



2017

Annual Report

on the Activities of the Czech Academy of Sciences

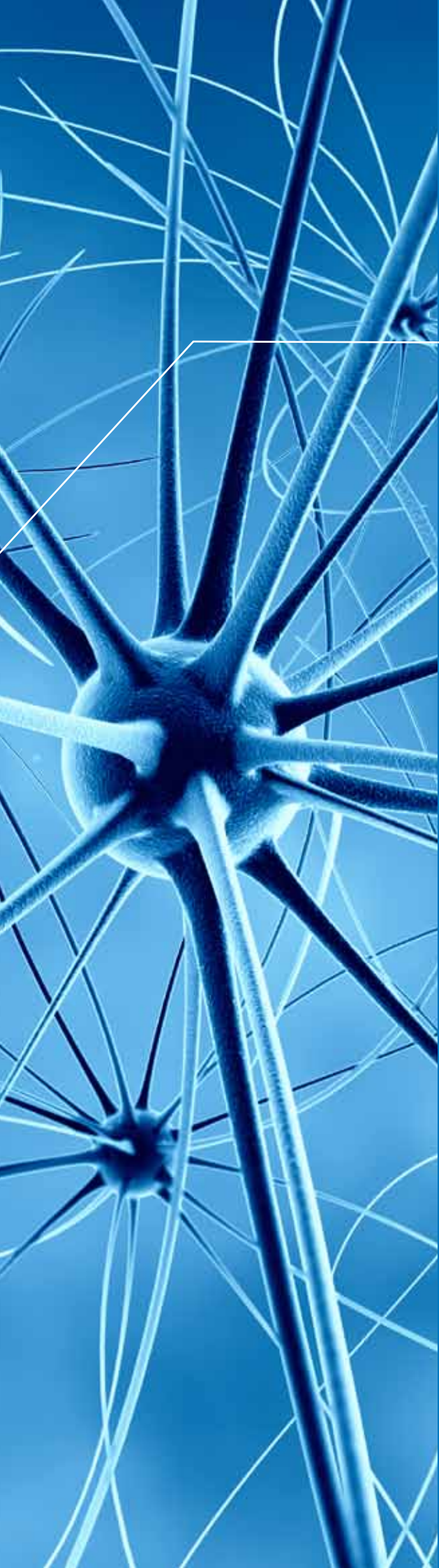
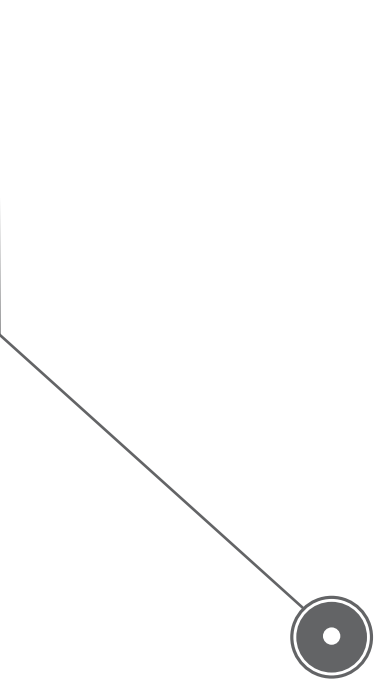


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Interview



with the President of the Czech Academy of Sciences

How would you characterise 2017 from the point of view of the Czech Academy of Sciences (CAS)?

2017 was a year of change and an election year. Based on the results of the Academy Assembly elections in December 2016, the President of the Czech Republic named me President of the Czech Academy of Sciences in March 2017, while at the spring Academy Assembly, the new Academy Council and Council for Sciences were elected. Parliamentary elections were held in the autumn and the new Government of the Czech Republic was appointed in the early winter. This, of course, was reflected in the work of the administration of the Czech Academy of Sciences. In accordance with their mission, however, the institutes of the CAS continued their intensive research, educational, popularising and cultural

activities. The most significant results are presented in the individual chapters of this report. Current activities are regularly published on our website. In the long-term, we are striving to keep the public informed of the results and successes of the Academy's scientists through the media.

In 2017, the CAS signed a “Declaration of the Stabilisation of the Research, Development and Innovation (R&D&I) Information System in the Czech Republic”. Is it going to be successfully fulfilled?

I am delighted that we were able to sign this document in late spring last year. From our perspective, it is very important, because, in the document, the then Deputy Prime Minister Pavel Bělobrádek and Minister of Education, Youth and Sports Kateřina Valachová

declare on behalf of the Government that they will advocate an annual five-percent increase in institutional contributions which the state sends to research organisations - the Czech Academy of Sciences and universities. The goal is to increase these funds to as much as 70% of their total income, as is the case with top-class institutions comparable with the Academy of Sciences in Germany or in Austria. For this reason, I hope that the next Government of the Czech Republic will respect this declaration and will strive for the continuity of support in the fields of education, science and research in order to fulfil the aim of this important document and to enable research organisations in the Czech Republic to perform the most efficient work possible.

How do you see the financial situation of the CAS? How can an optimal amount of funding reach the scientific community?

I consider it a minor miracle that even though the share of institutional support of the CAS has stagnated over the past few years at around a third of its total budget, it remains the most efficient Czech science and research institution. Compared to the international standard, it is an extremely low level of institutional funding which is unparalleled in the scientifically significant countries of Western Europe. About a further third comes from royalties and contractual research. Scientists have to procure the remainder through various grants. I find this method inefficient, because leading figures in their fields and non-contingent workers are constantly forced to compete for relatively short-term grants and to deal



with the related paperwork instead of fully concentrating on their own conceptual scientific work. Therefore, we will continue to appeal to the state administration and, together, attempt to find and implement measures which best suit the interests of our scientists and support the high quality of Czech science.

Will the CAS allocate funds to institutes according to the results of the last evaluation you have carried out?

The need to move closer to, or keep up with, the European and global level of science in the widest possible range of fields leads the CAS to regularly evaluate the level of its institutes and individual scientific teams, based on typical global criteria and with the participation of foreign evaluators. The last such evaluations (Evaluations of the Research and Professional Activities of the Institutes of the CAS for 2010–2014) were conducted in 2015 and completed in early 2016. Their results were therefore reflected in the amount of institutional support

for each institute for the year 2017. At the same time, we are making a long-term effort to ensure that these broadly conceived evaluations have an increasingly greater influence on the distribution of funds between individual institutes. In this context, it should be noted that all institutes of the CAS are also evaluated on a continuous basis, which is one of our annual obligations by law.

Which scientific results of the CAS institutes are you most pleased with?

The CAS has successfully achieved a series of significant results across individual scientific disciplines. Here, I will mention just a few examples that have the potential of application in the medical field: a new generation of polymeric drug carriers has been developed, enabling the treatment of both drug resistant as well as metastatic tumours in terminally ill patients. There are also new findings regarding the role of lipids in the progress of Alzheimer's disease. These could reveal new directions in the

treatment of the disease. And last but not least, a new procedure has been developed to modify the structure of joint replacement materials and to extend their lifetime by using ionising radiation – joint replacements with an increased lifespan are currently being introduced into production. The specified examples as well as a range of other results clearly show how the quality of life of our citizens in the coming years and decades depends on today's and tomorrow's discoveries from basic and applied research.

In 2016, the Academy Assembly elected you President of the Czech Academy of Sciences for four years. What direction should the Academy take under your leadership?

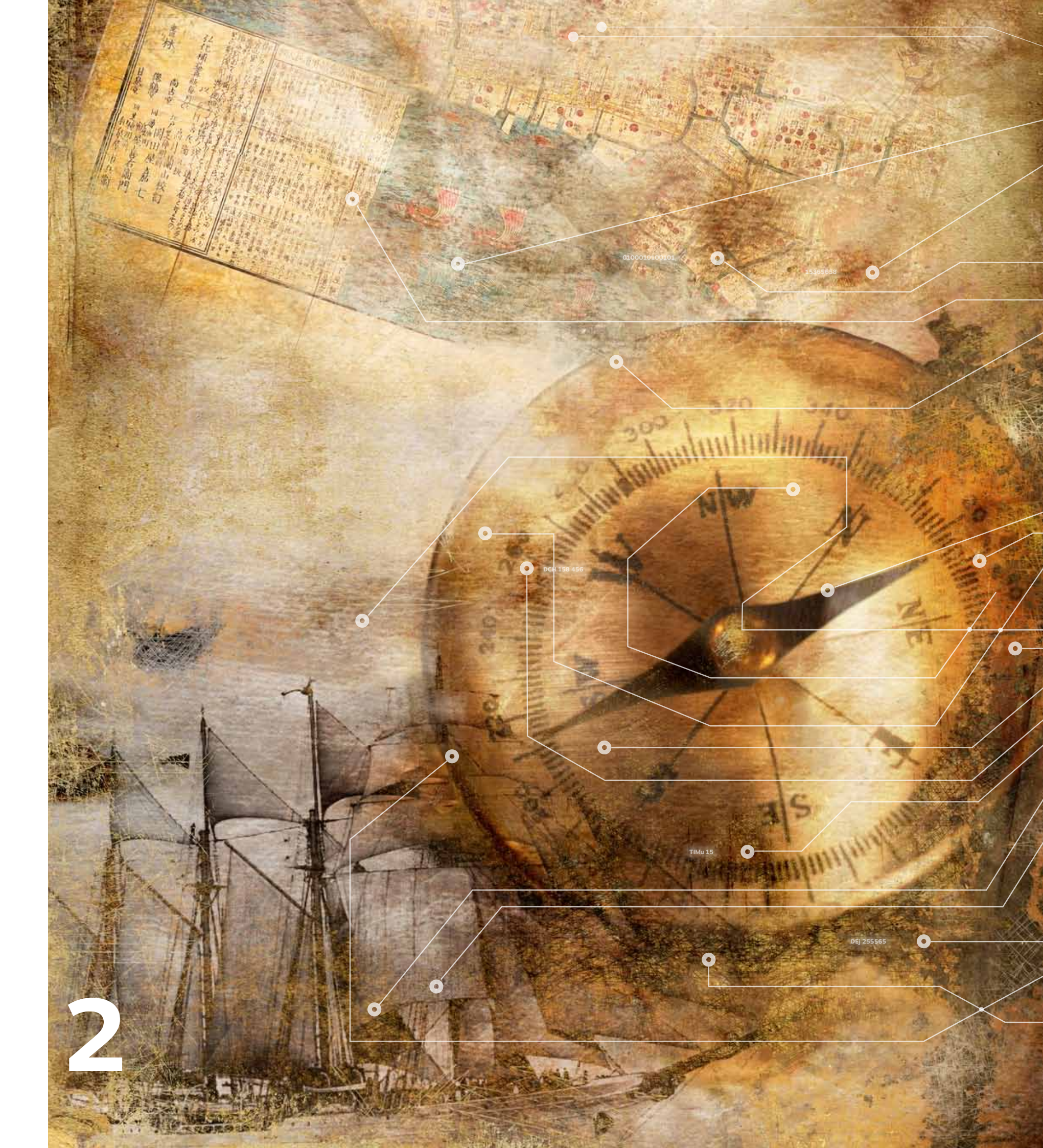
In my policy statement I specified that my main aim, besides striving to further raise the level of the scientific performance of the Czech Academy of Sciences and to strengthen its role within society, is to consolidate and stabilise our institutes. I consider the strengthening of institutional funding of the Czech Academy of Sciences from its own chapter of the state budget to be of the utmost importance in order to give us more time for our own conceptual and research work.

If we want science in the Czech Republic to excel, we have to create conditions for our scientists which will be at least a little comparable to conditions in leading foreign scientific institutions. Therefore, I will strive to ensure that we begin to at least partially approach such a status, that is a status similar to that of elite foreign scientific institutions.

Another area which I wish to systematically devote myself to is the role of the Czech Academy of Sciences within society. In this regard, I consider it an important step to extend the cooperation of the Academy with both Chambers of the Parliament of the Czech Republic, as well as with the Office of the Government of the Czech Republic, with the aim of providing legislators and members of the government with expert opinions on important topics which currently have a substantial impact on life within society. Here, we have been inspired by the British Parliament that uses the services of the Parliamentary Office of Science and Technology. I believe that this is one of the things that the Czech Academy of Sciences should and ultimately must do.

A handwritten signature in black ink, appearing to be 'E. Zažímalová'.

Professor RNDr. Eva Zažímalová, CSc.



2



Mission and Structure

of the CAS

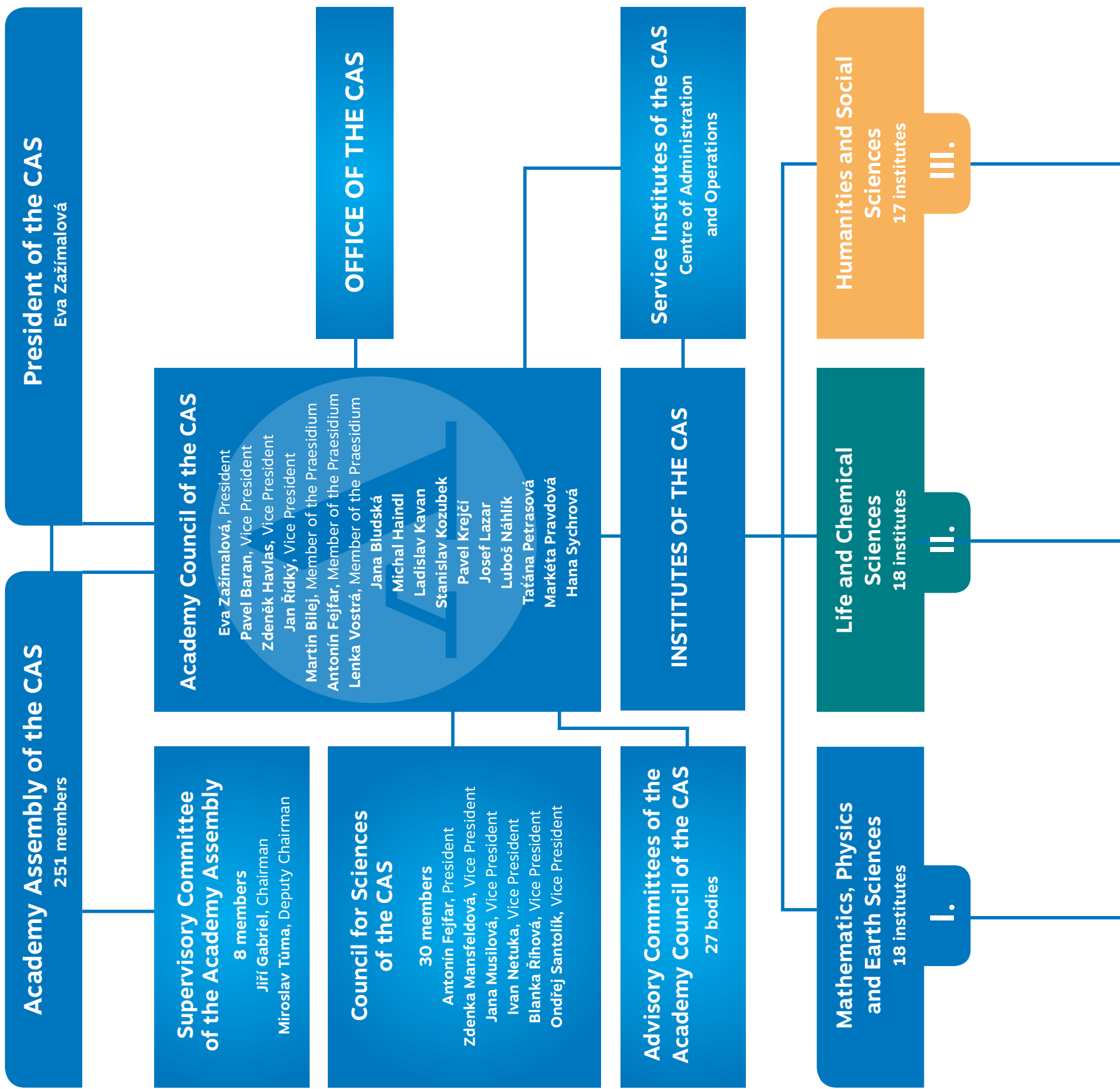
The Czech Academy of Sciences (CAS) was established by Act No 283/1992 Coll. The CAS conducts research through its institutes which are established as public research institutions. The total number of employees of the CAS reached 9,000, more than a half of which are researchers of the required certification.

The primary mission of the CAS and its institutes is to carry out research in a wide range 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 respecting the current needs of Czech society and respecting Czech culture.

The institutes of the CAS participate in education, primarily by educating young researchers in doctoral study programmes, as well as through the pedagogical activities of their researchers at universities.

The CAS also develops cooperation with applied research and industry. A range of joint international projects and exchanges of research scientists with partner institutions abroad reinforce the integration of Czech science into the international framework.

The structure of the CAS in the year 2017 is graphically illustrated on the following two pages.



1. Section of Mathematics, Physics and Computer Science

Astronomical Institute of the CAS (ASÚ)
Institute of Physics of the CAS (FZÚ)
Institute of Mathematics of the CAS (MÚ)
Institute of Computer Science of the CAS (ÚI)
Nuclear Physics Institute of the CAS (ÚJF)
Institute of Information Theory and Automation of the CAS (ÚITA)

4. Section of Chemical Sciences

Institute of Analytical Chemistry of the CAS (ÚIACH)
Institute of Inorganic Chemistry of the CAS (ÚACH)
J. Heyrovsky Institute of Physical Chemistry of the CAS (ÚFCH JH)
Institute of Chemical Process Fundamentals of the CAS (ÚCHP)
Institute of Macromolecular Chemistry of the CAS (ÚMCH)
Institute of Organic Chemistry and Biochemistry of the CAS (ÚOCHB)

7. Section of Social and Economic Sciences

Main Library of the CAS (KNAV)
Economics Institute of the CAS (NHÚ)
Institute of Psychology of the CAS (PSÚ)
Institute of Sociology of the CAS (SOÚ)
Institute of State and Law of the CAS (ÚSP)

2. Section of Applied Physics

Institute of Photonics and Electronics of the CAS (ÚFE)
Institute of Physics of Materials of the CAS (ÚFM)
Institute of Plasma Physics of the CAS (ÚFP)
Institute of Hydrodynamics of the CAS (ÚH)
Institute of Scientific Instruments of the CAS (ÚPT)
Institute of Theoretical and Applied Mechanics of the CAS (ÚTAM)
Institute of Thermomechanics of the CAS (ÚT)

5. Section of Biological and Medical Sciences

Institute of Biophysics of the CAS (BFÚ)
Institute of Biotechnology of the CAS (BTÚ)
Institute of Physiology of the CAS (FGÚ)
Institute of Microbiology of the CAS (MBÚ)
Institute of Experimental Botany of the CAS (ÚEB)
Institute of Experimental Medicine of the CAS (ÚEM)
Institute of Molecular Genetics of the CAS (ÚMG)
Institute of Animal Physiology and Genetics of the CAS (ÚZFG)

8. Section of Historical Sciences

Institute of Archaeology of the CAS, Brno (ARÚB)
Institute of Archaeology of the CAS, Prague (ARÚ)
Institute of History of the CAS (HÚ)
Masaryk Institute and Archives of the CAS (MÚA)
Institute of Art History of the CAS (ÚDU)
Institute of Contemporary History of the CAS (ÚSD)

3. Section of Earth Sciences

Institute of Geophysics of the CAS (GFÚ)
Institute of Geology of the CAS (GLÚ)
Institute of Atmospheric Physics of the CAS (ÚFA)
Institute of Geonics of the CAS (ÚGN)
Institute of Rock Structure and Mechanics of the CAS (ÚSMH)

6. Section of Bio-Ecological Sciences

Biology Centre of the CAS (BC)
Institute of Botany of the CAS (BÚ)
Institute of Vertebrate Biology of the CAS (ÚBO)
Global Change Research Institute of the CAS (ÚVGZ)

9. Section of Humanities and Philology

Institute of Ethnology of the CAS (EÚ)
Institute of Philosophy of the CAS (FLÚ)
Oriental Institute of the CAS (OÚ)
Institute of Slavonic Studies of the CAS (SLÚ)
Institute of Czech Literature of the CAS (ÚČL)
Institute of the Czech Language of the CAS (ÚJČ)



3

Czech Academy of Sciences

in the System of Research,
Development and Innovation

Leaders of the Czech Academy of Sciences concentrated on negotiations for the 2018 state budget of the Czech Republic, including a medium-term outlook for 2019–2020. From a conceptual perspective, the preparation of several important documents concerning the area of research, development and innovation (R&D&I) was completed in 2017, with the Czech Academy

of Sciences also actively participating through its representatives. This primarily concerned a new law on the support of research, development and innovation from public funds and the methodology for evaluating research organisations and programmes for targeted support of research, development and innovation.



Negotiations of the 2018 State Budget of the Czech Republic (including a medium-term outlook for 2019–2020)

Under Resolution of the Government of the Czech Republic No 831 of 21 September 2016 expenses of CZK 5,247 million were approved for chapter 361 – the Czech Academy of Sciences – in a medium-term outlook for the year 2018 and CZK 5,434 million for the year 2019.

Following negotiations with providers, at its 325th meeting on 27 April 2017, the Research, Development and Innovation Council (R&D Council) approved a draft for Czech state budget expenditure on research, development and innovation for 2018 with an outlook for 2019 and 2020, recommending that the Deputy Prime Minister for R&D&I and the Chairman of the R&D Council submit the following proposal to the government: budget chapter for CAS: CZK 5,685 million

for the year 2018, CZK 5,915 million for the year 2019 and CZK 6,216 million for the year 2020. From the year 2018, these amounts newly include CZK 210 million for ensuring funding of ELI Beamlines, as well as CZK 5 million for the year 2018, CZK 131 million for the year 2019 and CZK 283 million for the year 2020 for expenses which, according to Resolution of the Government of the Czech Republic No 1067/2015, are being transferred from projects of National Sustainability Programme I (NSP I) which are nearing completion to institutional expenses for the development of research organisations.

On the basis of Resolution of the Government of the Czech Republic No 385 of 22 May 2017, this proposal of the R&D Council for the budget chapter CAS was approved, with

the condition that the amount for the year 2020 would be reduced by CZK 100 million, i.e. from CZK 6,216 million to CZK 6,116 million.

On 30 May 2017, a Declaration on the Stabilisation of the R&D&I System in the Czech Republic was signed. Management of the CAS, together with representatives from public universities and in mutual agreement with the R&D Council, agreed to advocate for a systematic increase in institutional support. It was agreed that between 2019 and 2023 there should be at least 5% increase in funding per year, so that the institutional support of the CAS and public universities gradually reaches 70% of the total research and development expenditure.



Pursuant to Resolution of the Government of the Czech Republic No 674 of 25 September 2017, proposed expenses of CZK 5,685 million were approved for chapter 361 – the Czech Academy of Sciences – for the year 2018, CZK 6,010 million in a medium-term outlook for the year 2019 and CZK 6,116 million for the year 2020.

During the preparation of the Czech state budget, the Ministry of Finance of the Czech Republic (independently of the R&D Council) then submitted to the government a preliminary draft of income and expenditure of budget chapters of the state budget of the Czech Republic for the years 2018–2020, which was adopted by Resolution of the Government of the Czech Republic No 442 of 14 June 2017. The following was proposed for the budget chapter CAS: CZK 5,333 million for the year 2018, CZK 5,413 million for the year 2019 and CZK 5,563 million for the year 2020.

The CAS acknowledged the submitted draft of state budget expenditure for the years 2018–2020 (in accordance with Resolution of the Government of the Czech Republic No 442 of 14 June 2017), however, given

the continuing underfunding of the CAS and the current possibilities of the state budget, disagreed with the submitted draft. In a letter of 31 July 2017 with the reference number KAV-2409/ŘKAV/2017 the CAS requested an increase in institutional support for the budget chapter CAS to 5,685 million for the year 2018, CZK 5,969 million for the year 2019 and CZK 6,267 million for the year 2020 in compliance with Resolution of the Government of the Czech Republic No 385 of 22 June 2017 and following on from the Declaration on the Stabilisation of the R&D&I System in the Czech Republic¹ of 30 May 2017.

After complicated budget negotiations, on 25 September 2017, the Government of the Czech Republic approved Resolution No 674 with the following proposed expenditure from the Czech state budget for the budget

chapter CAS – CZK 5,685 million for the year 2018, CZK 6,010 million in a medium-term outlook for the year 2019 and CZK 6,116 million in a medium-term outlook for the year 2020.

The final incorporation of the Government-approved expenditure from the Czech state budget on R&D&I into the drafted law was discussed at the 329th meeting of the R&D Council on 27 October 2017. The Act on the state budget of the Czech Republic for the year 2018 itself was approved by the Chamber of Deputies on 19 December 2017 with effect from 1 January 2018.

¹ The Declaration on the Stabilisation of the R&D&I System in the Czech Republic was signed on 30 May 2017, and therefore could not be taken into consideration in the proposal for expenditure on R&D&I from the Czech state budget for the year 2018 with a medium-term outlook for 2019 and 2020 put forward by the Research, Development and Innovation Council, which the Government approved with Resolution No 385 on 22 May 2017.

...by way 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 (hereinafter “the Regulation”). The so-called European Amendment to Act No 130/2002 Coll., on the Support of Research and Development from Public Funds, prepared by the Research, Development and Innovation Council in cooperation with the Section for Science, Research and Innovations of the Office of the Government (SRI)



New Act on Support of R&D&I

from Public Funds

“ Efforts to bring the legislation of the Czech Republic for the support of research, development and innovation from public funds into full compliance with superordinate legislation of the European Union have continued...

and approved by the Parliament of the Czech Republic in May 2016 (Act No 194/2016 Coll., applicable as of 17 June 2016, in force as of 2 July 2016), however, has only partially aligned the act with the Regulation.

By early 2016, work had already begun on an entirely new act on the support of R&D&I from public funds, which was intended not only to reflect the Regulation, but also to fundamentally change the as yet unsatisfactory R&D&I system in the Czech Republic. Through its representatives, the CAS very actively participated in the wording of the material intent of this act, as well as the wording of its articulated version, and pushed through a number of important principles on which the act has been based (see more detailed information in the Annual Report for 2016).

In the first quarter of 2017, the preparation of the articulated version of the new act on the support of research, development and innovation from public funds was completed and in late March 2017, the SRI submitted it

for an interdepartmental comments procedure. On 18 April 2017, the Czech Academy of Sciences raised a number of objections against this version, disputing, above all, the inconsistent alignment with the Regulation, the forms of targeted support and the forms of innovations support.

Following the settlement of the comments from the standard interdepartmental comments procedure, the SRI submitted a further version of the act in mid-June 2017, which, although taking into account a significant part of the comments of the CAS, still contained several provisions to which the CAS subsequently expressed a fundamental disapproval in mid-July 2017, in the form of a letter from the President of the CAS sent to the Deputy Prime Minister of the Government, Pavel Bělobrádek.

In the final version of the draft of the act which Deputy Prime Minister of the Government Pavel Bělobrádek submitted to the government and to the Government Legislative

Council in early August 2017, most of the remaining remarks of the CAS had been taken into account and explained in a satisfactory manner. However, the Government Legislative Council had a number of comments on the draft of the act, and the government did not discuss the act until the end of its term of office.

The draft of the new act brought about a fundamental change in the organisation of government bodies responsible for the field of research and development and, in spite of continuing shortcomings, was a step towards a standard management system in this area. After the government dismissed the SRI in December 2017, and when none of its ministers was assigned competences for the area of R&D&I, the Prime Minister himself assumed the position of Chairman of the Research, Development and Innovation Council. Under these circumstances, the Czech Academy of Sciences will actively participate in future organisational and, possibly, legislative steps resulting from the situation.

Methodology for Evaluating Research Organisations

and Research, Development and Innovation Purpose-tied Aid Programmes – hereinafter referred to as M17+



In November 2016, the R&D Council approved a draft of a new Methodology for Evaluating Research Organisations and Research, Development and Innovation Purpose-tied Aid Programmes, which replaced the previous methodology for evaluating research and development results known as the “coffee grinder”. On the material submitted by the R&D Council to the Government at the beginning of 2017, the CAS made two fundamental remarks and several recommendations in the interdepartmental comments procedure. As a whole, however the CAS welcomed the draft of the new methodology M17+, especially because it signalled a substantial departure from the previous and from the perspective of support of quality research, utterly unsuitable Methodology 2013–2016, which was based on a mechanical sum of the points scores of individual results. Based, by field, on multi-criteria evaluations of research organisations by international panels of experts, the division of research organisations into three basic segments (the CAS, universities and departmental research or-

ganisations) and the balanced use of bibliometrics as an auxiliary tool, the CAS considers the framework of the new methodology to be correct. The new methodology M17+ is particularly based on good international practice, the recommendations of an International Audit of Research, Development and Innovation in the Czech Republic and on the latest evaluation of the institutes of the CAS in 2015. A number of elements were adopted, particularly the division of results into quartiles and deciles according to the AIS (article influence score) of journals in various fields separately. This concerns division into FORDs (such as mathematics, physics, chemistry, biology, etc.), but information is also provided for more precise divisions used by the CAS (WoS Categories). A working group was also established to ensure the interconnection of evaluations of research institutes of the CAS and methodology M17+.

The Government of the Czech Republic approved methodology M17+ through Resolution No 107 of 8 February 2017. It must be noted, however, that as a result of the above-mentioned legislative development, problematic provisions with elements of the so-called “coffee grinder” remain in paragraph 7 of the applicable version of Act No 130/2002 Coll., on the Support of Research and Development from Public Funds.

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

In the course of 2017, the Chamber of Deputies of the Parliament of the Czech Republic drafted an amendment to Act No 341/2005 Sb., on Public Research Institutions, intending to strengthen the role of founders of public research institutions. Negotiations on changes to the act were, however, interrupted by the end of the parliamentary term.



In April 2017, the Academy Council and the Council of Sciences of the CAS jointly responded to the results of the Audit No 16/19 of the Supreme Audit Office - **State Funds Designated for Targeted Support of Research and Development through the Budget Chapter of the Czech Science Foundation**. The Supreme Audit Office concludes that between the years 2011 and 2015, the Czech Science Foundation (GAČR) did not support the field of research with the greatest potential for practical use and greater interconnection of basic and applied research. In the opinion of the CAS, the criticism of the GAČR is factually inaccurate and is not grounded on any legislation which regulates the activities of the GAČR. The CAS therefore believes that it is its duty to point out this important fact and to support the response of the GAČR to the main conclusion of the audit of the Supreme Audit Office.

Response of the Academy Council and Council for Sciences of the CAS to the Conclusion of the Audit of the Supreme Audit Office

Preparation of the “Declaration of the Stabilisation of the R&D&I Information System in the Czech Republic”

In the early months of 2017, the wording of the **Declaration on the Stabilisation of the R&D&I Information System in the Czech Republic** was successfully agreed and on 30 May 2017, this important document was co-signed by the Deputy Prime Minister of the Government for Science, Research and Innovation - P. Bělobrádek, the Minister of Education, Youth and Sports - K. Valachová, the President of the CAS - E. Zajímalová and the President of the Czech Rectors Conference - T. Zima. In the document, the signatories declare that they will work in cooperation with the R&D Council to advocate a systematic increase in institutional support of the institutes of the CAS and public universities between 2019 and 2023, by at least five percent each year. The goal in the longer term is for institutional support to reach 70 percent of the expenditure of the institutes of the CAS and public universities on research and development, on condition that the amount of earmarked funds in this field will not be adversely affected. We believe that the next government will also seek continuity in the fields of education, science, and research to ensure the effective implementation of this important document. This is only the first, and yet a very important and very necessary step towards the consolidation and stabilization of the institutes of the CAS and public universities.







Organisational Measures

At the 50th session of the Academy Assembly of the CAS on 21 March 2017, elections to the bodies of the CAS were held.

A new Academy Council and Council for Sciences of the CAS were elected. On 4 April, a constitutive session of the Academy Council of the CAS was held, where a new praesidium was elected

and, in compliance with Act 31 of the Statutes of the Czech Academy of Sciences, sections of the activities of the Academy Council of the CAS were distributed between its individual members. Over the course of 2017, 27 advisory bodies of the Academy Council were newly established, and their statutes approved, at meetings of the Academy Council of the CAS.

These advisory bodies included the newly established Council for the Use of Intellectual Property, the Commission for the Evaluation of the Research Activities of the Teams and Institutes of the CAS, the Coordination Council of ELI Beamlines, and the Council for Academic Media and Popularisation of the CAS. For the purpose of increased support and interconnection of communications activities of the CAS and its institutes, a new working group of the Council for Academic Media and Popularisation was established, where every institute has its representative – Collegium of Science Popularisers and PR professionals.

In the area of relations with universities, the management of the CAS focused mostly on negotiating mutual cooperation for the implementation of doctoral study programmes. In accordance with an amendment to the Act on Higher Education Institutions, on 11 August 2017, the first of the relevant agreements was entered into, specifically between the Czech Academy of Sciences and Palacký University in Olomouc. The CAS subsequently entered into an agreement with the Jan Evangelista Purkyně University in Ústí nad Labem (19 October 2017) and a cooperation agreement with the Technical University of Liberec (14 December 2017). On 18 December 2017,



Signature of the memorandum with Charles University

a Memorandum of Understanding was signed between the CAS and Charles University.

In order to support excellence, the Academy Council of the CAS decided to increase the funds from the Otto Wichterle Award and approved wage support of researchers of the institutes of the CAS involved in research activities of the CEFRES platform. In addition, for the purpose of intensifying international cooperation, effective use of financial resources and the support of excellence, it approved a new directive regulating rules for supporting the international cooperation of research teams of CAS institutes.

For the implementation of the “Methodology for Evaluating Research Organisations and Research, Development and Innovation Purpose-tied Aid Programmes” (abbreviated as “Methodology 17+”) within the CAS, on 21 September 2017, the Academy Council of the CAS held an extraordinary meeting with the directors of its institutes, in the presence of Mgr. Ing. Kateřina Miholová, Ph.D., head of the Department for the Evaluation of Research Organisations of the Office of the Government of the Czech Republic.

In cooperation with the members of the Academy Council of the CAS, the President of the CAS proposed an introduction of a tool named Lumina Quaeruntur for the support of research scientists (generally with experience from abroad) when setting up new scientific groups and laboratories.

The Academy Council of the CAS has continuously dealt with the issue of the functioning of the Czech National Committees and, in 2017, with regard to applicable legislation, decided (as the founder) to abolish all national committees. (A decision had already been made to abolish several committees that had not been functioning over a long period or in the case of duplicate representation of the relevant Czech scientific communities in an international union). The Academy Council of the CAS also decided to terminate the membership of the CAS in a number of international unions, since this concerned the non-systemic representation of only certain fields. At the same time, negotiations were held between committees and scientific societies from related fields with regard to their integration into scientific societies, which means taking over committee activities at a national level and obligations ensuing from the representation of the Czech scientific community at an international level. In this context, the Academy Council of the CAS held discussions with the management of the Council of Scientific Societies of the Czech Republic.

Through the electronic EU R&D conference, the institutes of the CAS obtain up-to-date information on European research, development and innovation initiatives, with a primary focus on the EU framework programmes and potential opportunities within. This network also serves for mutual communication and for sending comments, which are further used as feedback regarding the needs of the institutes.

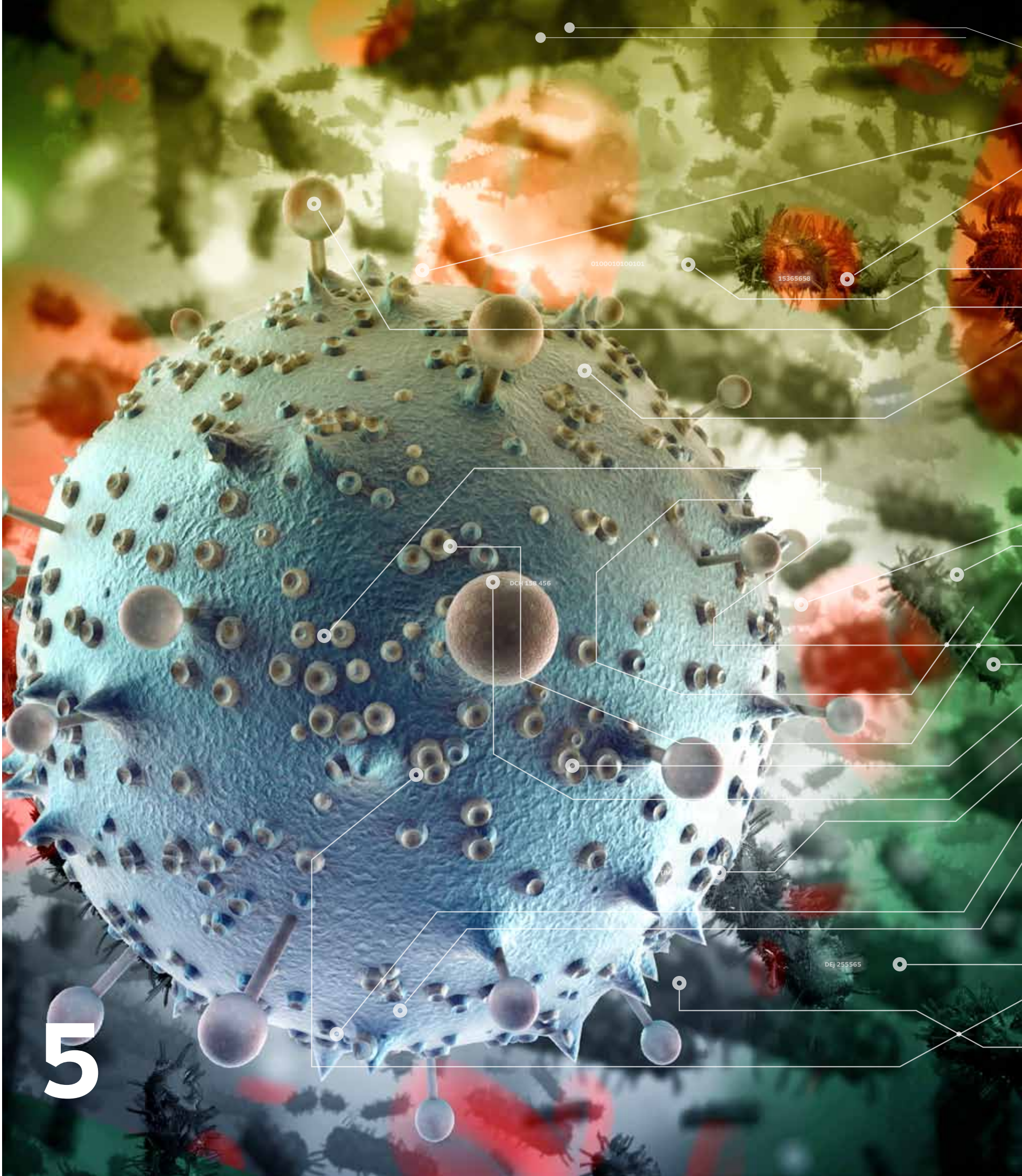
Based on the results of selection procedures and proposals from the relevant institutes of the CAS, the President of the CAS has appointed or entrusted management to 38 institute directors.

In accordance with the newly adopted internal directive on the procedure for issuing the prior consent of the founder and further handling of property, the Academy Council of the CAS granted its prior consent in the sense of Act No 341/2005 Coll., on Public Research Institutions, as amended, and permission to enter into, in particular, lease relationships. It also dealt with further acts regarding the handling of the property of the CAS and held intensive discussions, above all, on the matter of the (joint) ownership of the building Hybernská 1000/8, Prague 1, and with regard to the organisation of (joint) ownership relations to the land within the BIOCEV project site. Talks were also held on the unified Prague dislocation of the Institute of the Czech Language.

In the field of the protection of archaeological heritage, the Czech Academy of Sciences entered into seven agreements for the performance of archaeological research with organisations authorised under Act No 20/1987 Coll., on State Heritage Care, as amended.

The Academy Council of the CAS approved a specimen of the English translation of the foundation deeds of the institutes of the CAS. The President of the CAS issued amendments to the foundation deeds of four institutes of the CAS.





5



Selected Results

The scientific research of the CAS in 2017 yield many positive results. The following 10 scientific results from various research areas belong among the most interesting.

Institute of Physics of the CAS

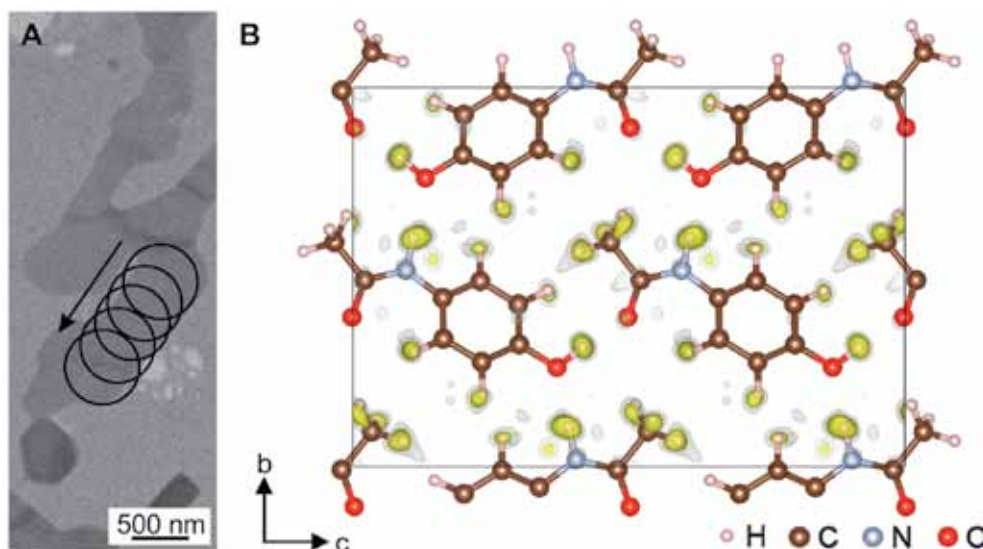
Hydrogen positions in single nanocrystals revealed by electron diffraction

Localization of hydrogen atoms is an essential part of crystal structure analysis, but it was so far almost impossible in nanocrystals. We report the localization of hydrogen atoms in nanocrystals of an organic and inorganic material, achieved by using a newly developed method for analysis of electron scatter-

ing (diffraction) on crystals. The results demonstrate that the technique can reveal fine structural details, including the positions of hydrogen atoms in micro-to-nanosized single crystals.

Palatinus, L.; Brázda, P.; Boullay, P.; Pérez, O.; Klementová, M.; Petit, S.; Eigner, V.; Zaarour, M.; Mintova, S.: *Hydrogen positions in single nanocrystals revealed by electron diffraction. Science* 2017, roč. 355, č. 6321, s. 166–169. ISSN 0036-8075.

The structure of paracetamol with the positions of hydrogen atoms (A) crystals of paracetamol imaged by the transmission electron microscope. The circles mark the regions used for the data collection for structure analysis. **(B)** Part of the crystal structure of paracetamol together with the map of electrostatic potential (gray and yellow maxima) showing the positions of hydrogen atoms in the structure.



Institute of Hydrodynamics of the CAS

The removal of undesirable cyanobacterial cells and algal organic matter (AOM) during water treatment

Cyanobacteria and their metabolites (algal organic matter - AOM) are a challenge in water treatment. Due to optimization of coagulation, up to 99% and 60% of *Merismopedia tenuissima* cells and AOM, resp., were removed. Further, pre-oxidation was efficiently applied – coagulation of peptides/proteins of *Microcystis aeruginosa* improved and 96% of hepatotoxic microcystin was eliminated. Finally, adsorption onto activated carbon was proved to be suitable for compounds that are difficult to coagulate.

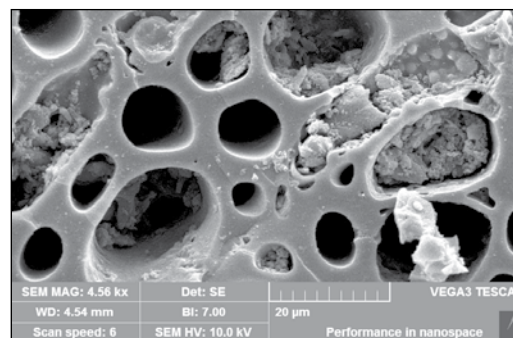
Čermáková, L.; Kopecká, I.; Pivokonský, M.; Pivokonská, L.; Janda, V.: *Removal of cyano-*

bacterial amino acids in water treatment by activated carbon adsorption. Separation and Purification Technology 2017, roč. 173, č. 1, s. 330–338. ISSN 1383-5866.

Načeradská, J.; Pivokonský, M.; Pivokonská, L.; Barešová, M.; Henderson, R. K.; Zamyadi, A.; Janda, V.: *The impact of pre-oxidation with potassium permanganate on cyanobacterial organic matter removal by coagulation. Water Research* 2017, roč. 114, May, s. 42–49. ISSN 0043-1354.

Barešová, M.; Pivokonský, M.; Novotná, K.; Načeradská, J.; Brányik, T.: *An application of*

cellular organic matter to coagulation of cyanobacterial cells (Merismopedia tenuissima). Water Research 2017, roč. 122, October, s. 70–77. ISSN 0043-1354.

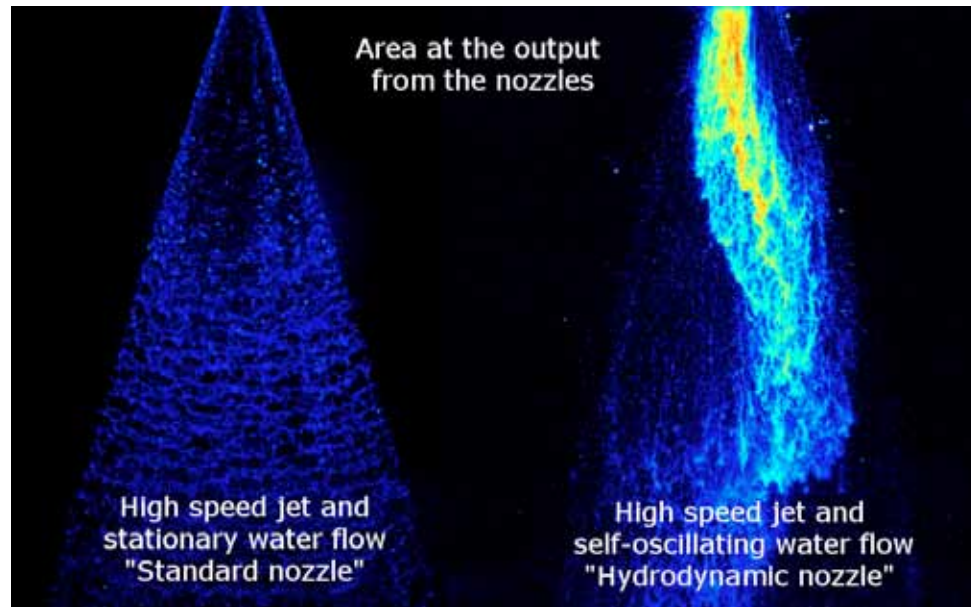


Vegetal-based granular activated carbon SSEM micrographs of external surface structure of vegetal-based granular activated carbon for adsorption of micropollutants in drinking water treatment.

Low-frequency hydrodynamic nozzle with a stabilizer as a tool for surface treatment of components

Water flows through the tool and creates self-excited oscillations. A high-speed water jet with a spray angle is produced at the tool exit. It causes changes in the surface quality of the treated parts. The stabilizer intensifies the effect of the water jet on the given surface. The tool allows to deliver higher energy in a form of a liquid jet to a given place at a given time than a stationary flow jet can do. This can result in significant energy and financial savings not only in using the technology.

A tool and a hydrodynamic nozzle for the generation of pulsating high-speed liquid jets without cavitation and saturated steam. Patent file No. 305370, Úřad průmyslového vlastnictví ČR, published 08/2015.



High speed water jets at the outputs from the standard and hydrodynamic nozzles.

Institute of Physiology of the CAS

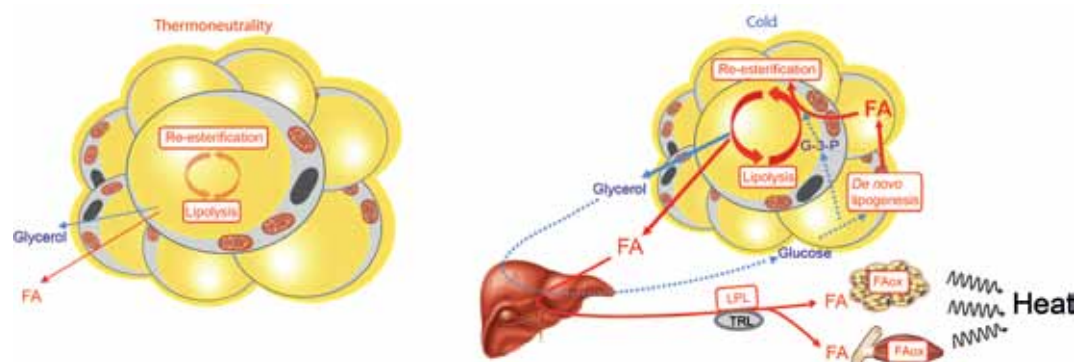
Correlation between resistance to obesity and lipid synthesis in adipose tissue

Using different murine strains at various temperatures, we revealed a paradoxical relationship between the inclination to obesity and the intrinsic metabolic properties of adipose tissue, namely inducibility of lipid synthesis. The capacity of adipose tissue to synthesize lipids and release fatty acids into the bloodstream may limit the ability of other tissues

to oxidate fatty acids; these mechanisms influence heat generation in the cold and accumulation of body fat during excessive energy intake.

Flachs, P.; Adamcova, K.; Zouhar, P.; Marques, C.; Janovska, P.; Viegas, I.; Jones, J. G.; Bardova, K.; Svobodova, M.; Hansikova, J.; Kuda, O.;

Rossmeisl, M.; Liisberg, U.; Borkowska, A. G.; Kristiansen, K.; Madsen, L.; Kopecky, J. 2017: Induction of lipogenesis in white fat during cold exposure in mice: link to lean phenotype. *International Journal of Obesity*. 41(3), s. 372–380.



Scheme of metabolic processes in adipocyte of mouse exposed to thermoneutral temperature or cold

Sensitive regulation of lipolysis, re-esterification and de novo lipogenesis in white adipose tissue is necessary for resistance to obesity and for supply of fatty acids (FA) to other organs.

Institute of Botany of the CAS

Horizontal gene transfer in grasses

We found that wild barleys harbour surprising amounts of foreign genetic material (DNA), originating from unrelated grasses. The foreign DNA was isolated and characterized, however, the mode of its acquisition by barleys is unknown. Nevertheless, both the nature and amount of the foreign DNA suggests, that its presence in barleys is due to multiple horizontal gene transfers, that is, it was transferred by mechanisms other than reproduction. Such a transfer is uncommon and rare in higher plants.

Mohelka, V.; Krak, K.; Kopecký, D.; Fehrer, J.; Šafář, J.; Bartoš, J.; Hobza, R.; Blavet, N.; Blattner, F. R.: Multiple horizontal transfers of nuclear ribosomal genes between phylogenetically distinct grass lineages. *Proceedings of the National Academy of Sciences of the United States of America* 2017, roč. 114, č. 7, s. 1726–1731. ISSN 0027-8424.

Hordeum comosum

Hordeum comosum from the Andes belongs to those barley species harbouring surprising amount of foreign genetic material. Photo by Frank Blattner.



High-molecular-weight biodegradable carriers of drugs for nanomedicine

Together with colleagues from cooperating institutions we have developed and successfully evaluated novel polymer drug carriers for targeted tumour treatment. Using up to date techniques of contemporary polymer chemistry, various polymer materials were prepared differing in their inner structure, above all block, star-like or nanogel structures were developed. The size of these "nanomaterials" in the range of tens of nanometers and their biocompatibility count them among suitable candidates for targeting various biologically active molecules, so called "nanotherapeutics". Our main aim was to synthesise nanomaterials enabling long-term blood circulation, drug transportation into unhealthy tissues, e.g. tumour tissue, drug release in its active form only in the treated tissue, and the final degradation of the polymer carrier into non-toxic products eliminable from the organism. We proved that our polymer drug carriers show not only excellent physico-chemical properties, but also advantageous behaviour in biological environment. Especially, the superior drug distribution leading to enhanced tumour accumulation and the significant ability to overcome the multi-drug resistance in the treatment of model tumours were demonstrated. These attributes predetermine the developed nanomaterials for further detailed study potentially leading to application in human medicine.

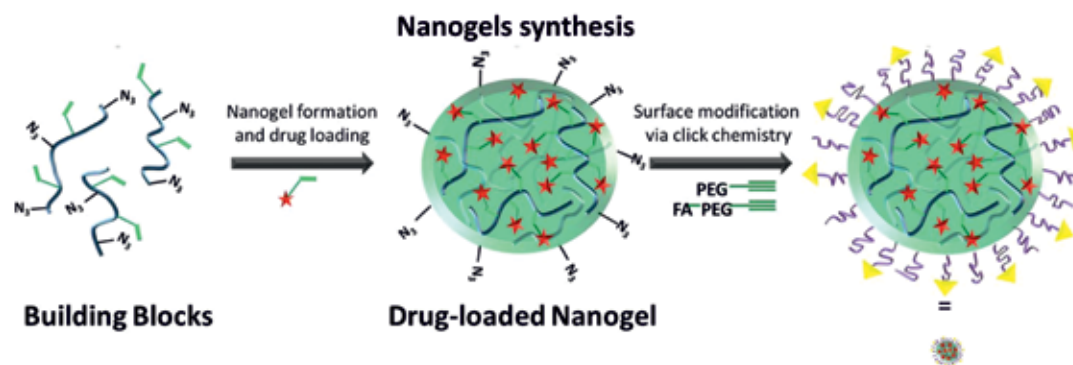
Kostková, H.; Schindler, L.; Kotrčová, L.; Kovář, M.; Šírová, M.; Kostka, L.; Etrych, T.: *Star polymer-drug conjugates with pH-controlled drug release and carrier degradation. Journal of Nanomaterials 2017, roč. 2017, 3 January, s. 1–10, č. článku 8675435. ISSN 1687-4110.*
 Sivák, L.; Šubr, V.; Tomala, J.; Řihová, B.; Strohal, J.; Etrych, T.; Kovář, M.: *Overcoming multidrug resistance via simultaneous delivery of cytostatic drug and P-glycoprotein inhibitor to cancer cells by HPMA copolymer conjugate. Biomaterials 2017, roč. 115, JAN 2017, s. 65–80. ISSN 0142-9612.*

Etrych, T.; Tsukigawa, K.; Nakamura, H.; Chytil, P.; Fang, J.; Ulbrich, K.; Otagiri, M.; Maeda, H.: *Comparison of the pharmacological and biological properties of HPMA copolymer-pirarubicin conjugates: A single-chain copolymer conjugate and its biodegradable tandem-*

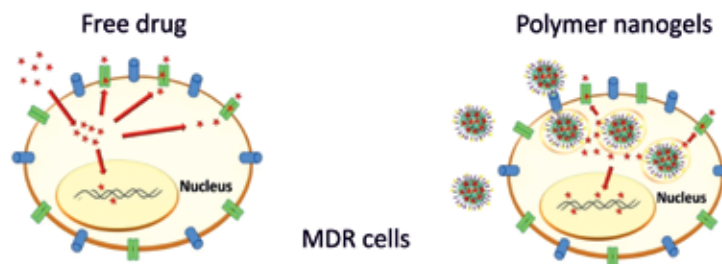
block copolymer conjugate. European Journal of Pharmaceutical Sciences 2017, roč. 106, 30 August, s. 10–19. ISSN 0928-0987.

Chen, Y.; Tezcan, O.; Li, D.; Beztsinna, N.; Lou, B.; Etrych, T.; Ulbrich, K.; Metselaar, J. M.; Lammers, T.; Hennink, W. E.: *Overcoming multidrug resistance using folate receptor-targeted and pH-responsive polymeric nanogels containing covalently entrapped doxorubicin. Nanoscale 2017, roč. 9, č. 29, s. 10404–10419. ISSN 2040-3364.*

Islam, W.; Fang, J.; Etrych, T.; Chytil, P.; Ulbrich, K.; Sakoguchi, A.; Kusakabe, K.; Maeda, H.: *HPMA - Copolymer Conjugate with Pirarubicin: In Vitro and Ex Vivo Stability and Drug Release study, International Journal of Pharmaceutics 536 (2018) 108–115.*



Schematic description of multi-drug resistance (MDR) overcoming



Schematic description of nanogel preparation and their ability to overcome multi drug resistance

The scheme describes the formation of nanogels formation from elemental polymer blocks and schematically also depicts the principle of overcoming multidrug resistance by synthesized nanogels.

Institute of Contemporary History of the CAS



An extract from the game involving even the stories of contemporary witnesses.



An extract from a computer simulation of everyday life at that time.

Video game *Attentat 1942*

Attentat 1942 is a unique video game that tells the story of Nazi occupation from the perspective of those who experienced it firsthand. The game is built on personal memories, interactive comics, and authentic footage. The game was released via the Steam digital distribution platform.

Šisler, V.; Gemrot, J.; Kolek, L.; Vávra, D.; Kokoška, S.; Černá, M.; Cuhra, J.; Hoppe, J.; Činátl, K.; Pinkas, J.; Brom, C.: *Attentat 1942*, 2017. www.attentat1942.com.

Institute of State and Law of the CAS

Euthanasia: Decision at the End of Life

This monography deals with the subject of euthanasia and other end-of-life decisions, such as assisted suicide, withdrawing and withholding life-sustaining treatments. It deals with such theoretical issues as terminology, causation, intention, principle of double effect. Research also focuses on legal orders in selected European countries and the Czech Republic. It also deals with the decisions of the European Court of Human Rights.

Doležal, A.: *Eutanazie a rozhodnutí na konci života. Právní aspekty*. Praha: Academia, 2017. 284 s. ISBN 978-80-200-2687-3.



Masaryk Institute and Archives of the CAS

Correspondence T. G. Masaryk – Josef Svatopluk Machar. Volume I. (1893–1895)

The book is introduced by a monograph “Scepticism and Hope. Formation of the Foundations of Reformist Modernism”. It shows that, for Masaryk and Machar, the years 1893–1895, as covered by the following edition of their correspondence, were the years of changes and key works influenced by their interactions. The research and its achievements draw mainly upon the newly acquired correspondence of Masaryk and Machar comprising 183 documents dating back to 1893–1895 that are edited.

Kokešová, H.; Kotyk, P.; Kraitlová, I.; Doubek, V.; Merhautová, L.: *Korespondence T. G. Masaryk – Josef Svatopluk Machar. Svazek I. (1893–1895) Praha: Masarykův ústav a Archiv AV ČR, 2017. 453 s. Korespondence TGM. ISBN 978-80-87782-68-2.*

Obálka knihy Korespondence T. G. Masaryk – Josef Svatopluk Machar. Svazek I. (1893–1895).



Institute of Art History of the CAS

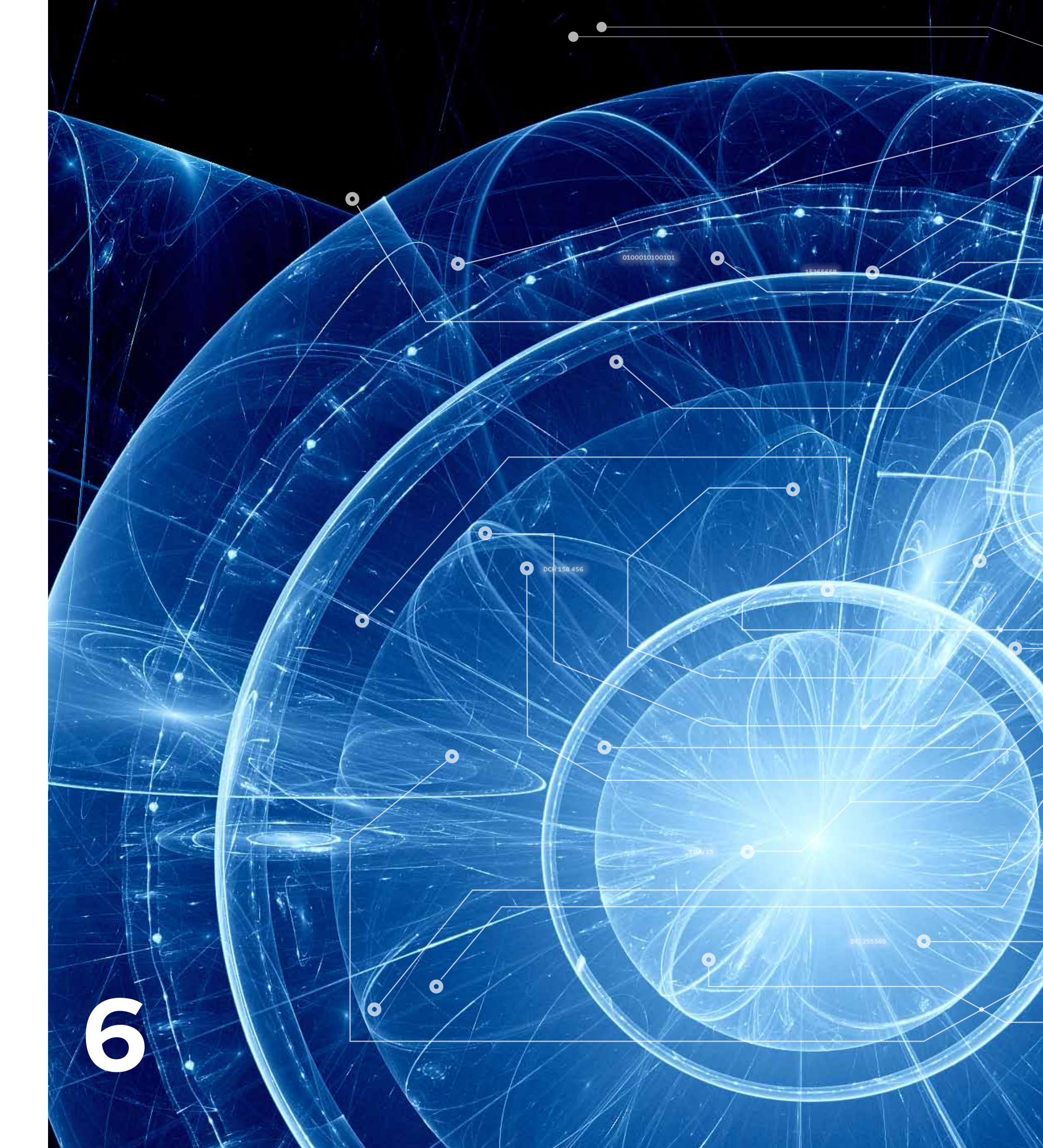
Architectural and Artistic Heritage of Prague. Great Prague. M–Ž

The publication includes urban-historical essays and catalogue entries covering individual protected and unprotected objects that are valuable from both artistic and historical point of view. The publication completes one of the long-term research tasks of the Institute of Art History and has an exceptional user potential for the general public.

Prix, D.; Beran, L.; Bureš, M.; Čížinská, H.; Dáňová, H.; Dragoun, Z.; Hilmera, J.; Hnídková, V.; Hůrková, L.; Janková, Y.; Kašpar, V.; Kostka, M.; Kuchařík, M.; Mádl, M.; Maták, M.; Mazač, V.; Mezihoráková, K.; Pařez, J.; Pařík, A.; Petrasová, T.; Platovská, M.; Prixová Dvorská, H.; Svobodová, M.; Šámal, P.; Šmolíková, M.; Tischerová, J.; Tomková, K.; Uhlík, J.; Vlček, P.; Všecková, Z.: *Umělecké památky Prahy. Velká Praha. M–Ž. 2 sv. Praha: Academia, 2017. 1731 s. ISBN 978-80-200-2469-5.*



Cover of the book Umělecké památky Prahy. Velká Praha (M–Ž), 1st volume



6



Strategy AV 21

Top Research
in the Public Interest

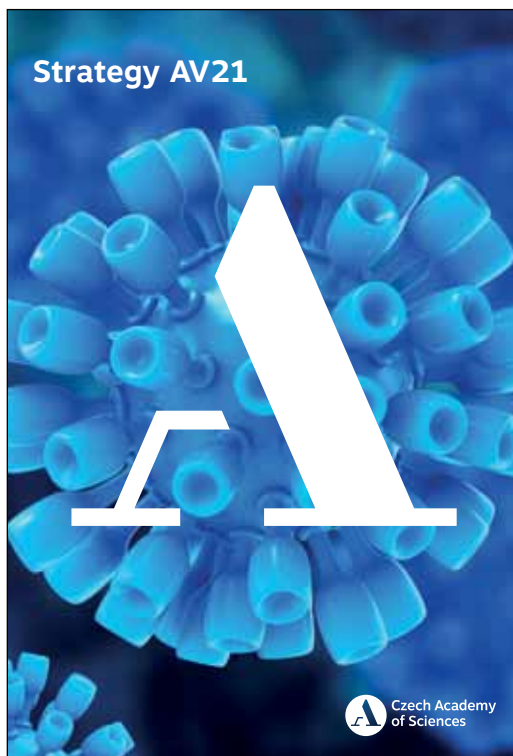
Strategy AV21, approved at the December Academy Assembly of the CAS in 2014, is the result of an ongoing effort of the Czech Academy of Sciences to help to solve problems of contemporary society, which is well characterised by the chosen motto of Strategy AV21
“Top Research in the Public Interest”.

“ Individual research programmes of Strategy AV21 focus on current and socially important issues.

Individual research programmes of Strategy AV21 focus on current and socially important issues. These issues require broadly-based research and multidisciplinary synergies between the institutes of the CAS and other relevant external partners. The programmes of Strategy AV21 are expected to benefit from a wide range of research concentrated within the institutes of the CAS and can come up with possibly exceptional combinations of findings from natural, technical and social sciences.

During the third year of the implementation of Strategy AV21, 18 research programmes and three associated activities were addressed. Over the course of the year, proposals were submitted for two further research programmes - **Genetics and Epigenetics: from Theory to Practice** and **Water for Life**. The main aim of the proposed Genetics and Epigenetics programme is the research of genetic and epigenetic processes which take place within various biological processes, such as DNA replication, gene expression or DNA repair. The proposed research programme Water for Life focuses on comprehensive and systematic research in the field of protection and use of water sources and on the issue of water supplies and maintenance of water purity. The Academy Council of the CAS is striving to strengthen one of the basic aims of Strategy AV21, which is mutual interdisciplinary cooperation within the CAS, and therefore recommended that the new programmes be merged with existing related research programmes. The programme Genetics and Epigenetics: from Theory to Practice has therefore been combined with the programme **AV21-07 Quality Life in Sickness and in Health** and the second proposed programme, Water for Life, with the programme **AV21-04 Natural Threats**.

With the aim of introducing uniform and simple rules for fulfilling the objectives of Strategy AV21, the Academy Council of the CAS drafted a directive on Strategy AV21 and



on subsidies for its implementation. The directive established managing bodies for Strategy AV21 and individual programmes, namely the Strategy AV21 Council and the Research Programme Coordination Council, and defined their competences. It laid down clear rules for the use of grants for supporting research programmes and associated activities, and criteria for evaluating the results of the research programmes and associated activities concerned. The directive further outlined requirements for proposals for new research programmes or associated activities. An important simplification of the administration of Strategy AV21 is the unification of all deadlines for coordinators of research programmes and associated activities into two, within which a report is submitted on solutions for the previous period, billing and a proposal for solutions and the budget for the coming period.

All information on the activities of research programmes and associated activities, their results and forthcoming events

is continuously published on the website <http://av21.avcr.cz>. The output of research programmes in the form of reports on the results of specific activities is published by the Strategy AV21 Editorial Board and editing and printing are provided by the Academia Publishing House. Information on their content and availability is published on the website <http://av21.avcr.cz/publikace>. The year 2017 saw the publication of updated Czech and English brochures on Strategy AV21 research programmes, application laboratories, several books and brochures on the results of individual research programmes, a book presenting the coordinators of individual research programmes and a number of analyses of the status of research arising from associated research and development analysis activities.

Expert advice for legislative bodies is also an important output of Strategy AV21. In accordance with the effort to provide policy makers with expert advice for their legislative decision-making, the first seminar *Expert Support of the Czech Academy of Sciences for Legislators*, held on 26 September 2017

in the Senate of the Parliament of the Czech Republic, was organised. Selected expert topics of the CAS were presented to the legislators, while British guest presented their long-standing experience in creating expert opinions in British Parliament. A supplementary brochure which was issued for the seminar contains all 125 possible topics for expert opinions of the CAS. This list is continuously updated.

The aims of Strategy AV21 are similar to the aims of the *National Research and Innovation Strategy for Smart Specialization of the Czech Republic (RIS3)*. Representatives of Strategy AV21 have become involved in work on updating both RIS3 and individual topics of RIS3 National Innovation Platforms.



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● Projects of Operational Programmes

of EU Structural Funds

In 2017, the institutes of the CAS were involved in 80 projects of operational programmes of EU structural funds. Institutes of the CAS were coordinators or beneficiaries of 59 projects, of which 42 were launched in 2017 and 17 were dealt with throughout the year.

A summary of the participation of institutes of the CAS in the research projects, broken down into individual operational programmes, is provided in Table No 1. More detailed information on projects launched in 2017 is presented in Table No 2. The total amount of approved aid for the specified projects and their timeframes is CZK 3,151.8 million.

Table No 1: Participation of the CAS Institutes in the research projects of operational programmes in 2017

Operational programme	launched projects	ongoing projects	completed projects	TOTAL
International Cooperation OP INTERREG EUROPE	1	1	0	2
Transnational Cooperation OP Central Europe	2	0	0	2
Transnational Cooperation OP Danube	1	0	0	1
OP Enterprise and Innovation for Competitiveness	1	3	0	4
OP Prague - Growth Pole of the Czech Republic	2	0	0	2
OP Austria – Czech Republic	1	0	0	1
OP Research, Development and Education	32	12	0	44
OP Employment	2	1	0	3
TOTAL	42	17	0	59

Table No 2: Projects of Operational Programmes Launched in 2017

Beneficiary/ coordinator	Project name	Total approved aid for the project in thousands of CZK
INTERNATIONAL COOPERATION OP INTERREG EUROPE		
ÚTAM	Interreg CZ-AT133; Kompetenzzentrum MechanoBiologie in Regenerativer Medizin	5,730
TRANSNATIONAL COOPERATION OP CENTRAL EUROPE		
ÚTAM	INTERREG CE902	2,711
ÚTAM	Interreg CE1127; Risk Assessment and Sustainable Protection of Cultural Heritage in a Changing Environment	4,491
TRANSNATIONAL COOPERATION OP DANUBE		
ÚTAM	Common Urban Values of Historic Towns in the Danube Region	237
OP ENTERPRISE AND INNOVATION FOR COMPETITIVENESS		
ÚFP	Avoiding and Removing Mid-Spatial Frequency Errors in Asphere and Free Form Fabric - MidFree	3,229
OP PRAGUE - GROWTH POLE OF THE CZECH REPUBLIC		
FZÚ	Physics at your service	12,145
ÚEB	Commercialisation of Research and Development Results of the Institute of Experimental Botany of the Czech Academy of Sciences in R&D&I	4,404
OP AUSTRIA – CZECH REPUBLIC		
BC	Infrastructure for Metabolomic Research and Medical Chemistry	15,148

Beneficiary/ coordinator	Project name	Total approved aid for the project in thousands of CZK
OP RESEARCH, DEVELOPMENT AND EDUCATION		
ARÚ	Archaeological Information System of the Czech Republic – Second Generation	18,853
BFÚ	Structural Gymnastics of Nucleic Acids: from Molecular Principles through Biological Functions to Therapeutic Targets. Support of Integrated Research Team	150,973
BC	Removing Barriers to the Application of Research Results	14,237
BC	Research of Key Ecosystem Interactions of Soil And Water in the SoWa Research Infrastructure	108,104
BÚ	Mobility 2017	9,650
FZÚ	Future of the Czech Participation at the Pierre Auger Observatory (AUGER-CZ)	19,267
FZÚ	CERN Computing	16,234
FZÚ	European Support of the Czech Participation in the Construction of the CTA observatory (CTA-CZ)	7,903
FZÚ	HiLASE Centre of Excellence	883,601
FZÚ	Laboratory of Spintronics	41,287
FZÚ	Extreme Light Infrastructure Tools for Advanced Simulation	18,993
FZÚ	Centre for Analysis of Functional Materials (SAFMAT)	19,950
FZÚ	Improving the Quality of the Strategic Management in the Institute of Physics of the Czech Academy of Sciences	63,196
FGÚ	Support of Professional Growth	6,848
GFÚ	Distributed System of Permanent Observatory Measurements and Temporary Monitoring of Geophysical Fields	64,230
NHÚ	SHARE-CZ+ National Research on Ageing	18,993
SOÚ	CSDA Research – Research Programme of the Czech Social Science Data Archive: The Participation of the Czech Republic in the International Social Survey Programme, Research on Data Quality and Data Sources	16,873
SSČ	Academic TTO	36,758
ÚČL	Czech Literary Bibliography – Czech Literary Internet: Data, Analysis, Research	18,575
ÚEM	Centre of Reconstruction Neuroscience	144,630
ÚFM	Modernization of Infrastructure for the Study and Application of Advanced Materials	37,310
ÚFP	COMPASS VI – Research	36,892
ÚFP	COMPASS-U: Tokamak for Cutting-Edge Fusion Research	757,195
ÚFP	ÚFP – Mobility	3,014
ÚFP	Creating and Probing Dense Plasmas at the PALS Facility	19,000
ÚCHP	ACTRIS-CZ RI	58,443
ÚCHP	ÚCHP – Mobility	9,488
ÚJF	CANAM – Centre of Accelerators and Nuclear Analytical Methods – OP	47,664
ÚMG	Modernisation and Support of Research Activities of the National Infrastructure for Biological and Medical Imaging Czech-Biolmaging	195,308
ÚMG	Upgrade of the Czech Centre for Phenogenomics: Developing Towards Translation Research	59,993
ÚMG	Upgrade of the National Infrastructure for Chemical Biology	21,454
ÚPT	Holographic Endoscopy for In Vivo Applications	170,120
OP EMPLOYMENT		
SOÚ	Analysis of Barriers and the Strategy of Gender Equality Support	5,700
SOÚ	Self-Employment as Precarious Work or Let's Prevent Further Disadvantages for Women on the Labour Market	2,965



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Technology Transfer

The effort to promote the use of science results in practice has long been an integral part of research and one of the missions of the Czech Academy of Sciences. The Czech Academy of Sciences also perceives its role in society through cooperation with the application sphere, not only in the shape of a contribution to the competitiveness of

the economy, but also in the form of a range of socially beneficial research activities including, for example, environmental protection, where research results from biological fields are used, or state administration, where the expertise of professionals in the social sciences can be leveraged.

In 2017, a set of recommendations for the handling and administration of intellectual property was completed by a joint effort with the Council for Use of Intellectual Property of the CAS and was adopted by the Academy Council of the CAS. The recommendations were submitted to the directors of the institutes and a series of introductory seminars were subsequently held for them or their representatives, in order to familiarise them with the importance of proper care of intellectual property. As a follow-up to these introductory seminars, training for institutes in the transfer of knowledge and technology began, provided by the staff of the *Technology Transfer Centre of the CAS (CETTAV)* in connection with the project OP RDE, focusing on the development of expert capacities in the transfer of knowledge and technology. The aim of the training is to familiarise both the scientific public and employees of the technological and economic administration of the institutes with basic procedures for

the identification of results with application potential, their further handling and further use in practice in the broadest sense.

With regard to the systematisation of the transfer of knowledge and technology, an initiative aiming at the foundation of a field-oriented technology transfer centre at the Complex of Biomedical Institutes in Krč was launched in 2017. The initiative, which aims to be a pilot project for the systemic research of the transfer of knowledge and technology at the CAS, is currently in the initial negotiations stage. Similar centres could gradually be created for other fields and complexes with central support of selected CETTAV activities.

In 2017, the Czech Academy of Sciences made the first steps towards joining the “European Technology Transfer Offices Circle” (TTO Circle), which is motivated by an interest in cooperation and the sharing of experiences and good practice in the transfer of knowledge and technology with organisations of a similar type to the CAS. The association operates under the auspices of the European Commission, namely its directorate general – Joint Research Centre (JRC). It is very important for the CAS that the TTO Circle unites technology transfer offices and centres of non-university scientific institutions. The opportunity to learn from the methods and practices (and mistakes) of (western-)European partner organisations will be invaluable.

Significant Examples of Cooperation

with Industrial Partners

Institute of Physics of the CAS

New technology for the transmission of high-energy laser pulses using an optical fibre bundle for transmitting laser pulses with a peak power of > 100 MW, a wavelength of 1030 nm, repetition frequencies in the tens of Hz and a pulse duration in the range of nanoseconds has been developed in cooperation with SQS Fibre optics a.s.

■ A multi-status antiferromagnetic memory has been developed with THz electrical writing speed which finds use for an ultra-fast memory resistant to powerful magnetic fields and for neural networks. The result is protected by a Czech patent and a European patent application has been submitted.

Institute of Photonics and Electronics of the CAS

A prototype pH meter designed to monitor pH in biological samples on a microscopic scale has been developed in collaboration with SAFIBRA, s.r.o. The result is patent-protected.

Institute of Physics of Materials of the CAS

The technological process of the precise casting of the superalloys MAR-M 247 and IN 713 LC has been optimised in cooperation with První brněnská strojírna Velká Bíteš, a.s. Mechanical tests were carried out for a damage with cyclic stress with a high mean value. The findings obtained will allow for a more accurate estimation of the lifespans of turbochargers and aircraft engine blades.



Institute of Computer Science of the CAS

A malware detection method for EXE files without preprocessing based on deep-learning techniques has been developed in collaboration with Avast Software s.r.o.

Institute of Scientific Instruments of the CAS

A device for measuring, recording and analysing electrical potential caused by cardiac activity capable of recording high potentials from the human body at high sampling frequencies with a high dynamic range has been developed in cooperation with the company CARDION s.r.o., St. Anne's University Hospital in Brno, and the company M&I spol. s.r.o. The design is patent-protected.

Institute of Biotechnology of the CAS

Preclinical testing of a new anticancer agent was carried out in cooperation with Smart Brain s.r.o. The test results are satisfactory and clinical trials of the agent can be performed on patients with difficult-to-treat types of cancer.

Institute of Physiology of the CAS

Synthetic polymer nanofibrous membranes with protein nanocoatings designed as skin cell replacements have been developed in cooperation with the University of Chemistry and Technology in Prague.

Institute of Inorganic Chemistry of the CAS

Cluster boron anion technology for new materials and applications in medicine and electrotechnics has been developed in cooperation with Katchem spol. s r.o.



Institute of Chemical Process Fundamentals of the CAS

A device for the preparation of non-flammable filler, dry soluble glass or expanded graphite with thermo-insulating and antibacterial properties has been developed in cooperation with SPM - Security Paper Mill, a.s. The design is patent-protected.

Institute of Experimental Botany of the CAS

Licences of licenses for up to 7 varieties of apple trees bred in the ÚEB have been granted to a range of entities in the Czech Republic, the EU and in more distant countries.

Institute of Experimental Medicine of the CAS

A 3D porous collagen composite cell support solution for accelerated regeneration of large bone defects in vivo has been patented.

J. Heyrovsky Institute of Physical Chemistry of the CAS

A new synthesis of materials based on TiO_2 and ternary oxides with a high capacity and charging rate for lithium batteries has been proposed in cooperation with HE3DA s.r.o.

Institute of Molecular Genetics of the CAS

A pharmaceutical preparation containing diphenylene iodonium has been patented for the treatment of diseases caused by parasites of the *Trypanosomatidae* family.

Economics Institute of the CAS

Macroeconomic models for forecasting and monetary policy analysis in developing countries have been proposed in cooperation with OGRResearch, s.r.o.

Institute of State and Law of the CAS

Interpretation of the concept of public interest and the content and application of the condition of urgent reasons overriding public interest have been dealt with as well as the burden of proof, the legal nature of the Water Transport Concept, the possibility of resistance against an approved concept, the Nature and Landscape Protection Act, the EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora, the Environmental Impact Assessment Act and case law of the EU Court of Justice.

The year 2017 marked a significant milestone for the international research centre ELI Beamlines. Upon the completion of the necessary modifications to the laser building in relation to the stability parameters of the floor structures, the installation of two laser systems was immediately commenced. Over the course of 2017, the installation of L1 laser systems began (these had previously been developed at the laboratory of the Institute of Physics on, Na Slovance Street in Prague) and the L3 laser system (this was transported to ELI Beamlines from the American Lawrence Livermore National Laboratory), and by the end of the year, their first part was operational.

This laser system, or chain of lasers, was further supplemented with a chamber of so-called optical compressor, which was supplied by the Czech company Delong Instruments. A vacuum chamber for laser-plasma interaction experiments, one of the largest vacuum chambers for civilian research in the world, was successfully transported from Bilbao in Spain. In addition, so-called secondary sources of X-ray radiation that can be offered for the first experiments to external users have also been successfully tested. In collaboration with a wide network of foreign institutes, a number of breakthrough studies have been published in scientific articles.

The ELI Beamlines Centre has organised or participated in many popularisation and scientific events in the Czech Republic and abroad - such as the Week of Science and Technology of the CAS, the Night of Scientists, the Science Festival, the Czech Innovation Festival in Berlin, the Science Fair in Dolní Břežany, the W3 Fair+Convention in Wetzlar, Germany, and more. Traditional and newly initiated events - such as the Talent Academy for secondary school students, open days for the public, the ELI Summer School or the Days of National Research Infrastructures - have enabled the Centre's activities to be presented to a wide range of visitors.

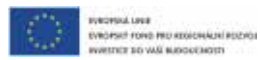
Thanks to success in obtaining new funding from various grant schemes, we have successfully launched a joint project with the BIOCEV Centre entitled ELIBIO. It maps new possibilities in optics with the aim of applying groundbreaking scientific findings in biology, chemistry and physics. The HiFI project focuses on exploring the interaction of high light intensity with matter. Both projects have led ELI Beamlines to world-class scientific capabilities that have helped to create an excellent team and to further strengthen the position of ELI Beamlines on the world map of laser research infrastructures.

ELI BEAMLINES IN 2017





The L3 laser system during installation and activation







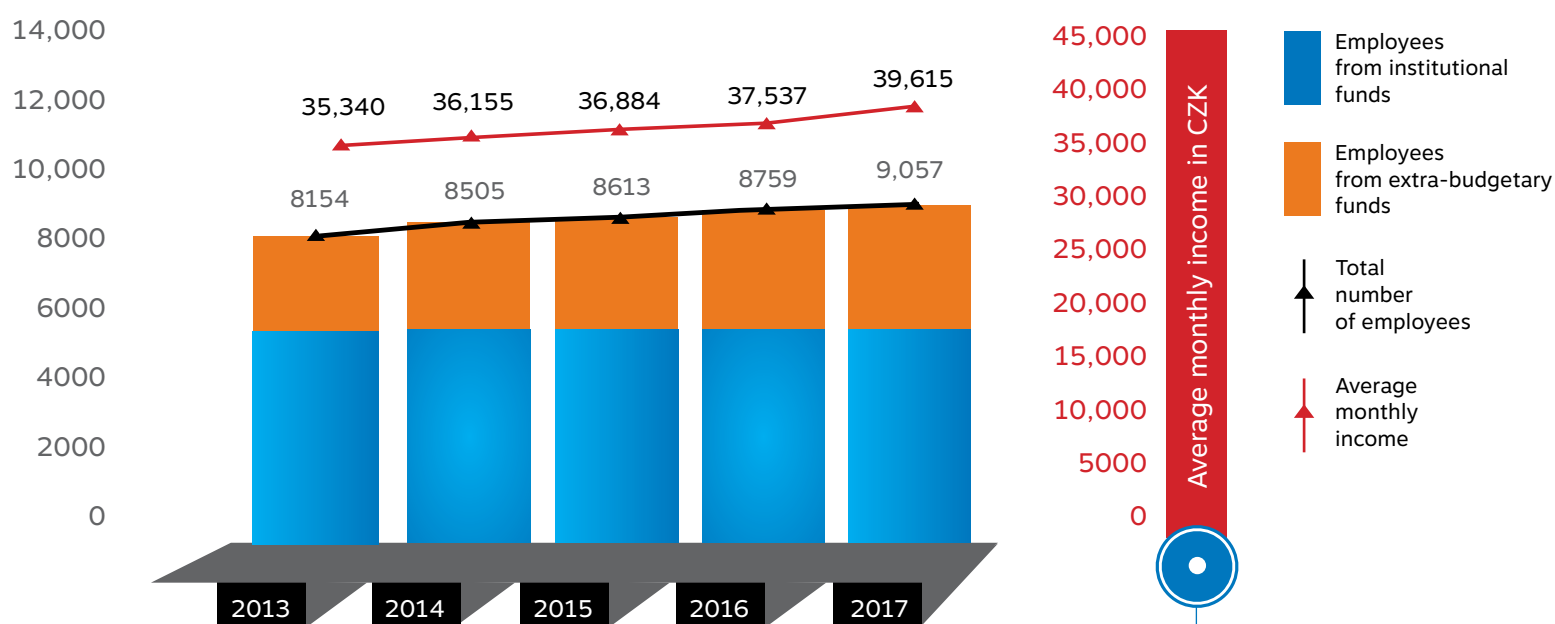
Employees and Wages

In 2017, there was a year-on-year increase in the total number of employees of the Czech Academy of Sciences (always presented as a full-time equivalent – FTE) from 8,759 to 9,057. Of these, 3,942 employees (equal to 43.53% compared to 41.12% in 2016) are paid from extra-budgetary funds.

The number of university-educated employees in research units, who have undergone attestation under the Career Rules for University-Educated Workers of the CAS and who have been placed in the relevant qualification grades increased year-on-year from 5,164 to 5,452.

” In total, the Czech Academy of Sciences and its institutes spent CZK 4,305,535 thousand on wages and salaries and CZK 161,187 thousand on OPE (other personal expenses for work performed) . The total average monthly income at the CAS reached CZK 39,615, with a year-on-year increase of 5.5% compared to 2016.

Graph No 1: Number of employees and average monthly earnings at the CAS



A more detailed overview of the number of CAS employees split into employees of the Head Office of the CAS and employees of all research institutes of the CAS is presented in Table No 3.

Table No 3: Number of employees of the CAS

Year	2013	2014	2015	2016	2017
In public research institutions of the CAS	8,080	8,432	8,539	8,685	8,983
In the Head Office of the CAS	74	73	74	74	74
Total CAS	8,154	8,505	8,613	8,759	9,057

In the Head Office of the CAS (hereinafter the HOC) CZK 43,164 thousand was invested in the salaries of 74 employees and CZK 1,466 thousand on other personal expenses for work performed, giving CZK 44,630 thousand in total. In 2017, the average monthly income of employees of the HOC, not including elected officials of the CAS, was CZK 42,293. The elected representatives of the Czech Academy of Sciences (President, Vice-Presidents and members of the Academy Council of the CAS) are also remunerated by the Czech Academy of Sciences under Government Regulation No 564/2006 Coll., on the Remuneration of Public Service and Administration Employees. For this reason, the

elected officials are counted among the employees of the HOC and therefore the total average earnings of the state organisational entity, the Czech Academy of Sciences, are CZK 48,852. Therefore, the total average earnings compared to the previous year increased by 4.4%, primarily influenced by a 10% increase in salary rates as of 1 November 2017 pursuant to Government Regulation No 340/2017 Coll., amending Government Regulation No 564/2006 Coll., on the Remuneration of Public Service and Administration Employees.

In 2017, in all institutes of the CAS (public research institutes), CZK 4,262,372 thousand

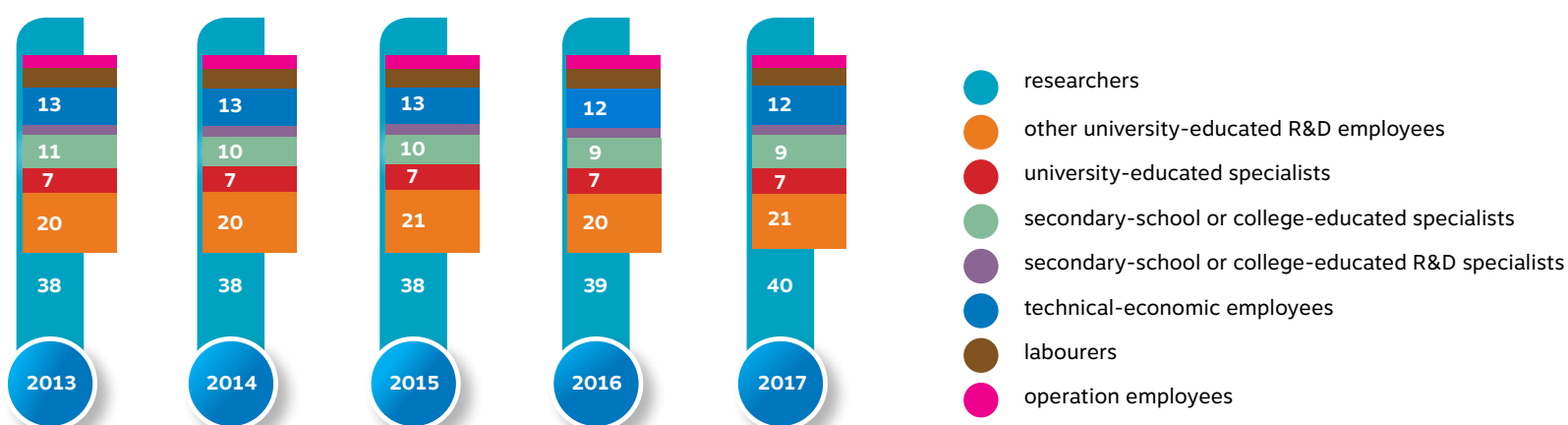
was invested in the wages of 8,983 employees and CZK 159,721 thousand on other personal expenses for work performed, giving a total of CZK 4,422,093 thousand in wage expenses. The average monthly income reached CZK 39,539, with a year-on-year increase of 5.5% compared to 2016.

A detailed overview of the average monthly earnings in the public research institutes (including all sources: institutional and extra-budgetary) grouped by employee category is provided in the following table.

Table No 4: Number of employees and average monthly earnings in 2017 given by categories

Category	Adjusted average number of employees	Average monthly income in CZK
Researchers	3,572	51,083
Other university-educated employees at research institutes	1,880	31,357
University-educated specialists	642	38,787
Secondary-school or college-educated specialists	800	27,627
Secondary-school or college-educated R&D specialists	179	30,191
Technical-economic employees	1,099	39,662
Labourers	484	22,293
Operation employees	327	21,318
Total	8,983	39,539

Graph No 2: Employee categories in research institutions of the CAS (in %)





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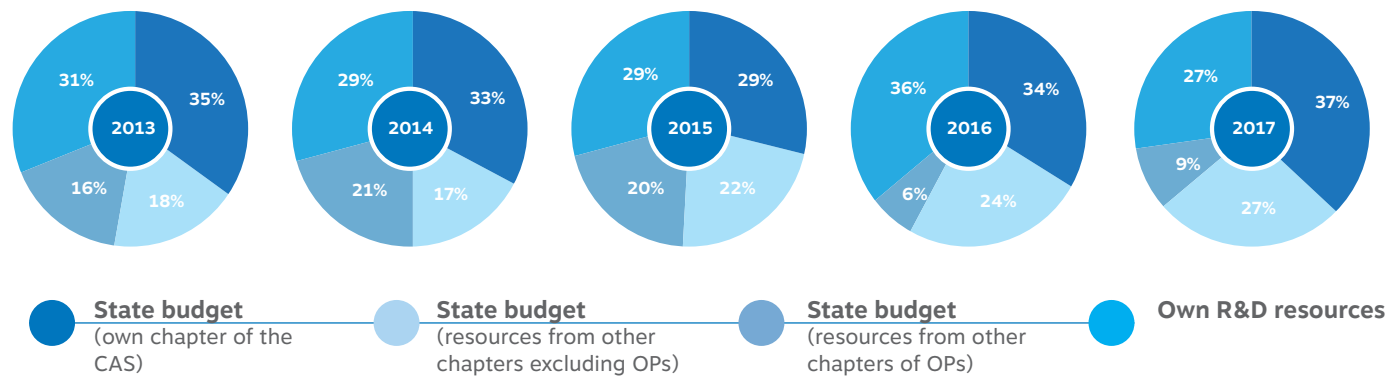
Financial Resources

and their Utilisation

In 2017, the Czech Academy of Sciences managed a total of CZK 14,212 million, of which CZK 5,231.6 million came from its own budget chapter of the state budget.

The share of resources from its own budget chapter to the total financial resources of the CAS was 37% in 2017.

The year-on-year increase in the share of resources from its own budget chapter of 3% was mainly due to the reduction of the resources of public research institutions (a decrease in income from licenses of the Institute of Organic Chemistry and Biochemistry).

Graph No 3: Financial resources of the CAS (in %)

Financial resources (for the entire CAS) originating from the budget chapter, from subsidies from other budget chapters and from its own resources are summarised in the following overview.

Table No 5: Structure of financial resources (real resources) in millions of CZK

NAME	Non-investment resources	Investment resources	TOTAL
Resources from the chapter of the CAS	4,241.9	989.7	5,231.6
Subsidy from other budget chapters	3,679.5	1,419.3	5,098.8
GA ČR grants	1,732.2	0.8	
TA ČR projects	183.3	0.0	
projects of other providers – excluding operational programmes	1,014.3	851.0	
projects of other providers – operational programmes	749.7	567.5	
Own R&D resources	3,881.6		3 881,6
main activity orders	191.3		
sales of publications	109.2		
rent	91.2		
licences	1,820.0		
sales of goods and services	186.5		
conference fees	27.8		
interest and exchange-rate profits	13.9		
sales of material and securities	667.7		
foreign grants and donations	351.9		
own fund resources	283.8		
other	138.3		
Total resources	11,803.0	2,409.0	14,212.0



Controlling Activities

Controlling activities at the CAS and at the institutes of the CAS are ensured by the Division for General Control (hereinafter the DGC), which is directly subordinated to the President of the CAS. The system of controlling at the CAS is based on requirements stemming from the decision-making and executive processes in the bodies of the CAS and meets public administration control requirements.

Public administration controls are carried out according to an approved annual plan. Controlling activities of the DGC are also defined by the Financial Control Act and other regulations for public administration control. This determines the content and physical implementation of the duty to control the management of state budget expenditure distributed by the CAS as the administrator of the chapter for science and research.

As usual, with controlled entities, controls particularly concentrated on relationships to public budgets and adherence to legal conditions for the utilisation of budgetary funds and their proper recording and accounting. In 2017, the Division for General Control, among other things, focused in more detail on examining the handling of intangible assets acquired by the controlled entities from public funds. Controls also focused on compliance with current legislation and internal rules of established procedures for the preparation, implementation and financing of investments, as well as legal provisions for tender procedures, including adherence to property manage-

ment regulations with due diligence.

Here, in the course of 2017, the Division for General Control particularly verified, as standard, whether the budget rules had met the given conditions and whether all operations had been properly reflected in the accounts, whether the records of assets had been properly kept, and whether the rules in force and internal rules of established procedures for preparing and implementing investments had been adhered to. Controls also verified compliance with legal provisions for tender procedures, including adherence to property management regulations with due diligence, when implementing goals set by both the CAS and its institutes for the reviewed period.

Considerable attention was also paid to the entities concerned to verify whether the financial management and workplace property management fulfilled the essential requirements of the Statutes of the CAS, the decisions of its bodies and the internal regulations of the CAS or its institutes.

Attention was also paid to respecting labour-law legislation, in particular compliance with conditions laid down by the Labour Code, including the resolution of employee liability if damage events occur in the workplace. The efficiency and functionality of the internal control system, which has a significant effect on the financial management and property management of individual institutes, were also examined. Over the given pe-

“ From the total revenues of CZK 11,722.5 million, the institutes of the CAS used CZK 10,837.6 million to cover their own expenses.

Since the institutes of the CAS are managed as public research institutions in the regime of non-governmental organizations, they do not need to close their accounts until 30 June of the following year, and must have their financial statements certified by an auditor, the following analysis of their economic activities must be taken into account as a preliminary one.

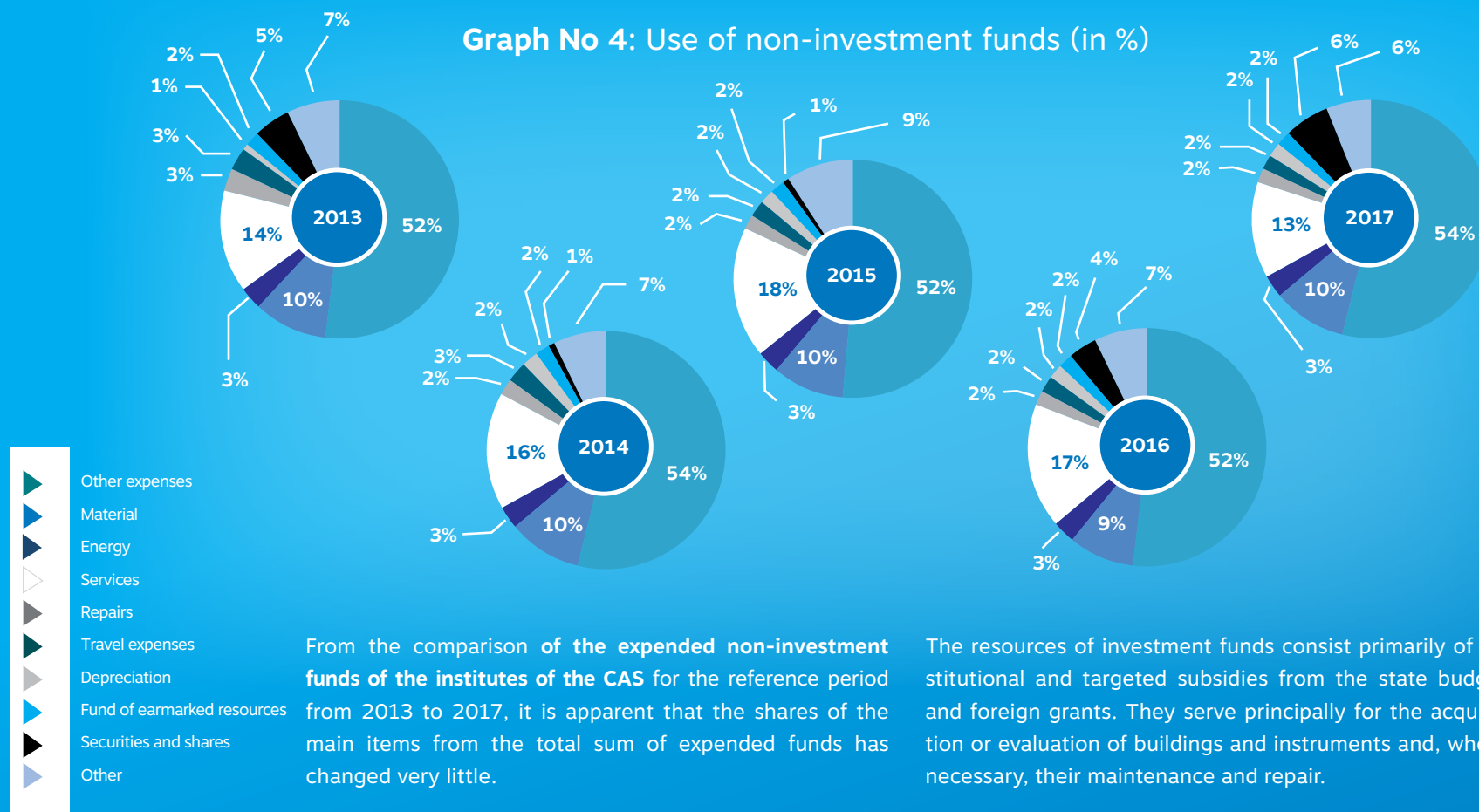
Compared to 2016, the total expenses of the institutes of the CAS (public research institutes) increased by CZK 363 million. A detailed breakdown of the expenses of the institutes of the CAS is provided in Table No 6 As of 31 December 2017, the institutes of the CAS posted a total profit of CZK 885 million.

Table No 6: Structure of non-investment expenses of the institutes of the CAS
(in millions of CZK)

NAME	2016	2017	Difference
personal expenses (wage expenses, mandatory insurance paid by the employer, refunds on sickness insurance benefits)	5,402	5,887	485
purchase of material (e.g. books, magazines, small tangible assets, material consumption, protective equipment)	957	1,077	120
purchase of energy, water and fuel	288	281	-7
purchase of services (postal services, purchase of small intangible assets, rent, conference fees, other services)	1,784	1,390	-394
repairs and maintenance	238	260	22
travel expenses	232	244	12
creation of funds total earmarked funds	187	187	0
transfers to a social fund and other social expenses	178	207	29
taxes and fees	419	192	-227
depreciation of fixed assets	210	214	4
exchange rate losses	51	195	144
securities and shares (sale)	426	665	239
other expenses (accident insurance, fines, damages)	147	109	-38
inventory change of own activities	-5	-11	-6
activation of material, goods, services and property	-39	-59	-20
Total	10,475	10,838	363

A substantial cost item consists of accounting depreciation of assets acquired from subsidies amounting to CZK 1,335,530 thousand, which are not included in this analysis.

Graph No 4: Use of non-investment funds (in %)



From the comparison of the expended non-investment funds of the institutes of the CAS for the reference period from 2013 to 2017, it is apparent that the shares of the main items from the total sum of expended funds has changed very little.

The resources of investment funds consist primarily of institutional and targeted subsidies from the state budget and foreign grants. They serve principally for the acquisition or evaluation of buildings and instruments and, where necessary, their maintenance and repair.

Table No 7: Investment resources of the institutes of the CAS (in millions of CZK)

NAME	2016	2017	Difference
resources from the chapter of the CAS	832.8	989.7	156.9
resources from other providers, including operational programmes	737.7	1,419.3	681.6
depreciation	222.2	207.7	-14.5
transfer from improved profit	31.6	60.4	28.8
foreign grants and donations	53.7	129.6	75.9
revenue from the sale of fixed assets	8.7	41.3	32.6
combination of funds for acquiring fixed assets	5.4	0.6	-4.8
Total	1,892.1	2,848.6	956.5

Table No 8: Use of investment resources in the institutes of the CAS (in millions of CZK)

NAME	2016	2017	Difference
financing of buildings	638.1	372.1	-266.0
acquisition of instruments and equipment	1,155.0	1,714.1	559.1
maintenance and repairs	48.2	136.2	88.0
other	134.0	133.7	-0.3
Total	1,975.3	2,356.1	380.8

From investment resources in the sum of CZK 2,848.6 million, in 2017, the institutes of the CAS used CZK 2,356.1 million. The asset reproduction fund was increased by CZK 492.5 million.

riod, contractual relations also received major attention, both in terms of the application of property rights in the case of intangible assets, or the optimal use of tangible assets, and in terms of supplier-customer relations following the fulfilment of conditions of economic and non-economic activities under the EU directive.

Problems revealed by controlling activities were subsequently analysed in detail and immediately discussed with the management and other responsible staff of the controlled entities in order to prevent similar shortcomings in the future. After appropriate generalization and processing, information obtained from controlling activities becomes a basis for methodological activity in relation to the economic units of other institutes of the CAS.

Although all controlling activities were duly initiated according to plan in 2017, they were not all successfully completed within the year. One of the reasons was the postponement of the completion of controlling activities from 2016 (due to an extraordinary audit of the Institute of Experimental Medicine), while in some cases it was due to an attempt to comply with a justified request of the director to postpone their commencement dates (e.g. in the Institute of Molecular Genetics), and in other cases the reason was related to the extension of controlling activities with the necessity to examine a significant quantity of documents of larger institutes with significant investment projects implemented within the reviewed period (for example, the Institute of Physics and the Institute of Microbiology). The schedule of controlling activities in 2017 was significantly interrupted, in particular, by the Institute of Information Theory and Automation, the management of which prevented the due performance of

controlling activities by failing to provide the controlling group with the necessary cooperation, therefore forcing the controlling activities to be repeatedly extended.

In accordance with the plan, 10 controlling activities were carried out in 2017. The following CAS institutes were inspected:

- Institute of Ethnology
- Oriental Institute
- Institute of Analytical Chemistry
- Institute of Psychology
- Institute of Geology
- Institute of Physics
- Institute of Information Theory and Automation
- Institute of Microbiology
- Institute of Macromolecular Chemistry
- Institute of Contemporary History

As a result of the specified postponements, the inspection of the management of the Institute of Macromolecular Chemistry was terminated in January 2018, while the control of the management of the Institute of Contemporary History was completed in February 2018.

In 2017, a further seven follow-up inspections at institutes of the CAS were conducted with the aim of verifying the implementation of measures to eliminate shortcomings identified by inspections of management in 2016.

The following institutes were inspected:

- Institute of Botany
- Institute of History
- Institute of Physics of Materials
- Institute of Chemical Process Fundamentals
- Institute of Theoretical and Applied Mechanics
- Institute of Thermomechanics
- Institute of Czech Literature



With regard to the completion of the inspection of the management at the Institute of Molecular Genetics in early 2017, a follow-up inspection will be conducted in 2018. At the Institute of Chemical Process Fundamentals, the follow-up inspection found partial shortcomings, the rectification of which will continue to be monitored in the forthcoming period. In the case of the two institutes inspected in 2016, no shortcomings were found. Therefore, there was no reason to conduct follow-up inspections in 2017.

Individual reports on the results of public inspections of the management of state budget funds were progressively presented and discussed at meetings of the Academy Council of the CAS.

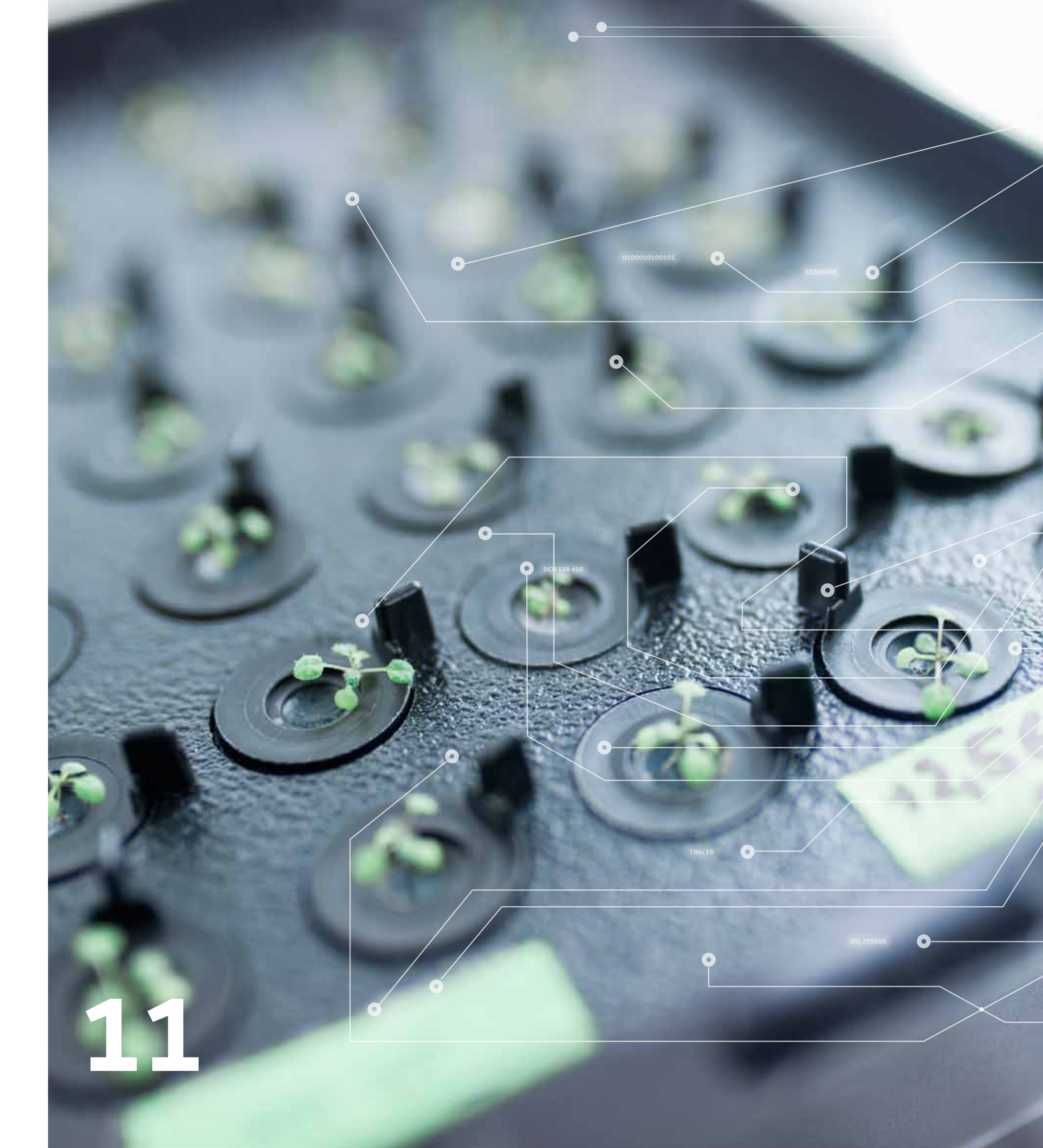
The Division of General Control also inspected the drawing of subsidies granted for 10 projects of eight scientific societies. It examined 6.43% of the total sum of funds provided to scientific societies from the CAS budget.

The following organisations were concerned:

- Czech Association of Geophysicists
- Czech Society of Biomechanics
- Czech Society for Ornithology
- Czech Society for Structural Biology
- Czech Sceptics' Club Sisyfos
- Czech Ethnographic Society
- Czech Plato Society
- Circle of Modern Philologists

Audits of the accounts of the EU Framework Programme projects were also carried out, with the volume of inspected funds in 2017 amounting to CZK 32,298 thousand.

Standard duties of the Division of General Control also include complaints and suggestions addressed to the bodies of the Czech Academy of Sciences and the Head Office of the Czech Academy of Sciences. Apart from cases which the division receives directly for resolving, it also keeps records of other complaints, continuously monitors their handling and, in some cases, subsequently participates in their resolution. In 2017, the Division of General Control resolved or recorded 14 suggestions and complaints. All submissions were duly settled and the CAS therefore considers the matters to be closed.



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Support of Excellence

Part of the scientific policy of the Czech Academy of Sciences is the support of excellent research in its institutes. This support is provided in a number of ways. Well-known is the **Academic Premium (Praemium Academiae)**, which serves to support scientists working on excellent research in all scientific fields. Another way of support is the **Otto Wichterle Award** aimed at prospective young researchers.

Prominent foreign scientists are invited to collaborate on research through the financial support of the **Jan Evangelista Purkyně Fellowship**.

The Czech Academy of Sciences also provides targeted financial support for emerging research scientists via three further programmes (the Programme Supporting Promising Human Resources, the Programme in Support of International Collaboration of Beginning Research Employees, and the Josef Dobrovský Fellowship Programme). Successful scientists are annually rewarded for their outstanding scientific results with the prestigious **Prizes of the Czech Academy of Sciences**.

The Academic Premium is the most significant financial premium of the Academy of Sciences for supporting scientific excellence. It is awarded to outstanding scientists who excel in their fields and represents both financial and moral support for further scientific work on a globally comparable scale. The financial sum of CZK 5 million a year associated with this award aims to help recipients cover the costs of their research over a period of six years and, in the longer term, to develop it both by building their own scientific teams and by acquiring required new devices or laboratory material. Thanks to its significance and prestige, as well as its financial support, the Academic Premium is comparable with grants of the European Research Council (ERC).

In 2017, the premium was awarded to:

doc. RNDr. Petr Baldrian, Ph.D.

Institute of Microbiology

doc. Mgr. Michal Fárník, Ph.D., DSc.

J. Heyrovský Institute of Physical Chemistry

prof. Ing. Jan Flusser, DrSc.

Institute of Information Theory and Automation



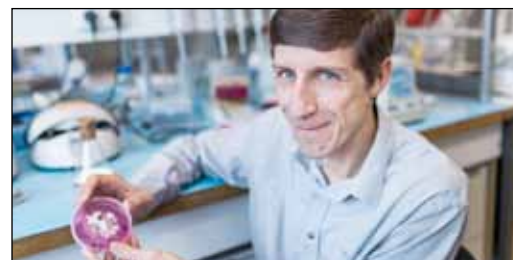
Prof. Jan Flusser

is an internationally respected specialist in the field of digital image processing and recognition. His work, oriented towards new methods of the registration of images, has been cited over 8,000 times. He is the author of a software method for increasing the spatial resolution of an image beyond the camera's hardware limit (approx. 1000 citations, 2007 CAS Award, 2006 Award of the GA ČR President). His contribution to a theory of invariant recognition, which allows direct recognition of objects from damaged images, is also significant (approx. 4000 citations). His h-index is 34.



Doc. Michal Fárník

is one of the world's leading experts in the field of chemical physics, photochemistry and atmospheric chemistry, where he focuses on processes leading to ozone hole formation in which ice nanoparticles play a key role. He is the founder of a new direction of research in the Czech Republic - the dynamics of molecules, clusters and nanoparticles in molecular beams in a vacuum. His work has been cited over 1200 times and his h-index is 23. He is Head of the Department of Dynamics of Molecules and Clusters at the J. Heyrovský Institute of Physical Chemistry.



Doc. Petr Baldrian

is a recognised expert in the field of ecology of microorganisms, focusing on the mechanisms of organic matter transformation of microorganisms in terrestrial ecosystems and the related application of microorganisms in environmental technologies. His work has received a significant response (over 5,800 citations and an h-index of 41). He has been the Head of the Laboratory of Environmental Microbiology at the Institute of Microbiology since 2006.

” The Academic Premium is the most significant financial means of the Academy of Sciences for supporting scientific excellence.



Akademie věd
České republiky

In 2017, support was awarded to:

RNDr. Ivan Řehoř, Ph.D.

Mgr. Martin Schwarzer, Ph.D.

Priv. Doz. Mgr. Aleš Pečinka, Ph.D.

M.Sc. Ivan Jarić, Ph.D.

Dr. Mirosław Janowiak

RNDr. Ivan Řehoř, Ph.D.

nominated by the Institute of Organic Chemistry and Biochemistry for scientific work on the development of elastic microparticles capable of circulating in the blood stream over a long period, used as fluorescence sensors for detecting important blood parameters.

Mgr. Martin Schwarzer, Ph.D.

nominated by the Institute of Microbiology for scientific research in the impact of a diet, intestinal bacteria and specified bacterial strains for correct postnatal growth under the conditions of normal nutrition and protein malnutrition.

Priv. Doz. Mgr. Aleš Pečinka, Ph.D.

nominated by the Institute of Experimental Botany for scientific work in the analysis of plant structure and nuclear genome function, focusing on the study of chromatin and its role in maintaining genomic stability.

M.Sc. Ivan Jarić, Ph.D.

nominated by the Biology Centre for scientific work in the research of the biology and behaviour of fish using telemetric methods that provide revolutionary data on the spatial distribution and behaviour of fish.

Dr. Mirosław Janowiak

nominated by the Institute of Slavonic Studies for scientific research in the field of Belarusian studies within the context of other Slavic languages, with a focus on Belarusian dialects in linguistically mixed areas.



The aim of the J.E. Purkyně Fellowship is to engage outstanding scientists from abroad in research at the institutes of the CAS. The scientists can be both scientists of Czech origin working abroad on a long-term basis, or top foreign scientists, generally younger than 40 years. The fellowship provides them with adequate financial resources for a period of up to five years. The selected researchers are expected to become leaders of creative teams in their respective institutes.

This award for young scientists bears the name of Professor Otto Wichterle, the world-renowned Czech chemist, who became president of the Czechoslovak Academy of Sciences after November 1989. The aim of this award is to stimulate young scientists of the CAS, whose excellent results contribute towards the development of their relevant scientific disciplines. On 6 June 2017, President of the CAS, Professor Eva Zažímalová presented the Otto Wichterle Award to the following 23 young scientists at the Lanna Villa in Prague:

”

The O. Wichterle award is designated for selected, extraordinarily talented and prospective scientists of the CAS aged up to 35 years.

I. Section of Life Sciences

1. **Ing. Vítězslav Jarý, Ph.D.** (Institute of Physics)
2. **RNDr. Lukáš Ondič, Ph.D.** (Institute of Physics)
3. **Ing. Jakub Vícha, Ph.D.** (Institute of Physics)
4. **RNDr. Martin Doležal, Ph.D.** (Institute of Mathematics)
5. **Ing. Miroslav Krús, Ph.D.** (Institute of Plasma Physics)
6. **RNDr. Karel Židek, Ph.D.** (Institute of Plasma Physics)

II. Section of Life Sciences and Chemical Sciences

1. **Mariana M. Salgado da Costa Amaro, Ph.D.** (J. Heyrovský Institute of Physical Chemistry)
2. **RNDr. Radek Šachl, Ph.D.** (J. Heyrovský Institute of Physical Chemistry)
3. **Ing. Libor Kobera, Ph.D.** (Institute of Macromolecular Chemistry)
4. **Mgr. et Mgr. Pavla Perlíková, Ph.D.** (Institute of Organic Chemistry and Biochemistry)
5. **Dmytro A. Yushchenko, Ph.D.** (Institute of Organic Chemistry and Biochemistry)
6. **Mgr. Soňa Legartová, Ph.D.** (Institute of Biophysics)
7. **Mgr. Lenka Polidarová, Ph.D.** (Institute of Physiology)
8. **RNDr. Vojtěch Vyklický, Ph.D.** (Institute of Physiology)
9. **Mgr. Zdeněk Kameník, Ph.D.** (Institute of Microbiology)
10. **Mgr. Peter Dráber, Ph.D.** (Institute of Molecular Genetics)
11. **Mgr. Milan Říha, Ph.D.** (Biology Centre)
12. **Mgr. Jan Hrček, Ph.D.** (Biology Centre)
13. **RNDr. Ondřej Mudrák, Ph.D.** (Institute of Botany)

III. Section of Humanities and Social Sciences

1. **Mgr. Martina Mikeszová, Ph.D.** (Institute of Sociology)
2. **Petr Gibas, MSc., Ph.D.** (Institute of Sociology)
3. **Dr. phil. Tomáš W. Pavlíček, Ph.D.** (Masaryk Institute and Archives)
4. **Ansten Mørch Klev, Ph.D.** (Institute of Philosophy)



AWARDS OF THE CZECH ACADEMY OF SCIENCES

The Czech Academy of Sciences annually awards the following prizes to outstanding researchers for exceptional research results focusing on social priorities which have strengthened the competitiveness of Czech science on an international scale and which were first published or implemented no more than five years ago.

In 2017, the Award of the Czech Academy of Sciences for outstanding results of great scientific significance was handed over by Professor Eva Zažímalová to:

Dr.rer.nat. Lukáš Palatinus

and the authorial team from the Institute of Physics:

RNDr. Mariana Klementová, Ph.D.;

Mgr. Petr Brázda, Ph.D.;

RNDr. Václav Petříček, CSc.;

MPhys. Cinthia Antunes Correa, Ph.D. – for the scientific result *Determination of Crystal Structures from Electron Diffraction Tomography Data*

prof. RNDr. Marek Jindra, CSc.,

Biology Centre – for the scientific result *Discovery of a Receptor for the Insect Juvenile Hormone*

MUDr. Josef Houštěk, DrSc.,

and the authorial team from the Institute of Physiology:

RNDr. Tomáš Mráček, Ph.D.;

RNDr. Marek Vrbacký, Ph.D.;

Mgr. Kateřina Tauchmannová, Ph.D.;

Mgr. Nikola Kovářová, Ph.D.;

Mgr. Petr Pecina, Ph.D.;

Mgr. Jana Kovalčíková

– for the scientific result *Energy Metabolism and Pathogenic Mechanisms of Mitochondrial Diseases*



Support of Emerging Scientists

The Academy Council of the CAS dedicates systematic and long-term support to prospective human resources and the establishment of international cooperation by the youngest scientists. In 2017, it continued its successful support programmes for emerging scientists.

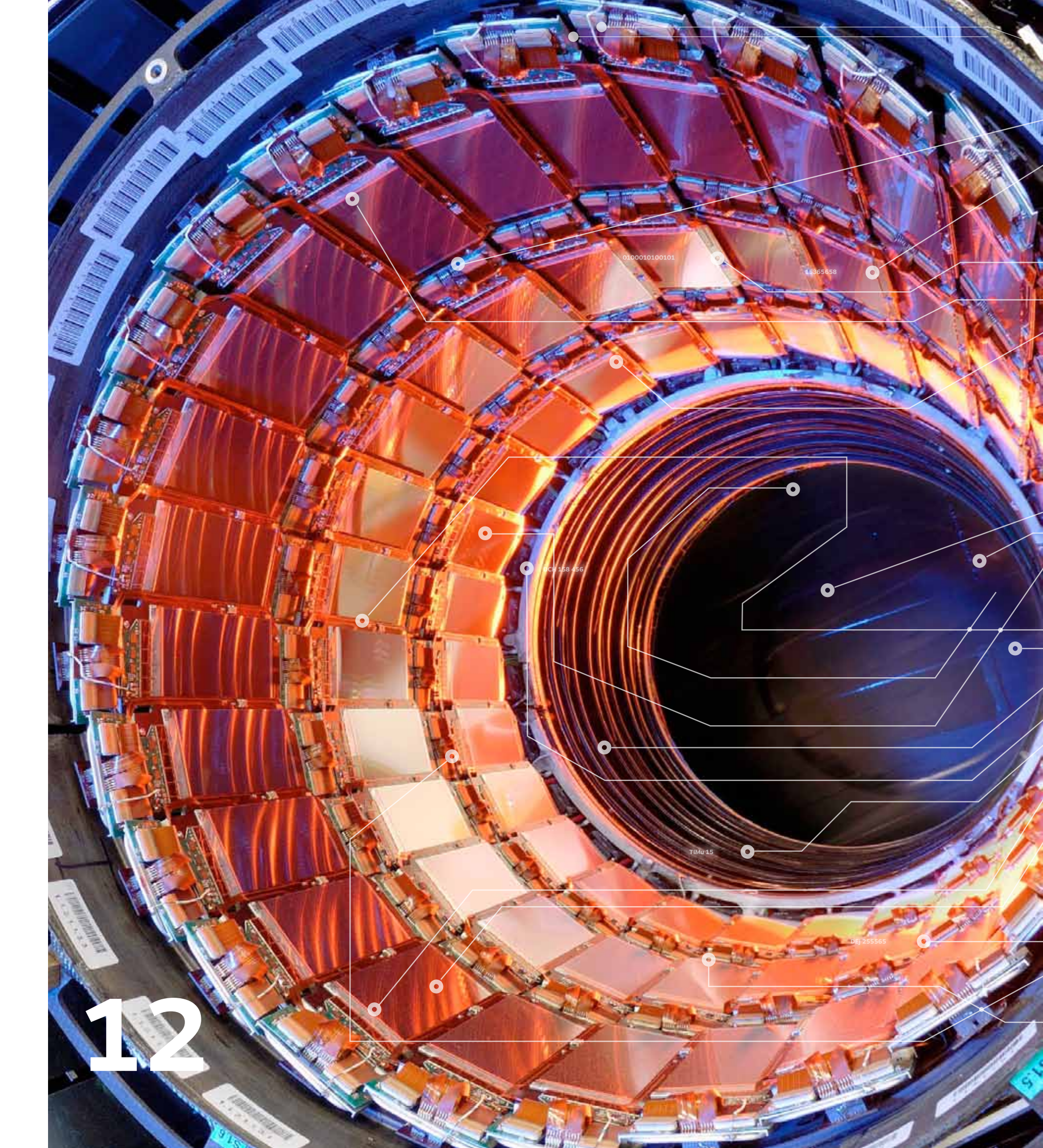
Programmes supporting promising human resources – Payroll support for post-doctoral students in institutes of the Czech Academy of Sciences (the PPLZ programme) is intended for emerging post-graduate students (two years after the defence of their Ph.D. thesis or equivalent, or four years in the case of a long-term foreign study stay or child care). In 2017, within the scope of two calls of the PPLZ programme, 32 candidates were provided with support in the 8th call and 29 candidates in the 9th call (with funding commencing from 1 January 2017, or from 1 July 2017).

The programme in support of international collaboration of beginning research employees aims to support the development of cooperation between the institutes of the CAS and major foreign institutions and to enable young researchers to become involved

in active international cooperation. In 2017, research in 33 projects was supported with CZK 12,708 thousand.

The Josef Dobrovský Fellowship Programme helps young foreign researchers who need to study local historical, cultural, artistic, linguistic, geographical or natural facts in the Czech Republic for their scientific work. In 2017, support in a total amount of CZK 354 thousand was provided for 10 study visits at four institutes of the CAS.

Since 2015, other priorities of the CAS in the area of support for emerging scientists and international collaboration have included **research and educational activities for young researchers and students from abroad**, which are organised by individual institutes of the CAS with the aim of establishing contacts, training and possible involvement of high-quality foreign participants in the research activities of the institutes of the CAS. In 2017, 15 such activities were supported.



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● International Cooperation

In the field of international cooperation, the CAS works on the basis of the Concept of Support of International Cooperation of the CAS, approved in November 2014, which reflects global challenges and changes, and is governed by the principle of free movement of researchers, knowledge and ideas. All supported international activities of the CAS contribute to the involvement of foreign partners in the research programs of Strategy AV21. The main objective is to develop internationalisation and to increase the quality of the institutes of the CAS and their teams through international cooperation and the mobility of researchers



In 2017, the institutes of the CAS received 44 foreign delegations at the request of the public administration (e.g. the Office of the Government or ministries), or foreign representative offices. The management of the CAS then received more than two dozen foreign delegations and representatives of foreign offices in Prague.

A committee for cooperation with countries of East and South-East Asia and the USA was newly appointed, meeting for the first time in late November 2017. Its main mission is to coordinate international cooperation activities. The committee is intended to serve as a platform for defining research priorities of the CAS, and as a tool for ensuring the continuity of cooperation in the areas of East and South-East Asia and the USA.

Cooperation within the ERA

At a European level, the long-term priority of the CAS is to deepen its integration into the European Research Area (ERA), thus ensuring access to unique research infrastructures, devices, platforms and scientific information sources and data. For some disciplines, a basic prerequisite for their development is the involvement of the Czech Republic in inter-governmental scientific organizations (e.g. CERN, EMBL and ESO). The Academy of Sciences actively takes advantage of opportunities offered by the framework programme for research and innovation EU Horizon 2020 as well as other EU initiatives in the field of R&D, both through the participation of teams from institutes of the CAS in projects and by the participation of representatives of the CAS in coordination activities in the field. In 2017, the CAS presented its opinion on the form of the future 9th Framework Program for Research and Innovation and continued to be actively involved in the activities of the Joint Research Centre (JRC) and the European Strategy Forum for Research Infrastructures (ESFRI), where a representative of the CAS has occupied the position of Vice-Chairman since 2016.

In 2017, the institutes of the CAS participated in the resolution of 91 projects of the

Horizon 2020 programme with funds totaling EUR 7.44 million. At the same time, 35 projects funded under the 7th EU Framework Programme for Research and Technological Development were addressed, with a total budget of EUR 3.67 million. In 2017, a CAS employee was awarded an ERC grant (Consolidator grant - J. Steiner from the Economics Institute). Other activities of the Horizon 2020 programme in which the CAS is involved include the Teaming event. With the project "ARIB", the Institute of Molecular Genetics and the Institute of Physics succeeded with the project "CHAMPP". This institute was also successful in the FET-OPEN call, where it co-ordinates the "ASPIN" project.

In 2017, the CAS also participated in a call for joint multilateral projects under the EIG CONCERT Japan programme, which are being addressed in cooperation between EU countries, associated countries and Japan. This led to its successful involvement in the similar programme EIG KONNECT with South Korea in 2016. The aim of these projects is to strengthen cooperation not only within Europe, but also with selected third countries with a prerequisite for the emergence of new consortia that could apply for projects from Horizon 2020 or FP9.

Involvement of the CAS in International Organisations

The CAS has also been involved in the development of a global science strategy through the activities of international non-governmental organisations aimed at finding solutions to pan-European and worldwide research and development problems (in particular the European Academies Science Advisory Council – EASAC, All European Academies – ALLEA, the International Council for Science – ICSU and the InterAcademy Partnership – IAP). The most important examples of active participation of representatives of the CAS in the creation of a European science strategy include the involvement of specialists from the CAS in EASAC expert groups, for example, in the areas of Negative Carbon or Climate Change and Health.



Bilateral Cooperation

The CAS has continued to strengthen bilateral cooperation with research institutions, especially from countries with a high intensity and level of activity in research and development. Scientific cooperation was implemented in 2017 on the basis of bilateral agreements between the CAS and 35 partner organisations from 30 countries. In compliance with the concept of international cooperation, the transition from cooperation in the form of study visits to cooperation on joint mobility projects continued, focusing on the sharing of knowledge and the use of complementary methodologies and equipment of the participating institutes. In this context, contractual documents with nine partner organisations have been updated and one new cooperation agreement has been entered into. As part of the bilateral cooperation, 137 mobility projects were dealt with,

almost twice as many as in the previous year. Increasing interest in cooperation in this form illustrates the success of the abovementioned transition from co-operation at the level of individual study visits to joint mobility projects. Today, short-term study visits are the exclusive form of cooperation with only five partner organisations of the CAS, and discussions are already being held with these for a change in cooperation to mobility projects.

Within the scope of an extraordinary financial subsidy received by the CAS from the Office of the Government of the Czech Republic for the development of cooperation with leading scientific and research institutes in Israel, 53 activities with a total value of almost CZK 3.2 million have been supported.

CEFRES

The CAS continues to be an active partner within the framework of the CEFRES platform, the French-Czech scientific cooperation project in the fields of the humanities and social sciences, implemented on the basis of a cooperation agreement entered into on 21 November 2014 between the CAS, Charles University, the Centre National de la Recherche Scientifique (CNRS) and the Embassy of the French Republic in the Czech Republic. A pilot call was implemented in 2017 as part of the research activity of this platform. In a two-round selection system, a committee composed of representatives of all four participating entities recommended that a project of Mgr. Luďek Brož, Mphil., Ph.D., of the Institute of Ethnology and his co-researcher Virginie Vaté, Ph.D., of CNRS, entitled “the Bewildering Boar Project”, be carried out from the year 2018.

Organised Conferences and Seminars



In March 2017, the CAS organised the international conference Prague Forum - Prospects of European Non-University Research beyond 2020 under the auspices of Pavel Bělobrádek, Deputy Prime Minister for Science, Research and Innovation. The conference, which became an opportunity to meet representatives of two dozen major European non-university research institutions and other research organisations, enabled the exchange of opinions and experience, particularly within the following three thematic circles: Scientific

Excellence and the Widening Concept, Open Science as a New Paradigm of the European Research Area and the Science - Politics - Society Dialogue. The meeting at the round table was attended by the elite of European science, among others Martin Stratmann (Max Planck Society), Maive Rute (JRC), Günter Stock (ALLEA) and Michael Matloz (ANR).

In October 2017, in cooperation with the German and French Embassies, the CAS organised a seminar for graduate students and post-doctoral students on the possibilities of study and research visits in Germany and France. It was the first time that the CAS had organised a similar event and, given the great interest of the participants and the positive response, another seminar is planned for autumn 2018.



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Regional Cooperation

The Czech Academy of Sciences helps regions and microregions of the Czech Republic to improve their quality of life through jointly funded research projects and their application. This is rooted in agreements progressively entered into with the Association of the Municipalities of Orlicko (2003), the South Moravian Region (2008), the City of Brno (2008), Prague Urban District 1 (2009), the Pardubice Region (2013), the Hradec Králové Region (2013), the Vysočina Region (2014), the Zlín Region (2015), the Ústí nad Labem Region (2015), the Central Bohemian Region (2016), the Karlovy Vary Region (2016) and the Olomouc Region (2017). In 2017, the majority of these agreements were successfully performed in 18 joint projects, financed according to the agreements of the institutes of the CAS and their regional partners.



Based on a proposal of the Committee for Regional Cooperation, the Academy Council of the CAS decided to finance the projects submitted for the first call at its 46th session on 29 November 2016 and, at its 3rd session on 23 May 2017, the newly elected Academy Council of the CAS approved subsidies for the projects proposed by the specified committee for support from the second call.

The projects covered the following topics: cooperation with observatories in the regions, research on changes in the landscape (management of lakes or species diversity of organisms), health and economic issues of the regions (common gnats as a health risk or air pollution), as well as the promotion of research in regional cultural heritage (archaeological research, conservational research of building materials and medieval works of art, research of baroque musical culture, and scientific literary themes).

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In 2017, institutes from the Section of Applied Physics, Earth Sciences, Chemical Sciences, Biological and Environmental Sciences, Historical Sciences, the Humanities and Philological Sciences of the CAS became involved in regional cooperation.

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Part of the resolution of joint tasks is a regular annual meeting, which is held alternately in Prague and Brno, in the presence of representatives of the CAS and representatives of regions of the Czech Republic.

Meetings serve as an informational, inspirational and discussion platform for researchers and representatives of regional and local self-governments. For the presentation and evaluation of the results of the grant provided for regional cooperation in 2017, to be held in Prague on 11 April 2018, the Committee for Regional Cooperation selected five out of 18 jointly submitted projects:

1. Opening and access to Goethe's Gallery in the volcano of Komorní Hůrka, Institute of Geophysics, the town of Františkovy Lázně and the Sokolov Museum
2. Provenience of decorative stone and raw lime binder material, Institute of Theoretical and Applied Mechanics and the Vysočina Region
3. Monitoring the influence of large herbivores on selected groups of organisms in the SAC Milovice-Mladá, Česká krajina o.p.s.
4. Early Neolithic Fencing in Bohemia. Trubin, District Of Beroun, Institute of Archaeological Heritage Care of Central Bohemia, p. o.
5. Petr Bezruč 150, Institute of Czech Literature, the Silesian Museum - Petr Bezruč Memorial.



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Educational Activity

Education of a young generation of scientists and quality improvement of the national education system at all levels are considered to be a crucial part of the mission of the CAS. Cooperation with universities stands at the centre of attention, particularly the doctoral study programmes.

However, employees of the CAS also directly teach or supervise university students and manage variety of educational activities aimed at secondary school students and teachers.

An amendment to Act No 111/1998 Coll., on Higher Education Institutions requires doctoral programmes which are implemented by individual institutions in cooperation with universities to be newly accredited by the National Accreditation Bureau. A mandatory part of applications for accreditation are cooperation agreements in the implementation of doctoral programs between the Czech Academy of Sciences and the relevant university. The Academy Council of the CAS has drawn up a model of such an agreement and is gradually negotiating with the competent officials of individual universities on a specific wording. Agreements have already been signed with five universities and negotiations with others are being conducted correctly and in mutual trust. In cooperation with the Division for Administration of the Head Office of the Czech Academy of Sciences, a “partial” agreement is also being prepared. This will be entered into by institutes of the Czech Academy of Sciences and university faculties which are applying for accreditation of a study programme.

Mutual relationships 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 one of the advisory bodies for the management of the CAS. Members come from different institutes to ensure representation of various scientific disciplines. The Chair of the Council for Cooperation with Higher Education Institutions regularly appears as guest

at board meetings as well at assemblies of the Council of Higher Education Institutions, while, in return, the newly elected Chair of the Higher Education Council will send a representative of the RVŠ as an external member of the Council for Cooperation with Higher Education Institutions.

The institutes and researchers of the CAS participate extensively in the education of students at both public and private universities. Last year, a total of 4,891 semestral courses of lectures, seminars or practical exercises or seminars were provided in a total amount of 76,127 hours. Institutes of the CAS contribute significantly to the education of students and to the management of students’ qualification work. In 2017, employees of institutes of the CAS trained 2,175 doctoral students and also participated in the management of bachelor and master programme students. Last year, 260 students trained at institutes of the CAS successfully completed doctoral study programmes.

For many years, the CAS has supported the general education of students of doctoral study programmes by organising a successful and sought-after weekly course on the basics of scientific work, which is intended for students of doctoral study programmes in various fields and whose aim is to cultivate the necessary skills in students to cope with challenging international competition. Courses are held in Prague and in Brno, with 266 students attending courses in 2017. The lectur-



ers are renowned and experienced specialists, mainly from the employees of the CAS, and the subjects of lectures are chosen so as to be useful for doctoral students of all disciplines. In 2017, the main subjects included science methodology, creativity of scientific thinking, ethical principles in scientific work, workloads and the role of stress, evaluation of scientific work, scientific communication and its written genres, presentation of scientific results, scientific writing techniques, rhetoric and the culture of the spoken word, lecturing skills, information resources for science, research and education, internet safety, research funding, targeted funding, the grant system in the EU, intellectual property and its commercialisation, English writing course, training in English conversation, and more.

Table No 9: Overview of the most significant activities of collaboration with universities

	2011	2012	2013	2014	2015	2016	2017
Doctoral students trained at the institutes	2,182	2,064	2,063	2,030	2,091	2,019	2,175
Newly accepted doctoral students	381	386	397	315	376	348	323
Number of doctoral dissertations completed	254	258	224	268	264	263	260
Number of semestral cycles of lectures, seminars and exercises	3,853	3,722	4,034	4,017	4,236	5,430	4,891
Number of hours lectured	80,600	76,939	74,198	74,747	76,154	75,262	76,127

Project Open Science



The Czech Academy of Sciences offers students of secondary, higher vocational and higher education institutions the opportunity to participate in scientific work in the form of a one-year placement at one of the institutes of the CAS. Student science placements as part of the Open Science project have been running since 2005, and the Czech Academy of Sciences fully finances them. In 2017, a total of 100 placements were implemented in 37 institutes, though the number of candidates exceeded this number almost tenfold. Since 2016, as well as natural sciences and technical disciplines, the humanities and social



sciences have also been incorporated. In the database of placements from which students could choose, more than 200 topics from the most various scientific disciplines were registered: biology, chemistry, physics, geology, ecology, technology, IT, geography, medical science, psychology, economics, history, philology, philosophy, law, art history, chemical technology, biophysics, astronomy and others. Courses were held in Czech and English under the guidance of experienced scientific researchers up until December. Thanks to the project, students had the opportunity to participate in various national and interna-

tional competitions, trade fairs and conferences, and have also achieved a high level of success in admission examinations at universities both at home and abroad. Many of them continue their research activities at the institutes of the CAS after completing their placements. The very best of these also enjoy success outside of the CAS. For example, fifteen-year-old Filip Novotný, a participant of Open Science in 2017, won a prestigious scholarship at Princeton University. The winner of this year's EXPO SCIENCE AMAVET secondary school science and technology project competition was former trainee Karina Movsesian from the First Czech Grammar School in Karlovy Vary, and in 2018, she will represent the Czech Republic at the most prestigious student competition INTEL ISEF in the United States and at the Beijing Youth Science Creation Competition in China.

Activities at Secondary and Primary Schools

The CAS also participates in educational activities at secondary and primary schools, by way of teaching and delivering a variety of lectures. An important role in these activities is played by the project "Don't Be Afraid of Science!", a cycle of lectures given by the Czech Academy of Sciences to both students and secondary school teachers. It focuses on topics close to school subjects, mostly about biology, physics, chemistry, mathematics, geography and social sciences. As part of the Open Science project, the Czech Academy of Sciences is also devoted to the education of educators of sciences and humanities, especially chemistry, physics, biology and Czech language and literature.





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Media Communications

and Promotion

Continuous, regular and systematic popularisation of the results of science and research through all forms of communication among the widest public is an inherent part of the activities of the CAS. Employees of the CAS strive to bring science closer to non-professionals, to present their specific research activities as well as the institutes. They make an effort to raise interest in scientific work not only among the general public and students, but also in very young children.

Czech Academy of Sciences – Media Partner

Representatives from the Academy of Sciences have talked to the media about basic and applied research, funding and evaluation of science and research, the sustainability of scientific centres, Strategy AV21 and the state of the environment, as well as acquainting them with their own scientific achievements. They have appeared on radio stations, public service television and private television channels, published their own work or commented on individual events in print and internet media, provided interviews, etc.

In 2017, more than 28,016 posts featuring the slogan of the CAS, its forms and other selected keywords relating to the Czech Academy of Sciences were published in the printed media, on the internet and in other media. The key word “CAS” itself (and its forms) appeared more than 11,760 times, the name of the President of the CAS, Professor Eva Zažímalová appeared in around 571 articles.

180 pieces of output related to Strategy AV21 show that the media was paying attention in 2017, referring to the President on average 15 times per month. Among other things, the media informed the public that the CAS, in cooperation with the Senate of the Parliament of the Czech Republic, had organised a conference called “Landslides - Underestimated Dangers?”, with the participation of the Institute of Rock Structure and Mechanics and the Institute of State and Law as part of the Strategy AV21 programme “Natural Threats”.

The Autumn School on the Basics of Electron Microscopy, organised by the CAS in Brno, also proved attractive to the media, with the Institute of Scientific Instruments and the Institute of Physics of Materials and Brno-based electron microscope manufacturers organising it as part of Strategy AV21.

Another topic discussed in the media was the status of Czech and Slovak scientific journals, as assessed by a new large-scale study called Local Journals in Scopus, published by the think-tank IDEA of the Institute of Economics. The topic was covered by Czech Television (Predatory Magazines Drain Science Funding. A new study has stated that this problem also concerns the Czech Republic), while Martin Srholec of the CERGE-EI Institute and co-author of a study of Predatory Journals in Scopus (Will the New Methodology Break the Tandem of Predatory Scientific Journals and the “Coffee Grinder?”) spoke on the Leonardo Magazine radio programme.

The scope of popularisation activities and media outputs regarding individual institutes is so extensive that only a few examples can be given in the following text.

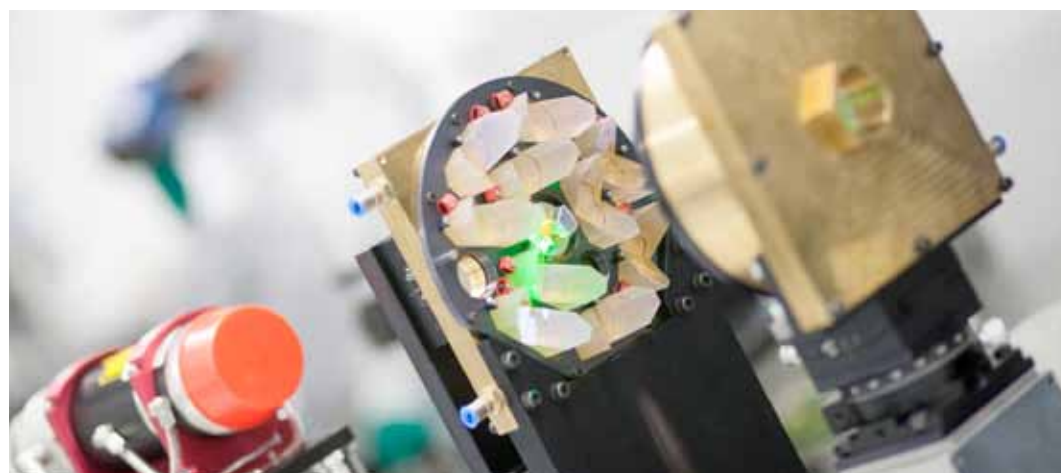
In 2017, the media also turned to employees of the CAS when it required an informed opinion on the sphere of science and research or current events both at home and abroad.

SECTION OF NON-LIFE SCIENCES

One of the most frequently mentioned institute in the media in 2017, with more than 820 appearances, was the **Astronomical Institute**, which, among others, was presented to viewers of Czech Television, when its reporters visited the European Southern Observatory (ESO) with the support of the Czech Academy of Sciences and the expert backing of the Astronomical Institute. In addition to the main programme Hyde Park Civilization shot on location, a total of 14 reports and programmes (some with audiences of around one million viewers) were broadcast.



A total of 464 articles with the keywords **Institute of Physics** show that media professionals have taken an interest in the scientific work of the Institute, such as the success of the HiLASE Laser Centre in Dolní Břežany, where the first experiments with a 1000W laser machine with the distinctive name Bivoj began. In connection with HiLASE (141 articles) and the ELI Beamlines Centre (304 mentions), they also informed the public about the first year of the Talent Academy for gifted secondary school students with an interest in science, and by extension laser physics, with the aim of attracting potential future collaborators.



The Institute of Scientific Instruments (145 appearances) received media attention throughout the year, even through difficult topics such as information on a special programme that can determine the level of problems with synchronization of ventricular contractions (more than 20 outputs) from a patient's ECG record. The scientific team was even awarded the prestigious Clinical Translational Award (CTA) for its work. The media also commemorated the 60th anniversary of the foundation of the institute and reported the death of its founder Professor A. Delong (about 25 times).



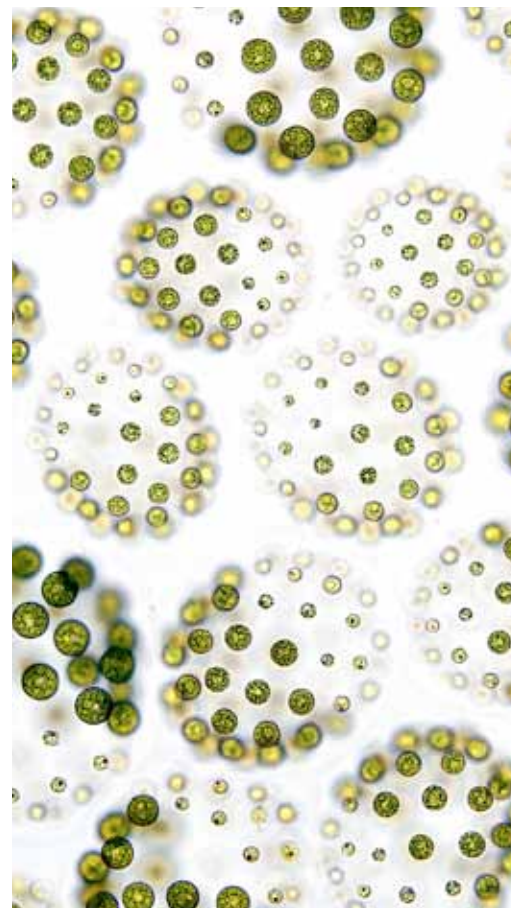
SECTION OF LIFE SCIENCES

The second most frequently mentioned institute of the CAS by the media in 2017, was the **Biology Centre** with over 750 media appearances. The institute combines five originally independent institutes (the Institute of Entomology, Institute of Hydrobiology, Institute of Parasitology, Institute of Molecular Plant Biology and the Institute of Soil Biology). A great media response served, among other things, as a warning to parasitologists against false campaigns of vendors of so-called parasitic medicinal products (more than 40 outputs) or a report on the mapping of significant trees of the "Amazon of Moravia" (more than 30). On the story of how the internationally renowned Director of the Institute of Parasitology Julius Lukeš successfully destroys clichés both in science and in life, Czech Television filmed one of its episodes for the series GEN. Czech Television broadcast a report on unique research into fish behaviour in the South Bohemian Římov Reservoir by scientists from the Institute of Hydrobiology, in its main news programme of the day "Události".

"Události" also broadcast a report on the discovery of antibiotics by a team of microbiologists led by Jiří Janata from the **Institute of Microbiology** and BIOCEV, on which 35 reports were published. The BIOCEV Centre itself has appeared in the media over 200 times.

The **Institute of Biotechnology** has been named over 20 times in connection with the discovery that the new substance MitoTam is very effective against breast cancer cells.

More than a third of the media reports (55) from a total of 150 concerning the **Institute of Experimental Medicine** focused on air pollution and its effects on the health of citizens of the Czech Republic. Czech Television also broadcast a critical report on this in the weekly magazine programme "ČT Reporters".



SECTION OF HUMANITIES AND SOCIAL SCIENCES

In 2017, references to the **Institute of the Czech Language** appeared in the media almost 400 times. The Czech Television series “Souvislosti Jana Pokorného” featured a discussion on the way in which our mother tongue is changing with member of the Academy Council of the CAS and Deputy Director of the Institute, Markéta Pravdová. She also appeared on the programme “Fokus Václava Moravce” (ČT24) and “Breakfast with Nova” (TV Nova) on the occasion of International Mother’s Day on 21 February.



In 2017, the Czech linguistic journal “Our Language” celebrated its hundredth anniversary. The media referred to the anniversary and the conference of the same name around 20 times, quoting the director of the institute Martin Prošek and the editor-in-chief of the journal Markéta Pravdová, who provided an interview for Czech Television (Studio 6) and the Czech Radio programme “Radiožurnál”. Each Friday throughout the year, the newspaper “Lidové noviny” published a column entitled “Language Window” with regular contributors from the Institute of the Czech Language Kamila Smejkalová and Anna Černá.

Members of the **Oriental Institute**, which was named in the media over 110 times, frequently reacted to current political events. On the Czech Television programmes “Studio ČT24” and “Události, komentáře”, Otakar Hulec, for example, commented on the situation in Zimbabwe after the removed Zimba-

bwean Prime Minister became the country’s new president. On “Horizont ČT24”, Ondřej Klimeš spoke on the matter of the 19th Congress of the Communist Party in China. Director of the Oriental Institute, Ondřej Beránek, commented on the war in Yemen for listeners of Český rozhlas Plus.

Members of the **Institute of Philosophy** were introduced to listeners of Český rozhlas, e.g. by way of an interview with Vít Gvoždík on the topic “Top Research in the Public Interest”, specifically on a project with the name “Forms and Functions of Communication”. In the article “Commotion around the 4th Congress of the Czechoslovak Writer’s Union”, on the pages of the journal “Host”, Jan Mervart of the Institute of Philosophy stated that, with fifty years of hindsight, it seems incredible that the occasion of a writer’s congress in the then Czechoslovakia could cause such a stir.



Popularisation of Science

through the Centre of Administration and Operations



The Centre of Administration and Operations has also made a significant contribution to the systematic popularisation of scientific results. Through its Division of External Relations, it provided activities that, in 2017, covered not only current scientific events, but also reminded events with a society-wide reach. The keyword SSČ was cited in the media over 70 times. Thanks to extended **cooperation between the Czech Academy of Sciences and Czech Television**, active collaboration continued with *the Science Editorial Board*, thanks to which the CAS appeared on television in 2017 more than 380 times.

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



The science festival of the CAS **Week of Science and Technology (WST)** came with a new concept for 2017 – it returned to its original duration of one week, was given a new visual style, and changes were made to the programme in the building of the CAS on Národní třída to a form of 5 + 2. Week days were devoted to current themes - foods of the future, super lasers, medicine, nanotechnology, robotics and artificial intelligence. Each theme had its own ambassador – a prominent personality in Czech science – Jaroslav Doležel, Tomáš Mocek, Bedřich Rus, Jan Kopecký, Antonín Fejfar and Jiří Wiedermann. The weekend was dedicated to families with children.



An interesting programme was also prepared by the Moravian institutes of the Czech Academy of Sciences. In Brno, where more than 50 events were held, there was great interest, for example, in a spectacular science show with renowned scientist and science populariser, Michael Londesborough.

Over the course of WST, 48,331 visitors were welcomed to 659 events. All 54 institutes of the CAS and a further 50 partner and collaborating organisations were involved in their implementation. The most attractive festival formats included traditional open days of individual institutes of the CAS and festival partners, panel discussions, a scientific stand-up show and an escape game. A special guest at the festival was Pavel Kacerle – creator of visual effects for films such as Iron Man 3 or Thor.

As in previous years, the photography contest **Photogenic Science** was presented, consisting of photos taken by employees of the Czech Academy of Sciences and its institutes. The results are a representative calendar with selected photos and an exhibition held in various places around the Czech Republic and abroad – e.g. Bratislava or Taiwan. In 2017, a total of 205 photographs by 89 employees from 27 institutes were registered for the contest.

Under the project heading **Spring Excursion to the World of Science 2017**, a total of 21 institutes of the CAS participated in over 40 events held in May and June. Events took place at the institutes and the building on Národní třída in Prague, as well as in locations of partner projects. In all, 10,786 visitors attended the events. Besides the **Open Days** of individual institutes of the CAS, the programmes of some of these were linked with worldwide activities such as a celebration of World Environment Day at the Biology Centre.



The fourth **festival lecture** from the cycle **Czech Academy of Sciences – Top Research in the Public Interest** held on 2 October 2017 at Žofín Palace, concentrated on the field of the humanities and social sciences. The lec-



ture “Right and Ownership in the Tension between Stability and the Variability of Legislation” was presented by Professor Karel Eliáš from the Institute of State and Law.

The third annual **Science Fair of the Czech Academy of Sciences** ran for three days, with 80 exhibitors involved and over 17,000 visitors in attendance. The largest popular and educational event of its kind in the Czech Republic was held between 8 and 10 June 2017 at the PVA EXPO Exhibition Centre in the Prague district of Letňany, where the results of the work of the Czech scientific elite, not only from the Czech Academy of Sciences, but also from universities, companies and science centres was on display.

Secondary school and university students who are interested in science and research have the chance to participate in science study visits at leading research institutes of the Czech Academy of Sciences, where they take part in science activities under the guidance of experienced specialists, thanks to the **Open Science** programme. In 2017, 100 scientific study visits took place. At 37 institutes of the CAS located across the Czech Republic, 100 students worked on their selected scientific subjects from the fields of natural and technical sciences, and the humanities.

The Summer Science Camp for Teachers of Primary and Secondary Schools, which was being held for the fourth time, is a part of the Open Science project of the Czech Academy of Sciences. Teachers tried their hand at practical exercises and experiments which they can later use in school lessons. As part of the Open Science project, the Czech Academy of Sciences is also devoted to the education of educators of disciplines in natural and technical sciences, as well as in the humanities (**School of Czech Language and Literature**).

The Exhibition of Czech Scientists was launched on 10 October 2017 in a vernis-



sage at the Embassy of the Czech Republic in Washington, D.C. as part of the Mutual Inspirations Festival 2017. Popularisation exhibitions of personalities of Czech science were created as part of the Open Science project of the Czech Academy of Sciences.

In 2017, four issues of the journal **A / Science and Research** were published. The first issue focused on artificial replacements of the future, the main topic of the second issue was drought, the third issue was devoted to microscopy, and the fourth to the phenomenon known as the Star of Bethlehem. The magazine is published in 2,700 to 3,000 copies.

Alongside magazine “A”, the CAS also issues a popularising magazine aimed primarily at school pupils and students and members of the public who visit popularising events of the CAS, such as the Science Fair and the Week of Science and Technology. In May it was published under the title **ABC / Science for All**, and in November it was renamed as **AΩ / Science for All**. The magazine is published in 10,000 copies. In the autumn of 2017, the Yearbook of the Czech Academy of Sciences 2016–2017, the last in its current form, was published in a total of 600 copies. Towards the end of the year, an exclusive promotional material complementing Strategy AV21 brochure entitled “Interviews with Strategy AV21 Coordinators” was introduced. Events at the CAS are also popularised through social networks (Facebook, Twitter and Instagram) and the CAS website. A photo gallery of the CAS is available at www.zonerama.com/AVCR.

Through the production of documentary films, the Czech Academy of Sciences has successfully presented itself at both a national and international level. Projections have been prepared in various cities of the Czech Republic, accompanying scientific discussions for the public. Dozens of reports have been produced on the work of Czech scientists and personalities of Czech science have been presented - both on the social networks of the CAS and in the original Czech science monthly TV magazine show, the Journal of the Czech Academy of Sciences. It is watched by viewers on four television channels with a daily audience of over 200,000 households. The overall audience of TV reports, Facebook, and YouTube coverage exceeds 100,000 viewers.

A unique presentation of scientific research and projects is displayed at an **exhibition** in the Prague **Gallery of Science and Art** in the building at Národní třída 3.



The exhibition programme of the gallery builds on the tradition of scientific exhibitions which educate the public in the form of professionally prepared installations with research topics of individual institutes, interdisciplinary teams and their domestic and foreign partners.

In 2017, the gallery presented five themes:

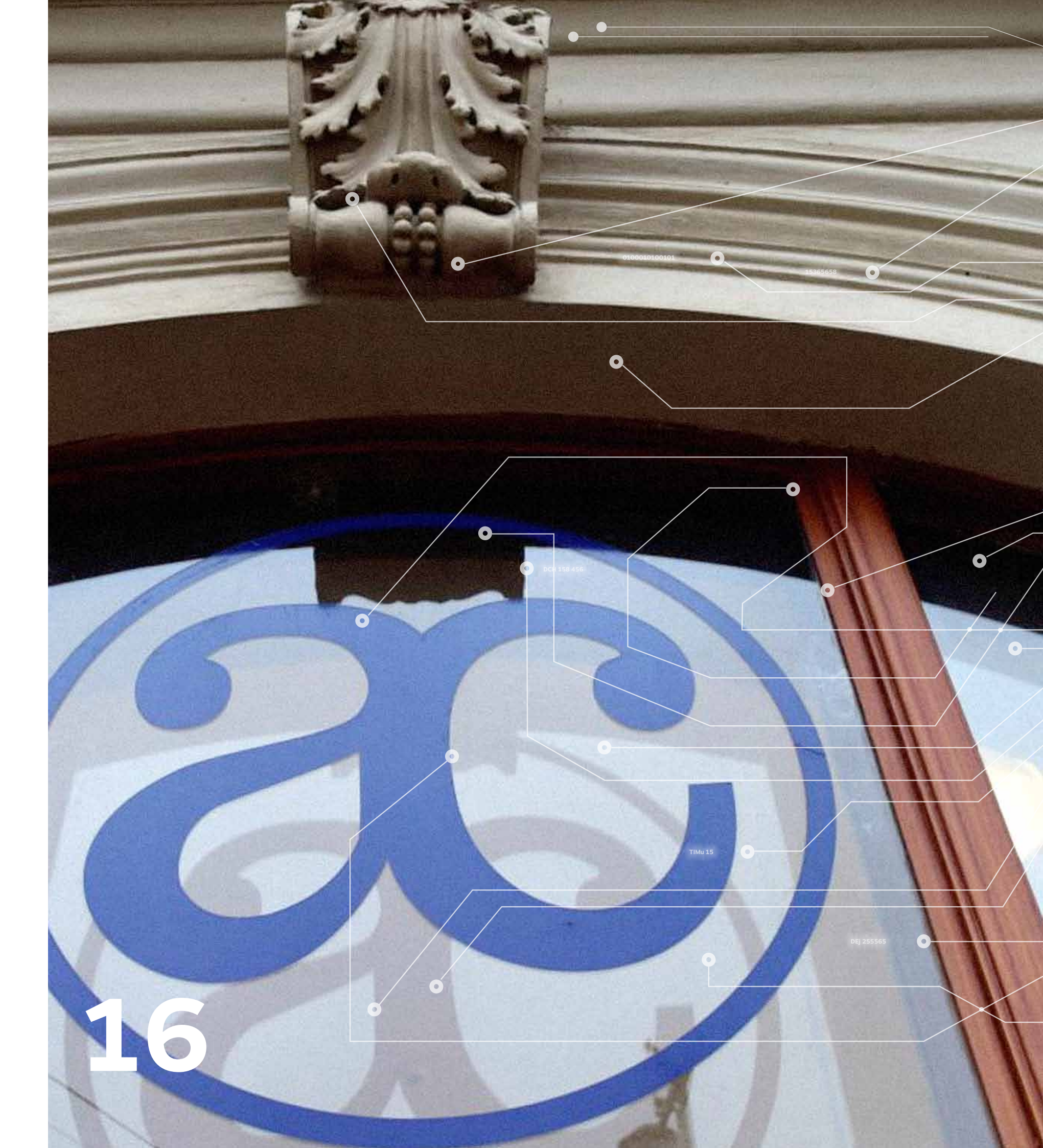
- **Josef Sudek in the Studios of Fine Artists** (7 December 2016 – 27 January 2017, Institute of Art History)
- **The Threatened Architecture of the City of Mosul** (8 February – 31 March 2017, Oriental Institute) – the exhibition was presented at the Academia Sinica Library in Taipei, Taiwan
- **AD INFINITUM** (Astronomical Institute)

- **The Invisible Bridge. Milada Blekastodová (1917–2003)** (6 September – 25 October 2017, Institute of Philosophy and Elg, z. s.)
- **Tools of Knowledge – KUK** (29 November 2017 – 31 January 2018, Institute of Scientific Instruments) – the theme of the exhibition was an excursion from the macrocosm to the microcosm

Together with the programme of the Library of the Czech Academy of Sciences and the institutes of the CAS at the building at Národní třída 3, exhibitions at the Gallery of Science and Art were part of Prague Museum Night. The exhibition programme also included an interactive installation prepared for WST.







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Publishing Activity

The Czech Academy of Sciences supports the publication of selected scientific and scholarly publications from all disciplines, both at the Academia Publishing House, which is part of the Centre of Administration and Operations, and at other institutes of the CAS.

In 2017, the CAS invested CZK 9 million in support for a total of 58 titles (of which 38 grants were allocated to the Academia Publishing House and 20 grants to other institutes of the CAS).

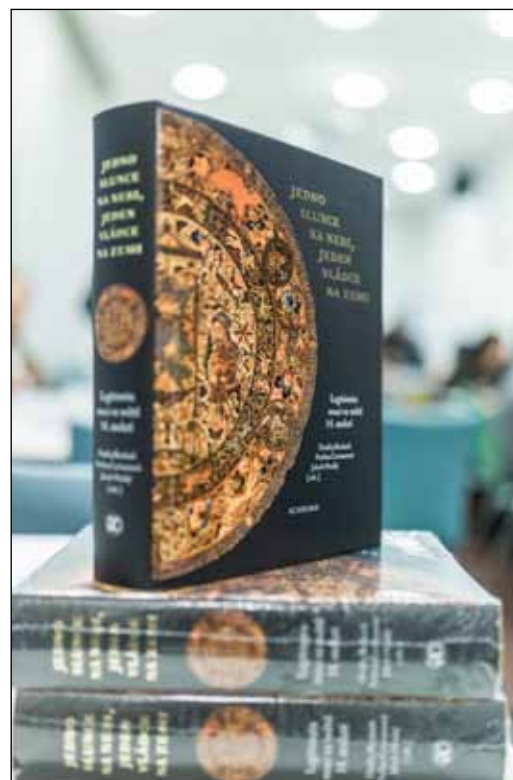
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Through its publishing activities, the Academia Publishing House takes a leading place among Publishers in the Czech Republic.

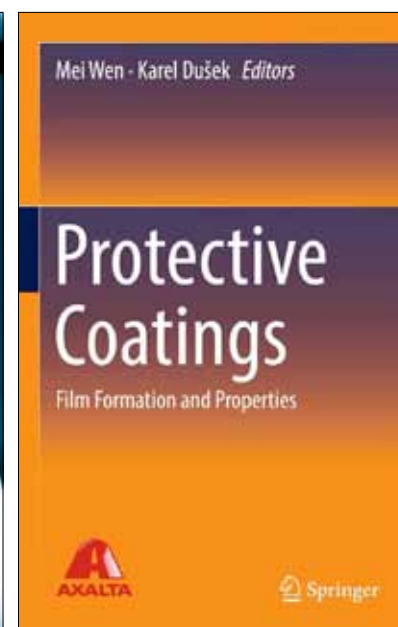
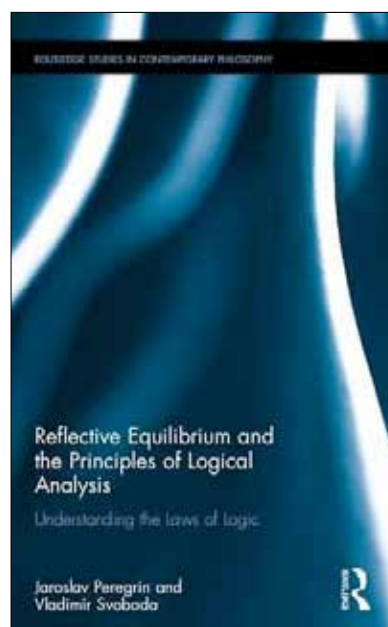
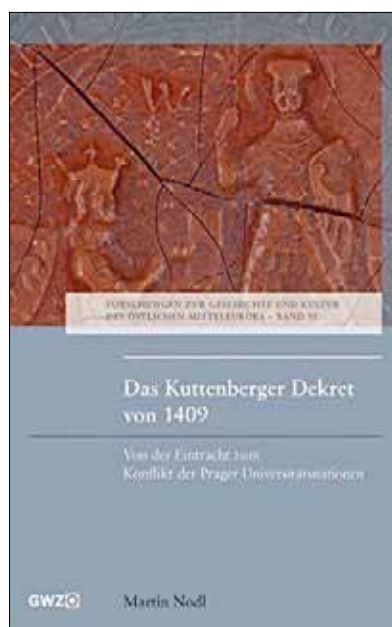
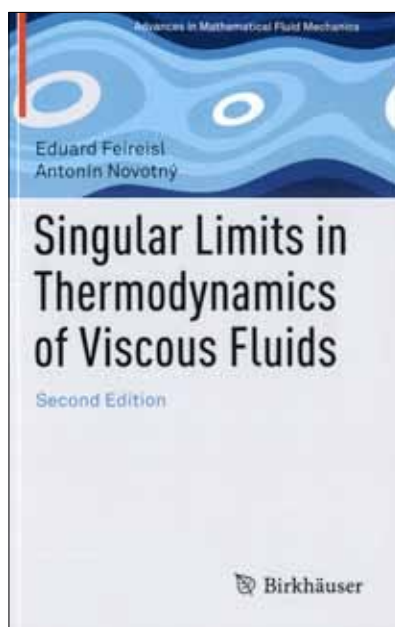
Academia publishes original scientific monographs and works of Czech scientists, classic scientific works, translations of foreign authors, popular-educational literature, factual books, encyclopaedias, dictionaries, language textbooks, manuals and university textbooks, popular-educational magazine “Živa”, and high-quality Czech and translated fiction. In 2017, the Academia Publishing House published a total of 100 book titles.

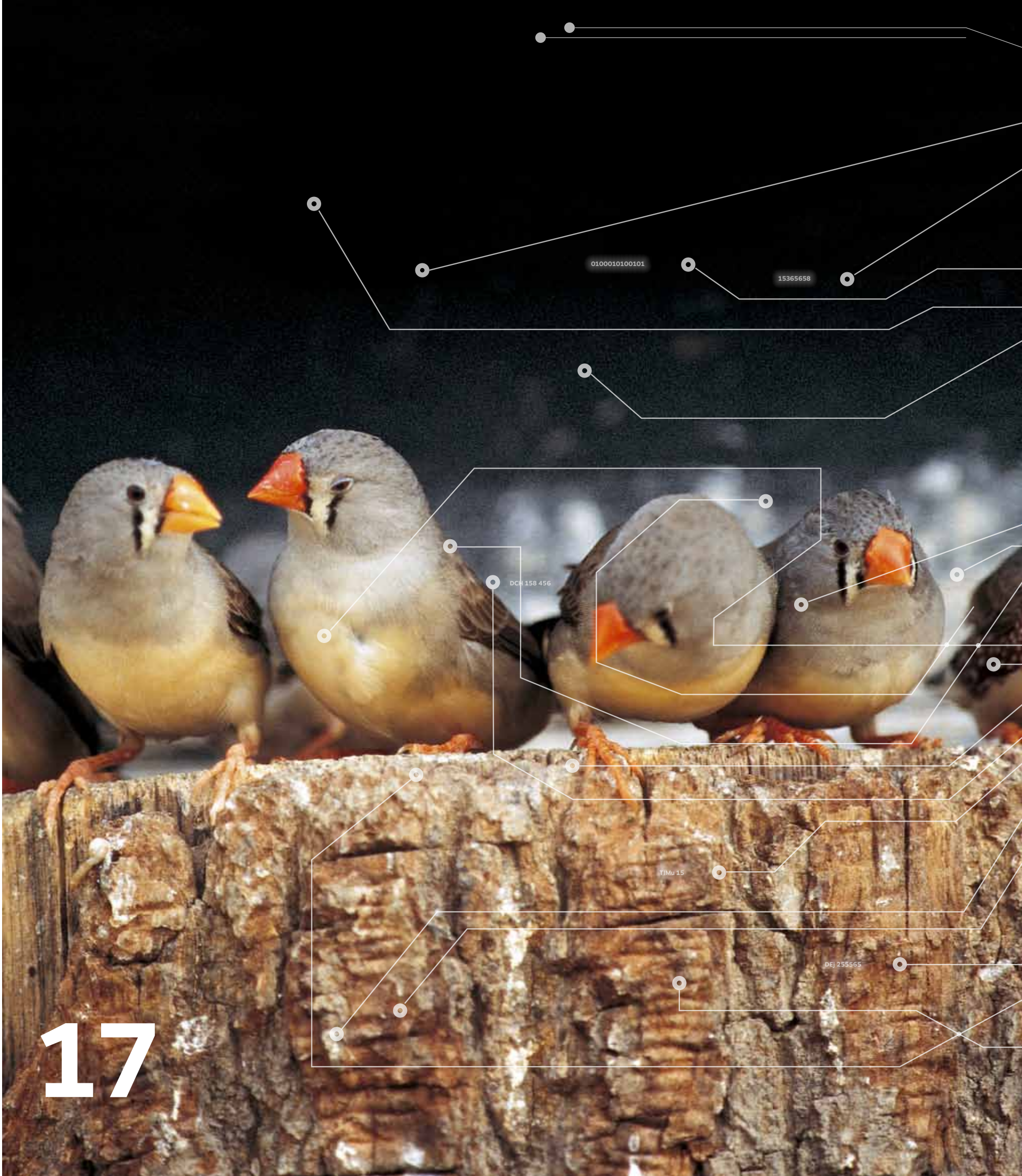


Among significant achievements of the Academia Publishing House, supported by the Editorial Board of the CAS, for the year 2017, we can identify *Liber Viaticus of John of Neumarkt* and two volumes of *Artistic Sights of Prague. Great Prague. M–F*. From the monographs for Strategy AV21, we should mention the publication of A. Doležal “*Euthanasia and Decisions at the End of Life*” for the year 2017. “*Legal aspects*”, a publication of editors M. Linková and N. Straková “*Housing Revolt: How Women Did Dissent*” and the monumental publication of editors O. Beránek, P. Cermanová and J. Hrubý “*One Sun in the Sky, One Ruler on Earth*”. In 2017, the Academia Publishing House also printed nine brochures of the Editorial Series “*Strategy AV21*” and 20 brochures of the Editorial Series “*Science around Us*”.



The book titles of scientists from the CAS are not only published at the institutes of the Czech Academy of Sciences, the Academia Publishing House and other publishing houses of Czech origin, but also at prestigious international publishing houses and publishers. In 2017, members of the CAS authored or co-authored 32 book titles published abroad. A good example is the publication of E. Feireisl and A. Novotný *Singular Limits in Thermodynamics of Viscous Fluids 2*. (Cham: Birkhäuser, Advances in Mathematical Fluid Mechanics), the publication of editors M. Wen and K. Dušek *Protective Coatings. Film Formation and Properties* (Cham: Springer International Publishing AG), the publication of J. Peregrin and V. Svoboda *Reflective Equilibrium and the Principles of Logical Analysis. Understanding the Laws of Logic* (New York: Routledge, Routledge Studies in Contemporary Philosophy) or the monograph of M. Nodl *Das Kuttenberger Dekret von 1409. Von der Eintracht zum Konflikt der Prager Universitätsnationen* (Cologne: Bohlau, Forschungen zur Geschichte und Kultur des östlichen Mitteleuropa, 51).







Cooperation

with Scientific Societies

The Czech Academy of Sciences has long supported the activities of scientific societies operating in the Czech Republic. These are the only institutions that bring together experts from universities, the Czech Academy of Sciences and departmental research institutes, and are also a significant link between the professional public and international scientific societies. Members of these scientific societies are renowned experts from scientific and scientific-educational fields, economic and political representatives, students, and other individuals interested in the relevant scientific disciplines.

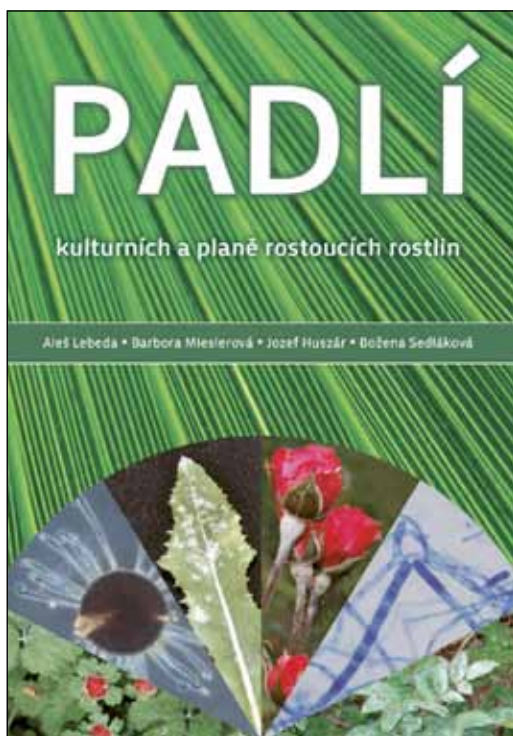
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At present, 81 scientific societies operating in the Czech Republic are associated with the **Council of Scientific Societies of the Czech Republic.**

Scientific societies show respectable annual statistics. The following have been selected at random: 396 scientific conferences and meetings (of which 227 international), 77 international and national professional periodicals (excluding internet publications), 751 events for schools of all levels or 661 individual lectures. They publish international impact journals (*Preslia* – the Czech Botanical Society – IF 3.00; *Fottea* – Czech Phycological Society – IF 1.35) and other specialist journals in Czech. This is similar with conferences: in addition to numerous international

conferences, such as the *13th International Conference on Polysaccharides – Glycoscience* (Czech Chemical Society); *XVII. International congress of AIFREF: Quality of life of the child today* (Czech-Moravian Psychological Society), a series of national or Czech-Slovak meetings have been organised, such as *In Movement: Migration, Mobility and Transport from the Perspective of Ethnology* (Czech Ethnographic Society) or *Rural Landscape 2017* (Czech Society for Landscape Ecology) with hundreds of participants. Numerous events for universities and doctoral students complement the ant-like organisational and professional work at secondary school Olympiads where the leaving certificate belongs mainly to scientific societies (Unity of Czech Mathematicians and Physicists, Czech Chemical Society). In annual reports, we can also find specific results, such as monographs (e.g. *Lebeda et al. Mildew on Cultivated Plants and Plants Growing on Plains* – Czech Society for Plant Pathology) or exhibitions, such as *Africa of Dreams and Realities After the 1970s* (Czech Geographical Society), which was held in reminiscence of the famous expedition of Hanzelka and Zikmund in Prague and Addis Ababa.

The Czech Astronomical Society was extremely active in 2017, as it celebrated the 100th anniversary of its foundation in Karolinum to the day and held hundreds of small events throughout the year.



The Learned Society of the Czech Republic unites prominent scientists from all disciplines. A prerequisite for membership is a significant and creative contribution to science and moral integrity. Regular fellows of the society are elected by outstanding local scientific figures from universities, the Czech Academy of Sciences and departmental institutes. Other categories include foreign fellows, elected from the ranks of significant foreign researchers who have extraordinary links to the Czech scientific community. The society has 96 regular fellows, 50 foreign fellows and 14 emeritus fellows.

The aim of the Learned Society is to encourage free cultivation of science, to foster the desire for knowledge and joy therefrom, to disseminate scientific knowledge to the members of the public, and to promote creative and rational social environment in the Czech Republic.



The society pursues rich lecturing activity on current scientific issues (e.g. *Genetics and the Origin of Biological Species*, *The Rise of Christianity into the Wide World* or *Czech Footprints in the Canadian Arctic*) and professional excursions (autumn 2017 – *Táborsko and Třeboňsko*). It organises a competition for secondary school students and awards prizes to outstanding scientists and secondary school teachers. It also awards educational workers for the promotion of interest in science and research at secondary schools, the creation of conditions for the individual activities of their students, and for the outstanding work of students in competitions (*Award of the Learned Society of the Czech Republic and the Neuron Fund*). Its highest award is the Medal of the Czech Learned Society for outstanding contributions to the advancement of science. The Society also represents the Czech scientific community at meetings with representatives of foreign learned societies and scientific institutes.



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Awards Granted

by the CAS

The Czech Academy of Sciences annually awards a number of special prizes to leading personalities for exceptional research results focusing on social priorities that helped strengthen the prestige of Czech science on an international scale and that were first published or implemented no more than five years ago.

The Award of the Czech Academy of Sciences for Outstanding Results of Great Scientific Significance, which was awarded in 2017 to authorial **teams of the Institutes of Physics and Physiology and an employee of the Biology Centre**.

More detailed information can be found in the chapter “Support of Excellence”.

The Award of the Czech Academy of Sciences for Young Scientific Employees for Outstanding Results of Scientific Work Achieved before Reaching the Age of 35 awarded in 2017 to:

Dr. Rhys Taylor, PhD., nominated by the Astronomical Institute for the scientific result Understanding the Origin of Optically Dark Hydrogen Clouds: Dark Galaxies or Tidal Debris?

RNDr. Filip Kolář, Ph.D., nominated by the institute of Botany for the scientific result Evolutionary Response of Plants to Quaternary Climatic Oscillations

Filip Vostal, Ph.D., nominated by the Institute of Philosophy for the scientific result Accelerating Academia: The Changing Structure of Academic Time

The Award of the President of the CAS for the Promotion or Popularisation of Research, Experimental Development and Innovation awarded in 2017 to:

prof. RNDr. Václav Hořejší, CSc.
Institute of Molecular Genetics

prof. RNDr. Jaroslav Peregrin, CSc., DSc.
Institute of Philosophy

The Award of the President of the CAS and the Neuron Fund for the Popularisation of Science awarded in 2017 to:

RNDr. Martin Ledinský, Ph.D.
Institute of Physics



HONORARY MEDALS AWARDED TO CZECH AND FOREIGN SCIENTISTS IN 2017

Honorary Medal of the CAS “De Scientia et Humanitate Optime Meritis”

prof. Hiroshi Nakatsuji
Director, Quantum Chemistry Research Institute, Kyoto Technoscience Centre, Kyoto, Japan

The Bernard Bolzano Honorary Medal for Merit in the Mathematical Sciences

prof. Samuel R. Buss
Department of Mathematics, University of California, San Diego, USA

prof. RNDr. Eduard Feireisl, DrSc.
Institute of Mathematics

The Ernst Mach Honorary Medal for Merit in the Physical Sciences

prof. RNDr. Marian Karlický, DrSc.
Astronomical Institute

prof. Jean-Luc Martin
École Polytechnique Fédérale, Lausanne, Switzerland

The František Pošepný Honorary Medal for Merit in the Geological Sciences

doc. RNDr. Jozef Michalík, DrSc.
Institute of Earth Sciences, Slovak Academy of Sciences, Bratislava, Slovakia

The František Křížík Honorary Medal for Merit in the Technical Sciences and Implementation of Results of Scientific Research

Ing. Josef Haláček, CSc.
Institute of Scientific Instruments

The Jaroslav Heyrovský Honorary Medal for Merit in the Chemical Sciences

prof. Joseph Wang, D.Sc., dr. h. c.
Department of NanoEngineering
University of California, San Diego, USA

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

prof. RNDr. František Krahulec, CSc.
Institute of Botany

prof. Roger Laurence Kitching, D.Sc.
Environmental Futures Research Institute and Griffith School of the Environment, Griffith University, Nathan, Brisbane, Australia

The Josef Dobrovský Honorary Medal for Merit in the Philological and Philosophical Sciences

Univ.-Prof. Mag. Dr. Stefan Michael Newerkla Institut für Slawistik Universität Wien, Austria

The Honorary Medal for Merit at the Czech Academy of Sciences

Ing. Petr Bobák, CSc.
Institute of Animal Physiology and Genetics

LETTER OF THANKS

for long-lasting work at the CAS was received from the hands of the President of the CAS Eva Zažímalová by 16 workers from eight institutes of the CAS

MAJOR AWARDS GRANTED TO WORKERS OF THE CAS BY INSTITUTES OUTSIDE THE CAS

The National Prize of the Government of the Czech Republic “The Czech Brain”

for life-long contribution was awarded to:

prof. PhDr. Petr Sommer, DSc.
Institute of Philosophy

A state honour – State Medal of Merit of the 1st grade in the Field of Science and Education

was received from the President of the Czech Republic by:

prof. Ing. Jaroslav Šesták, DrSc., dr. h. c.
Institute of Physics

A Commemorative Silver Medal of the Senate of the Parliament of the Czech Republic for 2017 for outstanding scientific and educational work was received by:

prof. PhDr. Petr Čornej, DrSc.
Institute of History and Institute of the Czech Language

The Hlávka Medal for Life-Long Contribution to Science was received from the Fund of Josef, Marie and Zdenka Hlávka by:

prof. RNDr. Helena Illnerová, DrSc.
Institute of Physiology

The František Běhounek Award, which the Ministry of Education, Youth and Sport of the Czech Republic awards each year, was received by:

prof. RNDr. Ladislav Kavan, CSc., DSc.
J. Heyrovský Institute of Physical Chemistry for the promotion and popularisation of Czech science and spreading the good reputation of the Czech Republic in the European research environment

Award of the Ministry of Culture of the Czech Republic for a life-long unique combination of scientific, educational, popularising and creative work in the field of traditional folk culture was received by:

doc. PhDr. Lubomír Tyllner, CSc.
Institute of Ethnology

The Neuron Award

for contribution to global science was received by:

prof. RNDr. Emil Paleček, DrSc.
Institute of Biophysics for research activities in the field of electrochemistry

prof. PhDr. František Šmahel, DrSc., dr. h. c. mult.
Institute of Philosophy for research activities in the field of social sciences

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 2017

a) Number of submitted requests for information	6
Number of issued decisions to reject a request	0
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

List of Abbreviations Used

CAS	Czech Academy of Sciences
ČVUT	Czech Technical University in Prague
ERC	European Research Council
EU	European Union
GAČR	Czech Science Foundation (Grant Agency of the Czech Republic)
HOC	Head Office of the CAS
MŠMT	Ministry of Education, Youth and Sport of the Czech Republic
TAČR	Technological Agency of the Czech Republic
UK	Charles University
R&D	Research and Development
R&D&I	Research, Experimental Development and Innovation
VŠ	University

The names of the institutes of the CAS appear in abbreviated form.





**Czech Academy
of Sciences**

The Czech Academy of Sciences (CAS) was established by Act No 283/1992 Coll.

The CAS carries out research through its institutes which are established as public research institutions. Over 8,000 workers are employed by the CAS, more than half of which are researchers with a university education.

The primary mission of the CAS and its institutes is to carry out research in a wide range 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 respecting the current needs of Czech society and respecting Czech culture.

The institutes of the CAS participate in education, primarily by educating young researchers through the implementation of doctoral study programmes, as well as through the pedagogical activities of their researchers at universities.

The CAS also develops cooperation with applied research and industry. A range of joint international projects and exchanges of research scientists, with partner institutions abroad reinforce the integration of Czech science into the international framework.



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March 2018