

## Bulgarian Academy of Sciences

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### Mission and strategic goals

The Academy is both a learned society and a National research centre.

The mission of the Bulgarian Academy of Sciences is to contribute to the development of the world science in accordance with human values, national traditions and interests and to assist in the accumulation of the spiritual values of the nation and its welfare.

In conformity with this mission, the main strategic objectives of BAS are to provide and keep the highest possible level of science, inter- and multi disciplinarity, international competitiveness and high national self-confidence in conformity with the needs of the socio-economic and spiritual development of the Bulgarian society and in harmony with the European and world trends of the organization of scientific research.

The strategic objective and the steps envisaged for its attainment determine the main policies of BAS for the period until 2013 as well as the programmes, which are substantiating these policies. The policies and programmes are aimed at revealing the role of the Academy in the national, European and world process of building a society and economy based on knowledge. They are as follows:

*Policy 1: Science – the essential driving force for the development of a knowledge based economy and society in Bulgaria as a member country of European Union.*

This policy includes four programmes:

- 1.1. Economic development, social relations and structures in Bulgaria as an EU member country;
- 1.2. Sustainable development and effective utilisation of the national natural resources;
- 1.3. Competitiveness of the Bulgarian economy and of its scientific and innovative capacity;
- 1.4. Human potential for the knowledge-based economy and society.

*Policy 2: Scientific potential and research infrastructure - part of the European Research Area.*

This policy includes four programmes:

- 2.1. Technological development, innovation and scientific expertise;
- 2.2. Modern methods and approaches for the study of the Earth, the climate and the near space;
- 2.3. Quality of life and Interdisciplinary studies of man, living nature;
- 2.4. Scientific and technological development of the information society.

*Policy 3: National identity and the cultural diversity in United Europe*

This policy includes two programmes:

- 3.1. The study of language, literature, arts and traditional folk culture - a contribution of Bulgaria to the cultural diversity of Europe;
- 3.2. History of Bulgaria and the Bulgarian lands - a contribution to European civilizations.

Fourteen problem councils for analysis of the state and prospects of the programmes have been set up, as follows: Materials science and new materials; New technologies; Biotechnologies and foods; Energy sources and energy effectiveness; Biological resources and sustainable development of ecosystems; Agro-biological research; Medico-biological research; Climate changes; Inanimate nature resources; Space sciences and technologies; Security; National identity and cultural-historical heritage, Economic development and social relations; Human resources, education and knowledge.

## Historical references and current status

The Bulgarian National Revival in the second half of the 19<sup>th</sup> century led to the establishment of a centre that would unify the people's aspirations towards the development of education and science. In April 1869, after a few years of preparation, representatives of Bulgarian population in eight cities outside the borders of the enslaved motherland laid the foundations of the *Bulgarian Learned Society* (BLS) in Braila, Romania. This happened nine years before the Bulgarians got national independence and the Bulgarian state was re-established.

The reestablishment of the Bulgarian state 1878 imposed the tasks of organization of the economy and government and the moulding of the scientific and cultural life of the nation. On the initiative of Professor Marin Drinov, President of BLS, it moved to Sofia, the city chosen to be the capital of Bulgaria. The government subsidized regularly BLS and in 1884 the Sofia City Council granted BLS a site for building its headquarters.

In 1940 Bogdan Filov, as President of BAS and at the same time prime-minister of Bulgaria, managed to put through a new BAS Law establishing a new branch of the Academy for Literature, plastic arts and music, which lead to renaming of BAS to *Bulgarian Academy of Sciences and Arts* (BASA). A new BAS Law from 1947 restored the Academy's older name and formulated its position as "the superior scientific institution in the country".

The cessation of the totalitarian communist regime in 1989 coincided with the democratization in the management and performance of scientific research in the *Bulgarian Academy of Sciences*. The Academy had been actively involved in the preparation of a new BAS Law, which was adopted in 1991 by the Grand Bulgarian Parliament, which elaborated and adopted the new Constitution of the Bulgarian State. The Bulgarian Academy of Sciences was defined as "a national, autonomous organization for scientific research" exercising three main types of activities: "basic research", "production, commercial and other activities related to scientific research" and "preparation of highly qualified specialists independently or jointly with higher educational establishments". The budget of the Academy is formed through state subsidy, as well as through profits from "intellectual and other products" and donations. The new BAS Law laid solid foundations for the democratic changes in the Academy and its transformation into a real national centre for scientific research. The General provisions in the BAS Law were further developed in the new Statutes of BAS, accepted by The Academy's General Assembly in July 1992.

The events from 1989 were a natural prerequisite for a major re-organization in the Academy. During the 1990's, the Academy accomplished a very difficult, but urgently needed reform, which had not been imposed from the outside, but was initiated by the academic community itself. As a result, 28% of the units were closed down and 42% of the personnel were dismissed.

In the early 1990's, BAS introduced project-based organization, planning, accounting and funding of scientific research. The infrastructure and salaries at BAS are supported by state budget allocations. Today 3.700 scientists are working at BAS, amounting to 18% of all Bulgarian scientists. These scientists produce more than 60% of the significant scientific output of the country, authoring 60% of all papers and patents and executing 40% of the projects financed by the EU framework programmes.

The Academy comprises 52 research institutes, 12 research laboratories and centres and 4 scientific centres. It includes also a [National Institute of Meteorology and Hydrology](#), a National Archaeological Museum, a National Ethnographic Museum, a National Museum of Natural History, a National Astronomical Observatory and a National Laboratory for Computer Virology.

## Governance and governing bodies

The **General Assembly** is the supreme governing body of BAS. The General Assembly is composed of senior scientists, representing the research units of the Academy and scientists elected by secret ballot by the researchers in the research units. The General Assembly elects the President and the members of the Executive Council of BAS by secret ballot. It elaborates, adopts, modifies and amends the Statutes, allocates the budget and is responsible for the properties and the investments of the Academy. The General Assembly is competent to setting up and closing down research units of the Academy.

**President.** Eligibility to this position is restricted to academicians (fellows) and corresponding members of BAS. The President represents the Academy in the country and abroad, allocates and governs the budget of the Academy. He organizes and supervises the implementation of all academic activities. He chairs the Executive Council and the Assembly of Academicians and Corresponding Members of BAS. Vice-Presidents, the Scientific Secretary General and the Scientific Secretaries are proposed by the President and elected by the General Assembly. They constitute the Board of the Academy.

The **Executive Council** is composed of 25 members, elected by the General Assembly. The members of the Board are members of the Executive Council by statute. The Executive Council elects the directors of the research units of the Academy and is responsible for the implementation of the decisions of the General Assembly and for the assessment of the research units. Directors of research units are not eligible for membership in the Executive Council. Officers of state and governmental institutions, universities and other organizations are eligible for its enlarged format as members entitled to a deliberative vote. Decisions concerning their membership are taken by the General Assembly. The chairperson of the General Assembly is *ex officio* member of the enlarged format of the Executive Council.

The **Assembly of Academicians and Corresponding Members of BAS** is composed of national (academicians and corresponding members) and foreign members. As a rule, the total number of academicians should not exceed 80 and that of the corresponding members is limited to 120. At the end of 2007 there were 55 academicians and 96 corresponding members. The members of the Assembly of Academicians and corresponding members of BAS are elected by the Academicians of BAS.

The budget of BAS, including amounts intended for capital investment, is composed of the state budget allocations approved by an Act of the National Assembly; income resulting from contracts for research projects signed with state bodies and agencies, companies and organizations; income resulting from the realization of intellectual property and other products; and income from sponsors and donations. Predominantly, however, the budget is state-funded (2008: ca. 85 Mio. BGN, 2009: ca. 95,7 BGN), but mainly covers staff costs, maintenance of buildings and equipment, and fellowships. Research expenditure is provided by revenues from contracts with ministries, industry, EU programmes, structural funds (ca. 800.000 BGN), tuition fees, contracts with foreign companies and sales of books and journals, amounting to ca. 5.6 Mio. BGN.

## Research Units of BAS

The **research units of BAS** are legal entities performing basic and applied research, postgraduate and postdoctoral training. Eligible for directors of the research units are senior scholars from any scientific organization in the country. The directors are elected by the Executive Council for four years.

## Research units of the Bulgarian Academy of Sciences:

### Mathematical Sciences

- [Institute of Mathematics and Informatics](#)
- [Institute of Mechanics](#)
- [Institute for Parallel Information Processing](#)
- [National Laboratory of Computer Virology](#)
- Laboratory of Telematics

### Physical Sciences

- [Institute for Nuclear Research and Nuclear Energy](#)
- [Institute of Solid State Physics](#)
- [Institute of Electronics](#)
- [Institute of Astronomy](#) with [National Astronomical Observatory - Rozhen](#)
- [Central Laboratory of Solar Energy and New Energy Sources](#)
- [Central Laboratory for Applied Physics - Plovdiv](#)
- [Central Laboratory of Optical Storage and Processing of Information](#)

### Chemical Sciences

- [Institute of General and Inorganic Chemistry](#)
- [Institute of Organic Chemistry with a Center of Phytochemistry](#)
- [Institute of Physical Chemistry](#)
- [Institute of Catalysis](#)
- [Institute](#) of Electrochemistry and Energy Systems
- [Institute of Chemical Engineering](#)
- [Institute of Polymers](#)
- [Central Laboratory of Photoprocesses](#)

### Biological Sciences

- [Institute of Molecular Biology](#)
- [Institute of Physiology](#)
- [Institute of Biophysics](#)
- [Institute of Plant Physiology](#)
- [Institute of Genetics](#)
- [Institute of Microbiology](#)
- [Institute of Experimental Morphology and Anthropology](#) with Museum
- [Institute of Experimental Pathology and Parasitology](#)
- [Institute of Biology and Immunology of Reproduction](#)
- [Institute of Botany](#)
- [Institute of Zoology](#)
- [Forest Research Institute](#)
- [Central Laboratory of General Ecology](#)
- [Central Laboratory of Biomedical Engineering](#)
- [National Museum of Natural History](#)

## Earth Sciences

- [National Institute of Meteorology and Hydrology](#)
- [Geological Institute](#)
- [Geophysical Institute](#)
- [Institute of Oceanology](#)
- [Space Research Institute](#)
- [Institute of Water Problems](#)
- [Geographical Institute](#)
- [Central Laboratory for Geodesy](#)
- [Central Laboratory of Mineralogy and Crystallography](#)
- [Central Laboratory of Solar - Terrestrial Influences](#)
- [Central Laboratory for Seismic Mechanics and Earthquake Engineering](#)

## Engineering Sciences

- [Institute of Metal Science](#)
- [Bulgarian Ship Hydrodynamics Centre](#)
- [Institute of Computer and Communication Systems](#)
- [Institute of Information Technologies](#)
- [Institute of Control and System Research](#)
- [Central Laboratory of Mechatronics and Instrumentation](#)
- [Central Laboratory of Physico-Chemical Mechanics](#)

## Humanities

- [Institute of Bulgarian Language](#)
- [Institute of Literature](#)
- [Institute of History](#)
- [Institute of Archeology with Museum](#)
- [Institute of Balkan Studies](#)
- [Ethnographic Institute with Museum](#)
- [Institute of Art Studies](#)
- [Institute of Folklore Studies](#)
- [Cyrillo - Methodian Research Center](#)
- [Centre of Thracology](#)
- [Centre for Architectural Studies](#)

## Social Sciences

- [Institute of Sociology](#)
- [Institute of Economics](#)
- [Institute of Philosophical Studies](#)
- [Institute of Psychology](#)
- [Institute of Legal Studies](#)
- [Centre for Population Studies](#)
- [Centre for Science Studies and History of Science](#)

## Specialized and Supporting Units of the BAS

- [Central Administration](#)
- [Central Library](#)
- [Scientific Archives](#)
- [Academic Publishing House "Prof. Marin Drinov"](#)
- [Botanical Gardens](#)
- [Scientific Information Centre](#) "Bulgarian Encyclopaedia"
- [Centre for National Security Research](#)
- [Laboratory of Telematics](#)
- PhD [Training & Career Development Centre](#)
- Centre for Innovations

## Main areas of scientific activities

During its 139 years of existence the Bulgarian Academy of Sciences strengthened the position of its best traditions and today has the position of a national centre for scientific research. It is acknowledged as partner in national and international programmes and projects by European and World organizations. The expertise of the Academy is used by governmental and other national institutions.

Both basic and applied research is performed at BAS. Until the mid 1990's, the proportion between basic and applied research was 60% to 40%. The share of applied research gradually increased over time and today it amounts to 70%. This ratio is defined by Frascati criteria.

The problems concerning the environment have an exceptional priority. The great interest in this topic is a consequence of the obligations of Bulgaria towards EU's "NATURA 2000", the UN's programmes for research and preservation of biological diversity, water and earth resources and ecosystems, UNESCO's strategy for development of a world network of biosphere reserves, international programme DIVERSITAS for studies in biological diversity and NATO's programme "Science for Peace". Almost 35% of all projects done annually are related to the preservation of the environment. As a result, over twenty new processes, apparatuses and systems with preservation of the environment and energy saving applications, technologies and apparatuses for extracting of toxic pollutants from waste gasses, biological purifying of water and technologies for bio ethanol production were introduced to the industry. Contemporary materials science, physics and nanotechnology and the relating engineering sciences are the key driving forces in research and innovation. Studies in these areas are well established in 23 scientific units of BAS (42% of the units are in the areas of natural and engineering sciences). Research is performed in the following fields: nuclear technology, photonics, optoelectronics, laser physics and technology, femtosecond photonics, medico-biological photonics, electron, ion, plasma and electrochemical technologies, micro and acustoelectron technologies. Research in the field of laser technology is performed with the aims of development and application of metal vapour lasers as well as metal vapour ionic lasers. Hybrid and ceramic nano-structured materials are developed at the Academy for possible use as new inorganic materials with application in optics, electronics, biomedical equipment, mechanics, functional and safety coatings, catalysts and sensors. Physics is intertwined with nano-sciences and nanotechnologies, new materials, intelligent systems and medical sciences. Organic chemistry is strongly involved in development of new organic materials for nanotechnologies, new catalysts for synthetic processes and in drug development as well.

The problems concerning energy production and renewable energy resources have a central place in the scientific research of BAS. New technological processes and materials for solar energy transformation into heat and electricity are developed. Development of the Bulgarian school in the area of electrochemical power sources continues. Hydrogen based energy systems is a new thematic

tendency developed together with the traditional research in the area of nuclear energy and energy efficiency.

The BAS scientists pioneered the development of high-speed communication networks in research and education infrastructure. Information and communication technologies are basic in the large-scale international projects of the BAS scientists. Their work is the creation of GRID infrastructure, Virtual University and numerous works in the areas of contemporary software, parallel algorithms and artificial intelligence.

Effective biotechnologies are developed for obtaining biologically-active substances for industry and medicine and biotechnologies for in vitro preservation of gametes, micromanipulations and embryo-transfer of animals for obtaining of enzyme preparations in medicine and sport. Natural compounds are obtained from medicinal and balmy plants, insects and sea organisms with the goal of finding new biologically-active substances with medical and pharmacological application. The mechanisms of food fat and oil oxidizing are investigated with the goal of improving their quality and increasing the period of their conservation as well as discovering technology for quick detection of food pathogens in meat, milk and their products. New analytical methods are developed for research and standardization of foodstuffs with the purpose of proving their quality and authenticity.

Bio-technologies for seed production and new competitive varieties are developed applying contemporary biotechnological solutions. More than 30 tomato species have been cultivated and introduced in large-scale production.

Essential experience was accumulated in designing and building of machinery for production and remake of biomass from micro-seaweed for food, forage and pharmaceutical purposes. Biomedical research with medicine and health services application includes the discovery of new anti-virus substances, healing methods, stem cells application for healing infertility and prevention and therapy of cancer-diseases.

Research is conducted for explaining the aetiology of Alzheimer's disease. Research in the area of physiology and toxicology aim at discovering new therapeutic methods for controlling functional disturbances in the human organism which are basic in diseases like Parkinson, depression, epilepsy, fear, aggression and ischemic conditions.

Research in the area of pathology and parasitology is concentrated towards virus carcinogenesis and virus illnesses related to animals and causing economical losses not only to the state but also to the private sector.

Scientific activities with medical application are conducted in the fields of methods for evaluation of the functional state of neuromuscular and cardiovascular system and evaluation of cardiac risk as well as acoustic analysis of vocal signals and screening of laryngeal illnesses.

Work is conducted aiming at creation of bio-compatible and bio-active coating of orthopaedic implants. Systematic research is conducted about the optical characteristics of human tissue and diagnostic schemes and algorithms were designed for analysing benign and malignant skin and other tissue formations.

The Bulgarian Academy of Sciences is a primary member and pioneer in international cooperation in space research. The machinery created by BAS works faultlessly onboard the "Intercosmos-8" satellite since 1972. The scientific programmes of the two Bulgarian astronauts Georgi Ivanov and Aleksander Aleksandrov were developed and realized by BAS. The satellites "Bulgaria-1300" and "Meteor-Priroda"

were fully equipped with Bulgarian research apparatuses. The space greenhouse SVET, in which for the first time vegetables and grain plants were grown, was installed in the MIR space station in 1990. It is the only fully automated apparatus for conducting long-term experiments with plants in space supported by MIR and NASA. Spectrometric and dosimetric systems were created by BAS and fly onboard the International Space Station. The RADOM device developed by BAS will be installed on the "Chandrayaan-1" Indian satellite of the Moon. Another device for measuring the dose and stream of cosmic radiation will be flying in space onboard the Atlantis space shuttle.

The Academy takes part in the international programme for studies of the long-term tendencies of dynamic processes of the Earth's atmosphere as part of the problem of cosmic weather and its forecasting. For eight years now BAS scientists participate in the COST European programme in the area of ionosphere telecommunications. They have created momentary maps of the real distribution of ionosphere parameters over the European region.

The social sciences institutes of the Academy are predominantly engaged with research related to the social and economic changes, which occurred in the country in the context of its EU association and membership, the transition to market economy under the specific to Bulgaria conditions, the development of Bulgarian economy and its competitiveness in the integrated European market. The social changes in Bulgaria created opportunities for social, psychological, philosophical and demographic studies of important processes pertaining to social transformation. Active scholarly work is conducted towards the harmonization of Bulgarian legislation and EU legislation and the legal aspects of the transition towards market economy.

An undisputable factor for the future development of the Bulgarian society is the preservation of its national identity in the process of globalization. BAS is the only national centre for collection, preservation, research and popularization of the historical, spiritual and cultural values, the language and the authentic monuments of the Bulgarian people. Theoretical and specific problems of our national political, social, religious and cultural history are worked upon at the Academy covering the period from the prehistoric times up to the present.

One of the greatest Bulgarian contributions to European and world culture is the creation of the Cyrillic alphabet, introducing in the European culture a practice unknown until then – the mass use in writing of a living contemporary language. The Academy is performing research on the Cyrillo-Methodian traditions, the lexical stock and culture, which have an important meaning for preservation of the rich historical and cultural heritage of the nation. The studies in the field of the language policy of the EU member countries take up an important role in the elaboration of national programs for transliteration and transcription. Intensive art studies are also performed: in the field of fine arts, music, film and media. Studies in the field of the language policy of the EU member countries take up an important role in the elaboration of national programs for transliteration and transcription.

Back in 1869 the first national historical archives were set up at the Bulgarian Learned Society. Valuable documents of the political and economic history of Bulgaria, its diplomatic relations, the educational role of the church, the development of finances, economics and culture have been preserved in BAS. With the establishment of the Bulgarian Learned Society in 1869 the foundations of the first Bulgarian scientific library were also laid down. Now it is the biggest in the country.

The oldest scientific institutions in Bulgaria are the National Museum of Natural History established in 1889, which has rich botanical, zoological and mineralogical collections, and the National Archaeological Museum – established in 1892. It exhibits the most valuable monuments of the past of the Bulgarian lands and has unique expositions from the stone-copper and bronze periods and from the Greek and Roman antiquity.

A keeper of Bulgarian spirit is the National Ethnographic Museum which was incorporated to the system of BAS in 1949, as a part the Ethnographic Institute. It has numerous collections of expositions of the Bulgarian old country life, of handicraft, attire, finery, objects related to folk customs and traditions. The fourth museum in the structure of BAS was opened in 2007 - the National Anthropological Museum. The Museum is concerned with the popularization of anthropological knowledge and recognition of anthropology in Bulgaria.

### **Activities of the Academy of national relevance**

The activities of the Academy of national and social importance are connected with the activities of national, governmental and state institutions, industry, energies production, environment and agro economy. Over 1600 scientists have worked in hundreds of scientific, expert and other consultant organs and have presented more than 5600 written expert opinions, reports and reviews.

BAS carries out yearly and round-the-clock the following national activities:

- Meteorological, hydrological and agro-meteorological observations and forecasts, incl. those connected with potential natural disasters;
- Registration and information of seismic dynamics in the whole country and the neighbouring territories as well as of landslides and other dangerous movements of the earth crust;
- Registration and information of geomagnetic, ionosphere and other processes for the needs of defence and communications;
- Monitoring of the environment and of a wide spectrum of ecological research on the territory of the country, the Black Sea basin and Bulgarian territory waters.

A major centre of the national electronic communication research and education network serving universities, scientific institutes and schools has been set up at the Academy.

The protection and security of computer networks and communication systems of ministries and other institutions is provided by the only National Laboratory of Computer Virology in the country.

Research activities connected with scientific advice for nuclear energy production in three aspects are carried out by the Academy – analysis and security of nuclear safety of the *Kozlodui* nuclear power plant, the effective use of nuclear fuel and safety management of radioactive waste.

The optimized draft version of the National ecological network *Natura 2000* (Nature 2000) served as a foundation for governmental decisions.

The National Institute of Meteorology and Hydrology at the Academy represents the Republic of Bulgaria in the World Meteorological Organization at the United Nations and in other international organizations according to intergovernmental agreements.

The Headquarters of the National Oceanographic Commission (UNESCO) and the National Centre for oceanographic data are based at the Institute of Oceanology.

A National Centre for nuclear-magnetic resonance spectroscopy supplied with unique for our country 600 MHz spectrometer for liquid and solid state investigations was set up at the Academy in 2007.

A Centre for research in the field of national security and defence, which supports, coordinates and organizes research in these fields, with particular attention on EU and NATO research and technological activities and programs has been created at the Academy. The Centre maintains close contacts with the Ministry of Defence, Ministry of Interior, Ministry of Emergency Situations, National Service Civil Protection, the “Rakovski” Military Academy, the Academy of the Ministry of Interior, etc. A database of the available technologies and the capacities of research structures, groups and scientists, which contribute to establishing contacts and cooperation between researchers and users are maintained. The

centre organizes and directs large-scale interdisciplinary research by attracting the best Bulgarian scientists and researchers from the Academy, from other scientific organizations and universities and practically serves as a *National centre* for coordination of research in the field of security and defence.

### **Innovative activities**

BAS is constantly developing its innovative policy and is working for the extension of the relations between science and business. From 80 to 250 new technological decisions are invented in the Academy yearly, out of which between 80 and 150 are applied in industry and social practice. Scientists from the Academy participate in more than 400 projects with Bulgarian enterprises. Over 90% of the applications are in Bulgarian and foreign companies, in SME.

BAS participates actively in the projects of the National Innovative Fund, which are a public partnership between business and science. BAS participates in 60 of the 300 projects of the Fund, while in 30 of them scientists of the Academy are consultants.

Since 1997 BAS has been founder, active participant and partner in the activities of the European Innovative Centre in Sofia, financed mainly by the European Commission.

A Transfer Centre (TC) was established in 2000 on the model of the German Steinbeis Foundation and with the latter's support. This centre is promoting the implementation of research results of scientists from BAS institutes in Bulgarian SMEs and the commercial use of competitive projects.

A Centre for Innovations was set up at BAS in 2006 for enhancing of our competitiveness as a member country of the European Union, for fostering of contacts in the field of innovations and technology transfer from the country and abroad and mainly in directing the state approach of connecting structural funds with culture politics. Basic parts of this activity are patents and licenses. Forthcoming for the Centre is to take up work in the field of patents and application of inventions. The number of the protective documents was about 130 in 2006 while the applications, including the European and international ones, were about 170.

### **Participation of the Academy in the education of highly-qualified specialists in the field of scientific research**

In compliance with established traditions, the Law of the Academy and the Law for Higher Education, the Bulgarian Academy of Sciences provides educational training in the third cycle of higher education in Bulgaria (PhD studies). It is one of the priority tasks of the Academy. Almost all of the academic units educate both regular and extramural PhD students from the country and abroad in the different scientific areas.

This imposed the establishment of a Training and Career Development Centre in 1997 which organizes and coordinates the preparation and education of PhD students and specialists. The Centre affirms the authority of BAS as a kind of university for the preparation of specialists in all areas of science.

The Academy educates about 700 PhD students annually or about 20% of all PhD students of the country. Students, PhD students and teachers from the institutions of higher education participate in BAS projects. Almost 30% of the scientific production of the institutions of higher education in the country is in co-authorship with scientists from the Academy. About 600 scientists from BAS give lectures every semester in universities. The whole number of the hours of lectures and seminars given in the universities by scientists of the Academy amounts to about 100.000 hours annually. Between 600

and 1000 PhD students from the universities prepare their theses in the laboratories of the Bulgarian Academy of Sciences.

The Base Environmental Observatory "Moussala"(BEO) is unique in Europe. The aim of BEO is to study global changes and their interaction with environment and to develop into a hi-tech demonstration centre of the 21<sup>st</sup> century. BEO is to perform the following functions:

- a base for field work and preliminary treatment of samples for complex environmental monitoring;
- a basic unit of an environmental automated information system with a view to future incorporation in national and European ecological networks;
- a laboratory for radionuclide monitoring of air, water and soil.

BEO "Moussala" is:

- the highest environmental observatory in Europe;
- a result of the Bulgarian-French OM2 Project;
- supported by the Ministry of Environment and Waters and will be included in the National Environment Monitoring System and the Gamma Background Control System;
- participating in multidisciplinary projects of the National Research Fund and in the joint Bulgarian-Serbian Rila-Shar Project;
- included in the GTOS (world system for global observation of terrestrial ecosystems) implementation plan.

## **Publications**

BAS has a publishing house of its own, named "Professor Marin Drinov" after one of the BAS founding fathers and its first president.

## **BAS in European and international research**

BAS participates successfully with in the contemporary trends of the European research area and the European requirements for building up of a knowledge-based society, economy and civilization. BAS had 142 successful projects in the 3<sup>rd</sup> and 4<sup>th</sup> FP of the European Commission for the period 1992-1998 out of 250 for the whole country. In the 5<sup>th</sup> and 6<sup>th</sup> FP BAS won projects for eight Centres of Excellence out of eleven awarded in the country. The Academy-based centres of excellence are the following:

1. Bulgarian IST Society: Institute for Parallel Information Processing;
2. Sustainable development and management of the Black Sea Region: Institute of Oceanology;
3. Portable and Emergency Energy Sources: Institute of Electrochemistry and Energy Systems;
4. Bulgarian Centre of Solar Energy: - Central Laboratory of Solar Energy and New Energy Sources;
5. Sustainable Environment and Advanced Integration into ERA: - Institute of Nuclear Research and Nuclear Energetic;
6. Strengthening the Research and Technological Capacity in the Field of Nanostructured Thin Films, Hard and Superhard Coatings: - Central Laboratory of Applied Physics;
7. Nanoscale Phenomena and Structures in Bulk and Surface Phases: at the Institute of Physical Chemistry;
8. Environmentally Oriented Multifunctional Materials and New Processes - Institute of General and Inorganic Chemistry.

As a result of participation in the 6<sup>th</sup> FP, BAS scientists have 652 scientific publications, 32 transfers to production companies (10 in Bulgaria and 22 abroad) and 11 patents. In the 7<sup>th</sup> FP BAS has 23 approved projects for over 1 million Euros. For the whole of the period 1992-2006 the Academy had a total of 462 successful projects. The Bulgarian Academy of Sciences is the most effective scientific

organization in Bulgaria in terms of participation in the Framework Programmes of the European Union leading to successful participation of SME's as end-users of the scientific product.

BAS maintains an active cooperation with more than 45 foreign academies, national research institutions and universities and is an active member of 27 governmental and non-governmental organizations. In all of its bilateral agreements priority is given to joint research projects which presently are about 500. About 2500 scientists and professionals from the institutes of the Academy travel abroad for research on joint projects, participation in conferences or symposia. The number of scientific papers with foreign partners published in international scientific journals or are presented at conferences amount to 1000 per annum.

Very positive are the results of the participation of the Academy in the programmes and commissions of ICSU, UNESCO, WMO and ALLEA. Fifteen years ago the Academy joined the European Science Exchange Programme (ESEP) together with other European academies. The membership in the European Science Foundation (ESF) is important because it allows a direct participation in the European science policy and research area. The European Academies Science Advisory Council (EASAC) invited the President of the Academy to join the Executive Council of EASAC immediately after the accession of Bulgaria in EU. Today the Academy is a member of the Executive Council of the organization.