140 years
Bulgarian Academy of Sciences
Annual Report 2009
Tribute to the founder of the Bulgarian Academy of Sciences

Prof. Marin Drinov
(1838–1906)
The Bulgarian Academy of Sciences celebrates its 140th anniversary in the reporting year 2009. The oldest Bulgarian institution, which anticipated by almost a decade the revival of the Bulgarian state tradition, was aiming at generating potential, which would put the Bulgarians on an equal footing with the more developed Europeans. The first scientific plans, blessed by daring ideals, with their aspiration for advancement and self-affirmation, are in harmony with the period of the formation of the Bulgarian national identity. This actuality in terms of the social needs has remained the central characteristic of the Academy throughout those fourteen decades of its existence. Today, as an independent national institution, BAS aims at ensuring and maintaining the highest scientific level, interdisciplinarity, competitive power on an international scale, and a high national self-confidence, in accordance with the needs of the social, economic, and spiritual development of Bulgarian society and with the European and global trends in organizing scientific research. The academy is a desirable partner in international programmes and projects, in European and global scientific organizations. Its scientific and expert competence is widely used by government and other state institutions which require scientific services.

Naturally, this structure should be constantly improved in order to adequately meet the contemporary challenges faced by the Bulgarian society and state. For that purpose, in 2009 an independent international evaluation was carried out which was organized by the European Science Foundation (ESF) and by the European Federation of National Academies of Sciences and Humanities (ALLEA). The principal conclusion of this evaluation was: “The evaluation committee came to the clear conclusion that the greater part of the BAS institutes are involved in valuable
research activities in accordance with international standards. In some of the cases, the panels discovered research groups, which occupy leading international positions. The evaluation team considers this conclusive result as a spectacular achievement, taking into account the especially difficult conditions for performing research in Bulgaria.” This conclusion, despite giving occasion for pride, should not be an excuse for complacency. We know best what and how BAS has to change. That is why at the end of the year, based on the results of the external evaluation, the Academy took action to optimize its structure and management. The first changes impacted the improvement of the age structure.

We have begun this reform with the clear awareness that the research and achievements of the Bulgarian Academy of Sciences are a national treasure and we are responsible for its preservation and further development – in the name of Bulgaria, in the name of her future as a prospering European country.
Annual Report 2009

Assembly of Academicians and Corresponding Members of BAS (AACM)

In the reporting year 2009 we made attempts to energize additionally the activities of AACM and its sections, an initiative launched by the President Academician Nikola Sabotinov. The aim was to be incorporated more fully the elite scientific corpus AACM in solving the new issues identified by the Bulgarian Academy of Sciences as a national centre for scientific research in Bulgaria.

A concrete step towards implementing this initiative was the adoption of a new set of regulations for the organization of the AACM activities on 18.12.2009. The Regulations were a product of the serious efforts of a commission, selected by the Assembly, including as follows: Academician Yachko Ivanov, Academician Aleksandar Aleksandrov, and Academician Aleksandar Popov. A detailed discussion of the Regulations for the meetings of the AACM Departments took place. Despite the fact that the Regulations were incorporated towards the end of the year, during the whole year the meetings of AACM and its sections took place much more frequently than in previous years. Five general meetings of AACM took place. In accordance with the new regulations the meetings of the sections had to be held on a monthly basis, and in 2009 this frequency was already achieved. The sections were assigned to develop scientific themes of importance to the Bulgarian economy and society. And if in 2009 this activity was in a certain sense not regulated by the old rules, we hope that during this current year the scientific activities of the AACM sections will benefit from a much better organization.

In 2009 work began on developing new regulations for choosing academicians and corresponding members. The
commission elected by AACM, comprising of Academician Yachko Ivanov, Academician Vassil Golemanski, and Academician Aleksandar Popov, prepared a project, which will soon be presented for discussion at the Assembly. The philosophy of the new Regulation presupposes rejuvenating of the AACM team, which is of great importance at this particular moment.

During the year, there was a competition for choosing new corresponding members and the number of academicians in AACM came up to 57 people, while the corresponding members numbered 80. This number does not include the three academicians who passed away during the year – Academician Borislav Boyanov, Academician Vera Mutafchieva, and Academician Yaroslav Radev and five of the corresponding members: Corresponding Member Lyubomir Shindarov, Corresponding Member Solomon Saltiel, Corresponding Member Stefan Angelov, Corresponding Member Maria Papazova, and Corresponding Member Dimitar Elenkov. In BAS work 48 academicians and 30 corresponding members, while other scientific organizations (Sofia University, Technical University-Sofia, Veliko Turnovo University, Medical University-Sofia, and the Agricultural Academy) – 19 people altogether. There are 73 retired members of AACM, i.e. 50% of the staff – a troubling fact. It draws the attention that many academicians and corresponding members retired before they were seventy. Five of the AACM members permanently live abroad. By sections, the members are distributed as follows: Section “Natural Sciences, Mathematics, and Engineering Sciences” – 28 academicians and 40 corresponding members, Section “Biological, Medical, and Agrarian Sciences” – 15 academicians and 16 corresponding members, Section “Humanities and Social Sciences” – 6 academicians and 19 corresponding members, and Section “Arts and Art Studies” – 8 academicians and 5 corresponding members.

The members of AACM published a total of 619 scientific articles and books. The activity of the collegues from the Section “Arts and Art Studies” have an obvious specification – they create musical works and were actively engaged in conducting
45 events, were cast in 10 movies, in addition to the articles and books, which were written during the year.

Many of the AACM members are engaged in significant teaching activities, are staff members of scientific councils, specialized scientific councils, the commissions of the Higher Attestation Commission, the Presidium of the Higher Attestation Commission, editorial associations (including a few chief editors), councils of periodical editions in Bulgaria and abroad, expert councils, national committees and expert, regulatory organs of scientific, social, agricultural, cultural, and other organizations, etc.

AACM members are: the Minister of Culture (Corresponding Member Vezhdi Rashidov), Vice Minister (Corresponding Member Mila Vlaskovska), Chairman of the Presidium of the Higher Attestation Commission (Academician Petar Kenderov), 11 directors of departments in BAS and outside, the President of the National Science Fund (Corresponding Member Emil Horozov), a judge from the Constitutional Court (Corresponding Member Tzanka Tzankova), the President of the Union of Scientists in Bulgaria (Corresponding Member Damian Damianov), the President of the Federation of the Scientific and Technical Unions (Academician Vassil Sgurev), the President of the Scientific Technical Union of Builders (Academician Yachko Ivanov), the Director of the Vision Centre (Academician Petya Vassileva), the President of Agrobiotechpark (Academician Atanas Atanassov), 26 members of the BAS General Assembly, 4 members of the BAS Executive Council, chairmen of national committees and associations, etc.

With their overall activity in 2009, the members of AACM of BAS gave an outstanding contribution to affirming the prestige of Bulgarian scientists and Bulgarian science at home and abroad.
Main Results of the Research Activity

In 2009 the independent scientific departments of BAS worked on a total of 3,720 scientific and applied scientific projects, distributed in the following way: mathematics and informatics – 314; physical sciences – 380; chemical sciences – 503, biological sciences – 775; earth sciences – 562; engineering sciences – 302; humanities – 617; social sciences – 246 and others – 21 (see Figure 1). 2,632 of these projects received additional funding from: the National Science Fund – 849 (compared to 725 in 2008), ministries, administrations and companies in Bulgaria – 287 (compared to 703 in 2008), various organizations and companies abroad as well as from international collaboration – 1,158 (compared to 1,234 in 2008) – see Figure 2. 434 (as compared to 514 in 2008) of the projects were additionally funded and they were assigned by institutions in Bulgaria or abroad. For the last eight years the share of the projects with additional funding has grown compared to the total number of projects developed at BAS. In 2001 it was 54%, in 2002 – 58%, in 2003 – 59%, in 2004 – 62%, in 2005 – 64%, in 2006 – 66%, in 2007 – 67%, in 2008 – 69.3%, in 2009 – 70.8%. This shows a permanent growth at the institutes of BAS (see Figure 3).

Below are presented only the most important achievements of the respective institutes of BAS.

Mathematical sciences

In the area of financial mathematics through a numerical study of the models, using the non-linear Black-Scholes Equation and with the aid of cell neuron networks, the non-linear special differential equations were studied, summarizing the Black-Scholes Equation. In the process were developed more precise models, which take into account realistic assumptions, such as price of transaction, non-liquid markets, the influence of the investor’s preferences.

When studying the contractibility of thin films of non-polar fluid, which undergo a critical phase transition in the presence of the earth’s gravitation, while the thin films are between hard surfaces, it was concluded that for all thicknesses of the film, the
**Number of projects developed in fields of Science**

- Biological Sciences: 775
- Chemical Sciences: 503
- Physical Sciences: 380
- Mathematical Sciences: 314
- Engineering Sciences: 302
- Geosciences: 562
- Social Sciences: 246
- Humanities: 617
- Others: 21

**Additional funding of BAS projects and contracts for the period 2002–2009**

- From the National Science Fund
- From Bulgaria
- From abroad

*Total number for 2009 is 2632*
A combination of the Van der Waals interaction and gravitation lead to a significant deviation from the film contractility. In addition to this, precise expressions were deduced in the framework of the continual approach.

In the area of the Voksel methods and algorithms for microstructural analysis and multi-level calculation models, solutions have been found for composite multilevel models for continuous mediums, which encompass processes diverse in their physical essence with highly differentiated dimensions and characteristic size. The solutions can be used in the analysis of the microstructure of the bone, the processes of development of osteoporosis, flows in highly heterogenous porous environments and in technological processes on the basis of ion exchange.

New polyvariance definitions were created for distinguishing malicious codes, which are used in exhaustive transformations for proving belonging to family characteristics of attacking sequences of a binary type, with the aim of deriving press-marks in virtual copies of operational systems used in “cloudy” information structures.
Physical sciences

A group of scientists from the Institute for Nuclear Research and Nuclear Energy participated in the construction of the ion collider NICA (Nuclotron based Ion Collider Acility) at the Joint Institute for Nuclear Research in Dubna. A series of theoretical studies of different systems of the cyclical injection-booster were conducted: an injection, a magnet structure, a correction of the equilibrium orbit, coherent instabilities, high frequency diagnostics, as well as the modernization of the existing ion accelerator Nuclotron.

Through the Raman Spectroscopy of carbon nanotubes with a metal filler, a growing sensitivity of the transversal branch to alloying was observed. This sensitivity maximum represents the first experimental proof of the Kon anomaly at the point $2\pi/3a$ in metalized nanotubes. The result gives the opportunity for a numerical evaluation of the force of the electron-phonon interaction at this point, while the applied method can be used in the study of the electron-phonon interaction in different parts of the Brillouin zone of lead, carbon nanotubes, and materials, in which a double resonance Raman diffusion is possible.

Two types of behavior of the resistance in the electron and ion nanolithography were observed for the first time – linear and non-linear development of the resist. In the second case, which is more common, the speed of dissolution of the resist in the development depends not only on the dosage of exposure, but also on the time elapsed since the beginning of the development process and/or the depth of the resist layer from which molecules are removed. For this case, a new scheme is offered of a time-dependent simulation of the development and the corresponding multi-ciphered experimental dependence on the speed of dissolution of the exposure dosage in different other conditions (time and depth).

Chemical sciences

The formation of polyelectrolyte complexes is used in an original way for the controlled modification of biological behavior on the surface of polymeric materials. Covered with
such a complex, the surface of the nanofiber materials, elaborated through an extremely perspective method electrospinning, acquires high compatibility with blood cells and is capable of reducing the adhesion of pathogenic microorganisms. These materials are very suitable for healing wounds. A contribution was made to understanding some of the fundamental aspects of a number of the contemporary methods of polymerization when using them for a controlled synthesis of block copolymers. The formation of polyelectrolyte complexes with the participation of these copolymers is used for obtaining pH-sensitive nanoparticles, with a cover of polymer chains, which enable the use of these nanoparticles as carriers of medicinal drugs.

An original method for electrohydrodynamic synthesis of immobilized micro- and nanosized fiber materials for a wide specter of oxide ceramics, such as titan, zinc, cerium, zirconium, and aluminum oxide, as well as hydroxylapatite – the mineral component of human bones. The new fiber materials have potential possibilities for quick contemporary application, such as neutralizing noxious substances in waste water. They will be able to replace the currently used TiO₂ and ZnO nanoparticles, which require a periodical regeneration for restoring their activity. The laboratory tests show that the photocatalytic effectiveness of the new materials when neutralizing noxious organic substances is no lesser than that of the nanoparticles. An original configuration of active electrochemical sensory electrode was proposed, with an electronic mediator from a nano-sized fiber crystal ZnO, is currently undergoing laboratory testing with the final aim of quantitative detection of pesticides in foods. It has been determined that the hydroxylapatite fibers stimulate the process of division of the osteoblast-like cells immobilized on top of them. On this basis a shortening of the healing processes is expected, through a synthesis of such fiber material on bone implants.

**Biological sciences**

*In Vitro* research proves the onycholitic activity of the H-1PV parvovirus on a model of a Balkitov lymphoma, which is expanded by the *In Vitro* research showing that this onycholitic virus
can potentially be of therapeutic significance. The pre-clinical research shows that parvovirus H-1PV could potentially be used for the therapy of such a type of neoplasma.

It was found that the oxidative damage of the membrane cholesterol in cells of three-dimensional cell culture are smaller when compared to the oxidative damage of the membrane cholesterol observed in cells of mono-layered cell culture. This is determined by the asymmetrical distribution of cholesterol in the two mono-layers of the membrane and the higher percentage of fingomieline as compared to the total number of lipids.

It is found that the adaptive response, which consists in one unspecific, evolutionary-developed defensive reaction of the genome to harmful influences of environmental factors, can be induced by new tiocarbamid compounds. An important role in generating this adaptive response is played by the accelerated reparation of the induced DNA damage and the activation of the antioxidant defense system.

The network of experimental areas was actualized and the data on the conditions of the forest ecosystems in Bulgaria was gathered. The climate change, entomological and phytopathological damage and anthropogenical influences contributed to the decimation and pigmenting of the leave system, and to the withering of the forest vegetation. The data on the chemical composition of the soils and the influence of toxic microelements on the tree, shrub, and grass vegetation was summarized. The complete analysis was presented to the Ministry of Environment and Waters - the Executive Environment Agency and the Executive Forest Agency responsible for making management decisions and to the International Centre in Hamburg.

The Minister of Agriculture and Foods endorsed the new varieties of tomatoes and sugar corn created in the Institute of Genetics “Academician Doncho Kostov.” The variety of tomato is distinguished by high productivity, very good taste, and good transportability. The sugar corn has a tender pericarp and improved taste qualities of the grains, which makes it especially suitable for fresh consumption and preserves.
Earth sciences

In order to comply with the European construction standards, the member-states of the European Union determine by themselves, within certain limits, the levels of security, exploitation suitability, and the durability of the buildings on their territory, taking into account the corresponding national differences. Maps were produced of the impact of temperature, wind, snow, and seismic danger on the basis of the scientific analysis and experimental studies, in accordance with the requirements of the Eurocodes; the corresponding obligatory national parameters and applications were defined. With its three components, the project was successfully finalized and ratified by the Contracting Authorities at the end of 2009.

A new approach for the combined chemical and mineralogical classification of the unorganic substance in coal was proposed which would allow a realistic assessment of the potential applications of various types and sub-types. On this basis a conception for “self-purifying fuels” was developed; it indicated mechanisms for more efficient capturing of volatile toxic elements in thermal power stations which burn coal.

Engineering sciences

The interrelation was developed between the cumulative jet, which penetrates through the multi-layered heterogeneous barrier, and the parameters of the supply current. The type of electrolyte and the number of hydraulic elements, guaranteeing the greatest resistance against the cumulative jet, were determined theoretically. On this basis were constructed and produced two-, three-, four-, and five chambered electric shields. The same were experimented in Bulgaria and NATO member-states. Light, anticumulative shields were constructed, which give the possibility for eliminating the synergy of the cumulative ammunition. Models and physical samples for resisting the kinetic energy of non-coactive cumulative ammunition were developed. The created shields can find application in flying objects, ground light-armored machines, and stationary objects.

A new method was developed for approximating one-di-
dimensional histograms (i.e. positive discreet functions) with a minimal number of Gauß divisions at a set allowed mistake in approximation. The method is applicable when there is segmentation of the images in intensity and/or color (for example, when identifying human skin in random images), as well as in a wide range of multidimensional tasks for identifying images, which can be brought down to one-dimensional, for example in systems for identifying symbols (letters, numbers, neume, notes, allophone, etc.)

The generation of a strong conductive layer on the surface area of the semi-conductor structures from the Hall effect was proved; a method was developed for the fusion of data through incorporating Hall micro-sensors in the new generation of medical instruments; a new heuristic classification of destabilizing factors of the environment was proposed for recognizing situations which are critical for the apparatus and the doctors’ health, and numerous high-efficiency methods were verified on the basis of intelligent software sensors for key parameters of the biotechnological processes for the wine and brewery industry. Their application significance includes a circular two-component Hall magnet-meter with a parallel sensitivity axis, high resolution, simplified scheme technology and a multi-functional application.

Humanities

BAS is responsible for the coordination of the entire national language policy. “The Bulgarian National Corpus” was developed in this respect. It was created as a mono-language massif, representative of the Bulgarian language in the period from 1945 (year of the last spelling reform in Bulgaria) to this day, and comprises an impressive collection of texts in Bulgaria, which are accessible in electronic format – to this date the corpus contains around 320 million words and includes more than 10,000 electronic documents. The corpus is accessible on the Internet through a specially developed system for advanced searching, which allows the extraction of repetitions (and their contexts) in requests which are diverse in complexity. The Bulgarian National
Corpus gives the opportunity to conduct theoretical research in different areas of linguistics (computer linguistics, lexicography, morphology, syntax, stylistics, etc.); research on the peculiarities of diverse language phenomena; for demonstrations when teaching Bulgarian as a native and foreign language, etc.

Conducting research on the metatheoretical problems of the theory of literature and establishing an independent Bulgarian point of view on the theoretical debates gave birth to the fundamental monography by Radosvet Kolarov “Repetition and Creation: Poetics of the Auto-textuality” (S., 2009 – 352 pg, ISBN 978–954–01–2370–7). The work reviews the problem of auto-textuality, in which the separate texts are interpreted as productive nuclei of a complexly organized work, simultaneously balanced and arguing with itself. The theoretical ideas are illustrated through analyses of Bulgarian and world classical literature: Botev, Vazov, Elin Pelin, Yavorov, Gogol, Dostoyevski, Blok, Baudelier, Kafka, etc.

In 2009, academic archaeology completed projects of exceptional scientific value and with the great potential to turn into a social-economic factor as key sites for cultural tourism. The most significant among them was the opening of the Apolonia acropolis on the island Saint Kirik in the aquatory Sozopol. During the rescue archaeological research in 2009 a church and altar from the late archaic epoch were discovered and studied (end of 6th – and first quarter of the 5th century B.C.); altar from the first quarter of the 5th century B.C., late antiquity single conch church with a baptistery and necropolis. The preliminary results of archaeological studies show that the island territory was used as a sacral place from the beginning of the 6th century B.C. until the end of the 19th century. The crown of Apolonia Pontiiska during the Rome epoch probably became a place of worship for the Thracian rider. During the Christian period the sacred territory was marked by an early-Byzantium basilica and a necropolis, probably connected to the status of Sozopol as an Episcopal and bishop centre, as well as the famous until now only from historical sources monastery from the Middle Ages “Saint Kirik and Ulita” and the church from a later period “Saint Troitza”.
Social sciences

A database with data on the ageing of the population was created, which contains information on the age changes in the population and the basic social-demographic indications of the adult population covering a period of 3-4 decades. It facilitates the combined use of data and the development of analytical indicators (correlational, covariational, for a criteria assessment of the statistical validity) and hypothesis for prognosis.

A unique source was developed for statistical data on output in Bulgaria from the 30s of the previous century until Bulgaria’s accession to the European Union. Indicators for the Gross domestic product for 1989 and 1990 were offered, which improves the possibilities for comparing the production in the country before and after 1989. Possible solutions were offered for the periods with comparable prices, as well as for the statistical and economic accuracy of long time-series of indices for the physical volume and for volumes of constant prices.

Factors are identified which diminish the use of agricultural lands, limiting the productivity and depriving the industry field from its natural and fixed competitive advantages. A framework for developing the size of the lease payments was proposed, which takes into account their relation to the price of the agricultural land and its dynamics, to the industry sector and economic peculiarities of the agricultural production process, and to the financial aspects of the common agricultural policies of the EU. A forecast was made for the expected rates of price increase of the agricultural lands in the medium and long-term perspective.

On the basis of a multidisciplinary analysis the household indebtedness was outlined; the profiles of social groups with credit liabilities were described; the problems and the conflict zones in the relationship “borrower – creditor” were identified. The attitudes and intentions for obtaining new loans were identified, arranged, and analyzed; an initial evaluation was made of the level of financial culture of the “financially competent” members of the households and of the capacity of Bulgarian citizens for dealing with credit products in the unique conditions of mass
consumption in the country. Concrete measures were proposed, which will ease the conflict between lenders and borrowers and ensure the smooth functioning of the Bulgarian credit system.

Identified were the specific patterns in the development of children’s knowledge of basic human emotions, in the construction of a semantic space, in which they are reflected, as well as their tendencies to change.

The need was justified and suggestions were formulated for changing the policies, the statutory order, and the practice of protecting the Bulgarian communities abroad. New aspects were outlined and a comprehensive reading was made of the adoption regulation and the relationships between parents and children.

It is evident that the ethnically differentiated models of national identity define the specific character of a society, which is influenced by the Euro-integration and globalization processes, but is itself in a deep social crisis, with an ever more depleting social capital (mistrust of the other, intensified egocentrism, closure within oneself, intensified individualism,
decrease of socialization and “openness-towards-the-other,” social “shyness”) and it is ever more difficult to generate social energy for optimistic perspectives.

Publications

The number of BAS scientists’ publications is 11,367 for 2009 in total, i.e. a bit less than in 2008 – 11,632. Their distribution according to the respective field is shown on Figure 4. The publications in the field of humanities are the most numerous, followed by the biological sciences, earth sciences, and physical sciences. For 2009 the average publication activity of a BAS scientist or scholar is 3.27, while in 2008 it was 3.1. Figure 5 shows the distribution of publications according to the respective type of edition.

Innovation Activity

At the end of 2007 the Centre for Innovation created a “Classification of Applied Innovation Research” which was adopted
by the Board of BAS. In addition, the reports of the BAS Institutes and Departments for 2007, 2008, and 2009 mention some identified innovative developments. This allows for widespread recognition and public demonstration of a wide range of innovation activities.

The total number of innovative developments in 2008 and 2009 (distributed according to the respective scientific field) is presented in the following Table 1.

In 2009, 44 of all the 71 BAS institutes and departments registered innovative activities. For 2008, only 50 did this.

The table shows that the greatest number – a total of 618 and 41 per institute – are the developments in the biological sciences, where the amount of additional funding is the greatest:

2009 – more than 2.4 times as compared to 2008 and
2010 – a growth of 111 % for 2009, which is 2.25 above the average in BAS

The additional funding for all the BAS Institutes and Departments is 60,655 BGN in 2009, without taking into account that of the specialized and subsidiary departments. The conditional correlations for 2008 and 2009 of the additional funding sums to

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<td>1</td>
<td>Mathematics</td>
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<td>3</td>
<td>Chemistry</td>
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<td>4</td>
<td>Biology</td>
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<td>5</td>
<td>Earth sciences</td>
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<td>6</td>
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<td>7</td>
<td>Humanities</td>
<td>64</td>
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<td>8</td>
<td>Social Sciences</td>
<td>44</td>
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|   | In total for BAS | 1862 | 1458 | 54 862 | 60 655 | 111 |

Table 1
the total number of innovations are, as corresponds: 29 thousand BGN (for 2008) and 41 thousand BGN (for 2009). The growth from 29 to 41 thousand BGN for innovative activity is impressive: 1.38 times. This can mean an orientation towards a smaller number but more profitable developments.

The innovation activity in 2009 continues to mark a high level, especially on a national scale. The great volume of work of the Patent Bureau encompasses all activities on protecting the BAS intellectual property and interests.

The number of those scientific results protected by the Law which were announced by BAS institutes has increased as compared to those announced solely by the teams who invented them. Yet the number of the latter continues to be great as a consequence, as well as from the absence of financial resources, in addition to the surprising lack of interest on the part of manufacturing companies to establish partnership with highly qualified specialists of the academic institutes. For the time being there are no signs that the industries will acquire awareness of the fact that the most effective economies are those which rely on scientific achievements and take full advantage of them.

Nationwide and Operational Activities Serving the State

The Centre for Research on National Security and Defence at BAS maintains its coordinating role on an academic and national scale, serving as a base organization of BAS when carrying out projects on problems of security with a national significance and interdisciplinary character. Representatives of the Centre for Research on National Security and Defence (CRNSD) at BAS take part in the Interdepartmental working group Number 29 “National security” at the Council on European Issues at the Government of Bulgaria. They participated in developing the National System for Crisis Management (2009 – 2013), as well as in regulating Bulgaria’s progress in applying the EU Directive 2008/114 on the Protection of European Critical Infrastructure. In 2009
the National Commission on Information Security elected the CRNSD for the National Training Organization under the Law for Protection of Classified Information.

The Institute for Parallel Processing of Information carries out national activities such as the base organization of the Bulgarian Research and Education Network Association, the National Grid Infrastructure, and the National System for Crisis Management.

The National Laboratory of Computer Virology implemented various activities related to detection and analysis of malicious software and malicious attacks, restoring data and systems, approving systems for access and protection systems, as well as consultation, training, and prevention related to information and computer security.

The Institute for Nuclear Research and Nuclear Energy together with the Institute of Metal Science, the Institute of Mechanics, the Institute of Physical Chemistry, and the Institute of Organic Chemistry implemented activities related both to analysis and provision of safety for Kozloduy NPP and to the efficient use of nuclear fuel when operating energy reactors. These institutes actively participate in the general and specialized training of nuclear power personnel and in the implementation of various scientific and applied scientific studies.

The Institute for Electrochemistry and Energy Systems is a basic organization of the technical committee TC64 for the standardization of electrochemical electric sources at the Bulgarian Institute of Standartization. The Institute for Electrochemistry and Energy Systems is a regular member of the Technical Committee on Corrosion and Corrosion Protection (TC42) and of the Technical Committe – 99 “Nanotechnology” of the Bulgarian Institute for Standartization.

Scientists from the Institute of Microbiology “Stefan Angelov” are members of the Expert Committee of Epidemiology Monitoring of Contagious Diseases, Immuno-prophylaxis and the Anti-epidemic control, the Expert Council on Resisting Intra-hospital Infections, the Board of Directors of the Pastior Institute and the associated institutes, the Council of FEMS and the Council on Virology, a section of IUMS, and represent Bulgaria in
the EU Expert group for resisting biological and chemical terrorism damage.

The activities of the National Institute of Meteorology and Hydrology (NIMH) combine scientific and applied scientific research related to monitoring atmospheric processes, agrometeorology, and hydrology. NIMH provides the country’s economy and society as a whole with expert meteorological, hydrological, and climate information by means of providing forecasts, analysis, and assessment of hydrometeorological processes and phenomena. The Institute guarantees the security of the citizens of the Republic of Bulgaria through the notifications and warnings on hazardous hydrometeorological phenomena. In conformity with the current legislation, NIMH assists certain public authorities, such as the Ministry of Defence, the Ministry of Agriculture and Forestry, the ministry of Environment and Waters, the Ministry of Emergency Situations, the Ministry of Transport and Communications, etc. It provides the legislative, executive, judiciary, and municipality authorities with specialized prognosis, data, and expertise. An important part of NIMH’s activities is preparing short, medium, and long-term weather forecasts and providing them regularly to the mass media. Additionally, NIMH ensures the flawless twenty-four hour operation of a number of specialized systems, such as the system for early warning of radioactive poisoning in case of a nuclear disaster, for measuring the quantity of radioactive substances in the air, water, and rainfall, for wind waves, part of a specialized shipping forecast for the western part of the Black Sea, for transport and diffusion of oil spills. NIMH performs monitoring and research of the global and regional climate changes, in accordance with the UN Framework Convention on climate change, monitors, studies, and exchanges information on the total quantity of ozone over Bulgaria and the quantity of reactive and greenhouse gases in the atmosphere, in accordance with the international conventions.

In 2009 the activities of the Geological Institute “Academician Lyoubomir Krustanov” were traditionally associated nationwide with the quality of the functioning of the four operational and scientific offices of the Institute, all unique to our country: the National Seismological Office, the Geomagnetic Service, the
Ionosphere Service, and the Network for Ground-Based Measurements of Biologically Active Solar UV Radiation.

With its activities, the Institute of Oceanology “Fritiof Nansen” assists basic government institutes with a maritime concentration: IA “Maritime Administration” of the Ministry of Transport and “The Basin Directive of the Black Sea Region,” the Ministry of Emergency Situations, the Executive Agency for Fishing and Aquacultures, etc. As a final result the continental shelf and coastline area of the Black sea at the Bulgarian border have been divided into districts, taking into account the wind-wave patterns for ensuring the security of maritime transport, in compliance with the requirements of the EU.

The Central Laboratory of Higher Geodesy is the national centre for processing and analysis of GPS measurements for precise applications on a national scale. The Centre’s main activity is related to the new National GPS Network of the Republic of Bulgaria. The main users of the results are the Ministry of Defence (the Military-geographical service) and the Ministry of Regional Development and Public Works (Geodesy, Cartography and Cadastre Agency).

The Nationwide activities of the Central Laboratory of Seismic Mechanics and Earthquake Engineering is involved mainly in the management, maintenance, and servicing of the National System for Strong Ground Movements. During the reporting period, the system has registered 8 earthquakes with a magnitude of \( M < 5.4 \), as well as a large number of impulse reactions from explosions, construction and repair-work, and service activities.

In 2008 the Institute of Metal Science together with the Ministry of Defense, the Centre for High Achievements “Antiterrorist intelligent systems” have performed research, development, and experimenting with new technologies and operational concepts for perspective projects and technologies for fighting terrorism. The institute carries out tasks of the NATO program “Terrorism Defense” in accordance with contracts with the Ministry of Defense.

The National Archaeological Institute with Museum (NAIM) is a national centre and also a coordinator of all the archaeological field studies in Bulgaria. It conducts scientific and methodo-
logical supervision of these studies. Part of it are the National Field Board responsible for issuing permits for terrain and archaeological studies in the country and the National Information System “Archaeological Map of Bulgaria”.

In addition to the National Archaeological Museum of BAS are the Ethnographic Museum, the Museum of Natural History, and the National Museum of Anthropology.

**International Activity**

After 2007 and 2008 – two years, filled with great hopes and incentives for intensive participation in new programmes and grant schemes following Bulgaria’s accession to the EU, the past year has proven to be the first one which has been financially extremely hard: in June all of the funds for business trips of Bulgarian scientists abroad were suspended which significantly complicated the planning of the activities under the different projects with the BAS partner organizations. Unfortunately, this trend of restrictive work regime will probably continue throughout 2010 due to the significantly decreased budget of the Academy.

On April 3, 2009 the Bulgarian Academy of Sciences hosted the Working Meeting of the Programme Committee of the Intercademic Council of the Academies-Members in Southeastern Europe. The implementation of three initiated projects was reviewed: researching the reasons for the Balkan endemic nephropathy, studying and indexing the Balkan cultural heritage, an evaluation of the competitiveness of the economies of the countries in the region. The participants were united in their position that the problem of the impact of climate changes will be a top priority in their cooperation. They expressed a common interest to create a Red Book with the endangered plant and animal species on our peninsula.

Without doubt, the greatest event of 2009 was the international evaluation of all scientific institutes of the Academy, carried out by two authoritative European organisations specialized in evaluating of academic institutions: the European Scientific Foundation (ESF) and European Federation of National Acad-
This is the first of its kind expert evaluation of the scientific production quality and the possibilities for further development of BAS, carried out at the initiative of the Academy itself.

The international activities of BAS have always aimed at a significant and effective presence of our scientists in the European and global science research space and the participation of scientists and teams in bilateral and multilateral international scientific projects. The year 2009 did not make an exception in this respect.

The main form of international cooperation, funded by BAS, are the bilateral projects in the framework of agreements signed with foreign academies of science and national centres for scientific research. We have many fruitful cooperation with the German Scientific Research Community (DFG), the Scientific Centre in Dresden – Rosendorf, the National Centre for Scientific Research (CNRS), the University of Artois, Arras, France, the General Committee for International Relations (CGRI) and the National Fund for Scientific Research (FWO) of the Flemish community, with the Academies of science in the Czech Republic, Slovakia, Austria, Russia, Ukraine, Belorussia, Estonia, Latvia, Lithuania, Hungary, Poland, Serbia, Romania, Slovenia, Croatia, Turkey, Macedonia, Montenegro with the National Councils for Scientific and Technological Research in Italy, Spain, Turkey, with the Thessaloniki University “Aristotle,” the Kharkov National University “V.N. Karazin,” the Royal Society, with the British Academy, the Royal Swedish Academy of Letters, History, and Antiquities.

Professor Yurn Schmelzer from the University in Rostok was honored with the honorary symbol of BAS – the ribbon “Marin Drinov” – for his significant scientific achievements in the area of phase formation and glazing, for his exceptional contribution to developing the German-Bulgarian cooperation, as well as for significant personal service to developing and popularizing the Bulgarian physics and chemistry school.

No less intensive is our scientific cooperation with scientific organizations outside of Europe – the National Scientific Foundation (NSF) in USA, the University of Pittsburg, the Israeli Acad-
emy of Sciences and the University “Ben-Gurion,” the Egyptian Academy of Sciences, the Chinese Academy of Science and the Chinese Academy of Social Science, the Tokio University, and the Mongol Academy of Science. The opportunities continue for cooperation under the programmes of the National Academy of Sciences COBASE and TWINNINGS, under which at the suggestion of US scientists, Bulgarian scientists could be admitted to the US. The scientific cooperation between Bulgarian and India takes place within an intergovernmental agreement signed by the Ministry of Education, Youth, and Science of Bulgaria and by the Ministry of Education and Technology of India.

The communication between Bulgarian scientists and researchers from the Taiwan academic institutions is developing in a positive direction.

The active participation of BAS scientists in establishing the European scientific research space, together with the other EU member-states, takes place mainly thanks to the wider and more successful inclusion of their scientists in the competitions of the 7th Framework Programme for Scientific Research and Technological Development of the EU. Through the framework programmes of scientific research and technological development, the Bulgarian Academy of Sciences is one of the first Bulgarian institutions to be actively included in the European scientific space, long before Bulgaria became a member of the EU. The participation of BAS scientists marks a growing activity and success-rate.

The tendency of increasing BAS’s active participation in a number of projects, increasing the number of successful projects and the magnitude of the attracted sum of European subsidies, remains constant throughout the third year of the activity of the 7th Framework Programme 2009:

– 420 is the total number of proposed projects for 2007-2008-2009;
– 62 are the participating institutes (only 7 state that they don’t have a single attempt for participation)
– 104 successful projects for the same period;
– 40 institutes that participated successfully (with varying success rates in terms of number of projects and attracted sum of money);
– 9,403,729 EUR of European subsidies for the three years (an increase of 2.5 million in one year).

After Bulgaria’s accession to the EU in 2007 BAS’s presence on a European and global scale became even more visible. In 2009 BAS representatives participated in different expert committees and councils providing standpoints on different scientific problems, formed part of significant organizations, such as the European Science Foundation, the International Atomic Energy Agency, UNESCO, and others.

The President of BAS Nikola Sabotinov is an active member of the executive boards of the three most authoritative European academic organisations – ALLEA, EASAC, and ESF.

Involvement of BAS in the Training of PhD Students and Experts

599 PhD students were trained at BAS in 2009: 270 full time, 190 part-time, and 139 self-funded. From these 160 were newly-accepted PhD students: 72 full-time, 34 part-time, and 52 self-funded.

47 of the Ph.D. students defended their doctoral theses in time, 32 – after the deadline, and 116 PhD students were discharged. So at the end of 2009 there were altogether 596 PhD students, 272 of whom full-time, 184 part-time, and 140 self-funded.

Table 2 presents summarized information concerning the involvement of BAS scientists and scholars in the training of experts in the last 10 years.

Publishing and Information Activity

In 2009 the Expert Council on Publishing had a team of 15 including a representative from the National Information Centre “Bulgarian Encyclopedia”. Four regular meetings were held.

In 2008 ”Professor Marin Drinov” Academic Publishing House printed 28 titles and 2 were returned for revision.

Based on marketing research and analysis of the consistent
trend toward poorer realisation of books on the market, the Academic Publishing House continued its reduction policy of certain non-sellable editions.

Despite the economic stagnation and hardship of the financial crises in 2009, the Publishing House printed 60 volumes – books and monographs with a total number of quires 1488.7 – in 27,854 copies.

43 journal volumes were printed, with a total number of quires 1,144 – in 44,785 copies. In 2009 began the publishing of 4 new journals in English: Balkan Journal of Philosophy, Series on Biomechanics, Bio Automation, Sociology. “The Bulgarian Pocket Encyclopedia”, which enjoys amazing interest from the readers, was also published. Two dictionaries, including the Bulgarian Language Dictionary, volume 13, and 5 textbooks for higher education institutions were published.

### Table 2

<table>
<thead>
<tr>
<th>Year</th>
<th>Lectures, courses At universities</th>
<th>Seminars At universities</th>
<th>Graduates</th>
<th>Post-graduate certificates specializations</th>
<th>Schools and others</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Topics number</td>
<td>Lecturers number</td>
<td>hours total</td>
<td>topics number</td>
<td>lecturers number</td>
</tr>
<tr>
<td>2000</td>
<td>1204</td>
<td>672</td>
<td>90285</td>
<td>451</td>
<td>341</td>
</tr>
<tr>
<td>2001</td>
<td>1231</td>
<td>627</td>
<td>81636</td>
<td>384</td>
<td>307</td>
</tr>
<tr>
<td>2002</td>
<td>1245</td>
<td>623</td>
<td>86046</td>
<td>407</td>
<td>285</td>
</tr>
<tr>
<td>2003</td>
<td>1250</td>
<td>650</td>
<td>80953</td>
<td>397</td>
<td>305</td>
</tr>
<tr>
<td>2004</td>
<td>1284</td>
<td>625</td>
<td>82481</td>
<td>452</td>
<td>320</td>
</tr>
<tr>
<td>2005</td>
<td>1197</td>
<td>598</td>
<td>83843</td>
<td>457</td>
<td>340</td>
</tr>
<tr>
<td>2006</td>
<td>1285</td>
<td>587</td>
<td>71471</td>
<td>451</td>
<td>306</td>
</tr>
<tr>
<td>2007</td>
<td>1289</td>
<td>680</td>
<td>74859</td>
<td>499</td>
<td>362</td>
</tr>
<tr>
<td>2008</td>
<td>1374</td>
<td>631</td>
<td>80302</td>
<td>563</td>
<td>390</td>
</tr>
<tr>
<td>2009</td>
<td>1444</td>
<td>626</td>
<td>77750</td>
<td>537</td>
<td>363</td>
</tr>
</tbody>
</table>

p – PhD students at other organizations but with supervisors in BAS, s – post-graduate students.
The publishing activity was focused on publishing literature dedicated to the 140th anniversary of the Bulgarian Academy of Sciences.

The management of the Academic Publishing House makes special efforts to promote its publishing activity and market the printed products. For this purpose 25 premieres were organized in Sofia, Gabrovo, Plovdiv, Haskovo, Popovo, Moscow, Bratislava, Kharkov etc. The Academic Publishing House production was promoted also in the electronic media. The Academic Publishing House took part in the International Book Fairs in Sofia, Moscow, as well as in the Spring Fair (Sofia, May 2009).

The Academic Publishing House continues the tradition of donating books to the schools, community centres, museum, and libraries (in 2009 the donations are 9).

A number of changes in 2009 gave positive influence to the multidisciplinary journal *Dokladi na BAN* (‘Papers of BAS’).

It is worth mentioning that the new assessment received from the “Thomson Reuters” Institute in Philadelphia was exceptionally positive for 2009. The impact factor of the journal was newly-increased by 50% from 0.106 in 2008 to 0.156 in 2009.

A total of 224 articles were published in 2009: 23 individual articles by foreign authors, 37 joint publications between Bulgarian copyright collectives and scientists from Russia, China, Spain, Portugal, Turkey, Serbia, Israel, Belgium, Italy, Germany, Romania, Austria, Columbia, Australia, England, Slovenia, France, Hungary, India, Switzerland, Macedonia, Czech Republic, Slovakia, Lithuania, Belarus, and the USA.

In the year of the celebration of its 140th anniversary, the BAS journal was following the mission of its predecessor *Periodichesko spiasnie* (‘Periodical Journal’) of the Bulgarian Literary Society to inform the Bulgarian society and the readers outside Bulgaria about the Academy life and its Permanent Research Units (PRU) and its scientists. Following the tradition of the BSA Journal, the editorial staff column *Nauchen dial* (‘Science Part’) publishes articles representing PSU which conduct research characteristic of our country and the region.

In 2009, *Nauchen Dial* (‘Science Part’) collected articles by scientists from institutes marking round anniversaries – Forest
Research Institute (80th anniversary), Central Laboratory of Geodesy (60th anniversary), Central Laboratory for Biomedical Engineering (15th anniversary).

Special attention was paid to the newly established in 2009 column “Public Discussion Club” where materials were published from the National Forum for Science and discussions took place on the problems of science and higher education, as well as data on the importance of BAS in the world research space.

The information bulletin for science and technology “News” in 2009 was released in full circulation – 12 books, including 26 materials of 18 institutes of the Academy. Most actively were published the works of the colleagues from the Institute of Control and System Research – 5 materials, Institute for Nuclear Research and Nuclear Energy and National Archeological Institute with Museum – 3 material each. The scientists from the National Museum of Natural History, Institute of Chemical Engineering, Institute of Plant Physiology, Institute of Folklore, Institute of Botany, Institute of Psychology continue their regular participation in the Bulletin.

The research and applied scientific activities of the Central Library were oriented towards the development of 15 projects (BAS, Equivalent Non-Currency Exchange, EU) in the fields of library studies, bibliography, Bulgarian studies, and towards solving problems related to research, constructing and management of the Academic Library Fund; automation of library processes; protection and use of Library Fund of traditional and electronic documents and database; creation of information infrastructure; publishing monographs, bibliographies, reference books, etc., which provide for the scientific research and applied scientific research in the field of mathematical, physical, chemical, biological, engineering, social sciences, and humanities, as well as earth sciences which are carried out in the BAS and the country and represent the Academy as a national scientific organization and contribute to the spiritual and cultural development of Bulgarian society.

The integrated library system ALEPH500 functions successfully and is gradually developed. The information potential and capacity of the electronic catalogue is expanding. It comprises 124,059 records of library items stored in CL and in the libraries at the respective institutes of BAS. 13,785 of those records were made in 2009.
The Central Library is a member of the OCLC (Online Computer Library Center). It submits and exchanges bibliographical entries to the WorldCat.

On 31.12.2009 the Academic Library Fund comprised 1,981,536 library items, 1,036,534 of which books, 914,156 periodicals, and 2,738 special editions units, among which 192 dissertations and 2,546 microfilms. Active international publication exchange is under way. The number of exchange partners is 1,145 libraries, museums, archives, foundations and other institutions located in more than 69 countries. CL has sent them 12,433 library items of academic publications. The most numerous and active are the exchange relations with scientific organisations in the USA, Germany, Russia, France, Ukraine, and the UK.


The Scientific Archive at BAS takes part in the international activity with three projects: 1) “The Bulgarian Academy of Sciences and the Romanian Academy: History of the Academic (scientific and cultural) Relations” with the Library and manuscripts section of the Romanian academy; 2) “Russia and Bulgaria: Unknown pages of the history of scientific relations on documental sources of the academic archives of BAS and the Russian Academy of Sciences” – with the Archive of the Russian Academy of Sciences; 3) “Sources of the History of Ukraine and Bulgaria in National Archive of BAS and the Ukrainian archives (19–20 c.) – with the S.M. Hrushevskyi Institute of Ukrainian Archeography and Source Studies at the Ukrainian Academy of Sciences.

In 2009 the Scientific Archive accepted for storage the documents of Senior Research Associate Velcho Kovachev, Academician Nikolai Iribadzhakov, Academician Assen B. Datzev, General Boris Dimitrov, as well as the funds of the Institute of
Chemical Engineering and the Institute of Metal Science. The collection of photographs and documents related to the history of the Bulgarian Orthodox Church and Digital collection is still being enriched. Several exhibitions were prepared individually or in joint efforts with other institutions.

**Organisational Structure of the Scientific Activity**

In 2009 no structural changes were made at BAS. 3 posts of institute directors were open for competition.

In 2009 there were some general changes in the personnel structure of BAS. The share of the scientists remained the same (48.2% of the staff). The share of experts with a university education remained 24.9% and those with a high school diploma – 17.6%.

*Table 3* shows the structure of the scientists at BAS. The data for 2009 show insignificant changes when comparing the scholars with an academic rank to those without such. The professors

<table>
<thead>
<tr>
<th>Year</th>
<th>Scientists and Scholars</th>
<th>With an academic rank</th>
<th>Without an academic rank</th>
<th>Distribution of the scholars with academic rank</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>number</td>
<td>%</td>
<td>number</td>
<td>%</td>
</tr>
<tr>
<td>1990</td>
<td>5039</td>
<td>1753</td>
<td>3286</td>
<td>65.2</td>
</tr>
<tr>
<td>2000</td>
<td>3664</td>
<td>1800</td>
<td>1864</td>
<td>50.9</td>
</tr>
<tr>
<td>2001</td>
<td>3635</td>
<td>1859</td>
<td>1776</td>
<td>48.8</td>
</tr>
<tr>
<td>2002</td>
<td>3585</td>
<td>1842</td>
<td>1743</td>
<td>48.6</td>
</tr>
<tr>
<td>2003</td>
<td>3551</td>
<td>1869</td>
<td>1682</td>
<td>47.4</td>
</tr>
<tr>
<td>2004</td>
<td>3612</td>
<td>1893</td>
<td>1719</td>
<td>47.6</td>
</tr>
<tr>
<td>2005</td>
<td>3625</td>
<td>1881</td>
<td>1744</td>
<td>48.1</td>
</tr>
<tr>
<td>2006</td>
<td>3719</td>
<td>1886</td>
<td>1833</td>
<td>49.3</td>
</tr>
<tr>
<td>2007</td>
<td>3719</td>
<td>1905</td>
<td>1814</td>
<td>48.8</td>
</tr>
<tr>
<td>2008</td>
<td>3638</td>
<td>1883</td>
<td>1755</td>
<td>48.3</td>
</tr>
<tr>
<td>2009</td>
<td>3574</td>
<td>1823</td>
<td>1751</td>
<td>49.0</td>
</tr>
</tbody>
</table>
and the senior research associates are 21.1% of the total number of scholars with academic ranks.

### Financial Activities

The Republic of Bulgaria 2008 State Budget Act confirmed a subsidy of 95,772,372 BGN from the state budget. As per Article 17 of the State Budget Act of the Republic of Bulgaria for 2009 and Art. 1, Paragraphs 4 and 7 and Appendix No 1 of Council of Ministers Decree (CMD N0 27/09.0.2009), the confirmed 90% budget subsidy is 86,195,135 BGN.

The following corrections to the budget subsidy have taken place:

1. With a letter № 0901-98 / 25.06.2009 from the Ministry of Education, on the authority of the State Budget Act of the Republic of Bulgaria № 27 / 09.02.2009 the BAS budget subsidy has been increased by 12,000 BGN for publishing an album “120th Anniversary of the National Museum of Natural Science.” Under the conditions of Article 17 of State Budget Act of the Republic of Bulgaria for 2009 in the correction were included 90% of the sum which comes up to 10,800 BGN

2. With a letter № 04-06-68/ 07.04.2009 from the Ministry of Finance, in fulfillment of the Council of Ministers Decree (CMD) № 252 / 17.10.2008 for providing additional resources for the official celebration of the 150th Anniversary of the Bolgrad High School, the BAS budget subsidy was increased by 7,200 BGN.

3. With decree № 196 from 2009 the BAS budget subsidy has been decreased by 1,500,000 BGN.

The total number of the received budget subsidy with the added corrections for the year is 84,713,135 BGN.

In 2009 the amount of the BAS institutes’ own incomes was 38,268,283 BGN. These earnings are from contracts related to international programs and agreements (including the 7th Framework Programme) – more than 13,5 million BGN, contracts with ministries and administrations, contracts with Bulgarian and foreign firms and organizations, sales of output and services, donations, etc.
In addition to that, the BAS departments have received revenues, shown as transfers in the annual reports. The amount of the transfers is 26,601,720 BGN, which compared to the 21,117,590 BGN from last year, marks a growth of 5,484,130 BGN.

In 2009 the relative share of salaries and of social security and welfare allowance expenses was 79% from the budget subsidy. The salaries in the BAS system have not been changed since 01.07.2008.

The budget expenses of the Bulgarian Academy of Sciences for 2009 were made in a situation requiring economy measures and budget shortages, in which the scientific and research activity fully depended on contracts for scientific developments and products, as well as on the incomes earned from them.

The budget subsidy covered the payment for the priority expenses only: salaries and social security and welfare allowance; scholarships; compensations stipulated by the Labour Code; free safety food for those who work in unhealthy environment; special work clothing and personal safety equipment; procedures of SC of HAC; membership fees in international organizations: water, fuels, electricity costs; mission trips; museum security, repairs, mobilization and defence preparation. The expenses for water, heat, and electricity have been fixed, besides with shortages, which results in economic measures, which do not positively affect the work.

With a decision of the General Assembly of BAS in the budget for 2009 provided money for capital expenses and routine repairs in the amount of 16,650,000 BGN. This sum included examining, planning, and repair work on the material and technical basis as well as acquiring material and durable intangible assets, building of infrastructure sites.
Conclusion

2009 was the year in which the independent international evaluation was performed by the European Science Foundation and the European Federation of National Academies of Sciences and Humanities. After this evaluation we began reforms related to the modernization and specification of the areas of scientific research activity and performing the corresponding adequate restructuring of our scientific institutes and departments. We hope that these reforms will increase the efficiency of our work for solving the most important problems related to the development of Bulgarian society and state, as well as our efficient participation in the development of the scientific research space.

Last but not least, I would like to thank all of my colleagues whose work is mentioned in this report, the Scientific Secretaries and the respective institutes that summarized the achievements of their colleagues, the employees at the Central Administration of BAS who helped to cover the general academic activities. It would not be possible for me to list all of the names but I should mention Mr. Sabin Tekev and Mrs. Petya Aleksandrova, for their contribution to the preparation of the Annual Report.

This report was presented by Stefan Hadjitodorov, Senior Research Associate 1st Degree, Doctor of Technical Sciences in front of the members of BAS General Assembly and was accepted at its meeting on May 17th, 2010.
PVD equipment “PLATIT” π80+” for applying and extra-hard nanostructured and nanocomposite cover

Central Laboratory of Applied Physics - Plovdiv

Scientific informational complex for air-cosmic polygons on the territory of the Republic of Bulgaria

Space Research Institute
Photo of a scanning electronic microscope on the surface of a nanostructure layer of ZnO, deposited in conditions of high concentration of H$_2$O$_2$ and with caps.

Central Laboratory of Solar Energy and New Energy Sources

The new desk for operating the 2 meter telescope at the National Astronomical Observatory-Rozhen.

Institute of Astronomy

The only transmission electronic microscope in Bulgaria was launched into action: “JEOL” which has a high dividing capacity of 0.19-0.23 nanometers.

Central Laboratory of Photoprocesses
Plants – hyperaccumulators of Re

Cosmetic series based on the Pomorie lye

Institute of General and Inorganic Chemistry

Fluor-bearing sediments near the river Satovcha, Middle Rhodopes

Clinopodium vulgare (Cat step)

Institute of Botany
Renovated laboratory block for studying humid areas

Light-microscope photo with details on the morphology of a female specimen, from a new species of phytonematoda, parasite on plant roots

Scanning electron microscope photo of a new species of parasite nematoda

Central Laboratory of General Ecology
Permanent GNNS station
Pazardzhik

Temporary line of coordinates
of the station Sandanski

National GNNS network
of permanent stations

Central Laboratory of Geodesy

Newly-installed accelerograph
on the ground floor of a 6-floor building
on Slaveikov Square in Sofia

Central Laboratory for Seismic Mechanics
and Earthquake Engineering

Annual Report 2009
Apolonia – island “St. Kirik”

Sector school

Depiction of wars (ceramics)

Temple and alter (6th-5th century B.C.)

Trapezica

Side of a sgraffito container

Fortified Wall

Pottery (12th-13th century)

National Institute of Archaeology and Museum

Bulgarian Academy of Sciences
Some editions in 2009
Some editions in 2009
Some editions in 2009