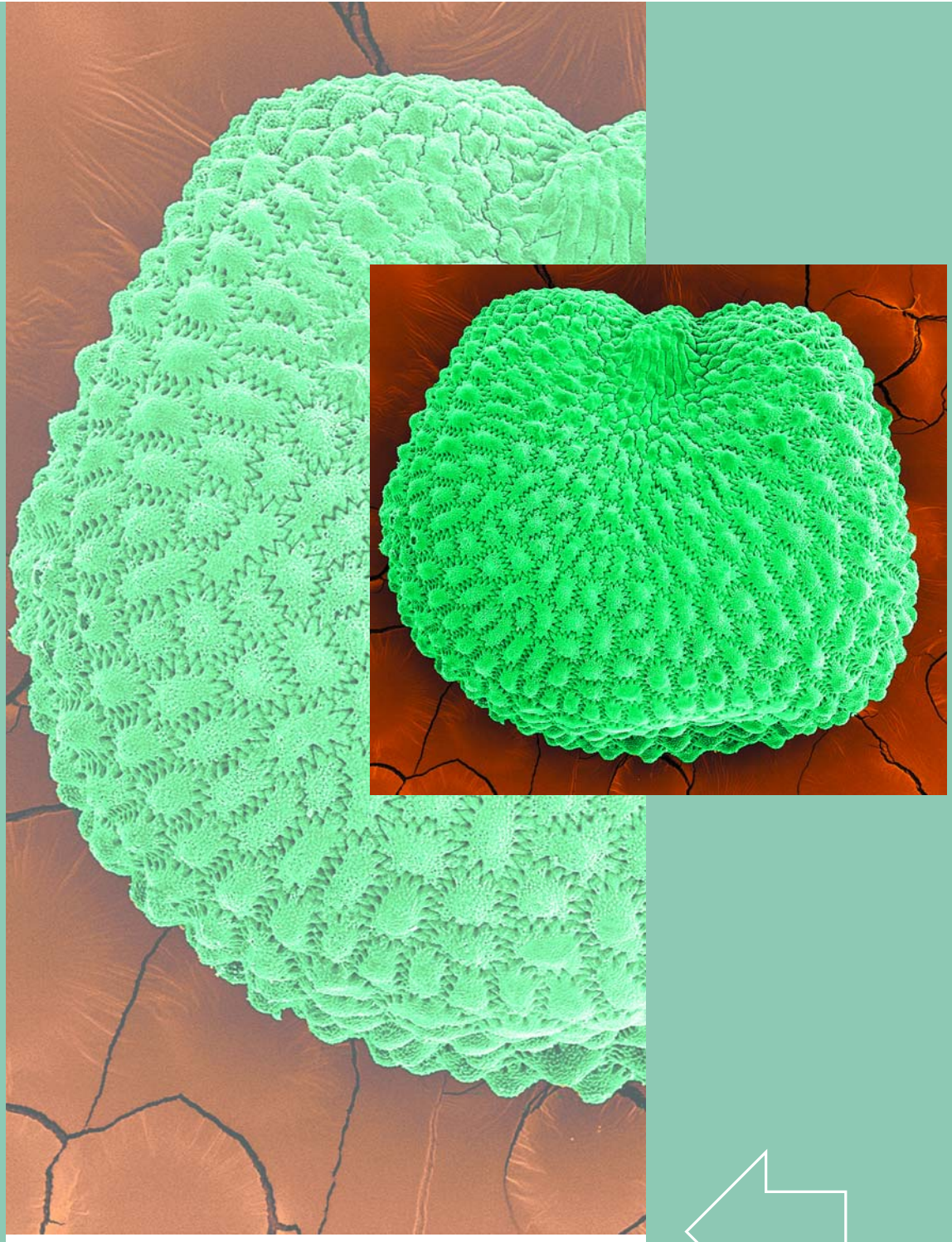
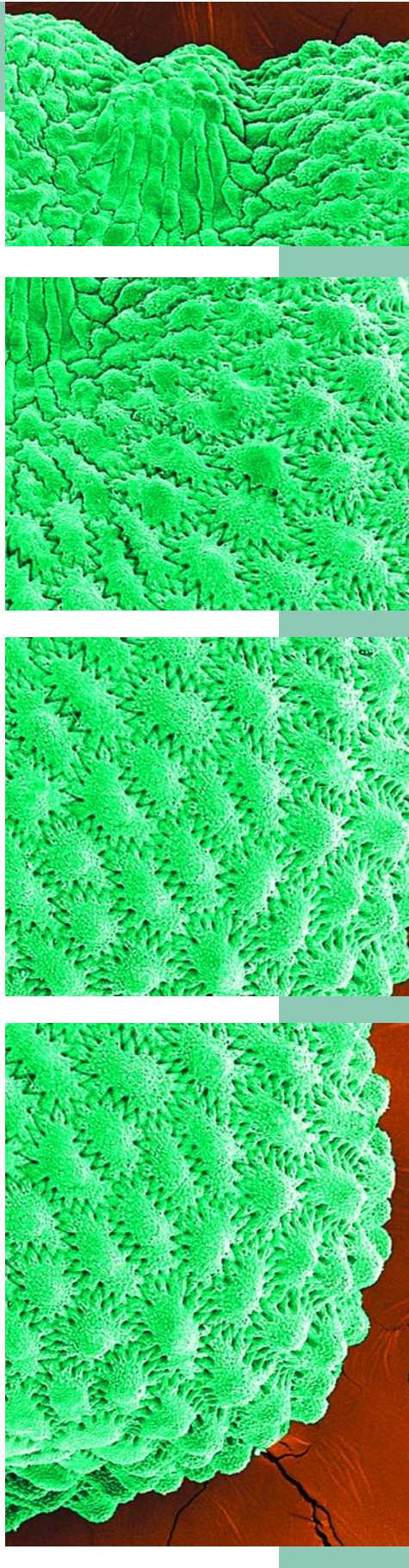


THE ACADEMY
OF SCIENCES
OF THE CZECH
REPUBLIC

Photo on front page:
Capsule. 1st prize of the
photographic competition
'Plant with a story,
scientist category
(foto by Viktor Sýkora)



FOREWORD BY THE PRESIDENT

Dear Readers,

Last year saw the complete stabilisation of activity at the institutes of the Academy of Sciences within the system of public research institutions. This report also presents the first examples of the establishment of joint research centres together with private organisations, which should help make it easier to use the results of research in actual practice, an opportunity to be continued into the future.

We also continued in the preparation of projects to be funded from the budgets of EU structural funds. We consider it most important to use these funds to build-up research infrastructures, and therefore centres of trans-European importance if at all possible, which centre around our major, unique facilities with long-term utility for basic research and application alike. We intend to continue with this in 2009 and beyond.

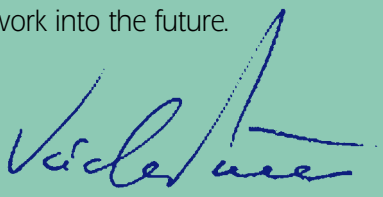
The institutes of the Academy of Sciences were evaluated by independent expert commissions in 2008. These generally confirmed the high standard of scientific work at individual institutes, although in certain cases they did point out weaknesses that should not be found at elite institutions. Even though this evaluation has no effect on the budgets of the institutes themselves, it is a guide to where to concentrate resources so that the evaluation planned for 2011, from which further financing will be derived, does not cause any of our institutes any fundamental problems. Do not forget that the Academy of Sciences can only survive if it maintains the highest standard of scientific excellence, a standard that is measured internationally.

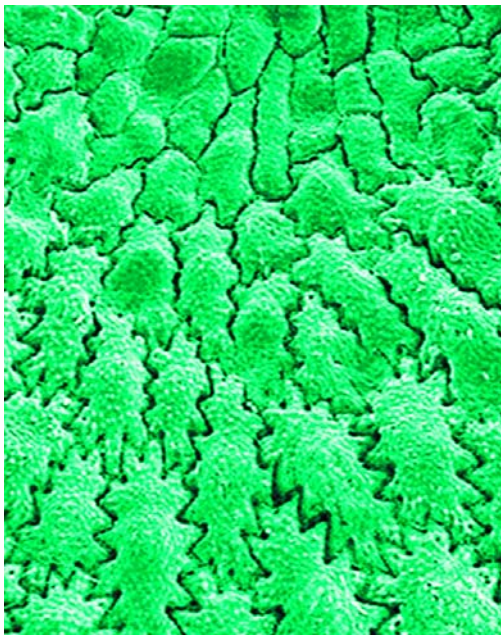
2008 was the year of Josef Hlávka. We took part in a number of commemorative, celebratory, cultural and professional events in tribute to the memory of this Czech luminary.

We also prepared a whole range of events in relation to the Czech Presidency of the Council of the EU in 2009. This began with the declaration of 2009 as the Year of Astronomy and it will continue with professional conferences and conferences on scientific/political subjects.

One important event in 2008 was the eighth 'Science Week', which this year moved into other Czech towns and cities. Around 11,000 people interested in our work visited the institutes of the Academy of Sciences during this particular week. A total of 25,000 visitors took part in the event, mainly young people. I think that this event will be a significant factor in helping improve the age structure at our institutes.

It is for the last time that I write this introduction in my role as President of the Academy of Sciences. My elected term in this position came to the end on 24th March 2009. I wish the newly-elected President and the entire Academy of Sciences great success in their work into the future.





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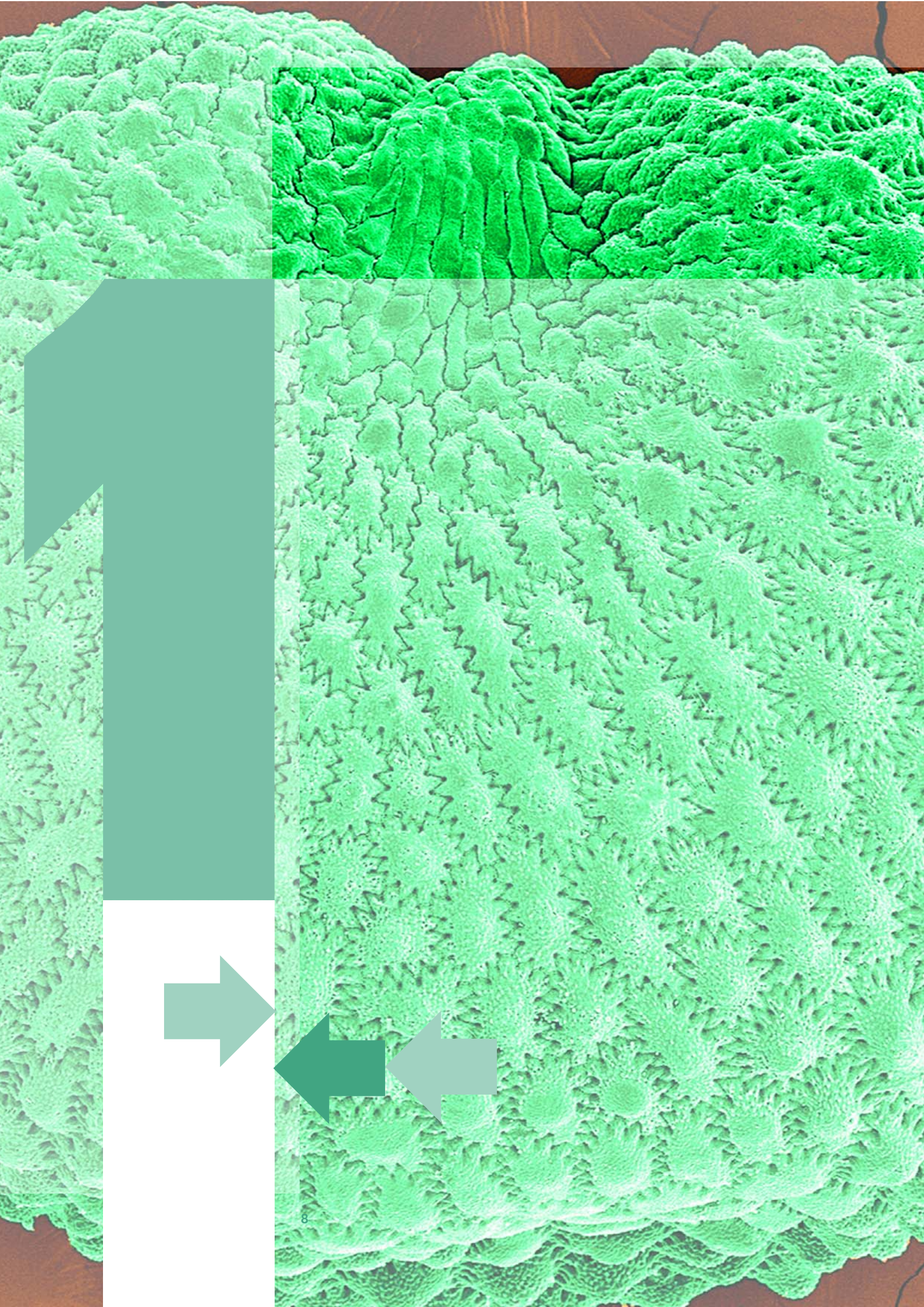


INTRODUCTION

1

For the Academy of Sciences of the Czech Republic (the ASCR), 2008 was its second year of operation in the form of a group of public research institutions and it began to take advantage of the new work and economic possibilities this form allows. It built up a network of external contacts, looked for partners and set up entities allowing research results to be put into use and rewarded for more quickly and more effectively on both a national and international scale.

The *Nuclear Physics Institute* obtained permission to set up the *RadioMedic*, s. r. o. company, the goals of which are to research, manufacture and distribute nuclear pharmacy and nuclear chemistry products and radionuclide emitters. In conjunction with the Catholic University of Leuven and the University of Liege, the *Institute of Organic Chemistry and Biochemistry* formed an offshoot company specialising in the development of antiviral treatments for veterinary purposes.

In December the Institute of *Plasma Physics* successfully ran integral technical tests on igniting a plasma discharge in the Tokamak Compass, which is similar to the already functioning Tokamak INTER at a ratio of 1:10.

Tokamak: the ceremonial inauguration of the tokamak COMPASS took place with the participation of M. Říman, the Minister of Industry and Trade, in the new building of the tokamak COMPASS in Mazanka, the premises of the ACSR in Prague 8, 1st April 2008 (photo by Petr Králík, archive AB).

The *ASCR Institute of Biotechnology, v. v. i.* came into being on January 1st 2008. The President of the ASCR named Ing. Peter Šebo CSc. as its director. Thus in 2008, the ASCR was a body of 53 research institutes and one institute securing research infrastructure, with over 7,500 employees. Information about the structure and activities of the ASCR is publicly available on its website (appendix 1).

The ASCR had to come to terms with a number of losses of colleagues during 2008. In the spring, we lost RNDr. Jiří Velemínský, DrSc. who was without doubt one of our leading scientific personalities, who held numerous important functions in the ASCR after 1989 and made a big impact on the profile of the ASCR.

The main **conceptual issues** which the ASCR was concerned with in 2008 were connected to completing the preparation and first steps towards reforming the system of research, development and innovation, which was approved by Government resolution no. 287 of 26 March 2008. This was mainly concerned with co-operation on the preparation of amendment of Act No. 130/2002 Coll., for the support of research and development from public funds. Although not all suggestions made by the ASCR made it into the final wording, it can be hoped that if it is implemented properly it will certainly advance research and development in the Czech Republic. The ASCR also made pronouncements on other documents related to the implementation of the reform, of which mention should be made, by way of examples: Assessment Methodology of Research and Development in 2008, the Proposal for the Inter-departmental Concept for International Co-operation in Research and Development to 2015, the Proposal for the Inter-departmental Concept of Applied Research and Development of National and Cultural Identity to 2015, and the Inter-departmental Concept of Support for an Enlarged Infrastructure for Research and Development to 2015.

As part of its **scientific organisational measures**, the Academy Assembly adopted new regulations for the university-educated employees of the ASCR. The amendment to the ASCR's internal standards regarding the allocation of ASCR awards involves widening the pool of those proposing candidates. To ensure the orderly operation of the ASCR, the election of the candidate for President of the ASCR for the term 2009 to 2013 took place at December's sitting of the Academy Assembly with the understanding that the newly appointed president would take up his office in March 2009, together with the members of the Academy Council and the Council for Sciences, who will be elected at March's meeting of the Academy Assembly.

The ASCR Council for Sciences accepted two new members elected to the Academy Assembly at the end of 2007. Regular elections of some members of the Grant Agency of the ASCR took place and Prof. Ing. Karel Štulík, DrSc. was appointed as the new Vice-President of the GA of the ASCR in the field of Life and Chemical Sciences. MUDr. M. Kellerová also took a position on the GA of the ASCR Supervisory Board as a representative of the Ministry of Health of the Czech Republic. The Research and Development Council was also required to appoint its representative to the Supervisory Board. The Academy Council appointed new members of the Evaluation Committee for research activities of institutes and its research plans. The ASCR formed an Archaeological Evaluation Committee to provide qualitative checks on performance in the discipline of archaeology.

Jiří Drahoš, Vice-President of the ASCR presenting Jan Ondřej with his certificate as Doctor of Science, May 2008 (photo by Petr Králík, archive AB).

With increased interest in the promotion of **excellence in science**, the scientific degree "Doctor of Science" awarded by the ASCR since 2003 has gained greater importance. The degree is given for indisputable scientific quality. It is not only workers at the ASCR who have expressed interest in obtaining this degree, but also scientists at universities and other research institutions including some from abroad. So far 48 degrees have been awarded. The ASCR has been attempting, so far without success, to get the degree more clearly anchored in national legislation.

Checks and continuous evaluation of results in ASCR research areas in the year 2005–2007 and the results of the scientific and professional activities of its institutions in this three-year period were important. These checks and evaluations, arising from the law on the support of research and development, were carried out by three independent evaluation committees with extensive input from external experts. It was shown that scientific output of the ASCR's institutes as a whole is gradually but continuously increasing. Appendix 2 contains more detailed information. On the basis of this evaluation, the Academy Council approved a continuation of, and thus an increase in, the funding of all current research areas. One distinctive feature of this development is that twenty-two institutes, thanks to their good results, were ranked higher than in the first evaluation three years ago.

The proof of the overall positive development of the **scientific output** of the ASCR institutes can be seen in the publication activities of the ASCR, a summary of which can be found in appendix 3. An analysis of the quantitative output trend shows that the number of articles in magazines with a definite impact factor according to the Thomson Reuters database, contributions to foreign conferences, and chapters in publications is rising. Within the Czech Republic, the ASCR still publishes more than a third of the articles in magazines with impact factor and approximately half of our published work is quoted. The trends in the total number of publications can also be seen in the following summary, although it should be borne in mind that the final number of publications for 2008 will be higher.

Year	*2004*	*2005*	*2006*	*2007*	*2008*	
Czech Republic		**7756**	**8045**	**9083**	**10801**	**10296**
ASCR	**2502**	**2663**	**2880**	**2973**	**2873**	

Basic information **on research at the ASCR and the results** for the individual institutes of the ASCR are contained in chapter 2.

A number of researchers from the ASCR's institutes received **significant accolades and awards**. On the occasion of the public holiday on 28th October 2008, the President of the Czech Republic bestowed the President of the ASCR, prof. RNDr. Václav Pačes, DrSc., with a Medal of Merit to the State in the Field of Science, Second Grade. Prof. Ing. Pavel Hobza, DrSc. from the *Institute of Organic Chemistry and Biochemistry* received the national Česká Hlava Award from the Government of the Czech Republic and MUDr. Radim Šrám, DrSc. from the *Institute of Experimental Medicine* received a special Česká Hlava award bestowed by the VZP health insurance company, plus an award from the Ministry of the Environment of the Czech Republic. Mgr. František Matějka from the *Institute of Scientific Instruments* received the Industry Award and Mgr. Alena Čížková who worked in the *Institute of Physiology* and the *Institute of Molecular Genetics* received the Doctorandus Award. The Interior Ministry of the Czech Republic awarded a Medal of Merit in archival science to Ivan Šťoviček, CSc. from the *Masaryk Institute and Archives*. The Czech Science Foundation Presidential Award was received by RNDr. Petr Baldrian, Ph.D. from the *Institute of Microbiology*. Prof. Ing. František Kaštánek, DrSc. from the *Institute of Chemical Process Fundamentals* and Doc. PhDr. Jiří Pechar from the *Institute of Philosophy* received Josef Hlávka Medals, while Ing. Lukáš Král, Ph.D., from the *Institute of Physics*, Mgr. Jiří Pinkas, Ph.D., from the *J. Heyrovský Institute of*

Physical Chemistry, Mgr. Kamila Réblová, Ph.D., from the *Institute of Biophysics*, MUDr. Jiří Šedý, from the *Institute of Experimental Medicine*, Mgr. Michal Šimůnek from the *Institute of Contemporary History* as well as Bc. Petr Hošek and Ing. Hana Svobodová, who co-operated with the *Institute of Experimental Botany*, received Josef Hlávka Awards for young scientists and students.

The prestigious Spires Memorial Award, administered by the British Royal Society of Chemistry was won by doc. Mgr. Pavel Jungwirth, CSc., from the *Institute of Organic Chemistry and Biochemistry*, while prof. RNDr. Antonín Holý, DrSc. from the same institute was awarded by the University of Minnesota (USA) with the John A. Montgomery Award. Ing. Pavel Hrubeš, Ph.D., from the *Institute of Information Theory and Automation* received an award from the Kurt Gödel Society and the American John Templeton Foundation. Prof. RNDr. Zdeněk Samec, DrSc., from the *J. Heyrovsky Institute of Physical Chemistry* won the Shikata International Medal from the Japanese Polarographic Society, while Prof. Ing. Rudolf Zahradník, DrSc. from the same institute received a Dädalus-Medaille der Studienstiftung des deutschen Volkes. A Distinguished Service Award in Cardiovascular Sciences from the International Academy of Cardiovascular Sciences was received by Prof. RNDr. František Kolář, CSc., and an EBBS 40th Anniversary Award for An Outstanding Contribution in His Early Scientific Career from the European Brain and Behaviour Society was received by RNDr. Aleš Stuchlík, Ph.D., both winners from the *Institute of Physiology*. The Visegrad Forum presented the Young Research Award to PhDr. Michal Kopečka, Ph.D., from the *Institute of Contemporary History*. Doc. Ing. Vladimír Havlíček, Dr. from the *Institute of Microbiology* became a member of the prestigious European Academy of Sciences and Arts. RNDr. Jan Květ, CSc., from the *Institute of Systems Biology and Ecology* was awarded a Ramsar Agreement on the Protection of Wetlands Committee Award in recognition of the contribution he has made to the field in his lifetime work and work within the Ramsar Convention. The Ministry of Foreign Affairs of the Republic of Poland awarded the work of doc. PhDr. Bočislav Borák, CSc., from the *Institute of Contemporary History*, with an Order of Merit. Prof. RNDr. Václav Pačes, DrSc., the President of the ASCR received a Slovak Academy of Sciences Gold Medal and RNDr. Jiří Rákosník, CSc. from the *Institute of Mathematics* received the Jur Hronec Honorary Plaque. At the 33rd Croatian Exhibition of Innovation – INOVA 2008 – the Croatian Association of Inventors

From the left: András Fejérdy (Hungary), Lubica Hermanová (Slovakia), Michal Kopeček (Czech Republic), young scientists who received the Young Scientist Award at the meeting of the academies of the Visegrad Four countries. 21st to 22nd April 2008, Budapest (photo by archive KAV)

awarded a gold medal to Ing. Ivan Wichterle, DrSc. from the *Institute of Chemical Process Fundamentals* for the glass apparatus for the determination of phase equilibria of vapour-liquid-polymer solutions.

It is particularly pleasing to see the number of young scientists awarded various different awards at international science conferences (twenty in 2008)

A summary of ASCR scientific awards which were bestowed by its President on the recommendation of an expert committee in 2008 can be found in appendix 4. The most prestigious of these is the Praemium Academiae, Exceptional Support, which has been awarded since 2007. In June 2008 the ASCR President handed out certificates of thanks for work for the ASCR to thirteen employees from seven ASCR institutes.

Co-operation with universities continued in its successful way. Detailed information is provided in chapter 3 and appendix 5. For example, preparation for the new Institute of Applied Sciences in co-operation with the Czech Technical University in Prague continued. A number of scientific projects were prepared in co-operation with universities for EU Structural Funds operational programmes.

The training of scientists in doctoral study programmes continued at ASCR institutes. To further improve on the quality offered, the ASCR has arranged two further courses on the fundamentals of scientific work in Prague and three in Brno. In connection with this, proposals were made for a project for the Prague Operational Programme – Adaptability, focused on the scientific formation of students of doctoral study programmes.

The ASCR broadened its work with the **business community**. The ASCR set up the Information Centre for Innovation (ICAVI in Czech) as part of *the Centre of Administration and Operations*, which, in co-operation with the Czech Management Association and the Confederation of Industry of the Czech Republic, should facilitate meetings of ASCR employees with representatives of the business sector. The ASCR has participated in the organisation and running of international events run by CzechInvest, the Ministry of Industry and Trade of the Czech Republic, the Ministry of Health of the Czech Republic and the Ministry of Education, Youth and Sports of the Czech Republic.

The *Institute of Macromolecular Chemistry* found its way to the top one hundred companies in the Czech 100 Best 2008 competition. Agreements on partnership and co-operation with municipalities also allow ASCR institutes to strengthen their links with **society and the economy**. In 2008 the ASCR signed contracts with the city of Brno, the South Moravian

Press conference for the handing-in of the preliminary report of the Independent Board for the Assessment of the Long-term Energy Needs of the Czech Republic to Prime Minister M. Topolánek, 4th July 2008 (photo by Petr Králík, archive AB).

Region and the Vysočina Region. The ASCR currently has co-operation agreements in force with three regions. The ASCR President, Prof. Václav Pačes, also headed the governmental independent board for the assessment of energy needs of the Czech Republic. More detailed information on this co-operation is presented in chapter 4.

In the area of **international relations and co-operation** (chapter 5), the ASCR's main priority was assisting the preparation for the Czech Presidency of the EU. The ASCR acceded to the recommendations of its Council for Sciences on the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities and joined the ranks of its signatories. An important first step was made for Czech aerospace when the Czech Republic became a formal member state of the European Space Agency (ESA), initiated by the ASCR, particularly by its *Institute of Astronomy*. Further development of scientific co-operation should facilitate six new agreements with foreign partners. The ASCR continued to work on the creation of research infrastructure as part of the **European Research Area**. Much time was spent

European Commissioner for Science and Research Janez Potocnik visited the Institute of Organic Chemistry and Biochemistry which successfully interconnects basic and applied research for the general public. Seen in the photo with profesor Antonín Holý, 6th November 2008 (photo by Stanislava Kyselová, archive AB).

dealing with the problems related to **structural funds**, particularly preparation for the Operational Programme Research and Development for Innovations (OP RDI). The ASCR also spent much time on issues surrounding the Seventh Framework Programme and the constitution of external agents for the European Research Council (ERC). The ASCR also prepared its own programme of support for projects of international co-operation.

The ASCR provided **targeted support** for research and development on the basis of public tenders by way of the Grant Agency of the ASCR and other separate programmes. The GA of ASCR announced the 19th round of public tendering for standard and junior research grant projects. The ASCR made checks on the implementation of the following project programmes: Information Society, the Support of Targeted Research Projects and Nanotechnologies for the Society, and it approved the distribution of the targeted grants. It made preparations for the new Nanotechnologies for Society II and IT for Research Programmes, transfer of knowledge and innovation, whose implementation will not now be sponsored by the ASCR due to the Government passing of the Reform of the System of Research, Development and Innovation in the Czech Republic act. On the basis the assessment of results, support for internal start-up projects was ended because the aims of this system of support had been achieved. Further information is provided in chapter 6.

The **popularising and publicising of activities** of the ASCR and its institutions made further strides in 2008. This is shown by the fact that the ASCR was deemed to be the best public sector communicating authority in the State Institution category by the EMGC 2008 (European Monitor of Government Communications) carried out by the independent company Westminster. The most important and largest event was, as for previous years, the **Science**

Michael Londesborough: during the Science and Technology Week 2008 Michael Londesborough form the Institute of Inorganic Chemistry presented his 'action' show to students revealing the secret of carbon dioxide (3rd to 5th November 2008) (photo by Stanislava Kyselová, archive AB).

and Technology Week, whose theme was Planet Earth due to 2008 being designated the International year of Planet Earth by UNESCO. The series of lectures, **Academic Prague**, for the general public and **Nebojte se vědy** (Don't be afraid of science) for school students were also a success. Further details are contained in chapter 7.

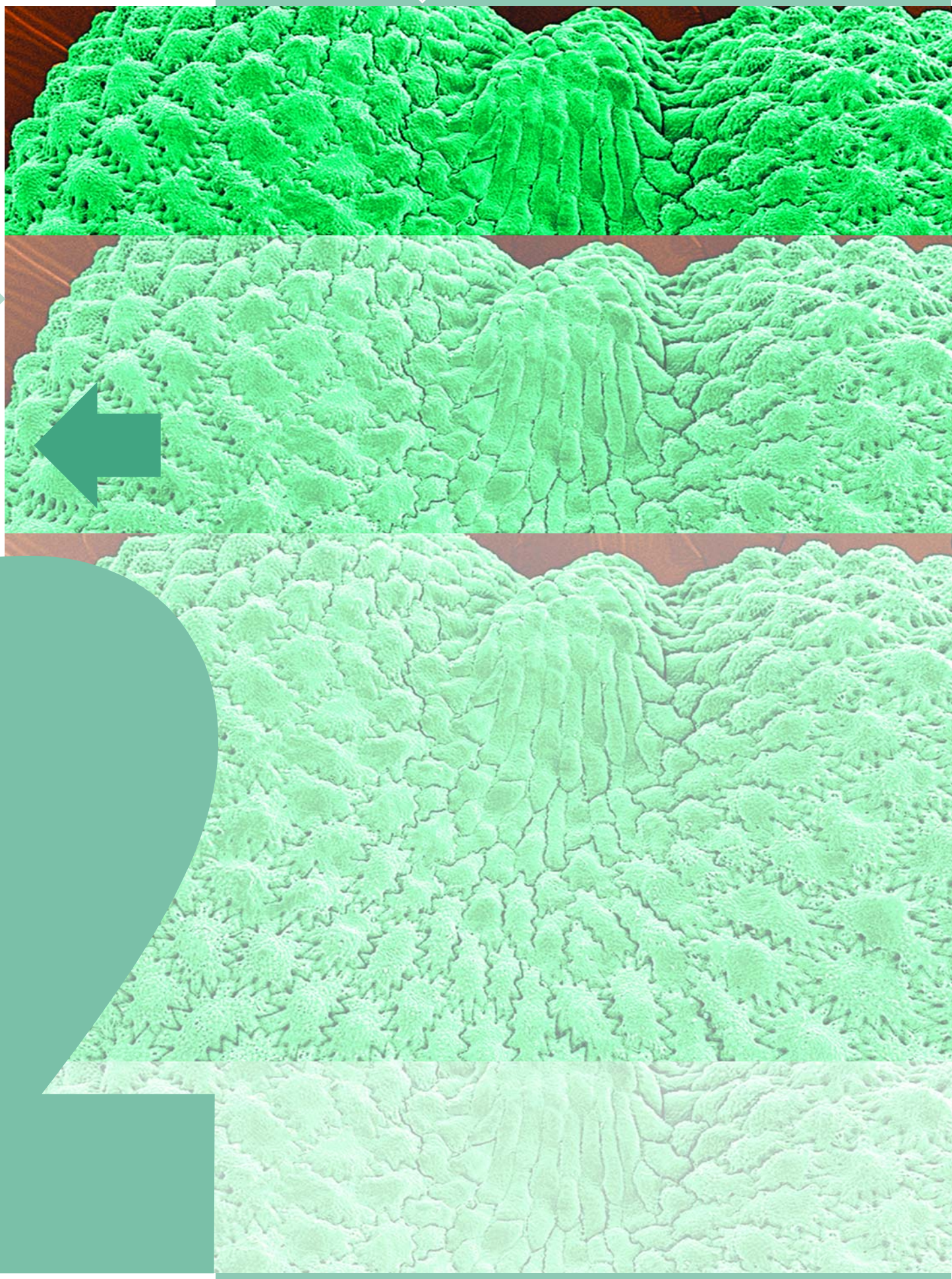
Chapter 8 provide information on the **management** of our assigned finances and property. In accordance with the law on public research institutions, the first announcement on the activities of the supervisory boards of the ASCR institutes was discussed and approved for the period from its appointment to the end of 2007.

The ASCR provided financial support towards the publication of thirty-five books, of which twenty-three were published by Academia – the Publishing House of the ASCR and twelve by ASCR institutes. The Academia publications received a number of awards in 2008. A summary of books published is provided by appendix 3.

As a part of statutory checks, the Academy Assembly held a discussion of the results of accounting checks and action to be taken to work on failings found in fourteen ASCR institutes. Follow-up checks were also made on ASCR institutes which had had their regular checks in the previous period.

The ASCR didn't forget its **educational role** either in 2008. This can be demonstrated by placements provided for secondary school students in ASCR institutions (winner of the national round of the Středoškolská Odborná Činnost competition, the Česká Hlavička Genus Project award). **Open Science to the Regions** held a number of activities that finished in the summer, which helped prepare talented secondary school students for work in science.

The **Learned Society of the Czech Republic** and the **scientific institutes** associated in the Council of Scientific Societies of the Czech Republic (supported by the ASCR) made significant contributions to the propagation of science, education and culture. Information on their activities can be found in appendices 7 and 8.



SCIENTIFIC ACTIVITIES AND THE RESULTS OF BASIC AND TARGETED RESEARCH

2

The results of scientific activity at the ASCR are presented by this section. The research objectives within whose limits results were gathered are mentioned first. These are followed by an overview of the most notable studies accompanied by selected illustrative abstracts.

1) Mathematics, Physics and Computer Science Section

The Section united six departments, of which three had a physical character and three were from the mathematics and informatics fields, and their research focus was characterised by the following exploratory aims:

- Astronomy and astrophysics (*Astronomical Institute*)
- Particle physics beyond the Standard Model (*Institute of Physics*)
- Specific effects in condensed systems with reduced dimension and broken symmetry (*Institute of Physics*)
- Physics and technology of nanostructures, surfaces and thin films (*Institute of Physics*)
- Wave and corpuscular light propagation, optical materials and technology (*Institute of Physics*)
- Intense radiation sources and radiation-matter interaction (*Institute of Physics*)
- Research and development of general mathematical knowledge and its application to other branches of science and practice (*Institute of Mathematics*)
- Computer Science for the Information Society: models, algorithms, applications (*Institute of Computer Science*)
- Nuclear physics and related fields in the basic, applied and interdisciplinary research (*Nuclear Physics Institute*)
- Advanced mathematical methods in retrieval, processing and applications of knowledge and information in complex and non-deterministic systems (*Institute of Information Theory and Automation*)

List of studies:

1. Hinode, TRACE, SOHO, and ground-based observations of a quiescent prominence (*Astronomical Institute*)
2. Thermal disc emission from a rotating black hole: X-ray polarization signatures (*Astronomical Institute*)
3. Explanation of the formation of a meteoric crater in Peru (*Astronomical Institute*)
4. An atomic force microscope used as a tool to write on a surface (*Institute of Physics*)
5. Terahertz phase transition dynamics in the ferroelectric $BaTiO_3$ (*Institute of Physics*)
6. Observation of the suppression of the flux of cosmic rays above 4*1019 eV *(Institute of Physics*)

7. Experimental implementation of linear-optical gates and partial symmetrisation and anti-symmetrisation filter (*Institute of Physics*)
8. Single-shot soft x-ray laser-induced ablative microstructuring of organic polymer with demagnifying projection (*Institute of Physics*)
9. Steady and decaying flow of He II in a channel with its ends blocked by superleaks (*Institute of Physics*)
10. Tip-induced reduction of the resonant tunneling current on semiconductor surfaces (*Institute of Physics*)
11. Singular limits in thermodynamics of viscous fluids (Institute of Mathematics)
12. Solvability of nonlinear singular problems for ordinary differential equations (*Institute of Mathematics*)
13. Higher dimensional Kerr-Schild spacetimes (*Institute of Mathematics*)
14. On optimal short reccurences for generating orthogonal Krylov Subspace Bases. dedicated to Gene Golub (*Institute of Computer Science*)
15. Relations in fuzzy class theory: initial steps (*Institute of Computer Science*)
16. Bootstrapping multifractals: surrogate data from random cascades on wavelet dyadic trees (*Institute of Computer Science*)
17. Geochemical characterization of moldavites from a new locality, the Cheb Basin, Czech Republic (*Nuclear Physics Institute*)
18. The study of astrophysical nuclear reactions by indirect methods (*Nuclear Physics Institute*)
19. Two-step ? cascades following thermal neutron capture in 95Mo (*Nuclear Physics* Institute)
20. Core and shapley value for games on MV-algebras (*Institute of Information Theory and Automation*)
21. Extension of moment features invariance to blur (*Institute of Information Theory and Automation*)
22. Evaluation of screening mammograms by means of local statistical models (*Institute of Information Theory and Automation*)

Illustrative abstracts:

Explanation of the formation of meteoric crater in Peru
(Astronomical Institute)

On September 15, 2007 a crater-forming stony meteorite fall occurred near the village of Carancas, Peru. The creation of a 13-meter wide crater was an unexpected event and the initial media reports were met with skepticism in the scientific community. An impact crater can be formed only by a body that reaches the Earth surface with a substantial speed of several kilometers per second. The commonly accepted opinion was that only iron meteoroids produce craters of this size. It was also expected that meteoroid atmospheric passage would be detectable by modern instruments over large distances. In reality, the recorded sonic waves corresponded to a relatively small body. Several tens of bodies that size enter the atmosphere every year without causing any damage on the ground.

To explain this mystery, we used the records of the passages of large stony meteoroids through the atmosphere from our own long-term observations. We also modelled the event. All observed meteoroids showed fragmentation into smaller pieces in the atmosphere. Small pieces were easily decelerated and reached the ground at low speed. Fragmentations always occurred under substantially lower pressures than correspond to the strength of recovered meteorites. Our explanation is that the bulk strength of the incoming meteoroids was low because of internal cracks acquired during collisions in interplanetary space. The meteoroid strength was found to vary from case to case. Our modelling showed that the Carancas meteoroid could survive the atmospheric entry without fragmentation and produce the observed

Fresh meteor crater in Peru: a meteor crater near the village of Carancas in Peru was created on 15th September 2007. The crater diameter is almost 14 meters. Photograph taken from the internet
(and is by Cis Verbeeck).

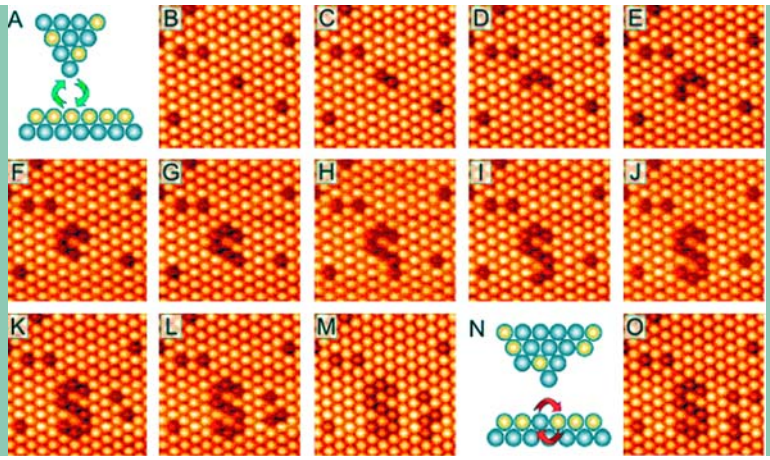
crater, provided that it was free of internal cracks and its bulk strength was comparable to normal meteorite strength. The event can be therefore explained by the fact that Carancas was a rare monolithic meteorid. The initial size was in the range of 0.9 to 1.7 meters.

Borovička, J. – Spurný, P.: The Carancas meteorite impact – Encounter with a Monolithic Meteoroid. Astronomy and Astrophysics, Vol. 485 (2008), pp. L1-L4

Atomic force microscope used as a tool to write on a surface

(Institute of Physics)

The formation of complex atomic patterns at room temperature by the vertical interchange of atoms between the apex tip of an atomic force microscope and a semiconductor surface is presented. In its work an international team of researchers from Japan, Spain and the Czech Republic presented a new method of atom manipulation, which makes it possible to "write" on the surface of a solid state with the help of single atoms, in the same manner as a pen. This new method allows not only the recording but also the controlled erasure of already assembled atomic patterns. In the paper the team of authors for the first time not only presented this new method but also explained its mechanism in detail on the basis of quantum mechanical calculations.



Writing with atoms: the evolution of the positioning of single Si atoms (dark circles) on the surface of tin (light circles) during the assembling of a preselected pattern, in this case the letter Si
(photo by archive FZÚ).

The team demonstrated the possibilities of the new method by writing the symbol "Si" on the surface of a solid state (symbol "Si" has been selected intentionally, because the Si atoms have been used as the "ink"). The experiment has been performed at the room temperature and this significantly expands the possibilities of the use of atom manipulation in nanotechnology.

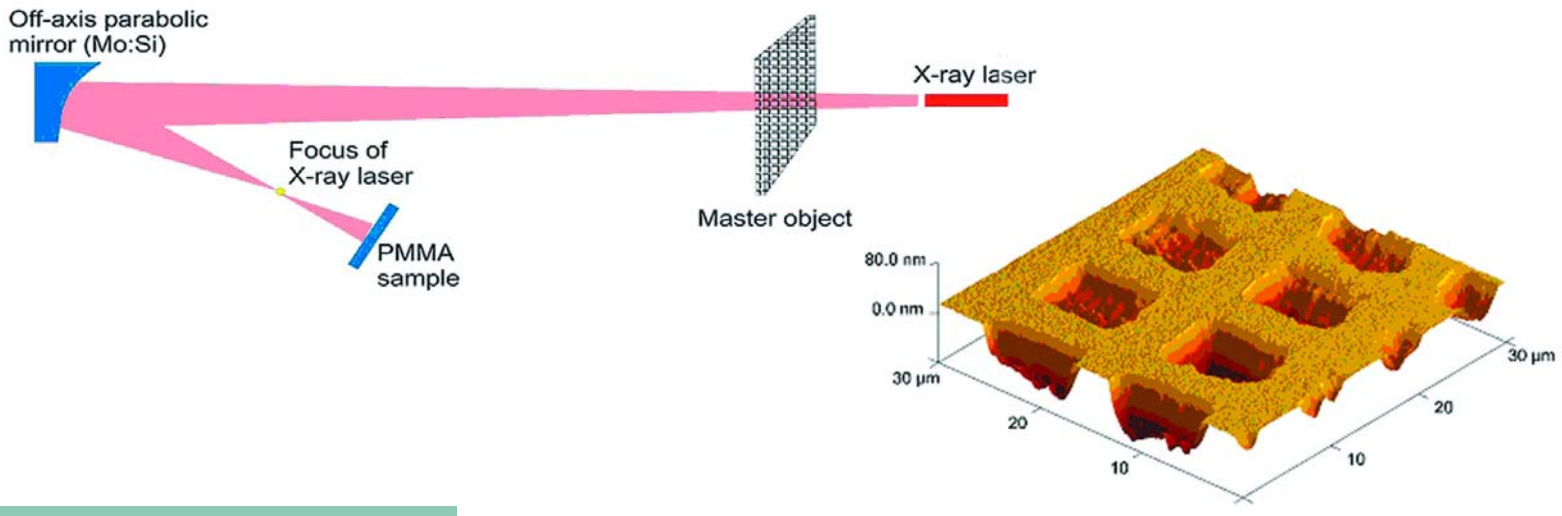
Sugimoto, Y. – Pou, P. – Custance, O. – Jelínek, P. – Abe, M. – Perez, R. – Merita, S. : Complex Patterning by Vertical Interchange Atom Manipulation Using Atomic Force Microscopy. Science 322 (2008), 413 – 417

Single-shot soft x-ray laser-induced ablative microstructuring of organic polymer with demagnifying projection

(Institute of Physics)

Further progress in nanoscience requires the use of novel techniques for the fabrication of structures with the smallest possible details. A very attractive, novel method is to employ direct photo-induced etching and ablation of the material surface with lasers. As the size of the smallest ablated feature is predominantly limited by the laser wavelength, common NIR or UV lasers cannot offer a sufficiently high resolution. Shortening the wavelength down to the X-ray spectral region offers a direct path to decreasing the feature size. Therefore, X-ray lasers represent a promising tool for applications in the micro- and nanopatterning of solids, capable of imprinting features with dimensions comparable to the wavelength. Previous studies on UV and X-ray induced ablation of poly(methyl methacrylate), PMMA, revealed that the process is very clean and the ablated surfaces can be remarkably smooth, thus giving a good prospect for the utilization of X-ray lasers in the direct imprinting of fine structures on PMMA. The proof-of-principle experiment was conducted at PALS Centre with the Ne-like zinc X-ray laser at 21.2 nm (58.5 eV) delivering up to 4 mJ, 120 ps pulses in a narrowly collimated beam. A nickel mesh with a spatial period of 0.1 mm was 10 times demagnified and imprinted on a PMMA sample via single-shot direct ablation. The quality of the ablated microstructure was found to be mainly dependent on the quality of the projected mask. The key advantage of using X-ray laser radiation for the single-step fabrication lies in the unique combination of an exceptionally short wavelength with high-peak power. This first demonstration of single-shot projection, single-step micropatterning of PMMA achieved by direct ablation using 21 nm laser shows the potential of high-energy X-ray lasers for the high resolution surface patterning of solid materials with a resolution scalable down to submicrometer domain.

Mocek, T. – Rus, B. – Kozlová, M. – Polan, J. – Homer, P. – Juha, L. – Hájková, V. – Chalupský, J.: Single-shot soft x-ray laser-induced ablative microstructuring of organic polymer with demagnifying projection. Optics Letters 33 (2008), 1087–1089.



Projection scheme for a single-shot ablative micropattern by an rtg laser (photo by archive FZÚ).

Test grid ablatively imprinted in the PMMA. AFM image of the test grid ablatively imprinted in the PMMA (photo by archive FZÚ).

Singular limits in thermodynamics of viscous fluids

(Institute of Mathematics)

In our monograph the results of several years research by the authors in the field of passing fluid dynamics between mathematical models are presented. Choosing suitable physical parameters, whose limit to critical values represents a limit model used under different physical hypotheses than the original model (e.g. compressibility vs. incompressibility corresponding to the limit value of the Mach number zero), they derive a limit model and prove the passing of a solution to one problem to a solution of the other one. Prevailingly formal limit procedures known in literature are substituted by rigorous mathematical theory using refined methods of mostly nonlinear functional analysis. Despite the complexity of this difficult discipline, the authors have succeeded in addressing a wide spectrum of the mathematically and physically erudite who are interested by maximal effort for clarity and self-sufficiency in the framework of this book. Almost all our results are original.

Feireisl, E. – Novotný, A.: Singular limits in thermodynamics of viscous fluids, Birkhäuser, Basel, monograph, 380 pp. To appear in February 2009.

Two-step γ cascades following thermal neutron capture in 95Mo

(Nuclear Physics Institute)

A strong enhancement of the photon strength function at low γ-ray energies was recently reported for several Fe and Mo isotopes. Confirmation of this effect would considerably change our knowledge of the deexcitation process of excited states. To study this enhancement we measured the spectra of two-step γ cascades following thermal neutron capture in 95Mo at LVR-15 reactor in Řež. Using two-step cascade methods we tested various photon strength functions. Unlike experiments performed in Oslo and Budapest, we did not observe this enhancement. Our experimental data are in general agreement with theoretical predictions based on a combination of E1, M1 and E2 photon strength functions with no enhancement of the photon strength functions at low γ-ray energies.

Krtička, M. – Bečvář, F. – Tomandl, I. – Rusev, G. – Agvaanluvsan, U. – Mitchel, G. E.: Two-step cascades following thermal neutron capture in 95Mo. Physical Review C. Vol. 77 (2008) 054319, pp. 1–15.

Extension of moment features invariance to blur

(Institute of Information Theory and Automation)

Object recognition tasks are intrinsic to a number of application areas such as industrial automation, cartography, or the media industry. The robustness of the already used algorithms with respect to certain degradations (object rotation, tilted camera location, or out-of-focus camera setting) is very important. We aimed our research to solve particular situations, when acquired images are blurred (out-of-focus blur, motion blur, atmospheric blur). We were able to solve most practical tasks, even though the analysis was long and tedious. Achieved results showed certain intrinsic similarities. We succeed in unveiling the unifying and as well the simplifying theory, which comprises all existing theories for blurred object recognition. It demonstrated that blurred object recognition could be solved in a similar way to sharp object recognition only extended by one extra internal step. Our proven theory gives us the power to judge the solvability of new application tasks without the necessity to prove anything. This theory enables easy implementation of object recognition even for people with minimal experience of digital image processing.

Boldyš, J. – Flusser, J.: Extension of moment features invariance to blur. Journal of Mathematical Imaging and Vision, 32(1) (2008):227–238.

2) APPLIED PHYSICS SECTION

This Section unites seven departments, the research focus of which was characterized by the following exploratory aims:

- Physical properties of advanced materials in relation to their microstructure and processing (*Institute of Physics Materials*)

- Physical and chemical processes in plasmas and their applications (*Institute of Plasma Physics*)

- Dynamics of fluid systems and transformation processes in the hydrosphere (*Institute of Hydrodynamics*)

- Research into experimental methods for the examination of physical properties of matter and their application in advanced technologies (*Institute of Scientific Instruments*)

- Materials, structures, systems and signals for electronics, optoelectronics and photonics (*Institute of Photonics and Electronics*)

- Time dependent response of materials, systems and environments on natural and human actions (*Institute of Theoretical and Applied Mechanics*)

- Complex dynamical systems in thermodynamics, fluid and solid mechanics (*Institute of Thermomechanics*)

- Interaction of electromagnetic fields and dynamics of controlled energy conversions in electrical engineering (*Institute of Thermomechanics*)

List of studies:

1. Surface plasmon resonance sensor for the detection of chemical and biological species in the field (*Institute of Photonics and Electronics*)
2. Optical integrator – photonic equivalent of electronic capacitor (*Institute of Photonics and Electronics*)
3. Wide-band Raman fibre amplifiers with time-division multiplexing (*Institute of Photonics and Electronics*)
4. Hydrogen storage in chosen Mg-Ni based alloys (Institute of Physics of Materials)
5. Influence of various short non-metallic fibres on the creep resistance of magnesium alloy matrix composites (*Institute of Physics of Materials*)
6. Simulation and measurement of plasma flows in divertor tile gaps in tokamaks (*Institute of Plasma Physics*)
7. Possibilities of amplifying spontaneous emission on the wavelengths <15 nm in pulse systems (*Institute of Plasma Physics*)
8. A new concept for the laser acceleration of macroparticles (*Institute of Plasma Physics*)
9. Progressive thermal coatings (*Institute of Plasma Physics*)
10. Hydroecological and biohydrological research in the headwater regions of the Czech Republic (*Institute of Hydrodynamics*)
11. The effect of cellular organic matter on water purification (*Institute of Hydrodynamics*)
12. The pptical binding of microparticles and their self-arrangement (*Institute of Scientific Instruments*)
13. Upgraded software for electron and ion optics (*Institute of Scientific Instruments*)

14. The laser nano-comparator for the calibration of length sensors (*Institute of Scientific Instruments*)
15. Thermodynamic properties of working media for absorption refrigeration cycles (*Institute of Thermomechanics*)
16. Experimental observations and analysis of interfacial microstructures in single crystals of shape memory alloys (*Institute of Thermomechanics*)
17. Static and dynamic characteristics of actuators working on the principle of thermo-elasticity (*Institute of Thermomechanics*)
18. Applications of the mesomechanical approach to shape memory phenomena (*Institute of Theoretical and Applied Mechanics*)
19. Micrometric scale measurement of material structure moving utilizing radiographic technique (*Institute of Theoretical and Applied Mechanics*)
20. A suspension bridge subjected to moving loads and support motions due to earth-quake (*Institute of Theoretical and Applied Mechanics*)

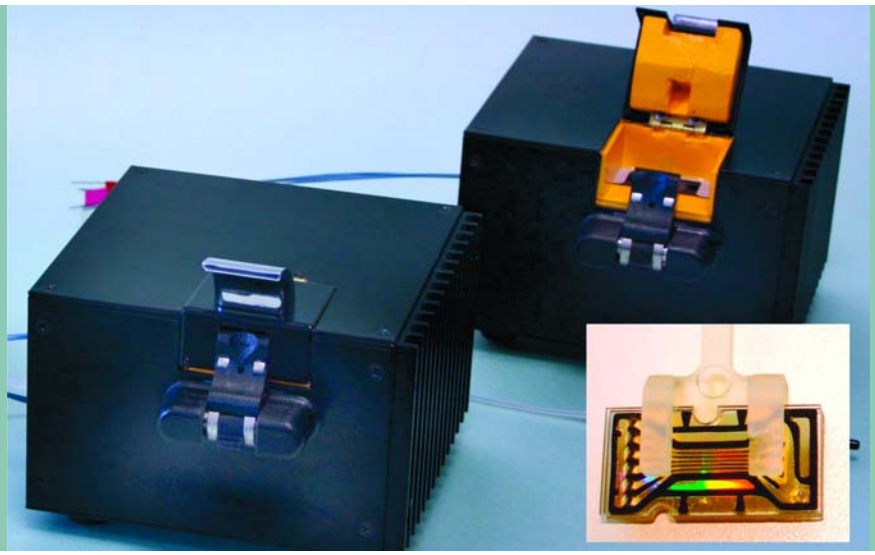
Illustrative abstracts:

Surface plasmon resonance sensor for the detection of chemical and biological species in the field

(Institute of Photonics and Electronics)

In the last two decades we have witnessed increasing efforts devoted to research and development of optical biosensors and biochips [1]. Label-free biosensors have been established as a unique technology that enables direct observation of molecular interaction in real time and allows rapid and sensitive detection of molecular analytes without labeling. Biosensors based on surface plasmon resonance (SPR) represent one of the most advanced label-free optical sensor technologies and have demonstrated tremendous potential for applications in areas such as genomics, proteomics, medical diagnostics, environmental monitoring, food analysis, agriculture, and security [2-3]. However, the current SPR sensors are rather complex, expensive, and lack portability, and, therefore, their use has been limited to centralized laboratories.

We have developed a new approach to the spectroscopy of surface plasmons [3, 4], which thus enables the construction of the first true mobile yet high-performance SPR sensors, the technology of choice for biosensing in the field. This approach is based on the simultaneous excitation of surface plasmons on a special gold-coated diffraction grating via the second order of diffraction and observation of the characteristic SPR feature in the first diffraction



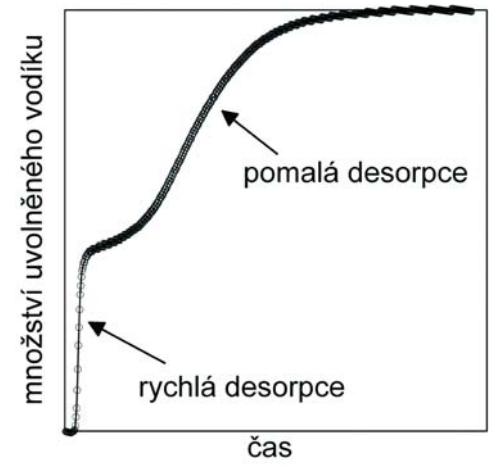
Laboratory prototype of the new compact SPR sensor for field use. Laboratory prototype of the new compact SPR sensor for field use with detail of the sensor cartridge
(bottom right) (photo by archive ÚFE).

order [4]. Recently, this approach has been incorporated into the first generation of high-performance SPR sensors for field use (Figure 1) [5]. The sensor consists of a miniature cartridge integrating the diffraction grating and microfluidics and a compact optical system which simultaneously acquires data from six independent sensing channels in the cartridge. It has been demonstrated that the sensor is able to measure refractive index changes as small as 3×10-7 and to detect nucleic acids in concentrations down to 200 pM [5]. The sensor technology has been licensed to the PhenogeGenomics Corporation (USA).

Homola, J.: Surface plasmon resonance sensors for detection of chemical and biological species, Chemical Reviews. Vol. 108, (2008), pp. 462–493.
Homola, J. – Telezhnikova, O. – Dostálek, J.: Způsob spektroskopie povrchových plazmonů pro senzory s povrchovými plazmony a senzorový element k provádění tohoto způsobu, Patent ČR # 299489, 2008.
Piliarik, M. – M. Vala, M. – Tichý, I. – Homola, J.: Compact and low-cost biosensor based on novel approach to spectroscopy of surface plasmons, Biosensors & Bioelectronics, in print: PMID: 19109004.
Homola, J. – Yee, S. S. – Myszka, D.: Surface plasmon biosensors, in Optical Biosensors: Today and Tomorrow, editors F. S. Ligler, C. R. Taitt, Elsevier, (2008), pp. 185–242.
Taylor, A. D. – Ladd, J. – Homola, J. – Jiang, S.: Surface Plasmon Resonance (SPR) Sensors for the Detection of Bacterial Pathogens, in Principles of Bacterial Detection: Biosensors, Recognition Receptors and Microsystems, editors M. Zourob, S. Elwary, A. Turner, Springer, (2008), pp. 81–106

Hydrogen storage in chosen Mg-Ni based alloys

(Institute of Physics of Materials)



Time dependence of the amount of released hydrogen. It is obvious that a considerable amount of stored hydrogen is released very slowly, if the harmful phase is present in the material (photo by archive ÚFM).

Hydrogen is a very prospective fuel both for direct combustion (or fusion) or for electrochemical batteries and fuel cells. One of partial problems of utmost importance is hydrogen storage. Principally, there are three main ways of storing hydrogen: (i) in high-pressure tanks, (ii) in a liquid state and (iii) as dissolved in solid media. The first way brings a relatively high hazard coupled with the manipulation of pressurized, highly flammable gas. The second one is relatively expensive and is especially suitable for stationary applications. Storage of hydrogen in solid media avoids the hazards and also it is applicable relatively easy. Moreover, the "storage density" is much higher than by the first two ways – it is surprising that hydrogen density stored in solid media is even higher than the density of liquid hydrogen.
In the year 2008, the kinetics of hydrogen desorption from Mg-Ni-H alloy and from Mg_2Ni-H_x was thoroughly studied in our research group. These materials are very possible for hydrogen storage. We have discovered that the rate of hydrogen release depends very sensitively on the phase composition of the storage media. We succeeded in the identification of the two different desorption kinetics with the presence of two crystallographic phases in studied materials. Since the ratio of the phases can be controlled in the production process, the series of our papers published in the year 2008 contributes significantly to our aim of an improvement

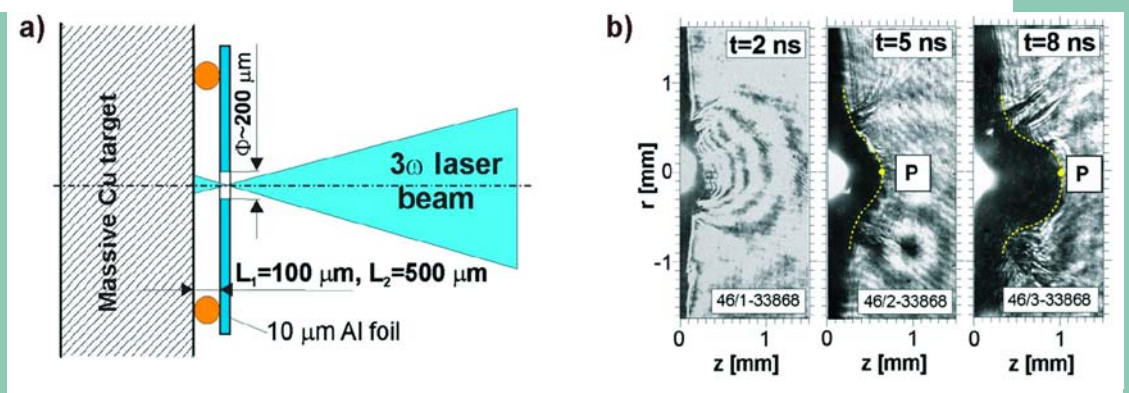
in desorption characteristics of storage media. The results obtained have a very high application potential especially for the production of small appliances (notebooks etc.). They were presented at international conferences and published in renowned journals – one publication was evaluated as the 15th in the Top 25 Hottest Articles in April – June 2008.

Čermák J. – Král, L. – David, B: Hydrogen Diffusion in Mg2NiH4 Intermetallic Compound. Intermetallics 16, 2008, pp. 508–517.
Čermák J. – Král, L. – David, B – Stloukal, I: Kinetics of Phase Transformations in Mg_2Ni-H System. Solid State Phenomena 138, 2008, pp. 71–90.
Čermák J. – Král, L: Hydrogen Diffusion in Mg-H and Mg-Ni-H Alloys. Acta Mater. 56 (2008), pp.2677–2686. 15th place in Top 25 Hottest Articles April – June 2008.
Čermák J. – Král, L. – Stloukal, I: Kinetics of Hydrogen in Mg_2Ni and in Hydrogenated Mg and Mg-Mg_2Ni Eutectic. METAL 2008 – Proc. 17th International Metallurgical & Material Conference, Hradec nad Moravicí, Czech Republic, May 13–15 (2008), CD–ROM.
Čermák J.– David, B: Influence of Phase Composition of Mg_2NiH_4 upon the Hydrogen Desorption Kinetics. Scripta Mater. 59, 2008, pp. 432–435.
Čermák J. – Král, L: Desorption Kinetics of Hydrogen in Mg_2NiH_4 Hydride and in Hydrogenated Eutectic $(Mg/Mg_2Ni)H_x$ Defect and Diffusion Forum – accepted to be published.
Král, L – Čermák J: Changes of Structure in Mg-Ni Alloys after Absorption and Desorption of Hydrogen. METAL 2008 – Proc. 17th International Metallurgical & Material Conference, Hradec nad Moravicí, Czech Republic, May 13–15 (2008), CD–ROM.
Čermák J. – Král, L: Hydrogenation of Mg and Two Chosen Mg-Ni Alloys Internat. J. Hydrogen Energy 33 (2008), pp. 7464–7470.
Čermák, J. – Král, L.: Interrelation between hydrogen desorption kinetics and structure of $(Mg_2Ni)H_x$ and Hydrogenated Eutectic$(Mg/Mg_2Ni)H_y$ Defect and Diffusion Forum – accepted for publication.

A new concept for the laser acceleration of macroparticles

(Institute of Plasma Physics)

Macroparticles accelerated to high velocities are used for the simulation of impacts of micrometeorites on the surface of cosmic vehicles, for the testing of materials of the first wall of thermonuclear reactors and for other technological applications. Recently, use of high-energy macroparticles has been concerned with the so-called impact schemes of fast ICF (inertial confinement fusion) ignition. Macroparticles can be accelerated to very high velocities for instance by pulsed high-power lasers. In the classical scheme, a focused laser beam impinging the particle surface creates hot expanding plasma, which accelerates the particle by its reactive ablation pressure. At the terawatt laser facility PALS a completely new acceleration concept, named 'the reversed acceleration scheme', has been tested. The new concept, the arrangement of which is shown in the picture below, exploits a similar principle as the experiments on so-called indirect-driven inertial fusion. The macroparticle, represented here by a



New concept of laser acceleration of macroparticles. Indirect laser acceleration of a disc flyer target (photo by archive ÚFP).

thin circular metallic foil, is not accelerated directly by reactive ablation pressure, but by the pressure and radiation of hot plasma produced by a laser on the surface of an auxiliary massive copper target, located at a short distance behind it. The laser beam passes through a small hole in the foil to be accelerated. At the experiments performed at the PALS laboratory the foil acceleration was driven by a focused beam at the 3rd harmonics of an iodine laser at a wavelength of 438 nm and pulse duration of 250 ps. At the laser energy of 190 J the aluminium disc 10 μm thick was accelerated up to the velocity of 130 km/s, which is much higher than that achieved by using the classical method. The new laser acceleration concept is much more efficient and advantageous than that used up to now, as the laser energy is not wasted in evaporation and ablation of the accelerated target and, in addition, the target mass does not change during the acceleration process.

Borodziuk, S., Kasperczuk, A., Pisarczyk, T., Ullschmied, J., Krousky, E., Masek, K., Pfeifer, M., Rohlena, K., Skala, J., Pisarczyk, P.: Reversed scheme of thin foil acceleration, Applied Physics Letters 93, 101502 (2008) The quoted publication was chosen for the US Virtual Journal of Ultrafast Science.

Badziak, J. – Kasperczuk, A. – Parys, P. – Pisarczyk, T. – Rosinski, M. – Ryc, L. – Wolowski, J. – Suchanska, R. – Krása, J. – Krouský, E. – Láska, L. – Mašek, K. – Pfeifer, M. – Rohlena, K. – Skála, J. – Ullschmied, J. – Dhareshwar, L.J. – Foldes, I.B. – Suta, T. – Borrielli, A. – Mezzasalma, A. – Torrisi, L. – Pisarczyk P.: The effect of high-Z dopant on laser-driven acceleration of a thin plastic targe. Appl. Phys. Lett. Vol. 92 (2008), pp. 211502(1) – 211502(3). The quoted publication was chosen for the US Virtual Journal of Ultrafast Science.

Kasperczuk, A. – Pisarczyk, T. – Gus'kov, S.Yu. – Ullschmied, J. – Krouský, E. – Mašek, K. – Pfeifer, M. – Rohlena, K. – Skála, J. – Kálal, M. – Tikhonchuk, V. – Pisarczyk P.: Laser energy transformation to shock waves in multi-layer flyers. Radiat. Eff. Defects Solids. Vol. 163 (2008), pp. 519 – 533.

Pisarczyk, T. – Kasperczuk, A. – Borodziuk, S. – Kalal, M. – Guskov, S.Yu. – Ullschmied, J. – Krousky, E. – Masek, K. – Pfeifer, M. – Rohlena, K. – Skala, J. – Pisarczyk, P.: Investigations of acceleration and collision of planar flyer targets with massive target on the PALS experiment, 30th Eu. Conf. on Laser Interaction with Matter (ECLIM), Darmstadt, Germany, Aug. 31 – Sep. 5, 2008.

Wolowski, J. – Badziak, J. – Borrielli, A. – Dareshwar, L. – Foldes, I.B. – Kasperczuk, A. – Krouský, E. – Láska, L. – Mašek, K. – Mezzasalma, A. – Parys, P. – Pfeifer, M. – Pisarczyk, T. – Rosinski, M. – Ryc, L. – Suchanska, R. – Suta, T. – Torrisi, L. – Ullschmied, J. – Pisarczyk P.: Application of laser-induced double ablation of plasma for enhanced macroparticle acceleration. J. Phys. Conf. Ser. 112 (2008), pp. 022072(1) – 022072(4).

The effect of cellular organic matter on water purification

(Institute of Hydrodynamics)

The influence of AOM (Algae Organic Matter) on destabilisation and aggregation processes is not yet sufficiently clear. Organic substances originating from the decay of cyanobacteria and algae (COM – Cellular Organic Matter) are difficult to remove and can result in serious technological problems in water treatment. The research proved that the removal of COM requires a substantial dosage of destabilisation reagent. The efficient removal of COM requires destabilisation of these particles to take place at a pH value at which the hydroxo-polymers carry the highest charge and the configuration of organic macromolecules offers most functional groups. The total removal efficiency of COM was relatively low. It has been about 46% and 41% using ferric sulphate and aluminium sulphate aggregation, respectively. It was found that proteins are removed with a higher efficiency than other organic substances and above all the polysaccharides. GPC analyses of the residual COM showed that the proteins of higher molecular weight were aggregated with a higher efficiency. The research proved the formation of a considerable quantity of the macro-aggregates, mainly during Al-aggregation. Despite this, a relatively large residual concentration of Fe and Al remains in the purified water.

Pivokonská, L. – Pivokonský, M. – Tomášková, H.: Optimisation of NOM removal during water treatment. Sep. Sci. & Tech. Vol. 43, No.7 (2008), pp. 1687–1700.

Pivokonský, M. – Polášek, P. – Pivokonská, L. – Tomášková, H.: Optimized reaction conditions for removal of algal cel-

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Pivokonský, M. – Pivokonská, L. – Polášek, P.: The influence of organic matter produced by Microcystis aeruginosa on water purification. Proc. Conf. WISA 2008, 18–22 May 2008, Sun City, JAR
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The laser nano-comparator for the calibration of length sensors

(Institute of Scientific Instruments)

The entry of Czech industry into the world global market emphasizes the need for higher quality and competitiveness standards. Thanks to the introduction of new methods of nanotechnology into production, the demands for precision in modern-day manufacturing are moving to the nanometer range. Sometimes laser interferometry cannot be the option for high-precision measurement in spite of being the most precise measuring tool. In those cases room is left for precise capacitive or inductive sensors and optoelectronic rules. Should these sensors approach the precision of laser interferometry, their calibration scale must be verified by laser interferometers. The Department of Coherence optics of ISI together with the Czech Metrology Institute and the company Mesing, Ltd. has now introduced a smart laser nano-comparator for the precise calibration of displacement sensors. It has been developed within a common research project for the last three years. The nano-comparator works as a stand-alone measuring system with resolution in the range of 100 picometers. The research team of ISI designed and experimentally verified a new original method for active stabilization of tilt of the interferometer measuring mirror. The method prevents any undesirable angle deviation (pitch and yaw) of the mirror during the calibration process. The tilt can be caused by possible looseness between the linear guide ways and the measuring carriage. The assembly exploits three independent piezo-electric actuators fixing the mirror to the carriage of the guide ways, which are capable of tilting the mirror horizontally and vertically. The digital servo-loop system monitors the position of the laser beam spot reflected from the mirror by a photo detector and then tilts the mirror back to its correct position. The method strictly removes dependence of the scale linearity of the interferometer on the position of the measuring mirror, what was experimentally verified by various methods. The combination of basic and industrial research under this project serves as an example of interdisciplinary cooperation between the Academy of sciences and private innovative enterprises. At the 50th

Laser nano-comparator for the precise calibration of length sensors, presented at the 50th International Engineering Fair. The Department of Coherence optics of the Institute of Scientific Instruments ASCR, v.v.i., together with the Czech Metrology Institute and the company Mesing, Ltd. introduced a smart laser nano-comparator for the precise calibration of displacement sensors. It has been developed inside a common research project for the last three years. The nano-comparator works as a stand-alone measuring system with a resolution in the range of 100 picometers (photo by archive ÚFP).

International Engineering Fair in Brno the common team of researchers obtained for the laser nano-comparator the award of the editorial board of the Technicky Tydenik journal and the award of the Automatizace journal.

Číp, O. – Buchta, Z. – Čížek, M. – Šmíd, R. – Lazar, J.: Detection and active stabilization of beams position at a high-resolution laser interferometer. Ninth International Symposium on Laser Metrology. (Proceedings of SPIE Vol. 7155). Bellingham : SPIE, 2008. 71550X: 1–9.

Číp, O. – Šmíd, R. – Buchta, Z. – Čížek, M. – Lazar, J.: Digital control of beams position in high-resolution interferometer for calibration of precise length sensors. NanoScale 2008 – 8th Seminar on Quantitative Microscopy (QM) and 4th Seminar on Nanoscale Calibration Standards and Methods. Torino : Istituto Nazionale di Ricerca Metrologica, 2008. p. 44.

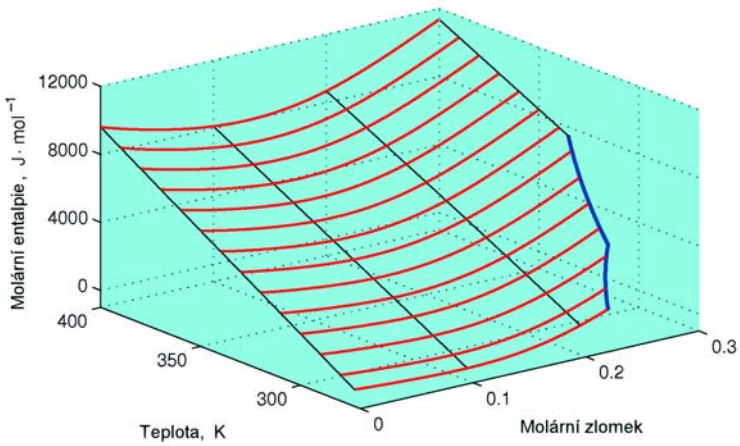
Číp, O. – Buchta, Z. – Čížek, M. – Šmíd, R. – Lazar, J.: High-resolution laser interferometer with stabilized spatial position of laser beams. ICPM 2008 – International Conference on Precision Measurement. Ilmenau : Technische Universität Ilmenau, 2008. pp. 109–110.

Číp, O. – Čížek, M. – Lazar, J. – Buchta, Z.: Systém pro detekci polohy optických svazků v laserovém interferometru. 2007

The thermodynamic properties of the working media for absorption refrigeration cycles

(Institute of Thermomechanics)

Absorption cycles are finding ever broader use in an increasing number of applications such as in refrigeration and freezing equipment, heat pumps, and solar collectors where they yield not only economic but especially specific operational, logistic, and environmental benefits. Besides such well-established media as water-ammonia and lithium bromide-water mixtures, the lithium chloride-water and calcium chloride-water systems are presently coming into use in the design of absorption cycles. For a reliable design of efficient absorption cycles, accurate and computationally effective knowledge is required of the thermodynamic properties of their working media. In the laboratory of the thermophysical properties of fluids of the Institute of Thermomechanics of the AS CR v.v.i., a formulation of the thermodynamic properties of the two-phase lithium chloride-water system has been developed in the form of the Gibbs energy of its liquid- and gas-phase [1]. The formulation makes it possible to calculate the thermodynamic properties of both phases in their dependence on temperature and composition at temperatures from 273 to 400 K and up to 50% of the salt mass fraction in the solution. Furthermore, a formulation has been developed for the calcium chloride-water system, of the liquid composition dependence of pressure and temperature in the states of the solid-liquid phase equilibrium, valid over the full range of compositions [2]. A special mathematical structure of the formulation with the coordinates of the transition points between hydrates standing for the optimized nonlinear parameters made it possible to find accurate



Liquid-phase molar enthalpy of the two-phase binary lithium chloride-water system. Liquid-phase molar enthalpy of the two-phase binary lithium chloride-water system as a function of temperature and the molar fraction of lithium chloride in solution
(photo by archive ÚT).

values of the temperature and composition of the eutectic and transition points between hydrates.

Pátek, J. – Klomfar, J.: Thermodynamic properties of the LiCl-H2O system at vapour-liquid equilibrium from 273 K to 400 K. – International Journal of Refrigeration. Vol. 31 (2008), pp. 278–303.
Pátek, J. – Klomfar, J. – Součková M.: Solid-liquid equilibrium in the system of CaCl2-H2O with special regard to transition points. Journal of Chemical and Engineering Data. Vol. 53 (2008), pp. 2260–2271.

3) EARTH SCIENCES SECTION

The Section is comprised of the five institutes with the following research objectives:

- The study of the internal structure and dynamics of the Earth (*Institute of Geophysics*)

- The Earth system at the intersection of geological processes, the evolution of life, climatic and anthropogenic impacts (*Institute of Geology*)

- Investigation of the Earth's atmosphere and its interaction with surface and cosmic forces (*Institute of Atmospheric Physics*)

- Physical and environmental processes in the lithosphere induced by anthropogenic activities (*Institute of Geonics*)

- Research into the properties of geomaterials, development of methods for their ecological exploitation and the interpretation of geodynamic processes (*Institute of Rock Structure and Mechanics*)

List of Studies:

1. Refraction and wide-angle reflection experiments in Central Europe – results of seismic modelling (*Institute of Geophysics*)
2. Internal fabric development in complex lava domes (*Institute of Geophysics*)
3. Seismic methods help in natural gas and oil exploitation (*Institute of Geophysics*)
4. Transition from island-arc to passive setting on the continental margin of Gondwana: U-Pb zircon dating of Neoproterozoic metaconglomerates from the SE margin of the Teplá-Barrandian Unit, Bohemian Massif (*Institute of Geology*)
5. Proposal for the redefinition of the global geological stratotype (GSSP) and the replacement of the global Emsian stage boundary (Devonian) (*Institute of Geology*)
6. Carboniferous and Permian faunas and their occurrence in the limnic basins of the Czech Republic (*Institute of Geology*)
7. Effects of solar activity variations on selected characteristics of atmospheric circulation (*Institute of Atmospheric Physics*)
8. Model SAM for precipitation nowcasting in the warm part of the year (*Institute of Atmospheric Physics*)
9. Modelling of the solar activity influence on the electron temperature in the Earth's topside ionosphere and plasmasphere (*Institute of Atmospheric Physics*)
10. Electron temperature anisotropy constraints (*Institute of Atmospheric Physics*)
11. The generation of a pulsating water jet for the disintegration of material (*Institute of Geonics*)
12. The geological environment and geotechnical properties covering the carboniferous strata in the Czech part of the Upper Silesian Basin (*Institute of Geonics*)
13. Modelling of geobags (*Institute of Geonics*)
14. A new sound absorbing material (*Institute of Rock Structure and Mechanics*)
15. Effect of nano/micro particles of calcium phosphates on the mechanical properites

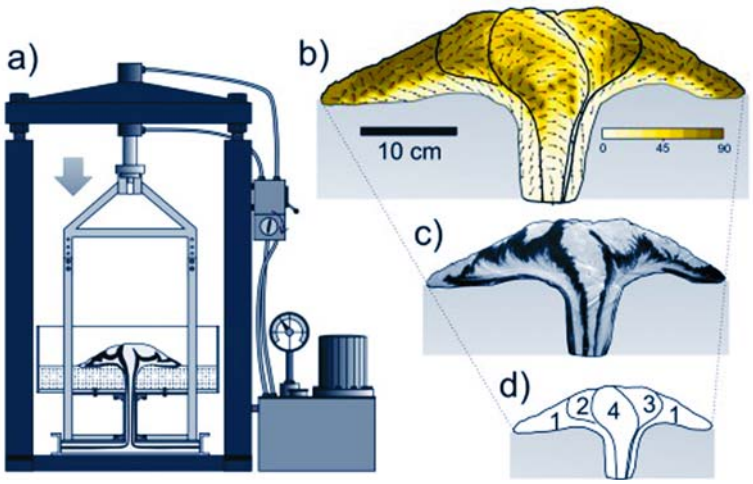
of composties based on polysiloxane matrix reinforced by polyamide (*Institute of Rock Structure and Mechanics*)

16. Primary oxide minerals in the system WO_3-Nb_2O_5-TiO_2-Fe_2O_3-FeO and their breakdown products from the pegmatite No. 3 at Dolní Bory-Hatě, Czech Republic (*Institute of Rock Structure and Mechanics*)

Illustrative Abstracts:

Internal fabric development in complex lava domes

(Institute of Geophysics)



Internal fabric development in complex lava domes. Experimental apparatus used for lava extrusion modeling and the internal structure of the experimental plaster body: a) the analogue apparatus scheme, b) vertical section through the model with plunge directions of magnetic lineations indicated and contours of their plunge angle (plunge from the vertical section plane), c) photographs of vertical section cut through the solidified plaster model, d) scheme of the internal structure of the experimental body (numbers indicate the portions of material emplaced successively close to the centre of growing extrusions)
(photo by archive GFÚ).

This work describes the results of analogue modelling simulating lava dome growth using plaster of Paris and a hydraulic squeezer apparatus. The dome shape development, the internal flow structure and the magnetic fabric pattern enabled the understanding of the growth dynamics of natural lava domes. Rheological properties of used analogue material correspond well with the expected behaviour of natural lavas with a higher content of crystals (e.g. andesites and dacites). The analogue modelling apparatus consists of a hydraulic squeezer and a container from which the plaster is forcefully injected into a perspex box filled with sand. The growth of most of the model lava domes has shown at first symmetrical growth, which was followed by the asymmetrical emplacement of distinct portions of the analogue material that had a lobate shape in vertical cross-sections. Comparison of different growth phases revealed that at a certain time localisation of shear stress in the dome above the feeding conduit causes development of shear zones that facilitate ascent of new portions of the material towards the dome surface. This finding also corresponds with the results of the numerical modelling of the origin of localised zones of deformation in lava extrusions (Hale and Wadge. The growth dynamics of the experiments corresponds well with the growth dynamics of dacite lava domes (Mt. St. Helens (WA, USA) a Unzen (Japan)). The experiments well illustrate the reason for symmetrical 'inflation' of the dome preceding emplacement of new lobate portions of lava on the dome surface, as it was described from the Mt. St. Helens dacite dome (1980–1985). These results can be used in the future for geohazard mitigation models in areas associated with active volcanism and lava dome growth.

Závada, P., Kratinová, Z., Kusbach, V., and Schulmann, K. (2008): Internal fabric development in complex lava domes.
Tectonophysics, DOI:10.1016/j.tecto.2008.07.005. ISSN 0040–1951.

Model SAM for precipitation nowcasting in the warm part of the year
(Institute of Atmospheric Physics)

An advection statistical model (SAM) for precipitation nowcasting with lead times from 1 to 3 hours has been developed. The model is focused on forecasting heavy precipitation which occurs in the warm part of the year when torrential rains and flash floods endanger properties and human lives. The model uses radar observations, satellite data from Meteosat, data from a lightning detection system and prognoses of the numerical weather prediction model Aladin. The forecast is based on modelling relationships between measured data and forecasted mean areal precipitation in squares 9 x 9 km^2 covering the Czech Republic. Precipitation is accumulated for 0–1h, 1–2h and 2–3h, and both probabilistic and quantitative forecasts are calculated. The model SAM was implemented in the Czech Hydrometeorological Institute and tested in a semi-operational mode in 2008. The model will be used as one of the operational models for precipitation nowcasting whose forecasts are used by hydrological models.

Sokol, Z. – Kitzmiller, D. – Pešice, P. – Guan, S.: Operational 0–3 hour probabilistic quantitative precipitation forecasts: recent performance and potential enhancements. Atmospheric Research, accepted.
Sokol, Z. – Pešice, P.: Comparing nowcastings of three severe convective events by statistical and NWP models. Atmospheric Research, 10.1016/j.atmosres.2008.09.016.

The generation of a pulsating water jet for the disintegration of material
(Institute of Geonics)

The result concerns the use of high pressure water jets for cutting and generally disintegrating materials. The generation of sufficiently high pressure pulsations in pressure water upstream the nozzle exit enables to the creation of a pulsating liquid jet that emerges from the nozzle as a continuous jet and it forms into pulses at a certain standoff distance from the nozzle exit. The advantage of such a pulsating jet over the continuous one is based on the fact that the initial impact of pulses on the target surface generates cyclically an impact pressure that is several times higher than the stagnation pressure generated by the action of continuous jet under the same working conditions. In addition, the action of a pulsating jet induces also both fatigue and shear stresses in the target material due to the cyclic loading of the target surface and the radial high speed flow across the surface. This further improves the efficiency of the pulsating liquid jet in comparison with the continuous one.
An original method of pulsating liquid jet generation was recently developed and tested extensively. The method is based on the generation of acoustic waves by the action of the acoustic actuator on the pressure liquid and their transmission via a pressure system to the nozzle. Research of the fundamentals of the process of excitation and the propagation of acoustic waves (and/or high-frequency pressure pulsations) in liquid via a high-pressure system and their influence on the formation and properties of a pulsating liquid jet was crowned by the granting of a Czech patent and the completion of a license agreement for the manufacturing of one piece of an acoustic generator of pressure pulsations. At present, the cooperation agreement with a German industrial partner leading to the signing of an exclusive licence agreement for the manufacturing, use and selling of generators based on the above mentioned patent is being prepared.

Foldyna, J.; Švehla, B.: Způsob generování tlakových pulzací a zařízení pro provádění tohoto způsobu. Ústav geoniky AV ČR. Praha : Úřad průmyslového vlastnictví, 2008. 9 pp. Patent document number: 299412. Date of the grant of patent: 05/06/2008.
Foldyna, J.: Akustický generátor tlakových pulsací pro generování pulsujícího vodního paprsku (licence agreement). Ústav geoniky AV ČR Ostrava. 5 pp.
Foldyna, J., Sitek, L., Habán, V.: Acoustic wave propagation in high-pressure system. Ultrasonics, Vol. 44 (2006), pp. 1457–1460. ISSN 0041–624X.

oldyna, J., Heiniger, K., Mettler, S., Sitek, L., Ščučka, J.: Enhancing of Water Jet Effects by Pulsations. Manufacturing Engineering/výrobné inženierstvo, Vol. 6 (2007), No. 4, pp. 30–33. ISSN 1335–7972.
Foldyna, J., Habán, V., Pochylý, F., Sitek, L.: Transmission of acoustic waves. Proceedings of the International Congress on Ultrasonics, Vienna, April 9–13, 2007.
Foldyna, J., Říha, Z., Sitek, L., Švehla, B.: Numerical simulation of transmission of acoustic waves in high pressure system. 7. Proceedings of the International Congress on Ultrasonics, Vienna, April 9–13, 2007.
Pochylý, F., Habán V., Foldyna, J., Sitek, L.: 3D problem of pressure wave propagation in the tube with inconstant cross section. Proceedings of the International Congress on Ultrasonics, Vienna, April 9–13, 2007.

4) CHEMICAL SCIENCES SECTION

This Section combines six departments, the research focus of which was characterised by the following exploratory aims:

- Advanced analytical techniques for bioanalysis, enviromental analysis and nanotechnology (*Institute of Inorganic Chemistry*)

- Design, synthesis and characterisation of clusters, composites, complexes and other compounds based on inorganic substances; the mechanics and kinetics of their interactions (*Institute of Inorganic Chemistry*)

- Structure, reactivity and dynamics of molecular and biomolecular systems: theory, experiment, application (*J. Heyrovsky Institute of Physical Chemistry*)

- Investigation of multiphase reacting systems for the design of processes important in the synthesis and preparation of novel materials, in energy production and in environmental protection (*Institute of Chemical Process Fundamentals*)

- Advances in polymer materials and supramolecular systems: synthesis and research on properties, phenomena and implementation in special application and innovative technologies (*Institute of Macromolecular Chemistry*)

- Regulation of life processes: chemical modulators of selected biological systems relevant to medicine and agriculture (*Institute of Organic Chemistry and Biochemistry*)

List of Studies:

1. Divergent flow isoelectric focusing (*Institute of Analytical Chemistry*)
2. Standard systems for the measurement of pKs and ionic mobilities by capillary electrophoresis (*Institute of Analytical Chemistry*)
3. UV-LED photopolymerised monoliths (*Institute of Analytical Chemistry*)
4. Active materials with a controlled size of particles for fotocatalytic paints (*Institute of Inorganic Chemistry*)
5. Photocatalytic TiO_2 layers prepared by plasma coating (*Institute of Inorganic Chemistry*)
6. New achievements in carborane chemistry (*Institute of Inorganic Chemistry*)
7. Application of a new 'single-molecule' method (J. Heyrovsky Institute of Physical Chemistry)
8. Complex multispectroscopic and quantum-chemical analysis of design on an atomic level – a catalyst for the abatement of N_2O/NO_x from real process gasses (*J. Heyrovsky Institute of Physical Chemistry*)
9. Photodisassociation of molecules in free clusters and nanoparticles: systems relevant in atmospheric chemistry and biophysics (*J. Heyrovsky Institute of Physical Chemistry*)

10. Instrument for controlled bubble generation (*Institute of Chemical Process Fundamentals*)
11. Kinetics of homogeneous nucleation in supersaturated vapours of water (*Institute of Chemical Process Fundamentals*)
12. On-line determination of the total amount of tar in gas production (*Institute of Chemical Process Fundamentals*)
13. Hydrogels with very fast mechanical response ('Artificial muscles') (*Institute of Macromolecular Chemistry*)
14. Development of polymer conjugates of anti-cancer drugs suitable for the treatment of solid tumors (*Institute of Macromolecular Chemistry*)
15. Biomimetic fibrin nanostructures (*Institute of Macromolecular Chemistry*)
16. N6-Methyl-AMP aminohydrolase – a key enzyme of N6-substituted purine acyclic nucleoside phosphonates intracellular activation (*Institute of Organic Chemistry and Biochemistry*)
17. Molecular characterization of a new type of antiviral resistance in HIV positive patients (*Institute of Organic Chemistry and Biochemistry*)
18. Protein association in salt solutions: molecular understanding of the Hofmeister series (*Institute of Organic Chemistry and Biochemistry*)

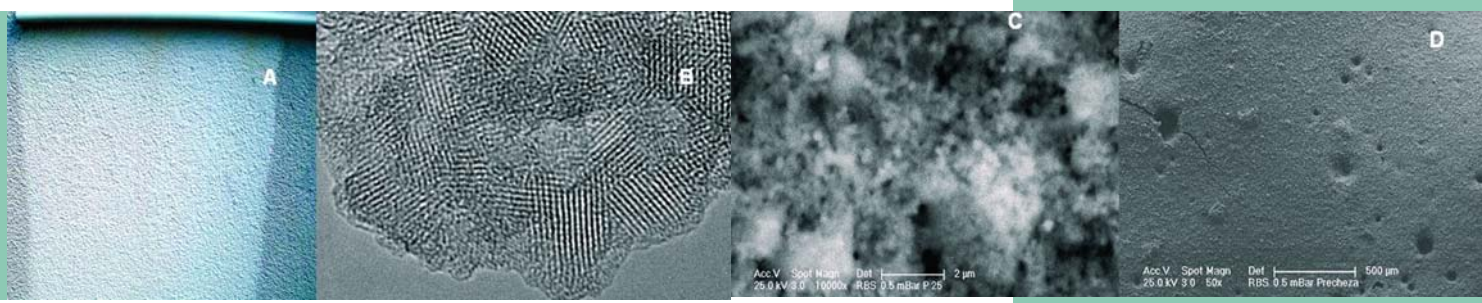
Illustrative Abstracts:

Active materials with a controlled size of particles for fotocatalytic paints

(Institute of Inorganic Chemistry)

During recent years environmental problems play an important role in the applications of titania pigments. These include the use of their photocatalytic behaviour in the development of self-cleaning surfaces for buildings, i.e. antisoiling and antifungal growth and NO_x emissions reduction. In terms of self-cleaning paints, the idea is to limit the oxidation and chalking of the paint film to the very near surface layers such that over time with weathering rain water will wash the top layer leaving an underlying clean fresh surface. In this regard, mixtures of pigmentary rutile and nanoparticle anatase pigments appear to provide the best option, with the former inducing some level of base stability, whereas the presence of the latter gives rise to surface activity. It was shown that these coatings, besides their self-cleaning activity, are able to reduce content of nitrogen oxides and organic pollutants in the air. During recent years we synthesised nonaparticulate anatase titanium dioxide, which depending on the reaction conditions the size of particles was in the range of a few nm to μm range. We synthesied also TiO_2 samples with enhanced sensitivity to visible light using suitable doping elements. Allied to this functioning photoactive coatings were prepared, their effectivity was verified with positive results even after a few years of testing.

Štengl, V. – Bakardjieva, S. – Houšková, V. – Petrova, N. – Kalvachev, Yu.: TiO_2/ZnS Nanocomposites – Characterization and Visible-Light Photocatalytic Aktivity. ADVANCED MICRO- and MESOPOROUS MATERIALS, pp.74–86, Eds: Hadjiivanov, K. – Valtchev, V. – Mintova, S. – Vayssilov, G., Heron Press, ISBN: 9789545802393.
Štengl, V. – Bakardjieva, S. – Murafa, N.: Visible-light photocatalytic activity of TiO_2/ZnS nanocomposites prepared by



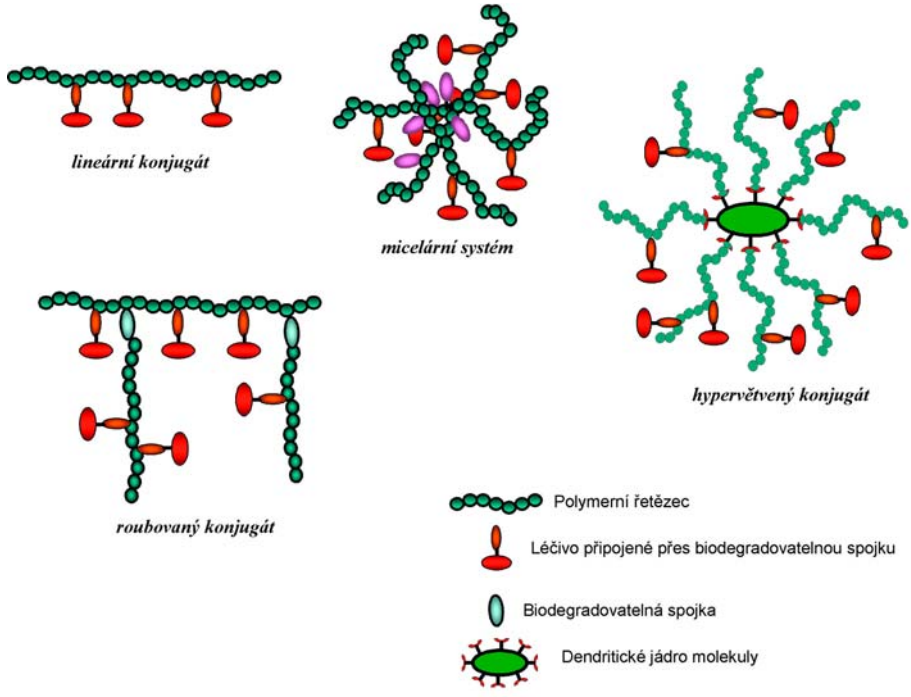
Photocatalytic self-cleaning paint.
A – Experimental photocatalytic coating after three years of weathering on a background of conventional white paint;
B – TEM micrograph of the TiO_2 photocatalyst used in the paint formulation showing randomly oriented TiO_2 (anatase) nanocrystals;
C – micrograph of the paint surface after three years of weathering shows anatase nanoparticles and particles of other inorganic components used in the paint formulations, the organic component being fully destroyed by the action of the used photocatalyst in consequence of which the paint surface shows strong self-cleaning properties;
D – micrograph taken at lower magnification shows the relatively undamaged paint surface still protecting the coated subsurface material
(photo by archive ÚACH).

homogeneous hydrolysis. Microporous and Mesoporous Materials. Vol. 110, No. 2-3 (2008), pp. 370–378.
Houšková, V. – Štengl, V., – Bakardjieva, S. – Murafa, N.: Photoactive materials prepared by homogeneous hydrolysis with thioacetamide: Part 2 – TiO_2/ZnO nanocomposites. Journal of Physics and Chemistry of Solids. Vol. 69, No. 7 (2008), pp. 1623–1631.
Szatmary, L. – Bakardjieva, S. – Šubrt, J. – Jirkovský, J. – Bastl, Z.: Charakteristika nanočástic TiO_2 dopovaných sírou, 2. Seminář výzkumného centra NANOPIN, NANOMATERIÁLY A FOTOKATALÝZA, Liblice, June 10–12, 2008, volume pp. 27–28.
Šubrt, J. – Szatmary, L. – Dianez, M. J. – Criado, J. M.: Mechanochemical Synthesis of Visible Light Sensitive N-doped Titanium Dioxide, 5th European Conference on Solar Chemistry and Photocatalysis: Environmental Applications, Palermo, Italy, October 4–6, 2008; volume 3.49.
Balek, V. – Šubrt, J. – Bountseva, I. M. – Irie, H. – Hashimoto, K.: Emanation thermal analysis study of N-doped titania photoactive powders. Journal of Thermal Analysis and Calorimetry. Vol. 92, No. 1 (2008), pp. 161–167

Development of polymer conjugates of anti-cancer drugs suitable for treatment of solid tumors

(Institute of Macromolecular Chemistry)

Study of the relationship between the structure of water-soluble polymer drug carriers based on N-(2-hydroxypropyl)methacrylamide copolymers and their physicochemical and biological properties carried out in co-operation of the Institute of Macromolecular Chemistry and the Institute of Microbiology resulted in the design and synthesis of polymer drug conjugates with significant anti-tumour activity verified by results of the treatment of mice bearing various solid tumour models. The anti-tumour effect of this group of polymer drugs is based on the significant accumulation of high-molecular-weight compounds in solid tumours due to EPR (enhanced permeability and retention) effect (passive targeting). New methods of synthesis of the previously studied biodegradable high-molecular-weight carriers based on grafted and supramolecular micellar structures have been elaborated and completely new structures of polymer drug carriers derived from a dendritic skeleton, and using the same polymer precursors as employed in the synthesis of grafted and micellar systems have been designed and synthesized. New synthetic procedures enable the synthesis of polymer drug carriers with a narrow distribution of molecular weights and improved susceptibility to biodegrada-



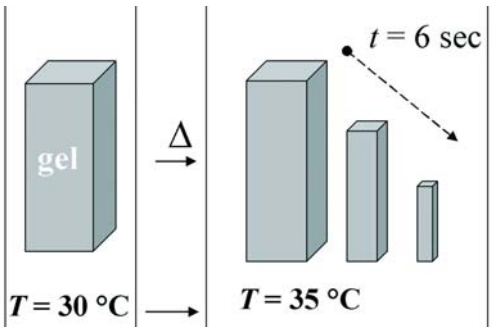
Schematic structures of polymer-drug conjugates designed for passive tumour targeting. Polymer chains form high-molecular-weight structures acummulating in solid tumours and tumour cells where degradation of spacers results in the release of an active cytostatic drug followed by degradation of the carrier forming polymer fragments excretable from the body (photo by archive ÚMCH).

tion in a living body. Conjugates of these carriers with the anti-cancer drug doxorubicin represent three different types of highly effective high-molecular-weight anti-cancer drugs with biodegradable polymer backbone enabling enhanced accumulation of the drug in the whole variety of solid tumours, controlled release of the active drug at their targets (cancer cells) and elimination of the polymer carrier from a body after the therapeutic effect of the drug has been achieved. Utility of the systems as well as high anti-tumour activity of all three polymer systems have been verified in in-vitro cytotoxicity tests using a variety of tumour cell lines as well as in in-vivo experiments in mice models. We have shown that these polymer drugs are highly effective at very low drug concentrations (single dose of 5 – 10 mg/kg) and that treatment of mice bearing model tumours treated in a therapeutic regimen of drug administration resulted in up to 100% of long term survivors.

Etrych, T. – Chytil, P. – Mrkvan, T. – Šírová, M. – Říhová, B. – Ulbrich, K.: Conjugates of doxorubicin with graft HPMA copolymers for passive tumor targeting. Journal of Controlled Release. Vol. 132, No. 3 (2008), pp. 184–192.
Etrych, T. – Mrkvan, T. – Chytil, P. – Koňák, Č. – Říhová, B. – Ulbrich, K.: HPMA-Based Polymer Conjugates with pH-Controlled Activation of Doxorubicin: I. New synthesis, Physicochemical Characterisation and Preliminary Biological Evaluation. Journal of Applied Polymer Science. Vol. 109, No. 5 (2008), pp. 3050–3061.
Chytil, P. – Etrych, T. – Šírová, M. – Mrkvan, T. – Říhová, B. – Ulbrich, K.: New HPMA copolymer-based drug carriers with covalently bound hydrophobic substituents for solid tumour targeting. Journal of Controlled Release. Vol. 127, No. 2 (2008), pp. 121–130.

Hydrogels with very fast mechanical response ("Artificial muscles")

(Institute of Macromolecular Chemistry)



Hydrogel reacting to a change of temperature. During a temperature change of 5 degrees, the gel deswells in an extremely short time of 6 seconds
(photo by archive ÚMCH).

Hydrogels are materials with a wide application. Mainly the use of hydrogels for the production of soft contact lenses is very important and widespread. This application has been followed by hydrogels for medical use as implants, as supporting materials for tissue engineering or as healing gels for the skinning-up of wounds, e.g. the new product HemaGel also developed in our institute. According to the volume of production, the most significant is the usage of the gel as a super-absorber of moisture, e.g. in modern nappies.

Hydrogels sensitive to external stimuli are another special group of gels responding to change of temperature, pH value, concentration of ions or other matter (e.g. metabolite in blood). Such materials are attractive mainly for advanced biomedical use as the targeted release of medicaments in particular conditions, immobilization and subsequent release of enzymes or for an application known as "artificial muscles". We have prepared highly porous poly (N-isopropylacrylamide) hydrogels showing a very fast response to change of temperature or pH value by a large change in volume due to swelling in water. The response to a temperature change occurs within 6 s corresponding to an acceleration of swelling by an order of magnitude. The gels displaying such a fast swelling have not been described so far. Also the gel de-swelling is extremely fast. The crucial role in the ability of the gels to quickly swell and de-swell is performed by the nanoparticles of inorganic filler (in situ generated silica). The nanosilica particles stabilize the hydrogel pores thus making possible a fast transport of water into

the gel and from inside the gel outwards. The filler also significantly reinforces mechanically the hydrogels. The project continues by the synthesis of the hydrogels quickly responding to both temperature and pH. For this purpose, the comonomer sodium methacrylate was added and as filler we used both in-situ generated silica particles and nanoparticles of TiO_2.

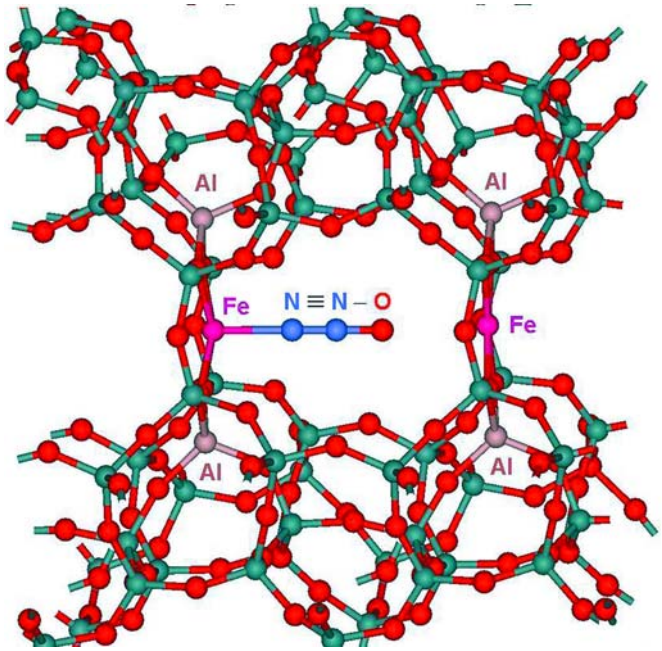
Strachotová, B. – Strachota, A. – Uchman, M. – Šlouf, M. – Brus, J. – Pleštil, J. – Matějka, L.: Super porous organic-inorganic poly(N-isopropylacrylamide)-based hydrogel with a very fast temperature response. Polymer. Vol. 48, No. 6 (2007), pp. 1471–1482.
Huerta, G. – Hishchak, K. – Strachota, B. – Šlouf, M. – Uchman, M. – Matějka L. – Strachota, A.: Super porous hydrogels with fast temperature and pH response based on poly(N-isopropylacrylamide-co-sodium methacrylate) filled with titanium dioxide nanoparticles. Polymer, sent to the editors, 2008

Complex multispectroscopic and quantum-chemical analysis to design on an atomic level a catalyst for the abatement of N_2O/NO_x from real process gasses

(J. Heyrovsky Institute of Physical Chemistry)

A complex approach to design highly specific catalysts at the atomic level has been developed. The catalysts are based on metal/oxide localised in a crystalline support and are employed to decompose N_2O into N_2 and O_2. A combination of multispectroscopic (FTIR, MAS NMR, UV-Vis-NIR) methods and state-of-the-art DFT calculations is applied to analyse the structure of catalysts to provide a complex description of the catalyst at the atomic level. We developed a unique computationally facile model of the fully hydrated zeolite to interpret experimental results and to describe the behavior of active centres localized in microporous matrices. Analysing the structure of catalysts and understanding their properties and behaviour at the atomic level represent an essential step in developing a new generation of highly active and selective heterogeneous catalysts and catalytic processes. This newly developed sophisticated approach resulted in the design of a new method of incorporating metals into a zeolite matrix and of determining the adequate crystalline structure of the zeolite. Moreover, subsequent cooperation with Eurosupport Czechia, s.r.o. resulted in the design of an industrial catalyst for the abatement of N_2O/NO_x from real process gases.

Sklenák, Š.– Dědeček, J. – Li, C.– Wichterlová, B.– Gábová, V. – Sierka, M.– Sauer, J.: Aluminum Siting in Silicon-rich Zeolite Frameworks. A Combined High Resolution ^{27}Al NMR and Quantum Mechanics / Molecular Mechanics Study of ZSM-5. Angew. Chem.-Int. Ed., Vol. 46, No. 38 (2007), pp. 7286 – 7289.
Sklenák, Š.– Dědeček, J.– Li, C.– Wichterlová, B.– Gábová, V. – Sierka, M.– Sauer, J: Aluminum Siting in the ZSM-5 Framework by Combination of High Resolution ^{27}Al NMR and DFT/MM calculations. Phys. Chem. Chem. Phys., Vol. 11, No. 8 (2009), pp. 1237 – 1247.
Dědeček, J. – Sklenák, Š. – Li, C.– Wichterlová, B.– Gábová, V. – Brus, J. – M. Sierka, M.– Sauer, J: Effect of Al-Si-Al and Al-Si-Si-Al Pairs in the ZSM-5 Zeolite Framework on the 27Al NMR Spectra. A Combined High Resolution 27Al NMR and DFT/MM Study. J. Phys. Chem. C, Vol. 113, No. 4 (2009), pp. 1447 – 1458.
Sklenák, Š. – Dědeček, J.– Li, C. – Gao, F. – Jansang, B.– Boekfa, B. – Wichterlová, B. – Sauer, J.: Aluminum Siting in the ZSM-22 and Theta-1 Zeolites Revisited: QM/MM Study. Coll. Czech. Chem. Commun., Vol. 73, No. 6 – 7 (2008), pp. 909 – 920.
Dědeček, J. – Sklenák, Š .– Li, C.– Wichterlová, B. – Gábová, V. – Brus, J. – Sierka M. Sauer, J.: Aluminum Siting in the Framework of Silicon Rich Zeolites. A ZSM-5 study. Zeolites and Related Materials – Trends, Targets and Challenges, eds. A. Gedeon, P. Massiani and F. Babonneau, Stud. Surf. Sci. Catal., No. 174 (2008), pp. 781–786.
Sklenák, Š.– Dědeček, J. – Li, C.– Gao, F.– Jansang, B. – Sauer, J.: Local geometry of AlO4- and SiO4 tetrahedra in the silicon rich chabasite. A combined high resolution NMR and QM/MM study. Zeolites and Related Materials – Trends, Targets and Challenges, eds. A. Gedeon, P. Massiani and F. Babonneau, Stud. Surf. Sci. Catal., No. 174 (2008), pp. 729–732.
Sklenák, Š.– Sobalík, Z. – Tvarůžková, Z. – Jansang, B. – Li, C.– Gao, F. – Boekfa, B.– Benco, L.– Bucko, T. – Hafner, J.: N_2O Decomposition on Iron Exchanged Ferrierite. A Combined Periodic DFT and Static IN-SITU FTIR Study, Stud. Surf. Sci. Catal., No. 174 (2008), pp. 713–716.



Local structure of catalytic centre in the zeolite for N_2O decomposition. Local structure of catalytic centre in the zeolite for N_2O decomposition (photo by archive ÚFCHJH).

Sklenák, Š.– Dědeček, J. – Li, C.– Wichterlová, B. –. Gábová, V– Sierka, M.– Sauer, J.: Aluminum Siting in Frameworks of Silicon Rich Zeolites. A Combined ^{27}Al 3Q MAS NMR and QM/MM study, Theoretical Aspects of Catalysis, eds. G. Vayssilov, T. Mineva, Heron Press, Sofia (2008), pp. 69–74.

Benco, L.– Bucko, T. –. Grybos, R – Hafner, J.– Sobalík, Z.– Dědeček, J.– Sklenák, Š. Hrušák, J.: Multiple Adsorption of NO on Fe^{2+} Cations in the Alpha and Beta-Positions of Ferrierite: An Experimental and Density Functional Study. J. Phys. Chem. C, Vol. 111. No. 26 (2007), pp. 9393–9402.

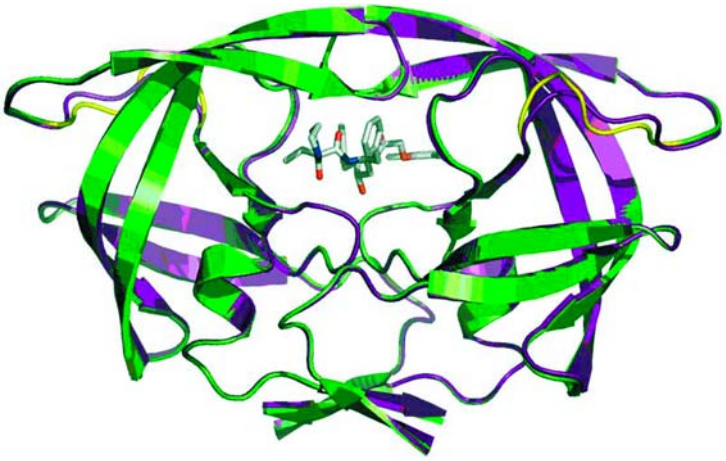
Jíša, K.– Nováková, J. – Schwarze, M.– Vondrová, A. – Sklenák, Š.– Sobalík, Z.: Role of the Fe-zeolite structure and iron state in the N2O decomposition: Comparison of Fe-FER, Fe-BEA, and Fe-MFI catalysts, J. Catal. Vol. 262, No. 1 (2009), pp. 27 – 34.

Nováková, J.– Sobalík, Z.: N_2O decomposition over Fe-ferrierite: primary and secondary reactions with reducing agents, Catal. Letters, Vol. 127, No. 1–2 (2009), pp. 95 – 100.

Molecular characterization of a new type of antiviral resistance in HIV positive patients

(Institute of Organic Chemistry and Biochemistry)

Inhibitors of viral protease are often and successfully used drugs against AIDS. An important complication of successful treatment is the development of virus resistance. Under the selection pressure of inhibitors new virus mutants appear very quickly that are no longer sensitive to corresponding compounds. Most mutations in HIV protease which lead to resistence development are caused by the change of one or more amino acids close to the binding site of the inhibitor. Recently, a novel type of mutations has been described which is based on insertion of one or more amino acids into the sequence of viral protease. No corresponding enzyme has been cloned yet, and neither resistance nor its mechanism on a molecular level has been characterized. Together with collleagues from the University Medical Centre in Utrecht we cloned two proteases containing amino acid insertions identified in a Duch patient who underwent long-term treatment by protease inhibitors. We prepared those enzymes by recombinant expression in E.coli and fully characterized them enzymologically. Together with Pavlína Řezáčová's team at IOCB we solved their structure by X-ray difraction and suggested a mechanism by which amino acids insertions can lead to the resistance development against inhibitors of HIV protease. This is the first work of its kind in the literature of this topic.



Molecular Characterization of Inhibitor Resistant HIV-1 Protease Mutants with Insertions in the Flap Region. Insertion in the HIV protease structure. Structural comparison of the wild-type (green) and mutated (violet) HIV PR. The area with amino acid insertion (Glu in the positron 35) is highlighted in yellow (photo by archive ÚOCHB).

Kožíšek, M. – Grantz Šašková, K. – Řezáčová, P. – Brynda, J. – Maarseveen, N. M. van – De Jongh, D. – Boucher, Ch. A. B. – Kagan, R. M. – Nijhuis, M. – Konvalinka, J.: Ninety-nine is not enough: molecular characterization of inhibitor-resistant human immunodeficiency virus type 1 protease mutants with insertions in the flap region. Journal of Virology. Vol. 82, No. 12 (2008), pp. 5869–5878.

5) BIOLOGICAL AND MEDICAL SCIENCES SECTION

The Section includes eight institutes whose research objectives were as follows:

- Biophysics of dynamic structures and the functions of biological systems (*Institute of Biophysics*)

- Genome and epigenome: 1D and 3D structures, dynamics, interactions with proteins and functions (*Institute of Biophysics*)

- Investigation of the molecular and cellular basis of physiological and pathophysiological processes to clarify the pathogenesis of important human diseases (*Institute of Physiology*)

- Microorganisms in research and biotechnology (*Institute of Microbiology*)

- Mechanisms of regulation of plant growth and development on the level of cells, organs and whole organisms: physiological, genetic and molecular bases (*Institute of Experimental Botany*)

- Molecular, cellular and systemic mechanisms of major diseases of the human organism: their diagnosis, therapy and pharmacotherapy (*Institute of Experimental Medicine*)

- New biotechnologies, nanomaterials and stem cells for use in regenerative medicine (*Institute of Experimental Medicine*)

- Molecular genetics and cellular bases of key biological processes: gene expression, oncogenesis, virus replication, immunity and the development of the organism (*Institute of Molecular Genetics*)

- Establishment of the Institute of Biotechnology ASCR (*Institute of Biotechnology*)

- Genetics, functional and developmental potential of animal cells, tissues and organisms: their use in medicine, ecology and agriculture (*Institute of Animal Physiology and Genetics*)

List of Studies:

1. Osmium tetroxide, 2,2 '-bipyridine: an electroactive marker for probing the accessibility of tryptophan residues in proteins (*Institute of Biophysics*)
2. Trans-generation inheritance of methylation patterns in a tobacco transgene following a post-transcriptional silencing event (*Institue of Biophysics*)
3. Theoretical study of the factors controlling the stability of the borate complexes of ribose, arabinose, lyxose, and xylose (*Institute of Biophysics*)
4. Effect of a low dose of anti-androgen vinclosolin on the reproductive parameters in mice (*Institute of Biotechnology*)
5. Intracellular expression profiles measured by real-time PCR tomography in the Xenopus laevis oocyte (*Institute of Biotechnology*)
6. α-Tocopheryl succinate induces apoptosis by targeting ubiquinone-binding sites in the mitochondrial respiratory complex II (*Institute of Biotechnology*)
7. TMEM70 is a novel factor of ATP synthase biogenesis and its mutations cause isolated enzyme deficiency and neonatal mitochondrial encephalo-cardiomyopathy (*Institute of Physiology*)
8. Identification of renal Cd36 as a determinant of blood pressure and the risk of hypertension (*Institute of Physiology*)
9. Information coding in olfactory neurons and their models (*Institute of Physiology*)
10. Chromatin position in human HepG2 cells: although being non-random, significantly changed in daughter cells (*Institute of Physiology*)
11. Characterization of the mechanism of action of the yeast factor eIF3 (*Institute of Microbiology*)
12. Proposal for a new mechanism of action of RTX cytotoxines (*Institute of Microbiology*)
13. Characterization of the evolution of the mitochondrial peptidases in two important unicellular parasites (*Institute of Microbiology*)
14. Characterization of proteins of the translational system in Streptomyces aureofaciens (*Institute of Microbiology*)
15. Characterization of role of gene slr2034 (ycf48) products in the assembly and reapir of photosystem II in cyanobacterium Synechocystis PCC 6803 (*Institute of Microbiology*)
16. Overcoming immunoescape mechanisms of BCL1 leukemia and the induction of CD8+ T cell-mediated BCL1-specific resistance in mice cured by targeted polymer-bound doxorubicin (*Institute of Microbiology*)
17. A novel strategy to dissect complex plant genomes (*Institute of Experimental Botany*)
18. How the protein complex exocyst regulates plant cell growth (*Institute of Experimental Botany*)
19. Regulation of the concentration of plant hormone cytokinin and its importance for control of plant development (*Institute of Experimental Botany*)
20. Genetic susceptibility to sporadic colorectal cancer (*Institute of Experimental Medicine*)
21. The use of hydrogels and stem cells in spinal cord injury repair (*Institute of Experimental Medicine*)
22. Oxidative damage of DNA, proteins and lipids in bus drivers in Prague *(Institute of Experimental Medicine*)
23. Genomic analysis and the higher susceptibility of children to air pollution (*Institute of Experimental Medicine*)
24. Construction of 27 Interspecific chromosome substitution strains of mice (*Institute of Molecular Genetics*)
25. Spliceosomal snRNPs repeatedly cycle through Cajal bodies (*Institute of Molecular Genetics*)

26. A rapid separation of two distinct populations of corneal epithelial cells with limbal stem cell characteristics in mice (*Institute of Molecular Genetics*)
27. Phospholipid scramblase 1 and mast cells activation (*Institute of Molecular Genetics*)
28. Antibody microarray analyses of signal transduction protein expression and phosphorylation during porcine oocyte maturation (*Institute of Animal Physiology and Genetics*)
29. Making it on their own: sperm-dependent hybrid fishes (Cobitis) switch their sexual hosts and expand beyond the ranges of their original sperm donors (*Institute of Animal Physiology and Genetics*)
30. Transcription analysis in the MeliM swine model identifies RACK I as a potential marker of malignancy for human melanocytic proliferation (*Institute of Animal Physiology and Genetics*)

Illustrative Abstracts:

TMEM70 is a novel factor of ATP synthase biogenesis and its mutations cause isolated enzyme deficiency and neonatal mitochondrial encephalo-cardiomyopathy

(Institute of Physiology)

The energy needs of the human organism fully depend on mitochondrial ATP synthase, which provides up to 95% of cellular ATP. In collaboration with the Institute of Inherited Metabolic Diseases and Pediatric Department of the First Faculty of Medicine, Charles University, we have elucidated the molecular basis of a novel mitochondrial disease due to ATP synthase deficiency affecting neuromuscular system of newborns and small children. In a number of patients suffering from a disorder of mitochondrial energetics we have found a decreased content of ATP synthase of quite normal, unchanged structure. The reduction of enzyme specific content to less than 30% control was caused by insufficient enzyme production. ATP synthase is composed of 16 different subunits and its biosynthesis depends on specific ancillary factors. A number of these are known in yeast but only 3 have been found in mammals. With the help of molecular genetic methods (whole-genome mapping, expression profiling, DNA sequencing) we have identified a mutation in TMEM70, a nuclear gene encoding putative mitochondrial protein of unknown function. The genetic basis of the disease has been confirmed by complementing of the patient's fibroblast with wtTMEM70, that fully restored the content and metabolic function of the ATP synthase. TMEM70 mutations were subsequently found in more than 30 patients from the Czech Republic, Slovakia, Austria, Germany and other countries. The results obtained within the Centre of Applied Genomics (1M6837805002) thus established TMEM70 as a new factor of mammalian ATP synthase biogenesis, the mutations of which are a frequent cause of ATP synthase deficiency in mankind. The results are of key importance for diagnostics, prevention and future therapeutic strategies in affected families.

Čížková, A. – Stranecký, V. – Mayr, J.A. – Tesařová, M. – Havlíčková, V. – Paul, J. – Ivánek, R. – Kuss, A.W. – Hansíková, H. – Kaplanová, V. – Vrbacký, M. – Hartmannová, H. – Nosková, L. – Honzík, T. – Drahota, Z. – Magner, M. – Hejzlarová, K. – Sperl, W. – Zeman, J. – Houštěk, J. – Kmoch, S.: TMEM70 mutations cause isolated ATP synthase deficiency and neonatal mitochondrial encephalocardiomyopathy. Nat Genet. Vol. 40, No. 11, (2008), pp. 1288–1290.

Characterization of the mechanism of action of the yeast factor eIF3

(*Institute of Microbiology*)

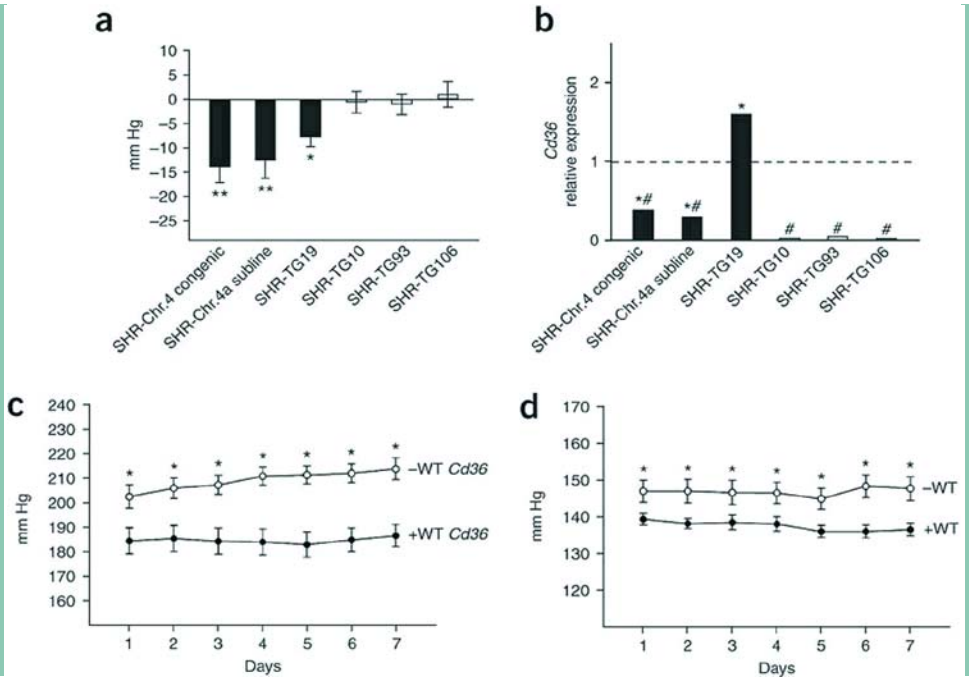
The mechanisms of the yeast initiation factor eIF3 action have been characterized in detail. It was found that partial deletion of the N-terminal domain (NTD) of eIF3a, which binds the small ribosomal protein RPS0A, impairs translation initiation and reduces binding of eIF3 and associated eIFs to native preinitiation complexes in vivo. Genetic analysis reveals a functional

interaction between the eIF3a-NTD and sequences 5' of uORF1 on mRNA that is critically required to enhance reinitiation. The results suggest that eIF3 is retained on ribosomes throughout uORF1 translation and, upon termination, interacts with its 5' enhancer at the mRNA exit channel to stabilize mRNA association with post-termination 40S subunits and enable resumption of scanning for reinitiation downstream.

Szamecz, B. – Rutkai, E. – Váchalová, L. – Munzarová, V. – Hermannová, A. – Nielsen, K.H. – Burela, L. – Hinnebusch, A. G. – Valášek L.: eIF3a cooperates with sequences 5' of uORF1 to promote resumption of scanning by post-termination ribosomes for reinitiation on GCN4 mRNA. Genes Dev. 22, (2008), pp. 2414–2425.

Identification of renal Cd36 as a determinant of blood pressure and a risk for hypertension

(Institute of Physiology)



Arterial blood pressure and renal expression of wild-type Cd36.
(a) Decreases in systolic blood pressure (SBP) associated with expression of wild-type Cd36 in two congenic and four transgenic strains of SHR (TG19, TG10, TG93 and TG106). The solid bars denote the strains with significant expression of wild-type Cd36 in the kidney;
(b) renal expression of wild-type Cd36. We used real-time RT PCR to quantify renal expression of wild-type Cd36 in the SHR-Chr.4 congenic strain, the SHR-Chr.4a subline and the SHR transgenic strains;
(c) radiotelemetry measurements of SBP in two groups bilaterally nephrectomized SHR recipients of either SHR or SHR Cd36 'transgenic' kidney that differ only in the renal expression of wild-type Cd36;
(d) radiotelemetry measurements of SBP in two groups bilaterally nephrectomized SHR recipients of either SHR or SHR Cd36 'congenic' kidney (photo by archive FGÚ).

To identify renally expressed genes that influence the risk of hypertension, we integrated expression quantitative trait locus (QTL) analysis of the kidney with genome-wide correlation analysis of renal expression profiles and blood pressure in recombinant inbred strains derived from the spontaneously hypertensive rat (SHR) and Brown Norway (BN) rat. This strategy, together with renal transplantation studies in the SHR progenitor, transgenic and congenic strains, identified a deficient renal expression of Cd36 encoding fatty acid translocase as a genetically determined risk factor for spontaneous hypertension. CD36 is expressed in several regions of the kidney, including on capillary endothelium in the renal medulla. CD36 is also known to colocalize with endothelial nitric oxide synthase (eNOS) in the caveolae of endothelial cells and is a determinant of eNOS activation by fatty acids. Given that reduced nitric oxide activity in the renal medulla has been implicated in the pathogenesis of hypertension, it is reasonable to speculate that mutations in Cd36 might influence the regulation of BP through nitric oxide-related pathways in the kidney. Consistent with this possibility, we have found that levels of the major nitric oxide second messenger cyclic GMP are significantly lower in both kidney tissue and urine of the SHR progenitor strain with mutant Cd36 than in the SHR-Chr.4 congenic strain and SHR-TG19 transgenic strain expressing wild-type Cd36. This is the first study describing identification of a blood pressure regulatory QTL in the SHR at molecular level.

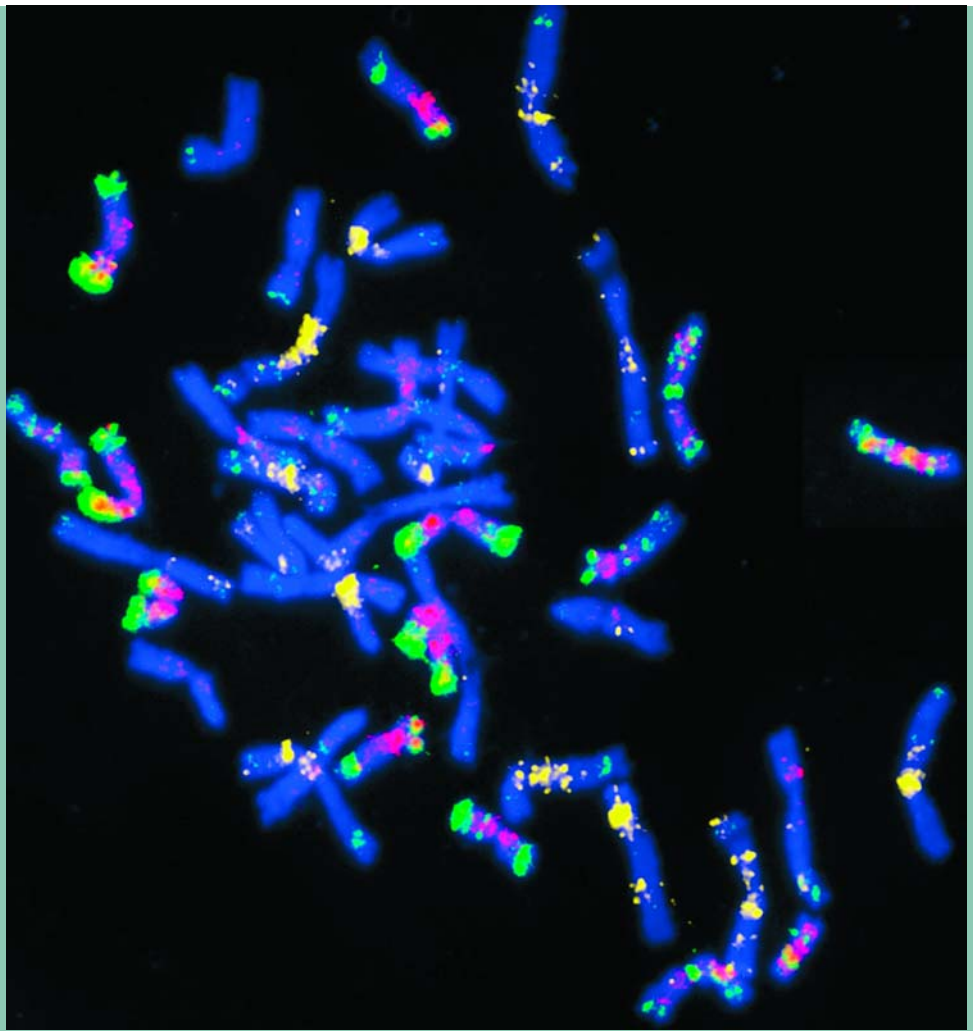
Pravenec, M. – Churchill, P.C. – Churchill, M.C. – Viklický, O. – Kazdová, L. – Aitman, T.J. – Petretto, E. – Hubner, N. – Wallace, C.A. – Zimdahl, H. – Zídek, V. – Landa, V. – Dunbar, J. – Bidani, A. – Griffin, K. – Qi, N. – Maxová, M. – Křen, V. – Mlejnek, P. – Wang, J. – Kurtz, T.W.: Identification of renal Cd36 as a determinant of blood pressure and risk for hypertension. Nat Genet. Vol. 40, No. 8, (2008), pp. 952–954.

A novel strategy to dissect complex plant genomes

(Institute of Experimental Botany)

The complete genetic information of an organism, present in its DNA, is called the genome. The "reading" (sequencing) of an entire genome helps to identify interesting genes, facilitates breeding programs, and reveals the evolution on a DNA level. However, the genome of many crops greatly expanded during their evolution. For example, its size in bread wheat is six times that in a human. Sequencing of such complex genomes is nearly impossible using current technology.

Our laboratory developed a strategy that solves this crucial problem. It is based on dividing a genome into chromosomes or chromosome arms – i.e. smaller parts that can be "read" separately. We sort chromosomes by size, using so-called laser flow cytometry. First we developed methods for obtaining intact bread wheat chromosomes, for sorting chromosomes or their arms, and for DNA isolation from them. The resulting DNA enabled a construction of libraries (sets of DNA fragments) containing the genetic information of a single chromosome or a chromosome arm. These libraries can be used for the construction of so-called physical



Chromosomes sorted using flow cytometry are used for the localization of specific DNA sequences. Structure of chromosomes at molecular level. Cytogenetic markers facilitate the analysis of chromosome changes accompanying evolution and breeding (photo by archive ÚEB).

genome maps, isolation of genes, and sequencing. Until now we have developed methods for chromosome sorting in a number of species, including the majority of temperate cereals, and confirmed the utility of the chromosomes thus obtained for mapping.
A breakthrough result was the construction of the first ever physical map of the wheat chromosome 3B which carries important genes. It confirmed the superiority of our strategy which was chosen by the International Wheat Genome Sequencing Consortium as a primary approach for genome analysis in this crop and is also employed in other international projects. We now focus on using these flow-sorted chromosomes for the detailed "reading" of genetic information.

Šimková, H. – Svensson, J. T. – Condamine, P. – Hřibová, E. – Suchánková, P. – Bhat, P. R. – Bartoš, J. – Šafář, J. – Close, T. J. – Doležel, J.: Coupling amplified DNA from flow–sorted chromosomes to high-density SNP mapping in barley. – BMC Genomics 9, (2008), pp. 294
Paux, E. – Sourdille, P. – Salse, J. – Saintenac, C. – Choulet, F. – Leroy, P. – Korol, A. – Michalak, M. – Kianian, S. – Spielmeyer, W. – Lagudah, E. – Somers, D. – Kilian, A. – Alaux, M. – Vautrin, S. – Berges, H. – Eversole, K. – Appels, R. – Šafář, J. – Šimková, H. – Doležel, J. – Bernard, M. – Feuillet, C.: A physical map of the 1-gigabase bread wheat chromosome 3B. – Science 322, (2008), pp. 101–104.

Genetic susceptibility to sporadic colorectal cancer

(Institute of Experimental Medicine)

Incidence of colorectal cancer (CRC) in the Czech Republic ranks at the top wordwide. While inherited susceptibility accounts for 35% of CRC, high-risk germline mutations in critical genes are responsible for 6% of cases. Recent hypothesis relates CRC risk to common, low-risk variants and their identification was the main aim of our investigation. We have addressed tentative functionally relevant variants in genes involved in specific pathways, such as DNA repair, mismatch repair, cell cycle regulation, multidrug resistence genes, insulin pathway, obesity genes, related to cancer incidence and progression. Whereas individual alleles exert only small effects on CRC risk, much larger risks may be expected in carriers of multiple risk alleles. A haplotype approach has been employed for investigation of mismatch repair genes and a pivotal gene (TP53) in cell cycle regulation. Haplotypes in the mismatch MSH6 gene and cell cycle TP53 significantly modulated CRC risk. A novel contribution was our research on polymorphisms residing on microRNA binding sites (micro RNA can bind to the 3' untranslated region of messenger RNAs and by interferring with the translation participate on regulation of cell growth, cell differenciation, apoptosis and tumorigenesis) in relation to CRC risk. A significant association of CD86 (a gene involved in immune response) and INSR (insulin receptor gene) with CRC risk has been reported. A multicentric GWAS study discovered susceptibility loci on chromosomes 8q23.3, 8q24, 10p14, 15q13, and 18q21 on 10731 CRC cases from all over the world. The data supports the role of common, low-risk variants in CRC risk and these variants will be investigated for their role in CRC aethiology.

Poláková, V. – Pardini, B. – Naccarati, A. – Landi, S. – Slyšková, J. – Novotný, J. – Vodičková, L. – Lorenzo Bermejo, J. – Hánova, M. – Šmerhovský, Z. – Tulupová, E. – Kumar, R. – Hemminki, K. – Vodička, P.: Genotype and haplotype analysis of cell cycle genes in sporadic colorectal cancer in Czech Republic. Human Mutation, (2008) in press
Tulupová, E. – Kumar, R. – Hánová, M. – Slyšková, J. – Pardini, B. – Poláková, V. – Naccarati, A. – Vodičková, L. – Novotný, J. – Halamková, J. – Hemminki, K. – Vodička, P.: Do polymorphisms and haplotypes of mismatch repair genes modulate risk of sporadic colorectal cancer? Mutat Res. 2008 Dec 15; 648(1–2):40–5
Pittman A. M. et al.: Refinement of the basis and impact of common 11q23.1 variation to the risk of developing colorectal cancer. Hum Mol Genet. 2008 Dec 1; 17(23):3720–7..
Tomlinson I. P. et al.: A genome-wide association study identifies colorectal cancer susceptibility loci on chromosomes 10p14 and 8q23.3. Nat Genet. 2008 May;40(5):623–30.
Campa, D. – Vodička, P. – Pardini, B. – Novotný, J. – Försti, A. – Hemminki, K. – Barale, R. – Canzian, F.: Could polymorphisms in ATP-binding cassette C3/multidrug resistance associated protein 3 (ABCC3/MRP3) modify colorectal cancer risk? Eur J Cancer. 2008 Apr;44(6):854–7.

6) BIO-ECOLOGICAL SCIENCES SECTION

This Section is comprised of four institutes with the following research objectives:

- The structure, function and evolution of the biodiversity of photoautotrophic organisms and fungi, the origin and causes of their variation, population, community and ecosystem dynamics; the application of selected results in Průhonice Park (*Institute of Botany*)

- The structure, functioning and development of aquatic ecosystems (*Biology Centre*)

- Parasitism and host-parasite relationships at the organismal, cellular and molecular levels (*Biology Centre*)

- The biodiversity and ecology of vertebrates: implications in conservation and the sustainable management of natural populations (*Institute of Vertebrate Biology*)

- Spatial and functional dynamics of biological, ecological and socio-economic systems interacting with global climatic change (*Institute of Biological and Ecological Systems*)

- Relationships between the structure and function of a decomposer food web in soil (*Biology Centre*)

- Research on the molecular organisation of plants and their pathogens, induction and analysis of targeted changes in genome and platome and the study of photosynthesis processes and heritability in interaction with the environment and pathogens (*Biology Centre*)

- The study of the regulation of insect organisms, the dynamics of insect populations and the function of insects in ecosystems (*Biology Centre*)

List of Studies:

1. Host plant catalog of aphids in the palaearctic region (*Biology Centre*)
2. A photosynthetic alveolate closely related to apicomplexan parasites (*Biology Centre*)
3. Survey of extrachromosomal circular DNA derived from plant satellite repeats (*Biology Centre*)
4. Identification and isolation of new secondary metabolites from actinomycetes with potential therapeutic applications to modulate immune mechanisms (*Biology Centre*)
5. Application of the PDMPO technique in studying silica deposition in natural populations of Fragilaria crotonensis (Bacillariophyceae) at different depths in an eutrophic reservoir (*Biology Centre*)
6. Knowledge of biological invaders in Europe is used for setting future research priorities (*Institute of Botany*)
7. New ecologically sustainable measures for the management of cyanobacterial water blooms in aquatic ecosystems (*Institute of Botany*)
8. Spontaneous succession or technical reclamation as tools for the restoration of vegetation in disturbed habitats (*Institute of Botany*)
9. Checklist and Red List of the lichens of the Czech Republic (*Institute of Botany*)
10. Brucella microti sp. nov. – a 'missing link' in the evolution of brucellae, the pathogens of mammals? (*Institute of Vertebrate Biology*)
11. The latest findings concerning the species diversity of gudgeon of the genus Gobio in the Euro-Asian context (*Institute of Vertebrate Biology*)
12. The role of UV wavelengths in the avian brood parasite-host system (*Institute of Vertebrate Biology*)

13. The three-dimensional structure of bacterial DNA`s long-distance cutter (*Institute of Biological and Ecological Systems*)
14. The influence of woody elements on the nadir reflectance of the Norway spruce canopy simulated by the DART model at very high spatial resolution (*Institute of Biological and Ecological Systems*)
15. Population systems (*Institute of Biological and Ecological Systems*)

Illustrative Abstracts:

A photosynthetic alveolate closely related to apicomplexan parasitesApicomplexa

(Biology Centre)

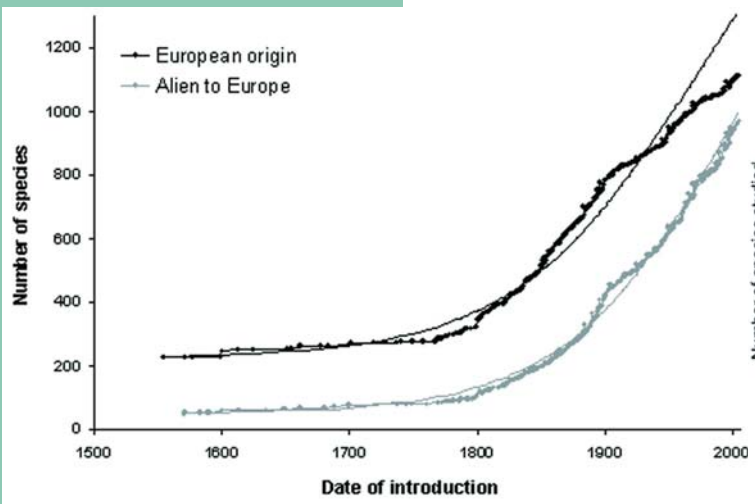
Many parasitic apicomplexans, such as for instance Plasmodium falciparum, the causative agent of malaria, or the teratogenic parasite Toxoplasma gondii, contain a non-photosynthetic relic plastid also called the apicoplast, which represents a prospective target for malaria. However, no close relative of apicomplexans with a functional photosynthetic plastid has yet been described. Here we describe a new organism isolated from corals that has ultrastructural features typical for alveolates, is phylogenetically related to apicomplexans, and contains a photosynthetic plastid. The plastid is surrounded by four membranes, is pigmented by chlorophyll a, and uses the codon UGA to encode tryptophan in the psbA gene. This genetic feature has been found only in coccidian apicoplasts and various mitochondria. The UGA-Trp codon and phylogenies of plastid and nuclear ribosomal RNA genes indicate that the organism is the closest known photosynthetic relative to apicomplexan parasites and that its plastid shares an origin with the apicoplasts. The discovery of this organism provides a powerful model with which to study the evolution of parasitism in Apicomplexa.

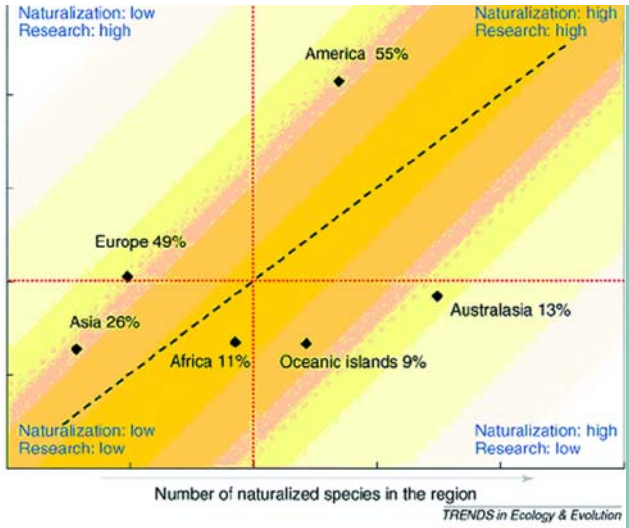
Moore, R. B. – Oborník, M. – Janouškovec, J. – Chrudimský, T. – Vancová, M. – Green, D. H. – Wright, S. W. – Davies, N.W. – Bolch, Ch. J. S. – Heimann, K. – Šlapeta, J. – Hoegh-Guldberg, O. – Logsdon, J. M. – Carter, D. A.: A photosynthetic alveolate closely related to apicomplexan parasites. Nature 451, (2008), pp. 959–963.

Knowledge of biological invaders in Europe is used for setting future research priorities

(Institute of Botany)

The DAISIE project of the EU 6th Framework Programme was aimed at collating existing data about invasive organisms in Europe into a pan-European database; this data has been up to now scattered in grey literature and unpublished. The resulting open-access database (www.europe-aliens.org) includes information about 11,000 non-native species of vascular plants, fungi, invertebrates and vertebrates in terrestrial, freshwater and marine ecosystems of Europe. The data was analysed in a monograph, which summarizes historical, geographical and ecological trends in particular taxonomic/environmental groups and evaluates the impact of biological invaders on invaded ecosystems and presents a complete list of alien species in Europe. This list captures the status quo of biological invasions in Europe and will serve as a reference data set for evaluating future trends and the effectiveness of adopted measures against invasive species. The results of the DAISIE project revealed that the number of naturalized alien species in Europe is much higher than previously thought. A warning signal is that in the dynamic increase in alien species numbers, in none of the taxonomic groups considered is shown any deccelaration; rather the opposite is true (DAISIE 2009). The Botanical Institute took a major role in the plant part of the project. The alien flora of Europe consists of 5789 species, of which 3749 species are naturalized; 1780 naturalized species arrived from other continents (the remaining are native to part of Europe and invading within another part outside of their native distribution range). Currently, six new naturalized species are recorded each year in Europe (Lambdon et al. 2008, Pyšek et al. 2009).





Dynamics of increase in numbers of alien plant species in Europe. Dynamics of increase in numbers of alien plant species in Europe, shown separately for arrivals from other continents (alien to Europe) and with native distribution in part of Europe and invading elsewhere in the continent (from Lambdon et al., Preslia, 2008).

Geographical bias in invasion ecology. Geographical bias in invasion ecology. Numbers of plant species studied in regions of the world are related to the total numbers of naturalized species in these regions. Values are standardized. Regions below the line of unity are less intensively researched, in terms of species addressed in case studies, these correspond to their proportional contribution to the global pool of naturalized plant species, and vice versa; the ratio of studied to naturalized species is indicated following the name of the region (from Pyšek et al., Trends in Ecology and Evolution 2008).

The data from the DAISIE project was used as a reference data set in a study assessing geographical biases in research on bilogical invasions. Some regions, such as Africa and Asia, are disproportionally little studied (related to the actual number of plant invaders), which leads to the lack of information on invasions occurring in regionally specific habitats. Taxonomic bias is minor (all major taxonomic groups of invaders are fairly well covered) but the majority of information on the mechanisms of invasions comes from case studies of a limited number of highly invasive species. Therefore, it seems plausible to shift the research focus more towards naturalization, i.e. the part of the process which determines the successful establishment of a species in a new region; this phase is also crucial for our understanding of how invasions work (Pyšek et al. 2008). Thanks to the DAISIE initiative, Europe has become a continent with the most comprehensive knowledge of its alien species, and the results have become an information base for the recently released European Commision policy options for EU strategy on invasive species (press release no. IP/08/1890).

DAISIE: Handbook of Alien Species in Europe. Berlin: Springer, 2009. 399 pp.
Pyšek, P. – Lambdon, P. W. – Arianoutsou, M. – Kühn I. – Pino J. – Winter M.: Alien vascular plants of Europe. Handbook of Alien Species in Europe. Berlin: Springer, 2009 – (DAISIE), pp. 43–61.
Lambdon, P.W. – Pyšek, P. – Basnou, C., Hejda, M. et al.: Alien flora of Europe: species diversity, temporal trends, geographical patterns and research needs. Preslia. Vol. 80, No. 2 (2008), pp. 101–149;
Pyšek, P. – Richardson, D. M. – Pergl, J. – Janošík, V. – Sixtová, Z. – weber, E.: Geographical and taxonomic biases in invasion ecology. Trends in Ecology and Evolution. Vol. 23, No. 5 (2008), pp. 237–244.

Brucella microti sp. nov. – a 'missing link' in the evolution of brucellae, the pathogens of mammals?

(Institute of Vertebrate Biology)

Severe systemic disease in common voles appeared in South Moravia (Czech Republic) several years ago, caused by a bacterium which has been, after detailed study, described as a new species Brucella microti (type strain CCM 4915T) this year. Its membership within the genus Brucella was confirmed using DNA-DNA hybridization and other molecular-genetic techniques. Biochemical tests revealed a surprisingly high level of enzymatic activity of this species and also certain metabolic features not present in other brucellae while common in some saprophytic soil microorganisms, e.g. in the related genus Ochrobactrum of the same family Brucellaceae. This year, additional isolates of B. microti were recovered from enlarged throat lymphatic nodes of a red fox in Lower Austria, and even from the soil samples in vole burrows on the original site of the prototype strain in South Moravia during the winter season several

years after the vole epizootic. It is therefore probable that B. microti is essentially a soil bacterium but potentially pathogenic to mammals. This species could represent a 'missing link' in the evolutionary trajectory of brucellae from saprophytic to pathogenic microorganisms. Brucellae belong to dangerous and frequently studied pathogens of humans and domestic animals. The unexpected discovery of their brand new species could be important for experimental studies of pathogenicity and therapy of brucellosis.

Scholz, H. C. – Hubálek, Z. – Sedláček, I. – Vergnaud, G. – Tomaso, H. – Al Dahouk, S. – Melzer, F. – Kämpfer, P. – Neubauer, H. – Cloeckaert, A. – Maquart, M. – Zygmunt, M. S. – Whatmore, A. M. – Falsen, E. – Bahn, P. – Göllner, C. – Pfeffer, M. – Huber, B. – Busse, H. J. – Nöckler, K.: Brucella microti sp. nov., isolated from the common vole Microtus arvalis. International Journal of Systematic and Evolutionary Microbiology. Vol. 58 (2008), pp. 375–382.
Schulz, H. C. – Hubálek, Z. – Nesvadbová, J. – Tomaso, H. – Vergnaud, G. – Le Fleche, P. – Whatmore, A. M. – Al Dahouk, S. – Krüger, M. – Lodri, C. – Pfeffer, M.: Isolation of Brucella microti from soil. Emerging Infectious Diseases. Vol. 14 (2008), pp. 1316–1317.

Host Plant Catalog of Aphids in the Palaearctic Region

(Biology Centre)

This is a unique synthesis of virtually all available information on aphid host plants, documenting 77,831 trophic relationships between aphid and plant species in a particular geographic area. These interactions involve 3,654 aphid and 11,793 plant species. This study thus includes two thirds of all known aphid species and as such represents a fundamental work for further analysis of the ecology and evolution of aphis-plant interactions. It is also a valuable source for agricultural and forestry practicioners.

Holman, J.: Host Plant Catalog of Aphids. Palaearctic Region. Springer Verlag, New York, 2009. 1216 pp. ISBN 978-1-4020-8285-6.

Three-dimensional structure of bacterial DNA`s long-distance cutter

(Institute of Systems Biology and Ecology)

Type I restriction-modification enzymes recognise a target sequence and translocate DNA from both sides while remaining stationary, creating supercoiled loops to cleave at nonspecific sites several kilobases away. The crystal structure of the motor subunit of EcoR124I which has been solved by the authors, provides insight into these complex machines, suggests how the pentameric translocating complex is assembled and is the first crystal structure of a functional RecA-like ATPase motor translocating duplex DNA.

Lapkouski, M. – Panjikar, S. – Janščák, P. – Kutá Smatanová, I. – Carey, J. – Ettrich, R. – Cséfalvay, E.: Structure of the motor subunit of the type I restriction-modification complex EcoR124I. Nature Structural & Molecular Biology, 2009, 16(1):94–5., advanced online publication, 14 December 2008 (doi: 10.1038/nsmb.1523)

7) SOCIAL AND ECONOMIC SCIENCES SECTION

The Section is comprised of five institutes with the following research objectives:

- The development of an infrastructure for science and research; the historical bibliography retrospective: the history of books and libraries in the Czech Lands to 1800 (*Library*)
- The economic aspects of EU and EMU entry (*Economics Institute*)
- The human being in the context of life-span development (*Institute of Psychology*)

■ Sociological analysis of long-term social processes in Czech society in the context of European integrational policies: the development of a knowledge-based society and of human, social and cultural capital (*Institute of Sociology*)

■ Harmonization of law in the European Union and its impact on the legal systems of the member states in the context of an Information Society (*Institute of State and Law*)

List of Studies:

1. Views of towns, residences and their parts in Bohemica print production of the 16th to 18th Centuries (with specific reference to the territory of the Czech Republic). (*Library of the ASCR*)
2. The DML-CZ Project (Czech Digital Mathematical Library): objectives and first steps. (*Library of the ASCR*)
3. The restructuring of firms in transition: ownership, institutions and openness to trade. (*Economics Institute*)
4. Job reallocation in two cases of large-scale adjustment in Eastern Europe. (*Economics Institute*)
5. The unbundling regime for electricity utilities in the EU: a case of legislative and regulatory capture? (*Economics Institute*)
6. Personality trait similarity between spouses in four cultures. (Institute of Psychology)
7. Software for adaptive testing CATo. (*Institute of Psychology*)
8. Narrative Psychology. (*Institute of Psychology*)
9. Flexibility of work, marginalisation and private life in specific occupations and social groups. (*Institute of Sociology*)
10. Handbook of the sociology of religion. (*Institute of Sociology*)
11. The changes to the representation of interests after EU accession. (*Institute of Sociology*)
12. International public law. (*Institute of State and Law*)
13. European international private law. (*Institute of State and Law*)
14. International conventions on investment protection and dispute resolution. (*Institute of State and Law*)

Illustrative Abstracts:

Views of towns, residences and their parts in Bohemica print production of the 16th to 18th centuries (with Specific reference to the territory of the Czech Republic)
(Library of the ASCR)

The project has aimed to: a) outline a list of all illustrations of localities or their parts appearing in books that were printed in presses founded within the current existing borders of the Czech Republic in the 16th to 18th centuries; b) outline a list of illustrations in prints from foreign presses between 16th and 18th century if the topic of the illustration was a locality found within the current existing borders of the Czech Republic; c) analyse the data obtained to discover possible relationships and collaborations among creators (printer/author of the print/illustration) and the usage timescale of topographic motifs and graphic techniques in printed books. In the first part (Prague 2002) there are altogether 180 localities or parts thereof, registered in 812 illustrations, 85 names of artists (about a third of the illustrations are not signed) and 113 printers were found in connection with these illustrations. In the second part there are in total 298 localities or parts thereof, registered in 1100 illustrations. Among them 208 names of graphic artists were found and which are linked with the production of 253 printers or publishers. If we eliminate names of localities and authors repeated in both parts there are 395 localities in approximately 1900 illustrations, works of 250

graphic artists and 306 printers and publishers. A CD-ROM contains illustrations of foreign-language Bohemica.

Bártová, L. – Baďurová, A.: Vyobrazení měst a jiných lokalit v tiscích 16.–18. století (se vztahem k území České republiky). II/1. Bibliografie cizojazyčných bohemikálních tisků z let 1501–1800. Textová část a soupis. II/2. Rejstříky + CD–ROM. Knihovna Akademie věd ČR, v. v. i., Praha 2008. 410 pp. + 13 add.

Česká Lípa in a Zittau print from the year 1780
(photo by archive KNAV).

Job reallocation in two cases of large-scale adjustment in Eastern Europe
(Economics Institute)

This paper uses worker-level data to characterize economy-wide job creation and job destruction during periods of massive structural adjustment. We contrast the gradualist Czech and the rapid Estonian approach to the destruction of the communist economy and assess their experiences in the light of selected theories of resisted reallocation.

Jurajda, Š. – Terrell, K.: Job reallocation in two cases of massive adjustment in Eastern Europe. World Development, Vol. 36 (2008), No. 11, pp. 2144–2169

Software for adaptive testing CATo
(Institute of Psychology)

Nowadays a new approach to testing psychological and other characteristics is widely used. This approach is known as Computerized Adaptive Testing (CAT) and enables testing to become more effective and accurate. The basic idea of CAT is to concentrate only on those items that are most appropriate for a tested individual and providing the maximum amount

Logo of the CATo software (Computerized Adaptive Testing optimized).
Logo of the CATo software (Computerized Adaptive Testing optimized) originated at the Institute of Psychology, p.r.i.
(photo by archive PSÚ).

of information, speaking in terms of Item Response Theory (IRT) as the most common mathematical apparatus of CAT. The software implements the functions for computerized adaptive testing, which are able to administer interactively and choose appropriate items, estimate proficiency, and evaluate a predefined condition for the end of the test. These functions are based on the mathematical apparatus Item Response Theory. We call this little piece of software CATO – Computerized Adaptive Testing Optimized.

Jelínek, M. – Květon, P. – Denglerová, D.: Software pro adaptivní testování CATo [Software for adaptive testing CATo.] Brno,Psychologický ústav AV ČR, v. v. i., Brno 2008

Handbook of the sociology of religion
(Institute of Sociology)

The purpose of this encyclopaedic handbook, prepared by top Czech experts, is to inform the expert and lay public alike about the current state of this field of research, its methods and its theories, around the world, and to establish the Czech sociology of religion on a comparable footing with foreign developments in this field allowing it to participate as an equal partner at an international level. The book is divided into three parts: the first focuses on the sociology of religion as a scientific field, the second examines the main themes in the contemporary sociology of religion, and the third offers biographical and bibliographical profiles of important figures in the field. The book is also accompanied by a detailed index. The second and larger part of the book examines the mutual links between religion and demographic factors, such as age and gender, ethnicity and kinship. It also looks at religion and transnationalism resulting from migration and globalisation, and the points of intersection between religion and economics, politics and the media. Religiosity figures in all these spheres, sometimes as a dependent and other times as a determining factor, and on a much larger scale than social scientists and the public had expected until recently. The contemporary world is no less religious than it was before; on the contrary, in many ways it is even more so. The final chapter of the second part of the book therefore deals with religious forms typical of advanced modern society, which include new religious movements and non-church spirituality (sometimes referred to as New Age), and with the changing nature of 'traditional' churches.

Nešpor, Z. R. – Václavík D. et al. Příručka sociologie náboženství. Sociologické nakladatelství (SLON), Praha 2008, 449 pp.

International public law
(Institute of State and Law)

This extensive publication deals with the history of international law and its science, presents the subjects, sources and types or rules of international law and deals with state territories, international areas and the international protection of human rights. It describes state authoritites and international organizations and deals with the law of international security and the solution of armed conflicts.

Čepelka, Č. – Šturma, P.: Mezinárodní právo veřejné. C. H. Beck, Praha 2008, 840 pp

8) HISTORICAL SCIENCES SECTION

This section consists of six institutes whose research objectives are as follows:

- Prehistoric and early historical development in Central Europe in the light of the latest results of archaeological research in Moravia and Silesia. (*Institute of Archaeology, Brno*)

■ The archaeological potential of Bohemia: theoretical research, methodology and information systems, care for its national cultural heritage. (*Institute of Archaeology, Prague*)

■ The search for an identity: intellectual and political conceptions of Czech Society in recent times, 1848 – 1948. (*Masaryk Institute and Archives*)

■ Research into, and the protection of, the starting place or font for the history of science and culture in the Czech Lands: modern methods of processing and providing access to their information value and a prospective strategy for working with electronic documents. (*Masaryk Institute and Archives*)

■ Czech historical space within a European context: diversity, continuity, integration. (*Institute of History*)

■ Research into the history of Czech visual arts in terms of integration within the European Community. (*Institute of Art History*)

■ Analysis of Czechoslovak/Czech contemporary history and the history of science. (*Institute of Contemporary History*)

List of Studies:

1. Petřkovice: on shouldered points and female figurines. (*Institute of Archaeology, Brno*)
2. Mutěnice-Zbrod: an extinct Slavonic settlement from the 7th–10th centuries. (*Institute of Archaeology, Brno*)
3. The economic hinterland of early medieval centres. (*Institute of Archaeology, Brno*)
4. The archeology of prehistoric Bohemia: the finalisation of the project – the publication of the last volumes. (*Institute of Archaeology, Prague*)
5. The taphonomy of prehistoric settlement layers. (*Institute of Archaeology, Prague*)
6. Mediaeval castles on the Malše river. (*Institute of Archaeology, Prague*)
7. War and the army in Czech history. (*Masaryk Institute and Archives*)
8. The library manuscript catalogue of St James Parish Church in Brno. (*Masaryk Institute and Archives*)
9. Agrarians, national democracy and the People's Party in the latter half of the First Czechoslovak Republic. (*Masaryk Institute and Archives*)
10. Medieval Sources: the treatises of Petr Chelčický. (*Institute of History*)
11. Biographical studies. (*Institute of History*)
12. The crisis of European democracy and Czechoslovakia in the early 20th century (until 1948). (*Institute of History*)
13. Emauzy: the Benedictine monastery of Na Slovanech in the heart of Prague. (*Institute of Art History*)
14. On the fundamentals of the conservative theory of the preservation of art historical monuments. (*Institute of Art History*)
15. Green architecture.cz (*Institute of Art History*)
16. Forgotten Heroes: documenting the destinies of the active anti-Nazis who were affected by the measures taken against the so-called enemy population in post-war Czechoslovakia. (*Institute for Contemporary History*)
17. History of the Czech Lands. (*Institute of History and Institute for Contemporary History*)
18. The Book of Twenty Arts by Master Pavel Žídek (Paulerinus): the Section devoted to natural history. (*Institute for Contemporary History*)

Aerial photograph of an archaeological excavation . Aerial photograph of the rescue excavation during road construction at Kolín, Central Bohemia. Arrows show Neolithic ditch enclosures, the so-called 'rondels' (2nd half of the 5. mill. BC). Excavation by the Institute of Archaeology ASCR, Prague (photo by archive ARUP).

Illustrative Abstracts:

The archeology of prehistoric Bohemia: the finalisation of the project – the publication of the last volumes.
(Institute of Archaeology, Prague)

Eight volumes of this work represent a particular statement by a generation of Czech archaeologists – the last attempt at such a synthesis was published in 1978. The work is a comprehensive summary of prehistoric archaeology in Bohemia built upon new data and theoretical developments. The team of authors comprises more than 50 specialists, most of whom come from the Institute of Archaeology ASCR, Prague. The work is intended for the use of specialists and students of archaeology, but it can also provide information for a wider public, too.

Jiráň, L. (ed.) et al.: Doba bronzová. Archeologie pravěkých Čech 5. Praha 2008 (ARÚP), 265 pp.
Neustupný, E. (ed.) et al.: Eneolit. Archeologie pravěkých Čech 4. Praha 2008 (ARÚP) (in press)
Venclová, N. (ed.) et al.: Doba halštatská. Archeologie pravěkých Čech 6. Praha 2008 (ARÚP). 173 pp.
Salač, V. (ed.) et al.: Doba římská a stěhování národů. Archeologie pravěkých Čech 8. Praha 2008 (ARÚP) (in press)

War and the army in Czech History.
(Masaryk Institute and Archives)

The basic starting point of this monograph is the question of the position taken within Czech history by war and the army from the end of the Middle Ages and the beginning of the Modern Age to the present day, with the authors concentrating primarily on social and cultural spheres within the history of Czech Society. The generally applicable thesis that war and military affairs are closely tied-in with the structure of society is supported in analyses which focuses on the specific case of Czech history over a broad timescale.

Koldinská, M. – Šedivý, I.: Válka a armáda v českých dějinách. Sociohistorické črty. NLN, Praha 2008, 580 pp.

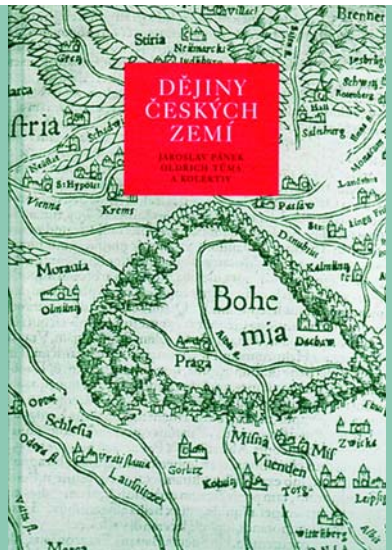
The crisis of European democracy and Czechoslovakia in the early 20th century (until 1948).
(Institute of History)

This monograph covers Czechoslovak diplomacy in the context of political development in the 1930s and 40's. The book deals with the break-up of Czechoslovak diplomatic missions after the German occupation of the Czech Lands in March 1939, including the liquidation of the Czechoslovak Ministry of Foreign Affairs, as well as with the renewal of Czechoslovak diplomacy after the recognition of the Czechoslovak Government-in-Exile during WWII. The above mentioned questions are also closely connected with the fate of the diplomacy of the Slovak state and with the various investigations and assessments after the re-establishment of Czechoslovakia in the years 1945–1948.

Němeček, J.: Soumrak a úsvit československé diplomacie, Academia, Praha 2008, 640 pp.

The Twilight and Dawn of the Czechoslovak Diplomacy. A detailed analysis of the fate of the Czechoslovak Diplomatic Corps and embassy staffs on the eve of and during World War II, based on hitherto unknown primary sources
(photo by archive HÚ).

History of the Czech Lands.
(Institute of History and Ther Institute for Contemporary History)



Title page of the book Pánek, Jaroslav- Tůma, Oldřich et al.: Dějiny českých zemí. Title page
(photo by archive ÚSD).

A collective monograph by notable historians, the intention of which is to give to a wider public (not only in Czech: the English version is to be published soon and editions in other languages intended) a well-researched digest of the history of the Czech Lands from prehistoric times to the present day. The authors of the monograph are historians of the Institute of History of the ASCR, and the final six chapters (1945–1992) were compiled by historians of the Institute of Contemporary History of the ASCR.

Pánek, J. – Tůma, O. et al.: Dějiny českých zemí. Karolinum, Praha 2008. 487 pp.

Forgotten heroes: documenting the destinies of the active anti-Nazis who were affected by the measures taken against the so-called enemy population in post-war Czechoslovakia.
(The Institute for Contemporary History)

A final evaluation of the project which involved the participation of national and foreign specialists, actual witnesses, political representatives of Germany, Austria and Czech republic and as well contemporary media sources co-inciding with the opening of the permanent project exhibition 'Forgotten Heroes' and of the documentation centre in Ústí nad Labem.

Okurka, T. (ed.): Zapomenutí hrdinové / Vergessene Helden. Accompanying document for long term exhibition. Museum of the city of Ústí nad Labem, Ústí nad Labem 2008, 96 pp.
Čermáková, B. – Weber, D. (eds.): Československu věrni zůstali. Životopisné rozhovory s německými antifašisty. Ústav pro soudobé dějiny AV ČR, v. v. i., Praha 2008. 250 pp.
Kokoška, S. – Oellermann, T. (eds.): Sudetští Němci proti Hitlerovi. Ústav pro soudobé dějiny AV ČR, v. v. i., Praha 2008, 231 pp.
Kokošková, Z. et al.: Osudy zapomenutých hrdinů. Příběhy německých antifašistů z ČSR. Národní archiv ČR, Praha 2008. 112 pp.

Forgotten Heroes. Poster for the opening of the exhibition 'Forgotten Heroes' (photo by archive ÚSD).

9) HUMANITIES AND PHILOLOGY SECTION

The section incorporates six institutes with the following research objectives:

- Cultural identity and cultural regionalism in the formation of the ethnic picture of Europe. (*Institute of Ethnology*)

- Transdisciplinary research into selected key areas of philosophy and related disciplines, in particular logic, classical and medieval studies, and the theory of science (with editions and publications of corresponding texts and electronic databases). (*Institute of Philosophy*)

■ Research into the religions, history, languages, literatures, cultures and civilizations of the countries of Asia and Africa. (*Oriental Institute*)

■ Scientific research and editorial output in the field of comparative Slavonic linguistics, Palaeoslavonic and Byzantine studies, comparative history of Slavonic literature and the history of Slavonic studies in the Czech Lands. (*Institute of Slavonic Studies*)

■ Research into Czech literature from earliest times to the present, reflecting its historical, theoretical, interpretational and documentary aspects. (*Institute of the Czech Literature*)

■ Integrated Research of the Czech language and its variants. (*Institute of the Czech Language*)

■ Creation of a lexical database of the Czech language at the beginning of the 21st century. (*Institute of the Czech Language*)

List of studies:

1. Communities of foreigners from the anthropological perspective: selected cases of notable immigration groups in the Czech Republic. (*Institute of Ethnology*)
2. The work of Antonín Dvořák (1841–1904). (*Institute of Ethnology*)
3. A catalogue of chapbooks. (*Institute of Ethnology*)
4. Social criticism in the era of globalization: the elimination of socio-economic inequalities and conflicts. (*Institute of Philosophy – Centre for Global Studies*)
5. Inventing things: on Plato's Hypothesis of Ideas. (*Institute of Philosophy*)
6. The metaphysics of antiindividualism. (*Institute of Philosophy*)
7. The staging of classical drama around 2000. (*Institute of Philosophy – Institute for Classical Studies*)
8. Trust and transitions: social capital in a changing world. (*Institute of Philosophy*)
9. Ritual of reconciliation: conflict and its resolution in the Middle Ages. (*Institute of Philosophy – Centre for Medieval Studies*)
10. With the gun and the Koran: terms and arguments of contemporary Islamic fundamentalism. (*Oriental Institute*)
11. The quest for hidden treasure. (*Oriental Institute*)
12. A history of China, Taiwan and Tibet: a chronology. (*Oriental Institute*)
13. Ukrainian-Czech and Czech-Ukrainian Dictionary. (*Institute of Slavonic Studies*)
14. Slavica in the Czech Language III, part 1: translations from West Slavic and South Slavic literature 1891–1918. (*Institute of Slavonic Studies*)
15. Greek-Old Church Slavonic Index. / Index verborum graeco-palaeoslovenicus. (Prolegomena) (*Institute of Slavonic Studies*)
16. The coordinates of freedom: Czech literature of the 90s of the 20th century. (*Institute of Czech Literature*)
17. Do we read? – the people of the Czech Republic and their relationship to books. (*Institute of Czech Literature*)
18. The first twenty years: The Cultural Board and other chapters from the history of literary exile 1948–1968. (*Institute of Czech Literature*)
19. Grammar and Corpora 2007. (*Institute of the Czech Language*)
20. The dictionary of minor place-names in Bohemia IV. (*Institute of the Czech Language*)
21. Electronic dictionary of Old Czech. (*Institute of the Czech Language*)
22. Creation of a lexical database of the Czech language at the beginning of the 21st century. (*Institute of the Czech Language*)

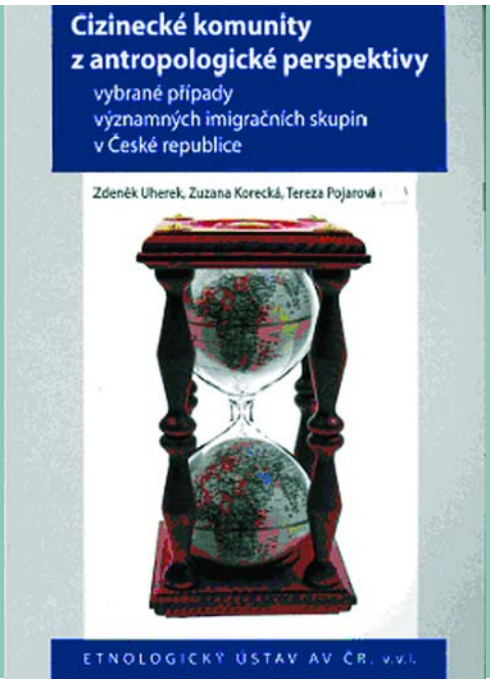
Illustrative Abstracts:

Communities of foreigners from the anthropological perspective: selected cases of notable immigration groups in the Czech Republic.
(Institute of Ethnology)

This nine-chapter monograph acquaints the reader with selected migration patterns which affect the Czech Republic and with the migrant communities who take advantage of these patterns and reproduce them. The book attempts to take into account the perspective of the immigrant groups in connection with their country of origin (mainly the Ukraine and Vietnam). It emphasises the fact that immigrants bring a certain cultural capital with them from their source countries, which they intend to develop further in their target destinations. They try to build on their existing knowledge and awareness and not to live the life of the majority society in which they find themselves. They want to live their own lives and fulfil their own dreams which they often dreamt long before migration.

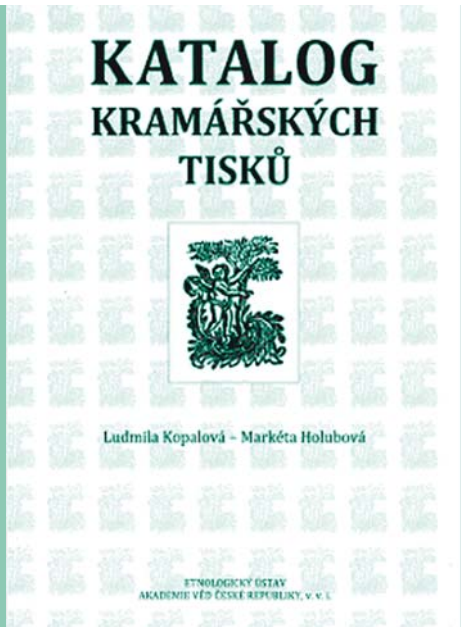
Uherek, Z. – Korecká, Z. – Pojarová, T a kol.: Cizinecké komunity z antropologické perspektivy: vybrané případy významných imigračních skupin v České republice. Etnologický ústav AV ČR, v. v. i., Praha 2008, 259 pp.

Uherek, Z. - Korecká, Z. - Pojarová, T. Communities of Foreigners from the Anthropological Perspective: Selected Cases of Significant Immigration Groups in the Czech Republic. Prague, Etnologický ústav AV ČR, v.v.i., 2008
(photo by archive EÚ).



A catalogue of chapbooks.
(Institute of Ethnology)

Religious as well as secular chapbooks (also called broadside ballads, fair-ground books, pamphlet books, popular prints, slip-song etc.) represented a specific cultural manifestation, closely related to the popular classes of town and country from the seventeenth up to the nineteenth centuries. This printed medium of communication, often illustrated, had from the sixteenth century onwards found favourable response in almost all European countries. They might have been acquired in the form of copperplates accompanied by verses that were being sold in French fairs, or of woodblock prints from Central Europe or the hand-coloured woodcuts of the Slavic East. Chapbook production had for a long time been considered by Czech historiography as literature unworthy of detailed analysis. This catalogue details about 3304 such chapbooks through eight separate indexes. The collection of chapbooks of the



Kopalová, L., - Holubová, M., Catalogue of Chapbooks. Prague, Etnologický ústav AV ČR, v.v.i., 2008. (photo by EU archive).

Institute of Ethnology of the Academy of Science of the Czech Republic can be perceived as a relatively representative sample of Czech chapbook production of the period that extended from the eighteenth up to the first decades of the twentieth century.

Kopalová, L., – Holubová, M., Katalog kramářských tisků. Etnologický ústav AV ČR, v.v.i., Praha 2008, 485 pp.

Trust and Transitions. Social Capital in a Changing World
(Institute of Philosophy)

This book presents the results of the research of the Social Capital Research Group which has sought to identify and scrutinize three prevailing threads in contemporary social capital theory and research, and uses that research to analyse democratic development in several post-communist countries in the following ways: 1) an economic or rational thread, found most notably in the rational choice theory of Gary Becker and James Coleman, and central to policy-oriented theories of growth and economic development such as those pursued at the World Bank; 2) a critical or Marxist thread, exemplified by the work of Pierre Bourdieu, in which theories of social groups, stratification, and conflict are applied in the empirical study of socio-cultural practices; and, finally, 3) a political or democratic thread, first intimated by Alexis de Tocqueville and made popular by the work of Robert Putnam, in which civil associations are considered crucial to making democracy work.

Znoj, M. – Lewandowski, J. D. (eds.): Trust and Transitions. Social Capital in a Changing World. Cambridge Scholars Publishing, Cambridge 2008, 325 pp.

Inventing things: on Plato's Hypothesis of Ideas
(Institute of Philosophy)

The book complements the traditional interpretation of Platonic Forms by a new approach that focuses on a sharp Platonic distinction between the objects of knowledge and the objects of production. From this point of view, Plato's epistemology and his cosmology are two separate fields of philosophical inquiry. Their mutual irreducibility then reflects, from different angles, the situation of Man within the cosmos. Each of these fields deals with the famous Hypothesis of Forms in its own and very original way. In both cases, however, the

premise of precisely these arguments is one of freedom from what is strictly given, a freedom proper to both the divine and human intellects. It is through a close reading of several of Plato's dialogues that the book shows how men came to know the properties of things and how the universe as a structured artefact came into being.

Thein, K.: Vynález věcí. O Platónově hypotéze idejí. Filosofia, Praha 2008, 518 pp.

The coordinates of freedom: Czech literature of the 90s of the 20th century.
(Institute of Czech Literature)

This extensive work on the coordinates of freedom (Czech literature of the 90s of the 20th century) is concerned with the first decade of the independent development of Czech literature after 1989. In four all-embracing studies (Jiří Zizler, Petr Hruška, Lubomír Machala, Libor Vodička) the work presents both general literary and cultural tendencies, contexts and the development of individual literary genres. Furthermore the work brings the profiles of next to a hundred works of poetry, prose and drama which have entered the Czech literary context after 1989. In addition to works of more classical authors, authors of experimental or post-modern literatures and the most remarkable débutants of the decade are also represented. Every individual interpretation is supplemented by an appendix which includes an excerpt of the work, a collage of reflections, an expression of opinion on the author, information on translations, adaptations, awards and a bibliography of the subject. The work is completed by profiles of the authors and by an index. The work is adressed to the experts, students, teachers, interested persons and the general public as well.

Composite authors: V souřadnicích volnosti. Česká literatura devadesátých let dvacátého století v interpretacích. Academia, Praha 2008. 738 pp.

The dictionary of minor place-names in Bohemia IV.
(Institute of the Czech Language)

This dictionary deals with the matter of minor place-names, namely the names of plots of land, terrain features, bodies of water, paths, statues, village chapels and other such structures. These names were collected in 1963–1980 and are a unique language resource of inestimable significance not only for research into the Czech language and its appellative abilities but also serving as the source of knowledge for other branches of science (archaeology, local history, ethnography, natural sciences, etc.). The treatment of these minor place-names in the dictionary form is thus intended for the broad professional community as well as the laity, those interested in local history and scholars in the area of national history and geography. On the international level, The Dictionary of Minor Place-Names in Bohemia falls within a European-wide research trend and lexicographical treatment of proper names, but by its particular content it is the first work of its kind. Its conception builds on general lexicographic principles, adjusted to the character of the material as well as the focus of the work for a wide spectrum of users. In the individual entry paragraphs, the reader of the dictionary will find all records on minor place-names and data on their geographical distribution, also an overview of the structures given these names, etymological explanations, an overview of morphologically related forms as well as references to other homonymous place-names.

Matúšová, J. et al.: Slovník pomístních jmen v Čechách IV. (Big-Bož). Academia, Praha 2008, 224 pp.

THE ESTABLISHMENT OF THE ASCR AS THE INFRASTRUCTURE FOR RESEARCH AND DEVELOPMENT

■ The structure of the Academy of Sciences of the Czech Republic is incorporated as *the Centre of Administration and Operations* with the following research objectives:

■ Implementation of a research and development infrastructure within the ASCR, a prerequisite of qualitative progress of the ASCR disciplines.

Selected activities:

Publishing scientific and technical literature, organizing conferences, workshops, professional seminars and exhibitions, marketing and promotional activities, ensuring the proper administration of real property and the legal support of the Research Institutes of the ASCR, and other works related to research work infrastructure.

Besides that, the following activities have been ensured:

■ Investment and technical support for construction activities for the institutes of the ASCR;

■ Project documentation for building the Institute of Applied Sciences at the Mazanka premises;

■ Administration of the computer network and PCs for end users;

■ Rebuilding the hardware of the all-academic Information System;

■ Resolution of security incidents in co-operation with Cesnet through the group CAS-CSIRT;

■ Expert one-year course, Management of Science, focused on management mechanisms in the complex legislative and economic environment of the Czech Republic and EU for directors and upper management of the institutes of the ASCR;

■ The setting-up of a producing audiovisual division to meet the needs of the ASCR and its institutes;

■ Activities connected with the getting of international certification for the Conference Centre of the ASCR – Château Liblice, Castle Hotel Třešť – the conference centre and Villa Lanna in the field of hygienic standards H.A.C.C.P., and activities connected with the acquisition of quality certificate ISO 9001:2000 for the Conference Centre of the ASCR – Château Liblice.

The full wording of all printed annotations of the results of scientific work and their applications as well as the entire Annual Report of the ASCR *are available in electronic form on the ASCR server http://www.avcr.cz. The final text of the Annual Report on ASCR activities will be completed with accompanying pictures.*

A detailed survey of the publication activities of ASCR institutes and staff in 2007 can be found at http://www.lib.cas.cz in the ASEP database.

COOPERATION WITH UNIVERSITIES, GRADUATE AND POST-GRADUATE STUDIES

3

The cooperation of the ASCR with universities covers both tuition and the education of research workers as well as scientific research. Formally, it has been shielded by basic and cooperation contracts as well as by contracts for the establishment of joint research centres of universities with ASCR institutes. There are currently 22 basic contracts for cooperation in graduate programmes and 53 contracts within joint research centres. Traditionally, the cooperation includes representatives of both sectors, even beyond the framework of official activities – bringing benefits both to the education of young research workers and to the research itself.

Participation in the education of research workers and cooperation with universities in Bachelor, Master and particularly Doctorial study programmes is an integral and significant part of ASCR activities. The programmes are realized on the basis of accreditations shared with universities. Particularly, the joint programmes with Charles University Prague have been continued – e.g. the biomedicine doctorial programme or that of the joint research centre of the *Economics Institute* with Charles University – CERGE-EI.

In 2008 ASCR institutes educated 2,162 students in studies in attended presence, combined, and distant forms. Compared with 2007, there was a slight decline in the number of DSP students, accepted in the following year and educated at ASCR institutes. Studies were completed by 266 students, having defended their theses; all of them being given PhD titles. Study at our institutes is a subject of interest for foreign students, too. ASCR institutes educated 328 foreign PhD students. For the list of jointly accredited DSP students, see the ASCR website. The level of cooperation between the ASCR and universities is indicative – see Table 1 and Appendix 5.

Table 1: Key activities of cooperation with universities

Year	*2004*	*2005*	*2006*	*2007*	*2008*
DSP students trained at institutes	1 939	2 079	2 072	2 154	2 162
Undergraduates trained at institutes	1 097	1 143	1 238	1 366	1 419
Students newly enrolled in DSP	421	391	366	431	411
Number of DSP graduates trained at institutes	204	220	259	256	266
Undergraduates at institutes	691	763	787	822	792
Number of semester lectures, seminars and tutorials given by ASCR staff members at universities	2 292	2 666	2 824	3 195	3 571
Number of lectures given by ASCR staff members at universities	60 329	66 006	68 429	71 739	78 306

The ASCR has been organising the Course in the Fundamentals of Research Work for DSP students for several years. The course-leavers receive a certificate issued by the Academy Council. The courses are held in Prague and Brno. The 2008 courses were held four- and three-times in Prague and Brno respectively with 269 DSP students whose advisors work at ASCR institutes, universities or other significant research organisations. The course was a matter of interest particularly for university students in Brno.

The constantly expanding cooperation between the ASCR and universities is demonstrated by the increase in the number of lectures as well as term lectures, seminars and tutorials having been given by ASCR staff members at universities in the past recent years.

Students staying at the J. Heyrovsky Institute of Physical Chemistry within the project 'Three tools of an Academic Institution Aiming at an Effective Inclusion of the Younger Generation into Science and Research' (photo by archive ÚFCH JH).

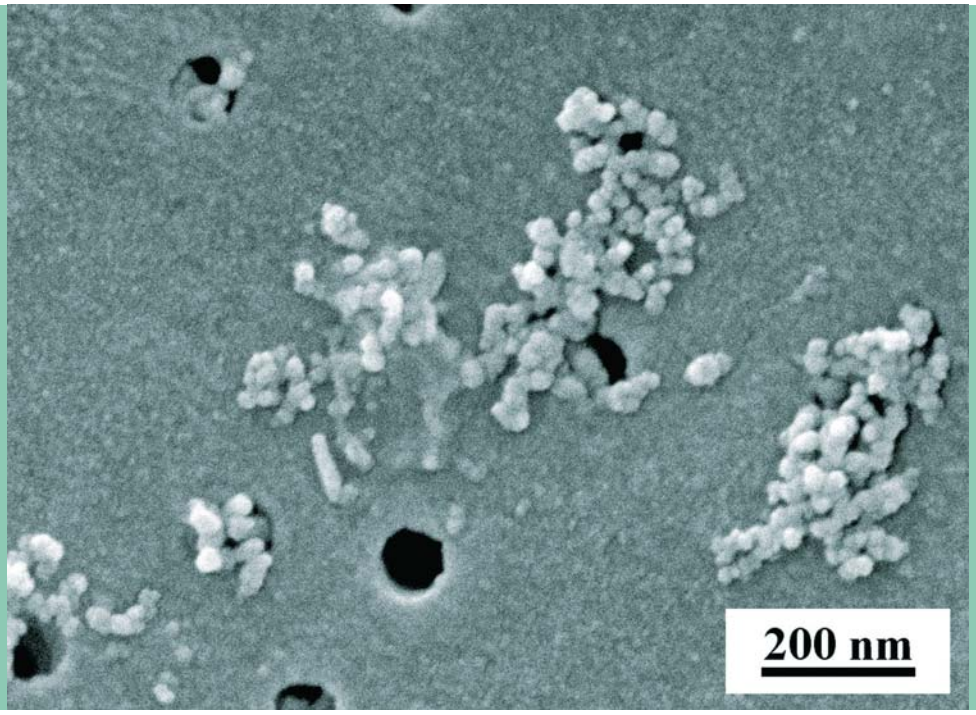
Regarding the research, universities and ASCR institutes cooperated on 752 projects and grants, given by the Czech Science Foundation and the Grant Agency of the ASCR.

The joint research activities led to the following significant results:

In **physical and Earth sciences** the *Astronomical Institute* and the Silesian University in Opava were given a grant by Ministry of Education, Youth and Sports to research the oscillations of accretion discs around neutron stars and black holes. The *Institute of Physics*, together with the Faculty of Mathematics and Physics of Charles University and VŠB-Technical University of Ostrava, developed a new technological method of nanocomposite layer preparation by means of physical deposit techniques. Another significant result was achieved by the *Institute of Physics* and the Faculty of Mathematics and Physics of Charles University by the generalisation of Ward identity for disequilibrium fermion systems. This identity has important uses – as a criterion of the consistence of estimate theories and as a tool of the creation of the theory of electron transport in disequilibrium conditions. The *Institute of Computer Sciences* and the 2nd Faculty of Medicine of Charles University focused on the research of EEG synchronisation changes, having demonstrated the hypothesis of cortical connectivity reduction in autistic people. The *Nuclear Physics Institute* and the Institute of Chemical Technology, Prague, dealt with the study of the effects of plasmatic modification and increased temperature on Ag and polyethylene quality before its use in electronics and optics. The cooperation between the *Institute of Information Theory and Automation* and the Academy of Fine Arts continues in the framework of the NEPHELE project. The aim of the project is the development of methods of automatic signature, followed by the classification of microsamples analysed during the renovation of artworks. One of the results of the cooperation between the *Institute of Photonics and Electronics* and the Faculty of Nuclear and Physical Engineering of Czech Technical University in Prague is a joint publication concerned with the realization of the device for the measurement of the time of events with sub-picosecond accuracy with potential use not only in time metrology but also in space and physical research. Significant contributions were achieved in the project entitled Multilevel Design of Progressive Materials, conducted by the *Institute of Physics of Materials*, Brno University of Technology and VŠB – Technical University of Ostrava. Besides a significant increase in the professional level of its participants, the project ended in the publication of a 4-volume collection of abstracts summarising all the results. This successful cooperation between the *Institute of Plasma Physics* and the Faculty of Nuclear and Physical Engineering of Czech Technical University in Prague is represented by the handing out of the Tokamak CASTOR in 2008. Collaborating with the Mendel University of Agriculture and Forestry in Brno, the *Institute of Hydrodynamics* solved a project which observed and assessed the sap flow in spruce vegetation by the thermal field deformation method with the study of not only vegetation, but also soil water and atmosphere synergy in the conversion of sunlight into warmth and phytomass production. The joint study of

the *Institute of Scientific Instruments*, the 1st Faculty of Medicine of Charles University, Department of Psychiatry and General Teaching Hospital was focused on dynamic changes in electrodermal activity, which might be used as a characteristic indicator of the presence of a chaotic neuronal process, enabling an early indication of schizophrenia. The *Institute of Thermomechanics* cooperated with the Faculty of Mechanical Engineering of Czech Technical University in a project for the numeric simulation of human voice production, thus creating three-dimensional human voice models, enabling phonation stimulation in a particular zone. The *Institute of Theoretical and Applied Mechanics* and the Institute of Chemical Technology in Prague were dealing with the effects of fire-protective coatings on the mechanical properties of historic wood. The knowledge obtained is significant for the estimate of the safety and reliability of cracked wooden components. The result of the cooperation between the *Institute of Theoretical and Applied Mechanics* and the Czech University of Life Science in Prague is an educational programme for the study of historical roof trusses. The *Institute of Geophysics* and the Palacký University in Olomouc examined the magnetic properties of solid atmospheric pollutant particles and their relationship to air pollution. The results of the project of the *Institute of Geology* and the Faculty of Science of Charles University suggested that, having complied with certain preconditions, it is possible to determine the age of uraninite. The *Institute of Atmospheric Physics* and the Faculty of Science of Charles University were dealing with the analysis of short-term precipitation in the Czech Republic region with the use of meteorological radars. The *Institute of Geonics* and the University of Ostrava created a three-dimensional non-stationary mathematical model showing a change in geometry of a cave-in with the simulation of the development of the oxidation process in the cave-in. The project of the *Institute of Rock Structure and Mechanics* and the Faculty of Science of Charles University was focused on the assessment of the effect of landscape changes (caused by human activity) on the course and outcomes of floods from a number of points of view and observed the possibilities of utilising the natural potential of the landscape for the reduction of their extreme effects (particularly those of 1997, 1998 and 2002 floods on the river Morava, in lowland Bohemia and on the river Labe, respectively).

In **life and chemical sciences** the *Institute of Analytical Chemistry* and the University of Pardubice were dealing with research resulting in the formulation of microreactors for the



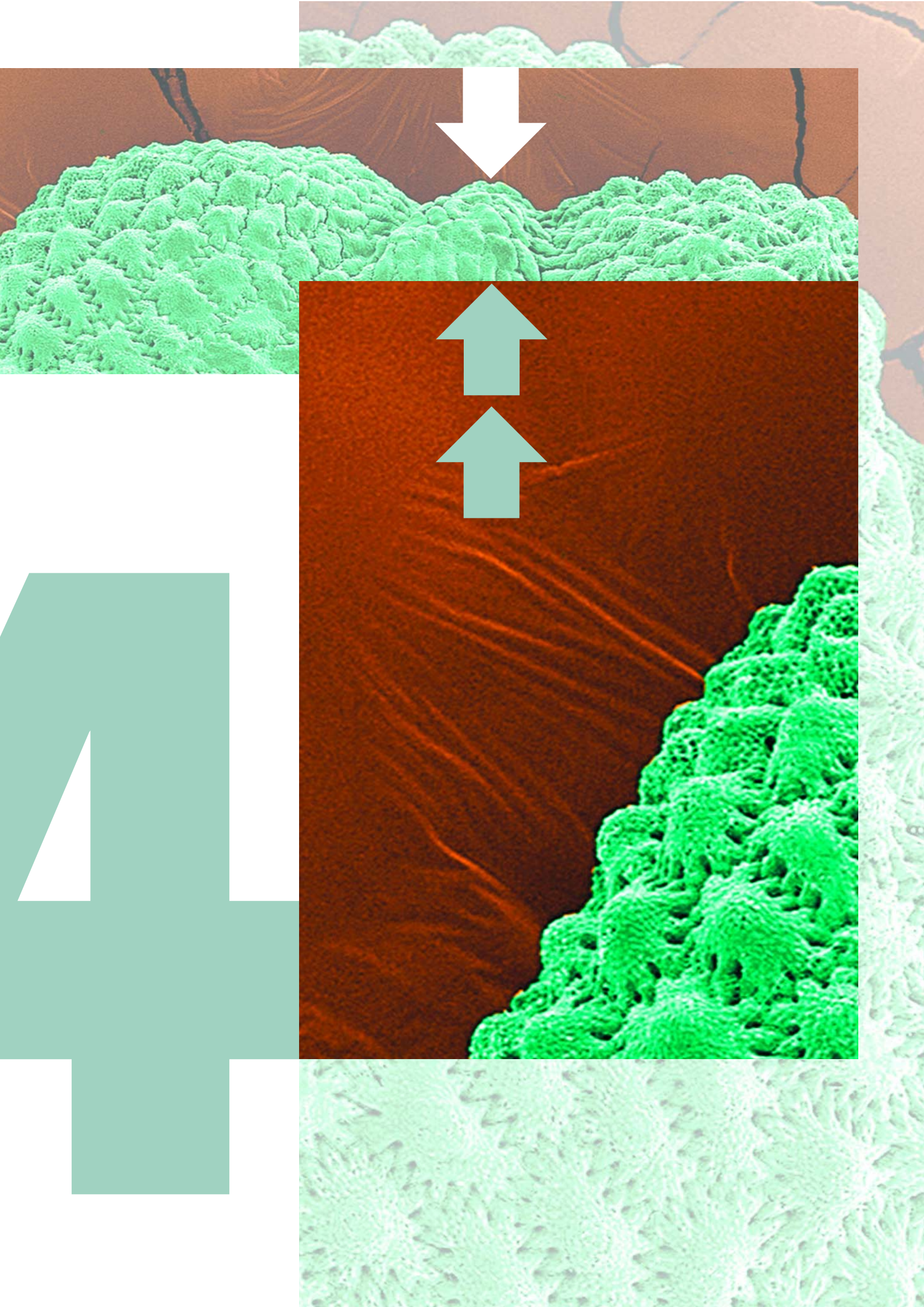
High-resolution SEM micrograph of wear nanoparticles of UHMWPE. High-resolution SEM micrograph, probably the first experimental evidence of in vivo wear nanoparticles of UHMWPE (photo by archive ÚMCH).

enzymatic cleavage of proteins, used in proteomics. Having cooperated with the Technical University of Liberec and the Faculty of Science of Charles University, the *Institute of Inorganic Chemistry* prepared fabrics with a bactericid surface for medical application. The cooperation of the *Institute of Chemical Process Fundamentals* and the *J. Heyrovský Institute of Physical Chemistry* with the *Institute of Chemical Technology* in Prague and the University of Pardubice was focused on the preparation of ceramic materials with a hierarchic structure for membrane separation technologies. Having cooperated with the Faculty of Civil Engineering of the Czech Technical University in Prague, the *Institute of Macromolecular Chemistry* finished the development of polycycloolephin- and polyethylene-based materials for selected tissue replacements and is preparing the development of materials based on the same mixture, intended for dental practice.

The preparation of new steroid platinum complexes and the tests of their antitumor activity continued within the framework of the cooperation between the *Institute of Organic Chemistry and Biochemistry* and the Palacký University in Olomouc. Cooperating with the Faculty of Science of Charles University, the *Institute of Biophysics* participated in the research of the structure, evolution and function of plant genome and in the elaboration of new databases and technologies. The research of the effect of environmental pollutants on mammal reproduction, carried out by the *Institute of Biophysics* and the Faculty of Natural Science of Charles University, suggested the negative effects of fluorides on mammal sperm maturation in laboratory conditions; fluorides used as food supplements might affect mammal reproduction (including humans). Cooperating with the 1st Faculty of Medicine of Charles University, the *Institute of Physiology* revealed the key role of osteoglycine in the determination of the left ventricular mass, even in humans, by means of integrated genomic approaches. The research carried out by the *Institute of Microbiology* in cooperation with the 1st Faculty of Medicine of Charles University resulted in the introduction of multi-colour analysis in clinical tests, enabling the diagnosis of rheumatoid arthritis, multiple sclerosis or unipolar depression. The *Institute of Experimental Medicine* and the Faculty of Natural Science of Charles University were dealing with research into new chemokine-stimulating antiviral agents. Cooperating with the 2nd Faculty of Medicine of Charles University, its workers proved that hydrogels based on 2-hydroxyethylmetacrylate and hydroxypropylmetacrylamide copolymers and their modifications make it possible to bridge over spinal cord injuries in experimental animals; thus, in the future, these might be part of neurotransplants in patients with spinal cord injuries. Cooperating with the Czech University of Life Sciences in Prague, the *Institute of Animal Physiology and Genetics* described new biphidobacteria species. The *Biology Centre*, Charles University and the Faculty of Science of the University of South Bohemia collaborated on the methods which can be used for reconstructing the historical evolution of flows with the aim of predicting future trends in the evolution of the chemical and ecological conditions of flows; the method was successfully applied for an ecosystem of the Litavka stream in Central Bohemia. Cooperating with Masaryk University Brno and the University of Veterinary and Pharmaceutical Sciences Brno, the *Institute of Botany* proved the harmful effect of cyanobacterial toxins on the avian metabolism – the changes having been proved were at biochemical, histopathological and cell levels. The *Institute of Vertebrate Biology* and the Faculty of Science of Masaryk University were dealing with the diversity of cultivatable microorganisms in ticks as vertebral pathogen vectors.

In the **humanities and social sciences** the *Institute of Psychology* and Charles University continued their research into burn-out syndrome and chain factors of cardiovascular disease, participating in the research of the psychological characteristics of approaching adulthood with Charles University. The *Institute of Sociology* participated in 10 projects with the faculties of VŠB – the Technical University of Ostrava, Masaryk University, the Czech University of Life Sciences Prague and Charles University. They were dealing with research into the development of Czech Society and its mentality. The result of the cooperation of the *Institute of State and Law* with the *Institute of Applied Law* was the publication of the monograph "Human

Rights and the Legal Politics of Fighting Terrorism". Cooperating with the Faculty of Science of Masaryk University and the Department of Geological Sciences, the *Institute of Archaeology*, Brno completed and published a monograph with the first summary and assessment of the cleaved stone tools of the bell-shaped cup-culture of the late Stone Age in Moravia. The *Institute of History*, the Institute of Philosophy and Charles University prepared an edition of three legends from the Wolfenbüttel Manuscript. The *Institute of History* and the *Masaryk Institute Archives* with Charles University cooperated on the organisation of a substantial international conference 'Men' of 28th October. The *Institute for Contemporary History* and the Faculty of Philosophy of the J. E. Purkyně University in Ústí nad Labem cooperated on the final international conference in the framework of the completion of the government project "Documentation of the destinies of active opponents of Nazism, proscribed after the World War II during the provisions against enemy citizens". The key outcome of this cooperation is a permanent museum display and Documentation Centre in Ústí nad Labem. The result of the cooperation between the *Institute of Philosophy* and the Faculty of Philosophy and Arts of Charles University and Masaryk University is the study "Definition and Concept: Aristotelian Definition Vindicated". The *Institute of Philosophy* and the Faculty of Humanities of Charles University participated in the creation of the book "The Research of Subjectivity: from Husserl to Foucault". *The Oriental Institute* and the Faculty of Arts of Masaryk University prepared for printing the publication "An Anthropological Dictionary: Indian Civilisation, Ethnics, Languages, Religions, Philosophy, Realia etc." The *Institute of Slavonic Studies* and the Faculty of Philosophy and Arts of Charles University participated in the preparation of parallel corpuses for the Slovenian and Croatian languages. The *Institute of Czech Literature* co-worked on certain chapters of the publication "The History of Czech Literature 1945 – 1989, volumes III./IV", and is a co-author of certain chapters in the publication "In the Coordinates of Freedom: Czech Literature of 1990s in Interpretations". The institute co-worked on these publications with selected faculties of Charles University, Masaryk University, the University of South Bohemia in České Budějovice, the University of Pardubice, the University of Ostrava and the Literary Academy in Prague. The *Institute of the Czech Language* participated in the preparation of chapters of Czech Grammar – the project was realized in cooperation with the Faculty of Education and the Faculty of Arts of Masaryk University, the Faculty of Philosophy and Arts and the Faculty of Mathematics and Physics of Charles University and certain foreign universities.



COOPERATION WITH THE BUSINESS SPHERE

4

One of the priorities of the ASCR is the transfer of research results into practice; thus, supporting the transfer into application spheres is one of the key tasks of the ASCR. Among others, the Academy targets the reinforcing of current contacts and making new ones between its institutes and possible application sphere subjects.

Cooperating with these subjects of application and the world of business, ASCR institutes resolved various grant projects in 2008, emphasising the direct utilisation of the knowledge obtained. The programmes The Support of Targeted Research Projects, Information Society, Nanotechnologies for Society and the Grant Agency of the ASCR included 40 joint projects; the programme NPV II organised by the Ministry of Education, Youth and Sports included 35 projects. As a whole, 40 projects of the Grant Agency of the ASCR were based on active participation between partners from the industrial sphere. Immediate cooperation of ASCR institutes and partners from the application sphere in innovations was reflected in the resolving of joint grants from the resources of the Ministry of Industry and Trade (43 projects), the Ministry of Environment (11 projects), the Ministry of Agriculture (10 projects), the Ministry of Health (6 projects) and other Ministries or institutions. The processes of the transfer of technologies and scientific results as well as the transfer of scientific results into the application sphere were significantly supported by contracts between representatives of the business sphere and ASCR institutes as well as by regular commercial contracts.

It should not be ignored that one of the impediments to intensive contacts between the research and application spheres is a lack of information and, possibly, the education of researchers in the area of innovation processes and the protection of industrial and/or intellectual properties. Three ASCR projects offered partial atonement; these projects were implemented within the framework of provision 4.2. of the JPD3 operational programme, focused on the further education of people being involved in the spheres of research, development and innovation or having influence on these spheres in the framework of their jobs or political positions. An example of a successfully completed educational project is the Centre of Innovative Education Liblice, whose main research associate was *The Centre of Administration and Operations*. Other partners of the project included the following institutions: the Association of Innovative Entrepreneurship CR, Czech Innovations Ltd., and particularly Vinnova, a Swedish state grant agency supporting the transfer of research and devel-

Press conference for projects of the Operational Programme 'Research and Development for Innovation' was one of the first acts held in the newly opened ASCR Information Centre for Innovations, 17th September 2008 (photo by Stanislava Kyselová, archive AB).

opment results into practice. The support of the development of innovations and the creation of a Czech innovation milieu is the aim of the ICAVI (ASCR Information Centre for Innovations) project, coordinated by *The Centre of Administration and Operations* with the Czech Management Association as the main partner.

The *Institute of Experimental Medicine* initiated implementing the project 'Extension of the Business Incubator of the Innovation Biomedical Centre', whose aim is to create a complete infrastructure for the transfer of technologies from basic research through to applied research and then to innovation funding business up to their eventual placement on the biomedical market.

Ceremonial inaguration of the Innovation Biomedical Centre. On 7th October 2008 the Innovation Biomedical Centre of the Institute of Experimental Medicine at the premises of the Research Institutes of the ASCR in Prague 4 - Krč was inaugurated by Prime Minister Mirek Topolánek with the participation of the President of the ASCR Václav Pačes, director of the Institute of Experimental Botany Eva Syková and other significant guests from the political, academic as well as the business spheres (photo by Stanislava Kyselová, archive AB). Inovační medicínské centrum (foto: archiv ÚEM)

The Innovation Biomedical Centre (photo by archive ÚEM).

The first centres of the "spin off" type were or have been found at the following ASCR institutes: the *Nuclear Physics Institute, Institute of Organic Chemistry and Biochemistry, Institute of Experimental Medicine*. To provide a more detailed presentation of the 'Framework Association of the European Committee for State Assistance in Research, Development and Innovations in the Czech Republic', the ASCR organised a round table discussion, which contributed to the clarification of the interpretation of certain portions of the Framework document and which have an immediate connection with the founding of these centres and with the innovation activities of public research institutions.

The ASCR successfully cooperates with the Engineering Academy of the Czech Republic (particularly with the Czech Knowledge Transfer Office, the research and consulting office of the Engineering Academy of the Czech Republic for the support of the commercial utilisation of research results and innovations). Long-term cooperation with the Association of Research Organisations, Association of Innovative Entrepreneurship, the Confederation of Industry of the Czech Republic, CzechInvest and other partners resulted in a number of joint activities. Moreover, the ASCR participated in the organisation and the course of the international proceedings of the Czech-Japan Science and Technology Days 2008 and Czech-Swiss Technology Days 2008, organised by CzechInvest, Ministry of Industry and Trade, Ministry of Health and Ministry of Education, Youth and Sports. The cooperation between L'ORÉAL CR and the Czech Commission for UNESCO continued, granting scholarships to young female scientists dealing with the living world or material sciences.

In the framework of regional activities in research, development and innovation, the ASCR particularly cooperated with the Vysočina Region (projects at the Scientific-Technical Park in

Jihlava I and II) and with the South Moravian Innovation Centre. Cooperation with the Pardubice Region and the Association of Municipalities of Orlicko continued, too.

The research results achieved by ASCR institutes and implemented in industrial plants, agriculture and health care and in the protection of the environment and cultural benefits are demonstrated in the following examples:

- Boroscope – an optical sensor for the visualisation and quantitative analysis of flame parameters in real time for the control of conditions in thermal caldrons or steel-making and case-hardening furnaces, *Institute of Physics*, Palacký University in Olomouc and INDEL, s. r. o., Košice, Slovakia

- Microscopic measurement of the abrasiveness and porosity of glass-blended cement surfaces for use in the building industries, *Institute of Physics* and Research Institute of Building Materials Inc., Brno

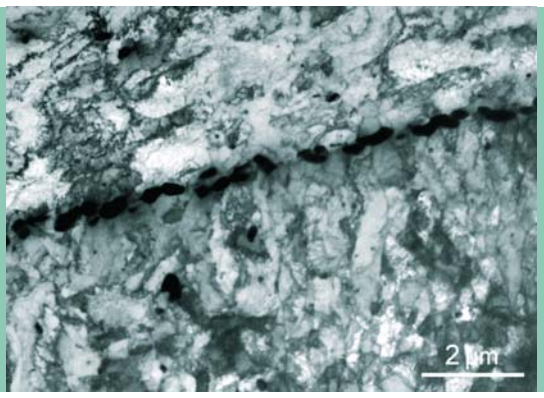
- Improvement of daily diagrams for the use of gas in the Czech Republic, *Institute of Computer Science* and Energy Regulation Authority / Czech Gas Union

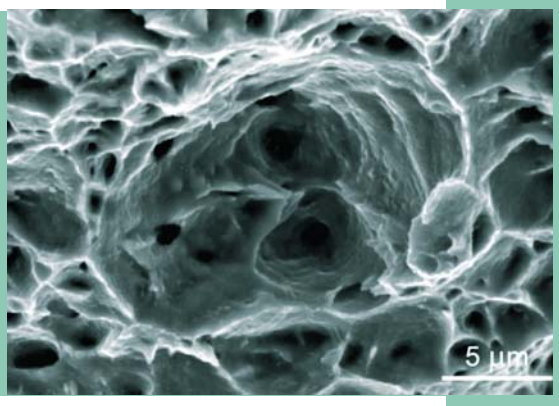
- Research of the retention properties of granite rocks in the Czech Republic by the Rutherford Backward Scatter (RBS) method for the study of the distribution of radio nuclides from radioactive waste, *Nuclear Physics Institute* and Nuclear Research Institute Řež, a. s.

- Quality control expert analysis of element concentrations in thin metal layers, *Nuclear Physics Institute* and Robert Bosch, s. r. o.

- Implementation of the laboratory prototype of a compact sensor with surface plasmons, *Institute of Photonics and Electronics* and Phenogenomics, USA

- Determination of the creep lifetime and limit plasticity of a new type of low-alloy creep-resisting 2.5%Cr1.6%WNbV (T23) steel for highly stressed new generation components of environmentally-friendly energy devices, *Institute of Physics of Materials* and UJP Praha, a. s.





Transmission electron microscope (TEM) micrograph of the bainitic microstructure of low alloy T23 steel after long-term high temperature loading (photo by archive ÚFM).

Scanning electron microscope (SEM) micrograph showing a detail of the fracture surface of the creep specimen loaded at 650°C (photo by archive ÚFM).

- Research into the characteristics of the plasma flow used in plasma cutting with the TransCut Fronius Plasmatron in the development of a new line of plasmatrons with water vapour TransCut 300, *Institute of Plasma Physics* and Fronius, Austria.

- Methodical solution of the experimental measurements of a model gas concentration gradient and its implementation in the model of the Pardubice agglomeration for a real picture of toxic agent flow from industrial plants in extreme situations, *Institute of Hydrodynamics* and Regional Authority of the Pardubice Region.

The special electromagnetic exciter was developed in the Institute of Thermomechanics of the Academy of Sciences for the excitation of vibrations of turbine blades rotating with the circumferential velocity of up to 600 m/s. The exciter was used in an experimental verification of the dynamic characteristics of the 1220 mm long blades in the testing apparatus CAMPBELL at the company ŠKODA POWER, a.s. in Pilsen and in the balancing tunnel ANSALDO ENERGIA in Italy (photo by archive ÚT).

■ Production of a new gun for an electron welder MEBW-60/2, *Institute of Scientific Instruments* and FOCUS GmbH, Germany.

■ Development of an excitation electromagnet with pre-magnetisation for rotating parts of devices, Institute of Thermomechanics and Škoda Power, a. s., Plzeň.

■ Determination of dynamic characteristics of antenna adapters before and after an exchange of aerials and pendulum attenuators, *Institute of Theoretical and Applied Mechanics* and České Radiokomunikace a. s.

■ Application of a new patented method of magnet compilation from rare earths in the magnetisation of NdFeB-magnet-filled desks and their assembly into blocks, *Institute of Rock Structure and Mechanics* and Verus, s. r. o., Mníšek pod Brdy.

■ Detailed map of magnetic susceptibility of superficial soils in the KRNAP region and its correlation with heavy metal concentration, *Institute of Geophysics* and the Krkonoše National Park.

■ Draft of a system of provisions and tools for the increasing the stability of working face drifts and in coal mining, *Institute of Geonics* and OKD, a. s.

■ Determination of the photocatalytic properties of TiO2-based nanofibrous materials for fillers in filtration devices, *Institute of Inorganic Chemistry* and Elmarco, s. r. o., Liberec.

■ Clarification of the mechanism of changes and the optimising of electrochemical properties of olivine $LiMn_xFe_{1-x}PO_4$ during milling with soot, *J. Heyrovský Institute of Physical Chemistry* and HPL (High Power Lithium, S.A.), Switzerland.

■ Development of a complex test system for materials intended for hydrogen storage, *Institute of Chemical Process Fundamentals* and Główny Instytut Górnictwa, Katowice, Poland.

■ Draft of the technical procedures and methods for the testing of paints, compact materials containing titanium dioxide nanoparticles and powders containing titanium dioxide nanoparticles, *Institute of Analytical Chemistry* and Czech Technology Centre for Inorganic Pigments, a. s., Přerov.

■ Development, application and testing of new catalysts for polyurethane systems, *Institute of Macromolecular Chemistry* and BorsodChem MCHZ, s. r. o., Ostrava.

■ Initiation of clinical tests of acyclic nucleotide analogue GS-9219, *Institute of Organic Chemistry and Biochemistry* and Gilead Science, USA.

■ Verification of the biological effect of epithermal neutrons of LVR-15 nuclear reactor, adjusted to the needs of the development of brain tumour therapy, *Institute of Physiology* and Nuclear Research Institute Řež, a. s.

■ The use of exhaust carbon dioxide in productive algae cultures, *Institute of Microbiology* and Termizo, a. s., Liberec.

■ The testing of various types of nanofibres with oriented and non-oriented structures in biocompatible nanofibrous constructs producing new pharmaceutical forms for the application of biologically and pharmacologically active agents, *Institute of Experimental Medicine* and Elmarco, s. r. o., Liberec.

■ Proteomic analysis for the use of a new PF2D device, carried out by a joint research centre, certified as an education centre of the Beckman Coulter company, Institute of Animal Physiology and Genetics, Institute of Experimental Medicine, *Institute of Microbiology* and Immunotech (Beckmann-Coulter), Marseilles, France.

■ Assessment of complex estimations of fish colonies in the water supply reservoirs of Nýrsko and Klíčava and a new estimation for water supply at Lučina, *Biology Centre* and Povodí Vltavy, state enterprise

Purse seine sampling in the Římov water supply reservoir. Purse seine is being used for sampling open water fish communities
(photo by archive Fishecu).

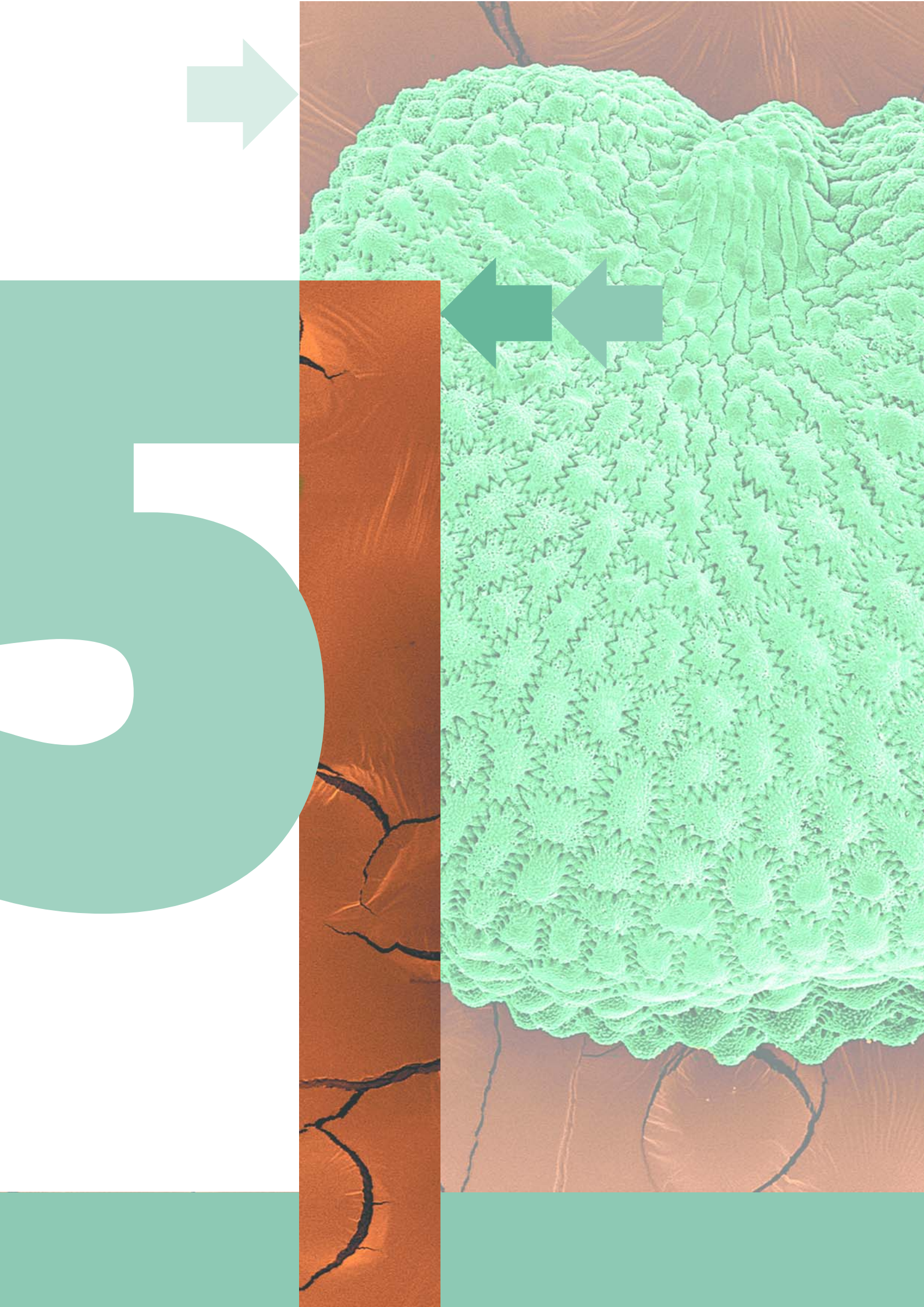
■ Monitoring the diversity of soil fauna in the ravines of the České Švýcarsko National Park, the *Biology Centre* and the Administration of the České Švýcarsko National Park.

■ The development of a new inoculation technology based on the concomitant treatment of bilberries by mycorrhizal and saprotrophic fungi, *Institute of Botany*, Symbio-m, s. r. o., Lanškroun and Atlantic Blue Ltd., Spain.

■ Estimation of electricity use in 2030 as a basis for the Independent Board for the Assessment of Energy Needs in the Czech Republic in the Long-Term, established by the government of the Czech Republic, *Economics Institute* and the Office of the Government of the Czech Republic.

■ Rescue archaeological research on the route of road link S1 at Opava-Malé Hoštice, *Institute of Archaeology*, Brno and Skanska DS, a. s.

Besides the above mentioned and selected examples of cooperation and the transfer of research results into practice, the research teams as well as particular researchers of ASCR institutes cooperated in making a number of technical norms, methodologies, measurements, laboratory tests and diagnostic methods. 27 and 11 patents were granted in the Czech Republic and abroad in 2008 respectively. There were granted and concluded 12 registered utility designs and 34 valid licence contracts. The most progressive institutes in this regard are the I*nstitute of Experimental Botany, the Institute of Macromolecular Chemistry and the Institute of Organic Chemistry* and *Biochemistry*.



INTERNATIONAL SCIENTIFIC COOPERATION

5

Cooperation within the structure of the EU

The year 2008 meant intensive preparations at the ASCR for the **Czech Presidency of the Council of the EU** in the first half of 2009. Representatives of the ASCR involved themselves in the programme and organisational committees of a number of main and accompanying events in different areas. To make cooperation in organising these events easier, the ASCR signed a Memorandum of Cooperation with the Ministry of Education, Youth and Sport in May 2008 to set out the degree of responsibility and to define the mechanisms of cooperation in organising selected events. The ASCR signed up to take responsibility for the conference on the "Role of basic research in the process of structuring the European Research Area and European Future Technologies (FET09)", for organising a joint session of European technology platforms in the sphere of information and communication technology (ICT), technological consultative groups ISTAG and national representatives of ICT and for ensuring the organisation of a regular meeting of control platforms on the issue of research for the countries of the Western Balkans. Six scientific events of ASCR institutes were also written into the presidency calendar: the CHEP 2009 conference – Computing in High Energy and Nuclear Physics (the *Institute of Physics,* the *Nuclear Physics Institute*) – COMPASS Programmatic (the *Institute of Plasma Physics*), a workshop of soil zoologists, biologists and ecologists (the *Biology Centre*), the conference entitled 'World Biodiversity: Aspects of European Responsibility' (the *Institute of Botany*), PERMEA 2009 (the *Institute of Macromolecular Chemistry*) and 'ENHR2009 – Changing Housing Markets: Integration and Segmentation' (the *Institute of Sociology*). The *Institute of Sociology* also became involved in preparing the conference on 'Changing Research Landscapes: 10 years of Women and Science'.

The ASCR also focused on the further development of the **European Research Area** (ERA), taking into consideration both the Ljubljana Process and the Vision 2020 document. In relation to a statement issued on the so-called Green Paper of the European Commission entitled 'The European Research Area: New Perspectives' the ASCR primarily focused on achieving advancement in implementing the projects of major research infrastructures of the so-called 'European Strategy Forum on Research Infrastructures (ESFRI) road map' and on questions associated with the mobility of research workers. It also made considerable efforts to join in the preparation of the Inter-departmental Concept of Support for Research Infrastructures. A round table meeting organised in October 2008 at the ASCR conference centre in Liblice attended by organisations associated with planned major research infrastructures focused on the proposed regulation of the Council of the EU on the legal framework of the Community for the European Research Infrastructure and contributed to the formulation of a national statement that was presented at a session of the Council for Competitiveness. In the interest of eliminating a number of ambiguities and differing interpretations of the binding Community Framework for State Aid in Research, Development and Innovation that cropped up in the Czech environment, the ASCR organised a round table meeting on this issue in Liblice in February with the widespread participation of the relevant players.

The ASCR paid great attention to the **issue of structural funds**, in particular the preparation of the **Operational Programme entitled 'Research and Development for Innovation'**, which is of key significance to projects of major research infrastructures of the future. The ASCR devoted a great deal of attention to the quality of its preparation of the 'Research and Development for Innovation Operational Programme', in particular to comments regarding the draft executive document of this and the associated work materials of

Signature of ELI and BIOCEV. The Governor of the Central Bohemia Region and the representatives of BIOCEV and ELI projects signing the Memorandum of Mutual Support and Cooperation in the office of the President of the Academy of Sciences of the Czech Republic, Václav Pačes on 7th October 2008 (photo by Stanislava Kyselová, archive AB).

the Ministry of Education, Youth and Sport of the Czech Republic. The ASCR issued a press release on the procedure of the control body of the 'Research and Development for Innovation Operational Programme' in selecting so-called major projects (those over 50 million euro) in the interests of maintaining the principle of partnership and to make sure the entire process was kept transparent.

ASCR institutes and departments also took advantage of the opportunity to get themselves involved in other EU structural fund operational programmes. A number of institutes at the ASCR submitted project proposals based on the call of the Ministry of Education, Youth and Sport of the Czech Republic to submit other single projects as part of the **Operational Programme Education for Competitiveness** (OP VK), Priority axis 2 Tertiary Education, Research and Development, Support area 2.3 Human Resources in Research and Development

Prague City Hall announced a call in the first half of 2008 as part of the **Operational Programme Prague Adaptability** (OPPA) and the **Operational Programme Prague Competitiveness** (OPPK) from which there is the possibility of obtaining funding for research and development carried out in Prague. ASCR institutes submitted projects as part of the OPPA Priority axis 1 – Support for the development of economic knowledge ('The education of science workers in the area of transferring biomedical technology into practice' project, compiled by the *Institute of Experimental Medicine*, was approved) and Priority axis 3 – The modernisation of elementary education ('The modular system of language courses for doctorate students supported by an Internet platform' project, submitted by the *Institute of the Czech Language*, and 'Innovative software aids for students of information science at secondary schools and universities' project, compiled by the *Institute of Computer Science*, were both approved). The project of the Ministry of Education, Youth and Sport of the Czech Republic entitled 'The Centre for Innovation in Nano-materials and Nano-technology', submitted by the *J. Heyrovsky Institute of Physical Chemistry*, and the project entitled 'The modernisation and robotisation of the apparatus at the Institute of Experimental Botany of the ASCR for the molecular biology of plants', submitted by the *Institute of Experimental Botany,* were both approved as part of the OPPK, or more specifically Priority axis 3, Support area 3.1 – The development of the innovation environment and partnership between basic research and development and practice.

Two projects, 'Fundamentals for forecasting the gradation of the spruce beetle' and 'The cross-border protection of waters in the Drachensee basin', submitted by the *Biology Centre*, were approved as part of the **operational programme Cross-border Cooperation Czech Republic – Bavaria**.

Activities associated with the implementation of the **7th Framework Programme for Research and Technological Development in the European Union (FP7)** were in the limelight at the ASCR in 2008. They mainly concentrated on ensuring aid for those submitting projects and on the effective use of public funds from European and national resources. The **Technology Centre** ensured the involvement of scientific institutes and departments in ERA training and consultative activity in the FP7 via the NICER project (National Information Centre for European Research). The work of the **Czech Mobility Centre** at The *Centre of Administration and Operations* helped reinforce cooperation with foreign scientists and research workers, attempting to remove obstacles and simplify administrative procedures in relation to these workers remaining in the Czech Republic for extended periods.

The total participation of the ASCR in European Commission projects and programmes in the past year was at approximately the same level as in 2007 (Table 2). In addition to 161 ongoing projects from the FP6, work began on 50 projects from the FP7, and so at the end of 2008 ASCR institutes were participating in work on **211 European Commission projects**. The total volume of contractually agreed funding provided to ASCR institutes reached **9 million euro**. This is an increase of around one-third on the figure for 2007. The fact that funds amounting to **1.8 million euro** were obtained from the first round of calls for the FP7 alone is also extremely positive. The average contracted amount per one project in 2008 was more than 1 million CZK, which testifies to the fact that science teams are becoming more involved in financially more demanding projects. The *Institute of Physics* (24), the *Institute of Experimental Medicine* (15), the *Institute of Plasma Physics* and (13) and the *Institute of Macromolecular Chemistry* (12) handled the most projects during the period in question. The results of the 1st calls for proposals for prestigious ERC AG grants (intended for experienced researchers) were announced in 2008. The ASCR was successful in two ERC 'Advanced' grants (both for the *Institute of Organic Chemistry and Biochemistry*).

ASCR institutes with an interest in participating in projects financed by EU funds were provided with information and consultation by the Department for European Integration and the use of the knowledge base of the head office of the ASCR.

Table 2: Participation of ASCR institutes in the main instruments of the FP7

Type of project	*Total number of projects 2008*
CP (Collaborative Projects)	30
CSA (Coordination & Support Actions)	8
NoE (Network of Excellence)	1
ERC (Support of frontier research)	0
MC (Marie Curie Support for the training and career development of researchers)	8
BSG (Research for the benefit of specific groups)	1
ERC (European Research Council)	1+1*

**Project passed two rounds of assessment by ERC expert panels and is placed on the back-up list.*

ASCR institutes became actively involved in other programmes as part of European cooperation during the year 2008. In addition to participation in the projects of the European Space Agency and of the so-called Norwegian Funds, there was a near two-fold increase in partic-

ipation in the programme projects of the European Science Foundation (ESF) and European Cooperation in Science and Technology (COST). ASCR institutes became involved in more than **80 projects** as part of other programmes of European cooperation.

ASCR cooperation with other international governmental organisations

The regular meeting of the representatives of the academies of the Visegrad Four countries was held in Hungary in 2008. You will find up-to-date information on the Forum of Academies of Science of the V4 countries at http://v4.avcr.cz/.

Tests on a new piece of scientific research equipment, the largest and most complex of its kind ever made, began at **Conceil Européene pour la Recherche Nucléaire** *(CERN)* in the year 2008. ASCR workers took an active part in launching the colliding beam accelerator and detectors of the ATLAS, ALICE, CMS, LHCb and TOTEM experiments, which represent a new generation of experiments in the world of particle physics. More than 400 workers and students from 15 ASCR institutes and universities from the Czech Republic took part in cooperation with CERN in 2008. They participated in 118 top-class publications and 88 papers at international conferences. Working contacts continued between certain ASCR institutes (in particular the *Nuclear Physics Institute*, the *Institute of Macromolecular Chemistry*, the *Institute of Geophysics* and the *Institute of Physics*) and the **Joint Institute for Nuclear Research in Dubna**, particularly in the field of experimental, theoretical, and mathematical physics, ion physics, the physics of transuranium, radiobiology, medical physics and geophysics, in research into polymers and in a number of other areas. ASCR institutes took part in 25 target projects with a capacity of 60 workers; their results were published in 26 articles and 17 conference papers. Two ASCR scientists work in the senior bodies of the Joint Institute for Nuclear Research..

The year 2008 was also one in which the Czech Republic was accepted as a full member of the **European Space Agency** (ESA). This broadens the opportunities for international cooperation in the sphere of space research in the implementation of the scientific objectives of Czech institutes, for which observation or experimentation outside the Earth's atmosphere is an essential condition. This mainly applies to the sphere of physics and astrophysics. However, new opportunities will also open up for medical and biological science, for example in the use of the International Space Station. Science projects launched as part of the PECS programme (Plan for European Cooperating States) will be completed and financed according to the contracts originally signed. The year 2008 was also the first time the Czech Republic was a full member state of the **European South Observatory** (ESO) and immediately the ASCR organised a meeting of the ESO council in June 2008.

The ASCR participated in the activities of the **European Science Foundation** (ESF), in which it has 2 representatives in management bodies. Scientists from ASCR institutes were involved in 11 research programmes. Science teams from the ASCR also took part in the work of 2 expert committees at NuPPECC (Nuclear Physics European Collaboration Committee) and CRAF (Committee on Radio Astronomy Frequencies) and were also involved in EUROCORES (European Collaborative Research) programmes..

Former President of the ASCR Helena Illnerová has been head of the Czech Commission for Cooperation with **UNESCO** since 2007 and other ASCR workers are members of the committee. Every year the *Institute of Molecular Chemistry*, the *Institute of Botany* and the *Institute of Systems Biology and Ecology* organise postgraduate UNESCO courses intended for scientists from developing countries. The Czech National Committee for the **UNESCO MAB** programme (Man and Biosphere) is also active.

ASCR cooperation with international non-governmental science institutions

All European Academies (ALLEA) brings together 53 academies of science from 40 European countries. Representatives of the ASCR were in attendance at the general meeting of this association and the sitting of its committee for science and ethics. The **European Academies Science Advisory Council** (EASAC) is an institution made up of 25 national academies of science from most EU member states, the main aim of which is to prepare expert studies and provide objective information from various fields of science being handled at that time by European and national political institutions (e.g. the European Parliament). ASCR workers participated in the work of expert groups for the environment, vaccination against infectious diseases and power engineering.

The **International Council for Science** (ICSU) is a non-governmental organisation which brings together 111 states and international unions. The ASCR is the umbrella organisation of national science committees of the Czech Republic (now 36 committees are registered and supported) and is in continuous contact with them via its Council for International Affairs. It also deals with situations whose very nature outgrows the jurisdiction of the committees and contributes to some of their activities. The new Czech National Committee for Oral History was set up in 2008.

The ASCR is also involved in the **InterAcademy Panel** (IAP) and the **InterAcademy-Medical Panel** (IAMP) – global organisations which unite academies of sciences from countries all over the world.

The **Union Académique Internationale** (UAI) is an organisation which unites 61 national academies from throughout the world and which is responsible for coordinating, and in certain cases providing, financial support to exceptionally significant projects from the sphere of humanities that stretch beyond the borders of any single country. ASCR institutes are also taking part in the following projects: Moravia Magna, Clavis monumentorum literarum Bohemiae, Lexicon iconographicum mythologiae classicae/Thesaurus cultus et rituum antiquorum, Corpus vasorum antiquorum, Dictionary of Medieval Latin and Aristoteles Latinus. One other important project which has flourished under the patronage of the UAI is the Old Greek Orthodox Church Slavonic Lexicon-Index, a project of the *Institute of Slavonic Studies*.

The **Czech History Institute in Rome** is a joint department of the Institute of History and the Faculty of Philosophy and Arts of the Charles University in Prague. It concentrates on systematic source research of material concerning Bohemia in Roman, Vatican and other archives and libraries in Italy. Its results are mainly published in issues of Monumenta Vaticana res gestas Bohemicas illustrantia and Epistulae et acta nuntiorum apostolicorum apud imperatorem. A catalogue of Bohemian manuscripts in the collections of the Vatican library is also being drawn up. The institute regularly provides information on the results of its work in the periodical review entitled 'Bollettino dell Istituto Storico Ceco di Roma'.

Cooperation abroad under international bilateral agreements

The ASCR made a total of 66 agreements in 2008 with partners from 49 countries (cooperation agreements were signed with further partners in Germany, Thailand and Vietnam) and with entirely new partners in other countries (for example Indonesia, Iran and Moldova). Agreements signed in previous years were updated on an ongoing basis, whereby emphasis was placed on specific projects. 659 people were sent abroad for a total of 6,427 days and 563 foreign scientists were received for a total of 4,798 days.

The ASCR delegation signing the Memorandum of Understanding on Academic Collaboration with the Chiang Mai University in Thailand, February 2008 (photo by archive KAV)

Relations between the ASCR and partners from neighbouring countries, in particular the Slovak Academy of Sciences, were outstanding. An updated executive appendix to accompany the Cooperation Agreement between the ASCR and the Slovak Academy of Sciences was signed at the regular meeting of representatives of both academies.

Table 3: Overall statistical data on two-way scientific cooperation as part of inter-academy agreements

Year	*Number of countries*	*Number of agree-ments*	*Arriving*		*Sent*	
			people	*days*	*people*	*days*
1999	43	61	425	4 252	371	4 181
2000	42	60	413	4 853	455	5 917
2001	42	57	421	4 441	447	5 825
2002	42	56	499	4 682	550	6 796
2003	45	59	426	4 442	529	6 042
2004	45	60	533	5 397	658	8 053
2005	45	60	631	5 334	730	8 964
2006	45	59	571	5 151	711	7 898
2007	46	63	549	5 075	614	6 515
2008	49	66	563	4 798	659	6 427

In addition to two-way inter-academy agreements, science workers also developed international cooperation based on direct contacts from ASCR institutes, whether this be in the form of inter-institutional agreements, involvement in international programmes and projects or attendance at international science meetings or via direct contacts.

Other activities as part of international relations

The ASCR was intensively involved in the activity of the International Human Rights Network of Academies and Scholarly Societies in 2007. Here the ASCR is represented by its president Václav Pačes. The principal aim of this network is consistently to search out cases of injustice committed against people of science and to protest against these. The ASCR intervened in a number of serious causes, for example the arrest of a Chinese engineer defending human rights and freedom of speech who made reference to the tragic situation of those suffering from AIDS in China and who advocated the rights of the people of Tibet. In a letter to the King of Saudi Arabia the president of the ASCR expressed his anxiety at the arrest of a professor of political science detained without reason and deprived of his professorial chair at the King Saud University in Riyadh. One major success in 2008 was the release of three Burmese scientists imprisoned since 1997 for organising a meeting with the Burmese Nobel Prize winner Aung San Suu Kyi. The president of the ASCR lobbied for their release at the end of 2007.

Selection of prominent international conferences organised by ASCR institutes in the year 2008

18th International Conference on Neuron Networks ● organiser: the *Institute of Computer Science* in cooperation with the Faculty of Electrical Engineering of the Czech Technical University; 234 participants, 213 of these from abroad.

ALICE Physics Week in Prague ● organiser: the *Nuclear Physics Institute* in cooperation with the Faculty of Nuclear Sciences and Physical Engineering of the Czech Technical University; 150 participants, 120 of these from abroad.

SOFSEM 2008: the theory and practice of computer science ● organiser: the *Institute of Computer Science* in cooperation with the University of P. J. Šafárik in Košice: 127 participants, 96 of these from abroad.

Classical and mesoscopic thermodynamics ● organiser: the *Institute of Physics*; 120 participants, 95 of these from abroad.

17th European Fractural Conference ● organiser: the *Institute of Physics of Materials* in cooperation with the Faculty of Mechanical Engineering of the Brno University of Technology; 500 participants, 450 of these from abroad.

9th International FIV Conference 2008 ● organiser: the *Institute of Thermomechanics*; 180 participants, 162 of these from abroad.

2nd International COST 2102 Conference on the multimodal analysis of speech, gesture, look and facial expression ● organiser: the *Institute of Photonics and Electronics*; 98 participants, 65 of these from abroad.

11th Conference on paleomagnetism, the magnetism of rock and environmental magnetism ● organiser: the *Institute of Geophysics* in cooperation with the Geophysical Institute of the Slovak Academy of Sciences in Bratislava; 75 participants, 59 of these from abroad.

18th International Congress on Chemical and Process Engineering ● joint organiser: the *Institute of Chemical Process Fundamentals;* 1013 participants, 834 of these from abroad; one of the three most prominent and largest conferences in the field in the world.

ESEAC 2008 – 12th International Conference on Electroanalysis ● joint organiser: the *J. Heyrovsky Institute of Physical Chemistry*; 272 participants, 239 of these from abroad.

Polymer colloids – 73rd PMM conference (Prague Meeting on Macromolecules) ● organiser: the Institute of Macromolecular Chemistry; 191 participants, 161 of these from abroad.

14th Symposium on the Chemistry of the Components of Nucleic Acids ● organiser: the *Institute of Organic Chemistry and Biochemistry*; 160 participants, 140 of these from abroad.

22nd International Mammalian Genome Conference ● joint organiser: the *Institute of Molecular Genetics*; 260 participants, 245 of these from abroad.

13th International Symposium on Spontaneously Hypertensive Rats ● organiser: the *Institute of Physiology*; 170 participants, 150 of these from abroad.

7th European Workshop on Molecular Biology of Cyanobacteria ● organiser: the *Institute of Microbiology*; 165 participants, 152 of these from abroad.

2nd International Symposium of the ESTOOLS Consortium and Open Scientific Symposium ● organiser: the *Institute of Experimental Medicine*; 100 participants, 90 of these from abroad.

Neobiotics: On the road to synthesis – 5th European Conference on Biological Invasion ● organiser: the *Institute of Botany*; 280 participants, 230 of these from abroad.

4th Annual Conference of the 6th FP EDEN ● organiser: the *Institute of Vertebrate Biology*; 150 participants, 140 of these from abroad.

Panel discussion as part of Forum 2000: The current financial crisis: genuinely financial? ● organiser: the *Economics Institute*; 130 participants, 39 of these from abroad.

2008 Financial Management Association European Conference ● organiser: the *Economics Institute*; 562 participants, 549 of these from abroad.

School and Health Conference ● joint organiser: the *Institute of Psychology*; 150 participants, 30 of these from abroad.

Science policy: research, institutions and gender in the creative process ● organiser: the *Institute of Sociology*; 65 participants, 55 of these from abroad.

14th Annual Conference of the European Association of Archaeologists ● joint organiser: the *Institute of Archaeology*, Prague; 600 participants, 590 of these from abroad.

Collective and individual patronage and the culture of the public donation in civil society (to mark the anniversary of J. Hlávka) ● organiser: the *Institute of History*; 40 participants, 25 of these from abroad.

International Corporeity and Affectivity Conference (Fifth Central and Eastern European Conference on Phenomenology) ● organiser: the *Institute of Philosophy*; 100 participants, 80 of these from abroad.

Prague Spring 1968: Civil society – the media – the broadcasting of political and cultural processes ● organiser: the *Institute for Contemporary History*; 142 participants, 37 of these from abroad.

Scientific conference on Russian emigrant culture and the arts in Czechoslovakia between the wars: areas of mutual cooperation ● organiser: the *Institute of Slavonic Studies*; 54 participants, 25 of these from abroad.

Etymological Symposium Brno 2008 ● organiser: the *Institute of the Czech Language*; 44 participants, 26 of these from abroad.

Selection of international projects in which ASCR institutes and departments were involved in the year 2008

CERN
ALICE (A Large Ion Collider Experiment) ● coordinator: CERN, Switzerland; joint participants: the *Nuclear Physics Institute* and another 94 institutes from 28 European countries.

COST
Physical Modelling of Transport Processes in Micro-meteorological Flows ● coordinator: Universität Hamburg, Germany; joint participants: the *Institute of Thermomechanics* together with other institutes from 22 countries.

Moderating the influence of ionospheric disorders on radio systems ● coordinator: Université de Rennes, France; joint participants: the *Institute of Atmospheric Physics* and another 35 institutes from 22 countries.

ESA
INTEGRAL ● coordinator: European Space Agency; joint participants: the *Astronomical Institute* and other European countries.

A photo from the international conference 'The Collective and Individual Patronage and the Culture of Donation in Civic Society' that was a part of the all-year celebrations of the Josef Hlávka anniversary in 2008 (photo by archive HÚ).

ESF

Spin-dependent transport and electron correlations in nanostructures ● coordinator: *Institute of Molecular Physics* at the Polish Academy of Sciences; joint participants: the Institute of Physics and another 9 institutes from 7 countries.

Source – slump: an integrated approach to sediment transport ● coordinator: Vrije Universiteit Amsterdam, The Netherlands; joint participants: the *Institute of Geophysics* and another 11 institutes from 8 countries.

The development of European products and services in the field of cosmic weather ● coordinator: National Observatory in Athens, Greece; joint participants: the *Institute of Geophysics* in cooperation with research institutes from another 14 countries.

Advanced materials for lead-free soldering at high temperatures ● coordinator: the *Institute of Physics of Materials*; joint participants: 48 institutes from another 20 countries.

Advanced techniques of interference optical micromanipulation ● coordinator: the I*nstitute of Scientific Instruments*; joint participants: 40 institutes from 18 countries.

Early Agricultural Remains and the Technical Heritage (EARTH) ● umbrella organisation and coordinator: participants: the *Institute of Archaeology, Prague* and another 21 European departments.

Associated Regional Chronologies of the Ancient Near East (ARCANE) ● umbrella organisation and coordinator: ESF; participants: the *Institute of Archaeology, Prague* and other departments from 4 European countries.

National Histories in Europe; Overlapping National Histories: Confrontations and (Re-)conciliation ● umbrella organisation: ESF; coordinator: University of Oxford, Great Britain; participants: the *Institute of History* and other departments from 7 European countries.

ESF/COST/Ministry of Education, Youth and Sport

Optical fibres for new challenges in the information society ● coordinator: École polytechnique fédérale de Lausanne, Switzerland; joint participants: the *Institute of Photonics and Electronics* and another 37 research institutes from 20 countries.

Crossmodal analysis of speech and non-speech communication ● coordinator: Instituto Internazionale Per Gli Alti Studi Scientifici, Italy; joint participants: the *Institute of Photonics and Electronics* and another 62 institutes from 28 countries.

EU-EK

XML_FED XML for senior citizens and the physically handicapped ● coordinator: Software 602, a. s.; joint participants: the *Institute of Information Theory and Automation* and another 8 research institutes from 6 countries.

Gender and Wellbeing: Work, Family and Public Policies ● coordinator: University of Barcelona, Spain; participants: the *Institute of Sociology* and another 23 partners from all over the world.

TROPOSAT 2 ● coordinator: Consiglio Nazionale delle Ricerche, Italy; joint participants: the *Institute of Computer Science* and another 30 European institutes.

Bridge Fatigue Guidance – Meeting Sustainable Design and Assessment ● coordinator: Centre Technique Industriel de la Construction Metallique, France; joint participants: the *Institute of Theoretical and Applied Mechanics* and another 6 institutes from France, Sweden, Germany and Great Britain.

Integrated design of catalytic nanomaterials for sustainable production (EC-Network of excellence) ● coordinator: Consorzio Interuniversitario Nazionale per la Scienza e Technologia dei Materiali (Italy); joint participant: the *J. Heyrovsky Institute of Physical Chemistry*.

Integrated Multiscale Process Units with Locally Structured Elements (IP) ● coordinator: CNRS Nancy, France; joint participant: the *Institute of Chemical Process Fundamentals*

Discovering the Archaeologists of Europe ● coordinator: University of Reading, Great Britain; participants: the *Institute of Archaeology* and another 11 European departments.

A Three-level Lexically Oriented Model for Teaching, Learning and Evaluating Oral Slavic ● coordinator: Institute of Bulgarian Language, Bulgarian Academy of Sciences; participants: the *Institute of the Czech Language* and another 7 departments from 4 European countries.

EURATOM

Actinide Recycling by Separation and Transmutation (EURATOM) ● coordinator: CEA Saclay, France; joint participant: the *Institute of Inorganic Chemistry*

Ministry of Education, Youth and Sport

Participation in the Pierre Auger Observatory project (2008–2012, MSM-LA) ● coordinator: AUGER Observatory; joint participants: the Institute of Physics and research institutes from 17 countries.

EU Framework Programmes

Novel Therapeutic Strategies for Tissue Engineering of Bone and Cartilage Using Second Generation Biomimetic Scaffolds (6th FP) ● coordinator: University of Minho, Portugal; joint participant: the *Institute of Macromolecular Chemistry*.

Triticeae Genome – Genomics for Triticeae Improvement (7th FP) ● coordinator: INRA, France; joint participant: the *Institute of Experimental Botany*

Eurosphere: Diversity and the European Public Sphere – Towards a Citizens' Europe ● coordinator: University of Bergen, Norway; participants: the *Institute of Psychology* and another 15 European departments and 1 department from Bolivia.

The Danube Limes – World Heritage Site ● coordinator: Institute for Research into Austrian History, University of Vienna; participants: the *Institute of Archaeology in Brno* and another 5 European departments.

SUS.DIV – Sustainable Development in a Diverse World (6th FP) ● coordinator: Fondazione Eni Enrico Mattei; participants: the *Institute of Ethnology* and another 15 European departments.

SUPER-SME (Supporting Potential and Existing Research Intensive SMEs) ● coordinator: Conseil Régional de Lorraine, France; participants: the *Institute of Philosophy* and another 7 European departments.

RESCUE – From Stem Cell Technology to Functional Restoration after Spinal Cord Injury ● coordinator: Institute for Neuroscience, Montpellier, France; joint participant: the *Institute of Experimental Medicine* and other research departments from Belgium, France, Germany, Spain and Great Britain.

THERAVAC – Optimised Delivery Systems for Vaccines Targeted on Dendritic Cells ● coordinator: Institut Pasteur, France; joint participant: the *Institute of Microbiology*.

UAI

Moravia Magna – The burial grounds of Great Moravia ● coordinator: Institute of Archaeology of the Slovak Academy of Sciences; participants: the *Institute of Archaeology in Brno* and other partners from 3 countries.

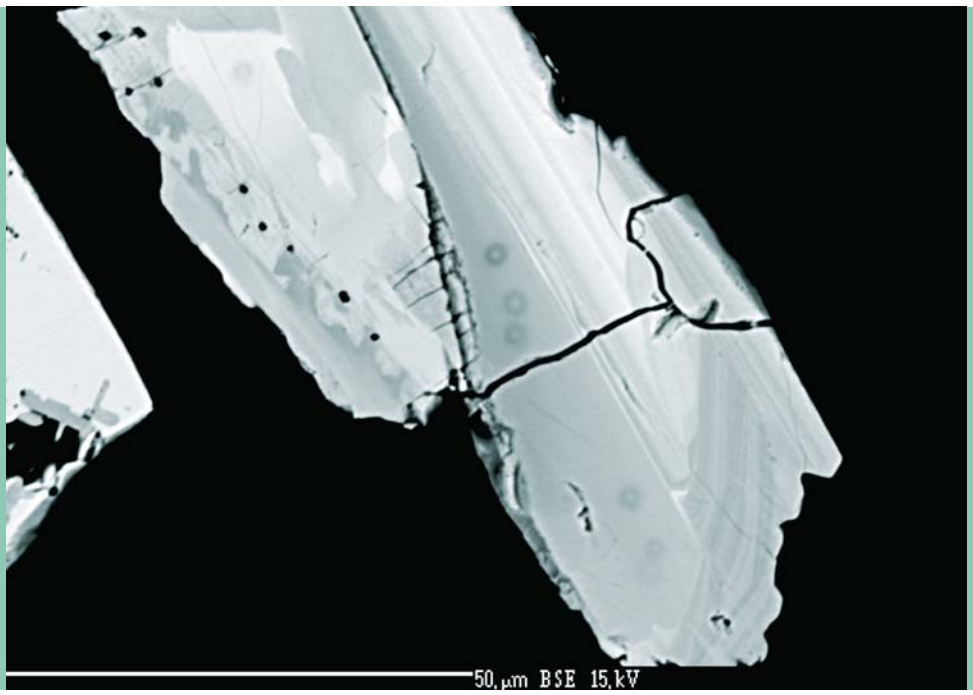
Corpus vasorum antiquorum ● participants: the *Institute of Philosophy* and other partners from 23 countries.

Latinitatis medii aevi lexicon Bohemorum ● participants: the *Institute of Philosophy* and other partners from 12 countries.

Old Greek Orthodox Church Slavonic Lexicon-Index ● coordinator: the *Institute of Slavonic Studies*; participants: 4 other partners from 3 European countries.

Other

A-granites and related rock in the history of the Earth ● coordinator: departments from Brazil, USA, Finland and South Africa; joint participants: the *Institute of Rock Structure and Mechanics* and 40 other departments from 40 countries.



Zonal grain of Mn-columbite from topaz-albite granite of the Krásno-Horní Slavkov ore district (photo by archive ÚSMH).

The socio-spatial consequences of demographic changes in the towns of Central and Eastern Europe ● coordinator: Helmholtz Centre for Environmental Research, Leipzig/Halle, Germany; joint participants: the *Institute of Geonics* and another 5 institutes from Poland and Great Britain.

Compressed baryon material ● coordinator: GSI Darmstadt; joint participants: the *Nuclear Physics Institute* and another 51 institutes from 16 countries.

The physics of peripheral plasma and the development of corresponding diagnostics on a CASTOR tokamak ● coordinator: the *Institute of Plasma Physics*; joint participants: 6 foreign departments.

Devonian land-sea interaction: the development of ecosystems and climate (DEVEC) ● coordinator: the *Institute of Geology* and other research institutes in Germany, Lithuania and Turkey; joint participants: research institutes from 30 countries from around the world.

Analytical Laboratory for Development of Biomarkers of Environmental Exposure to Arsenic, umbrella organisation: UNC School of Public Health ● participant: the *Institute of Analytical Chemistry in cooperation with* a department in the USA.

Digestive Proteases of Blood-feeding Parasites (Sandler Family Supporting Foundation) ● coordinator: Sandler Center for Basic Research in Parasitic Diseases; participant: the *Institute of Organic Chemistry and Biochemistry* in cooperation with a department in the USA.

Platinum and Ruthenium Compounds: from DNA Damage to Cancer Chemotherapy ● provider: Howard Hughes Medical Institute, USA; participant: the *Institute of Biophysics*

Genes and Functional Networks Predisposing to Cardiovascular Diseases ● provider: Howard Hughes Medical Institute, USA; participant: the *Institute of Physiology*.

C57/BL/6- and PWD-derived Consomic Strains (NIH) ● coordinator: the *Institute of Molecular Genetics*; joint participant: Dr. B. Paigen from Jackson Laboratory, Bar Harbor, USA.

Model of Huntington Disease in Pigs (High Q Foundation) ● participant: the *Institute of Animal Physiology and Genetics* in cooperation with four research departments from the USA and Italy.

A Long-term Biodiversity, Ecosystem and Awareness Research Network ● coordinator: Natural Environment Research Council, Centre for Ecology and Hydrology, Lancaster, UK; joint participant: the *Biology Centre*.

Delivering Alien Invasive Species Inventories for Europe (CT) ● coordinator: NERC-Great Britain; participant: the **Institute of Botany**

Emerging Diseases in a Changing European Environment ● coordinator: CIRAD Montpellier, France; joint participants: the *Institute of Vertebrate Biology* and another 46 partner institutions from Europe, Asia and Africa

Integrated Carbon Observation System (ESFRI-RI) ● coordinator: CEA-CNRS-France; joint participant: the *Institute of Systems Biology and Ecology*.

Policy Information Markets: Experimental and Theoretical Studies ● umbrella organisation: The World Bank; participant: the *Economics Institute*.

Public-Business Sector Alliance for Investment Attraction and Growth ● coordinator: UN Economic Commission for Latin America; participants: the *Institute of Sociology* and another 14 partners from all over the world.

Democratic Accountability and Citizen-Politician Linkage ● coordinator: Duke University, Durham, North Carolina, USA; participants: the *Institute of Sociology* and another 64 partners from all over the world.

Eastern Europeans at the Beginning of the Middle Ages: from Tribe to State ● zumbrella organisation: CNRS, France; coordinator: the *Institute of Archaeology, Brno*; participants: the Institute of Archaeology, Brno and another 5 European departments.

Historic Town Atlas of the Czech Republic ● umbrella organisation and coordinator: Commission internationale pour l'histoire des villes; participants: the *Institute of History* and other departments from 13 European countries.

Bohemian and Moravian Nobility and Intellectual Communication in Early Modern Europe in the 16th and the First Third of 17th Century ● umbrella organisation and coordinator: University of Oxford, Great Britain; participants: the *Institute of History* and other departments from 3 European countries.

Preparation of an Exhibition and the Catalogue for the Opening of the New National Gallery of Modern Art in Vilnius, Lithuania ● coordinator: National Gallery in Vilnius, Lithuania; participants: the *Institute of Art History* and the National Gallery in Vilnius.

Around 68. Activism, Networks, Trajectories ● umbrella organisation: Modern European Research Centre, Faculty of History, University of Oxford, Great Britain; participants: the *Institute for Contemporary History* and other partners from 8 European countries.

Prague Spring: The Year of International Crisis ● umbrella organisation and coordinator: Ludwig-Boltzmann-Institut, Graz, Austria; participants: the *Institute for Contemporary History* and other partners from 15 European countries.

The (Re-)construction of National History and State-building after Communism: Belarus, Czechia, Poland, Slovakia, and the Ukraine in Comparative Perspective ● umbrella organisation: International Visegrad Fund; coordinator: the *Institute for Contemporary History*; participants: the Institute for Contemporary History and other partners from 5 European countries.

International Repertory of Music Literature (RILM) ● umbrella organisation and coordinator: RILM International Center New York, USA; participants: the *Institute of Ethnology* and a global network of partners.

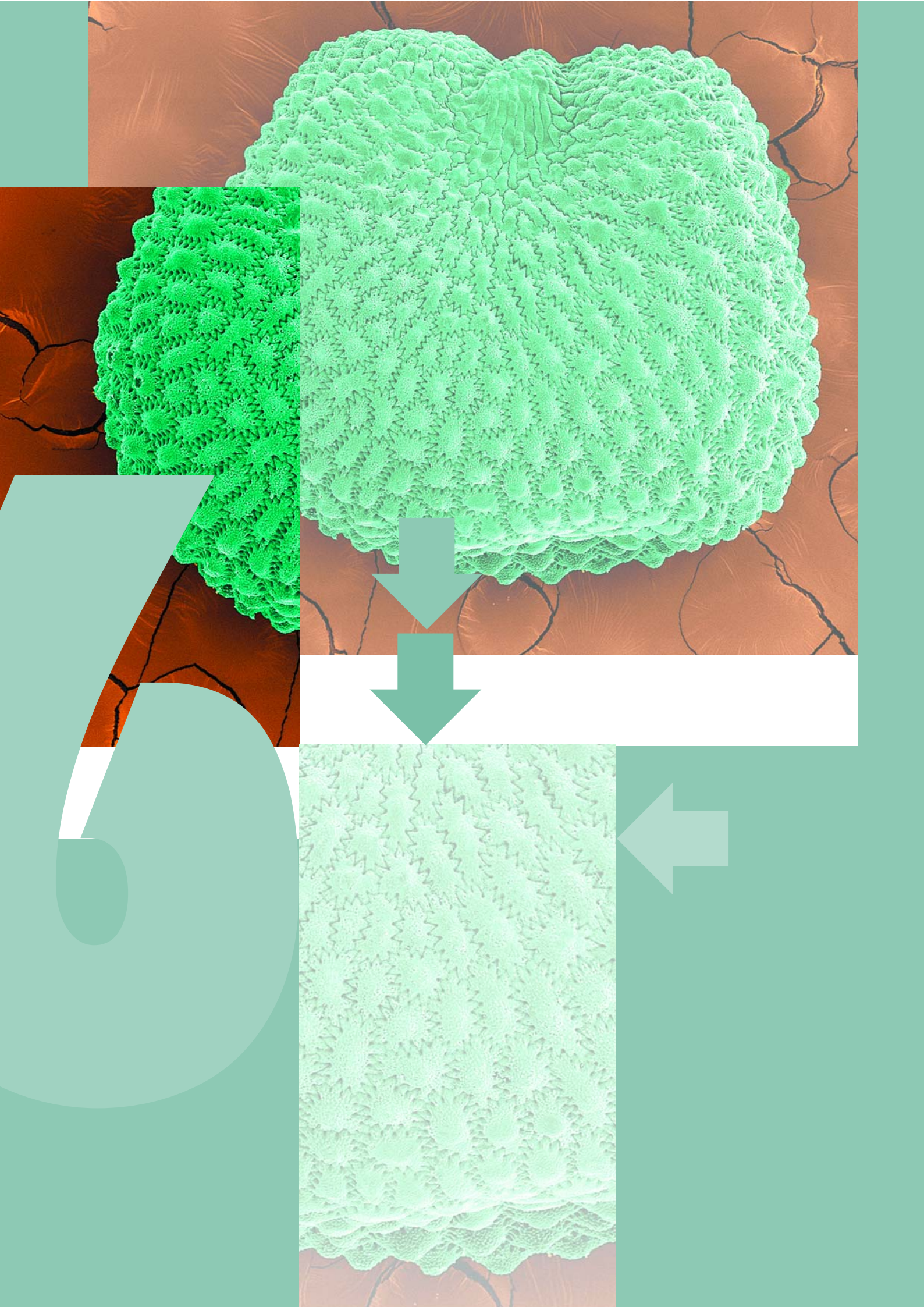
Socio-spatial Consequences of Demographic Change for East Central European Cities ● umbrella organisation: Volkswagenstiftung, Germany; coordinator: UFZ Leipzig, Germany; participants: the *Institute of Ethnology* and other partners from 3 European countries.

The Intellectual History of Patriotism and the Legacy of Composite States in East-Central Europe ● coordinator: The Balázs Trencsényi Centre for History Studies, Central European University, Budapest, Hungary; participants: the *Institute of Philosophy* and another 6 partners from EU member states.

Der Beitrag des slavischen Funktionalismus zur internationalen Narratologie ● umbrella organisation: Universität Hamburg, Germany; coordinator: ICN – Forschergruppe Narratologie Hamburg, Germany; participants: the *Institute of Czech Literature* and other partners from 3 European countries.

Czech Structuralism and Russian Formalism ● coordinator: the *Institute of Czech Literature*; joint participants: departments from 4 European countries.

European Language Atlas ● umbrella organisation: UNESCO; coordinator: Institute of Linguistics at the Romanian Academy of Sciences, Bucharest, Romania; participants: the *Institute of the Czech Language* and other European departments.



PUBLIC TENDERS IN RESEARCH AND DEVELOPMENT

6

The ASCR, or more precisely the Grant Agency of the ASCR (GA AS), organised two public tenders in the sphere of research and development for the allocation of funds to standard research grant projects and junior research grant projects. Funding for individual projects is provided solely on the basis of the results of public tenders in that the GA AS pays great attention to the fact that the same project is not funded by another provider at the same time (in particular the Czech Science Foundation). Specific financial resources allocated from the budget chapter of the ASCR are used to fund projects that successfully pass through the tender process. No public tenders for projects within the programmes announced by the ASCR were organised in 2008 with respect to the length of the duration of these programmes

Programme projects

Work continued on 50 projects in the programme of **Information Society** (a thematic programme) and on 47 projects as part of the programme of **The Support for Targeted Research Projects** (a sub-programme of the sectional programme entitled "Integrated Research") classified under the National Research Programme I (NRP I). The specific funding provided to work on continuing projects in the programme of Information Society in 2008 amounted to 126.2 million CZK. Overall funding of 65.6 million CZK was provided as part of the programme of The Support for Targeted Research Projects. Work on 20 projects in the programme of Information Society and 6 projects in the programme of The Support for Targeted Research Projects was completed by 31st December 2007. The programme councils assessed the completed projects according to the quantity and quality of the results achieved, in particular those of the applied output. Six projects from the programme of Information Society were evaluated as having been accomplished with outstanding results, 13 projects were accomplished and 1 was not accomplished. Two projects from the programme of The Support for Targeted Research Projects were accomplished with outstanding results and 4 projects were accomplished. Contracts for the use of the results of research and development were signed with the recipients of the completed projects, with performance set to be monitored every year for a period of three years after completion.

Work continued on 29 projects launched in 2006 and 2007 as part of the programme of **Nanotechnology for Society.** A total of 217.3 million CZK was invested in this work in 2008. Work also began on another 9 projects on 1st January 2008, with allocated specific funding of 95.8 million CZK for the year 2008.

Grant projects of the Grant Agency of the ASCR

A total of 402.5 million CZK in special funding from the ASCR budget was set aside for the GA AS in 2008, including investment funding. This money was used to support projects continuing from previous years and projects which were successful in public tenders announced in 2007. The overall sum was divided as follows: a total of 128.1 million CZK was dedicated to funding the implementation of newly-initiated grant projects and 273.4 million CZK to the implementation of continuing projects. The remaining 740 thousand CZK was used to pay members of the departmental councils of the GA AS.

Funding for newly-initiated grant projects

Work on 130 standard research grant projects began on January 1st 2008 based on the results of public tenders, with a total of 98.5 million CZK being assigned to these projects. A separate category of "inter-disciplinary" projects was again set aside within standard research grant projects. Such projects are mainly intended to improve cooperation between ASCR institutes and universities. Funding amounting to a total 8.7 million CZK was provided to 6 inter-disciplinary projects. The sum of 29.6 million CZK was provided to 76 junior research grant projects that were initiated within the same timescale. More detailed information on the success of individual disciplines and on the financial resources allocated is found in tables 4 and 5.

Table 4: Standard research grant projects initiated on 1st January 2008

	Discipline	*Number of proposals*	*Number of projects funded*	*Percentage of projects funded*	*Special grants in thousands of CZK*
1	Mathematics and physics, computer science	58	20	34,5	12 798
2	Technical sciences and cybernetics	43	11	25,6	7 789
3	Earth and space sciences	64	14	21,9	9 102
4	Chemical sciences	67	20	29,9	18 279
5	Medical sciences and molecular biology	66	15	22,7	14 587
6	Bio-ecological sciences	100	20	20,0	19 263
7	Social sciences andeconomics	29	6	20,7	2 653
8	Historical sciences	28	9	32,1	2 773
9	Humanities andphilology	23	9	39,1	2 576
	Total	**478**	**124**	**25,9**	**89 820**
X	Inter-disciplinary projects	17	6	35,3	8 680

Table 5: Junior research grant projects initiated on 1st January 2008

	Discipline	*Number of proposals*	*Number of projects funded*	*Percentage of projects funded*	*Special grants in thousands of CZK*
1	Mathematics and physics, computer science	31	9	29,0	2 197
2	Technical sciences and cybernetics	30	9	30,0	2 535
3	Earth and space sciences	30	9	30,0	3 163
4	Chemical sciences	34	6	17,6	3 675
5	Medical sciences and molecular biology	37	8	21,6	3 726
6	Bio-ecological sciences	110	17	15,5	9 777
7	Social sciences andeconomics	35	6	17,1	1 441
8	Historical sciences	36	7	19,4	1 633
9	Humanities andphilology	31	5	16,1	1 477
	Total	**374**	**76**	**20,3**	**29 624**

Assessment of completed and continuing grant projects

At their sessions in February 2008 the Department Councils of the GA AS assessed the standard of project work and the quality of the results of grant projects completed by December 31st 2007 and the progress of grant projects continuing in the year 2008. Evaluation was based on reports provided by the implementers of these projects, which were principally supplemented with offprints of the most significant work created during implementation. A total of 86 standard research grant projects with a period of duration of between 2 and 5 years were completed towards the end of 2007. The results of 39 projects were evaluated as outstanding, whilst the aims of 2 projects were not accomplished. An average of 8.6 publications per project were issued during work on the completed projects, the majority of publications in prestigious, reviewed periodicals. A total of 57 junior research grant projects of between 1 and 3 years in length were completed. 20 of these were achieved with outstanding results. Department Councils evaluated 5 projects as unsuccessful. The average number of published results was 2.8 per project, which can be considered a success given the length of time spent of the work and the age/research history of the implementation teams. Work on the final 8 supplementary publication grant projects also came to a close on 31st December 2007, 3 with outstanding results. The GA AS no longer funds this type of grant project. Department Councils also assessed the progress of 328 standard and 161 junior research grant projects and in all cases recommended that work continue in 2008.

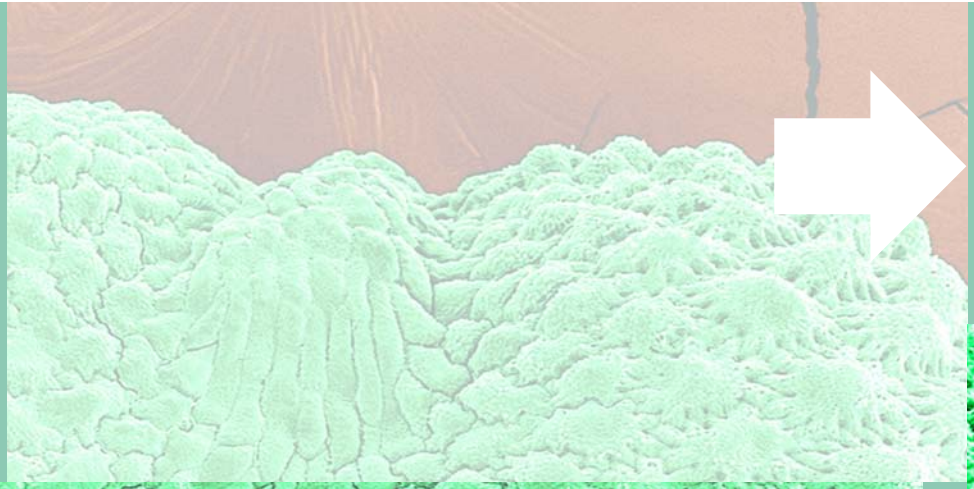
The progress and results of public tenders in the year 2008

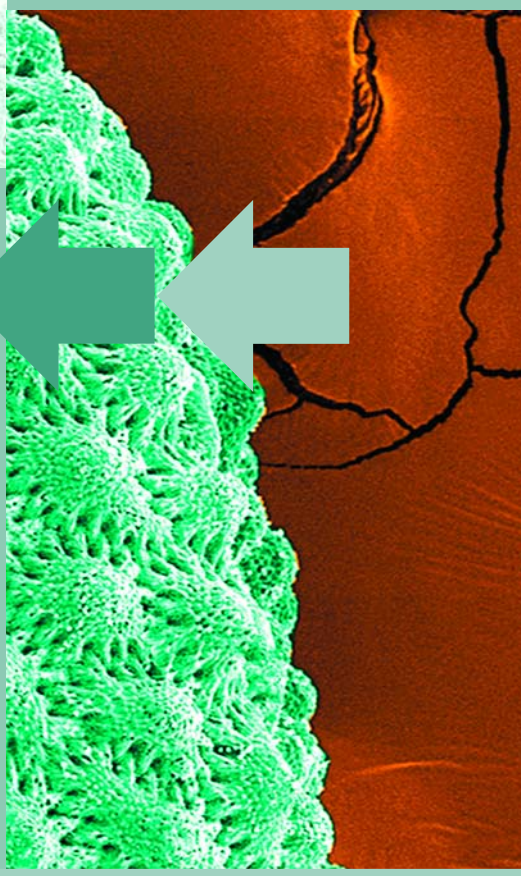
Last year the Grant Agency of the ASCR organised the XIX round of tenders for funding new grant projects with start dates in 2009. The Agency focused on standard and junior research projects. An enlarged board of the GA AS decided on the results of public tenders in accordance with the valid Statutes of the GA AS. The order lists compiled by individual Department Councils (also referred to as "a DC/DCs") were used as the basis for final decision-making. In compiling these order lists the DCs drew on the assessments of the enclosed proposed projects made by outside examiners and on their own evaluation of the proposals, carried out before the results of the outside assessment were known. The ratio of the weight of evaluation by independent examiners to that of provisional assessment by a panel was 7:3. The same method of calculation that had been tried and tested in the previous round of tenders was again used to distribute funds among the individual Department Councils and the Council for Interdepartmental Projects.

A total of 687 proposals were submitted in the tender for funding **standard research grant projects**, 10 of which were rejected from the tender for not meeting the terms and conditions set out in request for proposal documentation. One project proposer withdrew from the tender itself. The separate category of **interdepartmental projects** was again set aside within standard research grant projects (as was the case in the previous two years). Twenty-eight proposals were submitted, 3 of which were eliminated from the tender. The reason for this was basically that the material content did not comply with the condition of being "interdisciplinary". A total of 452 proposals were submitted in the tender for **junior research grant projects**. 8 proposals were eliminated because they did not comply with the terms and conditions of tender for this type of project. This was the highest number of project proposals submitted in tenders since 1991. Approximately 30% more applications (standard) and 20% more applications (junior) were submitted in comparison to the XVIII round of the tender.

A total of 9,338 evaluators (3,870 from the Czech Republic and 5,468 from abroad) were contacted in order to evaluate 1,145 proposed research grant projects received as part of tenders; 2,051 reports were received from evaluators in the Czech Republic and 2,007 reports from foreign evaluators, i.e. an average of around 3.5 reports for each proposed project.

At its session on 27th November 2008 the enlarged board at the GA AS decided to fund 111 standard projects (16% of the proposals received as part of the tender), 5 interdepartmental projects (25% of the proposals received as part of the tender), and 80 junior research grant programmes (18% of the proposals received as part of the tender), in that the order of proposals following the final proposal accepted at the time of the session was also approved. If the proposers of projects recommended for funding were also successful in winning funding from the Czech Science Foundation for practically the same proposals and therefore waived the grants allocated by the GA AS, these funds were subsequently used to support the proposed projects next in line at the relevant DC. The number of projects launched in 2009 was as follows after the elimination of projects with double funding: 112 standard, 6 interdepartmental and 77 junior. A total of 96,453,000 CZK (standard), 11, 646,000 CZK (interdepartmental) and 37, 658,000 CZK (junior research grant projects) will be invested in the first year of work. The very low success rate in the XIX round of grant tenders is based on the limited funds which the GA AS had at its disposal to invest in 2009. The slight rise in total specific funding earmarked from the budget of the ASCR to finance grant projects does not cover the demands of a considerable rise in interest among researchers in applying for grants because this budget is weighed down by the high expense of projects continuing from the past 4 years.





7 COMMUNICATION AND PUBLIC RELATIONS

The ever-broadening communication of research activities and other activities and indeed working parties and individual personalities at the ASCR is both successful and of a high standard, which can be witnessed in the results for 2008. It ensues from the statistics of news items published featuring the phrase ASCR and its various forms (more than 8300) that in the media monitored alone the ASCR was written and spoken about up to 700 times a month (on average this means 23 articles a day).

Press conference for the international conference 'Czechoslovakia and the Crisis of Democracy in Central Europe in the1930´s and 1940´s: The Search for a Solution'. Vice -president of the ASCR Jaroslav Pánek, Prof. Svatava Raková, director of the Institute of History and some of its members (Prague 2008) (photo by archive HÚ).

The ASCR organised a total of 26 press conferences in 2008 and issued 149 press releases from various areas of its activity. As is the case every year, ASCR institutes prepared a wide range of educational and communication programmes for all age groups, from the pupils of primary schools through secondary school pupils and doctorate students to students of the University of the Third Age as well as people living in retirement homes. The participation of the general public and the professional public in communication and public relations events of the ASCR also rose, and the circle of people interested in activities that were originally directed at only certain target groups also expanded. Indeed interested members of the public actually requested certain new activities themselves. For this reason the ASCR used

approved and well-established methods, for example the **European Brain Week** (ten lectures for students and the public attended by around 1,500 people), as well as entirely new approaches to communicating science – approaches which presented it from a different perspective; for example a photographic competition for scientists and the public entitled **Plant with a Story** (the *Institute of Experimental Botany*). This event was deserving of particular attention as it was able to promote relations to a discipline of science in an original way that was accessible to the general public. The competition culminated in an exhibition of the best entries on the premises of the ASCR during **Science and Technology Week**.

The ASCR, as a member of the European Science Events Association, takes part in a number of joint communication projects organised by this association. In April it organised a conference of promoters of science from around forty countries at the ASCR's château in Liblice. Then at Euroscience Open Forum 2008, which was held in Barcelona in July, the ASCR, as the sole representative of Czech science, successfully presented its Open Science project. Three students, participants in the project, appeared with the communication and education programme 'The Rainbow as a Bridge to Stars', which concentrates on astronomy, plasma physics and polymer chemistry.

Presentation of the Open Science Project at the European Science Open Forum (ESOF) in July 2008 in Barcelona
(photo by S. Donegen).

Cycas thouarsii is now the basis of studies of chromosomes considered to be the oldest species of cycads. This massive nearly 10 metres tall Cycad is probably 140 million years old. Cycads are called living fossils because they have not changed much since their origins. 1st prize of the photographic competition 'Plant with a Story, public category'
(photo by Jaroslav Vogeltanz, Plzeň Zoo).

The **website** for **journalists and the general public** at http://press.avcr.cz/ has been an inherent part of the communication activities carried out at the ASCR. The site was kept up-to-date, with news and events in the world of science added on a daily basis. Three temporary websites provided information about the eighth Science and Technology Week (the site recorded 17,000 hits during the two months of its operation), the 8th international conference of EUSCEA (European Science Events Association) and the ceremonial launch of the LHC (Large Hadron Collider) at the CERN laboratory in Geneva.

The communication and public relations activities of the individual ASCR institutes can be divided into three spheres:

The **didactic** sphere is associated with organising placements for students or secondary school teachers and organising specialised, primarily methodical seminars and courses and blocks of lectures:

The participants of practical courses in physics of Open Science to the Regions are getting acquainted with simple experiments usable during electronics lessons (photo by T. Palatý).

■ The eighteen-month ASCR education project known as **Open Science to the Regions** came to a close. As a part of this three practical courses in biology, chemistry and physics for secondary school teachers were organised in Nové Hrady and a multi-discipline seminar in Třešť. A total of 394 teachers underwent the training. Blocks of lectures were also organised directly at secondary schools in the regions. The project resulted in two interactive teaching DVDs that were distributed to secondary schools in the Czech Republic.

■ One entirely new event was the **Contemporary History Summer School** that was prepared by the ASCR (the Institute for Contemporary History) for secondary school history teachers in association with Charles University. The event aroused uncommon interest among teachers and history students alike.

■ Individual **institutes of the ASCR** organised a number of events on their own. The *Institute of Physics* arranged a five-day stay for a group of secondary school students at its institute and at other institutes of physics of the ASCR, the *Nuclear Physics Institute* organised an excursion for the general public at the isochronous cyclotron department and the *Institute of Analytical Chemistry* organised the publicity event entitled Window to Practice for the graduates of the chemical and biological disciplines, with the aim of presenting potential employers to them, and the competition to find the best paper in the area of spectroscopy by young authors up to 35 years of age. The *Institute of Macromolecular Chemistry* prepared (among other events) the 22nd summer school for secondary school chemistry teachers and lectures for the University of the Third Age. The *J. Heyrovský Institute of Physical Chemistry* organised the NANO 2008 summer school for secondary school and university students (from 10 universities and 3 secondary schools) and the ceremonial presentation of the Jaroslav Heyrovský Foundation Award to the winners of discipline-related competitions and creative competitions

Twelve secondary school students from all over the Czech Republic were awarded Jaroslav Heyrovský Endowment Fund 2008 Awards, 17th December 2008 (photo by archive ÚFCH JH).

(specialised secondary school activity – SOČ) announced by the Ministry of Education, Youth and Sport of the Czech Republic. The *Institute of Experimental Medicine* organised a seminar on research into stem cells at the Ministry of Health of the Slovak Republic in Bratislava and took part in activities at the University of the Third Age in association with the 2nd Faculty of Medicine of Charles University. The *Institute of Microbiology* continued its cooperation with the Association of Patients with Celiac Disease and the *Institute of Animal Physiology and Genetics* worked with the Mendelian Moravian Provincial Museum to organise the prestigious Mendel Forum communication/science conference and excursions and lectures for secondary school students on Cell Organs.

The second sphere of communication and public relations activities at the ASCR consists of **lectures** for the lay and expert public alike to **publicise and promote** science activity at ASCR institutes and at prominent events in public and scientific life:

■ The most prominent communication event of the ASCR was **Science and Technology Week** (STW), which was held in Prague, Brno, Ostrava, České Budějovice, Plzeň and Hradec Králové. This took in 100 lectures, 18 exhibitions, six 'science cafés' and the chance to visit 72 departments of academic institutes (including the *Library*) and eight ČEZ power stations during Open Days. The main topic was the **International Year of the Planet Earth**. STW also involved the presentation of significant European projects prepared by the ASCR: the multipurpose ELI (Extreme Light Infrastructure) laser and the Central European Synchrotron Laboratory (CESLAB). The ASCR also presented itself with a fine programme at the newly-opened Techmania Science Centre in Plzeň. There was even a live recording of Jaroslav Dušek's "Duše K" radio show, in which the host interviewed scientists, this time Václav Pačes. A total of 25,600 people came along to events as part of the 8th STW.

The attraction of the eighth Science and Technology Week was a workshop on the theme 'The Earth and its Place in the Universe' where students learned the basics about the construction of telescopes. The ASCR and the National Technical Museum Prague participated in mounting this meeting
(photo by archive OMK KAV).

■ **Lectures series** continued: Academic Prague (for the general public) and 'Nebojte se vědy' – 'Don't be afraid of science' (for secondary school students). The ASCR took part in awarding scholarships from L'Oreal to young female scientists and together with the Czech Commission for UNESCO and Charles University Prague organised a colloquium on the Czech language entitled "Do We Need Czech? What kind?" to mark Mother Tongue Day.

■ The ASCR took part in events associated with the trans-European celebrations to mark the launch of the Large Hadron Collider in Geneva, Switzerland, and with major projects put forward for aid from EU structural funds. For example, the *Institute of Biophysics* had presentations at the Senate of the Parliament of the Czech Republic and at CESLAB project days in Brno and the *Institute of Biotechnology* presented the BIOCEV (Biotechnology and Biomedicine Centre) project at a public audience in the town of Jesenice.

■ The *Institute of Czech Literature* organised a year-round radio programme on contemporary Czech literature entitled The Critic Club (Czech Radio 3 Vltava) and participated in the Bridelius and Kutná Hora communication project (a four-day cultural and spiritual programme focusing on the literary, musical and dramatic art of the 17th century).

■ The *Institute of Systems Biology and Ecology* organised more than 60 seminars and courses for the 'Network of environmental and information centres for the care for wetlands and water in the countryside' project (intended for public administration).

■ The Council for the Popularising of Science organised press conferences and together with the Academia Publishing House (the *Centre of Administration and Operations*) prepared **'Academic Cafés'** (the Academic café on the topic of Evolution, this time as an applied science, and the press conference on 'Recycling plastics – principles, technological possibilities and reality in the Czech Republic' aroused the greatest interest).

Science and Technology Week 2008 – Academic Café: The City in the Historical Landscape - Peaceful Image or Collision?. The popularization of the research outcomes of comparative urban history. (photo by archive HÚ).

■ The Committee on the Environment organised four working seminars to look at the issue of the environment, for example 'Perspectives on the development of power engineering in the Czech Republic', 'A millennium evaluation of ecosystems' and 'The significance and function of greenery in towns'.

■ Another proven form of presenting the ASCR that is accessible to the general public is the **exhibition**. The ASCR organised 19 independent exhibitions in 2008 (all but two of which were held in the ASCR building), with employees from institutes taking part in ten. Visitors were mainly attracted by the exhibition organised by the *Institute of Geophysics* to mark this year's International Year of the Planet Earth, the pictures and graphic art of academic artists Rudolf Riedlbauch and Karel Demel or the photographs of Ivan Englich from the most famous period in the history of the Semafor Theatre.

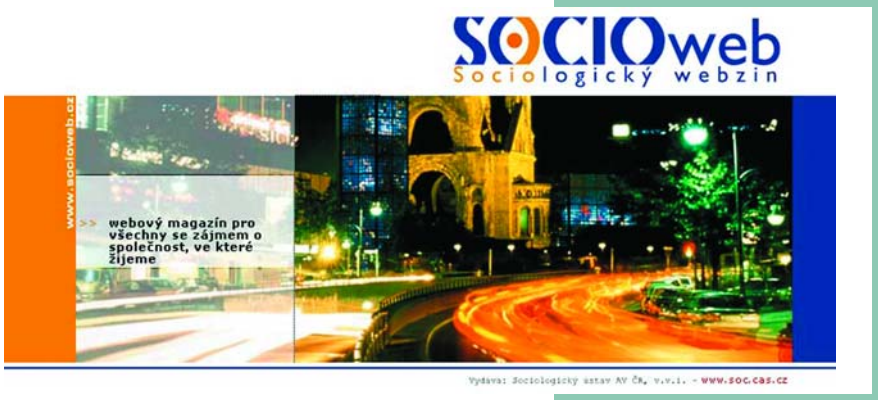
■ The New Year's concert jointly organised by the ASCR and the Czech Philharmonic Orchestra is another traditional publicity event

■ A number of awards presented to publications issued by the Academia Publishing House (the *Centre of Administration and Operations*) also helped promote the ASCR. The Lexicon of Czech literature came first in the Book of the Year Award organised by the newspaper Literární noviny. As part of the Dictionary of the Year Awards the Union of Interpreters and Translators awarded the 15-year Dictionary Award to the 'Dictionary of Czech Phraseology and Idioms' set and presented the Czech Language Atlas with the first prize in the Explanatory Dictionary

category. The publication entitled 'Guide to the Empire of Evil' won the panel's award for a biographical dictionary. The Czech Literary Fund Foundation and the Josef, Marie and Zdeňka Hlávka Foundation awarded the Josef Hlávka Prize to the book 'The physics of clouds and rainfall' in the area of inanimate nature..

The ASCR also participated in the **third sphere of communication and public relations** activities: the provision of **expert consultation** and help in creating **scripts for the programmes** of certain forms of media. This was done through certain institutes and departments:

■ The Institute of Analytical Chemistry took part in the Czech Television programme 'Michaelovy experimenty' – 'Michael's Experiments' (34 episodes), which won the prize for the Best Educational Programme at the 45th International TECHFILM Festival 2008. The Institute of Geophysics worked on the Czech Television programme 'Živé srdce Evropy' – 'The Living Heart of Europe' and the Institute of Physiology prepared a programme for Czech Television with serious social content on 'Drug-using and its impact on contemporary society'. The Institute of Archaeology, Brno participated in the creation of a French television serial on the beginnings of European civilisation entitled 'The origins of settlement in Europe' and in the preparation of a British television serial on the origins and development of the human race in the very earliest times. The Institute of Archaeology, Prague, meanwhile, cooperated on the completion of a television film called 'The Vampire Princess', had an article published in the catalogue to accompany the 'Kunst der Kelten' – 'Art of the Celts' exhibition in Bern, prepared a series of programmes on castles entitled



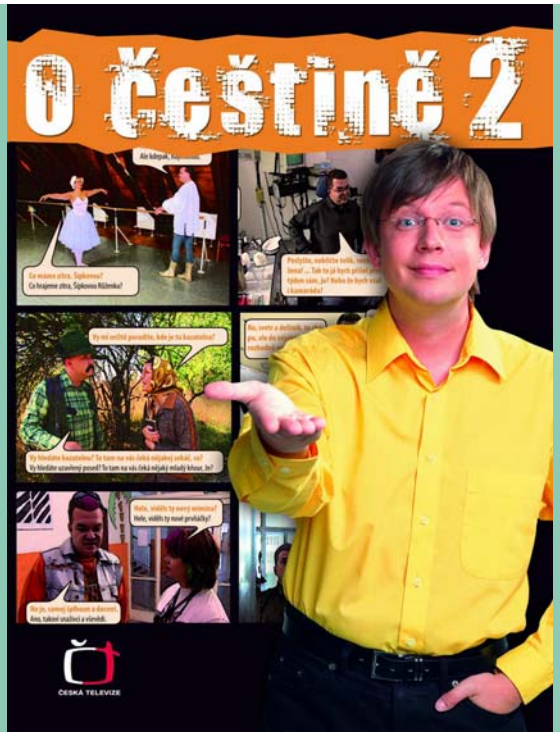
Webzin in Sociology. This web magazine is aimed at everyone who is interested in learning more about the society (photo by archive SOÚ).

'Prague 1 Present and Future Exhibition', 1st December 2008 (photo by Luděk Svoboda, archive AB).

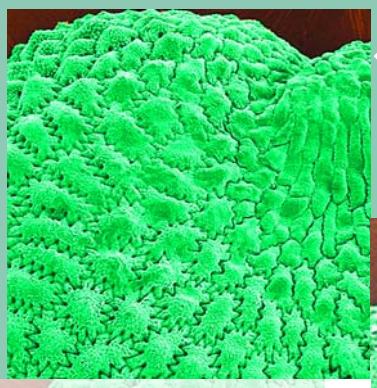
'Štíty království českého' – 'Shields of the Kingdom of Bohemia' for Czech Television, a series on the people whose names are written on the facade of the National Museum in Prague

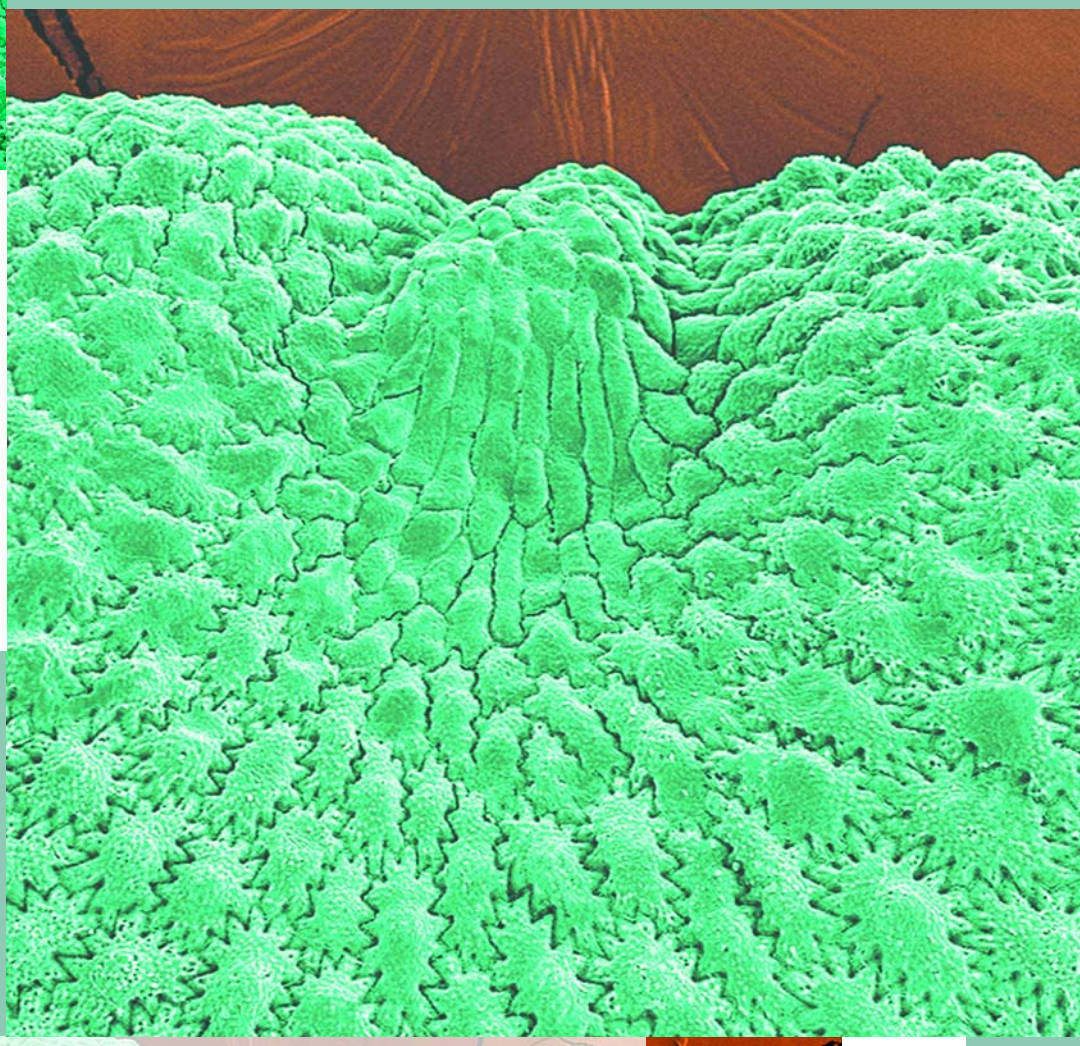
and so on. The Institute of History, the Institute for Contemporary History and the Institute of Philosophy all cooperated on television programmes and film scripts, mainly on the "anniversary of years ending in an eight" in 'Historický magazín' – 'History Magazine', 'Světci a svědci' – 'Saints and Witnesses' and 'Historie.cs', which was presented with an award by the Czech Film and Television Academy. The Institute of State and Law organised a cycle of talks associated with discussions surrounding the new draft of the Civil Code, an evaluating conference on the institutional and legal impacts of the first four years of Czech membership of the EU and more.

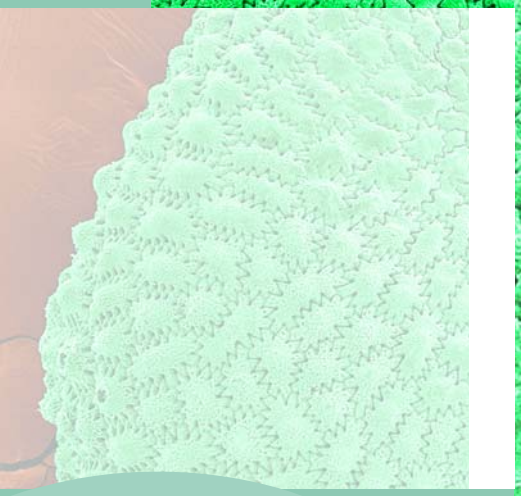
■ The *Institute of the Czech Language* continued its **language consultancy** – its employees dealt with more than 10,000 written and e-mail questions and telephone calls in 2008, took part in the creation of the 'O češtině' – 'About the Czech Language' television and radio show (and in its book form – 'O češtině 2') and in the creation of 'Divnopis' (which explains unusual Czech place names). It was also involved in language columns and other activities.



On Czech 2. Second part of the TV programme about Czech (photo by archive ÚJČ).







SUMMARY OF THE USE OF FINANCIAL RESOURCES

8

The uncommon and promising growth of 18.3% in 2007 was unfortunately an entirely unique fluctuation in the development of support for research and development from the state budget, whose share in the size of gross domestic product exceeded 0.6% for the first time in the history of the Czech Republic. The situation in 2008 returned to its previous, less-than-positive trend, whereby support for research and development expressed in financial terms did rise by 7%, but its share in GDP fell by 0.03%.

The overall expenditure of the budget chapter of the ASCR fell by 1.8% year-on-year. It only remains to repeat last year's assertion that the considerably unbalanced development of funding for research and development from public sources in recent years has certainly not helped the effectiveness of the use of funds.

2008 was the second year of management at ASCR institutes within the regime of public research institutions. We can say with satisfaction that the new method of management generally settled in very well and proved itself effective at our institutes.

The ASCR operated with a total budget of 9074.2 million CZK in the year 2008, 5555.3 million CZK of which came from the organisation's own budget chapter.

The institutional funds provided for research objectives and for the assurance of the research infrastructure amounted to 83.6% of the total volume of budget resources. The total volume of specific resources obtained in public tenders for research and development rose by 2.7% by comparison to the year 2007.

The non-investment funds of the ASCR in 2008 were generated as follows: 55.5% resources from its own state budget chapter, 18.5% transfers from other state budget chapters and 26.0% own revenues and extra-budgetary funds. The share of the final two elements here rose somewhat in comparison with the previous year.

The investment funds of the ASCR were generated as follows: 93.1% resources from its own state budget chapter, 6.6% transfers from other state budget chapters and 0.3% from extra-budgetary funds.

The structure of financial resources (in million CZK):

		Non-investment funds	*Investment funds*
Approved chapter budget		**4 496,4**	**1 033,1**
Amended ASCR chapter budget		**4 345,0**	1 183,9
of this amount	subsidies to public research institutions	3 923,2	1 161,1
	subsidies to the Office	421,8	22,8
Subsidies from other budget chapters		**5,3**	
Sources of the ASCR chapter reserve fund		**32,4**	**4,0**
Transfer into files of claims from unexpended expenses		**-15,1**	**-0,2**
Subsidies from other budget chapters (pursuant to Act No. 130/2002 Coll.)		**1 435,3**	**83,2**
of this amount	Czech Science Foundation grants	526,9	26,3
	projects of other departments	908,4	56,9
Own resources of public research institutions		**2 000,4**	
of this amount	Main activity orders	162,4	
	Sales of publications	130,8	
	Sales of goods and services	223,4	
	Licences	864,2	
	Conference fees	15,9	
	Foreign grants and donations	227,0	
	Rent	60,2	
	Interest, exchange rate profits	101,7	
	Own fund resources	116,2	
	Other	98,6	
Total resources		**7 803,3**	**1 270,9**

The public research institutions of the ASCR used the sum of 6845.8 million CZK to cover their own costs. This sum they took from its overall income of 7372.2 million CZK. In addition to covering any losses incurred in previous years, improved trading income of a total of 526.4 million CZK will primarily be used for the supplementation and renewal of instruments and equipment essential for the scientific activity of the institutes.

Structure of the costs of public research institutions (in million CZK):

Personnel costs	56,27 %	3 852,4
(labour costs, mandatory insurance paid by the employer)		
The purchase of materials	12,68 %	867,1
The purchase of energy, water, and fuels	3,40 %	232,8
The purchase of services	13,43 %	919,4
Repairs and maintenance	3,86 %	264,5
Total travel expenses	3,17 %	216,8
Depreciation of fixed assets	0,51 %	35,1
The creation of a fund of special-purpose resources	1,33 %	91,0
Total other costs	5,35 %	366,7
The institutes of the ASCR used in total	100,00 %	6 845,8

The structure of the costs of public research institutions (classed as state contributory organisations until 2006) is rather stable.

The creation of investment resources and their use

Sources of investment funds are primarily created through institutional and specific subsidies from the state budget and funds from depreciation. The data for the Academy of Sciences as a whole can be summarised as follows:

Total investment resources (in million CZK)			**1 542,4**
of this amount	Depreciation	30,8	
	Transfer from other budget chapters	216,6	
	Recipients; joint recipients		
	(pursuant to Act No. 130/2002 Coll.)	83,2	
	Foreign grants and donations	24,4	
	Subsidies from the state budget		
	institutional	1 099,5	
	specific	87,9	
These resources were used to fund:			
	Buildings	644,8	
	The acquisition of instruments and equipment	744,4	
	Maintenance and repairs	16,8	
	Other	34,4	
Total used on the acquisition of long-term assets			**1 440,4**
Use of the Property Development Fund			102,2
Sum returned to the state budget			-0,2

There was a considerable year-on-year reduction in the volume of investment funds for construction operations in 2008 in relating to the stagnation of institutional financing.

Analysis of employment and the drawing of wage funds

The total average monthly earnings in public research institutions in 2008 was 30 483 CZK, which represents a year-on-year growth of 6.25%.

The average monthly earnings in classification by category of employees in public research institutions are shown in the following table:

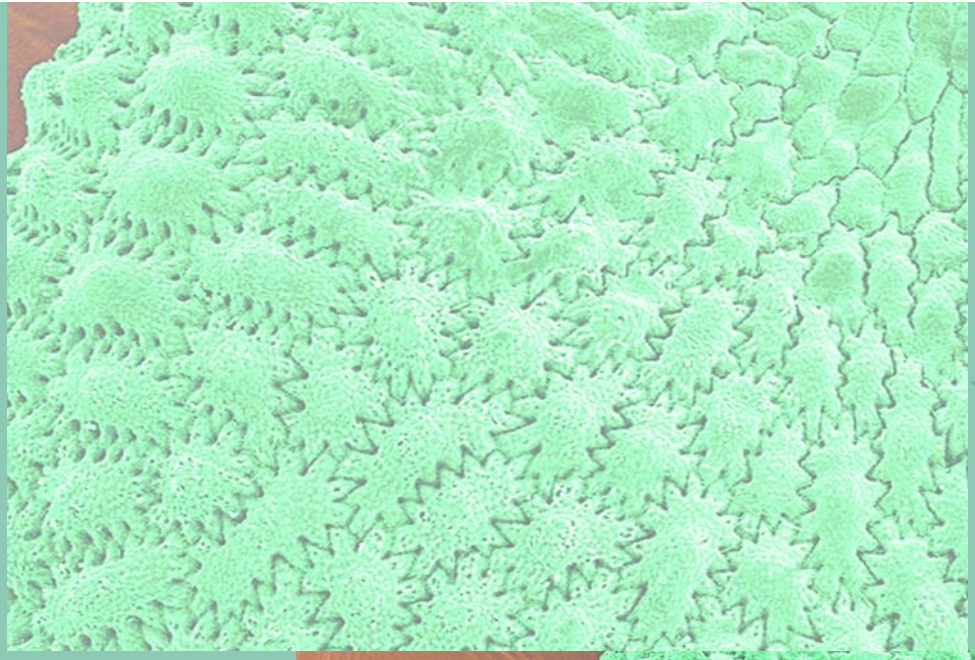
Category	*Average adjusted number of employees*	*Average monthly earnings in CZK*
Research workers	2 610	42 832
Other university-educated workers of research departments	1 740	27 240
Specialist workers with university education	346	26 105
Specialist workers with secondary education and technical college	932	20 791
Specialist R&D workers with secondary education and technical college	152	22 950
Technical and financial employees	909	29 313
Manual workers	567	16 322
Other operatives	373	14 898
Total	**7 629**	**30 483**

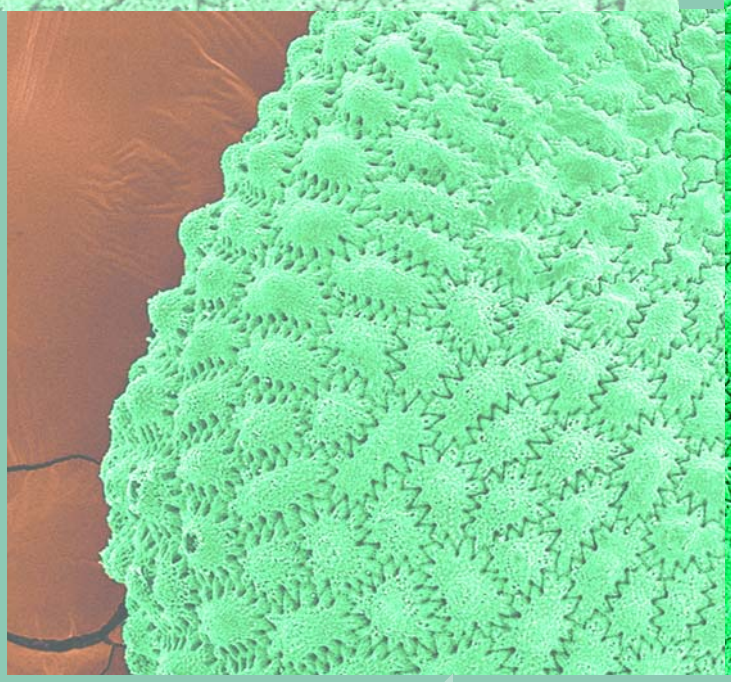
An analysis of wage resources shows that 69.5% of all payroll costs in the year 2008 were paid from the institutional resources of public research institutions.

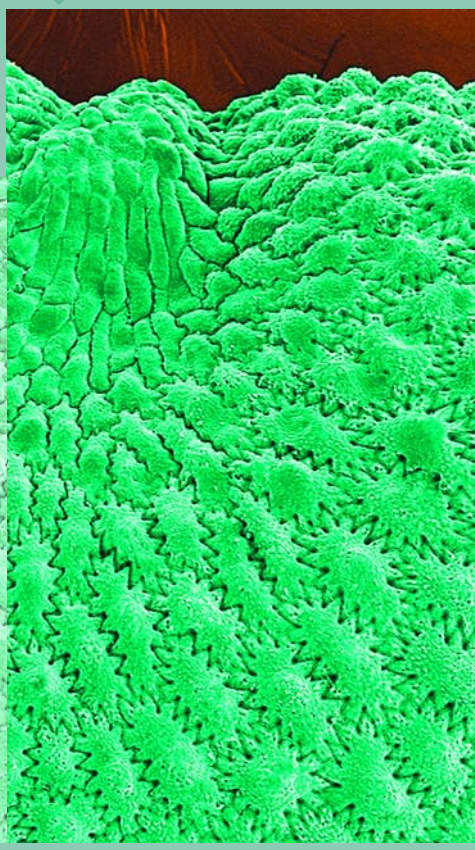
Audit activity

The aim of audit activity is primarily to ensure that legislation and the internal measures adopted is/are observed in the management of public funds and to make sure that public funds are protected from risk.

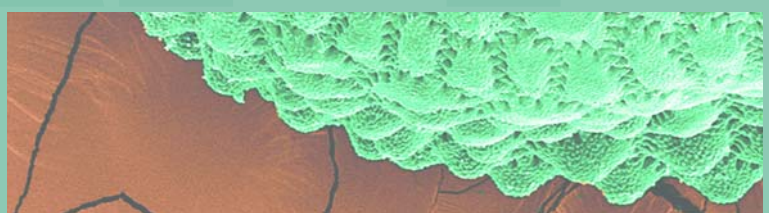
The audit department undertakes internal audits of the accounting of projects from the 6th EU Framework Programme based on the approval of the competent body of the EU. A total of 215,787,000 CZK of funding was audited in 2008. Forty audit certificates were issued.







APPENDIX



APPENDIX 1

OVERVIEW OF INFORMATION ON THE ASCR WEB SITE

Basic characteristics of the ASCR ■ http://www.avcr.cz/zinfo.php
ASCR History ■ http://www.avcr.cz/historie.php
ASCR Annual Reports ■ http://www.cas.cz/vyr_zpr.php
Concept of Research and Development in the ASCR (updating for 2004–2008) ■ http://www.cas.cz/koncepce_vav.php
Act on the ASCR ■ http://www.avcr.cz/zakon_avcr.php
Statutes of the ASCR ■ http://www.avcr.cz/stanovy_avcr.php
Code of Ethics for Researchers in the ASCR ■ http://www.avcr.cz/eticky_kodex.php
Career Rules of University-Educated Employees of the ASCR ■ http://www.avcr.cz/karierni-rad-vysokoskolsky-vzdelanych-pracovniku-avcr.html
ASCR Structure ■ http://www.avcr.cz/struktura.php
Academy Assembly ■ http://www.avcr.cz/akademicky_snem.php
Academy Council ■ http://www.avcr.cz/akademicka_rada.php?m=3
Council for Sciences ■ http://www.avcr.cz/vedecka_rada.php?m=3
Advisory and Auxiliary Bodies of the ASCR ■ http://www.avcr.cz/ostatni.php?m=3&ID=88
Register of Public Research Institutions ■ http://rvvi.msmt.cz/
ASCR Head Office ■ http://www.kav.cas.cz/gen.php?page=o_nas
Grant Agency of the ASCR ■ http://www.gaav.cz/
Prizes and Distinctions http://www.avcr.cz/ostatni.php?m=4-10&ID=4-10-01-00
Awarding the Scientific Degree "Doctor of Science" ■ http://www.avcr.cz/ostatni.php?m=5&ID=5-03-00-00
Doctoral Study Programmes Conducted at the ASCR Institutes in cooperation with Institutions of Higher Education ■ http://www.avcr.cz/ostatni.php?m=5&ID=5-01-00-00
Research projects undertaken in the ASCR ■ http://www.cas.cz/vav.php
Research centres in which the ASCR Institutes participate ■ http://www.avcr.cz/ostatni.php?m=4&ID=4-02-00-00
Research and development programmes announced by the ASCR ■ http://www.avcr.cz/programy_vav.php
Catalogue of Publication Activity of the ASCR Institutes ■ http://library.sk/aRL/main.php?language=czech&ictx=cav
Journals published by the ASCR ■ http://www.lib.cas.cz/vydano-avcr/Vydano-v-Akademii-ved-CR/casopisy-vydavane-v-akademii-ved-cr/
List of experts from the ASCR Institutes ■ http://www.avcr.cz/experti.php
List of ASCR Institutes qualified for expert activities ■ http://www.avcr.cz/pracoviste_pro_znaleckou_cinnost.php

The Learned Society ■ http://www.learned.cz/
The Council of Scientific Societies ■ http://www.cas.cz/rvs

APPENDIX 2

CONTINUOUS ASSESSMENT OF RESEARCH PROJECTS AT ASCR INSTITUTES LAUNCHED IN 2005 AND THE EVALUATION OF THEIR SCIENTIFIC AND PROFESSIONAL ACTIVITY RESULTS

Act No. 130/2002 Coll., imposes on the providers of institutional aid for the handling of research projects the obligation to conduct inspections of their handling at least once during their handling; the Academy Council decided to combine these inspections with an evaluation of the results of scientific and professional activity at ASCR institutes between 2005 and 2007. This continuous assessment was ongoing throughout 2008 based on the thematic areas, accepted principles and the agreed time schedule. It was undertaken by Evaluation Committees on Scientific Activities and the Results of Academy Institutes and their Research Objectives for individual Research Areas (hereinafter Committees), which began their work at the end of November 2007.

The basis for the accepted methodology of this evaluation involved the principles contained in the document entitled 'Standard Evaluation Protocol 2003–2009 for Public Research Organisations', which was compiled in the Netherlands and modified to suit Czech conditions. It can be said that this method proved useful in continuous assessment mainly because it placed few administrative burdens on institutes and took into consideration in its assessment all important spheres of activity associated with the main purpose, i.e. scientific work. The Committees were provided with documents and materials for all ASCR institutes under assessment and it was recommended that they formulate the resulting statement/opinion very openly (even critically) in that this could help institutes improve their activity in the subsequent period. The Committees thereafter proceeded independently at their own discretion. They summarised the results of their work in a Research Plan Evaluation Protocol and a Protocol on the Evaluation of the Scientific and Professional Activity of Institutes documents. Both protocols were sent to the relevant institutes for comments and/or objections, which were subsequently discussed by the Committees.

73 % of institutes were classified to category A (mostly teams comparable to the European standard and some teams even comparable to the world elite) and the remaining 27 % were classified to category B (some teams reaching European standard but with the vast majority of science departments among the national elite). Sixty of the sixty-three research projects launched in 2005 were evaluated as "very good" (ie a research project carried out entirely in accordance with the aims and timescale of the work as set out) and three were evaluated as "good" (problems arose whilst undertaking the research project which could influence the accomplishment of the aims or the time schedule of it). The Committees did not identify any serious problems which could threaten the continuation of work for any of the research projects during their inspection and evaluation of the results achieved.

The management of the ASCR and the management of the individual institutes were provided with an objective picture of the current state of institutes after three years of work on research projects. In the context of society as a whole, the management at the ASCR proceeded in this evaluation fully within the intents and purposes of the approved 'Reform of the System of Research, Development and Innovation in the Czech Republic', which recommended that providers undertake their own evaluations of their organisations. The continuous assessments which have taken place should be seen as a very important additional tool in the range of possibilities available for improving the standard of excellence of both individual researchers and research teams.

APPENDIX 3

OVERALL PUBLICATION RESULTS AT THE ASCR

	Publication results			
Type of publication	**Year of issue 2007**		**Year of issue 2008***	
	Czech	**Foreign languages**	**Czech**	**Foreign languages**
Knihy	243	57	165	38
Essays in books	1175	425	363	245
Articles in science magazines	1526	3335	925	2818
Conference proceedings	24	22	22	20
Papers in Proceedings	790	1621	454	1125
Translations	53		27	
Reviews	415		255	
Special articles in the daily press	224		211	
Research reports	275		221	

*) The data for 2008 is incomplete since publications with a publication date in the given year are also published the following year.

NB: the aggregate data for the ASCR is not a sum of the data by field of science given the fact that staff from more than one institute can participate in a single piece of work. Such work is included for each institute and in the summary once only.

PUBLICATION RESULTS IN AREAS OF SCIENCE

Type of publication	**Sections 1 – 3**				**Sections 4 — 6**				**Sections 7 — 9**			
	Year of issue 2007		**Year of issue 2008***		**Year of issue 2007**		**Year of issue 2008***		**Year of issue 2007**		**Year of issue 2008***	
	Czech	**Foreign languages**	**Czech**	**Foreign languages**	**Czech**	**Foreign languages**	**Czech**	**Foreign languages**	**Czech**	**Foreign languages**	**Czech**	**Foreign languages**
Books	35	16	18	8	6	11	8	8	206	31	140	22
Essays in books	40	110	40	41	40	117	8	64	1 096	208	317	145
Articles in science magazines	457	1 298	251	1 076	222	1 903	135	1 669	860	179	557	134
Conference proceedings	8	12	12	12	2	8	4	5	14	2	6	3
Papers in Proceedings	352	1 108	241	752	164	457	87	322	282	78	134	69
Translations	1		0		0		0		52		27	
Reviews	3		1		5		0		407		254	
Special articles in the daily press	35		68		42		27		148		116	
Research eports	142		96		14		11		120		114	

*) The data for 2008 is incomplete since publications with a publication date in the given year are also published the following year.

APPENDIX 4

ASCR AWARDS

The Praemium Academiae 2008 was given to:

- prof. **Tomáš JUNGWIRTH**, Ph.D. (*Institute of Physics*),
- prof. Ing. **Karel ULBRICH**, DrSc. (*Institute of Macromolecular Chemistry*).

ASCR awards for outstanding scientific results of major significance were given to:

- RNDr. Marian KARLICKÝ, DrSc. (*Institute of Astronomy*) for the scientific work: **The Discovery of New Types of Radio and X-Ray Emission from Solar Eruptions and Their Theoretical Explanation**.
- Team of authors: Prof. RNDr. Ladislav KAVAN, DSc., and RNDr. Ing. Martin KALBÁČ, Ph.D., (*J. Heyrovský Institute of Physical Chemistry*) for the scientific work: **Electrochemically Active Titanium Dioxide- and Carbon-Based Nanomaterials**.
- Team of authors: PhDr. Stanislav BROUČEK, CSc., doc. PhDr. Lubomír TYLLNER, CSc. doc. PhDr. Lydia PETRÁŇOVÁ, CSc., PhDr. Jiří TRAXLER a PhDr. Josef VAŘEKA, DrSc. (*Institute of Ethnology*) for scientific the work: **Traditional culture. Ethnic encyclopaedia of Bohemia, Moravia and Silesia, I.-III**.

Awards of the ASCR: the presentation ceremony took place on 30th September 2008 in the Villa Lanna (photo by Stanislava Kyselová, archive AB).

ASCR awards for young researches for outstanding achievements in scientific work were given to:

- Mgr. Martin ONDREJÁT, Ph.D. (*Institute of Information*) Theory and Automation) for the scientific work: **A Set of Works about Non-linear Stochastic Wave Equations**.

■ ■ Team of authors: doc. RNDr. Jan SUDA, Ph.D., a Mgr. Ing. Pavel TRÁVNÍČEK (*Institute of Botany*) for the scientific work: **Use Flow Cytometry in Population Biology, Biosystematics and Ecology of Plants**.

■ ■ Dr. phil. Pavel BLAŽEK, B.A., D.E.A. (*Institute of Philosophy*) for the scientific work: **Middle-aged Reception of Aristotle's Philosophy of Marriage: from Robert Grossetest to Bartolomew of Bruggen (1246/7–1309)**

ASCR awards for the successful resolution of particular programme and grant projects were given to**:**

■ ■ Team of authors: Ing. Václav KOLÁŘ, CSc., a doc. RNDr. Zdeněk SKALÁK, CSc. (*Institute of Hydrodynamics*) **for the scientific work: The Whirl Character of Selected Skid Flows.**

■ ■ Team of authors: doc. Martin HOF, Dr.rer.nat., DSc., Mgr. Aleš BENDA, Ph.D., Mgr. Jan SÝKORA, Ph.D., a Mgr. Jana HUMPOLÍČKOVÁ, Ph.D. (*J. Heyrovský Institute of Physical Chemistry*) for scientific work: **Understanding Spontaneously Formed Biomembranes on Phase Boundaries; their Regulation and Preparation.**

■ ■ Team of authors: PhDr. Lenka BYDŽOVSKÁ, CSc., a PhDr. Polana BREGANTOVÁ (*Institute of Art History*), PhDr. Karel Srp, Ph.D., (City Gallery Prague) for the scientific work: **Jindřich Štyrský (1899–1942)**

The following Czech and foreign scientists were awarded ASCR medals:

The ASCR Honorary Medal "De scientia et humanitate optime meritis":

The Honorary Medal "De scientia et humanitate optime meritis" for Merit in Science, Civilization and Cultural Development was given to Pavel Novák, Professor emeritus of the University of Newcastle-upon-Tyne and former director of the Institute of Hydrodynamics of the Czechoslovak Academy of Sciences, 18th June 2008 (photo by Luděk Svoboda, archive AB).

prof. Dr. Ing. **Pavel NOVÁK**, DrSc. (Newcastle University, Great Britain).

Bernardo Bolzano Honorary Medal for Merit in the Mathematical Sciences:

prof. **Stephen A. COOK**, FRS, (University of Toronto, Kanada).

Ernst Mach Honorary Medal for Merit in the Physical Sciences:

prof. Dr. **Matthias SCHEFFLER** (Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin, Germany),

prof. **Michel A. Van HOVE** (City University of Hong Kong, Čína).

František Křižík Honorary Medal for Merit in the Technical Sciences and for the Implementation of Scientific Research Results:

prof. Ing. **Petr MOOS**, CSc. (CTU Prague),
Ing. **Vladimír PEKÁREK**, CSc. (*Institute of Chemical Processes*),
prof. Ing. **Jaromír PŘÍHODA**, CSc. (*Institute of Thermomechanics*),
prof. Ing. **Miroš PIRNER**, DrSc., Dr. h. c. (*Institute of Theoretical and Applied Mechanics*).

Jaroslav Heyrovský Honorary Medal for Merit in the Technical Sciences:

RNDr. **Rudolf POLÁK**, CSc. (*J. Heyrovský Institute of Physical Chemistry*),
prof. **Alexander WLODAWER**, Ph.D. (National Cancer Institute at Frederick, USA).

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

prof. **Sune LINDER** (Southern Swedish Forest Research Center, Alnarp, Sweden),
prof. **Peter K. VOGT**, Ph.D. (The Scripps Research Institute, La Jolla, USA),
prof. Dr. **Robin A. WEISS** (University College London, Great Britain).

Jan Evangelista Purkyně Honorary Medal for Merit in the Biomedical Sciences:

RNDr. **Jaroslav KUNEŠ**, DrSc. (*Institute of Physiology*),
prof. **Ján T. VILČEK**, M.D. (New York University – School of Medicine, New York, USA).

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

prof. PhDr. **Radoslav VEČERKA**, DrSc., Dr. h. c. mult. (Masaryk University, Brno).

František Palacký Honorary Medal for Merit in the Historical Sciences:

prof. PhDr. **Ivan VOJTĚCH** (*Institute of Ethnolog*).

Jan Patočka Memorial Medal:

prof. Dr. **Bruno NETTL** (University of Illinois at Urbana-Champaign, Nevada-Urbana, USA),
Nathalie ROUSSARIE (Association of Jan Hus in Paris, France).

Vojtěch Náprsetk Honorary Medal for Merit in Science Popularisation:

Editorial staff of 'Science' section of daily paper 'Lidové noviny': Mgr. **Josef MATYÁŠ** (chief), Ing. **Eva HNÍKOVÁ**, Mgr. **Eva VLČKOVÁ**, Mgr. Matouš **LÁZŇOVSKÝ** a Bc. **Luděk VAINERT**.

Honorary Medal for Meritorious Services to the ASCR:

prof. Ing. **Rudolf ZAHRADNÍK**, DrSc., Dr.h.c.mult. (*J. Heyrovský Institute of Physical Chemistry*),
RNDr. **Jiří GRYGAR**, DrSc. (*Institute of Physics*),
JUDr. **Jaroslav SEIDL** (*Institute of Plasma Physics*).

The support of the "J. E. Purkyně Fellowship" for outstanding and promising scientists was awarded toi:

Ing. **Oleg HECZKO**, Ph.D. (*Institute of Physics*),
Ing. **Alexander KROMKA**, Ph.D. (*Institute of Physics*),
Jan KUNEŠ, Ph.D. (*Institute of Physics*),
MVDr. **Martin ANGER**, CSc. (*Institute of Animal Physiology and Genetics*).

The Otto Wichterle Award for ASCR young scientists was given to 24 young scientists in 2008. Eight, ten and six scientists received the Premium for the research of unanimated nature, research of animated nature plus chemical sciences and research in humanities as well as social studies, respectively.

J. Pánek: The Otto Wichterle Award presentation ceremony in the presence of the President and Vice-presidents of the ASCR, June 2008 (photo by Luděk Svoboda, archive AB).

The 24 perspective and talented scientists of the ASCR who in the year of submitting their proposal did not exceed the age limit of 35 were given the Otto Wichterle Award by the President and Vice-president of the ASCR in the Villa Lanna, June 2008 (photo by Luděk Svoboda, archive AB).

APPENDIX 5

SUMMARY ON COOPERATION WITH UNIVERSITIES

Section/Institute	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1 ASÚ	19	3	4	14	8	18	13	9
1 FZÚ	116	11	40	20	19	62	52	73
1 MÚ	31	12	5	17	4	47	30	22
1 ÚI	46	4	8	36	20	74	79	16
1 ÚJF	32	7	4	9	10	14	14	15
1 ÚTIA	52	7	6	33	7	71	67	14
2 ÚFE	22	4	4	11	6	17	18	3
2 ÚFM	21	4	6	13	8	18	17	16
2 ÚFP	24	3	5	6	19	25	26	7
2 ÚPT	20	4	1	12	12	7	17	10
2 ÚH	8	3	3	2	2	4	3	13
2 ÚTAM	8	2	0	11	5	13	11	6
2 ÚT	51	6	7	19	8	12	25	29
3 GFÚ	11	0	3	11	9	6	13	7
3 GLÚ	19	5	0	6	2	13	19	8
3 ÚFA	24	3	4	11	12	6	17	10
3 ÚGN	43	2	7	16	12	35	36	8
3 ÚSMH	24	3	1	9	0	4	4	9
4 ÚIACH	28	3	5	10	10	14	18	12
4 ÚACH	24	3	1	7	4	5	8	26
4 ÚCHP	33	10	5	10	12	21	28	18
4 ÚFCH JH	41	11	15	8	20	15	19	25
4 ÚMCH	43	6	3	7	2	20	21	31
4 ÚOCHB	101	18	23	62	20	37	33	41
5 BFÚ	58	11	15	25	24	26	29	16
5 BTÚ	10	3	2	6	0	9	9	8
5 FGÚ	75	9	17	31	11	59	59	14
5 MBÚ	120	13	14	61	70	21	20	60
5 ÚEB	63	4	6	51	46	34	30	25
5 ÚEM	63	2	14	5	12	16	12	17
5 ÚMG	78	6	12	44	0	14	19	18
5 ÚŽFG	37	4	9	11	7	27	25	13
6 BC	101	7	19	174	122	49	55	20
6 BÚ	51	9	11	63	27	54	50	23
6 ÚBO	62	11	8	100	100	10	11	19
6 ÚSBE	50	5	13	39	21	11	22	17
7 KNAV	2	0	0	2	2	0	0	1
7 NHÚ	136	6	40	10	12	47	43	9
7 PSÚ	46	3	13	67	4	21	21	3
7 SOÚ	37	6	2	81	10	26	22	6
7 ÚSP	12	0	2	0	0	26	25	4

Section/Institute	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
8 ARÚB	22	1	2	1	3	12	17	2
8 ARÚP	22	3	0	4	5	29	29	6
8 HÚ	48	1	17	42	0	38	38	2
8 MÚA	35	3	14	28	2	30	30	0
8 ÚDU	18	1	4	22	8	12	10	1
8 ÚSD	14	5	2	31	15	22	27	3
9 EÚ	12	0	0	17	8	14	15	3
9 FLÚ	32	7	7	55	6	104	101	28
9 OÚ	6	0	1	12	0	9	10	0
9 SLÚ	7	2	0	5	1	5	5	0
9 ÚČL	47	9	7	38	2	18	19	0
9 ÚJČ	57	1	9	34	43	31	28	6
Total	**2 162**	**266**	**411**	**1 419**	**792**	**1 332**	**1 369**	**752**

Key:

1. *Total number of DSP students at institutes*
2. *Number of DSP graduates trained at institutes*
3. *Number of newly-accepted DSP students*
4. *Number of students preparing their dissertations at institutes*
5. *Number of undergraduate students involved at institutes*
6. *Number of lecturers at universities during the summer semester*
7. *Number of lecturers at universities during the winter semester*
8. *Number of projects and grants handled together with universities in 2008 (including the Czech Science Foundation and the GA AS)*

APPENDIX 6

EDITORIAL WORK AT THE ASCR

A) Survey of titles issued by ACADEMIA Publishing House (the *Centre of Administration and Operations) in 2008*[x]

*x Publications marked * were issued with the financial support of the ASCR*

Physics, Climatology, Astronomy

Bruno, G.: Dialogy, 392 pp.

Diamon, J.: Kolaps. Proč společnosti zanikají a přežívají, 776 pp.

Häckel, H.: Atlas oblaků, 192 pp.

Geophysics, Geology

Kouřimský, J., Sejková, J.: Atlas minerálů, 375 pp., reprint

Computer Science

Husák, M.: Mikrosenzory a mikroaktuátory, 544 pp. (*published with the financial support of Česká matice technická*)

Mathematics

Aczel, A. D.: Umělec a matematik, 235 pp.*

Rosenthal, J.: Zasažen bleskem. Podivuhodný svět pravděpodobností, 296 pp.

Technical Sciences

Radvanovský, A.: Italsko-český technický slovník, 1 144 pp.*

Biology, Medicine, Ecology

Dawkins, R.: Příběh předka, 836 pp.

Deyl, M.: Naše květiny, 702 pp., reprint

Dungel, J.: Atlas ptáků, 252 pp., reprint

Flegr, J.: Zamrzlá evoluce, 326 pp., reprint

Fokt, M.: Zoologické zahrady České republiky a okolních zemí, 400 pp.

Hadravová, A. (ed.): Kniha dvacatera umění mistra Pavla Žídka. Část přírodovědná, 544 pp.

Chloupek, O.: Genetická diverzita, šlechtění a semenářství, 2nd edition, 320 pp. (*issued with financial aid of Česká matice technická*)

Janoška, M.: Nejkrásnější vodopády ČR, 284 pp.

Markoš, A.: Profil absolventa, 348 pp.

Musil, I., Hamerník, J.: Jehličnaté dřeviny. Přehled nahosemenných (i výtrusných) dřevin, 352pp.*

Nesvadbová, J., Pecháčková, S.: Historický atlas hub. Obrazy Františka Tyttla, 280 pp.*
Komárek, S.: Příroda a kultura, 312 pp.

Komárek, S.: Obraz člověka a přírody v zrcadle biologie, 328 pp. (*issued with financial aid of Charles University*)

Kůdela, V., Braunová, M.: Česko-anglická rostlinolékařská terminologie, 876 pp.*

Richarz, K.: Atlas stop zvířat, 192 pp.

Schindler, J.: Ze života bakterií, 160 pp.

Veselovský, Z.: Etologie, 456 pp., reprint

Economics, Political Science, State Administration, Law

Clausewitz, C. von: O válce, 752 pp.

Hauner, M. (ed.): Edvard Beneš: Paměti I.–III., 1 500 pp., reprint

Janoš, J.: Japonsko a Korea, 320 pp., reprint

Klicperová-Baker, M.: Demokratická kultura v České republice, 288 pp. (*issued with financial support of the Grant Agency of the ASCR*)

Philosophy, Sociology

Bauman, Z.: Tekuté časy. Život ve věku nejistoty, 112 pp.

Brockman, J.: Třetí kultura. Za hranice vědecké revoluce, 432 pp.

Fischer, J. L.: Výbor z díla I, 784 pp. (*co-issued by Palacký University Olomouc*)

Jaspers, K.: Duchovní situace doby, 192 pp.

Kracauer, S.: Ornament masy, 296 pp.

Šmajs, J.: Filosofie – obrat k Zemi, 432 pp.*

History, Archaeology

Agnew, H. L. C.: Češi a země Koruny české, 552 pp.

Brügel, J. W.: Češi a Němci 1939–1946, 416 pp. (issued with the financial support of the Česko-německý fond budoucnosti – The Czech-German Fund for the Future)

Bláhová, K. (ed.): Cizí, jiné, exotické v české kultuře 19. století, 524 pp.*

Blažek, P.: A nepozdvihne meč … Odpírání vojenské služby v Československu 1948–1989, 340 pp. (*issued with the financial support of the Czech Science Foundation*)

Doležel, L.: Fikce a historie v období postmoderny, 160 pp. (*issued with the financial support of the Ministry of Culture of the CR*)

Hastings, M.: Armageddon. Bitva o Německo 1944–1945, 696 pp. (*issued with the financial support of EU Culture 2000 programme*)

Himmlerová, K.: Bratři Himmlerové. Historie jedné německé rodiny, 296 pp.

Holloway, D.: Stalin a bomba. Sovětský svaz a jaderná energie 1939–1956, 576 pp. (*issued with the financial support of the EU Culture 2000 programme*)

Konečný, R.: Jeden z vás, 224 pp.

Kulhánek, I.: Klopýtání přes budoucnost. Dějiny Evropy od Vídeňského kongresu 1815 do roku 2005, 364 pp.

Kural, V., Vašek, F.: Hitlerova odložená válka za zničení ČSR, 240 pp.

Lewin, A.: Pohár slz, 296 pp.

Murphy, D. E.: O čem Stalin věděl, 336 pp.

Němeček, J.: Soumrak a úsvit československé diplomacie. 15. březen 1939 a československé zastupitelské úřady, 640 pp.*

Pekař, J.: Valdštejn. Dějiny valdštejnského spiknutí, 736 pp.

Pokorná, M. (ed.): Spoléhám se docela na zkušené přátelství Vaše ... Vzájemná korespondence V. V. Tomka a J. Jirečka 1858–1862, 316 pp. (*co-published with Charles University*)

Pokorný, J.: Odkaz Josefa Hlávky, 2nd edition, 304 pp.*

Schmitt, J.-C.: Svatý chrt, 280 pp. (*issued with the financial support of the French Ministry of Foreign Affairs, the Embassy of the Republic of France in the CR and the French Institute in Prague*)

Velemínská, J., Brůžek, J. (ed.): Early Modern Humans from Předmostí, 400 pp.*

Verner, M.: Pyramidy, 2nd enlarged and revised edition, 408 pp. (*issued with the financial support of 'Research Intent' of the Ministry of Education, Youth and Sports of the CR to celebrate the 50th anniversary of the establishment of the Czech Institute of Egyptology*)

Waldstein-Wartenberg, B.: Řád johanitů ve středověku, 472 pp.

Music, Theatre, Film

Hanáková P. (ed.): Výzva perspektivy. Obraz a jeho divák od malby quattrocenta k filmu a zpět, 244 pp.*

Linguistics and Literary Science

Bláhová, K., Sládek, O. (ed.): O psaní dějin, 232 pp.*

Havránková, M. (ed.): Pražský lingvistický kroužek v korespondenci. Korespondence z let

1923–1974, 448 pp. (*issued with the financial support of the Czech Science Foundation*)

Hoffmannová, J., Müllerová, O.: Čeština v dialogu generací, 456 pp.*

Janáčková, J.: Božena Němcová. Příběhy, situace, obrazy, 328 pp.* (*issued with the financial support of the Nadace Českého literárního fondu – The Czech Literature Fund*)

Janoušek, P. a kol.: Dějiny české literatury 1945–1989, III. 1958–1969, 692 pp.*

Janoušek, P. a kol.: Dějiny české literatury 1945–1989, IV. 1969–1989, 980 pp.*

Knappová, J.: Jak se bude vaše dítě jmenovat, 382 pp., reprint

Composite authors: V souřadnicích volnosti. Česká literatura devadesátých let dvacátého století v interpretacích, 740 pp.*

Composite authors: Pravidla českého pravopisu, 392 pp., reprint

Kraus, J. a kol.: Nový akademický slovník cizích slov A–Ž, 880 pp., reprint

Macura, V.: Šťastný věk, 352 pp.*

Merhaut, L. a kol.: Lexikon české literatury 4/ I.,II. S–Ž, 1 650 pp.*

Composite authors: Staročeský slovník 26, 96 pp.*

Pinker, S.: Slova a pravidla. Složky jazyka, 456 pp.*

Saussure, F. de: Kurs obecné lingvistiky, 488 pp.

Štícha, F. (ed.): Gramatika a korpus 2007, 444 pp.* (*issued with the financial support of the Czech Science Foundation*)

Vojtěch, D.: Vášeň a ideál. Na křižovatkách moderny, 280 pp.

Cultural Anthropology

Karpenko, V.: Alchymie. Svět pohádek a legend, 392 pp.

Lewis-Williams, D., Pearce, D.: Uvnitř neolitické mysli. Vědomí, vesmír a říše bohů, 392 pp.

Schumann, H. W.: Svět buddhistických obrazů, 340 pp.

Psychology

Eysenck, M. W., Keane, M. T.: Kognitivní psychologie, 752 pp.*

Förster, J.: Přehled dějin reflexe psychologie osobnosti v našich zemích, 248 pp.*

Plháková, A.: Učebnice obecné psychologie, 460 pp., reprint

Arts

Benešovská, K. (ed.): Emauzy. Benediktinský klášter Na Slovanech v srdci Prahy, 408 pp.*

Pachmanová, M., Bartlová, M. (ed.): Artemis a Dr. Faust, 264 pp.*

Petráňová, L.: Domovní znamení staré Prahy, 344 pp.

Rakušanová, M.: Bytosti odnikud, 512 pp.*

Staňková, J.: Pražské zámky, zámečky a usedlosti, 264 pp.

Veselý, D.: Architektura ve věku rozdělené reprezentace, 312 pp.*

Wittlich, P.: Jan Štursa, 615 pp.*

Science and Society, Journalism

Kohout, P.: O ničem a o všem. Krátká čtení 1975–2008, 289 pp. (*co-issued by the Pistorius & Olšanská publishing house*)

Márai, S.: Deníky I., II., 944 pp.

Morawetz, H.: Mých devadesát let, 320 pp.

Šesták, Z.: Jak se ze Žižkova stalo velké město, 504 pp.

Zahradník, R.: Laboratorní deník. Zač jsme bojovali, 484 pp.

B) Survey of titles issued by ASCR institutes in 2008

Institute of Archaeology, Brno

Boháčová, I., Poláček, L. (ed.): Burg – Vorburg – Suburbium. Zur Problematik der Nebenareale frühmittelalterlicher Zentren. Internationale Tagungen in Mikulčice, Band VII – Spisy Archeologického ústavu AV ČR, Brno, v. v. i., sv. 35, 308 pp.

Galuška, L., Kouřil, P., Mitáček, J. (ed.): Východní Morava v 10. až 14. století, 334 pp. (*co-published by the Moravian Museum*)

Měřínský, Z., Kouřil, P. (ed.): Archaeologia historica 33/08. Sborník příspěvků přednesených na XXXIX. medzinárodnej konferencii archeológie stredoveku s hlavným zameraním sídliská v stredovekom rurálnom prostredí, 591 pp. (*co-published by the Museum and Geography Society in Brno, Institute of Archaeology of SAV Nitra and Masaryk University Brno*)

Poláček, L. (ed.): Das wirtschaftliche Hinterland der frühmittelalterlichen Zentren. Internationale Tagungen in Mikulčice, Band VI – Spisy Archeologického ústavu AV ČR, Brno, v. v. i., sv. 31, 438 pp.

Přehled výzkumů 49, 468 pp.

Svoboda, J. A. (ed.): Petřkovice. On Shouldered Points and Female Figurines. The Dolní Věstonice Studies, Volume 15/2008, 252 pp.*

Institute of Archaeology, Prague

Drda, P., Rybová, A.: Akropole na hradišti Závist v 6.–4. stol. př. Kr., 132 pp.

Dreslerová, D., Haišmanová, L. (ed.): Výzkumy v Čechách 2005, 490 pp.

Ernée, M.: Pravěké kulturní souvrství jako archeologický pramen. Urgeschichtliche Kulturschicht als archäologische Quelle, 162 pp.*

Ernée, M.: Gotické kamnové kachle z hradu a zámku v Českém Krumlově. Gotische Ofenkacheln aus der Burg und Schloss in Český Krumlov. Archeologické výzkumy v jižních Čechách, 126 pp. (*co-published by the South Bohemia Museum in České Budějovice*)

Fridrichová-Sýkorová, I.: Počátky staropaleolitické drobnotvaré industrie v Čechách. Hořešovičky, okres Kladno. Archeologické studijní materiály 16, 304 pp.

Frolík, J., Tomášek, M.: Discovering the archaeologists of Europe – Zkoumání evrop-ské archeologické komunity, 96 pp.

Jiráň, L. (ed.) a kol.: Doba bronzová. Archeologie pravěkých Čech 5, 265 pp.

Macháček, J. (ed.): Počítačová podpora v archeologii II, 282 pp. (*co-published by Masarykova universita Brno a Západočeská univerzita Plzeň - Masaryk University Brno and the University of West Bohemia Plzeň*)

Maříková-Kubková, J., Schlanger, N., Lévin, S. (ed.): Sites of Memory. Between Scientific Research and Collective Representations. Archives of European Archaeology (AREA Network). Proceedings of the AREA seminar at Prague Castle, February 2006. Castrum Pragense 8, 119 pp.

Neustupný, E. (ed.) a kol.: Eneolit. Archeologie pravěkých Čech 4, 178 pp.

Smetánka, Z., Žegklitz, J.: Studies in postmedieval archaeology 1, 2. vydání (na CD), 328 pp. (*co-published by Archaia Praha, o. p. pp.*.)

Venclová, N. (ed.) a kol.: Doba halštatská. Archeologie pravěkých Čech 6, 173 pp. with pic-tures

Zápotocký, M., Zápotocká, M.: Kutná Hora – Denemark. Hradiště řivnáčské kultury (ca 3000–2800 př. Kr.), 650 pp.

Astronomical Institute

Galád, A., Janík, J., Mánek, J., Příhoda, P., Sobotka, P., Šmelcer, L., Vondrák, J., Zejda, M., Znojil, V.: Hvězdářská ročenka 2009, 295 pp.* (*co-published by the Prague Planetarium*)

Biology Centre

Nováková, A. (ed.): Sborník příspěvků z workshopu MICROMYCO 2008, 105 pp. + CD-ROM

Institute of Botany

Maršálek, B., Vinklárková, D., Maršálková, E. (ed.): Sborník Cyanobaktérie 2008, 138 pp.

Pyšek, P., Pergl, J. (ed.): Neobiota: Towards a synthesis, book of abstracts, 250 pp.

Institute of Ethnology

Bajgarová, J. (ed.): Vojenská hudba v kultuře a historii českých zemí, 506 pp.

Baťa, J. (ed.): Miscellanea z výročních konferencí ČSHV 2006 a 2007, 227 pp. (*co-published by Česká společnost pro hudební vědu, o. pp. - the Czech Musicology Society and AGORA Praha*)

Gabrielová, J., Kachlík, J. (ed.): The Work of Antonín Dvořák (1841–1904). Aspects of Composition – Problems of Editing – Reception. Proceedings of the International Musicological Conference, 445 pp.

Holubová, M. a kol.: Obrazy ženy v kramářské produkci, 224 pp.

Kopalová, L., Holubová, M.: Katalog kramářských tisků, 485 pp.

Novotný, J., Secká, M., Sedlická, K., Woitsch, J.: Český lid 1946–2000. Bibliografie, 325 pp.

Kratochvíl, M., Tyllner, L.: Masopustní koleda na Doudlebsku, 35 pp.

Šrámková, M.: Česká prozaická folkloristika v letech 1945–2000, 150 pp.

Thořová, V.: Jarní obchůzkové koledy děvčat na Olomoucku a Přerovsku, 146 pp.

Toncrová, M. (ed.): Vývojové proměny etnokulturní tradice, 167 pp.

Tureček, D., Tyllner, L.: Těžko temu kameni: Anna Komárková, zpěvačka z Javorníku na Horňácku, 81 pp. + CD

Uherek, Z., Korecká, Z., Pojarová, T. a kol.: Cizinecké komunity z antropologické perspektivy: vybrané případy významných imigračních skupin v České republice, 259 pp.

Institute of Philosophy

Acta Comeniana sv. 20-21 (XLIV-XLV), 345 pp.*

Dvořák, P., Schmutz, J. (ed.): Juan Caramuel. The Last Scholastic Polymath, 424 pp.

Fichte, J. G.: O pojmu vědosloví; Druhý úvod do vědosloví; Pokus o nové podání vědosloví, 134 pp.

Hauser, M., Žižek, S.: Humanismus nestačí, 60 pp.

Hrubec, M. (ed.): Interkulturní dialog o lidských právech: Západní, islámské a konfuciánské perspektivy, 492 pp.

Hrubec, M. a kol.: Sociální kritika v éře globalizace. Odstraňování sociálně-ekonomických nerovností a konfliktů, 482 pp.

Hříbek, T.: Metafyzika antiindividualismu, 332 pp.

Kohák, E.: Hearth and Horizon: Cultural Identity and Global Humanity in Czech Philosophy, 248 pp.

Nodl, M. (ed.): Zbožnost středověku. Colloquia mediaevalia Pragensia 6, 244 pp.

Nodl, M., Wihoda, M. (ed.): Šlechta, moc a reprezentace ve středověku. Colloquia mediaevalia Pragensia sv. 9, 314 pp.

Patočka, J.: Fenomenologické spisy I – Přirozený svět (Sebrané spisy Jana Patočky, sv. 6), 471pp. (*co-published by OIKOYMENH*)

Pechar, J. a kol. (překl.): Merlau-Ponty, M.: Struktura chování, 328 pp.

Peliš, M. (ed.): The Logica Yearbook 2007, 288 pp.

Silagiová, Z., Šedinová, H., Kitzler, P. (ed.): Pulchritudo et sapientia. Ad honorem Pavel Spunar, 408 pp.

Sommer, P., Soukup, P. (ed.): Centrum medievistických studií Akademie věd České republiky a Univerzity Karlovy v Praze při Filosofickém ústavu AV ČR, v. v. i., v Praze – badatelství, doktorandská výuka, mezinárodní spolupráce 1998-2008, 108 pp.

Sommer, P., Liščák, V. (ed.): Odorik z Pordenone: z Benátek do Pekingu a zpět. Setkávání na cestách starého světa ve 13.-14. století. Colloquia mediaevalia Pragensia sv. 10, 288 + 8 pp.

Šnebergová, I. (ed.): Augustin Smetana. Příběh jedné exkomunikace a doprovodné texty, 788 pp.

Thein, K.: Vynález věcí. O Platónově hypotéze idejí, 518 pp.

Institute of Geophysics

Špičák, A. (ed.) a kol.: Geologické procesy zapsané v horninách, Geopark Spořilov, 54 pp.*

Institute of Geology

Rudajev, V., Živor, R. (ed.): Proceedings of XXX. Czech-Polish-Slovak Symposium on Mining and Environmental Geophysics, 72 pp.

Institute of History

Boubín, J.(ed.): Mediaevalia Historica Bohemica. Sv. 11, 312 pp.

Boubín, J.: Petr Chelčický, Spisy z Pařížského sborníku, 272 pp.

Dvořáčková-Malá, D., Zelenka, J. (ed.): Dvory a rezidence ve středověku II. Skladba a kultura dvorské společnosti. (Mediaevalia Historica Bohemica. Supplementum 2), 510 pp.

Chodějovská, E., Semotanová, E., Bílková, E., Gottlieb, J., Janků, R., Kindermann, J., Klipcová, B., Kudyn, M., Rasl, T., Uličný, P., Ulrychová, E., Česáková, M., Dubinová, T.: Historický atlas měst České republiky. Sv. 18, Jičín, 73 pp.

Krafl, P. (ed.): Sacri canones servandi sunt. Ius canonicum et status ecclesiae saeculis XIII–XV., 686 pp.

Kůrka, P., Pánek, J., Polívka, M. (ed.): Angelus pacis. Sborník prací k poctě Noemi Rejchrtové, 459 pp.

Mikulec, J. (ed.): Folia Historica Bohemica, sv. 23, 417 pp.
Moderní dějiny. Sborník k dějinám 19. a 20. století. Sv. 16, 359 pp.

Němeček, J. (ed.): Reflexe dějin Československa 1918–1948 v historiografii na počátku 3. tisíciletí, 258 pp.

Raková, S., Malíř, J. (ed.): Historica. Historical Sciences in the Czech Republic. Series nova. Sv. 13, 345 pp.

Vlček, R., Hanuš, J. (ed.): Interpretace ruské revoluce 1917, 182 pp.

Vlček, R. (ed.): Slovanské historické studie, sv. 33, 211 pp.

Library

Bártová, L., Baďurová, A.: Vyobrazení měst a jiných lokalit v tiscích 16.–18. století (se vztahem k území České republiky) II/1. Bibliografie cizojazyčných bohemikálních tisků z let 1501–1800. Textová část a soupis II/2. Rejstříky, 410 pp. + 13 add. + CD-ROM

Masaryk Institute and Archives

Broklová, E., Tomeš, J., Pehr, M.: Agrárníci, národní demokraté a lidovci ve druhém poločase první československé republiky, 268 pp.

Hájek, J., Hájková, D., Kolář, F., Lacina, V., Maršálek, Z., Šedivý, I.: Moc, vliv a autorita v procesu vzniku a utváření meziválečné ČSR (1918–1921), 197 pp.

Hradilová, M. (ed.): Studie o rukopisech XXXVI, 2005–2006, 392 pp.*

Kaleta, P. (ed.): Cestování Čechů a Poláků v 19. a 20. století, 240 pp.

Petr, S.: Soupis rukopisů knihovny při farním kostele svatého Jakuba v Brně, XCIV + 587 pp.

Pichlík, K., Maršálek, Z. (ed.): Masaryk, T. G.: Válka a revoluce II, Články – memoranda – přednášky – rozhovory 1917, 356 pp.

Rychlík, J. (ed.): Korespondence T. G. Masaryk – slovenští veřejní činitelé [do r. 1918], 192 pp.

Šťovíček, I.: Ediční teorie a metodika, 230 pp.

Vašek, R.: Prezident Beneš v letech 1935–1938, 246 pp.

Economics Institute

Bičáková, A., Katuščák, P. (ed.): Czech republic 2008: strong currency, no rush toward the euro, 121 pp. (*co-published by Charles University*)

Oriental Institute

Mendel, M.: S puškou a Koránem. Pojmy a argumenty soudobého islámského fundamentalismu, 242 pp.

Ostřanský, B.: Hledání skrytého pokladu. Antologie komentovaných překladů ze středověkého arabského súfijského písemnictví, 264 pp.*

Institute of Psychology

Vobořil, D., Květon, P., Jelínek, M.: Experimentální přístrojová technika v raných psychologických laboratořích,147 pp.

Institute of Slavonic Studies

Bečka, J., Ulbrecht, S.: Slavica v české řeči III/1. Překlady ze západo- a jihoslovanských jazyků v letech 1891–1918, Práce Slovanského ústavu, Nová řada, sv. 23, 554 pp.

Bláhová, E. (ed.): Řecko-staroslověnský index. Index graeco-palaeoslovenicus. Sešit první – Prolegomena, 64 pp.

Institute of Sociology

Dudová, R. (ed.): Nové šance a rizika: Flexibilita práce, marginalizace a soukromý život u vybraných povolání a sociálních skupin, 308 pp.

Historická demografie č. 32, 208 pp.

Linková, M., Mladenić, D., Oleksy, E. H., Palasik, M., Papp, E., Piscová, M., Melichová, D.: Reclaiming a political voice: women and science in central Europe, 242 pp

Lux, M., Sunega, P., Mikeszová, M., Kostelecký, T.: Standardy bydlení 2007/2008. Faktory vysokých cen vlastnického bydlení v Praze, 206 pp.

Stachová, J.: Občanská společnost v regionech České republiky, 93 pp.

Institute of Analytical Chemistry

CECE 2008. 5th international interdisciplinary meeting on bioanalysis, 68 pp.

Institute of Inorganic Chemistry

Hradil, D., Hradilová, J. (ed.): Technologia Artis 6/2008 (AHVT, ALMA, Akademie výtvarných umění v Praze, Ústav anorganické chemie) – Sborník 2. mezioborového semináře ALMA Výtvarné a materiálové aspekty při hodnocení původu a stáří uměleckého díla, 308 pp. (*co-published by the Academy of Fine Arts in Prague*)

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Institute of the Czech Language

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Institute of Scientific Instruments

Mika, F. (ed.): Proceedings of the 11th International Seminar Recent Trends in Charged Particle Optics and Surface Physics Instrumentation, 110 pp.

Institute of State and Law

Hamerník, P., Doležal, T.: Otázky sportovního práva, 136 pp.

Jermanová, H., Masopust, Z. (ed.): Metamorfózy práva ve Střední Evropě, 456 pp. (*co-published by Vydavatelství a nakladatelství A. Čeněk Plzeň*)

Sobek, T.: Argumenty teorie práva, 330 pp. (*co-published by Vydavatelství a nakladatelství A. Čeněk Plzeň*)

Institute of Systems Biology and Ecology

Pithart, D., Benedová, Z., Křováková, K.: Ekosystémové služby říční nivy. Sborník příspěvků z konference, 235 pp.

Institute of Theoretical and Applied Mechanics

Jírová, J. (ed.): Sborník konference: New Trends in Experimental methods together with Advanced Numerical Modelling, 90 pp.

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(Part B of the list shows only books issued by the relevant institute. Books by authors from institutes issued in other publishing houses are not included and might be found in the relevant institute's bibliography. All publications shown in the list have an ISBN and/or ISSN number.)

APPENDIX 7

ACTIVITIES OF THE LEARNED SOCIETY OF THE CZECH REPUBLIC

The ASCR supports the activities of the Learned Society of the Czech Republic (Učená společnost České republiky, o. s. – hereinafter the Society) in accordance with Act No. 342/2005 Coll. on Public Research Institutions.

At the beginning of 2008 the Society was managed by its Council with President RNDr. Jiří Grygar, CSc. at its head. The XIV General Meeting elected a new Council in May 2008, with a new President, Prof. RNDr. Helena Illnerová, DrSc., and council members: Prof. RNDr.Václav Pačes, DrSc. (1st Vice-President), RNDr. Jiří Grygar, CSc. (2nd Vice-President), RNDr. Zdeněk Jirák, CSc. (Scientific Secretary), Prof. RNDr. Aleš Pultr, DrSc. (Chairperson of the Section of Mathematics and Physics), Prof. Ing. Vladimír Mareček, DrSc. (Chairperson of the Section of Chemical Science), Doc. RNDr. Jan Konvalinka, CSc. (Chairperson of the Section of Biology and Medicine), and Prof. PhDr. Ivan Hlaváček, CSc. (Chairperson of the Section of Social Science and Humanities). At the end of the year the Society had 97 Fellows and 38 Honorary Fellows.

The Society organised lectures and discussions on current issues in science, education and so on. Professional lectures and profiles honouring personalities of Czech and world science were delivered at plenary meetings, lectures were given on current topics and talks were presented at the XIV General Meeting and at other discussion meetings (19 in total). It also organised 8 working sessions.

One feature of the XIV General Meeting of the Society was the ceremonial presentation of Society awards and medals for the year 2008:

In the category of 'SCIENTIST':

- prof. Ing. Miloslavu **FRUMAROVI**, DrSc. (*Faculty of Chemical Technology, University of Pardubice*) for important, innovative work in the field of new perspectives on inorganic materials and compounds

- prof. PhDr. Eduardu **MAUROVI**, CSc. (*Faculty of Arts, Charles University*) for significant contributions to the knowledge of ancient Czech history and historical demography

In the category of 'JUNIOR SCIENTISt':

- Mgr. Janě **HUMPOLÍČKOVÉ**, Ph.D., (*The J. Heyrovsky Institute of Physical Chemistry*) for the development of fluorescent techniques and their innovative application in bio-sciences

- doc. RNDr. Martě **ŠTEFÁNKOVÉ**, Ph.D., (The Mathematical Institute of the Silesian University in Opava) for internationally recognised contributions to the development of the theory of dynamic system.

Thirteen awards were presented in the 'GRAMMAR SCHOOL STUDENTS' category:

The Society awarded medals of merit for the development of science to two prominent personalities/Society Fellows: Prof. RNDr. Antonín **HOLÝ**, DrSc., from the *Institute of Organic Chemistry and Biochemistry* and Prof. PhDr. František **ŠMAHEL**, DrSc., from the *Institute of Philosophy*.

The Society continued its successful cooperation with Czech Radio (in particular the Praha, Vltava and Leonardo stations) and with Radio Classic. The Society's website (http://www.learned.cz) is an important source of information about the Society's activities and about its members (the website also includes the texts of lectures or indeed the actual presentation of these lectures).

The Society also made a documentary film mapping out its origins and organisation, including an outline of its historical roots and a presentation of its fellows and activities.

The Society develops international relations and cooperation. Its members take part in various meetings with the representatives of foreign learned societies and scientific institutes, for examples the Berlinbrandenburgische Akademie der Wissenschaften in Berlin, the Deutsche Akademie der Naturfoscher Leopoldina in Halle, the European Space Policy Institute in Vienna and the Workshop on Spectral Graph Theory with Applications in Computer Science, Combinatorial Optimization and Chemistry in Rio de Janeiro.

Prof. A. Holý receiving the Medal of the Learned Society of the Czech Republic For Merit for the Development of Science at The XIV General Meeting of the Learned Society on 19th May 2008 in the aula magna of the Carolinum
(photo by J. Tichý).

APPENDIX 8

THE COUNCIL OF SCIENTIFIC SOCIETIES OF THE CZECH REPUBLIC

The activities of the ASCR are supplemented and broadened by the work of the Council of Scientific Societies of the Czech Republic, an independent non-profit association, and by the scientific societies associated with it. The members of these societies are experts, students and other people interested in science. The focus of the societies ranges from basic research to applicative and technical specialisations. Three new societies were taken into the Council of Scientific Societies of the Czech Republic in 2008: the Czech Society for Ecology, the Czech Oral History Association and the Edvard Beneš Society. The Council of Scientific Societies of the Czech Republic covers 74 societies with many thousands of members. Information about the activities of the Council of Scientific Societies can be found at the society's website at www.cas.cz/rvs.

Activities of the scientific societies which the Council of Scientific Societies of the Czech Republic supports or in which it directly participates were very far-reaching in 2008. Societies organised and jointly organised a total of 61 prominent international congresses or conferences and seminars. Society members took an active part in 28 other events of this kind, 22 of which were joint Czech-Slovak events. In addition to this the societies themselves organised or took part in the organisation of 227 national conferences, major seminars or national conventions. Among the most prominent conferences were the 45th Lojda Symposium on Histochemistry, The Retrovirus Assembly Meeting, Human Biomechanics 2008, the 8th Conference of the European Association for the Study of Religions and SOFSEM 2008: The Theory and Practice of Computer Science.

The final of the Astronomic Olympics, June 2008
(photo by the archive of the Czech Astronomical Society).

The societies actively supported education at primary schools, secondary schools and universities via a total of 661 events such as competitions in mathematics, chemistry, physics and astronomy, field-study courses for secondary-school and university students, doctoral seminars and doctorate courses, other competitions, etc. They also actively participated in the creation of educational materials, textbooks and legal norms. 22 awards were presented to distinguished public figures in branches of science or to promising young researchers (predominantly doctorate students) as recognition of their outstanding activities. The scientific societies associated within the Council of Scientific Societies of the Czech Republic have also represented Czech science quite significantly on the international stage due to the fact that members

Lecture on the properties of telescopes, May 2008 (photo by the archive of the Czech Astronomical Society).

of societies have been involved in the activities of more than 83 international unions, federations, associations, and organisations, often participating in the actual management bodies of such associations.

A no less important activity of most societies is their publication work. Scientific societies have often published a number of very prominent journals and magazines for decades now, as well as other, non-periodical publications. In 2008 they published or shared in the publication of 21 internationally significant journals (for example Preslia). In addition to this, 72 nationally-significant journals and bulletins were published (for example Česká antropologie (Czech Anthropology), Imunologický zpravodaj (The Immunology Bulletin), Ptačí svět (The World of Birds), Pokroky matematiky, fyziky a astronomie (Progress in Mathematics, Physics and Astronomy) and E-psychologie (E-psychology). They are publications which mostly have an irreplaceable role in conveying the results of research to the general expert public and in providing information on the activities carried out at societies and on interesting domestic and foreign events. 142 conference proceedings, books and other non-periodical publications were also released.

The core activity of most societies took the form of lectures, communication exercises and other society, often interdisciplinary, events. Societies organised 1276 lectures, excursions and smaller seminars for experts and the lay public in 2008 and society members took part in hundreds of media events (articles, interviews, and direct participation in broadcasts). The scope of society activity can be estimated at more than 400,000 interested parties from the expert and lay public.

In 2008 the Council of Scientific Societies of the Czech Republic evaluated and approved in intellectual evaluation proceedings a total of 116 applications for the provision of grants from the ASCR for projects of the scientific societies. Grants from the ASCR allow societies to broaden considerably their publication activity, lecture activity and so on. The Council of Scientific Societies of the Czech Republic provided consultation activity for scientific societies in the sphere of submitting applications and implementing projects.

Following this summary of activity in the year 2008 we can certainly say that through their activities scientific societies and the Council of Scientific Societies of the Czech Republic helped raise interest in science and technology, in research itself and in the opportunity for its application and in the achievement of excellence.

STRUCTURE OF THE ACADEMY OF SCIENCES OF THE CR 2008

ACADEMY ASSEMBLY ASCR
(256 members)

SUPERVISORY COMMITTEE AS
(9 members)

Jaroslav Spížek, President
Miloš Buděšínský, Vice-President

PRESIDENT OF THE ASCR

Václav Pačes

COUNCIL FOR SCIENCES
OF THE ASCR
(29 members)

František Šmahel, President
Antonín Holý, Vice-President
Petr Kratochvíl, Vice-President
Antonín Šimůnek, Vice-President
Blanka Wichterlová, Vice-President

ACADEMY COUNCIL OF THE ASCR

Jiří Drahoš, Vice-President
Jaroslav Pánek, Vice-President
Pavel Vlasák, Vice-President
Hrušák, Member of the Presidium
Jiří Rákosník, Member of the Presidium
František Šmahel, Member of the Presidium
Miroslav Flieger
Jiří Kolbek
Petr Nejedlý
Jan Palouš
Petr Ráb
Václav Sklenička
Martin Steiner
Josef Syka
Miroslav Tůma
Radomír Vlček

GRANT AGENCY OF THE ASCR

Jiří Gabriel, President
Štefan Schwabik, Vice-President
Karel Štulík, Vice-President
Jaroslav Peregrin, Vice-President

HEAD OFFICE OF THE ASCR

ADMINISTRATIVE CENTRE
OF THE ASCR

Centre for Administration and Operations

ADVISORY AND AUXILIARY BODIES
OF THE ACADEMY COUNCIL
OF THE ASCR
(22 bodies)

RESEARCH INSTITUTES OF THE ASCR

MATHEMATICS, PHYSICS
AND EARTH SCIENCES
(18 institutes)

LIFE AND CHEMICAL SCIENCES
(18 institutes)

HUMANITIES AND SOCIAL SCIENCES
(17 institutes)

1. Mathematics, Physics and Computer Science Section

- Astronomical Institute (ASÚ)
- Institute of Physics (FZÚ)
- Institute of Mathematics (MÚ)
- Institute of Computer Science (ÚI)
- Nuclear Physics Institute (ÚJF)
- Institute of Information Theory and Automation (ÚTIA)

2. Applied Physics Section

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

3. Earth Sciences Section

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

4. Chemical Sciences Section

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

5. Biological and Medical Sciences Section

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

6. Bio-Ecological Sciences Section

- Biology Centre (BC)
- Institute of Botany (BÚ)
- Institute of Vertebrate Biology (ÚBO)
- Institute of Systems Biology and Ecology (ÚSBE)

7. Social and Economic Sciences Section

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

8. Historical Sciences Section

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

9. Humanities and Philology Section

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