LATVIAN
ACADEMY
OF SCIENCES

LATVIAN ACADEMY OF SCIENCES

The mission of the Latvian Academy of Sciences is to identify, select and unite distinguished scientists at a national level, to carry out scientific expertise in a number of fields, to care about development and promotion of national science, and to endorse implementation of the national science policy which enables competitiveness and growth of the national economy of Latvia internationally.

Prof. Ojārs SPĀRĪTIS, *Dr.habil.art.*, President of the Latvian Academy of Sciences

The Latvian Academy of Sciences was established in 1946, soon after the Second World War, when European economies were in need of new technologies and inventions in order to renew the state and its functions and revitalise the societies. In the following almost 50 years, the Latvian Academy of Sciences held a significant place in the system of the socialist state, exercising functions characteristic to the Ministry of Science, and in order to achieve strategic objectives set by the state, performed the role of a link between scientific research and production.

In 1992, after the renewal of the independence of the Republic of Latvia, the Latvian Academy of Sciences was transformed into a European-style personal Academy. The academy was in charge of the functions delegated by the state and its activities were aimed at development of measures to maintain a highly qualified academic community. The Latvian Academy of Sciences in cooperation with policy makers, government institutions, entrepreneurs, foreign partners and research institutions actively implements the European research and development policies. As a social partner, expert and communicator the Latvian Academy of Sciences supports development of the national economy and promotes scientific achievements, thus assisting in building of a sustainable society and overall welfare of the state.

The four structural units or divisions of the academy are responsible for monitoring and evaluating the performance in various research areas, following the generational replacement of the academic staff, providing for academic qualification, and exchanging experience and mobility of scientists, as well as organizing conferences, discussion round tables, lectures and other events. The topical issues are discussed at the Senate of the Academy, while the decision making body is the General Meeting of the Academy gathering twice a year. With its almost 400 full members, corresponding, foreign and honorary members, and enjoying the support of the sponsors and entrepreneurs, the Latvian Academy of Sciences has grown into a significant centre of intellectual and scientific life in the Baltic region, a place where the rapprochement between science and entrepreneurship is made possible due to personal incentives and projects of technology transfer.

Building of Academia Petrina in Jelgava, the place where the Courland (Kurzeme) Society for Literature and Art was founded in 1815 – the first learned society in Latvia and predecessor of the Latvian Academy of Sciences. Postage stamp dedicated to the 200 anniversary of the foundation of the Courland Society for Literature and Art, 2015. Graphic design by Elita Viliama.

ACADEMY ACROSS THE CENTURIES

The years 1815, 1869, 1932, 1936, 1946, and 1992 that are embroidered on the flag of the Latvian Academy of Sciences mark the important moments in its history.

In **1815**, the war with Napoleon had ended. The teaching staff of the Academic Gymnasium (Academia Petrina) at Mitau (present Jelgava, Latvia), or the Mitau Distinguished High-School (Gymnasium illustre), once they recognised that the decision to establish a University had been taken in favour of location at Dorpat (present Tartu, Estonia), nonetheless did not wish to remain outside academic, scholarly society. This consideration led to the Courland (Kurzeme) Society for Literature and Art (Kurländische Gesellschaft für Literatur und Kunst) being founded in 1815; the event may be seen as the first attempt at creating an academy of sciences in the Baltic region. Certainly the year 1815 cannot be seen as the beginning of today's Latvian Academy of Sciences, yet it marks the beginning of the concept of such an Academy.

The next steps leading to creation of the Latvian Academy of Sciences relate to founding of the Science Commission of the Rīga Latvian Society in **1869** – the creation by Latvians by themselves of a "Folk Academy of Science", followed by creation in **1932** of Academia Scientiarum Latviensis SRL, followed by an intention declared in **1936** by Prime Minister Kārlis Ulmanis, to establish an Academy of Sciences of Latvia, the first element of which was the History Institute of Latvia, founded in **1936**.

The real Academy of Sciences of Latvia was established after the end of the Second World War, in **1945–1946**, under the conditions of Soviet occupation. A number of distinguished Latvian scholars and scientists were among those who gathered on 14 February 1946 for the first annual general meeting, namely linguist Jānis Endzelīns, forestry specialist Arvīds Kalniņš, micro-biologist Augusts Kirhenšteins, agriculture specialist Paulis Leiņš, agro-chemist Jānis Peive, medical scientist Pauls Stradiņš and others. A new generation of Latvian scientists grew up in the post-war years and new directions of scientific investigation were developed – magneto hydrodynamics and solid-state physics, astronomy, mechanics of polymers, wood chemistry, development of new biologically active substances (pharmaceuticals), molecular biology, virology, elaboration of material technologies for space applications.

The 1990s marked the collapse of the Soviet Union and re-gaining of the independence of the Republic of Latvia, and in **1992** the Latvian Academy of Sciences was transformed into a European-style academy that unites eminent scientists and scholars, elected members, that is supported by the state, with the aim of furthering the advancement of science in Latvia, discussion of urgent problems and is engaged internationally.

PRESIDIUM OF THE ACADEMY OF SCIENCES

From the left: Andrejs Siliņš, Raita Karnīte, Jānis Spīgulis, Jānis Stradiņš, Tālavs Jundzis, Baiba Rivža, Andrejs Ērglis, Andrejs Krasņikovs, Pēteris Trapencieris, Oļģārs Spārītis

President Oļģārs SPĀRĪTIS
Vice President Andrejs KRASŅIKOVS
Vice President Andrejs ĒRGLIS
Chair of the Senate Jānis STRADIŅŠ
Secretary General Andrejs SILIŅŠ
Foreign Affairs Secretary Tālavs JUNDZIS
Chair of the Division of Physical and Technical Sciences Jānis SPĪGULIS
Chair of the Division of Chemical, Biological and Medical Sciences Pēteris TRAPENCIERIS
Chair of the Division of the Humanities and Social Sciences Raita KARNĪTE
Chair of the Division of Agriculture and Forestry Sciences Baiba RIVŽA
Chair of the Fund of the Academy Bruno ANDERSONS

ORGANISATIONS IN ASSOCIATION WITH THE LATVIAN ACADEMY OF SCIENCES

Research institutions

Baltic Center for Strategic Studies of the Latvian Academy of Sciences

The Baltic Center for Strategic Studies of the Latvian Academy of Sciences (LAS BCSS) was founded and started functioning in November 1993. Since then, LAS BCSS has organised more than 60 both local and international scientific conferences and published a number of monographs and teaching aids as well as several hundreds of scientific articles. The main objective of LAS BCSS is to execute research in the fields of international and national security, focusing on problems of the development of democracy and the modern period of Latvia's history. Researchers of the LAS BCSS regularly participate in the implementation of the National Research Programmes and the Latvian Council of Science grants. LAS BCSS coordinated and lead the preparation of the two-volume academic collected articles in English, Russian, and Latvian, entitled *Latvia and Latvians*, which was published in 2018. E-mail: bspc@lza.lv.

Institute of Economics

The main activities of the Institute of Economics (founded in 1946), are focused on academic and applied socio-economic and other types of research, development and implementation of projects in areas of technology and economy. The mission of the Institute is to investigate prospects in promotion of the development of the regional and national economy, providing research-based expert assessments and analysis on the current processes in the economies of Latvia, Baltic States and European countries, as well as recommendations for economic development. Website: https://eilza.lv. Tel.: +371 20207092. E-mail: ei@lza.lv.

European Policy Research Institute

The objective of the European Policy Research Institute (EPRI, established in 2018) is to develop and implement research projects and programmes, ensure the quality and involvement of scientists in cross-disciplinary research and cooperation in European policies. The functioning of the EPRI is aimed at providing researchers and other stakeholders with the opportunity to acquire knowledge of the interdisciplinary challenges of European integration, implementation of the topical research and projects for the development of the society, particularly in the context of economic, legal, political and sociological aspects, with a view to promote visibility of the Latvian Academy of Sciences in the international scientific environment. E-mail: eppi@lza.lv.

Other structural units

The State Scientific Qualification Committee is a consultative and coordinating institution monitoring the awarding of the scientific degrees in Latvia. It was established in 2005 in accordance to the Regulations of the Cabinet of Ministers No 165. The Committee organises the reviewing procedure of Doctoral Thesis by appointing relevant experts. Thesis have to be submitted by the candidates and have to be approved by the Promotion Council of the university. The Committee is also responsible for the development and maintaining the data base of the defended Doctoral Thesis. E-mail: alma@lza.lv.

The Council of the State Scientists Emeritus is a collegial institution deciding on annual quotas for the state scientists emeritus, making a selection of the appropriate candidates for this status, and making proposals to the Latvian Academy of Sciences concerning the applicants to whom the status of the state scientist emeritus is to be granted. Tel.: +371 67224040. E-mail.: emeritus@lza.lv.

Terminology Commission of the Latvian Academy of Sciences deals with development, examination, and approval of terms. Although the terminology creation of national importance was started in Latvia already in 1919 when the Terminology Commission for the Ministry of Education (which operated until 1921) was established, the current commission was born simultaneously with the Latvian Academy of Sciences, when it gathered for its first meeting on 2 September 1946. Since then the commission has held more than thousand meetings, organised working groups, prepared many terminological resources (dictionaries and bulletins), and its subcommissions have arranged several thousands of their own meetings. Chair of the Terminology Commission is *Dr.habil.med.* Māris Baltiņš. E-mail: tk@lza.lv.

PUBLISHING

Latvijas Zinātņu Akadēmijas Vēstis / Proceedings of the Latvian Academy of Sciences is a peer-reviewed academic journal published since 1947. Beginning with 1992, the journal appears in two independent sections, A and B.
The scope of SECTION A covers social sciences and the humanities.
Tel.: +371 67225889. E-mail: vestis@lza.lv.
The scope of SECTION B covers natural, exact, and applied sciences.
Tel.: +371 29516935. E-mail: izaks.rasals@lu.lv.
Both editions are available in printed and online versions.

The newspaper *Zinātnes Vēstnesis (Science Bulletin)* reflects current events and the most important developments in the science life in three organisations – the Latvian Council of Science, the Latvian Academy of Sciences, and the Association of Latvian Scientists, the newspaper is available in printed and online versions. *Science Bulletin* is published only in Latvian. E-mail: zinatnes.vestnesis@lza.lv.

The *Latvian Academy of Sciences Yearbook* (annual report) is a follow-up edition published since 1991. Beginning with 2006, the annual reports are available both in printed and online versions. The Yearbook contains basic information on the Academy, research reports, the membership directory. The English version of the Yearbook is published every second or third year.

Proceedings of the Latvian Academy of Sciences: Section A, Section B
Newspaper *Zinātnes Vēstnesis*
Latvian Academy of Sciences Yearbook

AGRICULTURE IN LATVIA

Latvian and Estonian scientists have bred grain varieties that are suitable for the North European climate. They have developed several new wheat varieties that are patented in the Baltic countries.

DIVISION OF AGRICULTURE AND FORESTRY SCIENCES

Prof. Baiba RIVŽA,
Dr.oec., Chair of the Division

The Division unites the leading scientists in agriculture and forestry sciences. The Division cooperates with the Ministry of Agriculture of the Republic of Latvia, Latvia University of Life Sciences and Technologies, Latvian Academy of Agricultural and Forestry Sciences, and other organisations in the development of recommendations for policy regarding enhancement in higher education and science, including activities aimed at increasing the international competitiveness of scientific institutions as well as closer cooperation with industry; joint organisation of conferences, expositions and other events aimed at popularising scientific achievements; cooperation in the organisation of young scientist contests in agricultural sciences; international cooperation and cooperation in holding annual surveys of institutes of agricultural and forestry sciences. The Division participates in the European Union's Horizon 2020 project 4D4F (Data Driven Dairy Decisions for Farmers, 2016–2019) and leads the National Research Programme EKOSOC-LV.

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The Grand Medal of the Latvian Academy of Sciences is the highest reward which in 2017 was conferred to LAS Full Member Baiba Rivža.

Institute of Food Safety, Animal Health and Environment "BIOR" has installed Fourier transform ion cyclotron resonance mass spectrometer (FT-ICR-MS) – an innovative equipment based on ultra-high resolution mass spectrometry that can be used in different research areas such as food product analysis, protein and lipid studies, environmental pollution monitoring and other studies.

Representatives of the Division of Forestry and Agriculture – Baiba Rivža (first from right, first row), Īzaks Rašals (first from left, first row) and director Aivars Bērziņš (first from left, second row), Institute of Food Safety, Animal Health and Environment "BIOR".

"Rasa" – the first cultivar of Japanese quince *Chaenomeles japonica* registered in the world for fruit production. Bred at the Institute of Horticulture.

On the opposite:
Latvia University of Life Sciences and Technologies is a higher education and science institution of the Republic of Latvia, where scientific research as well as academic and professional study programmes are carried out.

Division actively collaborates with its partners:

Latvian Academy of Agricultural and Forestry Sciences (www.llmza.lv) is a non-profit scientific organisation, where the best scientists in agriculture, rural economy, veterinary science, food science, engineering sciences, food and wood processing are united on a voluntary basis.

Latvia University of Life Sciences and Technologies (www.llu.lv) is one of the leading universities of science and technologies in the Baltic Sea region, specialising in the sustainable use of natural resources and aimed at the enhancement of quality of life for society.

Institute of Food Safety, Animal Health and Environment "BIOR" (www.bior.lv) is a research centre of national importance, which develops innovative research methods and new practically applicable knowledge in the following areas: public and environmental health, food, fishery and veterinary medicine. In the area of its competence, Institute "BIOR" with its excellent research, technical and developed human resource base is the leader in the region. "BIOR" is a cooperation partner of the European Food Safety Authority.

Latvian State Forest Research Institute "Silava" (www.silava.lv) is the main centre of forest science in Latvia, leader of scientific ideas in forestry and related research and development. "Silava" develops innovative technologies to promote sustainable development and competitiveness in the forestry sector.

Institute of Horticulture (www.darzkopibasinstituts.lv) is the leading horticulture research institution in Latvia. The main directions of research are: diversification and breeding of horticultural crop cultivars suitable for the Baltic Sea region; environmentally-friendly horticultural production systems; storage and processing technologies of horticultural crops; basic research for horticultural science.

Institute of Agricultural Resources and Economics, Latvia University of Life Sciences and Technologies (www.arei.lv) was founded by merging several agricultural research institutes. Now it is the only research institute in Latvia engaged in breeding of field crops; its researchers specialise in breeding, arable farming and interdisciplinary studies in the science of economics.

RADIO-TELESCOPE RT-32

of Ventspils Radioastronomy Centre is one of the biggest in Europe (antenna diameter 32 m, height 47 m, weight 650 tons) and is part of the European radiointerferometric network for galactic scale observations.

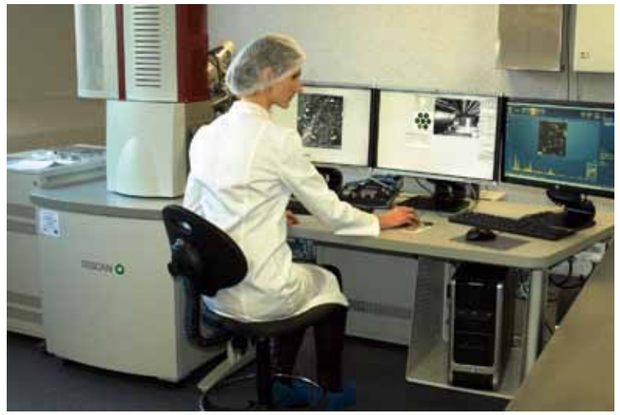
DIVISION OF PHYSICS AND TECHNICAL SCIENCES

Jānis SPĪGULIS,
Dr.habil.phys., Chair of the Division

The Division unites leading Latvian and foreign experts in physics, astronomy, mathematics, computer science, mechanics, energetics and other fields of engineering. Activities of the Division include discussions of latest research results, offering advanced technologies to industry, assistance in development of Latvia's science policy and organisation of conferences and other public outreach events. The Division closely collaborates with Latvia's leading research institutions in the above-mentioned areas.

Tel.: +371 67223633, E-mail: fizteh@lza.lv

Latvian computer scientists are world champions in programming of deep learning for text analysis, winners of the SemEval Award 2016.



Vertical axis wind generator developed at Rīga Technical University.

The young researcher *Dr.phys*. Marija Dunce, doing research with a scanning electron microscope.

At the opening ceremony of the largest in Latvia science project "CAMART^{2}" (The Excellence Centre of Advanced Material Research and Technology Transfer), on 23 February 2017. The international team of the project (from the left): Andris Anspoks, Andris Ozoliņš, Mārtiņš Rutkis, Teresita Kvarnstrom (Rise, Acreo, Sweden), Andris Šternbergs, Līga Grīnberga, Nil Nordell (KTH, Sweden), Anatolijs Šarakovskis.

Majority of the institutes are part of the University of Latvia:

Institute of Solid State Physics (www.cfi.lu.lv/eng) – performs top-level fundamental and applied research in material sciences and related areas.

Institute of Mathematics and Computer Sciences (www.lumii.lv) – experts in physical and language system modelling, software technologies, artificial intelligence and real time systems.

Institute of Physics (www.lu.lv/lufi) – one of global leaders in magnetohydrodynamics (MHD), has performed the world's first MHD Dynamo experiment confirming the origin of Earth's magnetic field.

Institute of Atomic Physics and Spectroscopy (www.asi.lv) performs high-level fundamental and applied research in atomic physics, spectroscopy, biophotonics and quantum optics.

Institute of Chemical Physics (www.kfi.lu.lv) – develops advanced nano-structures and nano-devices, carries out studies in radiation chemistry.

Institute of Material Mechanics (www.pmi.lv) researches deformations and fractures of materials and mechanics of composite structures, with prediction of long-term deformation and strength.

Institute of Astronomy (www.astr.lu.lv) investigates spectral, photometric and time-resolved measurements of stars, asteroids and satellites.

Technical University (www.rtu.lv/en/sciences) research is organised on six research platforms: energy and environment; cities and development; information and communication; transport; materials, processes, and technologies; security and defence. The research platforms ensure multi-faculty and interdisciplinary research in the areas of great significance for Latvian national economy and society.

The Division collaborates with several state research institutes:

Institute of Electronics and Computer Sciences (www.edi.lv) works on novel information, communication and signal processing technology methods; smart integrated systems for data acquisition, processing and transmission; cyber physical systems; photonics; space data processing and satellite electronics.

Institute of Physical Energetics (www.energyresearch.lv) performs regional energy sector analysis and optimisation; energy – environmental policy studies; renewable energy resources.

Ventspils International Radio Astronomy Centre (www.virac.eu) aims at space research and global communications on the basis of large 16 m and 32 m radio-telescopes.

Cooperating industries:

Latvenergo Group (www.latvenergo.lv) – power supply utility operating on electrical and thermal energy generation and supply;

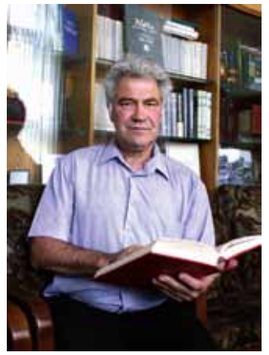
Tilde (www.tilde.lv) – provides language technologies for a connected world;

Emergn – develops large-scale and integrated IT systems for government and business needs.

MONUMENT TO WILHELM OSTWALD

Professor at the Rīga Politechnicum, now Rīga Technical University, Wilhelm Ostwald was the founder of modern physical chemistry and is the only Nobel Prize laureate (1909) from Latvia.

DIVISION OF CHEMICAL, BIOLOGICAL AND MEDICAL SCIENCES



Pēteris TRAPENCIERIS,
Dr.chem., Chair of the Division

The Division unites scientists from the fields of biology, chemistry and medical sciences. The Division resumes the new developments in natural sciences in Latvia and discusses the problems in those directions. The highest expertise of the Division members is used to award the best achievements of scientists in the field. The Division organises regular meetings, where topical issues in chemistry, biology and medicine are discussed. The Division has organised several interdisciplinary seminars, and seminars with participation of postdoctoral researchers, public lectures and discussions on topical issues in science.

The Division has a close cooperation with the main Universities and with research directions in the scientific institutions in all fields of chemical, biological and medical sciences in Latvia.

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Postage stamp dedicated to Professor Paul Walden. Paul Walden is an inventor of a modern dynamic stereochemistry and was seven times nominated for Nobel Prize. In 1896, he discovered a famous rule, later called the "Walden inversion". 150th anniversary of the birth of Paul Walden was included in the UNESCO Celebrations Day Calendar for Year 2013.

Academician Ivars Kalviņš – a medical chemist, inventor of a cardiovascular drug *Mildronate*.

Among the laureates of the title of the most significant achievements in Latvian science in 2017 was a scientific team of A. Kirchenstein Institute of Microbiology and Virology, Rīga Stradiņš University, for their involvement of persistent viral infections in the development of nervous system diseases: *Dr.habil.biol.* Svetlana Čapenko, *Dr.med.* Santa Rasa, *Dr.med.* Sandra Skuja, *Dr.habil.med.* Valērija Groma, and the team leader LAS academician Modra Murovska (second from the right).

The Latvian Centre of Cardiology at the Pauls Stradiņš Clinical University Hospital conducts the most up-to-date invasive cardiology surgeries and clinical studies, cooperating with the world's leading cardiology centres. Prof. Andrejs Ērglis and Dr. Inga Narbute at the surgical table.

University of Latvia (www.lu.lv) coordinates research areas in life sciences such as: material science, nanotechnology, medical physics, regenerative medicine and sustainable use of environmental resources and which are developed in the Faculties of Chemistry, Biology and Medicine. Pharmacological research is focused on fundamental investigations of biological activity of natural and synthetic substances and mechanisms of action of molecules which may stop the pathological processes before they start.

Rīga Technical University (www.rtu.lv) has considered research excellence a priority right from the start. The Faculty of Materials Science and Applied Chemistry had employed renowned scientists Wilhelm Ostwald, Paul Walden, Lidija Liepiņa and Gustavs Vanags. Research in the field of materials is very diverse in the following directions: functional nanomaterials, nanotechnologies, green chemistry and bio-based technologies.

Rīga Stradiņš University (www.rsu.lv) performs research in medicine, pharmacy, dentistry, rehabilitation, and nursing science in Latvia. Its subunit A. Kirhenšteins Institute of Microbiology and Virology (www.rsu.lv/akmvi) provides expertise on host-pathogen interactions, urgent viral infections and importance of them in the development of non-communicable diseases, biotechnology approaches and nanomedicine. The Institute has experience in coordination of EU projects (BALTINFECT; COST action CA15111).

The Latvian Institute of Organic Synthesis (www.osi.lv/en) is the largest academic drug discovery centre in the Baltic States. Institute is the inventor of 18 original medicines and more than 70 manufacturing processes of active pharmaceutical ingredients. The core competences are: organic synthesis, medicinal chemistry, process chemistry. Pharmacology and advanced preclinical development studies are performed for anti-cancer, cardiovascular, anti-infective and CNS drugs. Institute has a developed network of partners all over the world with academic research institutions and pharmaceutical companies.

The Latvian State Institute of Wood Chemistry (www.kki.lv) is a modern research centre with broad research infrastructure potential. The institute works on the development of knowledge-based, environment friendly low-waste technologies for obtaining competitive materials and products from renewable raw material resources of wood and other plant biomass. The main avenues of research are fundamental studies in wood science and applied studies for obtaining innovative products and materials.

The Latvian Biomedical Research and Study Centre (www.bmc.lv) is the leading scientific institute in molecular biology and biomedicine in Latvia. It performs basic and applied research in molecular genetics, vaccine development, genomics and proteomics, cancer biology, immunology, biotechnology, stem cell biology and structure biology. BMC maintains a number of unique facilities including National Biobank: the Genome Database of the Latvian Population. The Centre has a wide network of collaborations with industry partners developing new diagnostics and therapeutics.

NATIONAL LIBRARY OF LATVIA

Since 2014, the National Library of Latvia, or the Castle of Light, is located in a building on the left bank of the river Daugava in Rīga. The core functions of the National Library of Latvia are the collection of national literature, its perpetual storage and the long-term provision of access to it.

DIVISION OF THE HUMANITIES AND SOCIAL SCIENCES

Raita KARNĪTE,
Dr.oec, Chair of the Division

The Division of the Humanities and Social Sciences brings together scientists of the highest rank and acclaimed arts and cultural personalities representing more than twenty branches of science: anthropology, archaeology, architecture, art, art history, art theory, bibliography, culture history, demography, economics, ethnology, folkloristics, history, history of science, journalistics, law, linguistics, music history, literature and literature theory, philosophy, pedagogy, political science, psychology, sociology, theology.

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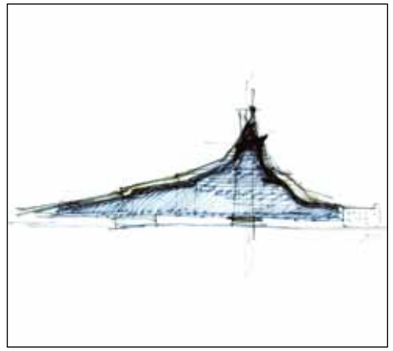


Gunnar Birkerts (Gunārs Birkerts, 1925–2017) was a Latvian–American architect. Many of his buildings could be regarded as iconic in the context of both – Latvian and American architecture, but the crowning of his creative work is the building of the Latvian National Library built in 2014 – a tribute for Latvia's second awakening and spirituality. Foreign member of the Latvian Academy of Sciences, Gunnar Birkerts was also the winner of the Grand Medal of the Latvian Academy of Sciences (2000).

Under the auspices of the Latvian Academy of Sciences the four-volume academic edition in Latvian *Latvians and Latvia* was completed in 2013 compiling the latest findings on Latvians as a nation and Latvia as a country. In 2018, the two-volume edition *Latvia and Latvians* in three languages – Latvian, English and Russian – was prepared as a continuation to the previous edition. Revised and completely new articles on Latvia's history, culture, language, science, demography, cultural, political and economic history, Latvians and other nationalities living in Latvia were elaborated. The edition *Latvia and Latvians* serves as a handy and informative guide both for those living in Latvia and abroad.

Foreign members of the Division are linguists and literary scientists, historians, economists, ethnologists, bibliographers, science historians, psychologists and philosophers from Australia, Canada, Czech Republic, Estonia, Finland, Georgia, Germany, Italy, UK, USA, Russia, and Slovakia.

Division's honorary members are outstanding representatives from cultural, art and public spheres – writers, visual artists, musicians, directors of museums and libraries, state officials.

Among the full members of the Division are professors, leading researchers and heads of the largest highest-level scientific institutions in Latvia: University of Latvia and its scientific institutes – Latvian Language Institute, Institute of Literature, Folklore and Art, Institute of History of Latvia, Institute of Philosophy and Sociology, the Livonian Institute, Rīga Technical University and its Faculty of Engineering Economics and Management, Rīga Stradiņš University, University of Daugavpils, Liepāja University, Latvia University of Life Sciences and Technologies, Latvian Academy of Music, Latvian Academy of Arts and its Institute of Art History, Ventspils University of Applied Sciences, Vidzeme University of Applied Sciences, as well as of private research institutions.

The Division can count on a number of doctors *honoris causa*, the degree having been conferred to both national and foreign scientists – the scientific staff of the libraries and museums, education specialists, representatives of the highest clergy, et al.

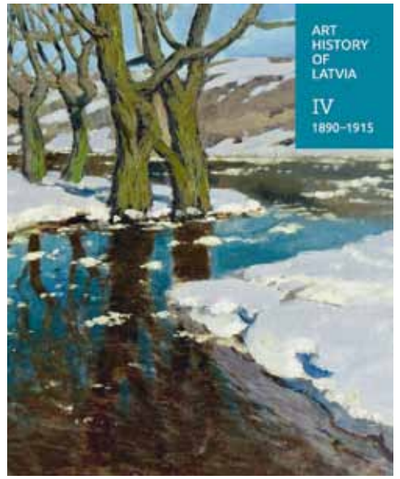
The Division maintains close links with all scientific institutions, not only those the members of the Division are affiliated with. Members of the Division participate in research projects of national and international level that are carried out in these institutions. Most typically the collaboration is carried out in the following areas: literary theory, linguistics, history and archaeology, philosophy and sociology, and economics. Unique resource storage depositories are set up and available for investigation and research purposes.

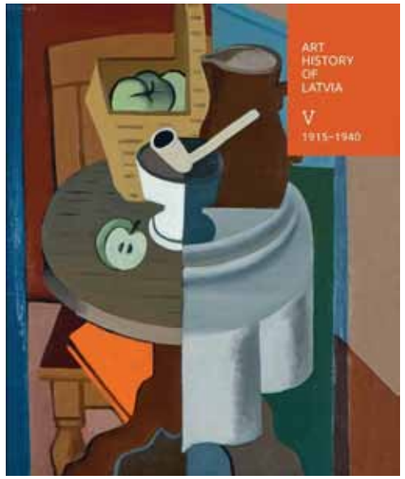
The Division supervises the work of the LAS Terminology Commission, and is in charge of publishing of *Latvijas Zinātņu Akadēmijas Vēstis (Proceedings of the Latvian Academy of Sciences),* an academic journal published since 1947. Beginning with 1992, the journal appears in two independent sections, A and B. The scope of Section A covers social sciences and the humanities. The members of the Division take part in compiling the National Encyclopaedia of Latvia.

While implementing the role of science promotion, the Division reviews and selects the best achievements of the year in the humanities and social sciences, and rewards the authors. The Division is responsible for assigning twelve awards in the humanities and social sciences.

The Division being a social partner and a participant in building science policy, its members are active in working groups set up by the Government of Latvia, as well as in public organisations. A representative of the Division is a member of the permanent composition of the Latvian Council of Science.

The expert meetings are summoned to discuss topical issues of public concern, resulting in expert conclusion; whereas working groups are set up to evaluate the draft laws and regulations and prepare evidence-based proposals for the administration and the Government.





In 2014, Institute of Art History of the Latvian Academy of Art, led by Honorary Member of the Latvian Academy of Sciences Eduards Kļaviņš, started publishing of the new serial edition *Art History of Latvia* in separate Latvian and English versions. The first, in 2014, was *Volume IV: Period of Neo-Romanticist Modernism: 1890–1915*, followed by *Volume V: Period of Classical Modernism and Traditionalism 1915–1940* in 2016. Both volumes have earned the title of the most significant achievement in Latvian science in 2014 and 2016. Volume III on the 19th century art is in preparation while seven volumes are envisioned in total, covering the time span from prehistoric artefacts to contemporary art.

On the opposite:
Researches of international significance in literature, folkloristics, theatre, music and art theory are carried out by members of the Latvian Academy of Sciences at the Institute of Literature, Folklore and Art of the University of Latvia (www.lulfmi.lv), where one of the largest stocks of folklore materials in the world is located – the Latvian Folklore Depository, which possesses the treasure of its own – the so called *Dainu skapis,* or the Cabinet of Folk Songs. There are more than 200 000 folk songs – each on a separate sheet of paper, all of them inside 70 drawers with 20 sections each. Between 1998 and 2006, the contents of the cabinet were scanned (each slip into a separate file), the song texts have been transcribed into machine readable form. Since 4 September 2001, *Dainu skapis* is part of the world culture — on this date it was inscribed on the UNESCO Memory of the World list. For a long period *Dainu skapis* was overseen by Mārīte Vīksna, *doctor honoris* causa of the Latvian Academy of Sciences.

Main depositories and on-line access data-bases of research resources

***Dainu skapis*, or the Cabinet of Folk Songs**, is part of the Latvian Folklore Depository (http://www.dainuskapis.lv/), situated at the National Library of Latvia

Depository of Archaeological Material (https://www.lvi.lu.lv/lv/arhkratuve.htm), Repository of Ethnographic Material (https://www.lvi.lu.lv/lv/etnokratuve.htm), Depository of Bio-archaeological Material (https://www.lvi.lu.lv/lv/biokratuve.htm), Laboratory of Dendrochronology (https://www.lvi.lu.lv/lv/dendrolab.htm) are located at the Institute of History of Latvia

Institute of Art History of the Art Academy of Latvia maintains a long-term on-line collective project of Latvian art history in Latvian and English (http://www.makslasvesture.lv/index.php)

Association of Oral History researchers of Latvia has set up an on-line collection – the project Lifestory (http://www.dzivesstasts.lv/en/default.htm) at the Institute of Philosophy and Sociology, University of Latvia

Centre of Oral History of the University of Daugavpils records and documents life histories of Eastern Latvian inhabitants and maintains an archive of oral testimonies (https://du.lv/fakultates/humanitara-fakultate/strukturvienibas/mutvardu-vestures-centrs/)

The Database of Local Place-names or toponyms is situated at the Latvian Language Institute of the University of Latvia (www.vietvardi.lv); the project is carried out in partnership with UNESCO National Commission. Also, the Latvian Language Institute maintains the Bibliography of Linguistics 1997–2015 (http://www.lulavi.lv/valodniecibas-bibliografija)

INTERNATIONAL COOPERATION

Tālavs JUNDZIS,
Foreign Secretary, Latvian Academy of Sciences

Ilze TRAPENCIERE,
Head of Department

Kristaps BROKS,
Advisor

The Latvian Academy of Sciences represents Latvia in global non-governmental international organisations: the International Science Council (ISC), the International Union of Academies of Humanities and Social Sciences (UAI), and is a member of the European Federation of National Academies of Sciences and Humanities (ALLEA). The LAS also participates in the Global Network of Academies of Sciences (IAP), and the Inter Academy Medical Panel on Global Health Issues (IAMP). Latvia is represented in Academia Europaea and Academia Scientiarum et Artium Europaea through individual membership of outstanding Latvian scientists, full and corresponding members of the LAS.

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Walter Zapp (1905–2003) was an outstanding inventor, with his world famous photo camera VEF-Minox he has promoted the name of Latvia to the world. The prize was established in 2004 together with the Patent Office of the Republic of Latvia and the German company "Minox GmbH".

The International Council for Science (ICSU) meeting at the Latvian Academy of Sciences in Rīga, 12 May 2017.

In 2017, the European Prize of the European Academy of Sciences and Arts (EASA), or Felix Award, named after its founder Prof. Felix Unger, President of the EASA, and two incentive prizes were awarded to *Dr.oec.* Inese Vaidere, *Dr.chem.* Kristaps Jaudzems and *Dr.sc.soc.* Inta Mieriņa. From left to right: Felix Unger, Kristaps Jaudzems, Inese Vaidere, Inta Mieriņa.

Since 2005, when at the initiative of Dr. Vaira Vīķe-Freiberga, the patroness of the L`ORÉAL Baltic fellowship programme "For Women in Science", L`ORÉAL, UNESCO LNC, and the Latvian Academy of Sciences commenced the implementation of the programme in Latvia, the fellowships were conferred to 42 young women researchers from Latvia. In 2017, the fellowship programme has been extended to Estonia and Lithuania thus encompassing all three Baltic States.

The encouragement of international contacts has always been one of the priorities of the Latvian Academy of Sciences. As of January 2018, LAS has concluded 31 bilateral agreements on scientific cooperation with foreign partner academies. Bilateral agreements of scientific cooperation are signed with Austrian Academy of Sciences, Azerbaijan National Academy of Sciences, National Academy of Sciences of Belarus, Bulgarian Academy of Sciences, Chinese Academy of Social Sciences, Czech Academy of Sciences, Estonian Academy of Sciences, Finnish Academy of Science and Letters, Academy of Sciences - Institute of France, Georgian National Academy of Sciences, Berlin–Brandenburg Academy of Sciences and Humanities, Saxon Academy of Sciences and Humanities, Hungarian Academy of Sciences, National Academy of the Linsey, Italy, Israel Academy of Sciences and Humanities, Lithuanian Academy of Sciences, Montenegrin Academy of Sciences and Arts, Polish Academy of Sciences, Russian Academy of Sciences, Slovak Academy of Sciences, Slovenian Academy of Sciences and Arts, Royal Swedish Academy of Letters, History and Antiquities, Swiss Academy of Sciences, Ministry of Science and Technology, National Academy of Sciences of Ukraine, Academy of Sciences of the Republic of Uzbekistan.

International mobility fellowships offer valuable opportunities for highly-qualified international scientists and postgraduate students to work and do research at the Latvian Academy of Sciences, universities or research institutions. Fellowships operate under the agreements of mutual mobility concluded with 17 foreign academies and provide for 350 mobility days per annum.

Since 2016, the Latvian Academy of Sciences regularly participates in workshops, conferences and other activities of the Scientific Advice for Policy by European Academies or SAPEA project on a variety of issues. The SAPEA project enables to share knowledge and expertise from across Europe as it is part of the European Commission's Scientific Advice Mechanism.

In partnership with international research institutions, organisations, and companies the Latvian Academy of Sciences organises the awarding of a number of prizes, among them the Walter Zapp Prize, the European Prize of the European Academy of Sciences and Arts or Felix Award (since 2001), the L`ORÉAL Baltic – UNESCO fellowship "For Women in Science" (since 2005), as well as a Medal of the Baltic Academies of Sciences (since 1999).

The bi-annual Baltic Conference on Intellectual Cooperation, bringing together intellectuals from the Baltic Sea region since 1935, was firstly summoned in Kaunas, Lithuania, and was revived in 1999 by the 7th conference held in Rīga. Since then, the conferences have been organised by the Estonian, Latvian and Lithuanian Academies of Sciences and the Finnish Academy of Science and Letters. The 16th conference will take place in Vilnius, Lithuania, in May 2019. The main purpose of these conferences is to promote intellectual and scientific cooperation around the Baltic Sea, to better comprehend the issues of common history, culture, economic and political situations and to give impetus for joint efforts in tackling current challenges. Since 1999, the awarding ceremony of the special international award or Medal of the Baltic academies of sciences take place.

ACCENT IN CITY PANORAMA

"This building will belong to the background of Rīga's silhouette, rising above the towers on the Daugava riverbank, it will express the power of the new Rīga, and its perpetual flourishing," announced the newspaper *Literatūra un Māksla (Literature and Art)* in 1951. In the early 1950s, there were no skyscrapers in Rīga, unless we count the church towers of Old Rīga, and the building was created as the first high-rise building in the city panorama.

BUILDING OF THE LATVIAN ACADEMY OF SCIENCES

The Building of the Latvian Academy of Sciences is an important monument of architecture and art in Rīga, the capital of Latvia. The building looks rather monumental and resembles eight other similar architectural monuments in Eastern Europe from the Stalinist epoch, sometimes called as Stalin Baroque style. The building was the first sky-rise building in Rīga, and it is still an important element of the Rīga panorama.

The building provides us with significant historical evidence. The decision about the construction of the building (at that time called as "Collective Farmers' House") was passed by the Central Committee of the Communist Party and the Cabinet of Ministers in 1951. Ideologically the emphasis was put on the development of the working class district of the capital city and it was one of the projects to be included into the general plan of the city: "(...) it will express the power of the new Rīga and its perpetual flourishing".[1]

The construction started in early 1950s. The name "Collective Farmers' House" came from the initial decision about a high-rise building for farmers' needs – rooms and halls for education and training of collective farmers, conference halls, hotel, etc. Accordingly, in the beginning of the 1950s, construction of the building was a responsibility of the Ministry of Agriculture. After the death of Stalin when the ideological accents of priorities were changed, the building came under the supervision of the Academy of Sciences of the Latvian SSR. The Academy of Sciences took over the building and financed the last phase of the construction. The building came into use in 1960–1961. The academician Jānis Stradiņš has emphasised: "This is a gift not from Moscow, but an unwanted gift from Latvian peasants to the Academy of Sciences"[2].

In the construction of this building, for the first time in the Soviet Union, structures of prefabricated concrete were used. The compositional structure, with a set of stairs, was close to other high-rise buildings of the time, but architects tried to adapt the building to the peaks of the Old Rīga towers. Natural and artificial stone plates, sent from Russia, have been used in outer finishing. Iron latticework at the entrance testifies to the ancient traditions of blacksmith's work.

[1] M. Rudovska, *Latvian Academy of Sciences Building*. Institute of Art History, Latvian Academy of Art, Rīga, 2009, p. 4.

[2] J. Stradiņš, Latvijas Zinātņu akadēmijas 50 gadi. *LZA Vēstis*, 2009, Nr. 1./2., 109.–117. lpp.

The building is still one of the most notable examples of Stalinist architecture, combining national motifs with those of socialist propaganda in high-quality artefacts. The building is rather representable. It has a symmetrical spatial composition that complies with the principles of the Soviet Stalinist architecture. There are, in addition, references to other historical styles, such as Classicism and Gothic, synthesised with Latvian ethnographic and folklore motifs. Apart from historical quotations, the architecture of the building features well-considered composition and there is much to be admired in the high quality of craftsmanship.

The total height of the building is 107,6 metres. There are 23 floors and a 21-meter-high tower. Amazing panorama of Rīga can be observed from the platform on the 17th floor of the building.

At present the Academy building provides a large number of office rooms, 17 smaller meeting rooms (up to 20 people), as well as two larger conference halls – the Portrait Hall (capacity up to 200 people) and a spacious Conference Hall with audio-visual equipment.

The building is still recognised as an important monument of architecture and art of Rīga.

References: M. Rudovska, Latvian Academy of Sciences Building. Institute of Art History, Latvian Academy of Art, Rīga, 2009, 22 pp.

ACHIEVEMENTS IN SCIENCE 2018 LATVIA

Every year in February the award ceremony to honour the best achievements in scientific research takes place. On 16 February 2018, winners of the contest "The Best Achievements in Science 2017" gathered at the House of Nature of the University of Latvia to celebrate their deeds and popularise science.

Since 2002, in December of each year the Latvian Academy of Sciences announces the list of the most significant achievements in Latvian science of the year. In order to win the title of the best achievement in science of the year the competition among researchers and research institutions has become more intense as the popularity and reputation of the contest organised by the Academy has grown and so has the number of participants. In 2018 the top twelve achievements were selected from 51 eligible proposals.

Traditionally achievements in science are divided into two groups – theoretical science and applied science; the achievements shortlisted for the winners group usually cover a vast scope of research areas in different sciences – ranging from solid state physics and IT technologies, biomedicine and genome research, pharmacy and chemistry to history, anthropology, literature, art history, music theory etc.

THEORETICAL SCIENCE

An unusual DNA form with an unusual packaging and genome maintenance function in human cells has been found by the scientists of the Latvian Biomedical Research and Study Centre of the University of Latvia and Rīga Technical University.

The collective monograph *Gotthard Friedrich Stender (1714–1796) and the Enlightenment in the Baltics in European contexts* by an international team of scholars, philosophers and theologians, linguists, pedagogical historians offers the first interdisciplinary study of the great 18th century Baltic German enlightener Gotthard Friedrich Stender. The monograph has been compiled by the researchers at the Institute of Literature, Folklore and Art of the University of Latvia.

An overview of musical life during the decade after the Second World War (1944–1953) and against the backdrop of political and social tensions in the Latvian Soviet Socialist Republic is revealed in the monograph *Music in Latvia during The Stalinist Post-War Decade*, published at the Institute of Literature, Folklore and Art of the University of Latvia.

The monograph *Art Nouveau Architecture in Latvia* provides data on the place and importance of the heritage of the Art Nouveau architecture of the early 20th century in the contemporary built-up environment of Latvia.

Research and tools for developing the smart economy and society in Latvia are offered in the monograph *Beyond a Century. The Smart Latvia*. The monograph is a compilation of the projects carried out within the national research programme EKOSOC-LV at a number of universities in Latvia. It has been published by the Latvian Academy of Sciences.

APPLIED SCIENCE

A novel energy-efficient method for preparation of long afterglow phosphors on metals has been developed at the Institute of Solid State Physics of the University of Latvia.

The Neural Machine Translation System for Small Languages is a result of a fruitful collaboration between the IT company Tilde and the University of Latvia.

The new concept nanogenerators for mechanical to electrical energy conversion has been worked out by the specialists of the Faculty of Materials Science and Applied Chemistry of Rīga Technical University and the Institute of Technical Physics.

Plant virus-based universal vaccine technology for the treatment of chronic diseases is the theme of research at the Latvian Biomedical Research and Study Centre.

The role of peripheral innervation in wound healing has been discovered at the Faculty of Medicine of the University of Latvia.

Sea buckthorn extracts have been developed for use in veterinary practice and farms for improvement of animal healthcare at the Faculty of Veterinary Medicine of the Latvia University of Life Sciences and Technologies and the Institute of Horticulture.

An original technology for synthesis of nanoporous carbonaceous material from wood and its processing residues using thermochemical activation has been found at the Latvian State Institute of Wood Chemistry.

LATVIAN ACADEMY OF SCIENCES

Concept of the contents by Tālavs Jundzis, Ilze Stengrevica, Ilze Trapenciere
Design and layout by Ieva Stūre
Language editor Antra Legzdiņa
Publisher Latvijas Zinātņu akadēmijas Baltijas Stratēģisko pētījumu centrs
Printed at Jelgavas tipogrāfija, 2019

Photos by Silva Bendrāte, Jānis Brencis, Kristaps Broks, Alma Edžiņa, Didzis Grodzs, Tālavs Jundzis, Dainis Lapiņš, Gita Rēvalde, Indriķis Stūrmanis and from the archives of the Latvian Academy of Sciences, Latvian Centre of Cardiology at Pauls Stradiņš Clinical University Hospital, Latvian National Library, Institute of Art History of the Latvian Academy of Art, Institute of Food Safety, Animal Health and Environment "BIOR", Institute of Horticulture, Latvian Institute of Organic Synthesis, Institute of Solid State Physics, Latvian State Forest Research Institute "Silava", Rīga Stradiņš University, Rīga Technical University, Latvia University of Life Sciences and Technologies.

ISBN 978-9934-8742-3-9