CAS Institutes supervised over 2,000 doctoral students and trained and led almost 1,000 bachelor and master programme students. In 2016, 263 doctoral students trained at CAS Institutes successfully completed their studies. The CAS has supported the general education of doctoral students for many years through its successful and sought-after week-long *Course on the basics of scientific work*, which is intended for doctoral students in various fields. Courses are held regularly in Prague and in Brno; in 2016 they were attended by 289 students.

CAS Institutes obtained joint accreditation in a broad array of doctoral fields of study. They concluded a total of 22 framework contracts on cooperation in implementation of doctoral study programmes with various universities, which will be renewed after the new act on universities is passed.

### Engagement at secondary and primary schools

CAS' engagement in secondary and primary school education centres around teaching and a broad spectrum of lectures. The CAS' role in these educational levels is often supported by EU funding and projects, which makes it possible to adapt content to various target groups.

Tab. No. 7: Overview of the most significant forms of cooperation with universities

	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
<b>Doctoral students trained at CAS institutes</b>	2,182	2,064	2,063	2 030	2,091	2,019
<b>Newly accepted doctoral students</b>	381	386	397	315	376	348
<b>Number of doctoral dissertations completed</b>	254	258	224	268	264	263
<b>Number of semester series of lectures, seminars and practical exercises</b>	3,853	3,722	4,034	4 017	4,236	5,430
<b>Number of hours lectured</b>	80,600	76,939	74,198	74 747	76,154	75,262

## MEDIA COMMUNICATIONS, PROMOTION AND PUBLIC EVENTS

The CAS' scientific and research work and its impact on Czech society are partially determined by how appropriately they are perceived by the political sector and the broader professional and lay public. Two important parts of the CAS' work, therefore, are cultivating the institution's media image and educating the younger generation about science and its social significance.

A broad array of institutes and offices, from the Academy Council, the CAO and various scientific institutes, took part in organising a large number of media and popularisation activities. One area encompassed seminars, held jointly by the Chamber of Deputies or Senate of the Parliament of the Czech Republic, about climate change and e.g. the work and heritage of Charles the IV. Another area included e.g. the role of the Brno-based Institute of Archaeology in the new *Archeopark Pavlov* and the *Klamárium* didactic exhibition about visual illusions, which was organised by the Institute of Psychology at the VIDA! Brno science centre. The Academy Council dedicated particular efforts to the conceptual development of the *Gallery of Science and Art* in the CAS main building, which resulted in a series of events presenting the results of CAS research, including Strategy AV21. The exhibitions *Seven Towers. Charles the IV Through the Eyes of Scholars*, *Echoes of Expo 2015* and *Josef Sudek: In the Studio* attracted the most attention.

The second-annual *Science Fair*, held in June 2016, was a remarkable event that was widely reported in the media. The *Science Fair* gave the CAS a chance to present the work of most academic institutes, including the humanities and social sciences this year, to the broad public. Held by the CAS at the Letňany fairgrounds, it was the largest popular/educational science event of its kind in the Czech Republic in 2016. There were 14,000 visitors over the three days of the event, which included an extensive array of accompanying events such as lectures, film screenings, a science show and a mobile planetarium.

Every autumn, the CAS presents its work through the *CAS Week of Science and Technology*. The interest of many partner organisations, such as Charles University and other universities, in taking part in the event are evidence of its extent, reach and effect. In 2016, there were 393 lectures, 78 seminars, workshops and excursions, 25 science cafes, 80 exhibitions, 30 film screenings, 17 science shows and 61 other special programmes.

An important step going forward is the forging of close, coordinated collaboration with the new science editorial office at Czech Television (CT), which provides an opportunity to present the CAS as a key research institution in the Czech Republic on a daily basis. The forerunner to this collaboration was CT's decision to air two lectures from the prominent new CAS lecture series – *CAS: Top research in the public interest* – on the CT website. In this new series, leading personalities of Czech science express opinions on current issues and social problems. The first to speak to the academic community and politicians was *Prof. František Šmahel* who spoke about *Charles the IV. and Master Jan Hus*, followed by *Prof. Jaroslav Doležel*, coordinator of the Foods for the Future Strategy AV21 programme, who gave a talk titled *Can genetics save humankind from famine?*.

## AWARDS GRANTED BY THE CAS

Each year, the Czech Academy of Sciences presents awards to leading scientists for excellent research results that focus on social priorities, have strengthened the international prestige of Czech science and were first published or implemented during the past five years.

In 2016, the **Award of the Czech Academy of Sciences for outstanding results with great scientific significance** was presented to a team nominated by the Institute of Microbiology, composed of Prof. RNDr. Josef Komenda, Ph.D., DSc., Ing. Roman Sobotka, Ph.D., RNDr. Jana Knoppová and Mgr. Vendula Krynická, Ph.D. for a scientific work on Biogenesis and Protection of Photosystem II, and to a team nominated by the Institute of Molecular Genetics composed of Doc. RNDr. Petr Svoboda, Ph.D., Ing. Matyáš Flešar, Ph.D., MUDr. Radek Malík, Ph.D., Mgr. Jana Nejepínská, Ph.D. and doc. Radislav Sedláček, Ph.D., for a scientific work on Mammal RNA interference.

**The Award of the Czech Academy of Sciences for Young Researchers Under 35 for Outstanding Scientific Work** was presented to Mgr. Martin Kopecký, Ph.D., nominated by the Institute of Botany for the scientific work Long-term Changes in Biodiversity of Temperate Forest Vegetation.

In 2016, on the occasion of the World Information Development Day (24 October), the joint **CAS President and Neuron Foundation Award** for scientists was awarded for the first time for excellent results that contribute to promotion and popularisation of research, experimental development and innovation. This award was presented to Doc. Mgr. Michal Švanda, Ph.D., of the Astronomical Institute.

**CAS honorary medals** were awarded to outstanding individuals in the Czech Republic and abroad for particular merit in scientific work, popularisation of science and increasing the social prestige of science in the development of scientific technical knowledge and methods and their application in society and economics, as well as advocacy of humanitarian ideas.

In 2016, the following honorary medals were awarded: “*The Honorary Medal of the CAS “De Scientia et Humanitate Optime Meritis”*” to Prof. PhDr. Jaroslav Pánek, DrSc., dr. h. c. mult., from the Institute of History, *the Bernardo Bolzano Honorary Medal for Merit in the Mathematical Sciences* to Doc. RNDr. Marián Fabian, DrSc., and Prof. RNDr. Vladimír Müller, DrSc., both from the Institute of Mathematics, *the Ernst Mach Honorary Medal for Merit in the Physical Sciences* to Doc. RNDr. Petr Hadrava, DrSc., from the Astronomical Institute and Prof. RNDr. Jaroslav Polák, DrSc., dr. h. c., from the Institute of Physics of Materials, *the František Křižík Honorary Medal for Merit in the Technical Sciences and for the Implementation of Results of Scientific Research* to Prof. Ing. Pavel Vlasák, DrSc., FEng., prof. h. c., from the Institute for Hydrodynamics and Ing. Milan Hájek, CSc., from the Institute for Chemical Process Fundamentals, *the Jaroslav Heyrovský Honorary Medal for Merit in the Chemical Sciences* to Prof. Ing. František Kaštánek, DrSc., from the Institute for Chemical Process Fundamentals, Prof. Emil Paleček, DrSc., from the Institute of Biophysics and Prof. Ing. Pavel Hobza, DrSc., FRSC, dr. h. c., from the Institute of Organic Chemistry and Biochemistry, *the Gregor Johann Mendel Honorary Medal for Merit in the*

*Biological Sciences* to Prof. Ing. Jiří Kopáček, Ph.D., from the Biology Centre and Prof. RNDr. Boris Vyskot, DrSc., from the Institute of Biophysics, *the Jan Evangelista Purkyně Honorary Medal for Merit in the Biomedical Sciences* to Prof. Jerzy Duszyński, DSc., Chair of the Polish Academy of Sciences, *the Josef Dobrovský Honorary Medal for Merit in Philological and Philosophical Sciences* to Prof. PhDr. Jana Nechutová, CSc., from Masaryk University Brno, *the František Palacký Honorary Medal for Merit in the Historical Sciences* to Prof. Leslie Sklair, Ph.D., LSE, from the University of London, Prof. PhDr. Lubomír Konečný from the Institute of Art History and Prof. PhDr. Josef Žemlička, DrSc., *the Jan Patočky Commemorative Medal* to Prof. Dr. Felix Unger, dr. h. c., Chair of the European Academy of Sciences and Arts, *the Vojtěch Náprstek Honorary Medal for Merit in Science Popularisation* to RNDr. Jana Šrotová, Editor-in-Chief of the magazine *Živa*, PhDr. Zdeněk Vejvoda, Ph.D., from the Institute of Ethnology and Prof. RNDr. Jan Suda, Ph.D., Chair of the editorial board of the magazine *Živa*.

*A letter of thanks for long-standing service to the CAS* was presented by the President of the CAS, Jiří Drahoš, to 29 particularly deserving long-standing academic, organisational, administrative and technical employees from 15 CAS Institutes, who contributed significantly to the successful work of their institutes, and thus the CAS as a whole, through their selfless work.

Of the many awards presented by other Czech and international organisations to CAS employees, the **National ‘Czech Head’ Prize of the Czech Government** should be noted; in 2016 it was awarded to Prof. MUDr. Jiří Forejt, DrSc., from the Institute for Molecular Genetics for life-long research into mouse genetics.

**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 to 31 December 2016**

a)	Number of submitted requests for information	7
	Number of decisions issued to reject a request	1
b)	Number of submitted appeals against a decision to reject a request	0
c)	Number of court judgments examining the legality of a decision to reject of a request	0
d)	Number of exclusive licences granted	0
e)	Number of complaints submitted pursuant to Section 16a of the Act	0