



LATVIAN ACADEMY OF SCIENCES

YEARBOOK

2017

 ZINĀTNE

LATVIAN ACADEMY OF SCIENCES

Akadēmijas laukums 1
Rīga, LV 1050
Latvia

Tel.: (371) 67225361. Fakss: (371) 67821153
E-mail: lza@lza.lv
<http://www.lza.lv>

The 2017 Latvian Academy of Sciences (LAS) Yearbook is a follow-up edition — already the fifteenth one under this title. The previous issues reflected the situation in 1991, 1992, 1994, 1995, 1996, 1997, 1998/1999, 2000/2001, 2002/2003, 2004/2005, 2006/2007, 2008/2009, and 2010/2011, 2012/2013, 2016/2017 (until 15 March 2017).

The Yearbook 2017 contains basic information on the Academy, including the membership directory.

The contents of the Yearbook are also available on the Website of the LAS
(<http://www.lza.lv>). See section About Academy/Annual Reports

Compiled by:

*Kristaps Broks, Daina Daija, Alma Edžiņa, Līva Griņeviča, Sofja Negrejeva,
Andrejs Siliņš (supervisor), Ilze Stengrevica, Viktorija Zaļūksne*

Photos from the collection of the LAS.

Photographers *Māris Bartulāns, Jānis Brencis, Alma Edžiņa, Edgars Liepiņš,
Virginija Valuckiene*

Edited by *Antra Legzdiņa*

Computer design by *Elmārs Lange*

Published by “Zinātne”: Akadēmijas laukums 1, Rīga
LV-1050, Latvia. Reg. no. 40003576967

ISSN 1407-0383
ISBN 978-9934-549-35-9

© Latvian Academy of Sciences, 2017

CONTENTS

Preface <i>Ojārs Spārītis</i>	5
Transformation of the Academy of Sciences (1990s) and accomplishments in Latvian science <i>Jānis Stradiņš</i>	8
CHARTER OF THE LATVIAN ACADEMY OF SCIENCES	15
STATUTE OF THE LATVIAN ACADEMY OF SCIENCES	20
National Research Programme „EKOSOC-LV”: Accomplishment in Stage 3. <i>Baiba Rivža</i>	35
National Research Programme „Letonics”. <i>Ilga Jansone</i>	44
PRESIDIUM, SENATE, BOARD, COUNCILS, COMMISSIONS OF THE LAS	52
SCIENTIFIC AND ORGANISATIONAL ACTIVITY OF THE LATVIAN ACADEMY OF SCIENCES	56
2016: The year in science	56
General Meetings of the LAS	67
Meetings of the LAS	87
Meetings of the Senate	93
Activities of the Presidium of the LAS	106
LAS Board activities	107
LAS funding from the state budget, 2016	109
Activities of the LAS Funds	110
Activities of organisations connected with the LAS	113
Academy awards and other awards	117
HONORARY PATRONS OF THE LAS	141
SCIENTIFIC DIVISIONS	142
Division of Physical and Technical Sciences	142
Stairways to excellence in modern materials research in the Institute of Solid State Physics, University of Latvia. <i>Andris Šternbergs</i>	150
Division of Chemical, Biological and Medical Sciences in Latvia	155
Main achievements of the State Research Programme “Biomedicine for Public Health” in 2016. <i>Valdis Pīrāgs</i>	170
Introduction and Breeding of Rhododendra in Latvia (1957–2017). <i>Rihards Kondratovičs</i>	178
Division of Humanities and Social Sciences	182
Turaida Museum Reserve — Outstanding in Humanitarian and Social Sciences in 2016. <i>Raita Karnīte</i>	193

Division of Agriculture and Forestry Sciences in Latvia	201
The foundation of future forests: current tree breeding. <i>Āris Jansons</i>	211
INTERNATIONAL COLLABORATION	216
MEMBERS OF THE ACADEMY	226
Full members	226
Honorary members.....	234
Foreign members	238
Corresponding members	244
Doctors <i>honoris causa</i>	252
In Memoriam	257
THE MAIN SCIENTIFIC INSTITUTES AND AGENCIES OF LATVIA.....	259

Preface

Highly esteemed academic community, colleagues and friends! I have to admit to all of you and to myself that I find it hard to share the responsibility for the events that occurred twenty-five years ago, when the administration of the then LSSR Academy of Sciences and nomenclature academics, for unknown reasons or possibly driven by director-dictated motives, proposed that the academy should be transformed into an academy of staff, following “the Western model”. In practice, this meant sweeping aside a powerful instrument for national development — academic intelligence — and paralysing the development-driving force of the country that had regained its independence.



Politically, this destructive practice was implemented by the transitional government leaders, whose followers in this office continued to strip the Academy of Sciences of its property, close down institutes and laboratories, remove and sell their equipment to the extent that the marginalised infrastructure of Latvia’s science and emigration-weakened personnel lost any impact on the country’s economic growth. The consequences of this subversive activity are seriously felt as scarcity of the destroyed national technological and industrial infrastructure, which results in the inability to exploit effectively the remaining scientific potential with a view of increasing innovative entrepreneurship.

Whatever would the former leaders of the Latvian Academy of Sciences say to justify their past compromises, I can only find, based on the attitude of the representatives of the country’s political and executive power both towards

science in general and the national Academy of Science in particular, that we are heirs of an institution that has been excluded from public administration as well as economic and intellectual domains, an institution with partly national but for the most part representative functions, with no real responsibility for the consequences and a limited ability to participate in the administration of the developmental processes in the country. Over the twenty-six years after the restoration of national independence, the leaders of the Latvian Academy of Sciences have not sought to increase its influence on the management processes in the fields of science and economy. This is clearly seen in the destructive activity of the officials of the executive power — Ministry of Education and Science — by continuously limiting opportunities and finances of the Latvian Academy of Sciences. We find such an attitude on the part of the executive power towards science embarrassing both domestically and internationally although any logical-minded individual understands that using academic potential for the economic development of national economy is an axiom, an idea that is constantly referred to by the officials in Brussels who are responsible for inculcating it in the national consciousness and for the growth of the European Union's common economic space.

Since the restoration of national independence, there has been no perceptible staff restart in either political or scientific management mechanism which would clear the way to new forces that would bring about structural changes. The evolution of our state, unfortunately, is slow and afflicted with continual contradictory administrative convulsions that do not allow either the economy to develop annually by the Minister's promised five per cent of the gross domestic product, or Latvian science funding to rise above 0.6% of the GDP¹ — now a tragic curiosity on the comparative scale of European Union national budgets. Last year the funding of science amounted to 79 million euro, while in 2017 it has already fallen to 39 million euro or 0.3% of the GDP.

For twenty-five years after the reorganisation of the Latvian SSR Academy of Sciences, the Latvian Academy of Sciences has worked in the efficiency mode as described in the introduction by academician Jānis Stradiņš, Chairman of the Senate. It is for the academicians to appraise whether much or little has

¹ *Sustainable Development in the European Union. A Statistical Glance from the Viewpoint of the Sustainable Development Goals*. 2016. Edition. EUROSTAT. European Union, 2016, p. 79.

been achieved, whether it was the maximum that the Academy of Sciences of independent Latvia has been able to accomplish. It is to them that this yearbook is addressed. A yearbook is like a calendar which starts a new year, and the foreword should contain words with which to encourage not only myself but also my colleagues to live and work in the coming years, considering the vigorous source within our academic community. Many may have forgotten that on taking up this post I quoted Kārlis Ulmanis' idea that yesterday's sun cannot dry the hay that is mown today. It is true that yesterday's success can help us very little in the face of the present and future challenges in science, but it can encourage us to seek new solutions and strengthen the scientist's idealism which urges us to move on. The public need for a faster involvement of the scientific elite in solving economic challenges is a task for today and tomorrow. To pursue this goal, the Latvian Academy of Sciences needs to strengthen its functional muscles, its performance, and find partners in the political, executive as well as business environment.

I believe in the common sense of society, opinion leaders among the Latvian intellectuals and our academic environment. **I depend** on our collective strength of spirit, the scientists' capacity and ability to speak to the general public as well as their elected leaders at all levels of administrative and political representation. **I call on** the Latvian excellence — the academic elite and every scientist personally — to accept this idea as their own: there is only one way for Latvia's progress — through the union of the spiritual and intellectual power and the politicians and businessmen who are capable to act and think nationally. It is only through our joint development of a welfare state that our country will see and duly celebrate the centenary of its foundation, as well as its next significant anniversaries. This is my hope to which I dedicate my faith and my deeds.

Ojārs Spārītis,

President of the Latvian Academy of Sciences

Transformation of the Academy of Sciences (1990s) and accomplishments in Latvian science

In 2015, the Latvian Academy of Sciences celebrated the 200th anniversary of the establishment of *Academia-200* Kurzeme Society for Literature and Art; during the first decades of its existence, this association had functioned as the first Academy of Sciences in the Baltic provinces of the Russian Empire until it was dissolved in 1939, with repatriation of the Baltic Germans. The Latvian SSR Academy of Sciences was founded in 1945/1946. It was composed of individual members and had a vast network of research institutes, design offices, workshops, libraries, and other institutions, which for almost 50 years served as the leading and most significant research system in Latvia. It introduced and developed branches of modern science previously absent in Latvia. The LSSR Academy of Sciences was formed according to the structure of the USSR Academy of Sciences, and coordinated its activities with its USSR counterpart, functioning however, relatively independently and efficiently, and earning a certain recognition in the Soviet Union and in some areas of research — even globally. It should be noted that the Latvian SSR Academy of Sciences had largely been formed on the basis of the Latvian State University and the Latvian Academy of Agriculture, hence its first academics were simultaneously the professors of these universities.

When the Republic of Latvia regained its independence in 1990/1991, a certain contribution in this process was also given by the progressive AS staff, and a logical problem arose: what shape should the Latvian Academy of Sciences take in these new conditions. This question arose not only in Latvia and its two neighbouring countries Estonia and Lithuania, but also in other post-communist countries of Eastern Europe, where the Academies of Sciences had functioned similarly to that of the USSR. In two countries, where the former Academies of Sciences had been too closely bound to the old regime (the German Democratic Republic and Czechoslovakia), they were dissolved, while in other countries — transformed, giving autonomy to their institutes or incorporating them into universities. The three Baltic republics independently of each other chose the Nordic model — the academy of individual members, without institutes, the so-called personal academies, associations of leading

scholars and scientists, even though Western Europe has a number of countries, where the Academies of Sciences do have institutes (e.g., Austria, the Netherlands). The overwhelming majority of the scientific community in Latvia was against the Academy acting as a “ministry of science”, supervising its subordinate institutes and allocating funds to them.

In Latvia, the dispute about the academy of sciences started in 1989 and went on until 1992, to some extent, even to the late 1990s. The name of the Academy was changed to the Latvian Academy of Sciences (the LAS) in March 1990, the academic staff had to be upgraded to enable the transformation of the existing Academy. Part of the members united by the newly established public organisation — the Latvian Union of Scientists (founded in 1988) insisted on liquidation of the “old” Soviet Academy and foundation of a new national Academy of Sciences (without institutes). Such a solution would annihilate the previous 45 years of existence of the Academy of Sciences in Latvia. The new Academy would have lost claim to such outstanding Latvian scholars as academicians Jānis Endzelīns, Paulis Lejiņš, Pēteris Stradiņš, Augusts Kirhenšteins, Gustavs Vanags, Alfrēds Ieviņš, Solomons Hillers, Arvīds Kalniņš, Lidija Liepiņa, Artūrs Krūmiņš, etc., the continuity would be interrupted, and the members of such a “National Academy of Sciences” could, most likely, be appointed or elected according to somewhat subjective criteria.

Another important issue was the prospects of existence of the newly established, strong institutes within the Academy of Sciences structure (the type of “a hybrid academy”) or outside the Academy, mostly attached to universities, because, in essence, several Academy institutes had grown from the universities historically, and within the structure of the university it would be easier to include research into study programmes and attracting the young generation to science. Furthermore, in 1990, the Latvian Council of Science (LCS) had already been founded by the resolution of the Republic of Latvia Soviet of Ministers, and it distributed funding for state research projects. Therefore, the Academy of Sciences objectively could no longer supervise the institutes. And finally, the decision whether the Academy should be transformed by the government’s (or the Supreme Council’s) resolution “from the top”, or should this change be effected on the Academy’s own initiative (the Academy of Sciences Constitutional Assembly at that time in addition to the

LAS members also included the elected representatives of the institutes)? The disputes on these matters raged for almost two years.

The option of “a hybrid academy” (individual members and large research institutes) was rejected by the majority of the institutes and by the large universities (UL), the Latvian Union of Scientists and the researchers’ representatives in the political circles (the head of the Science Council at the time, academician Andrejs Siliņš, who urged scientists to actively engage in politics and later became a Chairman of the Parliament Standing Committee for Culture and Science, supported the conversion of the existing LAS into a classical type academy of sciences and opposed its dissolution). Nevertheless, the contested Academy of Sciences concept originally was not included even in the new Republic of Latvia draft law on scientific activity, the preparation of which commenced in 1991/1992.

It should be noted though that the status of academies of science at that time was uncertain in Western Europe too, because science and its funding at the national level was governed by the respective national science councils, rich universities or there were state and private investor-funded research institutions (as the societies of Max Planck or Fraunhofer Institutes in Germany). Consequently, on 17–18 March 1992, in Stockholm the All-European-Academy Meeting “The Role of Academies as Learned Societies in the New Europe” was held. The representatives of the Latvian Academy of Sciences Jānis Lielpēters and Jānis Stradiņš were invited to attend the meeting, which laid the foundations for a new, not yet formalised organisation ALLEA (European Federation of Academies of Sciences and Humanities). This event partially legalised the admission of the LAS (at that time not yet recognised by the state of Latvia itself), into the international academic community. Since the summer of 1990, the direct relations of the LAS with the Royal Swedish Academy of Sciences motivated the LAS to shape the new version of its Charter after the Swedish model as “a personal academy” rather than “a hybrid academy” (with institutes). Thus, the Latvian Academy of Sciences gave up its former administrative power over funding and problem-solving of the institutes which were addressed independently of the LAS, whose authority was upheld by the more active individual Academy members, especially those elected by the LCS.

The General Meeting of the LAS, where the new LAS Charter and the Statutes were approved, was held on 14 February 1992 (to emphasise the historical link with the existing Academy of Sciences, whose first founding general meeting had taken place on 14 February 1946). It proceeded quite dramatically, since the first round of voting failed to achieve the majority of 2/3 of the votes cast, however, in the second round the Charter was accepted (68 votes – for, 1 – against, 1 – abstained). The general meeting was attended by the President of the Royal Swedish Academy of Sciences T. Laurent and Secretary General C. O. Jacobson. The adopted Charter established that “The Latvian Academy of Sciences is an autonomous legal entity made up of elected members of the Academy of Sciences and subsidised by the state. LAS Charter is approved by *Saeima* and therein are specified the operational objectives, main directions, the legal and economic basis, the system of governance, rights and obligations of the LAS. *Saeima* or the Cabinet of Ministers may set the LAS specific tasks and mandate in the sphere of science.” Although both the Charter and the Statutes provided that the institutions had the right to form an association with “the personal academy”, in actual fact, with rare exceptions, such an association did not materialise, and in 1996–1998, as a result of the so-called “Cimdiņš’ reform”, the majority of the institutes were incorporated into the University of Latvia (and later, some also into the structures of the RTU and the RSU).

The obstacles had to be overcome in order for *Saeima* — the Parliament of Latvia — to unanimously approve (in a modified form) the LAS Charter on 23 January 1997, granting this decision the power of law. Thus, the Latvian Academy of Sciences was permanently legally established as an important institution of the renewed Republic of Latvia, and no longer perceived as a relic of the Soviet regime, in opposition to the attitudes maintained earlier in some circles. This unanimous vote confirmed the authority attained by the LAS in the Latvian society. The LAS has become a nationally and internationally recognised centre of multidisciplinary scientific excellence, expertise and publicity, an advocate of Latvian scientific achievements on the international scene, where such academies are seen as significant intellectual and cultural attributes.

According to its Charter, the tasks of the LAS include promoting research in basic and applied sciences, especially in interdisciplinary studies; research

and cultivation of Latvian history, culture, and the Latvian language; active participation in policy making regarding the science in Latvia, and advising public institutions about scientific issues; elaboration of scientific terminology; organisation of congresses, conferences, discussions, and competitions; popularisation of scientific achievements and the Baltic history of science; maintenance of bilateral international contacts of Latvian scientists; safeguarding, preservation and further development of research ethics, principles, and traditions of discussion. In the scientific organisation aspect, the LAS participates in the evaluation of the choice of research directions in Latvia, including the debating and improvement of draft legislation related to research and innovation, working in close cooperation with the Latvian Council of Science.

What has been achieved by the LAS during the years of regained independence? It has significantly updated its membership, electing as members or honorary doctors the most notable Latvian scientists, who, before the restoration of independence, due to political or subjective motives, were not elected to the LAS. Currently, according to membership figures, the LAS is the largest Academy of Sciences in the Baltics (as of 1 January 2017, there were 127 full members, 127 corresponding members, 57 honorary members, and 97 foreign members). As time passes, there arises the disproportion in terms of age and sectoral representation and the LAS personnel grows older, which is also characteristic of the academies of sciences in other countries.

The renewed LAS has attracted the researchers of the Latvian diaspora, and to some extent, reintegrated the so-called “expatriate scientists” into the Latvian scientific community. Creation of the LAS honorary membership has helped bring into the LAS outstanding personalities of Latvian culture and art.

In 1998, the nomination system for LAS awards and awarding of young scientists was put in order, allowing to stimulate the most renowned and promising scientists. Since 1998, joint prize allocation has been launched in cooperation with Latvian manufacturing companies (Grindeks, Latvenergo, Dati, Latvijas Gāze, Itera Latvija, etc.) and individual patrons.

The LAS has given a momentum and materially contributed to establishment of major research centres important to Latvian science, e.g., Ventspils International Radio Astronomy Centre (VIRAC), the Baltic Centre for Strategic

Studies, signed agreements with a number of scientific and administrative institutions for implementing joint research.

Since 2004, the LAS has participated in the national research programming conducted by the Republic of Latvia Ministry of Education and Science. Of these programmes, Letonika (Letonics or Latvian Studies) and EKOSOC are directly managed by the LAS, while most of the other programmes of national importance are headed by the LAS members.

The LAS has become a good mediator in forming scientific ties between Latvian universities, academies and other higher education institutions and state research centres. The LAS has concluded contracts or cooperation agreements with academic educational institutions, and elected their lead researchers as the members of the LAS.

Since 1999, the Latvian Academy of Sciences has helped to maintain a high quality of the doctoral theses elaborated in Latvia, having evaluated them by the State Scientific Qualification Committee.

In the general meetings, gatherings, and councils of the LAS and its chapters a dispute culture is encouraged, comprehensive discussions of topical scientific and practical matters take place, the LAS is also in charge of the ethics of science (LAS and LCS Ethics Committee).

The LAS operates in close contact with the Ministry of Education and Science, the Latvian Council of Science, the Ministry of Health, the Ministry of Agriculture, the Ministry of Defence, and the Ministry of Culture.

The LAS has facilitated active regional studies, together with the Latvian Association of Local Governments has held visiting sessions (for example, in Liv Coast, Selonia, Latgale, etc.).

Since 2002, the LAS has traditionally held a competition to define and promote the 10–12 most outstanding achievements of science in Latvia.

The LAS coordinates the work of the Terminology Commission; it renders support to national emeritus scientists and their club “*Emeritus*”; it promotes the activities of young scientists in collaboration with the Association of Latvian Young Scientists, individual student organisations (“*Austrums*”), etc.

The LAS establishes and maintains its own traditions (LAS insignia, promotion of scientific and technical history studies, research of the history of the building housing the LAS).

It has to be admitted that in recent years, in addition to the large natural science institutes the LAS has also lost the humanities institutes, which until 2014 were located in the LAS building. The Latvian Academic Library, Archives of Latvian Folklore with the famous historical folksong cabinet *Dainu skapis* and other institutions have moved, too. With the strengthening of research in the universities, the role of the LAS in the science in Latvia has diminished. However, the LAS still encourages, evaluates, and provides professional expertise on research and innovation trends and results in the country. It would be beneficial to facilitate in-depth cooperation with universities and institutes. Unfortunately, insufficient state funding for the LAS activities and the fact that the LAS does not hold property rights to the Academy's high-rise building, impedes the expansion of the LAS work. Transfer of the high-rise building into the LAS ownership might significantly contribute to further development of the LAS, creating a more stable economic base and establishing the scientific and cultural centre of Latvia and, possibly, of the entire Baltic region in one edifice.

Presently, the Latvian Academy of Sciences is one of the essential vehicles for manifestation and implementation of the democracy in science in this country, where the researchers' weighted collective opinion is crucial.

The priority task of the LAS for the nearest future would also be the regaining of the partially lost influence within governmental structures as a qualified intellectual advisory body on national development strategy issues, which was of importance in the 1990s and in early 21st century. LAS together with the Latvian Council of Science must become a significant support for the Latvian Innovation and Research Strategy Council permanently running at the Cabinet of Ministers. LAS should be actively involved in promoting scientific and innovative technologies, become a scientific lobby in our country, and encourage interaction between science and technologies in all their manifestations.

Such is the position of the current LAS management which has gained approval with the researchers and the academic community of Latvia. This position is winning a growing support, although often a purely declaratory one, also in the political environment.

Prof. *Jānis Stradiņš*,
Chair of the Senate, Latvian Academy of Sciences

CHARTER OF THE LATVIAN ACADEMY OF SCIENCES

(Adopted at the General Meeting of the Latvian Academy of Sciences on 22 November 1996
Ratified by the Saeima (Parliament) on 23 January 1997)

GENERAL

The Latvian Academy of Sciences is a successor of several scientific associations which previously existed in Latvia. Its predecessors are the Kurzeme Society for Literature and Art, founded in 1815 in Jelgava and the Commission of Science, founded within the Rīga Latvian Society in 1869, which in 1932 was reorganised into the Science Committee with the status of a private academy of sciences.

Since 1919, the government of the Republic of Latvia had repeatedly considered the foundation of an official Latvian Academy of Sciences. In 1927, the idea was supported by Rainis, who was then Minister of Education. In 1935, the intention to create the Latvian Academy of Sciences was expressed in public by the Prime Minister Kārlis Ulmanis, and on 14 January 1936, by the Cabinet's Act, the Institute of History of Latvia was founded as the first constituent part of this Academy.

In Latvia, the Academy of Sciences started its work on 14 February 1946, when academy members gathered for their first General Meeting. Scientists from the University of Latvia and the Latvian Academy of Agriculture formed the core of the Academy of Sciences. When adopting the Charter and the new Statute, by the decision of the General Meeting, adopted on 14 February 1992, the Latvian Academy of Sciences was reorganised into a classical academy which united elected members — prominent scientists and other scholars.

In the restored Republic of Latvia, the Latvian Academy of Sciences facilitates the development of sciences, carries out scientific research. It takes care that all special knowledge that Latvia and the Latvian people have given and can give to the world science and culture — national culture, language, folklore, literature, social and economic experience, traditions — are realised, studied, perfected, maintained, and passed over to the future generations. It studies and preserves the historical traditions of Rīga and regions of Latvia, shows the place of the Baltic countries in the world.

The Latvian Academy of Sciences has joined the international scientific community, collaborates with other academies of sciences and scientific organisations in Europe and the world.

Article 1. LEGAL BASIS OF THE LATVIAN ACADEMY OF SCIENCES

In the Republic of Latvia, there is one Latvian Academy of Sciences as a centre of national importance, formed by the state. The Latvian Academy of Sciences is an autonomous legal entity which consists of elected members of the Latvian Academy of Sciences and which is subsidised by the state. The Latvian Academy of Sciences functions in accordance with its Charter and Statute. The Charter is adopted by the General Meeting of the Latvian Academy of Sciences and endorsed by the Saeima (Parliament) of the Republic of Latvia. The Saeima and the Cabinet of Ministers can assign certain tasks and authority to the Academy of Sciences in the field of science.

The Latvian Academy of Sciences may associate with scientific research institutions, societies, foundations, scientific technical organisations, universities, and higher educational institutions. Their collaboration with the Latvian Academy of Sciences is based on mutual agreement. In order to fulfil the goals of the Academy, groups of scientists or institutions are formed, which may function within the Latvian Academy of Sciences.

Members of the Latvian Academy of Sciences are elected prominent Latvian and foreign scientists, and honorary members — also universally recognised Latvian scholars of other spheres.

The Latvian Academy of Sciences is a legal entity. It observes the laws of the Republic of Latvia and international legal acts.

Article 2. GOALS AND KEY DIRECTIONS OF THE LATVIAN ACADEMY OF SCIENCES

Goals and key directions of the Latvian Academy of Sciences are:

- to develop science, to facilitate and carry out studies in the sphere of basic and applied sciences, to promote the study and development of the history, culture, and language of the Latvian people and the state, as well as to support studies connected with the natural resources of Latvia, possibilities for their optimal utilisation and protection of environment;
- to prognosticate processes of Latvia's development, to report promptly to the government and the community about scientific forecasts on desirable and undesirable consequences of different economic, cultural, and social processes and projects.

Article 3. RIGHTS OF THE LATVIAN ACADEMY OF SCIENCES

The Latvian Academy of Sciences has the rights:

- to collaborate with institutions of higher education and scientific research organisational system, to delegate its representatives for work in these institutions;

- to receive information in the Saeima commissions, ministries, and other governmental institutions on preparation and modification of laws and regulations, which are related to science and higher education, as well as to express its opinion about these documents;
- to undertake initiative in the development of new scientific trends and scientific institutions which are connected with them;
- to award a degree of the *Dr.h.c. (Doctor honoris causa)* of the Latvian Academy of Sciences to Latvian and foreign scientists;
- to propose and adopt modifications in its Charter, to submit them for endorsement to the Saeima;
- to preserve in its archives, depositories, and libraries manuscripts and documents belonging to prominent people in science, literature, art, and other spheres of culture, as well as other materials important for science and history.

Article 4. OBLIGATIONS OF THE LATVIAN ACADEMY OF SCIENCES

The Latvian Academy of Sciences has the obligation:

- to take an active part in the development of science policy of Latvia and to promptly advise the Saeima and government in matters of science;
- to participate in scientific expertise of different governmental programmes, in stating the research level of studies, projects, programmes, and scientific institutions;
- to recognise excellence in science of Latvia (to award prizes for outstanding contribution in science of Latvia);
- to promote principles of self-government and democracy of science and scientists of Latvia, to protect these principles in governmental structures and the mass media;
- to care about involving of researchers of new generations into science and the social protection of the retired scientists, including the state emeritus ones;
- to protect, preserve, and perfect principles and traditions of scientific research ethics, discussion, to study problems of history of Latvian science;
- to care about publishing scientific literature, the scientific level of terminology and encyclopaedias in Latvia;
- to organise scientific congresses, conferences, open meetings of the Latvian Academy of Sciences, discussions, and competitions and to popularise achievements in science;
- to scientifically supervise the depositories of Latvian science and the national cultural heritage — Academic Library of Latvia, Misiņš Library, and the Depository of Latvian Folklore;

- to develop and encourage international contacts of Latvian scientists, to collaborate with other academies of sciences, scientific unions and associations, to maintain international scientific relations and to represent science of Latvia in international scientific organisations.

Annually the Latvian Academy of Sciences publishes a report on its activities.

Article 5. COMPOSITION AND MANAGEMENT OF THE LATVIAN ACADEMY OF SCIENCES

Composition of the Latvian Academy of Sciences is the following: full members (academicians), honorary members, foreign members, corresponding members. Their number, procedure of nominating and discussing candidates in the scientific community, as well as order of election is determined by the Statute of the Latvian Academy of Sciences.

The highest decision-making body of the Latvian Academy of Sciences is the General Meeting, in which elected full, honorary, foreign, and corresponding members take part. Matters pertaining to the Charter and the Statute and admittance of new members are decided by full members. In order to facilitate solving of interdisciplinary problems and contacts among representatives of allied sciences, members of the Academy form divisions of sciences of the Latvian Academy of Sciences. In between general meetings, the work of the Latvian Academy of Sciences is headed by the President, who is elected by its members, and the Senate.

The General Meeting of the Latvian Academy of Sciences elects the Supervisory Council. With the purpose to organise different spheres of work of the Latvian Academy of Sciences and to take prompt decisions, the Presidium, Board, and other organisational structures are formed. Composition and duties of these structures are determined by the Statute of the Latvian Academy of Sciences.

Article 6. ECONOMIC BASIS OF THE LATVIAN ACADEMY OF SCIENCES

The necessary financing for work of the Latvian Academy of Sciences is subsidised from the state budget. The Latvian Academy of Sciences submits a motivated application for the following year's financing together with the annual report, according to a procedure, determined by the government. The special budget of the Latvian Academy of Sciences is formed of resources which are obtained from:

- contractual works and entrepreneurial activity;
- managing of the property;
- donations and presents;
- other sources.

Under possession or property of the Latvian Academy of Sciences may be real estate or movables — land, buildings, and other property, which has been given over to it by the state institutions, or which it has obtained as a result of its activities or on other legal basis, as well as intellectual property, currency, and securities in Latvia and abroad.

Under the supervision of the Latvian Academy of Sciences are institutions and organisations, which are necessary for its work, as well as institutions and organisations which facilitate the functioning of science.

Administration of property, belonging to the Latvian Academy of Sciences, and objects, which are under its possession and supervision, is determined by the Statute of the Latvian Academy of Sciences.

Article 7. STATUTE OF THE LATVIAN ACADEMY OF SCIENCES

The General Meeting of members of the Latvian Academy of Sciences independently adopts and/or modifies its Statute which may not be in contradiction with the provisions of the present Charter.

STATUTE OF THE LATVIAN ACADEMY OF SCIENCES

(Approved by the Decision No. 7 of the General Meeting of the Latvian Academy of Sciences on 14 February 1992. Amended by the decisions of the General Meetings of the Latvian Academy of Sciences on 24 November 1992, 11 February 1993, 18 February 1994, 21 November 1997, 4 April 2002, 3 April 2008, and 29 November 2012)

Article 1. GENERAL PROVISIONS

1.1. The Latvian Academy of Sciences (LAS) is a derived legal entity under public law in the public administration system with autonomous competence which consists of elected Members of the LAS. Its rights and obligations have been established in the LAS Charter, the Law on Scientific Activity, and other laws, as well as the LAS Statute, and its operation is partly funded from the State budget. Its operational objectives, basic orientations, legal and economic grounds, administration system, and rights and obligations have been specified in the LAS Charter which has been approved by the Saeima (Parliament) of the Republic of Latvia. The Saeima of the Republic of Latvia or the Cabinet of Ministers may delegate special tasks and authorities to the LAS in the sphere of science.

Members of the LAS are elected prominent Latvian and foreign scientists, and Honorary Members — universally recognised Latvian intellectuals of other spheres as well.

On contractual or associative basis, or in other legal forms, the LAS may affiliate legally independent scientific research institutions, societies, foundations, scientific technical organisations, universities, and other institutions of higher education. Their cooperation with the LAS is determined by mutual agreements. In order to implement objectives of the LAS, groups of scientists or institutions may be formed which may function within the LAS, as well as experts from among scientists and specialists may be attracted.

1.2. The LAS collaborates with Ministries of the Republic of Latvia, the Latvian Council of Science, and other similar institutions of a public character in the analysis, assessment, and formulation of strategies and current important issues of Latvian science, research and innovations. Ministries may delegate special authorities to the LAS in the sphere of science ensuring their implementation with adequate funding.

1.3. The abbreviation of the Latvian Academy of Sciences is LZA (or LAS in English). Its name in other languages should be translated as follows: Academia Scientiarum Latviensis (in Latin), Latvian Academy of Sciences (in English), Académie

des Sciences de Lettonie (in French), Akademie der Wissenschaften Lettlands (in German), *Латвийская Академия наук* (in Russian).

1.4. The registered office of the LAS is at Akadēmijas laukums 1, Rīga, LV-1524, Latvia; its web address is <http://www.lza.lv>.

1.5. The symbols of the LAS are regulated by a special Statute. Colours of the LAS are white, cobalt blue, and gold. The seal of the LAS contains the Small Coat of Arms of the Republic of Latvia and the words “Latvijas Zinātņu akadēmija – Academia Scientiarum Latviensis”.

1.6. The Latvian Academy of Sciences marks 14 February as “The Day of the Academy”, as on 14 February 1946, the Members of the Academy gathered for their first General Meeting, and on 14 February 1992, the LAS adopted its Charter and new Statute.

Article 2. OPERATIONAL OBJECTIVES AND BASIC ORIENTATIONS

2.1. The LAS has the following operational objectives and basic orientations:

2.1.1. to carry out and encourage studies in basic and applied sciences;

2.1.2. to investigate the history of the Latvian people and the State; to study the culture, history, and prospects of Latvia; to encourage the investigation and perfection of the Latvian language; to assess natural resources of Latvia and possibilities for their optimal use; and to promote studies related to the protection of environment;

2.1.3. to forecast processes of the development of Latvia, to report promptly to the nation and Government about scientific forecasts on desirable and undesirable consequences of different processes in the national economy, culture, and social procedures;

2.1.4. to develop a knowledge-based society and to promote the development of innovative technologies in Latvia;

2.1.5. to provide the highest quality scientific expertise; to give expert conclusions on the principal questions with regard to Latvia and the Baltic area;

2.1.6. to participate in the development and implementation of national research programmes and regional research programmes of the Baltics and the European Union;

2.1.7. to take an active part in the development and implementation of the Latvian science policy; to promptly advise the Saeima, the President of the State, the Government and their authorities on the matters of science;

2.1.8. to enter into agreements or associative relations with scientific and professional societies, funds, unions, and associations of Latvia; to confer the name of the LAS to

institutions associated with the LAS; to take part in the evaluation of the main research trends of these institutions if it is stipulated by a mutual agreement;

2.1.9. to develop an active cooperation with institutions of higher education of Latvia, to develop a single academic environment in Latvia and to take part in the training of scientists of the highest qualification;

2.1.10. to encourage the publishing of scientific literature and encyclopaedias and increase their scientific level in Latvia;

2.1.11. to promote the development of Latvian scientific terminology;

2.1.12. to organise scientific congresses, conferences, open sessions of the LAS, and competitions, and to promote achievements of science;

2.1.13. to develop interdisciplinary studies, to initiate foundation of new scientific directions;

2.1.14. to cooperate with other academies of sciences, scientific associations, unions and societies; to maintain international scientific relations and represent science of Latvia in international scientific organisations;

2.1.15. to award prizes and scholarships of the LAS for work in science, including together with universities, other institutions of higher education and patrons of science, or other science-supporting organisations; to take part in recommending and deciding about international awards for work in science;

2.1.16. to evaluate the contribution and potential of the Latvian scientists and of foreign scientists connected with Latvia, and to recommend them for election as Full, Foreign, Honorary, or Corresponding Members of the LAS;

2.1.17. to promote studies in the history of science of Latvia and in scientometrics ensuring the preservation and cultivation of scientific traditions;

2.1.18. to develop and further improve the Scientist's Code of Ethics and the principles of scientific discussions;

2.1.19. to involve new generations of researchers into science;

2.1.20. social protection of the retired scientists (including the State Emeritus ones) and support for their activities.

2.2. The LAS fulfils its operational objectives set in the LAS Charter and Paragraph 2.1 of the present Statute through activities of its Members and of institutions formed by the Academy, and through promotion of funding of separate scientific studies, and scientifically organisational and publishing activities.

Article 3. THE LAS MEMBERS

3.1. The LAS is composed of the following:

3.1.1. Full Members (academicians), out of which no more than 100 may be under the age of 70;

3.1.2. Honorary Members (no more than 60 in total);

3.1.3. Foreign Members (no more than 100);

3.1.4. Corresponding Members (out of which no more than 100 may be under the age of 70).

3.2. The LAS Members are elected under the following procedure:

3.2.1. Full Members of the LAS are elected Latvian scientists whose studies have been widely recognised in Latvia and abroad. A scientist may be elected a Full Member of the LAS if he or she is under the age of 70. An elected Full Member of the LAS after the age of 70 is not included in the total number stipulated in Paragraph 3.1.1, however, he or she, retains the vote in the LAS convocations.

3.2.2. Honorary Members of the LAS are elected prominent figures of science, culture, national economy, education, and social sphere of Latvia or foreign countries who reside and work in Latvia or who have close cooperation with Latvia and its science.

3.2.3. Foreign Members of the LAS are elected outstanding scientists of the world who mainly reside and work abroad.

3.2.3.1. When selecting candidates for Foreign Members, particular attention is paid to the scientists of Latvian origin who reside and work abroad.

3.2.3.2. When moving for permanent residence in Latvia and commencing scientific activity here in Latvia, a Foreign Member of the LAS may be elected a Full or Corresponding Member of the LAS by voting of the General Meeting.

3.2.4. Corresponding Members of the LAS are elected scientists who have gained recognition in any field of science in Latvia, who can represent the relevant field of science on a qualified level, evaluate scientific work and scientific orientations corresponding to their speciality. Corresponding Members of the LAS may be elected scientists under the age of 60. An elected Corresponding Member of the LAS after the age of 70 is not included in the total number stipulated in Paragraph 3.1.4, he or she, however, retains the vote in the LAS convocations. When a Corresponding Member of the LAS reaches the age of 70, a new vacancy is opened for the election of a new Member.

3.2.5. The General Meeting of the LAS delegates to the LAS Senate the authority to develop regulations for the election of the LAS Members and Doctors *honoris causa*.

3.3. The LAS Members have the following rights:

3.3.1. to suggest discussing of scientific and scientifically organisational questions at a meeting of the LAS or its Division, as well as at the General Meeting of the LAS;

3.3.2. to receive information on the LAS, its structure, and activities of its Divisions;

3.3.3. to discontinue their membership in the LAS by submitting a written notification to the LAS Presidium;

3.3.4. to receive remuneration for performing individual LAS tasks under Paragraph 5.6.4 of the present Statute;

3.3.5. to maintain for life the title acquired by election to the LAS, except in cases stipulated in Paragraphs 3.3.3 and 3.7 of the present Statute;

3.3.6. to carry out scientific activity within the LAS, to organise, with the consent of the LAS Senate, scientific structures — working groups, centres, and institutes, including both structural units of the LAS and legal entities associated with the LAS.

3.4. The LAS Members have the following obligations:

3.4.1. to take an active part in the implementation of the LAS operational objectives;

3.4.2. to participate at General Meetings, sessions, and other activities of the LAS;

3.4.3. to publish results of their studies in *Latvijas Zinātņu Akadēmijas Vēstis (A) / Proceedings of the Latvian Academy of Sciences (B)* or in other scientific issues;

3.4.4. to participate in scientific evaluations and provide advice within their competence;

3.4.5. to submit, on an annual basis, to the LAS brief information in writing on their scientific or other activities, especially focusing on the work conducted in fulfilment of the LAS operational objectives (Paragraph 2.1 of the Statute), and the information to be added on the personal website which is maintained by the LAS. Honorary Members and Foreign Members, as well as Full Members who have reached the age of 70 may provide information orally at their respective Divisions.

3.5. The LAS Foreign Members have the following rights and obligations:

3.5.1. In addition to the aforementioned in Paragraphs 3.3 and 3.4, the LAS Foreign Members may be involved as experts in the evaluation of Latvian and international scientific projects, as well as in rendering assistance in order to establish and strengthen contacts with the Latvian science and scientists in countries of their residence.

3.5.2. The LAS Foreign Members who reside in the same foreign country or foreign region may form a division of foreign members; establishment of such a division and its operational objectives are approved by the General Meeting of the LAS.

3.5.3. According to its financial possibilities the LAS covers accommodation costs incurred in Latvia by a Foreign Member or an Honorary Member residing outside Latvia, if this visit takes place at the LAS invitation.

3.6. Formation of the LAS funds.

3.6.1. The LAS forms the Fund of the LAS which is aimed at attracting financial resources in order to promote scientific and academic activities of scientists and students, organise scientific conferences, prepare and publish scientific literature, solve social problems of scientists, and carry out any other activities by following instructions of the donors. Operation of the Fund is carried out according to the Regulations approved by the LAS. The Chairperson of the Fund of the LAS is elected by the General Meeting of the LAS from its Full Members.

3.6.2. In order to achieve its operational objectives and basic orientations (Article 2 of the Statute), the LAS may also form other aid funds to attract additional resources. The procedure for their formation, use, and control is approved by the Presidium of the LAS on the recommendation of the Board of the LAS.

3.7. Procedure for secession from the LAS.

3.7.1. The General Meeting of the LAS may suggest that the LAS Full Members and Corresponding Members secede from the LAS in the event of a serious breach of the Scientist's Code of Ethics.

3.7.2. If a LAS Member has informed the Presidium of the LAS about his or her secession from the LAS in accordance with Paragraph 3.3.3 of the present Statute, information regarding this secession and reasons specified in the relevant notification are presented and a decision to strike this person off the lists of the LAS members is taken at the regular General Meeting of the LAS.

3.8. Procedure for election of the LAS members.

3.8.1. Election of new LAS Members takes place in accordance with the present Statute. The provisions specified in Paragraph 3.1 of the present Statute about the total number of the relevant Members should be observed at the election. New LAS Members are elected by the LAS Full Members.

3.8.1.1. Vacancies for new LAS Full and Foreign Members appear within the quotas stipulated in Paragraph 3.1 of the present Statute, or when the existing LAS Full and Foreign Members reach the age of 70. When electing new Full and Foreign Members, a common competition of candidates takes place with no privileges granted to any speciality (unless the General Meeting or the LAS Senate decides otherwise). The LAS Senate announces the number of vacancies in April.

3.8.1.2. Vacancies for new LAS Corresponding Members appear within the quotas stipulated in Paragraph 3.1.4 of the present Statute, or when the LAS Corresponding Members reach the age of 70. When electing new Corresponding Members, a competition takes place within the announced fields of science. The LAS Divisions suggest the relevant fields of science and the number of vacancies for Corresponding Members by indicating the possible candidates. The final decision on the number of

vacancies and the fields of science is taken by the LAS Senate considering different recommendations.

3.8.1.3. The LAS Honorary Members are elected by the General Meeting of the LAS without any competition announced in advance on recommendation of the LAS Senate and within the quotas stipulated in Paragraph 3.1.2 of the present Statute. Candidates for the LAS Honorary Members may be nominated by the LAS Full and Honorary Members.

3.8.2. The Secretary General of the LAS informs, through the press, the LAS Members, scientific institutions, universities and other institutions of higher education, scientific societies, and other organisations of scientists about the vacancies for the LAS Members by the end of April each year.

3.9. The LAS degree of the Doctor *honoris causa* (*Dr.h.c.*) is conferred to foreign and Latvian scientists whose work in the relevant field of science has gained international recognition, whose contribution has influenced the development of Latvian science and culture, and who have creative scientific contacts with the LAS. The LAS Doctor *honoris causa* is conferred by the LAS Divisions and approved by the LAS Senate. The LAS Honorary Doctors have the rights stipulated in the Law on Scientific Activity, as well as the voting rights in the LAS Divisions.

3.10. A title of the LAS Honorary Patron may be awarded under a decision of the Senate, presenting a relevant diploma in the event of considerable financial and moral support of the Latvian science in order to promote achievement of the operational objectives of the LAS (Paragraph 2.1 of the Statute).

Article 4. THE LAS CONVOCATIONS

4.1. The LAS convocations mainly take place in a form of General Meetings, meetings (sessions), symposia, conferences, and discussions.

4.1.1. Convocations are convened when necessary. Agenda of the regular convocations should be announced in advance.

4.1.2. Extraordinary General Meetings are convened by the President or the Presidium of the LAS on their own initiative or on recommendation of any Division, or if it is required by at least 25 LAS Members. Extraordinary General Meeting is competent if it is known that 2/3 of the Full Members (of the total number stipulated in Paragraph 3.1.1) have received information about it at least 24 hours before the convocation.

4.1.3. Information on the held convocations is published in *Latvijas Zinātņu Akadēmijas Vēstis* (A) and/or other scientific issues and press of Latvia, as well as on the LAS website.

4.2. The LAS meetings include the following:

4.2.1. listening to lectures and thematic reports of the LAS Members, Honorary Doctors, and other scientists;

4.2.2. discussions on specific activities aimed at fulfilment of the operational objectives set in the LAS Charter and the present Statute, and adoption of the relevant recommendations;

4.2.3. assessment of national programmes and programmes of national importance of Latvia, the relevant projects, and final results of their implementation; proposals to form working groups in order to promote development of programmes and projects;

4.2.4. discussions on foundation or liquidation of institutions and organisations necessary for provision of the LAS operation and fulfilment of its operational objectives;

4.2.5. hearing to reports of the LAS Members and other scientists on the most important scientific studies, course of development and implementation of national programmes and programmes of national importance, and large projects important for national economy, culture, and education, essentially important foreign scientific visits and their results, as well as examination of any other issues important for Latvia and its science.

4.3. The LAS meeting is chaired by the President of the LAS or a LAS Full Member authorised by the President. Issues are decided at the LAS meetings by a simple majority of votes of the LAS Members present, unless the majority of the participants votes for other agenda. The LAS meeting has the right to adopt recommendations to the Senate, the Presidium, the Board, the President of the LAS and other elected LAS officials, as well as the Saeima of the Republic of Latvia, the President of the State, Government and its structures.

Article 5. THE LAS ADMINISTRATION, ELECTED INSTITUTIONS, AND OFFICIALS

5.1. The highest decision-making body of the LAS is the General Meeting which is attended by the LAS Full Members, Honorary Members, Foreign Members, and Corresponding Members.

5.1.1. Participation in the LAS General Meetings is compulsory for the LAS Full Members and Corresponding Members under the age of 70, unless there are objective reasons for their absence. The General Meeting is competent to start its work and take decisions, provided more than half of Full Members and Corresponding Members under the age of 70 are present, including those who have cast their votes in advance by post.

5.1.2. The General Meeting is chaired by the President of the LAS or the Vice President authorised by the President. Issues are decided at the General Meetings of the LAS by a simple majority of votes of the LAS Members present, except the voting for

the amendments to the LAS Statute stipulated in Paragraph 7.1. The General Meeting decides all personal issues by secret ballot, unless the General Meeting decides on open voting. The LAS Members who cannot participate in the General Meeting may vote on the issues announced on agenda of the General Meeting by post (also in the event of open voting). The form of the voting-paper approved by the LAS Senate should be used for voting by post.

5.1.3. General Meetings of the LAS are convened at least twice a year and are open.

5.1.3.1. The Spring General Meeting (usually in April) hears and approves the annual report of the Secretary General of the LAS on the LAS activities in the previous year, hears the report of the Supervisory Council, re-elects LAS officials on the Senate's recommendation, and examines other issues;

5.1.3.2. The Autumn General Meeting (usually in November) hears the academic lecture, elects new LAS Members, exceptionally elects individual LAS officials on the Senate's recommendation, and examines other issues.

5.1.4. The General Meeting of the LAS elects the following officials: the President, Vice Presidents, the Secretary General of the LAS, the Chairperson of the LAS Fund, the Secretary of Foreign Affairs of the LAS with authority of the Vice President, and other LAS officials put on the list which is approved by the General Meeting of the LAS. The term of LAS officials is 4 years, and their election to each of the posts may be permitted no more than two consecutive times. Vice Presidents of the LAS, the Chairperson of the LAS Fund, and the Secretary of Foreign Affairs of the LAS are not public officials within the meaning of the Law on Prevention of Conflict of Interest in Activities of Public Officials, unless the order of the President of the LAS stipulate otherwise.

5.2. The LAS Senate as a decision-making body together with the President of the LAS and the Secretary General of the LAS direct the work of the LAS between the General Meetings.

5.2.1. The Senate:

5.2.1.1. regulates the procedures for the LAS management and preservation of its important documents, property, and other valuables, as well as nominates representatives of the LAS for national and international institutions, councils, and commissions;

5.2.1.2. on the basis of recommendations of the LAS meetings and Divisions, takes decisions, including decisions on conferring of the name of the LAS to scientific institutions and organisations associated with the LAS under mutual agreements;

5.2.1.3. provides interpretation of the LAS Charter, Statute, and decisions of its General Meetings.

5.2.2. The following LAS Full Members are included in the LAS Senate according to their positions: the President, Vice Presidents, the Secretary General of the LAS, the

Chairperson of the LAS Fund, the LAS officials elected at the General Meeting and the elected (Paragraph 5.7.4) Chairmen of the LAS Divisions of Sciences. By a decision of the General Meeting of the LAS, other Full Members and Corresponding Members, as well as Honorary Members of the Senate from the Full Members are also elected to the Senate. The term of the Senate is 4 years. The Corresponding Members elected to the Senate have the voting rights concerning all the issues, except the issues regarding election of new Members and amendments to the Statute.

5.2.3. Election of the Senate or of individual Members to the Senate takes place during the General Meeting of the LAS. Candidates for Members of the Senate are nominated at the LAS Divisions according to the quotas stipulated by the Senate. Members of the newly elected Senate take the office on the first day of the following month. Until then the Members of the previous Senate fulfil their obligations. The Chairperson of the Senate is elected by the Senate during its previous meeting; the Chairperson of the Senate is a Member of the Presidium.

The Senate may accept a notice of resignation from its Members (if they are not able or willing to participate in the work of the Senate for any reason) and is entitled to co-opt new Members by approving their authority in the next regular General Meeting of the LAS.

5.2.4. The Senate is competent to take decisions, provided more than half of the Senate Members with the voting rights are present at the Meeting. Decisions are taken by open voting, unless the Senate has decided otherwise, and a decision is deemed adopted if the majority of the Senate Members present has voted for it; if the vote is a tie, the Chairperson of the Senate has the casting vote, except elections when in case of a tie the choice is made by repeated voting or drawing lots.

5.3. Regular organisational work of the LAS in between General Meetings of the LAS and Meetings of the Senate is carried out by the President of the LAS in cooperation with the Presidium of the LAS which is composed of the LAS officials invited by the President, the Chairperson of the Senate, the Chairperson of the LAS Fund, and an invited person who takes the minutes. The Senate can additionally co-opt or recall persons of the Presidium.

5.3.1. The LAS is managed and represented by the President of the LAS.

5.3.1.1. In the President's absence, one of the Vice Presidents acts for the President.

5.3.1.2. The President is elected for 4 years but not more than two consecutive times; after leaving the post the President of the previous term is traditionally nominated as a Vice President and thus a Member of the Senate and of the Presidium.

5.3.1.3. The President may partly give the President's powers to other elected LAS officials, as well as authorise other LAS Members to represent individual interests of

the LAS in Latvia and abroad by informing the Presidium or the Senate about this decision.

5.3.2. Under the leadership of the President, the Presidium of the LAS:

5.3.2.1. proposes that the Senate approves specific directions of activities and responsibility of elected LAS officials (except the members of the Supervisory Council), and defines their concrete operational duties, as well as assigning of separate duties of the LAS officials to other Members of the Senate by specifying their functions;

5.3.2.2. recommends solutions for regular more significant problems of the LAS;

5.3.2.3. proposes agenda for regular and extraordinary General Meetings of the LAS and announces it to the LAS Members;

5.3.2.4. performs regular operational and representative tasks assigned by the President of the LAS, the Senate, or the General Meeting of the LAS.

5.4. Business and organisational activities of the LAS are planned and realised by the Secretary General who is the Chairperson of the Board.

5.4.1. The Secretary General:

5.4.1.1. executes the decisions of the General Meeting, the Senate, and the Presidium of the LAS;

5.4.1.2. coordinates the joint activities of the LAS Divisions (including the LAS meetings) and development of their programmes;

5.4.1.3. controls work of the LAS personnel, including activities of the Managing Department of the LAS and other business structures of the LAS, receives regular reports from them and instructs them to take the measures necessary for optimisation of the work, as well as ensures audit of the LAS financial activity;

5.4.1.4. regularly informs the General Meeting, the Presidium, and the Senate of the LAS about the work done.

5.4.2. The Board of the LAS functions in accordance with the Regulation adopted by the LAS Senate. Members of the LAS Board are elected by the LAS Senate from Chairmen of the Divisions and Full Members. The Secretary General proposes the number of Members of the Board. The Senate elects a Deputy Secretary General (Chairperson of the Board) who performs the duties of the Secretary General in his or her absence. The Senate may include other LAS Full Members and Corresponding Members in the Board, including the elected LAS officials, with the deliberative vote.

5.5. The General Meeting of the LAS elects the Supervisory Council which, in accordance with the Regulation approved by the General Meeting of the LAS, becomes acquainted with the operation of the LAS and assesses its conformity with the LAS Charter and the Statute, follows the execution of decisions taken by the General Meetings, the Senate, the Presidium, and the Board of the LAS, performs other tasks

assigned to it by the General Meeting of the LAS, and supervises election of the LAS officials. The term of the Supervisory Council is 4 years.

5.6. Procedure for election of the LAS officials is as follows:

5.6.1. Only the citizens of the Republic of Latvia may be elected the President, Vice Presidents, the Secretary General, and the Chairperson of the LAS Fund.

5.6.2. The LAS Full Members may be elected the President, Vice Presidents, the Secretary General, the Secretary of Foreign Affairs and the Chairperson of the LAS Division. On the Division's recommendation, the duties of the Chairperson of the Division may also be temporarily fulfilled by a Corresponding Member upon approval of the LAS Senate.

5.6.3. All the LAS officials are elected and recalled at the General Meetings of the LAS under the following procedure:

5.6.3.1. Candidates for the President of the LAS may be nominated from the Full Members by all LAS Members (Full, Honorary, Foreign, and Corresponding Members) and Divisions of the LAS, or commissions formed by them. A nominator or his or her representative should provide motivated characterisation of the nominees in his or her application addressed to the Senate. The application should be submitted to the LAS Senate not later than 30 days before the General Meeting of the LAS, in which the election will take place. A candidate is deemed elected if he or she has received the majority of votes at the General Meeting, but not less than half of the votes cast by the LAS Members present. The elected President traditionally nominates candidates for the posts of Vice Presidents, the Secretary General, and other LAS officials approved at the General Meeting of the LAS. LAS officials are deemed elected if they have received more than half of the votes cast by the LAS Members present.

5.6.3.2. LAS officials may be recalled by the General Meeting of the LAS, if a motivated proposal is made by the LAS Senate or at least 25 Full and/or Corresponding Members (at least 10 Full Members should be among submitters of the proposal). The decision to include the question about recalling of a LAS official in the agenda of the regular or extraordinary General Meeting of the LAS is adopted by the Senate. Such recalling takes effect after the secret ballot of the General Meeting, if the recalling is supported by at least 2/3 of the LAS Members present and the General Meeting takes a decision on the term for election of a new official.

5.6.4. LAS Members who are elected to the posts of the LAS, as well as experts and other scientists who fulfil individual tasks assigned by the Academy, receive remuneration for this work. Remuneration for the elected LAS officials is specified and approved by the LAS Senate.

5.7. In order to promote development of interdisciplinary problems and mutual contacts among representatives of related sciences, the LAS Members join together in

Divisions of Sciences. Establishment, basic orientations, and name of the Division are approved by the General Meeting of the LAS.

5.7.1. The Division holds its own meetings or organises meetings of the LAS in order to:

5.7.1.1. develop national programmes, programmes of national importance, and other programmes and to discuss the course of their implementation;

5.7.1.2. solve interdisciplinary scientific problems;

5.7.1.3. hear scientific reports, reviews over scientific studies and activities which have been carried out with the support of the LAS or are topical for the development of the Latvian science, education, national economy, and culture;

5.7.1.4. give recommendations to the LAS and the Chairperson of the Division on necessary activities of the LAS.

5.7.2. Divisions of Sciences form permanent or interim sections, working groups, commissions, and other similar structures within their framework which unite LAS Members and other scientists to carry out concrete programmes, projects, grants and other scientifically topical tasks. Scientific activities of such a structure are managed by a LAS Member whose nomination is approved by the Division. On the LAS Senate's recommendation, the said structures may acquire the rights of a legal entity as scientific institutions by registering the foundation documents under the procedure provided by the law.

5.7.3. To ensure the work of such structures, Divisions of Sciences of the LAS may, in addition to the LAS Members, attract experts from among scientists and specialists. The experts are elected at the meetings of the Divisions.

5.7.4. Each Division elects the Chairperson in secret ballot who is approved by the General Meeting of the LAS in secret ballot. The Chairperson of the Division, or a Member of the Division authorised by him or her participates in all meetings of sections and working groups of the relevant Division, thus promoting exchange of information and its assessment. By decision of the Senate, Chairpersons of the Divisions are assigned authority of the Vice President within the competence of their Divisions.

5.7.5. The Division itself adopts and approves a concrete programme of activities and regulations of the Division in order to achieve the operational objectives and basic orientations of the LAS.

5.8. The LAS may be related to autonomous scientific institutions (legal entities) which, in accordance with Paragraph 5.7.2, are founded under the procedure established by the law, or whose cooperation with the LAS is determined by mutual agreement (agreement of association or other).

5.8.1. The agreement should provide for mutual obligations and forms of cooperation between the LAS and the scientific institution, i.e. the use of the name of the LAS by the

associated institution, participation of the LAS in the assessment of the main research directions of this institutions, and representation of interests of the institute of the LAS before the supreme authorities of the Republic of Latvia.

5.8.2. The associated scientific unions and societies referred to in Paragraph 2.1.8, as well as individual groups of scientists may function under the authority of the LAS or its Divisions.

5.9. Museums and scientific collections and archives which require special preservation may be hold or controlled by the LAS.

5.10. The LAS has permanent and temporary personnel, and the list and employment contracts of the relevant personnel are controlled by the Secretary General of the LAS and the Managing Department, a structural unit of the LAS (in accordance with the Regulation of the Managing Department approved by the LAS Senate). The list of the permanent personnel is prepared by the Secretary General of the LAS within the limits of the annual budget estimate approved by the LAS Senate.

Article 6. PROPERTY AND RESOURCES OF THE LAS

6.1. The property of the LAS may constitute land, other real estate, as well as movable property, intellectual property, cash, and securities in Latvia and abroad.

6.1.1. The LAS has in its possession fixed assets and other property, which has been given to it by public institutions, given by legal entities or individuals as a present or which it has acquired as a result of its activities or on other legal basis.

6.1.2. The LAS manages institutions and organisations which are necessary to ensure fulfilment of its functional and operational objectives. The LAS may also manage scientific institutions and organisations which secure functioning of directions of science important for Latvia, as well as functioning of new directions. Procedure for management of such structures is established by the LAS and by agreements signed with the institutions associated with the LAS.

6.2. Core funding necessary for operation of the LAS is subsidised from the State budget.

6.3. Additional budget necessary for operation of the LAS constitutes the resources which are obtained from the following:

- 6.3.1. contractual works and entrepreneurial activity;
- 6.3.2. property management;
- 6.3.3. donations and gifts;
- 6.3.4. other sources.

6.4. The LAS uses surplus income over expenditure for material and technical development and for formation of its assets. The rules for use of assets are approved by the LAS Senate.

6.5. Management of the LAS property is ensured by the Managing Department of the LAS which, according to Paragraph 5.4 of the Statute, is under the authority of the Secretary General of the LAS and of the Board of the LAS. The Secretary General reports to the LAS Senate about acquisition of additional property and resources.

6.6. The Supervisory Council exercises control over management of the property and use of resources of the LAS in accordance with Paragraph 5.5 of the present Statute.

Article 7. PROCEDURE FOR MAKING AMENDMENTS TO THE STATUTE

7.1. Amendments to the Statute may be proposed by the Senate, the Presidium, LAS Divisions, and the General Meeting of the LAS.

The Presidium of the LAS forms a commission for aggregation of the submitted proposals by decision of the Senate. After receipt of conclusion of the commission, the LAS Senate takes a decision to refer the submitted amendments to the General Meeting. The LAS Full Members participate in the General Meeting and vote for or against amendments to the LAS Charter, and amendments are adopted, provided more than half of the total number of Members present has supported the relevant amendments.

7.2. Draft amendments to the Statute are put for voting on a motivated initiative of the Senate or 25 Full Members of the LAS. The draft amendments should be submitted to the LAS Members for discussion or announced in the press at least 14 days before voting at the General Meeting.

7.3. Results of the voting are fixed by a polling commission and their correctness is checked by the Supervisory Council of the LAS which draws up a common statement that should be signed by all members of the polling commission, no less than 2/3 of the Members of the Supervisory Council, as well as by the President and the Secretary General of the LAS. The amendments to the Statute take effect 10 days after signing of the said statement.

National Research Programme “Economic Transformation, Smart Growth, Governance and Legal Framework for Sustainable Development of the State and Society – A New Approach to the Creation of a Sustainable Learning Community (EKOSOC-LV)”: Accomplishment in Stage 3

The National Research Programme EKOSOC-LV reached the most active phase in 2016. The projects were examined by an independent international expert commission, and its work was positively rated. In getting familiarised with the performance of the programme during its 3rd period, it has to be noted that an important change occurred during its implementation; as a result, ten projects were combined into thematic blocks according to the principle 3+1.



Projects of the thematic blocks investigate the spatial development of Latvia, the country's economic competitiveness, and the development of Latvia's society; the legal framework of all the blocks was examined by the project “Development of a Model for Increasing the Effectiveness of the Legal Framework for Sustainable Economic Transformation”.

Following is a more detailed description of researchers' performance in each of the thematic blocks.

Economy – the potential of innovation and the competitiveness of industries

Research on the national economy and the development of recommendations for its transformation is a great challenge; in order to perform this, themes have to be narrowed or accents specified. The projects combined into the economic block research opportunities for establishing cooperation systems among the public sector, science, the education system and business and ways of promoting innovation and entrepreneurship. Solutions are sought for, how to foster restructuring of Latvia's national economy within the priorities set by the Smart Specialisation Strategy. An essential indicator of the performance of the national economy is its competitiveness in foreign markets. The economic block projects of EKOSOC-LV develop a theoretical justification and practical solutions for enhancing and increasing the competitiveness of Latvian enterprises in foreign markets.

A project managed by *Dr.oec. Natalja Lāce*, professor of Rīga Technical University, focused on the development of innovation and entrepreneurship in Latvia in compliance with the Smart Specialisation Strategy.

The research on the innovation potential of Latvian enterprises involved an analysis of data on 144 288 Latvian enterprises as of March 2016. The enterprises were divided

by region (119 administrative territories: 110 municipalities and 9 republican cities). The data analysis employed an Eurostat indicator for “technology intensity” on the scale of high, medium high, medium low, and low technology, while the knowledge intensity level of service enterprises was expressed on the scale of high and low. It was found that the regions with the highest business activity demonstrated the highest innovation level as well. An analysis of the priorities set by Latvia’s Smart Specialisation Strategy in respect of the bioeconomy sector and innovation potential in sustainable agriculture showed that the innovation level in the bioeconomy sector in Latvia was low. At present, mostly primary production with a low innovation level prevails in the sector. Despite the fact that promoting an innovative bioeconomy was prioritised in national policy documents, support for innovation in the fields of both higher education and science and technological development in the bioeconomy sector was low and insufficient.

Of Latvian farmers surveyed, 40% believed that cooperation with the scientific research sector was essential, yet almost a half of them thought that the sector did not work on tackling sustainable agriculture problems, and only 8% considered cooperation with scientists to be successful. Agricultural sector enterprises focus on profit-making opportunities, yet higher profits involve the creation of new techniques, new technologies and new product distribution networks, in which scientists, researchers as well as the public that shapes the demand for agricultural goods have to be engaged more actively. At present, support payments, to a great extent, provide profits.

An important component of innovative economic growth is enterprises’ investment in intangible assets that can generate revenue in future. This may involve costs related to enterprise research and development, concessions, patents, trademarks etc. Researchers have found that in Latvia investments of less than 10% in intangible assets by enterprises make no effect on the enterprises’ profit margins, while a share of intangible assets that is higher than 10% considerably increases their profit margins — every extra 1%-point of investment increases the profit margin by 0.74%-point with regard to turnover profitability.

Innovation development is impossible without technology transfer. However, to do this, any enterprise has to choose an optimum technology transfer model. Linear technology transfer models are applicable if universities play the leading role in this process. Non-linear sequential parallel models may be applied if the determining role in technology transfer is played by old and stable enterprises. Feedback models may be applied if the leading role in technology transfer belongs to new enterprises: spin-offs and start-ups. To identify hindering factors for innovation and cooperation between universities and industries, EKOSOC-LV conducted in-depth interviews with business representatives. The interviews revealed that the motivation and initiative of the business sector to invest funds in research made by universities were low.

A project managed by LAS Full Member *Dr.habil.oec.* **Regimījs Počs**, “Studying the Competitiveness of the Latvian Companies on External Markets and Provision of

Proposals for its Strengthening” continued the work on methodological issues regarding assessing international competitiveness. The project examined Latvia’s competitiveness in the following aspects: electrical power supply, logistics, Internet marketing, and health care.

At macro-level, competitiveness analyses involved such indicators broken down by industry and product group as export orientation, value added per output unit, labour productivity, value added per unit of labour, value added as a % of labour cost, unit labour cost, the revealed comparative advantage (RCA) index etc., while analyses of particular industries and enterprises employed more detailed indicator systems and methods.

At present, the research allows drawing up a number of conclusions. It was found in the research that Lithuania performed better in terms of value added of exports than Latvia and Estonia, its exports as a % of GDP was also relatively higher. However, Estonia demonstrated better performance in high technology industries. Imports of Estonia as a % of GDP were higher.

The analysis of the railway sector of Latvia involved calculations of quantitative indicators of the competitiveness of the railway sector’s enterprises, which were based on the classical Porter’s model, the so-called Diamond model; Latvia’s sector was compared with competing railroads in the Baltic Sea region — those of Lithuania, Estonia, and Russia. It was found that in all the years analysed Russia had strong advantages, as a business cluster was established in its railway industry, which ensured harmonised functioning of supply chains and cheaper factors of production.

An analysis of the competitiveness of road transport and seaports was performed as well. The research has shown that in order to enhance the competitiveness of seaports, it is necessary: to increase the amounts of container and *Roll on/Roll off* freight and reduce dependence on commodity re-exports to the West; to modernise the complexes of seaports and cargo terminals, providing an appropriate access road infrastructure; to facilitate the entry of international logistics enterprises and cargo terminal operators in the seaports; to achieve closer cooperation among the seaports, railways, and other modes of transport; and to develop new passenger transport routes. It was concluded that a transit corridor for road transport was profitable, therefore it was useful to develop it.

The research performed an analysis of new scenarios employing a dynamic system model for identifying the competitiveness of power industry enterprises. The scenario analysis has brought the conclusion that the electricity price has to be set in a short-term with regard to variable costs, which would allow developing the power industry. Consequently, the industry could become competitive in the international market.

An analysis of data on health care competitiveness focused on identifying the factors hindering the domestic and foreign competitiveness of it.

The research found that Latvia, compared with a number of European countries, lagged behind very much with respect to a range of indicators of health care, such as the population death rate and the sickness rate as well as geographical distribution and availability of health care resources and labour productivity. At the same time, large investments were made in new technologies in the health care system, which were not always exploited economically efficiently and sufficiently intensively.

The analysis done showed that public and private financial investment practices were typical of Latvia's health care system, at tertiary level in particular, as the system of co-payment existed, and any public sector service provider also produced commercial services. The analysis of Latvia's health care system revealed that there were several factors that contributed to the comparative advantages in international competitiveness: low wages and salaries and a high level of professional education. The health care system had serious human resource problems. A high proportion of doctors were at the pre-retirement age, which indicated the need to replace them, while the number of young generation doctors, including graduates, was insufficient. The insufficient number of doctors and their low wages and salaries made them work at several workplaces and in several job positions. One of the ways how to increase wages and salaries for doctors is to attract foreign patients. According to the research data, in general, health care institutions wished to engage in providing services to foreign clients, yet there was a range of obstacles within the system and outside it. For example, Latvia has not implemented all the necessary measures meeting international requirements, and it negatively influences the foreign competitiveness of Latvia's medical institutions and their information exchange. The most significant national-level problems, which deserve special attention, are as follows: the lack of a single evaluation system of health care quality and technologies, the unavailability of electronic medical data on patients, and the slow introduction of the national e-health programme.

SOCIAL DEVELOPMENT IN LATVIA: PROBLEMS AND TRENDS

A project managed by Professor *Dr.habil.oec. Juris Krūmiņš*, "Renewal of Society Through Reducing the Risk of Depopulation, Through Demographic Development and Strengthening Links with the Diaspora for the Transformation of the Latvian Economy" led to a conclusion that the demographic situation in Latvia, since the restoration of its independence, may be characterised by the indications of the second phase of demographic transition, yet it is possible that it could shift to the third phase owing to international migration, which is characterised by a higher proportion of individuals born abroad. The low birth rate, an increase in life expectancy and emigration contributes to the aging of the population in Latvia. This influences the country's sustainable development. The surveyed residents of Latvia mentioned the following most important measures to be taken to improve the demographic situation: reduction of social inequality and improvement of the health care system. The surveyed residents pointed

out depopulation risks at local, regional, and national levels. In the opinion of four-fifths of the respondents, a further decrease in the population was a threat to the economic development of their village, rural territory, city, region, and the entire country. Not only national-level demographic policy measures but also local government initiatives were important. According to the respondents, the most important task to be performed to improve the demographic situation was financial assistance aimed at increasing the birth rate. However, with regard to tackling demographic problems, the residents often relied on support from their family and on themselves. An opinion prevailed that the economic growth was possible if stabilising the current number of residents.

A project “Reflecting on Values and Social Agency During Social and Economic Change”, managed by *Dr.sc.inf. Sergejs Kruks*, professor of Rīga Stradiņš University, examined interaction between the society and public administration.

The scientists have made an in-depth analysis of Latvia’s policies during its independence period, when examining social development processes. The daily views of Latvia’s residents about the country indicated the low rating of state administration institutions and of the political process.

However, an analysis of the speeches made by presidents of the Republic of Latvia on 18 November (2004–2016) showed that the key obstacle in the development of the country was insufficient socialisation of individuals, which contributed to social disunity and hindered social interaction in tackling common problems. A research study of psychologists involved in the EKOSOC-LV research confirmed that the low socialisation was directly associated with individual anomy as well: the less people participate in social activities and the more uniform the activities, the higher are individual anomy indicators. According to psychologists, anomy is an individual psychological condition that is characterised by failure to perceive social norms, social isolation, and the feeling of senselessness.

Social and political transformations in Latvia in the post-crisis period were investigated by *Dr.sc.pol. Feliciana Rajevska*. One of the objectives of her project was to examine the ability and opportunities of social groups subjected to high risk of social exclusion, particularly families with children, individuals with functional impairments, at local (municipal) and regional levels, taking into consideration socially and economically important fields: education, employment, social and health care. The researchers referred to *inclusive labour relationships* as one of the most important factors of sustainable employment for youth. A survey of both youth and employers revealed that the situation of the youth regarding labour relationships was influenced by a complex of conditions: the culture of relationships at the job, the work environment, technologies, the level of wages or salaries, the individual capacity of the youth, the youth’s goals and interests against employers’ priorities and requirements. The research allowed concluding that there existed work culture that was oriented towards instant profit making rather than long-term investment in human resources. The surveyed

employers were only partly oriented towards making investments in the skills and knowledge of the youth as prospective employees. In general, there was a quite explicit imbalance of the goals and interests between the youth and employers, which required considerable change. Positive labour relationships have to be based on mutual respect, honesty, and responsibility. Balancing the work life and private life is in the interest of not only employees but also employers. Women, too, as an important part of the labour market deserve special attention of the government, particularly when returning to the labour market after their childcare leave. The researchers have found that social problems were a strong factor for labour relationships, which negatively influenced not only the employability of women after their childcare leave but also provoked discriminatory attitudes and intolerance in the work environment. Enterprises that observe corporate social responsibility less frequently see problems concerning employability of a female employee having a child.

One of the ways how to tackle complicated interaction processes in society is social innovation. During discussions at different levels, opinions are often expressed that positive changes in society require a change in the way of thinking of individuals. According to one of the definitions, social innovation is the form of thinking that, first, makes individuals think of the common public interests and development, and second, of one's personal benefit. It tends towards cooperation rather than competition. The possibilities to apply this approach are investigated in the project managed by *Dr.paed. Karine Oganisjana* and *Dr.oec. Inna Dovladbekova*, "Involvement of the Society in Social Innovation for Providing Sustainable Development of Latvia". When identifying the factors that motivated individuals to engage in social innovation processes, three factor groups were distinguished: 1) internal personal factors: empathy, personal gains, self-confidence, experience, and proactivity; 2) inter-personal factors: social consciousness, opportunities for creation in joint efforts, active dialogue with involved parties, mutual learning, and social responsibility; 3) external factors: support, recognition, inspiring examples, and participation opportunities.

Spatial development

For several years, there have been discussions in Latvia's public and political arena on the role of Latvia's rural areas and cities in the context of the country's spatial development. Centralisation trends in the country are unavoidable in a situation of fast decrease of the number of residents. However, researchers of the NRP EKOSOC-LV preferred focusing particularly on the space beyond the larger cities. One of the research projects of the NRP focuses "Processes of Latvian Rural and Regional Development and Possibilities Within the Framework of Economy" (project 5.2.3, managed by LAS Full Member *Dr.habil.oec. Baiba Rivža*). Experts of diverse industries were involved in the project: entrepreneurs, local government officials, scientists, representatives of state authorities, etc. The project performed an expert evaluation of the hierarchy of

factors influencing the formation and development of the smart specialisation for each region of Latvia. Processing the data, the project yielded analytical ratings of each region's development priority based on the experts' individual ratings and significance assigned to the criteria. The acquired results of this analysis determined scenarios for the formation and development of smart specialisation for Latvia's regions. For Zemgale, Kurzeme, and Pierīga, it was smart economy, for Latgale — smart individuals, and for Vidzeme — smart governance.

Another important research result of the project is the developed municipality performance index that allows making illustrative cartographic aids and evaluating the performance of a municipality in the following domains: smart governance, smart economy, smart resources, and smart individuals. It is also important to examine the processes in the cultural environment, the urbanisation process, and the process of preservation of environmental diversity in the context of balanced development of Latvia along with the processes taking place in the rural space of Latvia. The abovementioned problems are investigated by *Dr.oec. Agita Liviņa*, professor of Vidzeme University of Applied Sciences (project 5.2.8). The research aim of the project is to examine the processes of development and degradation of the cultural environment, the process of preservation of and decrease in environmental diversity, the depopulation process in Latvia as a whole, the effect of the urbanisation process in Pierīga on the balanced development of Latvia. Sustainable development policy makers of Latvia were familiarised with the research findings, and the knowledge acquired in the project was suggested to be integrated into strategic policy documents of the regions and municipalities.

A project “Impact of Social Awareness Changes on Sustainable Provision of Ecosystem Services”, managed by *Dr.biol. Inese Kokina*, professor of Daugavpils University, focuses on the lifestyle and motivation of individuals living in specially protected nature areas of Latvia. The researchers perform an in-depth analysis of the daily life of individuals residing in specially protected nature areas and examine the individuals' motivation to continue living in the areas where economic activity is limited. The researchers also have designed a conception of social consciousness characteristic of such areas and have developed a model for the sustainable harmonisation of social consciousness. The dimensions of social consciousness selected for the research are as follows: emotional experience, values, and behaviour. The currently developed social consciousness model has been adapted to social environment specific features in Slitere National Park, which manifest themselves in the so-called island mentality characteristic of the local social groups, the psychological passivity of the local public and the dialectic of self-activity, the exacerbated biophilic perception and the focus placed on the social role of catalysing personalities. The project develops proposals to harmonise the consciousness of the local community with its behaviour for the purpose of sustainable use of ecosystem services. As an example, the eco-technological paradigm

can be mentioned, which stimulates the public interest through by demonstrating the great opportunities for the use of ecosystem services, new employment opportunities in the usual and comprehensible environment, and a new psychological perspective for the development of an environment stimulating the sense of self-identity (i.e. “own environment”).

A project “Elaboration of a Sustainable Model for Increasing the Effectiveness of the Legal Framework for Economic Transformation” is managed by *Dr.iur. Ārija Meikališa*, professor of the University of Latvia. The project identified and analysed problems in the legal framework for national economy and developed proposals for problem solving. The project prepared comments for legal texts, i.e. explanatory reviews of the legal provisions related to the researched field. The project made an overview of court practices, case studies, identified imperfections in the existing court practices and came up with proposals, where it was possible and useful. All the researchers analysed the valid legal provisions and their content, made critical remarks as well as recommendations for perfection, which were integrated into research papers as well as reported at conferences. In view of the public availability of the research papers and the broad participation of responsible individuals at conferences, the recommendations were made known to the individuals engaged in the legislative process. Lawyers, candidates for prosecutor positions, higher court justices and candidates for justice positions heard lectures on the following topics: a constitutional complaint at the Constitutional Court, property-related issues in criminal procedure, insurance contracts, compulsory civil liability insurance of owners of motor vehicles, ways of termination of pre-trial proceedings etc. Therefore, one can say that the vision of the most well-known lawyers of Latvia who are engaged in the research programme with regard to the legal framework for the economy is directly passed on to professionals and integrated into daily court practices.

Upon completing Stage 3 of the NRP EKOSOC-LV, all the tasks set were reached with considerable success. Thirty research papers were published, which were indexed by databases for original research papers – SCOPUS and ScienceDirect (Elsevier), as well as 72 original scientific articles in journals included in the databases ERIH (A and B), EBSCO, CEEOL, Web of Science (Thomson Reuters). Five peer-reviewed scientific monographs were published. Ten doctoral dissertations and 36 master’s papers were defended. The programme’s researchers participated in 272 conferences. The amount of funding attracted under the programme during Stage 3 totalled EUR 20 770, which indicated great interest of entrepreneurs and local governments in purchasing the intellectual property created by the programme’s researchers. The work on the VPP EKOSOC-LV ends on 31 July 2018. Upon completing the programme, its researchers are going to participate in the IV World Congress of Latvian Scientists and II Congress of Latvian Historians to be held in Riga and other cities of Latvia on 18–21 June 2018. At the Congress, it is planned to present a VPP EKOSOC_LV monograph dedicated

to the 100th anniversary of the Republic of Latvia, highlighting the contribution of scientists to smart development in Latvia.

Programme manager:
Dr.habil.oec. Baiba Rivža,
full member of the LAS

National Research Programme “Letonics”

As from the second half of 2005, the National Research Programme “Letonics” (Latvian Studies) is related to the Latvian Academy of Sciences. Chairperson of the LAS Senate, LAS Full Member Jānis Stradiņš was the head of the first two programmes (“Letonics: Studies of History, Language and Culture”, 2005–2009 and “National Identity (Language, History of Latvia, Culture, and Human Safety)”, 2010–2013). Head of the ongoing National Research Programme “Letonics: History of Latvia, Languages, Culture, Values” is Ojārs Spārītis, president of the Latvian Academy of Sciences. The aim of the programme is to facilitate the existence and development of Letonics as a stable interdisciplinary complex research sector in Latvia and integration thereof into the world science, to carry out fundamental and applied research, including interdisciplinary research, through development of new, scientifically grounded knowledge on Letonics topics, and to make them publicly available.

Scientific and economic aspects in Letonics research are related to the necessity to perform a systematic analysis, in an international context and using new methods, of the history of Latvia, Latvian language, the impact of languages of minorities on the Latvian linguistic space, cultural processes in terms of shaping national and European identity, conservation of traditions in the innovative environment, changing and stable values, development of culture and self-awareness of different social groups.

Knowledge obtained through Letonics research provides a practical basis for economic development by developing human capital and symbolic capital resources, strengthening democratic and ethical values, citizenship, national responsibility, objective understanding of history and reasons why learning Latvian language is significant for social cohesion.

Research developments focus on identifying 20th century problems in history, language, literature, arts, and other cultural fields, since the 20th century has been the least researched century so far.

In the 3rd stage of the National Research Programme, which lasted from 1 January 2016 until 31 December 2016, intensive work was performed concerning all the planned tasks. Moreover, the funding provided for the year 2016 was only 78% of the target funding, which has caused a significant delay in outcome disclosure, namely, book publishing.

The work on the National Research Programme “Letonics: History of Latvia, Languages, Culture, Values” is organised through six projects led by LAS full members: Ojārs Spārītis, Tālav Jundzis, Ilga Jansone, Maija Kūle, Benedikts Kalnačs, and Guntis Zemītis.

Project No. 1 “Latvia’s Centenary: an Integrative View of the History, Language, and Culture (in the international context)” (leader T. Jundzis). Scientists of the LAS Baltic Centre for Strategic Studies, as well as all the authors, translators, editors, etc., of the publication *Latvia and Latvians* are involved in project implementation.

During the reference period, the main scope of work was associated with development of a two-volume edition of the collection of scholarly papers *Latvia and Latvians*, which will be published in English, Latvian, and Russian. The structure of the volumes of this collection was created according to the concept of this edition. The first volume will include articles about Latvians and Latvia in the modern world (Part 1), and articles about contemporary Latvian culture (Part 2). The second volume will include articles about Latvians from the ancient times until the establishment of the State (Part 3), as well as articles about the Latvian State during the period from 1918 to 1999 (Part 4). At the end of the reference period, all 44 articles were received from their authors. Out of these 28 articles have been translated and edited in English and 13 articles in Russian. The submitted scholarly articles give an adequate insight into significant Latvian history and contemporary matters. By virtue of these articles we were able to discover new peculiarities and details of studies of Latvian history and contemporary issues. Moreover, authors have tried to resolve the contemplated issues within the European and global context. The upcoming collection will undoubtedly be the first most voluminous and most modern summary about Latvia as a country and its people, which will bring the latest Latvian scientists’ discoveries and modern approaches to the attention of the international community.

This study is going to be a contribution of all Latvian humanities in honour of Latvia’s centenary, it will serve as a source of information about Latvia, its land and people. Along with the work on the edition *Latvia and Latvians*, the 25th anniversary of the restoration of independence of the Baltic States was celebrated with a wide range of activities.

Project No. 2 “Latvian History: Cultural-Historical Environment and Socio-political Processes in the Context of the Baltic Sea Region” (leader G. Zemītis). Researchers of the Institute of Latvian History, University of Latvia (UL), as well as a small group of historians of the Institute of Philosophy and Sociology, UL, are involved in project implementation.

Historians have worked on five topics: “Socio-political Processes and Historical Studies in Latvia within a 100-year Period: Stages, Assessments, Prospects in the European Context”; “Aspects of Interethnic Relations in Latvian History”; “Contribution of Courland Society for Literature and Art to the Study of Latvian History”; “Interdisciplinary Research on Cultural-Historical Heritage and Environment”, and “Occupations and Annexation of Latvia in 1940”. These research topics suggest new discourses regarding the view on Latvian history, as well as new methods used for

acquisition of knowledge about historical events, and cooperation among scholars of the Baltic Sea Region. The published articles also addressed methodological issues crucial for this branch of science and provided assessment of the history of the branch of science, etc.

Two monographs were published: one by an archaeologist R. Brūža *Tuvcīņas ieroči 14.–16. gs. Latvijā* (Close Combat Weapons of 14th–16th Centuries in Latvia) and the other one by historians E. Evarts and J. Pavlovičs *Ikdienas dzīve Latvijā nacistiskās Vācijas okupācijas laikā 1941–1945* (Everyday Life in Latvia During the Occupation Period by Nazi Germany in 1941–1945). *Jauno vēsturnieku zinātnisko lasījumu rakstu krājums* (Collection of Young Historians' Scholarly Article Readings) and a Collection of Abstracts of Scientific Readings dedicated to the 120th Anniversary of the All-Russian Archaeology Congress were placed into the repository of the University of Latvia. The XXIX issue of *Arheoloģija un etnogrāfija* (Archaeology and Ethnography) edition was published.

A monograph by A. Jansone *Rucavnieku apģērbs cauri laikiem* (Rucava Inhabitants' Clothing Through Time) and Ē. Jēkabsons' *Latvijas – ASV attiecības 1918.–1922. gadā* (Latvian – USA relations 1918–1922) currently are in the publishing house, whereas a collaborative work by A. Karlsona, I. Korsaka, R. Siliņa-Piņķe — a collection of sources with scholarly commentaries *Krāsošana ar augu krāsvielām: baltvācieši Marta Bīlenšteina un latviešu nemateriālais kultūras mantojums* (Dyeing with Vegetable Dyes: the Baltic German Marta Bīlenšteina and Latvian Intangible Cultural Heritage) and a collection of documents *Nacionālkomunisms Latvijā 1956.–1962. gadā* (Latvian National Communism in 1956–1962) by Dz. Ērglis and A. Žvinklis are ready for publishing. Work on the publication *Latvijas 100 gadu hronika* (Latvian 100-year Chronicle) is almost finished. Work on the chapters of a multi-authored monograph *Latvijas okupācija un sovetizācija (1940–1941): vēsturiskie un starptautiskie tiesiskie aspekti* (Latvian Occupation and Sovietisation (1940–1941): Historical and International Legal Aspects) (by I. Feldmanis, A. Stranga, A. Zunda, J. Taurēns, I. Butulis, Ē. Jēkabsons) was carried out by analysing the most important problems in terms of source studies and historiography.

The stocks of the Repository of Archaeological Material (RAM) and Repository of Ethnographic Material (REM) were complemented and inventoried. Newly obtained REM stock items (350 units) were inventoried and processed by entering data in the electronic register. Selection of photo negatives by themes was performed, comments were added, file post-processing for digitisation of photo negative sets (287 neg.) of the Repository of Ethnographic Material was conducted on the topic "Tautas nami un kultūras nami Latvijas laukos un mazpilsētās" ("Community Centres and Culture Centres in the Latvian Countryside and Small Towns"). Six new scientific reports and 15 source document materials were added to the RAM, and 30 new units of professional literature were added to the RAM library.

Four scientific readings were held in cooperation with the Library of the University of Latvia and the Academic Library of the University of Latvia:

"Forever Young Stone Age. In Honour of Archaeologist, LAS Corresponding Member, *Dr. habil. hist.*, State Emeritus Scientist Ilze Biruta Loze's 80th Birthday";

"Livonian Historical Evidence in Stone Castles and Chronicles. In Honour of LAS Full Member Prof. *Dr. habil. hist.* Ēvalds Mugurēvičs' 85th Birthday";

Scientific Readings dedicated to the 120th Anniversary of the 10th All-Russian Archaeology Congress;

Scientific Readings on "The 80th Anniversary of the Institute of Latvian History".

Project No. 3 "Latvian Language Studies in the Context of the 21st Century Science" (leader I. Jansone). Researchers of the Latvian Language Institute of the UL, Liepāja University, Ventspils University College, Faculty of Humanities of the UL, and the Institute of Mathematics and Computer Science of the UL are involved in project implementation.

Under the project, studies in dialectology (development of atlases and dictionaries), onomastics, lexicography, grammar, language history, children's language have been continued. The link between Latvian research and processes occurring in the Baltic Studies and Indo-European Studies is created through the work on morphology of the *Atlas of the European Languages* (Atlas Linguarum Europae), *Atlas of the Baltic Languages*, and *Dialectal Atlas of Latvian Languages*. For the *Atlas of the European Languages* maps and comments, total size 10 author's sheets, were edited, for the *Atlas of the Baltic Languages* map design and development of comments in Latvian and Lithuanian was finished. The text of the *Dialectal Atlas of Latvian Language* was fully completed. Also, the S-Se volume of *Latvijas vietvārdu vārdnīca* (Latvian Dictionary of Toponyms) needs only manuscript editing. Work on the two-volume *Kalnienas izloksnes vārdnīca* (Dictionary of Kalniena dialect), as well as *Nīcas izloksnes vārdnīca* (Dictionary of the Nīca Dialect), Volume 1, is also completed. On-line versions of *Mūsdienu latviešu valodas vārdnīca* (Dictionary of Contemporary Latvian Language) and *Latviešu valodas vārdnīca* (Latvian Language Dictionary) (www.tezaurs.lv/mlvv and www.tezaurs.lv/lvv) were updated. The automatic marking system was tested to improve e-version administration, display and search capabilities, creating a single Latvian e-lexicography software system. A monograph *Jāņa Endzelīna lingvistiskie uzskati* (Jānis Endzelīns' Linguistic Opinions) by Daina Nītiņa and a monograph *Lietvārds latviešu valodā* (Noun in Latvian Language) by Gunta Smiltneiece were published. A selection of Maigone Beitīņa's works *Latvietis raksta latviski* (A Latvian Writes in Latvian) was published as an electronic edition. A selection of Aina Blinkena's (Volume 2) and Velta Rūķe-Draviņa's works is ready for publication. Traditional scientific conferences were within the project: A Conference in Commemoration of

Jānis Endzelīns' 143th birthday (February, Latvian Language Institute of the University of Latvia) and "The Word: Aspects of Research" (December, Liepāja University).

Project No. 4 "Culture and Identities in Latvia: Heritage and Contemporary Practice" (leader B. Kalnačs). Researchers of the Institute of Literature, Folklore, and Art (UL), Faculty of Humanities (UL), Liepāja University, and Daugavpils University are involved in project implementation.

Within the project, research in the history of literature, folklore studies, musicology has been continued. In folklore studies work on *Latviešu tautasdziesmas* (Latvian Folk Songs) edition, Volume 11 *Kāzu dziesmas* (Wedding Songs), and a monograph by Aldis Pūtelis *Latviešu mitoloģijas meklējumi. Priekšstatu par latviešu mitoloģiju veidošanās vēsture* (Quest of the Latvian Mythology. History of formation of the perception of Latvian mythology) is almost finished. In the literary theory, work on the following monographs has been fully or almost completed: Maija Burima *Hibrīdteksti latviešu literatūrā* (Hybrid Texts in Latvian Literature), Valentīns Lukaševičs *Tautas un kultūras Latgalē* (Latgalian People and Cultures), Alīna Romanovska *A. Austriņa dzīves un jaunrades krustpunkti* (A. Austriņš's Life and Work Crossing Points), Elīna Vasiljeva *Ebreju teksts latviešu literatūrā* (The Hebrew Text in Latvian Literature), Ingrīda Kupšāne *Telpa, laiks, cilvēks Gunara Janovska prozā* (Space, Time, Man in Gunars Janovskis' Prose), Rudīte Rinkēviča *Rīga – Latvija – Eiropa mūsdienų latviešu bērnu prozā* (Rīga – Latvia – Europe in Contemporary Latvian Children's Prose), Sandra Meškova *Anita Liepa: dzīves raksti* (Anita Liepa: Life Stories), Inese Valtere *Augusta Saulieša proza Eiropas literatūras kontekstā* (Augusts Saulietis' Prose in the Context of European Literature), Žans Badins *Latvija 20. gadsimta krievu literatūrā (1901–1940)* (Latvia in the 20th Century Russian Literature (1901–1940)), Māra Grudule *Latviešu dzejas sākotne 16. un 17. gadsimta sākuma kultūrvēsturiskos kontekstos* (Origins of Latvian Poetry in the Cultural and Historical Contexts of the Early 16th and 17th Centuries), a multi-authored monograph *Gothards Frīdrihs Stenders un apgaismība Baltijā Eiropas kontekstā* (Gothards Frīdrihs Stenders and Enlightenment in the Baltic States in the European Context), Zigrīda Frīde *Latviešu literatūra 19. gadsimtā* (Latvian Literature in the 19th Century), Gundega Grīnuma *Rainis un Aspazija Kastanjolā. Jaunatkārti tuvplānā* (Rainis and Aspazija in Castagnola. Newly Discovered Close-ups), Inguna Daukste-Silasproģe. *Otrpus Baltijas jūrai Zviedrijā. Latviešu bēgļu izjūtu un pieredzes dokumentējums literārajos tekstos* (On the Other Side of the Baltic Sea in Sweden. Documentation of Latvian Refugees' Feelings and Experience in Literary Texts), etc.

Also, in musicology and theatre studies work on four monographs almost has been finished: Arnolds Klotiņš *Mūzika pēckara staļinismā. Latvijas mūzikas dzīve no 1944. līdz 1953. gadam* (Music in the Postwar Stalinism. Latvian Musical Life from 1944 till 1953), Ilze Liepiņa *16. gadsimta mūzika Latvijā* (Latvian Music of the 16th Century),

multi-authored monograph *21. gadsimta teātris Latvijā* (Latvian Theatre of the 21st Century), *Vēsmā Lēvalde Klasika un teksts: Oļģerta Krodera interpretācija* (*Classics and Text: Oļģerts Kroders' Interpretation*).

Project No. 5 "Identification and Update of Latvian Architectural and Artistic Heritage" (leader O. Spārītis). Art historians of the Institute of Art History of the Art Academy of Latvia, Rīga Technical University, and Latvian Academy of Sciences are involved in project implementation.

Work on the project focused on studies of visual and plastic arts, as well as of architecture. Anna Ancāne's monograph *Rīgas arhitektūra un pilsēt būvniecība 17. gadsimta otrajā pusē* (Architecture and Urban Planning of Rīga in the Mid-17th Century) was published. Jānis Krastiņš' monograph *Eiropas jūgendstila ceļš* (European Art Nouveau Route) is almost finished. It is intended as a fairly comprehensive assessment of architecture at the European centres of Art Nouveau, revising traditional stereotypes and significantly expanding analytical and geographical coverage of current topic circulation by including the architectural heritage of Latvian Art Nouveau therein. The study on the life and work of the painter Miervaldis Ķemers, student of Vilhelms Purvītis, by Ojārs Spārītis is also almost completed. The monograph will be based on the decoded diaries of M. Ķemers'.

Project No. 6 "Value Aspects in Letonics" (leader M. Kūle). Researchers of the Institute of Philosophy and Sociology (UL), Latvian Academy of Culture and Rēzekne Academy of Technologies are involved in project implementation.

In the project stage 3 the researchers continued work on the study on philosophical questions regarding axiology, addressing the topic "Value Aspects in Letonics". Significance of value research in Latvia and the European Union persists due to the topicality of geopolitical issues (flows of asylum seekers into Europe, migration of cultures, human rights concerns) and seeking awareness of the common European identity. Value issues still remain important in education, politics, and economics, society is seeking for values and identification thereof. Philosophers accept values not as given ones, but as those that were established, constituted in cultural processes, therefore, basing on their competence in the axiology subject matter, philosophers address issues of the sources of values, the status, historicity, contextuality, coherence with ethics, cultural archetypes, human feelings, social experience, etc., providing both theoretical and practical results. The tasks of stage 3 have been accomplished.

A multi-authored two-volume monograph *Vērtības: Latvija un Eiropa* (Values: Latvia and Europe) and Maija Kūle's monograph *Jābūtības vārdi. Eitīdes par zināšanām un vērtībām mūsdienu Latvijā* (Words of Obligation. Essays on Knowledge and Values of Contemporary Latvia) were published; work on the monograph *Herdera universs*

(Herder's Universe) still continues. Project researchers started working on value issues in religion studies. Two issues of the journal *Православие в Балтии* (Orthodoxy in the Baltic States) and one issue of the journal *Reliģiski-filozofiski raksti* (Religious-Philosophical Articles) were prepared and published. An anthology called *Reliģiskās idejas Latvijā* (Religious Ideas in Latvia) is ready for publication. Two studies in the series "Filosofijas lekcijas Rīgā" ("Lectures on Philosophy in Riga") have been published: M. Kastijo *Eiropas apgaismības liktenis* (Fate of the European Enlightenment) and M. Rufinga *Kants, Šopenhauers un Niče* (Kant, Schopenhauer and Nietzsche) were published.

A group of oral history researchers continued working on the edition *100 Latvijas gadi 100 dzīvesstāstos* (Latvia's 100 Years in 100 Life Stories). Work on the encyclopaedic edition of *Mūsu Latvija* (Our Latvia) still continues — 50 new questionnaires from the inhabitants of the ethnically diverse Daugavpils Municipality have been obtained, an area that has not been fully covered so far, as well as 25 questionnaires from the inhabitants of other municipalities.

Two bilingual DVDs for reference and study were developed and issued: I. Šuplinska, M. Justs *Viļakys ticiejumi* (Viļaka Legends). I. Šuplinska, M. Justs *Senī omoti Dagdā* (Ancient Crafts of Dagda).

Overall, in 2016, within the National Research Programme "Letonics: Latvian History, Language, Culture, Values", 22 articles were published that were included in the *SCOPUS* and the *Web of Science* databases, and eight articles were included in the *ERIH PLUS* editions. 40 scientific articles were published in other foreign editions, while the number of articles published in different Latvian editions is 176. 11 monographs, 16 collections of articles, and 4 serial editions came out. Seven scientific journals were published. 18 conferences and 27 seminars were organised, where 279 reports were delivered. 133 publications appeared in the Latvian press, reflecting programme implementation results and explaining particular Letonics questions. The audience had the opportunity to get acquainted with research results by virtue of 10 exhibitions and 65 TV and radio interviews.

Thanks to the programme's preparatory work, scientific institutions have managed to attract more than 45 000 euros.

Programme implementation allows development of such fields as history, linguistics, literary theory, folklore studies, study of art, philosophy, academic religion studies, etc. These studies can be used for tourist attraction to Latvia, upgrading available information about the tourist attraction facilities in the capital, towns and rural areas of the country. All of these studies can be applied in the education system, from primary schools to higher education and lifelong learning. They allow to attract funding for contractual works ordered by state and local government institutions. Interest in multi-authored works facilitates acquisition of co-financing for printed publications. Book distribution strategy aided by the National Library of Latvia and the Academic Library

of the University of Latvia makes it possible to get acquainted with the results of the NRP "Letonics" (i.e. printed and electronic books) in municipality and school libraries, as well as on the Internet. Statements made during international events and publications in foreign editions include the performed researches into international circulation.

Programme developments affect strengthening of values in the education system, lifelong learning, and value awareness in politics, media work, and public opinion, thus helping to make a choice in favour of European and democratic value priorities as our national fundamental principles.

Dr.habil.philol. Ilga Jansone,
full member of the LAS

PRESIDIUM, SENATE, BOARD, COUNCILS, COMMISSIONS OF THE LAS

Akadēmijas laukums 1, Rīga, LV 1050, Latvia

Tel.: (371) 67225361. Fax: (371) 67821153. E-mail: lza@lza.lv

President

Ojārs Spārītis

Secretary

Dace Govinčuka

SENATE

Chair **Jānis STRADIŅŠ**

Scientific Secretary **Alma EDŽIŅA**

Members of the Senate

Bruno Andersons

Jānis Kloviņš

Leonīds Ribickis

Mārcis Auziņš

Tatjana Koķe

Baiba Rivža

Juris Borzovs

Andrejs Krasņikovs

Andrejs Siliņš

Andrejs Ērglis

Maija Kūle

Ojārs Spārītis

Ilgā Jansone

Dace Markus

Jānis Spīgulis

Tālavš Jundzis

Indriķis Muižnieks

Andris Šternbergs

Ivars Kalviņš

Modra Murovska

Pēteris Trapencieris

Raita Karnīte

Īzaks Rašals

Guntis Zemītis

Honorary Members of the Senate:

Elmārs Grēns

Tālis Millers

PRESIDIUM

President

Ojārs SPĀRĪTIS

Vice President

Andrejs KRASŅIKOVŠ

Vice President

Andrejs ĒRGLIS

Chair of the Senate **Jānis STRADIŅŠ**

Secretary General **Andrejs SILIŅŠ**

Foreign Affairs Secretary **Tālavš 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 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**

BOARD

Chair **Andrejs SILIŅŠ**, *Secretary General*

Vice Chair **Baiba RIVŽA**, *Chair of the Division of Agriculture and Forestry Sciences*

Member of the Board

Bruno ANDERSONS, *Chair of the Fund of the Academy*

INTERNATIONAL RELATIONS

Tel.: (371) 67227391, Fax.: (371) 67821153; E mail: int@lza.lv

Advisor to the President **Anita DRAVENIECE**

Acting Advisor to the President **Ilze TRAPENCIERE**

External Affairs Organiser **Kristaps BROKS**

PUBLIC RELATIONS

Ilze Stengrevica

Tel.: (371) 67223567; E mail: prese@lza.lv

SUPERVISORY COUNCIL

Chair **Juris KRŪMIŅŠ**

Members of the Council

Jurijs Dehtjars

Ārija Meikališa

Īzaks Rašals

Edīte Kaufmane

Andris Ozols

Nikolajs Sjakste

**JOURNAL LATVIJAS ZINĀTŅU AKADĒMIJAS VĒSTIS, A
/ PROCEEDINGS OF THE LATVIAN ACADEMY
OF SCIENCES, B**

Tel.: 67229830. Fax: 67821153. E mail: vestis@lza.lv; proceed@lza.lv
<http://www.lza.lv/vestis/vestis.htm>

Editor-in-charge **Arno JUNDZE**

Chair of the Editorial Advisory Board **Tālavš JUNDZIS**

Vice Chair of the Editorial Advisory Board **Īzaks RAŠALS**

Editorial staff of Section "A" (Social Sciences and Humanities)

Chair of the Editorial Board **Raita KARNĪTE**

Editorial staff of Section "B" (Natural, Exact and Applied Sciences)

Chair of the Editorial Board **Īzaks RAŠALS**

Editors

Antra LEGZDIŅA

Anastasija BRICE

COMMISSIONS, COUNCILS

State Commission of Scientific Qualification

Akadēmijas laukums 1, Rīga, LV 1050

Tel.: 67223931. Fax: 67821153. E-mail: alma@lza.lv

Chair **Ilga JANSONE**, full mem. LAS, *Dr.habil.philol.*

Vice Chair **Raimonds Valters**, full mem. LAS, *Dr.habil.chem.*

Scientific Secretary Alma EDŽIŅA, *Dr.chem.*

Council of State Emeritus Scientists

Akadēmijas laukums 1, Rīga, LV 1050

Tel.: 67224040. E-mail: emeritus@lza.lv

Chair **Baiba RIVŽA**, full mem. LAS, *Dr.habil.oec.*

Scientific Secretary **Baiba ĀDAMSONE**, *Dr.chem.*

Certification Centre, Latvian Academy of Sciences

Akadēmijas laukums 1, Rīga, LV 1050
Tel./fax: 67212807. E-mail: certcn@latnet.lv
<http://www.sertifikācijascentrs.lv/>

Director Imants MATĪSS, full mem. LAS, Dr.habil.sc.ing.

Baltic Centre for Strategic Studies, Latvian Academy of Sciences

Akadēmijas laukums 1, Rīga, LV 1050
Tel./fax: 67227555. E-mail: bspc@lza.lv

Director Tālav JUNDZIS, full mem. LAS, Dr.habil.sc.pol., Dr.iur.

Terminology Commission, Latvian Academy of Sciences

Akadēmijas laukums 1 -707, Rīga, LV 1050
E-mail: tk@lza.lv
<http://termini.lza.lv>

Chair Māris BALTIŅŠ, Dr.habil.med.

Centre for Science and Technology Studies, Latvian Academy of Sciences

Akadēmijas laukumā 1, Rīga, LV 1050
Tel.: 29331211. E-mail: jtk@lza.lv
http://www3.lza.lv/csts/ztpc_galv.htm

Head of the Centre Jānis KRISTAPSONS, cor.mem. LAS, Dr.phys.

Ethics Committee of the LAS and the Latvian Council of Science

Akadēmijas laukums 1, Rīga, LV 1050
Tel.: 29489249, E-mail: tjundzis@gmail.com

Head Tālav JUNDZIS, full mem. LAS, Dr.habil.sc.pol., Dr.iur.

SCIENTIFIC AND ORGANISATIONAL ACTIVITY OF THE LATVIAN ACADEMY OF SCIENCES

2016: THE YEAR IN SCIENCE

19 February 2016: the official opening of the Biopharmacy Centre of the Latvian Institute of Organic Synthesis in the presence of the representatives of universities and collaboration partners. The official opening was attended by the Speaker of the Saeima (Parliament of the Republic of Latvia) Ināra Mūrniece, Minister of Economics, and Deputy Prime Minister Arvils Ašeradens, and Minister of Education and Science Kārlis Šadurskis.

16–17 June 2016: the research team of the Institute of Mathematics and Computer Science of the University of Latvia lead by Professor Guntis Bārzdīņš, corresponding member of the Latvian Academy of Sciences, won the international competition “SemEval-2016” in San Diego (USA), among eleven world-recognised teams, with the improved version of the C6.0 algorithm adjusted to derivation of the AMR (Abstract Meaning Representation) from the natural English language text.

3–6 July 2016: International Conference Balticum Organicum Syntheticum, or BOS-2016, was held at the Latvian National Library in Rīga. The conference gathered 335 participants from 25 countries of the world. The conference was addressed by Professor Ojārs Spārītis, President of the Latvian Academy of Sciences. The 19 invited speakers represented 10 countries at the conference.

23 September 2016: within the framework of the 9th International Conference for Cultural Tourism in Europe which took place in Guimaraes, Portugal, on “Intangible Heritage: Incomparable Asset for Sustainable and Responsible Tourism Development”, Turaida Museum Reserve was awarded the 1st prize for preservation and popularisation of the intangible cultural heritage, “Intangible Heritage Tourism 2016”. Following this recognition, the Ministry of Culture of the Republic of Latvia conferred the Turaida Museum Reserve the Excellence Award in Culture 2016.

October 2016: a number of notable events marked the 154th anniversary of the Rīga Technical University, among them the international scientific conference.

3 November 2016: the forum “Smart Growth. Challenges and Solutions” of the National Research Programme “Economic Transformation, Smart Growth, Governance and the Legal Framework for the Sustainable Development of the State and Society — New Approaches to Creation of Sustainable Knowledge Society (EKOSOC-LV)” was opened at the University of Latvia. The forum aimed to bring to the public the important and topical findings of the research studies realised within the programme, as well as to contribute to the discussion about these findings. The forum raised public awareness about the importance of science, and fostered the prolific interaction between science and other sectors of public life in future. Three panel discussions on the following themes were held: economic development, social development and legal framework, and spatial framework. The work of the forum was continued on 4 November at various universities in Rīga, Jelgava, Valmiera, and Daugavpils. The opening of the forum was accompanied with the publication of the *Proceedings of the Latvian Academy of Sciences* summarising a collection of researches carried out under the programme, and the poster exhibition featuring ten projects within the programme.

11 November 2016: the conference to mark the 70th anniversary of the Terminology Commission of the Latvian Academy of Sciences was held. A collection of short articles, *Term-Formation in Latvia: Past and Today*, dedicated to the 70th anniversary of the Commission was published.

15 November 2016: the Zemgale forum “Smart Economy: Science, Technologies and Innovation” organised by the Latvian Academy of Sciences, the National Research Programme “EKOSOC-LV”, the Latvian Association of Local and Regional Governments, Jelgava City Council, Jelgava Municipality Council, and the Latvia University of Agriculture, was held. The forum was attended by scientists, entrepreneurs, and representatives of Zemgale municipalities. Prime Minister of the Republic of Latvia Māris Kučinskis spoke about the tasks and opportunities of science in the development of the national economy.

23 November 2016: during the conference “Spreading Excellence and Crossing the Innovation Divide”, organised by the European Commission in Brussels, the winners of “WIDESPREAD 1-2014: Teaming” competition were announced. The Institute of Solid State Physics, University of Latvia, was the only scientific institution in the Baltic Sea region to be granted support from the European Commission for the Horizon 2020 programme “Spreading Excellence and Widening Participation”. 169 submitted

proposals were evaluated in a two-stage process, and a multinational group of experts selected ten best projects. The project CAMART² from Latvia was ranked as the 5th best project.

CAMART² aims to upgrade the existing Centre of Excellence in Advanced Material Research and Technology at the Institute of Solid State Physics, University of Latvia, to a new and significantly stronger Centre of Excellence. The upgrade will enable efficient transfer of new materials and technologies into products for commercial and public benefits based on exchange of knowledge and synergy with innovation-intensive partners.

30 November 2016: two reports, “Indicators for a Circular Economy” and “Priorities for Critical Materials in the Circular Economy”, were introduced in Brussels by the European Academies Sciences Advisory Council (EASAC). EASAC set up this project on the circular economy in winter 2015, when member academies nominated their experts from the natural and social sciences, among them Professor Baiba Rivža, full member of the Latvian Academy of Sciences, leader of the National Research Programme EKOSOC-LV, who developed the reports.

16 December 2016: scientific readings dedicated to the 80th anniversary of the Institute of Latvian History were held at the Academic Library of the University of Latvia. History has been written and re-written, with some chroniclers having faded into obscurity whose secrets were also taken away with them, and, instead, the floor is given to other adepts of history who try hard to explore the unknown causes and to guess the connections and consequences that have occurred as a result of some social shock waves or changes.

Top Scientific Achievements in Latvia in 2016

Theoretical science

- **Modelling and synthesis of flexible magnetic filaments**

LAS Full Member Andrejs Cēbers, *Dr.phys.* Kaspars Ērglis
Faculty of Physics and Mathematics, University of Latvia

Flexible magnetic filaments in an external magnetic field behave like micro-organisms, and may be used for creation of micro-swimmers, micro-mixers, nanorobots, and similar devices. Theoretical models of flexible magnetic strings, numerical algorithms for their behaviour simulation and their synthesis protocols are parts of the research. In 2016, the findings were published in prominent scientific journals.

- **Studies of asteroids, small planets of the Solar system**

Dr.phys. Ilgmārs Eglītis

Institute of Astronomy, University of Latvia

A set of 72 publications represents results of multiannual research of the small planets of the Solar system, as performed in the Baldone Observatory. 48 new asteroids of the Solar system have been discovered and orbits of 826 asteroids were specified through determination of astrometric positions of 3511 small bodies. The theory of orbit's evolution forecasting for the Centauri type asteroids has been complemented.

- **Pharmacological effects and pharmacokinetic properties of meldonium**

LAS Full Member Maija Dambrova, *Dr.pharm.* Marina Makrečka-Kūka, *Dr.pharm.* Reinis Viļķērsts, *Dr.pharm.* Elīna Makarova, *Dr.pharm.* Jānis Kūka, LAS Corresponding Member Edgars Liepiņš

Latvian Institute of Organic Synthesis

The activity of meldonium depends on the lowered concentrations of L-carnitine and its metabolites, acylcarnitines and trimethylamine-N-oxide, and the following adaptive changes in the cellular energy metabolism pathways. These molecular mechanisms of action secure activity of meldonium in the treatment of cardiovascular diseases, atherosclerosis, and diabetes complications. Pharmacologically decreased levels of acylcarnitines and trimethylamine-N-oxide contribute to the preserved mitochondrial function and protect cardiac and other tissues against ischemia and metabolic stress. The active transport of meldonium in tissues is ensured by the organic cation transporter 2, OCTN2.

- **A concluding stage of the research into Latvian folklore dedicated to studies of the form and content of more than 4000 Latvian sun-songs**

Monograph *The Threefold Sun. The Mythological Sun* (Rīga: Pētergailis, 2016, 488 pp.) by LAS Full Member Vaira Viķe-Freiberga

The present volume, *The Mythological Sun* represents the last in a pentology of commentaries about the corpus of over 4000 Latvian folksongs (*dainas*) containing the

word ‘sun’, the texts of which are available digitally, as well as in printed form (1988). A separate collection of *Latvian Sun-song Melodies*, along with their original texts and English translations, has also been published (2005).

The texts of the Latvian sun-songs were originally classified as aspects of *The Threefold Sun* and the subsequent volumes of commentaries have followed the same conceptual principles. First was *The Cosmological Sun* (1997), linked to pre-Christian conceptions of heaven and earth, this world and the next, death and life. The second, the physical sun, with around 2500 texts relating to it, was in turn subdivided into three conceptual categories: *The Chronological Sun* (1999) about the sun as heavenly time-piece, *The Meteorological Sun. The Warm Sun* (2002) about good and bad weather, and the *The Luminous Sun* in its visual aspect of light and brightness (2011).

The present volume *The Mythological Sun* refers to approximately 40% of the original sun-song corpus, with 1567 separately numbered texts, but takes into consideration additional variants and subvariants of the same (originally not digitised) from the original collection of Barons and Visendorfs (1895–1915). Since some mythological texts may have as many as 60 or even 100 versions, this considerably enlarged the material to be analysed (but not necessarily quoted). As in the previous four volumes, song texts are regrouped for analysis according to their main thematic content, then according to clusters dealing with more specific motifs. Within each subsection, songs are organised according to surface features of the text, such as repeated keywords, formulaic half-lines, lines, line couplets or even longer text modules that reappear as such in different contexts. The texts are discussed with respect to their semantic content, linguistic and logical structure and poetic effect, using ethnographic and historical references where necessary for their better understanding and, where pertinent, referring to interpretations offered by earlier authors.

- **An important contribution to the history of architecture in Latvia — a treatise on the architecture of Rīga in the 17th century**

Monograph *Architecture and Urban Planning of Riga in the 2nd Half of the 17th Century* (Rīga: Institute of Art History, Latvian Academy of Art, Art History Research Support Foundation, 2016, 447 pp.) by Anna Ancāne

The innovative importance of *Dr.art.* Anna Ancāne’s work lies in her addressing the 17th century architecture of Rīga — a part of heritage that has long been left outside the focus of art-historical interests. Her book can be considered as the first comprehensive publication about the urban development in Rīga in the period when the medieval town was transformed into a modern Baroque city. Having explored a wealth of sources, the author gives a detailed analysis of transformations of the fortification system and urban planning, innovations in the architecture of religious and public buildings, typology of residential houses, their architectural structure, finish, and decor. Furthermore, Anna

Ancāne has explored and reconstructed international routes of influence establishing the position of Rīga in the context of European architecture at that time.

- **Analytical and topical research-based overview of the crucial period in Latvia's cultural progress from the First World War till the loss of national independence (1915–1940)**

The volume *Art History of Latvia V: Period of Classical Modernism and Traditionalism. 1915–1940* (Rīga: Institute of Art History of the Latvian Academy of Art; Art History Research Support Foundation, 2016, 694 pp.) by *Dr.habil.art.* Eduards Kļaviņš, *Dr.art.* Stella Pelše, *Mg.art.* Anita Vanaga, *Dr.art.h.c.* Valdis Villerušs, *Dr.art.* Katrīna Teivāne-Korpa, *Mg.art.* Ilze Martinsone, *Mg.art.* Rūta Rinka, *Mg.art.* Marta Šuste

The book has separate Latvian and English editions, for the first time covering all forms and spheres of visual arts in a comprehensive, in-depth and topical research-based overview of the crucial period in Latvia's cultural progress from the First World War till the loss of national independence following the aggression of totalitarian empires. In the previous general art histories of Latvia, some of the arts (photography, design) have not been considered at all; some other ones (artistic life, book art, stage design, etc.) were revealed inadequately because of ideological barriers or lack of research.

The preceding volume IV of the *Art History of Latvia — Period of Neo-Romantic Modernism. 1890–1915* (ed. by Eduards Kļaviņš) was listed as a Latvian Achievement in Science 2014 and has received positive reviews in international scholarly journals (*Centropa*, *Kunstchronik*, *Kunstiteaduslikke Uurimusi*). The full programme of the publication will comprise seven volumes covering the whole span of time from the prehistory to our days. Currently the Institute is working on materials for volumes I and III.

- **The most comprehensive scientific monograph on fruit growing over the period of 50 years**

Monograph *Fruit Growing* (Latvia State Institute of Fruit-Growing, Latvia University of Agriculture, 2015 (December), 544 pp.) by *Dr.biol.* Laila Ikase (editor-in chief), *Dr.biol.* Sarmīte Strautiņa, *Dr.agr.* Māra Skrīvele, *Mg.agr.* Inese Drudze, *Dr.agr.* Daina Feldmane, *Dr.agr.* Edgars Rubauskis, and 24 more co-authors

Fruit growing is a developing branch of agriculture in Latvia with significant increase recently. It has been over 50 years since a comprehensive text book in fruit growing has been published in Latvia, including both theory and practice. This book attempts to fill in this significant gap. It is a collective work of the most experienced fruit scientists and practitioners in Latvia. The book opens with a historical review

of fruit science in Latvia, further it gives a deeper insight in fruit plant biology and biochemistry, their vegetative development, flower and fruit development processes. It analyses the influence of environment on plants and practical solutions to reduce plant stress. A special chapter is devoted to fruit plant winter hardiness. The origin and biology of temperate fruit crop species including rare and novel crops with commercial potential is described, as well as fruit breeding methods, fruit breeding programmes and achievements in Latvia and worldwide. Based on research and practical experience in Latvia and other countries, the book deals with modern and traditional fruit propagation methods, orchard establishment, fruit and berry growing and storage technologies.

Applied science

- **Technologies for semantic analysis of natural language**

LAS Corresponding Member Guntis Bārzdiņš, *Mg.* Didzis Goško, *Mg.* Pēteris Paikens, *Dr.sc.comp.* Normunds Grūzītis

Institute of Mathematics and Computer Science, University of Latvia

An accurate, rapid, and practically functional computerised semantic (i.e. the relationship between the characters/symbols and what they represent) analysis technology has been designed. An innovative machine learning method and the world's best tool for English semantic parsing is developed. The technology is adapted also for the Latvian language and introduced by the news agency LETA in automatic media monitoring.

- **The three-dimensional structures of ssRNA phages AP205 and MS2 established**

Bc. Mihails Šišovs, *Dr.biol.* Jānis Rūmnieks, *Dr.biol.* Andris Kazāks, *Mg.* Svetlana Koteloviča, *Bc.* Ināra Akopjana, LAS Full Member *Dr.biol.* Kaspars Tārs

Latvian Biomedical Research and Study Centre in cooperation with French National Centre of Research, Leiden University, and Madrid National Centre of Biotechnology

In collaboration with the colleagues from the Netherlands, France, and Spain, researchers from the Latvian Biomedical Research and Study Centre (BMC) have established the three-dimensional structure of bacteriophage AP205 virus-like particles (VLPs) and contributed to asymmetric structure of phage MS2 virion. The structure of AP205 VLPs was established by combining three different methods in three European countries — protein x-ray crystallography (BMC), cryo-EM (Netherlands) and solid state NMR (France, including guest researcher *Dr.chem.* Kristaps Jaudzems from the Latvian Institute of Organic Synthesis). As a result, it was established that during

evolution the structure of AP205 capsid has become very different from that of related phages, since a part of N-terminal sequence has been shifted to C-terminus. As a result, both terminal ends of coat protein are exposed on the surface of VLPs, which is an important factor in the construction of VLP-derived vaccines. Bacteriophage MS2 now is the first virus in the world with established three-dimensional asymmetric structure at medium (7.5Å) resolution, which includes coat protein and genome. The investigation is of fundamental importance, since for the first time there is undisputable argument that virus genome can have a strictly defined three-dimensional structure.

- **Novel leads for antimalarial drug development**

Mg. Dace Rasiņa (LIOS), *Mg.* Mārtiņš Otiņš (LIOS), *Mg.* Jānis Leitāns (BMC), *Dr.* Rosario Recacha (LIOS), *Dr.chem.* Oleksandr V. Borysov (LIOS), *Mg.* Iveta Kaņepe-Lapsa (LIOS), *Dr.chem.* Ilona Domračeva (LIOS), *Mg.* Teodors Panteļevs (LIOS), LAS Full Member Kaspars Tārs (BMC), *Dr.chem.* Kristaps Jaudzems (LIOS), LAS Corresponding Member Aigars Jirgensons (LIOS)

Latvian Institute of Organic Synthesis (LIOS) in cooperation with Latvian Biomedical Research and Study Centre (BMC) and Francis Crick Institute, UK

A novel class of non-peptidic malaria plasmepsin inhibitors has been discovered. Representatives of this class show high potency and selectivity in enzymatic tests as well as promising growth inhibition of *Plasmodium falciparum* in cell-based assays. These properties render them as perspective leads for the anti-malarial drug development. The investigation involves screening of fragment library by NMR, protein crystallography, molecular modelling, biochemical assays and modern organic synthesis as a collaborative effort of experts of various research fields.

- **A new conception of complex recycling process of birch bark into a high added value production**

Dr.sc.ing. Jānis Zandersons, *Dr.sc.ing.* Jānis Rižikovs, *Dr.sc.ing.* Aigars Pāže, *Mg.chem.* Kristīne Meile, *Dr.sc.ing.* Ausma Tardenaka, *Mg.chem.* Baiba Spince, *Bc.* Ance Pļavniece

Latvian State Institute of Wood Chemistry

The applied research on complete recyclability opportunities of birch trees' bark into biologically active compounds and polymer raw materials has been accomplished. As a result, a novel birch bark chemical processing method has been developed and patented as well as its processing equipment. The method ensures extraction of high purity betulin in a single technological stage. Owing to the obtained results the studies of industrial production and commercialisation process of the extractive matter of birch bark suitable for cosmetic production were launched in cooperation with JSC

“Latvijas Finieris”. The results were used in development and patenting of a new, free of formaldehyde emission mode of fabrication of chipboard panels made of the residue left after the birch bark extraction.

Certificate of Appreciation of the President of the Latvian Academy of Sciences

Achievements in Science 2016

Theoretical science

- **Discovery and investigation of pressure-induced insulator to metal phase transition in tin tungstate**

LAS Full Member Alexei Kuzmin, *Dr.phys.* Andris Anspoks, *Dr.phys.* Aleksandrs Kalinko, *Dr.phys.* Jānis Timoshenko, *Dr.phys.* Roberts Kalendarevs

Institute of Solid State Physics, University of Latvia

Pressure-induced insulator to metal phase transition in orthorhombic tin tungstate (α -SnWO₄) has been theoretically predicted and experimentally investigated. The conditions of collapse of the tungstate band gap in the pressure range of 5–7 GPa have been established. The origin of the phase transition has been explained using theoretical modelling from the first principles.

- **A novel study into 20th century Latvian, Estonian, and Lithuanian drama**

Monograph *20th Century Baltic Drama: Postcolonial Narratives, Decolonial Options* (Bielefeld: Aisthesis Verlag, 2016, 238 pp.), by LAS Full Member Benedikts Kalnačs.

Institute of Literature, Folklore and Art, University of Latvia

The path of Estonian, Latvian, and Lithuanian societies has to a great extent been determined by historical processes of occupation, colonisation, and foreign settlement. This remains a terrain insufficiently explored by literary scholars. In this book 20th century drama in Baltic countries provides a matrix which helps to take these issues into account. Principal literary texts are discussed within their specific political, social, and aesthetic contexts relevant for all three cultures from the perspective of postcolonial studies. The main question posed by the book is whether Baltic cultures might be looked upon as agencies of Europe’s internal others and in what ways Baltic identity has been determined by responses to these threats and challenges.

Applied science

- **Study of bio-hydrogen production from the organic production waste materials and storage in metalhydrides for further exploitation**

Dr.biol. Ilze Dimanta, *Mg.biol.* Sintija Valucka, engineer Laimonis Jēkabsons, *Dr.chem.* Ilva Nakurte, *Dr.phys.* Jānis Kleperis, *Dr.biol.* Vizma Nikolajeva, LAS Full Member Indriķis Muižnieks

Institute of Solid State Physics and Faculty of Biology, University of Latvia

The research demonstrated hydrogen production via fermentation with pure bacterial cultures, extracted from Latvia's soil and waters. Economically available organic waste materials were used as substrates: crude glycerol (waste of bio-fuel production) and lactose as a waste of dairy production. Innovation for the bio-produced hydrogen storage is the use of selectively absorbing metal alloys.

- **Application of sulphur dioxide in the synthesis of high-value products**

LAS Full Member Māris Turks (RTU), *Mg.* Jevgeņija Lugiņina (RTU), *Dr.chem.* Irina Novosjolova (RTU), *Bc.* Krista Suta (RTU), *Mg.* Daniels Posevins (RTU), *Mg.* Agnese Stikute (RTU), *Bc.* Dace Cīrule (RTU), *Mg.* Jevgeņija Uzuleņa (RTU), *Dr.chem.* Dmitrijs Stepanovs (LIOS)

Institute of Technology of Organic Chemistry, Rīga Technical University (RTU)

New methods for the use of sulphur dioxide in organic synthesis were developed. The reagents obtained via fixation of SO₂ are useful for the gas chromatographic analysis of non-volatile substances and also in the synthesis of biologically active substances. Additionally, it was discovered that liquid sulphur dioxide can be used as an easily recyclable solvent for accomplishment of various organic synthesis processes. The developed methodologies can be applied in the synthesis of pharmaceutically active substances.

- **New material and technology for solar energy collectors**

Dr.habil.sc.ing. Gundars Mežinskis (RTU), *Dr.sc.ing.* Laimons Bīdermanis (RTU), *Dr.sc.ing.* Ilona Pavlovska (RTU), *Dr.sc.ing.* Andris Cimmers (RTU), *Dr.sc.ing.* Jānis Liepiņš (RTU), *Dr.sc.ing.* Kaspars Mālnieks (RTU), *Dr.phys.* Jevgēnijs Gabrusenoks (Institute of Solid State Physics, University of Latvia)

Institute of Silicate Materials, Rīga Technical University (RTU)

Tubular material for high-power solar collector (HPSC) must be able to withstand continuous high temperatures, without changing their microstructure and losing its initial thermodynamic characteristics. The scientists of the Institute of Silicate Materials, RTU, in collaboration with a specialist of the Institute of Solid State Physics of University

of Latvia, developed a technology that allows to obtain HPSC solar energy receiving material capable to withstand 600 °C for at least 250 days. This material is based on stainless steel tubular material coated with a glass-ceramic enamel containing pigments which provide black colour to the enamel. Not only specific supplements added to the enamel but also the additional sol-gel nano-coating applied to the enamel ensures the heat treatment process of the enamel and the long-term high-temperature stability.

- **Innovative approach to hull-less spring cereals and triticale use from human health perspective**

Dr.sc.ing. Evita Straumīte, *Dr.sc.ing.* Dace Kļava, *Dr.sc.ing.* Tatjana Ķince, *Dr.agr.* Ieva Stūrīte, *Dr.agr.* Arta Kronberga, *Dr.med.* Laila Meija

Faculty of Food Technology, Latvia University of Agriculture (LUA), Institute of Agricultural Resources and Economics (AREI, LUA), NIBIO (Norway), Rīga Stradiņš University (RSU)

Latvia University of Agriculture (LUA) Faculty of Food Technology, LUA Institute of Agricultural Resources and Economics (AREI), NIBIO (Norway), Rīga Stradiņš University (RSU) have conducted a study about hull-less barley, oats and triticale growing possibilities in Latvia and Norway, developed technology for germinated flakes production by preserving biologically active compounds, additionally clinical studies were carried out about influence of germinated flakes on human health. The overall aim of the project is to increase the knowledge on impact of triticale and hull-less spring cereal species on human health potential.

GENERAL MEETINGS OF THE LATVIAN ACADEMY OF SCIENCES

Two LAS general meetings were held in 2016.

Spring General Meeting, 7 April

The general meeting was attended by Kārlis Šadurskis, Minister of Education and Science, Jānis Vucāns, member of Saeima Education, Culture, and Science Committee, LAS members, Academy of Sciences award recipients, and guests of the meeting. State President Raimonds Vējonis sent a message of greetings to the participants.

An introductory address was given by the LAS president Ojārs Spārītis, the Education and Science Minister Kārlis Šadurskis delivered a speech to the General Meeting expressing his gratitude for the past and future contribution of scientists to the country, and presented the action plan outlining the prospects of increase of funding for education and science from the state budget. The LAS prizes and awards for young scientists were distributed. The report on the LAS activities in 2015 was given by the LAS Secretary General Valdis Kampars. The Chairman of the Supervisory Council Juris Krūmiņš read the Supervisory Council report on the LAS 2015 operation supervision, concluding that no serious shortcomings had been identified and wishing success in the LAS lawsuit against “Rīgas koncertzāle” (“Rīga Concert Hall”). The General Meeting approved both reports. The LAS presidential candidate Ojārs Spārītis gave the Academy members a presentation on his work and his new team’s plans for the next four-year period. The LAS presidential and officials’ elections followed. Academicians Baiba Rivža, Andris Šternbergs, Dace Markus, and *Dr.h.c.sc.comp.* Edvīns Karnītis took part in the debate while the votes were counted (See the General Meeting materials in *Zinātnes Vēstnesis (Science Bulletin)* as of 25 April 2016).

LAS Full Member Ojārs Spārītis was re-elected as the LAS President, and LAS full members Andrejs Ērglis and Andrejs Krasņikovs — as Vice Presidents. LAS Full Member Andrejs Siliņš was elected as the LAS Secretary General, and LAS Full Member Tālavš Jundzis — as the Foreign Affairs Secretary. LAS Full Member Bruno Andersons was elected as the Chairman of the LAS Fund. The newly elected Supervisory Council consists of LAS full members Juris Krūmiņš, Ārija Meikališa, Edīte Kaufmane, Jurijs Dehtjars, Andris Ozols, Īzaks Rašals, Nikolajs Sjakste. The General Meeting approved the elected chairs of LAS divisions: LAS Full Member Raita Karnīte — the Division of Social Sciences and Humanities; LAS Full Member Baiba Rivža — the Division of Agriculture and Forestry Sciences; LAS Full Member Jānis Spīgulis — the Division of Physical and Technical Sciences; LAS Corresponding Member Pēteris Trapencieris — the Division of Chemical, Biological, and Medical Sciences. The elected LAS Senate members are LAS full members Mārcis Auziņš, Ilga Jansone, Ivars Kalviņš, Jānis

Kloviņš, Maija Kūle, Dace Markus, Indriķis Muižnieks, Modra Murovska, Īzaks Rašals, Leonīds Ribickis, Jānis Stradiņš, Andris Šternbergs, Guntis Zemītis, and in advisory capacity — LAS corresponding members Juris Borzovs and Tatjana Koķe.

*Programmatic Speech of the LAS President Ojārs Spārītis
at the Spring General Meeting, 7 April*

Esteemed academic family — LAS academicians, foreign, honorary members and corresponding members, rectors of Latvian universities, honorary doctors, research institute directors, LAS honorary patrons, our allies and successors — representatives of the Association of Latvian Young Scientists, Members of the Republic of Latvia Parliament — *Saeima*, leading representatives of the Ministries of Education and Science, Agriculture, Economy and Health, distinguished colleagues,

Today, it is four years since I first stood before you, and I have a lot of exciting things to share with you: **first of all**, thanks for the honour you showed me along with entrusted responsibility, which I had to carry in long and hard days of the far-from-simple scientific administration work among the Latvian political and administrative elite, as well as the representatives of scientific excellence — yourselves, in front of whom I dare to stand again, founding this step on the assurance that I have further strengthened over these years. Namely, that the Latvian Academy of Sciences, after the restoration of independence, with your participation, on its 70th anniversary continues to be an academic centre of excellence, with its tradition based on responsible and honest work in shaping a science-based society and selfless desire to use academic qualifications for the greatest contribution to the national economic growth. **Secondly**, getting to know the operation of the Latvian state legislative and executive structures and the underlying mechanisms in action, as well as the personalities involved in this work, for three and a half years in a team with you I have maintained a continuous dialogue with the representatives of both the legislative and executive powers regarding the rights of scientists and the opportunities to exercise their intellectual potential in our country to the maximum capacity. This dialogue, as it happens in real life, has had a variable success, but I am sure you have noticed that when it speaks on your behalf and in your interests, the Latvian Academy of Sciences has maintained an active position and tried to do it in modern language, by modern means and methods.

In my view, this path is to be continued implementing “LAS Operational Strategy for 2015–2020” adopted at last year’s Autumn General Meeting, the main strategic objectives being: **firstly**, to facilitate the retention of the national scientific personnel and the increase of their number as the national intellectual core, without which further existence of the science-based society is not possible; **secondly**, in a sound dialogue

with the authorities to encourage national leaders to increase funding for basic research in the natural sciences, as well as humanities and social sciences. **Thirdly**, I consider an important strategic goal for the LAS to stand for ensuring innovative research technology transfer for shaping more successful cooperation of the Latvian science with industrial production. **Fourthly**, to promote international cooperation in implementing scientific research, enrichment of scientific experience and also the greatly needed participation to attract international funding. And **fifthly**, to maintain an active position in enrolling the new generation of scientists in science promotion and management of scientific life. A guarantee of this is seen in the negotiations already entered into with the Education and Science Minister Kārlis Šadurskis regarding establishment of the New Academy, following the example of the German National Academy of Sciences *Leopoldina*.

Although one of the LAS objectives is identifying the personalities representing academic excellence as the highest standard of intellectual values and their advancement along the steps of a scientific career, the Academy of Sciences as an organisation is best able to fulfil its mission through teamwork. Every era has its own tasks and each era appoints its performers to implement them. The LAS also sees that the change of generations is inevitable. I am pleased that for the work of the next four years, with your help, we have managed to approach outstanding personalities known to you as eminent scientists and organisers, and whom you are willing to entrust with the management of the LAS units. I have published their names on the LAS website and in the newspaper *Zinātnes Vēstnesis (Science Bulletin)*, and you have had the opportunity to read the thesis containing actions proposed by the main candidates. Presently, they reflect every academician's individual vision of the work to be done, but as a team they are destined to act as a coordinated and well-targeted force.

I am satisfied with the organisational perseverance and talent, demonstrated during the previous period by the chairs of the LAS Division of Agriculture and Forestry Sciences, and Division of Social Sciences and Humanities — LAS full members **Baiba Rivža** and **Raita Karnīte**, and also express my gratitude to the scientists working in the divisions for their willingness to devote their energy to coordination of scientific life in various sectors of science. With just as great hopes I look at the organisational revival taking place at the Division of Physical and Technical Sciences, and I wish the Division under the stewardship of LAS Full Member **Jānis Spīgulis** the success in developing a platform for active exchange of ideas. Expressing gratitude to LAS Full Member Raimonds Valters for long-standing and successful leadership of the Division of Chemical, Biological, and Medical Sciences, I convey my faith in the foresight of the Division choosing its candidate of future Chair — LAS Corresponding Member **Pēteris Trapencieris**.

To ensure coordinated work, the Secretary General's position is of strategic importance its extensive powers and functions are stipulated in the LAS Statutes and include the responsibility to supervise implementation of decisions passed by

the Divisions, the Senate, and the Assembly, overseeing the work of the office and coordination of operational tasks. These duties I would like to entrust to LAS Full Member **Andrejs Siliņš**, for whom this would be a return to the position of the Secretary General, having gained the experience and sense of responsibility rooted in LAS work and leading the Latvian Council of Science. The Statutes provide for the possibility to elect two vice presidents, whose representation of different research spheres, academic qualifications, organisational activities and ambitions, will and skill to address the audience of scientists, as well as the country's political leaders would enable them both to raise the prestige of science, and to bring scientific innovation closer to business. Exactly for this purpose I have called academicians of international reputation to participate in the work of the LAS management team: LAS full members **Andrejs Ērglis**, cardiac surgeon, BIRTI Consortium's Chairman of the Board and University of Latvia professor, and **Andrejs Krasņikovs**, a specialist in creation of innovative construction and polymer materials, professor at RTU Department of Theoretical Mechanics and Resistance of Materials. As we approach Latvia's 100th anniversary and the World Congress of Latvian Scientists, the extensive international activity of LAS Full Member **Tālavš Jundzis** is a guarantee of ensuring international scientific contacts and especially the involvement of the scientific diaspora in carrying out research projects of the national importance. I think we can all be certain of his ability to successfully manage not only the Baltic Centre for Strategic Studies, but also the duties of Secretary for Foreign Relations.

I express my gratitude to the colleagues in my present for their wisdom of life, collegial tolerance and erudition worthy of the highest standard of scientists — all these are qualities so much needed in united action of a team and to achieve the set goals. I wish strength to those (and especially **Juris Ekmanis**, **Juris Jansons**) who due to health conditions could not attend the general meeting today. Like every one of you, I count on LAS Full Member **Jānis Stradiņš**' farsightedness and knowledge-based expertise necessary to successively lead the Senate as a platform for topical problem analysis and discussion. I extend my heartfelt thanks to the long-standing head of the Academy of Sciences Fund, LAS Full Member **Jānis Bērziņš** for his ongoing and meticulous work. With complete confidence I invite you to entrust this work to LAS Full Member **Bruno Andersons**, while LAS Full Member **Juris Krūmiņš** is called upon to continue to manage the LAS Supervisory Council for the next four years as responsibly and impeccably as before.

The main benefit gained over these last four years was the increased LAS activity, which would not have been possible without the support of the Senate members and more active academics, university rectors, heads of institutes, creating the sense of security, because, using the sports terminology, we have built a strong extended team, and filled the substitute bench. With such potential it is possible for us to forecast and manage the processes, plan the work well ahead, not just feebly respond to the

consequences, since, as I said at the beginning, it is in the interests of the LAS to ensure a proactive dialogue with all representatives of economic, political, and administrative circles, whose responsibility is the promotion of economic development with science as an instrument.

We place great hopes in our cooperation with Minister of Education and Science **Kārlis Šadurskis**, as well as with **Agrita Kiopa**, Director of the Higher Education, Science and Innovation Department at the Ministry of Education and Science, who themselves have the highest scientific qualifications, and whose thinking and action ensures concerted implementation of the National Research Programme, reallocation of internationally provided resources, as well as a timely embarkation on the road to the increase of the state budget allocation to the scientific activity. The new team of the LAS is focussed on achieving synergy in collaboration with the State Education Development Agency and its Director **Dita Traidās** by offering assistance in the administration of science projects — formation of sectoral expert groups necessary for an in-depth project evaluation. Since the majority of the academicians are associated with universities, the Academy of Sciences has a vital interest to actively support the efforts of the Latvian Council of Science, the Rectors' Council, and the Council of Higher Education to implement internationally competitive education and science policies. Taking into account also the strong stance of the current Prime Minister **Māris Kučinskis** on tackling the gaps in the national governance and building effective state budget structure, I would like to confirm that the Latvian Academy of Sciences will continue to be active in the Latvian Research and Innovation Strategic Council, exercising its direct subordination function and providing the Prime Minister and the government with advise on effective science policy and strategy. And finally, in the context of this important day, I wish to address the Latvian Academy of Sciences Honorary Patrons, companies — sponsors, foundations, private donors, and well-wishers. Your support to both young and already mature scientists in the form of bonuses, prizes and scholarships is invaluable, in that, in addition to stimulating the scientists to pose and examine more and more innovative research hypotheses, your support also strengthens the prestige of science in the eyes of today's schoolchildren — future scientists, and the general public. I would like to extend my thanks to all of you for this contribution, and to pledge our commitment to further goal-oriented work!

PRESIDENT OF THE REPUBLIC OF LATVIA
**Congratulations on the occasion of
the Spring General Meeting
of the Latvian Academy of Sciences**

Highly esteemed Mr. Spārītis, honourable Members of the Latvian Academy of Sciences, distinguished scientists!

I sincerely congratulate you on the opening of the annual General Meeting of the Latvian Academy of Sciences! I would like to use this opportunity to extend my greetings to the Academy on its 70th anniversary. Thanks to the work you have invested, the science in Latvia has developed, raising the competitiveness of our scientists in the global market and carrying Latvia's name far in the world!

Promotion of science and research is important for the growth of Latvia. The welfare and economic development of a state is closely linked to its achievements in science, research, innovations and new technologies resulting in creation of highly demanded and competitive products. Integration of science into entrepreneurship should be much stronger in Latvia. The cooperation between science and industry must become an important driving force for our country's economy to develop faster and to compete successfully with the countries occupying the leading position in global markets. Therefore, your joint efforts have a special role to play in facilitating the progress of science and welfare of Latvia!

I wish to the members of the Latvian Academy of Sciences, especially the new ones, the emerging scientists and researchers, perseverance in achievement and implementation of their goals in order to provide the greatest possible input into all sectors of Latvia's economy and the society and to enhance the overall development of this country! May you to become a major contributing force on Latvia's road to global scientific achievements!

Sincerely yours,

/signature/

Raimonds Vējonis

Rīga, 7 April 2016

Autumn General Meeting, 24 November

President Ojārs Spārītis made the introductory address. The General Meeting was also addressed by Jānis Vucāns, Chair of Saeima Budget and Finance Committee, and Jānis Endziņš, Chair of the Board of the Latvian Chamber of Commerce and Industry, who urged the scientists to take part in EXPO 2017, whose theme is “Future Energy”, in Kazakhstan, Astana, if they have scientific achievements that can be commercialised.

Traditionally the LAS Autumn General Meeting is dedicated to honouring the recipients of the LAS Grand Medal. This year, the Grand Medal was awarded to LAS Full Member Tālavš Jundzis for his studies in the history of Latvian independence restoration, and to Professor *Dr.habil.med.* Romans Lācis for an important contribution to the development of cardiac surgery in Latvia. *Laudatio* for Tālavš Jundzis was spoken by LAS Full Member Jānis Stradiņš, *Laudatio* for Romāns Lācis in video version was spoken by Andrejs Ērglis (see LAS website). T. Jundzis delivered an academic lecture “Continuity Doctrine in the Restoration of Latvian Independence From 1986 to 1991”, whereas R. Lācis gave an emotional academic lecture “What is the Heart” (see *Zinātnes Vēstnesis (Science Bulletin)*, 5 December 2016).

The election of new LAS members was held during the meeting. The elected full members were Ina Druviete (linguistics), Donāts Erts (physics), Aleksejs Kuzmins (physics), Remigijs Počs (economy), Uldis Rogulis (physics), Inna Šteinbuka (economy), and Pēteris Trapencieris (chemistry).

The newly elected corresponding members of the LAS included Ivars Austers (psychology), Uģis Cābulis (forestry science), Ēriks Jēkabsons (history), Sandra Muižniece-Brasava (food science), Aiva Plotniece (chemistry), Gita Rēvalde (physics), and Andris Zeltiņš (biology).

Four foreign members were elected: Zenon Dabkevičius (agricultural science, Lithuania), Vladimirs Gevorgjans (chemistry, USA), Viktoras Algirdas Sniečkus (chemistry, Canada), and Jānis Vārna (mechanics, Sweden).

The Latvian Academy of Sciences acquired two new honorary members — composer Mārtiņš Brauns and musicologist Arnolds Laimonis Klotiņš.

Laudatio for the laureate of Grand Medal,
LAS Full Member Tālavš Jundzis
LAS Full Member Jānis Stradiņš

Highly esteemed recipient of the Medal, Honourable President of the LAS Mr. Spārtiis, honourable Mr. Vucans, Ms. Jautriite, the participants of the General Meeting, ladies and gentlemen!

After the double Players' Night celebration, which has just taken place both in our Parliament and at our Dailes Theatre, the time has come for our science players' afternoon. We are here to give our tribute to a brilliant doctor and a prominent lawyer — political scientist. I think that all those present will agree that these two men are no less important for Latvia than our parliament members, or our popular actors.

This year's vivid series of events may have made us forget that 25 years have already elapsed since Latvia regained its independence. It is not at all a coincidence that exactly this year LAS Grand Medal is awarded to LAS Full Member Tālavš Jundzis for his studies in the history of independence restoration of Latvia.

Not every individual is destined to write his name in the history of the nation and the state, to affect the course of events of an era. There are even fewer of those who, after active participation, are still able to document and analyse the past developments, and furthermore, try to be as objective as possible.

Tālavš Jundzis has been fortunate: during Latvia's Third Awakening and the early years after the restoration of independence, he was an active member of the Popular Front, as the deputy of the Latvian SSR Supreme Soviet he voted both for the Declaration of 4 May 1990, and for the Constitutional Law on 21 August 1991, whereby the Republic of Latvia was restored *de facto*. Being the Chairman of the National Security Committee, he was also the Deputy Chief at the Barricade Headquarters in January 1991, but after regaining of independence — the first Minister of Defence of Latvia. He built the foundations of our defence system, launched the talks on withdrawal of the Soviet troops to the Russian Federation, and gradually paved the way for Latvian involvement in the North Atlantic Alliance.

Tālavš Jundzis remains in the history of Latvian independence restoration as the main theoretical supporter of a non-violent resistance concept, taking over the Princeton University Professor Gene Sharp's ideas and adapting them to the situation in the Baltics at that time. It was the right tactic under the relatively favourable conditions of Gorbachev's rebuilding for the Baltic republics to be able to re-conquer their independence step by step without bloodshed and loss of life, to some extent consolidating the very fragmented and multinational population to prevent violent ethnic conflicts. Understandably, this was not Jundzis' merit alone, but the common policy of the Popular Front of Latvia (PFL), however, in its implementation the role of Tālavš as a theoretician was essential.

Today we can repine — it is a pity that this national movement declined quite soon after gaining the independence, and that the first legitimately elected parliament in the autumn of 1993 did not include the candidates put forward by the PFL, including Tālavš Jundzis. But then, it was probably logical: the PFL was an amorphous organisation that united people with a great variety of views. These developments did not allow Tālavš to unfold as a statesman and a politician, although up to the elections of 1998, he tried to reanimate the Popular Front, reconstructing it as a Christian party. Maybe it was the loss to the political environment, which became more pragmatic, less ethical, moving toward the consumer society. Different values began to dominate, and a gap between the elite and the people appeared.

This loss was simultaneously the gain of the science in Latvia, the legal and political disciplines, because after the conclusion of his political career Jundzis began his work as a scholar and the teacher of the new lawyers. He founded the College of Law and also worked as a lecturer, and later — a professor at the University of Latvia.

I remember the autumn of 1993, when Tālavš Jundzis arrived at the Academy of Sciences with a proposal to establish a Baltic Centre for Strategic Studies here. At the time, the LAS as a system of research institutes was being dismantled. The suggestion did not seem timely, and there were concerns that such a centre could involve the LAS too deeply and perhaps one-sidedly in politics, from which the then management of the LAS distanced itself. However, in LAS Presidium we resolved that Jundzis' idea under the auspices of the Academy directly conforms to the spirit and letter of the LAS Charter yet to be approved by the Parliament. The Academy to be transformed should set the scientific strategy for Latvia, but also the newly formed country's overall progress, analyse bittersweet lessons taught by “the Singing Revolution”, reconcile the society, strengthen the ties with neighbouring countries in the Baltics, provide the guarantees of their protection, focusing on Euro-Atlantic structures.

Although the Baltic Centre for Strategic Studies did not achieve these objectives, yet largely it has served its purpose not only regarding the intended targets, but as an organisational structure quite useful for the Academy for publication of the necessary collection of articles and monographs, implementation of many Lettonics and political science projects.

I will mention the book written by Jundzis, *Latvijas drošība un aizsardzība (Latvia's Security and Defence)*, 1995), which has produced 18 reviews published in Latvia and abroad. This was followed by a collective edition *Latvijas valsts atjaunošana, 1986–1993 (Restoration of the Latvian State, 1986–1993)* with contributions of D. A. Loeber, E. Levits, and others, the collection of articles compiled by T. Jundzis *Baltijas valstis likteņgriežos (The Baltic States at Historical Crossroads)*, 700–800 pp., the book was published in two editions, Latvian and English, in 1998 and 2001, then — *Latvija Eiropā — nākotnes vīzijas (Latvia in Europe: Visions of the Future)*, 2004, in Latvian and English), and finally — *Nevardarbīgā pretošanās: Latvijas neatkarības atgūšanas*

ceļš, 1945–1991 (Regaining Independence: Non-violent Resistance in Latvia 1945–1991, published in Latvian in 2008, in English in 2009), a fundamental work under editorship of T. Jundzis, and the co-authors included Gene Sharp himself and the late Professor Henriks Strods. Do these works belong to the science of history or political science? Probably, more to the latter, still, to the future historians they can serve as a set of testimonies by contemporaries, which will be used for analysis. Jundzis consistently defended the idea that the 4th of May Republic is a continuation of the 18th of November Republic, a direct continuation, rather than a vague new formation, as some tried to interpret it.

Another work that should be mentioned here is the collection compiled by T. Jundzis, *4. Maijs: rakstu, atmiņu un dokumentu krājums par Neatkarības deklarāciju (4th of May: Collection of Writings, Memories and Documents About the Declaration of Independence*, 2000). It helped to achieve the official recognition of 4 May, the public holiday in Latvia, the second in terms of significance after 18 November, although it severely toned down public celebration of 21 August, in contrast to Estonia, where it is marked as the true date of regaining independence.

Either way, the publications and studies mentioned above, as a consequence of which today we praise T. Jundzis, are an enduring contribution to the documentation of Latvia's contemporary problems.

The Baltic Centre for Strategic Studies physically brought Tālavs Jundzis to the high-rise building of the LAS, and in due course he became a Full Member of the LAS (2000). For 15 years he has held elected positions in the leadership of the LAS as a Vice President of the Academy, Secretary for Foreign Affairs and Vice President of the Senate.

Since 2005, Tālavs Jundzis has acted as a key driving force of nationally important research programmes “Letonika” (Letonics or Latvian Studies) and “Nacionālā identitāte” (National Identity), coordinated the publishing of a four-tome academic article collection *Latvieši un Latvija (Latvians and Latvia)* in 2013, he currently supervises publication of a two-volume collection *Latvija un latvieši (Latvia and Latvians)* in English, Russian, and Latvian, conceived as a tribute to the centenary of Latvia and IV World Congress of Latvian Scientists in 2018. Jundzis also has participated in organisation of all six Letonics congresses and has been the head of the III World Congress of Latvian Scientists Steering Committee in 2011. These particular studies, events, and the stringent organisation work required to implement them are to be regarded as principal activities of the Academy in the humanities, whose value was particularly noted by the Archbishop of Rīga, metropolitan Stankevičs in his recent sermon of 18 November at Rīga Cathedral.

I consider it a special favour of destiny to have had the opportunity to work with LAS Full Member T. Jundzis personally for many years of leading “Letonics” and national identity programmes and creating the collection *Latvians and Latvia*, to experience his support and high responsibility in completing every work.

Tālavš Jundzis as a colleague and scientist is characterised by equanimity, impartiality, rigorous defence of his convictions, and ability to listen to a different points of view, to communicate, and if necessary — to seek reasonable compromises.

Tālavš Jundzis largely inherited his idealism and versatility from his father Edgars Jundzis — a pastor and professor of Theological Seminary, who during the bitter Soviet years did not stop to serve God and raise the people in Christian spirit, despite the repressions (including Vorkuta camp) and constant humiliation. The opposition was also inherited by his son. It obstructed Tālavš' path to obtaining education of a lawyer in Rīga, and the Soviet regime hampered his academic career until 1980s.

It is significant that Tālavš became a staff member of the LAS at the then LAS Institute of Philosophy and Law exactly on 2 June 1988, the final day of the Plenum of Creative Unions, where he had given a speech. From the today's perspective, these restrictions in the scientific and academic career can even be seen as a positive factor, because Tālavš has not become deeply entangled in those half-truths, which at that time were dictated by the rules prevailing in the jurisprudence.

In the recent years, academician Jundzis has particularly focused on the Latvians dispersed in the world, and this is partly related to his organisational activities of IV World Congress of Latvian Scientists. He has visited practically all the continents and established contacts with the academic community abroad, which allows to truly raise the influence of the LAS at the international level.

I cannot omit Tālavš' and his wife Jautrīte's enjoyment of travelling, which has become almost a lifestyle — hiking in Greenland and Chile, road trips in Australia, and approximately 50 countries more. At the same time, it has not undermined their love of Vidzeme, where Jundzis family have created a beautiful country home in Jaunpiebalga, and where under Tālavš' guidance the Church of St. Thomas is being fully restored.

I shall not enumerate the multiple awards given to Tālavš Jundzis, I will only mention the Grade I Order of Viesturs, the Order of the Three Stars, the Republic of Latvia Cabinet of Ministers Award, D. A. Loeber Prize in Political Science, and election to the European Academy of Sciences and Arts. Today these honours are joined by the LAS Grand Medal, which is a well-deserved evaluation given by the academic community.

Continuity doctrine in the restoration of Latvian independence from 1986 to 1991

Laureate of the Grand Medal LAS Full Member Tālavš Jundzis

The continuity doctrine is a concept created in public international law, recognising retention of state's capacity under conditions where this capacity is externally disrupted or limited as a result of occupation or other violent annexation, or the country has been

internally reorganised following social revolutions or similar events. In such cases, the continuity doctrine recognises the national legal continuity, and from that follows also the legal continuity of the state's obligations and rights.

This doctrine is different from the concept of state succession in international law, which is to be applied, as new states are formed as a result of merging or division of states, or as a consequence of implementing the self-determination rights of nations. In both cases, there is a direct link to the concept of the state identity: in the first case, the continuity means preservation of the respective state's identity; in the second — succession is formed as a result of the state's identity loss. Significantly, the state continuity is not governed by any international convention, because simply it is not necessary, while three conventions are devoted to the state succession, however, of these only one has entered into force.

In theory, the continuity is clearly distinguishable from the succession, but in practice this is not the case. For example, after the collapse of the Soviet Union, the Russian Federation was initially recognised as its successor, yet quite soon it coveted many the desirable former Soviet powers and rights (nuclear weapons, a place in the UN, embassies abroad, etc.). To retain those, Russia substantiated its claims with the doctrine of continuity, recognising itself as the continuator of the USSR (not a successor), and the international community actually accepted it.

The continuity doctrine clearly applies to the case of the Baltic States. Russia, however, questions the fact of occupation and denies illegality of annexation, while a number of Western scholars see the protracted occupation (51 years) as a barrier to continuity — in the international practice, it could mean legalisation of the actual situation, if the majority of countries recognise it.

In Latvia, often referred to, and recalled is the ancient Roman principle of *ex injuria jus non oritur* (unjust acts cannot create law), especially with regard to the 1940 occupation and the illegal annexation of the Baltic States by the Soviets. Less often heard is another, no less significant Roman law principle of *ex factis jus oritur* (the law arises from the facts), which is also recognised in the contemporary international law, and under certain circumstances may even legalise internationally wrongful acts. Such conditions are essentially two, and they meet the generally accepted understanding of the international legal customs. One of them requires to take into account the long-term nature of an action or omission to act — even an illegal one, whose appraisal is left to the countries and the international community. The second condition requires that the countries, at least the majority of countries recognise the actual situation as legal, regardless of its initial or previous evaluation.

For five decades, the majority of countries in the world, including almost all Western democracies, except for Sweden, the Netherlands and a few others, did not recognise the lawfulness of the Baltic occupation and annexation. The United States held a particularly consistent position, largely maintained by the Baltic diaspora and

diplomatic activities, which influenced other Western countries. However, the situation regarding the Baltic issue was not so unequivocal. Albania, Bulgaria, Cuba, China, and the other socialist bloc countries of the time, as well as Brazil, India, Egypt, Japan, and several other countries recognised the annexation of the Baltics as legal. Not once has Baltic occupation and annexation question entered the agenda of the UN or its institutions, although some countries had raised it. Dangerous trends also appeared in the Western unity, when in the summer of 1974 New Zealand decided to change its position and to improve its relations with the Soviet Union recognising the annexation of the Baltic States as lawful. New Zealand's example was immediately followed by Australia, and it is difficult to say how this process would have developed, if the Baltic diasporas, not only in Australia and New Zealand, but almost all over the world had not raised such a tumult that already in December of 1975 the new Australian government cancelled the previous Labour government's decision. Although New Zealand did not follow the suit, other countries were reluctant to repeat the experience of Australia, and did not support the obstinate position of New Zealand.

Taking into account the prevalent position in the international framework regarding non-recognition of the occupation and annexation of the Baltic States, as the Awakening movement started in Latvia, it was already an important international prerequisite for application of the continuity doctrine, restoring the Republic of Latvia proclaimed in 1918, on the basis of the 1922 Constitutional foundations. However, in the first year of the Awakening, in 1988, the political situation had not yet sufficiently matured. In that year, the newly formed non-governmental organisations, including the Latvian National Independence Movement (*LNNK*) and the Latvian Popular Front (*LPF*), only spoke of greater democracy, sovereignty, and economic autonomy within the Soviet Union. To achieve its goals, the *LPF* put forth even several dangerous demands, which would distance Latvia from restoration of an independent state, including creation of a new Soviet Union Treaty, constitutional strengthening of the Latvian SSR citizens' status and admission of the Latvian SSR to the United Nations and other international organisations. At one time, the Western countries had already rejected the USSR proposal to accept the three Baltic republics in the United Nations, in order to prevent the legalisation of the unlawful annexation. However, 1988 was an important year with extensive discussions about the actual circumstances of losing the independence of the Latvian state, including Mavriks Vulfsons' public statement concerning the Latvian occupation in 1940, which already laid the foundation for applying the doctrine of continuity on the further path to independence.

The second year of the Awakening began with the first congress *LNNK* held on 18 and 19 February 1989, which in its programme clearly and unequivocally set the objective of restoring an independent and democratic Latvian state within the borders of 1940 and on the basis of 1922 Republic of Latvia Constitution. During this time, *LNNK* acquired the organisational experience of the Estonian citizens' movement and

the perfect concept of the restoration of the Estonian state on the basis of the principles within the continuity doctrine. Consequently, Latvia in the spring – summer of 1989 also came to identifying the citizens of their legally still existing state and creating citizens' committees, on the basis of a consistent and legally sound continuity doctrine.

The political leaders of the Latvian Popular Front initially sharply opposed the citizen movement initiative as politically unacceptable and practically unenforceable. This was clearly articulated by the LPF leader Pēteris Laķis, Jānis Škapars, Ivars Godmanis, also Andris Plotnieks, and Juris Bojārs, offering to build a new independent and democratic state, which would continue and develop the parliamentary and democratic traditions of the Republic of Latvia. This position was endorsed in the LPF Congress in October 1989, and the Popular Front's electoral platform published in February 1990 before the Latvian SSR Supreme Council elections scheduled for 18 March. If the LPF won the elections and the newly elected Supreme Council would pass the decision regarding independence, Ivars Godmanis offered to consolidate it in two referendums — national and general, with the participation of all the citizens, as well as to hold new elections of the Constituent Assembly (the newspaper *Atmoda*, 1989, December 19). These intentions would forever exclude the possibility to renew the independent state of Latvia founded in 1918. In fact, Ivars Godmanis' offer was closely in tune with the model approved in the Latvian Union of Scientists' meeting on 28 September 1989, which, strangely, for some time was supported as a possible compromise even by one of the leaders of civil movement Māris Grīnblats until it was rejected by the Board of this movement, rightly seeing it as an essential departure from the continuity doctrine.

After winning the elections of the Supreme Council on 18 March 1990, the position of the LPF almost immediately fundamentally changed, which probably was influenced by the decisions of Lithuania (March 11) and Estonia (March 30) regarding the reconstruction of these countries to *restitutio ad integrum* (restoration to the previous state). The LPF completely took over the state reconstruction model propounded by the citizen movements based on the continuity doctrine, which quite consistently was included in the Declaration of 4 May 1990, "On the Restoration of Independence of the Republic of Latvia". The clearly expressed determination of Latvia and other Baltic States to restore the once lost statehood in fact was the basis for the international community, through the weakness of Soviet power after the August 1991 coup attempt, to recognise the independence of the Baltic States as subjects of international law. Not all the countries recognised the independence restoration of the Baltic States and some considered and still perceive them to be newly created independent states. Unfortunately, the United Nations secretaries-general have repeatedly called the Baltic States "the new countries" that have separated from the USSR. In addition, the Baltic countries' membership fees in the United Nations up to 1996 were calculated as a portion of the former USSR membership fee.

Some politicians and scientists in Latvia also continue to believe that instead of the country's reestablishment it would have been better to create a new independent state,

which would then be the successor of the USSR, allowing to request a part of the former Soviet Union's military weapons and other assets, foreign loans still payable to the Soviet Union. Creation of a new state would also have helped avoid denationalisation of property in Latvia. This view cannot be accepted, since the reestablishment of the state on the basis of continuity doctrine has given Latvia much more. Firstly, it respected the once implemented self-determination of the Latvian people and did not legalise the Soviet annexation, as well as restored equity and ensured the unity of the Baltic States. Secondly, Latvia did not have to grant citizenship automatically to all those who had come here during the Soviet era; Latvia did not have to pay the debts of the USSR to other countries; it did not have to take responsibility for the crimes of the USSR abroad; Latvia retained the right to restitution and compensations from the aggressor states or their continuators; the Republic of Latvia regained its former embassy buildings and the gold from the Western countries; restored the international treaties already concluded by the Republic of Latvia and important legislation of that time, the re-established Republic could use and still uses the case-law of that time. Last but not least, the current status of Latvia permits to hold the perpetrators of repressions and the Soviet regime activists criminally liable for crimes against peace, humanity and war crimes, proving that Latvia is a civilised member of the international system.

Theoretical research and publications dedicated to restoration of the state of Latvia are important and topical not only for the sake of understanding of the past, but even more — in the context of the present and future, to build and implement both our internal and external policies and to be accountable to our society and international partners.

Soul. Heart. Surgery

Laureate of the Grand Medal, Professor Dr. habil. med. Romans Lācis

In the Antiquity, 3500–5000 and even 6000 years BC, to preserve the body for afterlife, the mummies of the deceased were created. It was important for the Soul, passing through a defined cycle, to return and find a place (the body) for a real afterlife. The site, the abode of the Soul was the heart.

Nowadays, the examination of mummies with the computed tomography (CT) method has revealed, that even in the ancient world, 3500–6000 years BC, a variety of vascular and heart diseases were common, and they could also be the cause of death. For example, Adell H. Allam et al., in 2011 (*Journal of the American College of Cardiology*, 2011, 4, 315–327), published the data on 52 mummies, investigating which in 44 cases vascular and cardiac structures could be identified, of which 20 showed signs of arteriosclerosis with calcification of vascular walls. Severe cardiac coronary

atherosclerosis with calcification was found in two mummies (1550th–1580th BC). This discovery is the oldest documented evidence of coronary atherosclerosis in humans many centuries before the beginning of our era.

Cardiovascular disease is the leading cause of death today, killing more than 17 million people a year (2010). Sadly, the forecast of experts, epidemiologists is quite negative. It is anticipated that in 2030 there will be over 23 million deaths brought about by this pathology — cardiovascular disease. And all of this — in spite of very extensive preventive actions taken to control the disease.

Already in 1852, with the autopsy method, Johann Nepomuk Czermak found atherosclerosis in a 3000-year-old Egyptian female mummy (Czermak, Mr N. Description and microscopic findings of two Egyptian mummies. *S.B. Akad. Wiss. Wien*, 9, 1852, 427). The contemporary CT scanning allows to conduct the research without damaging the mummies that are extremely valuable to the science. Atherosclerosis was found in 20 of 44 examined mummies, i.e., in 45% of cases.

The modern CT studies allowed M. A. Allison et al. (2004), while examining 650 asymptomatic 50–60-year-old fellow human beings, to discover that artery atherosclerosis is observed in 92% of men and 72% of women, but, as they reach a certain age — 60 years (men) and 70 years (women) — 100% calcinosis is found in one or more arteries (Allison, M. A., Criqui, M. H., Wright, C. M. Patterns and risk factors for systemic calcified atherosclerosis. *Arterioscler. Thromb. Vasc. Biol.*, 24, 2004, 331–336).

An alarmingly high occurrence and mortality from cardiovascular disease is the reason for exceptional public attention focussed on the search for solutions. Of course, the activities are directed toward prevention — the measures to reduce the rate of new cases. These measures include promoting a healthy living regime, cardiovascular disease adjustable risk management and control.

Undeniably, timely treatment of patients is of a great importance. One group of diseases — cardiovascular disease — still is the main cause of death in the world's population. Within only one year, 17 to 17.5 million people die. It is a much greater number than those that pass away in war, violence, due to injuries, more than those killed by oncologic diseases and other illnesses.

In Latvia, cardiovascular disease is common and the cause of death is more than 50% of all deaths. It is the leading cause of death in the country.

Statistical data show that in 2015 a total of 28 179 people died in Latvia, of which 16 135 passed away because of cardiovascular pathology. It amounts to 57%. This is an acute and disturbing fact. It is estimated that in Latvia about 19% of the population suffer from cardiovascular pathology, which accounts for approximately 380 000 people. According to forecasts of international experts, the disease epidemiologists regarding the increase in mortality, this trend is clearly marked also in Latvia. For instance, in

2011, per 100 000 of the population, 776.1 people died of cardiovascular diseases, in 2011, this number was 760.9, in 2012 — 801.9, in 2013 – 812.8, in 2014 – 806.1 and in 2015 – 815.9 people.

The world has responded with very extensive, massive, financially very costly treatment and prevention activities. Cardiology and cardiac surgery centres have been created. Changes of national legislation have been introduced in order to promote a healthy lifestyle, to limit the disease risk factors. For example, a ban on smoking in public places, on aircraft, near schools, on the street, on balconies, etc. Catering in schools is adjusted, physical activity programmes changed, etc. In Latvia, prevention and treatment of cardiovascular disease generally have gained very much attention. A well-equipped cardiology assistance service has been established, two cardiac centres created — in Pauls Stradiņš Clinical University and the Children's Clinical University Hospital. All this, undoubtedly, has an important, positive result even in a very short period, within a few years. The Central Statistical Bureau of Latvia indicates that mortality caused by a particularly serious disease — myocardial infarction — is significantly reduced. In 2009, per 100 000 inhabitants, myocardial infarction caused the death of 70.5 people, but already in 2015 — only of 59.2 people. It is an excellent result. Unfortunately, similar dynamics is not observed regarding the so-called cerebrovascular disease, hypertensive disease, and cardiomyopathy.

The Latvian Cardiovascular Surgery Centre was created in 1969 following the decision of the Ministry of Health (Minister V. Kaņeps). Professor Jānis Volkolākovs was appointed a director of the Centre. Many important directions were developed: surgery of congenital heart ailments, correction of heart valve abnormalities, myocardial revascularisation, aortic disease surgery, peripheral arterial and venous surgery, heart rhythm disorders surgery with different types of pacemakers, implantation of defibrillators, cardiac tumour surgery, heart failure surgery using mechanical assisted circulation methods, as well as a heart transplant from person to person. At that time, virtually everything was unknown, new, both here and throughout the world. This direction, cardiovascular surgery, was just taking shape, and it rapidly developed. The first “closed” mitral commissurotomy took place on 30 March 1957 in Pauls Stradiņš Hospital, and it was carried out by the outstanding Latvian surgeon, a surgeon with golden hands, Professor Ēvalds Ezerietis.

The decision to establish the Cardiovascular Surgery Centre in 1969 in Latvia was very progressive and absolutely timely. Mortality from cardiovascular disease in those years was high, and the existing resources and experience was divided among different Latvian hospitals. Therefore, uniting everything in a single centre, the experience of Pauls Stradiņš Clinical Hospital, Rīga City 1st Hospital, Military Hospital, and Children's Hospital was consolidated. As a result, not only the experience, but also human resources and partially the then existing equipment was concentrated in a single place. The initial significant experience in heart surgery was accumulated at the Rīga

City 1st Hospital — by Dr Anatolijs Nikitins, Ojārs Aleksis. At the Military Hospital, heart surgeries were performed by Dr. Valentīns Harlamovs. In Pauls Stradiņš Hospital, cardiac surgery pioneers were professors Ēvalds Ezerietis, Jānis Slaidiņš, and Vladimirs Utkins, Dr. Uldis Bērziņš and Dr. Natālija Bāliņa. The most vigorous activity was at the Children's Hospital under the leadership of Professor Aleksandrs Bieziņš — professors Jānis Gaujens, Jānis Volkolākovs, Oļģerts Putniņš, Herberts Zandersons, Visvaldis, and Valija Ledus, Dr. Juris Lejassaus, Dr. Juris Breicis, Juris Jansons, Māris Ligers, Āris Lācis, etc. Those people formed the core of the Cardiovascular Surgery Centre and shaped this institution, which was acutely needed in Latvia.

The further developers of the newly established Cardiovascular Surgery Centre were also Pauls Stradiņš Hospital surgeons Uldis Bērziņš, Maruta Skujiņa, Andris Aivars, Biruta Puriņa, Ivars Jaunkalns, Biruta Mamaja, Augusts Ozols, Heinrihs Lācis, Pēteris Ošs, Edvīns Lietuvietis, Svetlana Thora, Igors Marcinkevičs, Andris Alks, anaesthetists Biruta Timofejeva, Olafs Radziņš, Laila Feldmane, and many, many others. Founding of the Centre was also associated with the accumulated initial experience in heart surgery at the Military Hospital (V. Harlamovs), Riga City 1st Hospital (A. Nikitins, O. Aleksis), as well as the Children's Hospital.

The original development since 1969 had been very complicated and demanding, because the insufficient experience was largely due to the limited opportunities to purchase the expensive technology. The road was thorny. At that time, in the 1970s, heart surgery was evolving globally. Good professional, collegial contacts developed with cardiac surgery centres in many universities. In my opinion, the paramount role in supporting cardiac surgery was played by the alliance created at that time: academic department, hospital and research laboratory. Their work was coordinated and highly focussed. I think, the creator of this alliance was Professor Anatolijs Bļugers, once very popular in Latvia.

The Latvian Cardiology Centre, working under the guidance of Professor Jānis Volkolākovs, has mostly retained the previous trends of activities and continues to develop them in a new quality. They include valvular heart surgery, myocardial revascularisation, ascending aortic surgery, surgical correction of heart rhythm disorders, treatment of heart failure by means of mechanical ventricles and heart transplants.

A great revolutionary event took place on 10 April 2002 — a successful heart transplantation was carried out. The experience accumulated to date encompasses 23 transplant operations, in 2015 — a successful heart transplantation to a child.

The most vivid moments in the development of the Centre:

1. The professional recognition extended by the superpower of the time to Professor Jānis Volkolākovs, granting the State Prize for achievements in the development of cardiac surgery (1977).

2. Stabilisation of the quality and supply of medical technology after the restoration of Latvia's independence.

3. Increase of assistance to residents of Latvia, since 2007, with opportunities to perform more than 1000 operations with artificial vasculature and increase of the survival rate after these operations up to 99% and more. In 2014, a heart surgery under artificial vasculature conditions was carried out on 1089 patients and in 2015 — on 1107 patients. The most advanced heart valve mechanical and biological prostheses have been used. (Figures 1, 2 and 3).

4. The possibility of a heart transplant and its successful realisation in 2002 and HTx on a child in 2015.

5. Mechanical ventricular implantation with excellent results for 35 patients. (Figures 4, 5).

6. Very successful introduction of transcatheter heart valve surgery, the so-called hybrid operations since 2009 have shown truly competitive results in Europe. (Figures 6, 7).



Fig. 1. Heart valve mechanical prostheses



Fig. 2. Edwards Lifesciences xenopericardial bioprosthesis Intuity



Fig. 3. St. Jude Medical xenopericardial bioprosthesis Trifecta



Fig. 4. Mechanical ventricle Heart Mate 2, Thoratec



Fig. 5. Thoratec Heart Mate 2

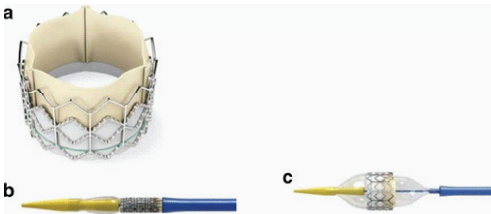


Fig. 6. TAVI Edwards Sapien transcatheter heart valve

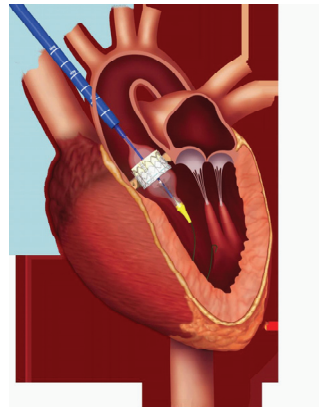


Fig. 7. Aortic insertion of the TAVI heart valve

Looking into the history of development and formation, the most important aspect must be noted — continuity and assertive, targeted daily work of the great staff of the Latvian Cardiology Centre. Its motto — *Salus aegroti suprema lex* — has indeed always been the main driving and motivating force. This theme must always be retained, and carried into the future.

And yet the question remains: What is the heart?! A pump? The power centre? The prohibited organ? Abode of the soul? The Sun?

In any case — the heart is not just a pump!

MEETINGS OF THE LATVIAN ACADEMY OF SCIENCES

20 January**From quantum complex matter to quantum biology: The emergence of a new physics in the 21st century**

Advances in the 21st century science are leading to a shift of paradigm in our understanding of the world of complex matter. In his lecture the author gave a perspective of experimental evidence for the emergence of phenomena of quantum coherence near room temperature [1, 2] and in our macroscopic world, while some years ago the quantum world was supposed to be confined at very low temperatures and only in the atomic and subatomic scale. New experiments in material science together with advances in quantum phenomena in biology [3] and in the science of complexity [4] are leading to a shift of paradigm in the physical sciences. Quantum complex materials such as high temperature superconductors and living matter are both non-equilibrium and fine-tuned systems. A new physics of active matter and adaptive matter is emerging looking for the general laws for jiggling atoms at the basis of the living state of matter. The new 21st century is associated with the beginning of the genomic era, cellular biophysics, and neurosciences in life sciences. All essential interactions for the emergence of life take place in the mesoscopic scale and in the low energy range 25–250 meV. The new emerging physics of life is based on the handling of big data set trying to understand the network of networks such as the protein–protein, protein–gene, metabolic, gene expression interaction networks.

The new physics of the 21st century is focusing to understand novel intricate non trivial mesoscale inhomogeneity in heterogeneous materials.

In material science our century is characterised by new nanotechnologies controlling the structure and textures in the mesoscopic scale. A new type of light, synchrotron radiation (SR), to investigate the mesoscale matter organisation became of worldwide use only in this century. This is due to the invention of storage rings in the 1960s, in Frascati, where the PULS facility in 1980 was the second SR facility in the world. The focus of this talk is on advances of SR methods to imaging and control Magnetic, Lattice, and Charge complexity in the mesoscale opening the way to produce new electronic and magnetic functional materials. The developments of novel synchrotron radiation-based methodologies to probe multiscale spatial and temporal complexity in the low energy range 25–250 meV, is opening new perspective for a new low energy physics explaining and controlling the emergence of new material functionalities. Complex mesoscopic textures made of transition metal oxides, graphene, and silicene control the emergence of colossal magneto-resistance, high temperature superconductivity, electronic functionalities of two dimensional electron fluids, making possible new types of detectors and memory storage devices. Condensed matter research using large

Synchrotron Radiation Facilities started around 1974–1976, and thus it was only ten years old when HTS was discovered. In these last 30 years, the impressive development of new Synchrotron Radiation Research methods is slowly producing a revolution on our knowledge of condensed matter. In lecture it was analysed how advanced SR methods, XANES and EXAFS and scanning nano X-ray diffraction show the key role of mesoscopic texture in high temperature superconductors. The author focused on the complex nanoscale phase separation where the high temperature superconductivity emerges and a first network of nanoscale puddles of polaronic charge density wave (CDW) with the associated periodic lattice distortions (PLD); and a second scale free network made by striped defects, stripes of oxygen interstitials.

1. Campi, G. *et al.* Inhomogeneity of charge-density-wave order and quenched disorder in a high-Tc superconductor. *Nature* **525**, 359–362 (2015). <http://dx.doi.org/10.1038/nature14987>. 1509.05002.
2. Bianconi, A., Jarlborg, T. Superconductivity above the lowest earth temperature in pressurized sulfur hydride. *EPL (Europhysics Letters)* **112**, 37001+ (2015). <http://dx.doi.org/10.1209/0295-5075/112/37001>.
3. Poccia N., Ansuini A., Bianconi A. Far from equilibrium percolation, stochastic and shape resonances in the physics of life. *Int. J. Mol. Sci.* 2011, **12**, 6810–6833; doi: 10.3390/ijms12106810.
4. Poccia, N. *et al.* Changes of statistical structural fluctuations unveils an early compacted degraded stage of PNS myelin. *Scientific Reports* **4**, 5430 + (2014). <http://dx.doi.org/10.1038/srep05430>.

Antonio Bianconi,

LAS Foreign Member

Rome International Center for Materials Science, Superstripes Rome, Italy

On 22 August, during Hankou University vice president’s Prof. Peter Sachsenmeier’s visit to Latvia, a Cooperation Agreement between the Latvian Academy of Sciences (LAS) and the Hankou University (the People’s Republic of China) International Innovation Centre was signed. The aim of the Cooperation Agreement is to promote interest in types of knowledge acquisition and avenues of research in both institutions, as well as to enhance comprehension of the economy, cultural, and social issues of represented states within competences of these institutions.

After the Agreement signing ceremony, Peter Sachsenmeier gave a lecture “Digital Transformation and the Future of Latvia”. The lecture included many findings associated with technological progress, not only those we already have heard of, but also some less known ones. In the presentation it was proposed that up to the early 20th century the scope of human accumulated knowledge had been doubling every 100 years. Currently it is doubling every 12 months and it is expected that soon this will happen even faster.

The most important role in this process is played by global digitisation — the Internet. Acquisition of new knowledge and progress is happening exponentially, digitisation affects all areas of life and in this process there are both winners and losers.

As a member of the German National Academy of Science and Engineering (Deutsche Akademie der Technikwissenschaften), Prof. P. Sachsenmeier described the German digital strategy guidelines associated with the anticipated research development. The audience was presented the Hankou University International Innovation Centre's Development Plan *Made in China 2025 / 13th Five Year Plan*, Prof. P. Sachsenmeier being in charge thereof. Prof. Sachsenmeier expressed his opinion on the Latvia's prospects in the digitised world. National success depends on implementation of multidisciplinary innovations and the ability to change in response to the rapidly changing circumstances. The question is — how and with whom to compete and cooperate. The future requires active regional cooperation in the NB8 format, with Denmark, Estonia, Finland, Iceland, Lithuania, Norway, and Sweden, to ensure successful self-presentation of Latvia in the Baltic Region and cooperation with other partners, including China.

Summary provided by Dr. Sofja Negrejeva

25 September, a popular science lecture “Light, Euclid, Einstein and the Universe” (see *Zinātnes Vēstnesis (Science Bulletin)*, 12 September 2016, No. 14; 26 September, No. 15)

The lecture was traditionally read by the winner of LAS Grand Medal, LAS Full Member Kurts Švarcs.

Light as a religious symbol and as the most important human source of information was studied in all ancient civilizations. The most extent were ancient Greek thinkers' perceptions of light. Their notions of visual perception and the light were quite descriptive. For example, Empedocles (490–430 BC), believed that objects radiate multicolour light, which causes a visual sensation. According to Empedocles, objects are sources of light. Euclid (4th–3rd centuries BC) was of a different opinion. He was a genius mathematician, who gathered mathematical knowledge of the time in his work *Elements* — the first work in mathematics with a strict logic and axiomatics, which contributed to the development of mathematics for centuries. Euclidean geometry is taught in schools even today. Euclid compared a light beam with a straight line, he studied the perspective projection and object sizes depending on the distance. Euclid explained visual sensation with light beams (corpuscles or the “lines of sight”) coming out of the eyes. The ancient Greek philosophers sensed the corpuscular or quantum nature of light, which was discovered in physics only in the early 20th century. [1]

Humanity understood the nature of light (light waves or particles) only in the early 20th century, although practical application started much earlier, significantly affecting the development of natural sciences (astronomy, physics, biology). The first applications of optics were lenses, telescope and microscope. This took place at the turn of the 16th and 17th centuries and is associated with the Dutch spectacle-makers Hans Lippershey (1570–1630) and Zacharias Janssen (1588–1631), and Galileo Galilei (1564–1641). These tools revealed to humanity both the expanse of the Universe and the microcosm, especially in biology.

At the end of the 19th century, the phenomenon of light led the physics to an impasse that was resolved only thanks to Albert Einstein's (1879–1955) theory of relativity and Max Planck's (1858–1947) theory of light radiation quantum. The first contradiction is related to measurements of the speed of light in astronomical observations and laboratory experiments, which have shown that the speed of light is not affected by movement of the source of light. These observations contradict Newton's laws of motion.

Another problem was the light emitted by heated bodies — thermal radiation. This radiation is inherent in all heated bodies with a temperature above the absolute zero ($T > 0$ K). Upon calculating the radiation spectrum, German theoretician Max Planck concluded that the light from heated bodies is not emitted continuously, but in discrete portions — light quanta. Planck's conclusion proved the corpuscular nature of light. Planck was surprised by these results and at first he believed that light is only emitted discretely in the form of quanta and it spreads continuously as a light wave.

The issue of the speed of light was resolved in 1905 thanks to Einstein's special theory of relativity, which covered motion rules at speeds close to the speed of light. The special theory of relativity postulated the speed of light as the maximum speed of movement of bodies. This postulate was proved by all experimental observations to the present day. Einstein has discovered a new era not only in physics and astronomy, but in all the high-speed engineering and astronautics. Einstein conducted his first brilliant work in isolation from the scientific community. In the same year, there appeared three more publications. According to expert appraisal, all four works met the Nobel Prize requirements and had a significant impact on the development of science. These works discussed photo-effects, molecular motion in fluids (Brownian motion) and mass-energy equivalence (the famous formula $E = mc^2$, where c is the speed of light). Einstein conducted all of his brilliant works in 1905 as a Swiss patent management expert, specifically, in his free time apart from the main job. Only in 1907, Einstein became an associate professor at the University of Zurich, and in 1911 he was elected as a professor at the University of Prague.

Max Planck's light quanta and Albert Einstein's theory of relativity began the scientific revolution of the 20th century, which facilitated all the further technical progress up to this day, including space exploration and awareness of the structure of the Universe.

Let us consider another branch of quantum mechanics — quantum computers that are being actively researched in the last few decades. Unlike the standard computer, a quantum computer works according to the principles of quantum mechanics. An American physicist, a Nobel Laureate Richard Feynman is known to be the originator of this research [2]. Feynman pointed out that quantum mechanical processes are difficult to model using regular computers, and these processes require a quantum mechanical approach. Quantum computers process information using quantum system parameters such as the electron or proton spin or polarisation of light quanta. Unlike the digital computer *bit* system (0 or 1), a quantum computer uses a *qubit* that defines the selected quantum states ($|0\rangle$, $|1\rangle$). According to the principles of quantum mechanics, the superposition of quantum states and the associated or entangled states are interrelated and quantum computers provide only a probable calculation result. Quantum computer calculations require quantum algorithms that differ from regular computer algorithms. To ensure stability of *qubit* states frequently low temperatures close to the absolute zero have to be used. For many years experiments with a limited number of *qubits* were conducted in the field of quantum computing. Quantum computer performance is complex and operation thereof requires a regular digital computer. Despite these difficulties, the leading world data centres are addressing this issue. Recently the American company IBM advertised the first *50-qubit* quantum computer (this number is a significant breakthrough!). [3] It should be noted that Latvian scientists, Professor R. M. Freivalds and Professor A. Ambainis and their co-workers have contributed significantly to this branch [4, 5].

Unfortunately, the major scientific and technical progress of the 20th and 21st centuries could not prevent global controversies. Today around a billion people in the world are suffering from hunger and around two billion of the world's population are undernourished. One of the world's contradictions is the gap between wealth and poverty. Global steps must be taken for humanity to have a future and for the world to survive [6].

Literature

1. Störig, H. J. *Kleine Weltgeschichte der Wissenschaft*. Frankfurt (M): Fischer Taschenbuch Verlag, 2007.
2. Feynman, R. P. Simulating physics with computers. *Intern. J. Theoretical Phys.*, **21** (6/7), 1982, 467–488.
3. Rieffed, E. G., Polak, W. H. *Quantum Computation*. Cambridge: MIT Press, 2014.
4. Freivalds, R. Knot Theory, Jones Polynomial and Quantum Computing. *Lecture Notes in Computer Science*, 2005, **3618**, 15–25.
5. Ambainis, A. Quantum walk algorithm for element distinctness. *SIAM Journal on Computing*, 2007, **37**, 210–239.
6. Randers, J. *2052: A global forecast for the next forty years*. Cambridge: University Press, 2012.

LAS Full Member *Kurts Švarcs*

On 4 October, a LAS and *Zvaigžņotā Debess (The Starry Sky)* magazine joint meeting **“The Starry Sky connects Latvia with the world”** was held (see *Zinātnes Vēstnesis (Science Bulletin)*, 10 October 2017, No. 16). The audience had the chance to get an overview of the current issues in astronomy and space exploration, and also to find out about interesting people, who write about these issues. Professor Dainis Draviņš, LAS Foreign Member of Lund Observatory (Sweden), spoke about the most important international astronomy organisations and their areas of activity. A new find was the Tartu Observatory (Estonia) Head of Space Technology Department PhD Andris Slavinskis. He leads the student satellite programme, under which the first artificial Earth satellite in the Baltic States “ESTCube-1” was launched into the outer space in 2013. One of the tasks is to explore how to build a spacecraft that would not cause contamination of space around our Earth with own debris after their work is complete. A member of the editorial board PhD Jānis Jaunbergs spoke about tar lakes of Saturn’s largest moon Titan. Raitis Misa prepared interviews for the magazine with authors of various just yet fantastic projects, such as Bas Lansdorp, the author of *Mars One* — the idea of establishing the first human settlement on Mars (without the possibility to return) and technical aspects thereof. Artist and photographer Kristaps Kemlers demonstrated his competition with the striking images captured by the Hubble Space Telescope on the screen. The meeting has proved once again that astronomy is not only for scientists and amateurs advanced in years, but also an activity for enthusiastic young people.

Summary provided by *Dr. Sofja Negrejeva*

MEETINGS OF THE SENATE

In 2016, there were 11 meetings of the Senate (on 12 January, 16 February, 1 March, 29 March, 26 April, 10 May, 14 June, 13 September, 4 October, 25 October, and 8 November).

On 12 January, the Senate confirmed the decisions of expert commissions on the LAS awards, listened to information presented by the LAS Deputy Secretary General Raimonds Valters on the achievements in science in 2015, nominated by the LAS, report by *Dr.habil.med.* Māris Baltiņš on the strategy of the LAS Terminology Commission, and approved him as the Chair of the LAS Terminology Commission. LAS Full Member Tālavš Jundzis reported to the Senate on the activities of Latvians in exile across countries and continents.

On 16 February, the ceremonial meeting was dedicated to the 70th anniversary of the Latvian Academy of Sciences.

The report “Formation of the Latvian Academy of Sciences” was delivered by Jānis Stradiņš, Chair of the Senate. Minister of Education and Science Kārlis Šadurskis presented the Cabinet of Ministers Certificate of Recognition to LAS Full Member Raimonds Valters, Head of the State Scientific Qualification Commission. The LAS President Ojārs Spārītis’ Certificates of Appreciation were awarded to the LAS previous presidents Tālis Millers, Jānis Stradiņš, vice president Tālavš Jundzis, Foreign Secretary Andrejs Siliņš, Chairs of divisions Baiba Rivža and Raimonds Valters, and to long-term officers: LAS Adviser to President Anita Draveniece, scientific secretaries Baiba Ādamšone, Alma Edžiņa, and Sofija Negrejeva, presidential secretary Dace Govinčuka, personnel specialist Ināra Augule, head of information technology services Elmārs Lange, head of the Archive Rūta Skudra, personal assistant to Chair of the Senate Dzintra Cēbere, editor of the journal *Proceedings of the Latvian Academy of Sciences* Antra Legzdiņa, editor-in-chief of the newspaper *Zinātnes Vēstnesis (Science Bulletin)* Zaiga Kipere, head accountant Ludmila Helmane, as well as Administration staff — Vitālijs Kozlovskis, Daina Kirillova, Īrisa Gādiga, Gaļina Siņakova. The Senate approved granting the Latvian Academy of Sciences honorary doctorate to *Dr.philol.* Gundega Grīnuma (*Dr.h.c.philol.*), Ivars Ločmelis (*Dr.h.c.hist.*), and Georgs Jankovskis (*Dr.h.c.med.*).

The participants of the meeting listened to two interesting reports, by *Dr.habil.teol.* Leons Taivans “Science Prospects in the Clash of Civilizations Era”, and *Dr.sc.pol.* Ivars Ījabs, “Union for Sunny Weather. Refugee Crisis and Europe’s Political Stability”.

On 1 March, the Senate listened to Agrita Kiopa, Director of the Department of Higher Education, Science, and Innovation, Ministry of Education and Science, who reported on the implementation and future of the National Research Programmes. The meeting was also attended by the National Research Programme managers or

persons authorised by them, who asked many questions and took part in the discussion. Ms A. Kiopa also presented the Ministry of Education Certificate of Recognition to Alma Edžiņa, long-term secretary of the Senate and the State Scientific Qualification Commission.

The Senate granted the LAS Grand Medal to *Dr.habil.sc.pol., Dr.iur.* Tālavš Jundzis, full member of the LAS, member of the European Academy of Sciences and Arts, and professor of the University of Latvia, for research on Latvia's independence restoration history, and to *Dr.habil.med.* Romans Lācis, Head of Pauls Stradiņš Clinical University Hospital Heart Surgery Centre, professor of the RSU, for important contribution to the development of cardiac surgery in Latvia.

On 29 March, the Senate listened to and endorsed the theses prepared by the LAS Secretary General Valdis Kampars for the report at the LAS Spring General Meeting and discussed Ojārs Spārītis' presidential candidate programme for the LAS presidential re-election.

On 26 April, the Senate members in respectful silence paid tribute to the memory of the deceased Juris Ekmanis, the LAS President (01.05.2004–26.12.2012) and Vice President (26.12.2012–01.05.2016). Juris Ekmanis passed away on April 9. The Senate approved the vacancies for the election of new LAS members in 2016, discussed the report of the Supervisory Board at the Spring General Meeting, and listened to the report by LAS Full Member Baiba Rivža and *Dr.* Sergejs Kruks on the progress of the National Research Programme "Economic Transformation, Smart Growth, Governance and Legal Framework for Sustainable Development of the State and Society — A New Approach to the Creation of a Sustainable Learning Community" (EKOSOC).

On 10 May, O. Spārītis, the LAS President, delivered the introductory address. The Senate elected LAS Full Member Jānis Stradiņš as the Chair of the Senate, who presented his vision of the Senate activities in 2016–2020. LAS Full Member Tālavš Jundzis was elected Deputy Chair of the LAS Senate. The Senate confirmed the LAS Board composed of three persons: Chair — Andrejs Siliņš, Secretary General of the LAS; members of the Board: LAS full members Baiba Rivža and Bruno Andersons. The Senate confirmed Vitālijs Kozlovskis for the post of Administration Director of the LAS. Tālavš Jundzis informed the Senate about preparations for the 4th World Congress of Latvian Scientists (June 2018).

On 14 June, the LAS Vice President Andrejs Ērglis informed the Senate on the Baltic Innovative Research and Technology Institute (BIRTI) project, LAS Full Member Raita Karnīte informed about the councils held in 2016, LAS full members Jānis Stradiņš and Baiba Rivža reported about the participation in the 8th Selonian Congress. The Senate passed the decision to organise a special prizes competition in 2017.

On 13 September, the Senate listened to the report by Boriss Kņigins, Deputy Director of the Structural Department of the Ministry of Finance of the Republic

of Latvia, “EU Funds Support for Research and Innovation in the Planning Period 2014–2010”; LAS Corresponding Member Pēteris Trapencieris, the LAS full member candidate, delivered the scientific report “Design of Multi-targeted Medicine” (see *Zinātnes Vēstnesis*, 10 October 2016). The Senate discussed the Scientist’s Code of Ethics and took the decision to authorise the representatives of the Ethics Commission, Tālavš Jundzis, Maija Kūle, and the Chair of the Latvian Council of Science (LCS) Jānis Kloviņš, to delineate the Code of Ethics more precisely, submit it to the LCS for approval and then re-approve the final version in both the LCS and once again in the LAS Senate.

On 4 October, the Senate listened to two scientific reports of the LAS full member candidates: “Latvian Sociolinguistic Research in the context of the European Union and its Member States Language Policy” (LAS Corresponding Member Ina Druviete) and “Modern X-Ray Absorption Fine Structure Spectroscopy — When Theory Meets Experiment” (LAS Corresponding Member Aleksejs Kuzmins, see *Zinātnes Vēstnesis*, 10 October 2016). The Senate approved the list of candidates for the election of new members of the LAS and assigned an additional LAS foreign member vacancy for 2016 elections. The Senate approved LAS Full Member Raita Karnīte, Chair of the Division of Social Sciences and Humanities, for the post of Chair of the Editorial Board of *Latvijas Zinātņu Akadēmijas Vēstis, A (Proceedings of the LAS, Section A)*. The Senate confirmed the Board of the LAS Foundation: Chair of the Fund Bruno Andersons, Board of the Fund: Jānis Bērziņš, Tālis Millers, and Jānis Stradiņš.

On 25 October, the Senate listened to three scientific reports by full member candidates of the LAS: “Promotion of Innovation and Research in Europe and Latvia (LAS Corresponding Member Inna Šteinbuka), “Macroeconomic Modelling and Development of Latvia’s Macroeconometric Model” (LAS Corresponding Member Remiģis Počs), and “Synthesis, Properties, Potential Applications of Nanomaterials” (LAS Corresponding Member Donāts Erts, see *Zinātnes Vēstnesis*, 7 November 2016). The Senate approved the commission for evaluation of the LAS members to be elected: Ojārs Spārītis (chair of the commission), members of the commission: Jānis Stradiņš, Raita Karnīte, Jānis Spīgulis, Pēteris Trapencieris, Baiba Rivža.

On 8 November, the Senate listened to the scientific report “Optically Detectable Magnetic Resonance Spectroscopy in Crystals, Glasses, and Glass-ceramics” (See *Zinātnes Vēstnesis*, 21 November 2016) delivered by Professor Uldis Rogulis, Faculty of Physics and Mathematics, University of Latvia. U. Rogulis had submitted documents for the corresponding member vacancy in physics, but the evaluation commission of experts suggested supplementing the list of to-be-elected LAS full members with U. Rogulis’ candidature, since the announced vacancies were not filled and the LAS Statute permits this.

The Senate deliberated the candidates to LAS membership and worked out recommendations for the General Meeting concerning this issue. The LAS Foreign

Affairs Secretary Tālavš Jundzis informed the Senate members about the Latvian scientists' international cooperation and the status of the International Council for Science.

The Senate granted the following LAS Certificates of Appreciation:

To LAS Full Member **Mārcis Auziņš** for strengthening the role of research in higher education in Latvia and to LAS Honorary Member **Raimonds Pauls** for enduring contribution to Latvian culture and nurturing of national identity (12 January), to LAS Honorary Member **Pēteris Vasks** for enduring contribution to Latvian culture and nurturing of national identity and to LAS Foreign Member **Juris Upatnieks** for lasting contribution to world physics and creation of new technologies (26 April), to LAS Honorary Member **Knuts Skujenieks** for lasting contribution to Latvian poetry and systematic familiarising of the Latvian public with literature of other nations, to LAS Honorary Member **Roalds Dobrovenskis** for lasting contribution to research of Rainis' creative work and acquainting the Latvian public with the best Russian cultural traditions, and to LAS Full Member **Oļģerts Krastiņš** for lasting contribution to research of the living standard of the Latvian population and establishment of the tradition of mathematical statistics in Latvia (13 September), to *Dr.h.c.hist.* **Zigrīda Apala** for outstanding contribution to Latvian archaeology, especially for the study and preservation of artefacts in Cēsis and its environs (4 October), to LAS Full Member **Edīte Kaufmane** for outstanding contribution to development of fruit-growing in Latvia and to LAS Full Member **Juris Zaķis** for important contribution to development of Latvian science and education (25 October), to LAS Honorary Member **Zigmunds Skujiņš** for outstanding contribution to Latvian literature and cultural history (8 November).

Dr.chem. Alma Edžiņa

16 February Senate meeting**Formation of the Latvian Academy of Sciences**LAS Full Member *Jānis Stradiņš*

On 14 February 1946, the members of the newly created Latvian SSR Academy of Sciences gathered for the first general meeting at the present-day building of the Cabinet of Ministers, 36 Brīvības Street, to chart the guidelines of their work and elect officials, including the first president of the Academy, the agrarian scientist Pauls Lejiņš. It is on this day that the life of our Academy officially begins, and this year we celebrate the 70th anniversary. In the Academy Statute 14 February is marked as the Academy Day since on 14 February 1992 (14 February again!), after Latvia regained its independence, the LAS Charter was adopted. The LAS continued its life in a new form, with new traditions as a staff academy like in other European countries, the centre of scientific excellence, expertise and promotion of national and international dimensions, Latvia's representative in the international world of science.

However, besides the above-mentioned years of 1946 and 1992, recorded in the LAS Charter and flag are even earlier dates of 1815, 1869, 1932, and 1936, marking the prehistory of the Academia and testifying to the centuries-long traditions of Latvian science. They are rooted in both the European-oriented research activities of Baltic Germans in Rīga, Jelgava, and Dorpat, and in the efforts of the first researchers of Latvian origin, as well as the scientific activities of the most prominent scientists of the University of Latvia (founded in 1919) and its predecessor — the Rīga Polytechnical Institute.

The first regional academy of sciences on the territory of Latvia was the Courland Society for Literature and Art, founded after the Napoleonic wars and whose bicentenary we marked last year as the UNESCO *Year of Academia – 200* by holding a number of events at the international level here in Rīga and Jelgava, including the joint session of the European Academy of Sciences and Arts and the LAS. We paid tribute to the Baltic German scientific heritage, their contribution to the formation of Latvian national education; in this context we mentioned Struve, Paucker, Grotthuß, Baer, also Watson and Bielenstein, Merkel and Sonntag, European scientists Gauss and Grimm. This society ceased to exist in 1939, and there is no direct historical continuity with the present-day LAS. However, the Europe-oriented Baltic German scientific society stimulated the Latvian academic environment and, indirectly, in terms of its initial objectives and guiding principles, should be regarded as the ideological predecessor of our LAS.

Some features of a *popular academy of sciences* can be traced in the Rīga Latvian Society Knowledge Commission, founded in 1869, whose members include personalities such as Fricis Brīvzemnieks, Krišjānis Barons, Andrejs Pumpurs, Augusts Deglavs, Vilis Olavs, Aleksandrs Vēbers, the early Jānis Pliekšāns (Rainis), Kārlis Mīlenbahs, Ludis Bērziņš, and Teodors Zeiferts. On this basis, in 1932, Professor Pēteris Šmits,

together with Jānis Endzelīns and Ludvigs Adamovičs, organised a private academy, the Latvian Science Committee or *Academia Scientiarum Latviensis SRL*, under the auspices of the Rīga Latvian Society.

But first a brief interlude: for the very first time the idea of a “Latvian academy of knowledge” was voiced among the First World War refugees, in Moscow, when along with organising care of Latvian refugees and Rifleman, the idea of the Academy of Latvian Higher Education Institutions and Knowledge was born. This intention with a detailed plan on the functions of a future academy was declared at a meeting of Latvian intellectuals in the big hall of the Moscow Polytechnic Museum in February 1916 — precisely 100 years ago! It was publicly announced by Pauls Dāle (1889–1968), later a well-known philosophy and psychology professor at the University of Latvia, one of the actual organisers of this university in 1919.

The idea of the Latvian Academy of Sciences was maintained throughout the first independence period of the Republic of Latvia (1918–1940), popularised by the economist Kārlis Balodis and philosopher Pēteris Zālīte, and Dāle, and the linguists Endzelīns and Šmits. It was actually organised under K. Ulmanis interim government under the auspices of the Ministry of Education and lead by J. Endzelīns, but the Minister of Finance soon deleted it from the budget out of austerity considerations. The founding of the Academy of Sciences in Latvia was supported by Rainis in 1927, but he did not manage to implement this idea. In this situation, the prominent linguist and folklorist Professor Pēteris Šmits founded the already mentioned private academy at the Rīga Latvian Society, which existed until 1940 and numbered 25 current members, 8 honorary members, and 8 corresponding members abroad, among them the well-known Finnish scientists Kaarle Krohn and Jozepi Mikkola, and the French historian Henri Hauser. Honorary members included Pēteris Šmits and Jānis Endzelīns, also rectors Mārtiņš Bīmanis, Jāzeps Vītols and Vilhelms Purvītis, while the current members included such authorities as Francis Balodis, Alfrēds Vītols, Pēteris Nomals, Pauls Kundziņš, Jūlijs Auškāps, Arveds Švābe, Teodors Celms, Aleksandrs Būmanis, Edvarts Virza, Leonīds Slaučītājs and several others, later also a number of representatives from the field of natural sciences and engineering.

This academy was not very popular and did not enjoy the confidence of the authoritarian state and the Prime Minister Kārlis Ulmanis, who suggested acting differently. Already in 1935, Ulmanis declared his intention to establish the Academy of Sciences and, on 14 January 1936, a law was issued (the first national act of the Republic of Latvia on an academy of sciences!) on the foundation of the Latvian Institute of History, stating that “*on establishing the Latvian Academy of Sciences, the Institute of History will enter it as its first constituent part*”. In Kārlis Ulmanis’ opinion, the Academy of Sciences should be formed of not just the scientists that were accepted (if not appointed) by him, but also of institutions. Besides the Institute of History there was the already established Repository of Latvian Folklore (1924), Language

Repository (1935), Natural Resources Exploration Institute (1936, 1939), the Nation's Vital Power Research Institute operated within the Health Promotion Society (1938), and also the Institute of Natural Sciences had been conceived. In 1939, optimisation of the Šmits–Endzelīns Rīga Latvian Society (RLS) Science Committee was started. It is quite likely that the idea of the Academy of Sciences might have been implemented in around 1940–1941, if not for the Molotov–Ribbentrop Pact, the Second World War, and the subsequent occupation of Latvia. In July 1940, the RLS was wound up along with the private academy; similarly, in Estonia President K. Päts signed the order to wind up the Estonian Academy of Sciences that he had founded in 1938.

All of these Academy's potential formation scenarios and the subsequent actual establishment of the Academy of Sciences have been analysed in detail in my book *Latvian Academy of Sciences: Origin, History, Transformations* (1998) and in two articles in the *Journal of the Institute of Latvian History* (2006). The period of 1939–1945 was fatal for the Latvian state and also its science. Many scientists perished in the totalitarian powers' repression mill, professors Auškāps and Adamovičs were shot in Stalin's prisons. 65% of Latvian scientists had fled to Germany and Sweden, in fear of repeated repressions and with no hope of unimpeded job opportunities in Latvia, which was devastated, occupied, annexed, and largely humiliated.

But, paradoxically, in this gloomy era the issue of organising the local (I would not call it national) Academy of Sciences was undertaken by the occupation power by creating academies of sciences in the united republics following the example of the USSR Academy of Sciences. Unlike in the Transcaucasian and Central Asian republics, they were not branches of the USSR Academy of Sciences, but formally independent Academies of Sciences. In fact, they worked under the supervision of the USSR Academy of Sciences and their activities were coordinated from Moscow.

On 4 November 1945, the USSR government granted permission to establish the Latvian SSR Academy of Sciences. On 7 February 1946, the corresponding resolution of the Latvian SSR Council of People's Commissars was signed by Vilis Lācis, the Academy of Sciences was founded and its first thirteen full members as well as its five corresponding members appointed. Following are the names of the full members: linguist Jānis Endzelīns, geographer Matvejs Kadeks, forestry researcher Arvīds Kalniņš, microbiologist and veterinarian Augusts Kirhenšteins, architect Arturs Krūmiņš, agricultural scientist Paulis Lejiņš, marshland researcher Pēteris Nomals, agricultural chemist Jānis Peive, medical scientist Pauls Stradiņš, biochemist Aleksandrs Šmits, architect Ernests Štālbergs, writer and specialist in literature Andrejs Upīts, nomenclature functionary and philosopher Pēteris Valeskalns. Most of them were prominent, authoritative scientists, eight were pre-war University professors (if to add the newly elected Latvian State University Professor Andrejs Upīts, it makes even nine), and only four were incomers from the USSR. Only five of them were Communist Party members, the rest were non-party, including the first president P. Lejiņš. Two

academicians were the pre-war RLS SC members (J. Endzelīns and P. Nomals). Except for J. Endzelīns and P. Valeskalns, the humanities and social sciences were not represented. Of course, many Soviet Latvian scientists remained outside the academy, also Pauls Dāle, the prime mover of the AS idea, but they were allowed to work in the newly established institutes, since the atmosphere in the Academy was generally much more liberal than in the Latvian State University.

The choice of P. Lejiņš for president was a success — he was experienced, possessing authority and reputation of a democratic public employee, charged with a desire to do something new and unprecedented for Latvia, upright, considerate, decisive enough, of dignified appearance and posture. Lejiņš was a man of honour, and during the five-year period (1946–1951) of his presidency, J. Endzelīns, A. Kalniņš, P. Stradiņš, A. Kirhenšteins, A. Šmits, J. Peive, also the subsequently elected academicians L. Liepiņa, G. Vanags, S. Hillers, A. Ieviņš, A. Mālmeistars, J. Zutis and others made valuable contributions to science. Also Lejiņš' closest colleagues, Matvejs Kadeks and Jānis Peive, both rectors of Latvia's universities and communists, respected the local scientific elite and were aware of the situation as well as the needs of science and higher education. Their participation in the creation of the LAS ensured real integration of the LAS and Latvian institutions of higher education. A comparatively tolerant atmosphere up to 1951 enabled the transfer of less politically reliable people to the Academy, so that they would not be detrimental to students' upbringing in the spirit of the regime.

Perhaps even more important than the LAS personnel was the formation of the system of research institutes of the LAS. Latvian SSR LAS was formed after the model of the USSR Academy of Sciences and the academies in other Soviet Republics as an institution not only with individual members, but also with large institutes. It should be added that this was also Kārlis Ulmanis' desired principle, and the new Academy included a number of institutes that had already existed before the war. In 1948, the LAS already numbered 1217 employees, including 409 research staff, many names still familiar later in Latvian science. During the first five-year period, the LAS mostly dealt with the research related to Latvia's post-war reconstruction, energy, natural resources, animal husbandry, forestry, and public health. Sergey Vavilov, physicist and president of the USSR Academy of Sciences, in 1948, passed the following evaluation: "As we have heard, it seems that 90% of the works are of a quite practical nature, but let us keep in mind also what we know as the great fundamental science". However, already in 1950, he could acknowledge that the LAS "had contributed a number of very significant results in medicine, agriculture, and economics. It is welcome that work in physics has noticeably improved..."

The foundation of the Academy of Sciences was a positive benefit to Latvia, an essential extension of the science system. But it also contributed to limitation of the freedom of research, characteristic of the pre-war universities; it included Soviet Latvia's science into a single Soviet system of science, gradually bringing it under

the totalitarian centralised and militarised superpower. In general, Latvia's science underwent realignment from science of a small state to science under superpower conditions, and also from a European system of science to one that is adapted to a totalitarian communist empire, with the involvement of science in politicisation of society, militarisation of the superpower, repressions against the more liberally minded or even apolitical scientists.

After Stalin's death, Latvia, too, saw gradual development of non-traditional science directions and schools — magnetohydrodynamics, solid-state physics, nuclear physics, chemistry of medical preparations and heterocyclic compounds, wood chemistry, mechanics of composite materials. In 1957, Solomons Hillers, a highly successful chemist-inventor created the Institute of Organic Synthesis, which made its mark in the USSR and still is a major research centre in Latvia with the largest number of researchers, where such active medical preparations as phtorafur (tegapur), furaginum, solafur, remantadine were synthesised, also meldonium (Mildronate, by Ivars Kalviņš), which has become the major intellectual export product of the independent Latvia. In the last international assessment of Latvian science the institute gained the highest score. In later years it was in this institute that for the first time in Latvia studies in molecular biology and genetic engineering were developed, currently successfully carried out at the Biomedical Research and Study Centre founded by Elmārs Grēns.

Closely associated with the Soviet military-industrial complex were the Institute of Polymer Mechanics and the Institute of Electronics and Computing, later also the Institute of Inorganic Chemistry and the Institute of Wood Chemistry (Tālis Millers, Arnolds Alksnis), which contributed significantly to the Soviet space research and rocket engineering development. It was in Latvia that thermal insulation coatings and composite materials, *Ripor* foam, nano-dispersed powders, were developed, which made the start of the Buran-type spacecraft possible. 25% of all the original medical preparations in the USSR were developed and produced at the Institute of Organic Chemistry.

There were achievements also in social sciences, especially in archaeology, ethnology, linguistics, literary theory, although many topics were banned and interpretation of data was often falsified (from the perspective of Marxist ideology or even chauvinism of a superpower, denying the period of Latvia's "bourgeois" statehood).

Science prestige (especially that of exact and natural sciences) in Latvia was very high; a considerable part of Latvian youth who sought refuge there from communism-imposed dogmas aspired to science. In 1990, 17 733 people were employed in Latvian science, whose mentality was largely characterised by local patriotism as one of the forms of spiritual resistance. The most important research at that time was carried out at the LAS institutes (they were responsible for $\frac{3}{4}$ Garfield SCI quoted Latvian scientists publications, 1986).

At the start of the Third Awakening, many LAS institutes and academicians got actively involved in it, just to mention the ecological expertise supported by Rita Kukaine, Aina Blinkena's involvement in the development of the Law on the State Language, the campaign for the restoration of national symbols and historical place names, the first scientific discussions about Latvia's history, the LAS democratisation efforts. In the recent conference on the issue of barricades of January 1991, we documented the role of the LAS staff at the time, also the writing of protest letters and Tālavš Jundzis' activities during those eventful days. On 15 March 1990, the Latvian SSR Academy of Sciences became the Latvian Academy of Sciences and took part in the organisation of the Latvian Popular Front, the Association of Scientists and the Latvian Council of Science.

In the discussions of that year there were some who spoke in support of dissolution of the Latvian SSR Academy of Sciences and the establishment of a new National Academy of Sciences in its place. However, the overwhelming majority voted for an evolutionary path, reforms, radically changing the existing LAS content and functions, replenishing its membership with new forces.

As a result of many discussions and not without fundamental disagreements, we arrived at the new concept of the AS — following the model of Scandinavian academies: AS works as a body of individual elected elite scientists. This stance is stipulated in the LAS Charter, adopted on 14 February 1992, at the LAS General Meeting, with the participation of the Swedish Royal Academy leaders — President Torvard Laurent and our well-wisher, Secretary General Carl-Olof Jacobson. Active participants in the drafting of the Charter were President Jānis Lielpēters, your humble servant, and the presidential advisor Jānis Kristapsons, but the very idea of the Charter and the Academy of Sciences “as a derived public person with autonomous competence” came from our friend, LAS Foreign Member Andrew Dietrich Loeber, a well-known Baltic German lawyer and patron.

There were also voices for the idea of a “hybrid academy” that would include both individual elected members and the existing large institutions, creating something similar to Max Planck's or the Fraunhofer system of institutes in Germany. But the new, hard-up State of Latvia did not have the financial capacity to build such a system and maintain it. Initially, the “liberal” government policy did not allot science a more or less significant place in the national long-term strategic development; moreover, there was basically no such strategy. The inflated science system of the Soviet era, created to serve the needs of the superpower, was tacitly seen as an unnecessary ballast for the financially-struggling small country and, as a matter of fact, the funds for science were scarce indeed.

By the year 1996, most institutions were included as part of the University of Latvia, Rīga Technical University, later of the Rīga Stradiņš University, and for the universities it was a valuable gain, especially for the UL. Other institutes maintained an

independent national research institute status (Institute of Organic Synthesis, Institute of Wood Chemistry, Biomedicine Research and Study Centre). The fate of the institutes differed: a few have survived and are successfully developing today by participation in international projects, others have been less successful and in the last assessment of Latvian scientific institutes (2013) have ranked lower, although the international scientific expertise of Latvia's science made in 1992 by the Danish Science Council, found 30% of the assessed projects, especially in physics, chemistry, informatics, engineering, as excellent or even outstanding.

The Academy of Sciences, whose Charter was unanimously approved by the Saeima in January 1997, has acquired a different content and functions. It appreciates scientific excellence by electing full, foreign, corresponding, and honorary members as well as honorary doctors, awarding the LAS Grand Medal, special prizes and grants, holding the competition of scientific achievements. It promotes science by organising congresses, conferences, and open LAS sessions, supervises major national research programmes, for example, Letonics (Latvian Studies). It takes care of emeritus scientists, evaluates the quality of doctoral theses submitted for the defence and manages the activities of the Terminology Commission. By active cooperation with Latvian universities and higher education institutions, the LAS creates a single academic environment, represents Latvia in international scientific organisations (ALLEA, ICSU, etc.). It is not possible to go into all spheres of the LAS activities, its positive achievements and shortcomings — they are summarised in the LAS strategy, the Senate-accepted document (2015), and have been regularly reflected in the LAS yearbooks.

At present according to the number of members the Latvian Academy of Sciences is the largest in the Baltic States — it is probably good, but also risky in a way. In the re-established Latvia it is a sufficiently significant player in science policy and life. One could even say that, in spite of a certain conservatism and aging academics, the Academy of Sciences has become one of the most stable structures with sufficient authority. It would be very dangerous if the Academy of Sciences started to wobble, lose quality, dynamism, and continuity. In a way, the Academy has been an anchor of stability for science in Latvia, the unifying element and Latvia's representative in the international scientific world. Naturally, together with Latvia's universities and the most prominent public research centres where the new generation of scientists grows and gains strength, including those who work outside Latvia.

But is it really so or is there a new situation in the making, and maybe the Academy of Sciences does not seem so topical for the new generation of scientists with foreign experience?

We should do more to ensure that replacement of generations should be harmonious, that young scientists association should get involved in the Academy for them to find their place in our somewhat oldish environment. Innovative processes in Latvia should be promoted more actively. The participation in the consultative debates about rational

use of European funds and public discussion of the country's economic process should get livelier. Let us keep in mind that the very contemporary science in Latvia is still under threat, its funding from its own government and entrepreneurs continues to be one of the lowest in the European Union. In innovations, too, Latvia's place, unfortunately, is quite modest.

All these matters can be optimised only with the contribution of a new generation of scientists and public support coming from an educated and innovative society to our science, which currently does not seem a priority. This is my senescent complaining, formerly expressed in better rhetorical forms, I think, has been heard for years in the past, also when I was President of the Academy, but we talk of these things to each other, though outside of these walls this has hardly been taken notice of.

Our science has its own real achievements, and I call on you to you notice them. Our Academy of Sciences, our universities have their own traditions, and please, mark them as well. Both forecasting the future of science and documentation of the history of science as well its popularisation also constitute the responsibilities of our Academy.

Studies in the history of science are summarised in the conferences on the history of science (the last 27th Baltic Science History Conference in October 2015 was organised by the LAS, linking it with the offsite meeting of the European Academy of Sciences and Arts in Rīga and Jelgava), while the research contribution of the LAS members is documented in the bio-bibliographies of Latvian scientists. Since 1958, the latter have been issued by the Academic Library of the University of Latvia (formerly the Fundamental Library of the Academy of Sciences, founded in 1524). The first to come out were the bibliographies of academicians J. Endzelīns and P. Stradiņš, followed by those of L. Liepiņa, G. Vanags, A. Kalniņš, E. Siliņš, E. Grēns, I. Kalviņš, M. Beķers, E. Lukevics, R. Kukaine, V. Z. Kluša, T. Millers, R. Valters, O. Neilands, J. Ekmanis, P. Zvidriņš, A. Blinkena, and many other academicians and prominent Latvian scientists, comprising a total of 88. They make it possible to assess the creative contribution of the particular scientists and obtain information on their biographies. Presented today is the bio-bibliography of Ojārs Spārītis, the current President of the LAS and art researcher, featuring Ojārs Spārītis' erudition, versatility, his wide-ranging research interests and noteworthy achievements. He is the author of many books and scientific articles, art history professor, student of Romis Bēms, researcher of the Baltic German contribution to Latvian culture, history and art treasures of Latvia's churches, Latvia's monuments. Among his books I would like to particularly highlight *Florence – Riga: cultural parallels*, and the recently published *Essays on Latvia's Sacred Culture*. Spārītis' bio-bibliography temporarily fills in the place reserved for his portrait in the portrait gallery of our presidents.

In conclusion, I wish once again to remind you of our responsibility — the existence of the Academy of Sciences in Latvia testifies to the sufficiently high intellectual level of our country, to the existence of the scientific elite in a country or region. Like the

university, the opera, the national library, encyclopaedia, etc., the Academy of Sciences is an attribute of a mature, developed society. The origins of the academy go back to the Enlightenment in the context of the emergence of experimental sciences and later also socially humanitarian sciences. Although in the 20th century several functions that used to be more characteristic of academies have been taken over by the state institutions — science councils, the role of academies in the promotion, evaluation and international representation of their respective national science is not lost, and the Latvian Academy of Sciences, in March 1992 in Stockholm, was admitted to the European community of academies. I think that the long and controversial path of the LAS formation is also one of the essential elements on the path towards the centenary of the Republic of Latvia, and the coming generations will similarly regard it on our country's 150th anniversary in 2068, when science in Latvia will have recovered its true glory.

ACTIVITIES OF THE PRESIDUM OF THE LATVIAN ACADEMY OF SCIENCES

The work of the Presidium of the Latvian Academy of Sciences (LAS Presidium) is regulated by the Statute of the LAS (Article 5.3.2):

5.3.1.3. The President may partly give the President's powers to other elected LAS officials, as well as authorise other LAS Members to represent individual interests of the LAS in Latvia and abroad by informing the Presidium or the Senate about this decision; 5.3.2. Under the leadership of the President, the Presidium of the LAS; 5.3.2.1. proposes that the Senate approves specific directions of activities and responsibility of elected LAS officials (except the members of the Supervisory Council), and defines their concrete operational duties, as well as assigning of separate duties of the LAS officials to other Members of the Senate by specifying their functions; 5.3.2.2. recommends solutions for regular more significant problems of the LAS; 5.3.2.3. proposes agenda for regular and extraordinary General Meetings of the LAS and announces it to the LAS Members; 5.3.2.4. performs regular operational and representative tasks assigned by the President of the LAS, the Senate, or the General Meeting of the LAS.

LAS Presidium sessions are chaired by the President of the LAS, and in his absence, following a previous decision of the President or the Presidium, chairing of the Presidium session is delegated to one of the LAS officials, most frequently — to the Vice President. LAS Presidium, unless otherwise decided, gather once a week. In 2016, the LAS Presidium has held 40 meetings.

The Agenda of the LAS Spring General Meeting held on 7 April 2016 included the election of LAS officials. With the election of the LAS President, leading officials, the Senate, and the LAS Supervisory Council, the LAS Presidium also was newly constituted and began its work on 1 May 2016.

During the reference year, the LAS Presidium has reviewed issues of the agenda relating to basic activities of the LAS, as well as a number of topical issues relevant to the sector and general problems, which required LAS involvement or expertise. As the newly constituted Presidium began its work, its members have increased the activity in setting and implementation of new tasks, in particular, developing cooperation with the State Education Development Agency, the Investment and Development Agency of Latvia, participating in the Latvian Research and Innovation Strategic Council and the Latvian Council of Science, in the Republic of Latvia Parliamentary Commissions and other entities, working groups of public administration institutions, expert committees, etc. A significant position in the work of the LAS Presidium was assumed by the issue of the LAS place, functions, and opportunities within the existing organisation of science, as well as in the overall national framework.

A number of guest lectures were given in the LAS Presidium sessions of 2016, for example, the lecture during the visit of Japanese scientist delegation headed by Prof. Teruo Kishi (27 June 2016). Meetings also took place, including meetings with public relations expert, META Advisory Group partner A. Gūtmanis (25 January 2016), the President of the Latvian Trade Union of Education and Science Employees I. Vanaga (16 May 2016), Chair of the Saeima Education, Culture, and Science Committee, I. Viņķele (23 May 2016), and consultant of the Cross-Sectoral Coordination Centre, E. Karnītis (6 June 2016), as well as specialists of particular scientific spheres like the representative of *Optilas Baltics* A. Siliņš.

The minutes of LAS Presidium sessions are taken by LAS Public Relations Specialist Ilze Stengrevica.

LAS BOARD ACTIVITIES

According to the resolution of the LAS Senate, as of 10 May 2016, during the reporting period, the LAS Board was composed of three persons: Chair — LAS Secretary General Andrejs Siliņš; Vice-chair — Chair of the LAS Division of Agriculture and Forestry Sciences Baiba Rivža; Member — Chair of the LAS Fund Bruno Andersons. LAS Administration Director Vitālijs Kozlovskis regularly attended Board meetings, and sometimes also the LAS President Ojārs Spārītis participated. The Board acted in accordance with the Statute adopted by the LAS Senate in 1998, in which several discrepancies were found in the tasks imposed on the Board by the LAS Statute. It was resolved to develop suggestions how to eliminate these discrepancies during the next acting period and to submit them to the working group (formed by the LAS Presidium) for improvement of LAS normative acts, which is acting under the direction of the LAS Foreign Affairs Secretary Tālavš Jundzis.

The Board discussed LAS budget implementation during 2016, the budget project for the year 2017, and the planned schedule of conferment of LAS awards, coordinated plans of the LAS and its divisions, examined and adjusted premise rent contracts and plans for the repair works of the building. The Board was regularly informed by LAS Administration Director Vitālijs Kozlovskis about the management of LAS properties and made corresponding decisions to better the economic activities of the LAS.

As assigned by the Board, its Chair Andrejs Siliņš conducts practical discussions with LAS permanent service staff, on a weekly basis, to discuss the specific work assignments. It was ensured that the point of view of each staff member was taken into account and considered to find the best possible ways of executing the set tasks. Coordination of the LAS scientific divisions is ensured as well.

The LAS Board and Administration devotes special attention to the legal process with Ltd. “Rīgas koncertzāle” regarding the termination of rental agreement. The court

of first instance has passed a sentence, on 25 April 2016, that termination of the rental agreement as done by LAS was justified and the debt amounting to 59 678.54 EUR must be recovered from Ltd. “Rīgas koncertzāle”. On 1 February 2017, the Court of Appeal — Civil Division of Latgale Regional Court — declared the earlier pronounced sentence valid without change.

The prolonged legal process, during which it is impossible to put to any practical use the Great Hall of the Academy which was formerly rented to Ltd. “Rīgas koncertzāle”, has attracted the attention of the government among others. The Ministry of Finance together with the Ministry of Education and Science were ordered to prepare suggestions regarding administration of the academy building in a long-term perspective. Taking into account the justified arguments provided by the Direction and Administration of the LAS the Ministry of Finance has suggested “to retain the present manager and the order of administration and management of the state-owned real property in Akadēmijas laukums 1”.

LAS FUNDING FROM THE STATE BUDGET, 2016

No.	Type of expenses, in accordance with the contract	Amount, EUR
1.	LAS basic functions, incl.:	283 912
1.1.	Salaries	158 866
1.2.	Employer's Social Security payments	37 476
1.3.	International cooperation	24 546
1.4.	Services	55 961
1.5.	Stationery items, materials, equipment, other	7 063
2.	The activities of State Scientific Qualification Committee	36 376
3.	Publication of the newspaper <i>Zinātnes Vēstnesis</i> (<i>Science Bulletin</i>)	24 606
4.	Publication of the journal <i>Latvijas Zinātņu Akadēmijas Vēstis</i> (<i>Proceedings of the Latvian Academy of Sciences</i>)	55 806
5.	Activities of the LAS Terminology Committee	16 696
6.	LAS prizes and awards for young scientists	10 165
7.	Grants for Scientists Emeritus	604 434
	TOTAL	1 031 995

ACTIVITIES OF THE LAS FUNDS

LAS Fund in 2016

The donations have funded the following awards:

- Emīlija Gudriniece Award in Chemical Technology presented to the young scientist of Rīga Technical University, Faculty of Materials Science and Applied Chemistry, Mg. **Daniels Posevins**.
- Emīlija Gudriniece Award to the Best Teacher of Chemistry in 2016 presented to Madona State Gymnasium chemistry and psychology teacher *Dr.chem.* **Līvija Tomiņa** for excellent results in teaching chemistry and social activity in the profession.

Scholarships:

Emīlija Gudriniece and Alfrēds Ieviņš Scholarships in Chemistry and Chemical Technology in the academic year of 2016/2017 awarded to Rīga Technical University Faculty of Materials Science and Applied Chemistry students **Dace Cīrule** and **Kristers Ozols**.

Chair of the Board *Bruno Andersons*

Foundation “Science Fund”

Public benefit organisation, type of activities — promotion of science,
VID 11.12.2013. No 8.5 Decision -11 / L-33760.

Tax payer registration code 40008211019, date 15.05.2013.

Board (from 15.05.2013 to 20.11.2016)

1. Vitālijs Kozlovskis
2. Jānis Bērziņš
3. Juris Ekmanis
4. Juris Jansons
5. Baiba Rivža
6. Raimonds Valters

Overview on donations and gifts
01.01.2016–20.11.2016

I	The Balance on 01.01.2016, EUR	186. 63			
II	Total, donations and gifts received in 2016 , EUR	7100. 00			
including:		Unlimited use (including general donations)		For certain purposes (including target donations)	
		cash	property	cash	property
1.	<i>Legal persons registered in the Republic of Latvia (the name, taxpayer registration number)</i>				
1.1.	LtD. "Itera Latvija", 50003317361			4500. 00	
1.2.	Atis Sausnītis			1600. 00	
1.3.	LtD. "Double D", 40103241653			1000. 00	
Total				7100. 00	
III	The total amount of spending of donations and gifts, EUR	4263. 75			
including		Unlimited use (including general donations)		For certain purposes (including target donations)	
		cash	property	cash	property
1.	Total, for objectives and tasks set in the Statute			4220. 32	
1.1.	LtD "Ziņas TV", 50103665341 (TV plot)			2500. 00	
1.2.	LtD "Tipogrāfija Ogrē", 40003285810 (Proceedings of the Academy of Sciences, Section A)			1720. 32	
2.	<i>Administrative expenses</i>			0. 00	
3.	Other operating expenditures (banking)			43. 43	
Total				4263.75	
IV	Balance on 20.11.2016, EUR	3022. 88			

Board, starting from 21.11.2016:

1. Ojārs Spārītis
2. Valentīns Jeremejevs
3. Ivars Kalviņš
4. Lienīte Caune
5. Normunds Štāls

Board member (until 30.11.2016) *Vitālijs Kozlovskis*

ACTIVITIES OF ORGANISATIONS CONNECTED WITH THE LAS

Baltic Centre for Strategic Studies of the Latvian Academy of Sciences (LAS BCSS)

The Baltic Centre for Strategic Studies of the Latvian Academy of Sciences was founded and started functioning in November 1993. During the past years, 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. In 2016, research projects at the LAS BCSS have been implemented by a team of 10 researchers, 8 of them with doctoral degrees.

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. General public is informed about the research results and proposals resulting from the research are submitted to state and non-governmental organisations.

In 2016, researchers of the LAS BCSS have participated in the implementation of two research programmes: the National Research Programme (NRP) "Letonics (Latvian Studies) – Latvian History, Language, Culture, Values" and the Latvian Council of Science grant "The Experience, Lessons and International Importance of the Restoration of Independent Statehood of the Republic of Latvia (Historical, Political, and Legal Aspects)". Within the framework of these projects, several conferences have been organised in 2016 and collections of conference materials published. The 25th anniversary since the Barricades of January 1991 was marked with an international conference, prepared in cooperation with the Museum of Barricades of 1991. Conference proceedings was prepared for publishing under the title *The Barricades: Civil Resistance to Anti-democratic Rule and Lessons Learned*. In April 2016, LAS BCSS organized another international conference dedicated to the 25 years of Baltic independence history.

Within the framework of the National Research Programme "Letonics" (Latvian Studies) LAS BCSS is coordinating and leading the preparation of the two-volume academic collected articles in English, Russian, and Latvian, *Latvia and Latvians*, while within the grant "The Experience, Lessons, and International Importance of the Restoration of Latvia's Independent Statehood" a monograph on the state continuity doctrine in the history of Latvia is being prepared.

In 2016, preparation for the IV Congress of World Latvian Scientists (planned for 2018) was started as well as preliminary works for organising the VII Congress of

Letonics (Latvian Studies) which is planned to be held in Rēzekne, Rīga, and other cities of Latvia in October 2017.

The Baltic Centre for Strategic Studies of the Latvian Academy of Sciences was founded and headed by LAS Full Member *Dr.habil.sc.pol.*, *Dr.iur.* Tālav Jundzis, winner of the Grand Medal of the Latvian Academy of Sciences (2016).

Tālav Jundzis,

Chair of LAS BCSS Board

Terminology Commission of the Latvian Academy of Sciences in 2016

Development, examination, and approval of terms

In 2016, the Terminology Commission (TC) held seven meetings during which it examined and approved terms from different areas, including medical, educational, and legal terms, as well as separate sports terms. Upon request of the General Secretariat of the Council of the European Union, specific nuclear terms have been examined and approved. Approximately 100 written and oral consultations have been provided to public institutions, individuals, and legal entities, mainly with regard to Latvian equivalents of English terms.

Work in the TC's terminology sub-commissions (TSCs)

The Information Technology, Telecommunications, and Electronics TSC, under the guidance of its Chair Eduards Cauna, has worked most intensively and regularly by holding meetings twice a month.

Dr. sc. agr. Arturs Stalažs has returned to the Botany TSC and become engaged in its work again.

Other TSCs have mainly worked in a form of consultancy.

Concept of a single database

In order to implement the Guidelines for Official Language Policy for 2015–2020 that envisage establishment of a single national database of terms by combining the existing resources of the TC and the State Language Centre, a working group has been set up, composed of V. Arnicāne, M. Baltiņš, J. Borzovs, E. Cauna, L. Kauķe, and A. Krastiņš, which developed and submitted the Concept of the New Database of Terms (Terminology Portal) by 29 February 2016. The study was carried out within the framework of the agreement No. AD-20163/2015 between the University of Latvia and the Latvian Academy of Sciences.

Publication of the TC's decisions and recommendations

Information about the TC's meetings and the relevant minutes, as well as the TC's decisions and other materials have been published on the TC's website at www.termini.lza.lv. The TC has continued the maintenance and update of the AkadTerm database. After a break since 2012, the TC has resumed publication of its decisions in the Official Gazette *Latvijas Vēstnesis*. Seven decisions taken by the TC in the reporting year have been published (decisions No. 93–99).

70th anniversary commemoration of the establishment of the TC

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 TC was born simultaneously with the Latvian Academy of Sciences, when it gathered for its first meeting on 2 September 1946. Since then the TC has held 1131 meetings, organised working groups, prepared many terminological resources (dictionaries and bulletins), and its TSCs have arranged several thousands of their own meetings.

On 11 November 2016, the TC organised its 70th anniversary conference in which 19 reports were presented. In honour of this important event, a collection of short articles titled *Terminrade Latvijā senāk un tagad* (Term-Formation in Latvia: Past and Today) was published. It has been decided to prepare a more detailed publication on the history of the TC until the celebration of Latvia's 100th anniversary, which would cover all aspects of the TC's operation, including information about activities of all TSCs and specialists involved in their work.

Other relevant information

In memoriam: *Dr.habil.phys.* Juris Ekmanis, former Co-Chair of the TC, President and Vice-President of the Latvian Academy of Sciences, *Dr.sc.ing.* Ivars Krieviņš, Chair of the Textile Industry TSC, *Dr.sc.ing.* Andrejs Zviedris, Co-Chair of the Energy TSC, and Janīna Danusēviča, Member of the Medical TSC.

So far the form of cooperation with the Editorial Board of the National Encyclopaedia has not been precisely determined. The TC deems that such cooperation would be necessary for implementation of unified terminology.

The inter-university working group on statistics which was formed on the initiative of the Faculty of Economics and Management of the University of Latvia and Rīga Stradiņš University has been very active over the reporting year. This working group has almost finished its work on the dictionary of terms of mathematical statistics that contains more than 700 English–Latvian entries.

Participation in the meeting of the Working Group for Development of the Draft Law on Restrictions on Prostitution held by the Ministry of the Interior on 2 June 2016 where the TC expressed its opinion on use of the most appropriate terms.

Participation in the seminar “Terminology in the Context of the European and Latvian Qualifications Framework” on 15 September 2016 which involved discussions on English and Latvian terms regarding qualifications framework.

Chair of the Terminology Commission *Māris Baltiņš*

GRAND MEDAL, PRIZES, AND AWARDS OF THE LATVIAN ACADEMY OF SCIENCES

GRAND MEDAL OF THE LATVIAN ACADEMY OF SCIENCES

The Grand Medal of the Latvian Academy of Sciences is the highest reward which is awarded by the LAS to scientists of Latvia and of foreign countries for their outstanding creative contribution.

The Grand Medal of the LAS is cast in bronze. The LAS emblem with an inscription “*Academia Scientiarum Latviensis*” is depicted on its front and the name and family name of the person awarded and the date of awarding are engraved on the reverse side.

Candidates for the above reward may be recommended by the LAS full, honorary, and foreign members, the LAS Divisions, by submitting in a written form a motivated proposal and a brief reference on the candidate recommended. The LAS Senate takes a decision about awarding.

So far, the LAS Grand Medal has been awarded to J. Graudonis (1993), J. Stradiņš (1993), E. Dunsdorfs (1994), E. Lavendelis (1994), E. Grēns (1995), D. A. Loeber (1995), M. Staudinger-Woīt (1996), E. Lukevics (1996), E. Siliņš (1997), V. Viķe-Freiberga (1997), D. Draviņš (1998), J. Krastiņš (1998), O. Lielausis (1999), J. Upatnieks (1999), G. Birkerts (2000), M. Beķers (2000), A. Caune (2001), J. Hartmanis (2001), T. Millers (2002), V. Toporovs (2002), R. M. Freivalds (2003), I. Šterns (2003), I. Lancmanis (2004), A. Padeģis (2004), E. Blūms (2005), E. Vedējs (2005), R. Kondratovičs, T. Fennels (2006), V. Hausmanis (2007), R. Evarestovs (2007), V. Tamužs (2008), Ē. Kupče (2008), I. Kalviņš (2009), K. Zariņš (2009), M. Auziņš (2010), K. Švarcs (2010), Ē. Mugarēvičs (2011), R. VILLEMS (2011), P. Pumpēns (2012), A. Ezergailis (2012), A. Ambainis (2013), A. Brāzma (2013), V. Ivbulis (2014), R. Žuka (2014), A. Barševskis (2015), A. Šternbergs (2015), T. Jundzis (2016), R. Lācis (2016), J. Bārzdīņš (2017), and B. Rivža (2017).

PRIZES OF THE LATVIAN ACADEMY OF SCIENCES

For the best scientific contribution in certain branches of science, the LAS awards prizes which are named after prominent Latvian scientists. Each prize is announced biennially or triennially.

A prize is awarded for individual scientific contribution, discoveries, inventions, as well as for a series of scientific works (devoted to a common subject). Only an individual candidate may be nominated to contest for the prize and the main author from a group of authors. Scientists of Latvia and those scientists living abroad, whose research subject is connected with Latvia, may stand for a prize.

The fund of the LAS prizes is formed of the LAS monetary resources and of supporters' donations.

The Latvian Academy of Sciences awards the following prizes:

The Rainis Prize

for outstanding contribution in science or culture

IN PHYSICAL AND TECHNICAL SCIENCES

The Eizēns Āriņš Prize

(together with the joint stock company JSC "Exigen Services Latvia" and RTU Development Fund)

in computer sciences and their applications

The Arturs Balklavs Prize

for outstanding achievements in popularisation of science

The Piers Bohl Prize

in mathematics

The Frīdrihs Canders Prize

in mechanics and astronomy

The Walter Zapp Prize

(together with the Patent Office of the Republic of Latvia)

to the best inventor

The Edgars Siliņš Prize

in physics

The Alfrēds Vītols Prize

(together with the joint stock company "Latvenergo")

in engineering sciences and energetics

IN CHEMICAL, BIOLOGICAL, MEDICAL, AND AGRICULTURAL SCIENCES

The Arvīds Kalniņš Prize

(together with the Latvian Academy of Agriculture and Forestry)

in forestry, wood research, and technology

<i>The Paulis Lejiņš Prize</i>	in agricultural sciences
<i>The Heinrichs Skuja Prize</i>	in biological sciences
<i>The Pauls Stradiņš Prize</i> (together with the Pauls Stradiņš Museum of the History of Medicine)	in science of medicine and its history, for outstanding scientific contribution in practical medicine
<i>The Gustavs Vanags Prize</i>	in chemical sciences
<i>The Solomons Hillers Prize</i> (together with the joint stock company “Grindex,” Latvian Institute of Organic Synthesis, Biomedical Research and Study Centre, University of Latvia)	for outstanding achievements in biomedicine and the design of new medications
IN SOCIAL SCIENCES AND HUMANITIES	
<i>The Jānis Endzelīns Prize</i>	in Latvian linguistics, Baltic Studies
<i>The Kārlis Balodis Prize</i>	in national economy
<i>The Fricis Brīvzemnieks Prize</i>	in Latvian folklore studies
<i>The Teodors Celms Prize</i>	in philosophy
<i>The Dietrich André Loeber Prize</i>	in jurisprudence or political science
<i>The Arveds Švābe Prize</i>	in history of Latvia
<i>The Vilis Plūdonis Prize</i>	in literary criticism
<i>The Tāļivaldis Vilciņš Prize</i>	in sociology
<i>The Kārlis Mīlenbahs Prize</i> (together with the Rīga Latvian Society)	in applied Latvian linguistics
<i>The Mārgers Skujenieks Prize</i>	in statistics
<i>The Kārlis Ulmanis Prize</i>	for research in and solutions for the national economy of Latvia and study of the problems of the history of the State

Four to six LAS prizes are granted every year. The list of prizes is published in June in the Official Gazette *Latvijas Vēstnesis* and newspaper *Zinātnes Vēstnesis*, as well as in the homepage of the LAS (<http://www.lza.lv>). The submission deadline for applications is 30 September of every year.

THE OUTSTANDING SCIENTISTS WHOSE NAMES HAVE BEEN
ATTRIBUTED TO THE LATVIAN ACADEMY OF SCIENCES
PRIZES

Eižens ĀRIŅŠ (1911–1987) — mathematician; in the 1950s, he was one of the first scientists in Latvia to go in for computer technology. In 1959, he established the first Computing Centre in Latvia (now the Institute of Mathematics and Computer Sciences at the University of Latvia).

The winners of Eižens Āriņš Prize are R. M. Freivalds (2000), V. Detlovs (2002), J. Osis (2004), J. Bārzdiņš (2006), Ļ. Kacnelsons (2008), A. Ambainis, J. Grundspeņķis (2012), A. Baums, J. Ertis (2013), I. Biļinskis, V. Ozoliņš (2014), A. Kalniņš, S. Skusovs (2015), V. Lokenbahs, A. Lorencs (2016).

Kārlis BALODIS (1864–1931) — a wide-profile specialist in national economy who has substantiated many new economic ideas, particularly focusing on “the state capitalism”.

The Kārlis Balodis Prize has been awarded to N. Balabkins (1994), P. Zvidriņš (1996), O. Krastiņš (1998), J. Krūmiņš (2004), R. Karnīte (2007), P. Guļāns (2015).

Arturs BALKLAVS-GRĪNHOFŠ (1933–2005) — radioastronomer, outstanding populariser of sciences. Since 1969, director of the Radioastrophysical Observatory (uniting observatories of the LAS and UL). From 1997, Director of the Institute of Astronomy of the UL. Member of the European Astronomical Society (EAS, 1967), Editor-in-Chief of the magazine *Zvaigžņotā Debess* (1969–2005).

The winners of the prize are V. Grabovskis, I. Vilks (2007), A. Alksnis, I. Pundure (2008), A. Vēriņš (2009), M. Gills (2010), Z. Kipere (2011), O. Gerts (2012), V. Hermanis (2013), J. Jansons (2015), O. Dumbrājs (2017).

Piers BOHL (1865–1921) — the most outstanding mathematician who has ever lived and worked in Latvia. In 1887, he graduated from the University of Tartu. Since 1895, professor at Rīga Polytechnic School and Rīga Polytechnic Institute, in 1919–1921 — at the University of Latvia. Remarkable studies in the theory of stability of differential equations and invariants, as well as in celestial mechanics. Founder of the theory of quasiperiodical functions, recognised as one of the authors of the principle of motionless point.

The winners of the prize are A. Buiķis (2005), A. Reinfelds (2009), A. Šostaks (2017).

Fricis BRĪVZEMNIEKS (1846–1907) — a student of folklore, writer, one of the first collectors, classifiers, and publishers of the Latvian ethnography and folklore materials.

The Fricis Brīvzemnieks Prize was awarded to J. Rozenbergs (1996), M. Vīksna (1999), A. Alsupe (2005), G. Zariņa (2011), I. Loze (2016).

Frīdrihs CANDERS (1887–1933) — one of the first pioneers in rocket construction in the world. He was born in Rīga, studied at the Rīga Polytechnic Institute from which he graduated in 1914. As a refugee, he went to Russia, when the First World War broke out. Ideas of “the sun sail,” “the cosmic hot-house,” and “the cruise missile” belong to him, Frīdrihs Canders’ name is given to a crater on the Moon and to one of the small planets.

The Frīdrihs Canders Prize follows up the best traditions of the Frīdrihs Canders Award established on 7 December 1967. It has been awarded to E. Blūms, J. Mihailovs (1971), G. Teters (1972), J. Uržumcevs, R. Maksimovs (1976), E. Lavendelis (1978), A. Mālmeisters, V. Tamužs, G. Teters (1981), E. Jakubaitis (1985), A. Bogdanovičs (1989), E. Ščerbiņins, J. Geļfgats (1991), A. Gailītis (1994), P. Prokofjevs, R. Rikards (1996), J. Kotomins, J. Tarnopolskis (1998), M. Ābele, A. Skudra (2000), J. Žagars, V. Poļakovs (2002), A. Balklavs–Grīnhofs, J. Vība (2004), K. Lapuška, K. Rocēns (2007), A. Lagzdīņš (2009), J. Andersons (2011), A. Krasņikovs (2015), J. Vārna (2016).

Walter ZAPP (1905–2003) — an outstanding inventor, with his world-famous photo camera *VEF-Minox* 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.

The winners of prize are B. Joffe, R. Kalniņš (2005), J. Upatnieks (2007), M. Ābele, K. Lapuška (2011), J. Spīgulis (2013), I. Kalviņš (2015).

Teodors CELMS (1893–1989) — an outstanding philosopher. He studied economy and philosophy in Moscow, obtained a doctoral degree in philosophy. Being a widely profiled specialist he has presented lectures in philosophy, cultural philosophy, philosophy of science and technology, as well as in history of technology. From 1944, he lived and worked abroad.

The winners of prize are M. Kūle (2006), E. Buceniece (2009), U. Vēgners (2015).

Jānis ENDZELĪNS (1883–1961) — an outstanding Latvian linguist. His scientific studies have influenced the development of the Latvian linguistics and the Baltic Studies in general, which cannot be overestimated; he discussed

the historical development of the Latvian language, its present structure, and allied connections.

The Jānis Endzelīns Prize follows up the best traditions of the Jānis Endzelīns Award established on 7 December 1967. It has been attributed to A. Laua (1970), B. Laumane (1974), L. Cepļītis (1976), A. Reķēna (1978), D. Nītiņa (1980), T. Jakubaite (1982), E. Kagaine and S. Raģe (1984), J. Rozenbergs (1986), B. Bušmane (1990), K. Karulis (1994), T. Fennell (1996), V. Rūķe-Draviņa (1998), V. Skujiņa (2001), I. Jansone (2004), D. Markus (2007), P.U. Dini (2011), A. Blinkena (2016).

Emīlija GUDRINIECE (1929–2004) — LAS Full Member, professor of the Rīga Technical University — outstanding chemist and teacher, founder of the Chair of Organic Synthesis and Biotechnology (1963–1989). Under her leadership the Chair prepared more than 800 specialists of biologically active compounds chemistry, 28 specialists have worked out doctoral thesis. The scientific work of E. Gudriniece was dedicated to heterocyclic compounds, to the investigation of their biological activity, as well as to the possibility of practical usage of the oil from plants in fuel production.

The laureates of the prize are A. Kotova (2007), D. Lubriks (2008), K. Jaundzems (2009), V. Rjabovs (2010), P. Ostrovskis (2011), I. Novosjolova (2012), J. Mackeviča (2013), J. Lugiņina (2014), E. Rolava (2015), D. Posevins (2016), A. Stikute (2017).

Solomons HILLERS (1915–1975) — professor, full member of the LAS, founder and long-standing director of the Latvian Institute of Organic Synthesis, excellent organiser of Latvia's chemical and pharmaceutical science and industry.

The prize was established in 2004 together with the public joint stock company “Grindex,” Latvian Institute of Organic Synthesis, and the Biomedical Research and Study Centre of the University of Latvia. The winners of the prize are I. Kalviņš (2004), E. Grēns (2006), and V. Kluša (2008).

Kārlis IRBĪTIS (1904–1997) — aviation constructor and designer. Since 1947, he was working in Canada and has received patents of Canada and USA for his inventions. Honorary doctor of the LAS.

Since 2003, the Kārlis Irbītis Grant has been given to 85 scientists and students.

LUDVIGS and MĀRIS JANSONS — Ludvīgs Jansons (1909–1958) and his son Māris Jansons (1936–1997) — Latvian physicists and pedagogues.

Ludvigs Jansons worked at the Department of Physics, University of Latvia, from 1934 till the end of his life, performing the duties of Vice-Dean and Dean of the Faculty at various periods. After the war, he established faculties of physics both at the University of Latvia and at the Pedagogical Institute. His study-book for students titled *Practical Studies of Physics* (1947) has been republished in 1954, 1961, 1971, and 1979.

Māris Jansons — full member of the LAS, professor. After graduation from the University of Latvia, he worked there all his life. Head of the Department of Spectroscopy (1979–1993), and also Head of the Department of the Experimental Physics (1989–1993). Since 1994 — Director of the Institute of Nuclear Physics and Spectroscopy.

The Ludvigs and Māris Jansons Prize has been awarded to H. Rjabovs (1999), A. Kuļšs (2000), O. Nikolajeva (2001), J. Alnis (2002), O. Docenko (2003), O. Starkova (2004), K. Blušs (2005), Z. Gavare (2006), B. Poļakovs (2007), A. Vembris (2008), E. Laizāne (2009), Z. Gavare, A. Šarakovskis (2011), L. Kalvāns (2012), A. Kaļinko, J. Zavickis (2013), A. Šutka, D. Zablockis (2014), J. Timošenko (2015), R. Zabels (2016), E. Nitišs (2017).

Arvīds KALNIŅŠ (1894–1981) — a prominent Latvian scientist, founder of wood chemistry and wood chemical technology in Latvia. Professor, full member of the LAS (from 1946), founder and director (1946–1976) of the LAS Institute of Forestry Problems (later, the Institute of Wood Chemistry).

The winners of Arvīds Kalniņš Prize are P. Eriņš (2000), M. Daugavietis (2002), G. Zaķis (2003), I. Liepa (2004), J. Zandersons (2005), A. Priedītis (2006), N. Vedernikovs (2008), L. Līpiņš (2012), G. Teliševa (2016).

Dietrich André LOEBER (1923–2004) — lawyer, honorary patron, foreign member of the LAS, laureate of the Grand Medal of the LAS.

Since 2002, Dietrich André Loeber Prize has been given to 23 students. The winners of the prize are T. Jundzis (2008), K. Torgāns (2009), E. Levits (2013).

Paulis LEJIŅŠ (1883–1959) — a prominent Latvian scientist of agriculture, one of the organisers of the University of Latvia and its Faculty of Agriculture; since 1932, a professor of agriculture at institutions of higher education in Latvia. The scientific contribution: basic research on the selection of Latvian herds and rational development of forage. The first President of the Latvian Academy of Sciences (1946–1951).

The Paulis Lejiņš Prize has been awarded to J. Latvietis (1994), J. Neilands (1995), A. Boruks (1996), C. Šķiņķis (1997), S. Timšāns (1999), M. Skrīvele (2002), R. Baltakmens, A. Jemeljanovs (2003), U. Osītis (2006), A. Adamovičs (2007), A. Ruža (2009), A. Kārķliņš (2011), I. Turka (2015), D. Lapiņš (2017).

Zenta MAURIŅA (1897–1978) — specialist in literature, cultural philosopher, writer, internationally recognised lecturer, one of the brightest and most tragic personalities in the cultural history of Latvia.

The Zenta Mauriņa Prize has been awarded to Z. Šiliņa (1999), I. Zepa (2001), D. Balode (2002), D. Oļukalne (2003), R. Ceplis (2004), S. Stepena (2005), A. Gaigala (2006), P. Daija (2007), D. Ratiņika (2008), K. Šlihta (2009), Z. Borga (2010), I. Deigele (2011), A. Hiršs (2012), H. Akatova (2014), A. Koroševskis (2016), K. Lācis (2017).

Kārlis MĪLENBAHS (1853–1916) — an outstanding Latvian linguist who has studied syntax, vocabulary, and orthography of the Latvian language. The founder of the Romanised Latvian orthography (1908).

The Kārlis Mīlenbahs Prize has been awarded to linguist J. Kušķis (1999), Dz. Hirša (2002), M. Stengrevica (2004), A. Blinkena (2007), O. Bušs (2009), R. Grīšle (2012), I. Druviete (2015).

Vilis PLŪDONIS (1874–1940) — a prominent Latvian poet. Worked as a literary critic, compiler of anthologies of poetry and literary readers, publicist, playwright, and teacher.

The Vilis Plūdonis Prize has been awarded to V. Hausmanis (1996), J. Kursīte-Pakule (1998), B. Kalnačs (2000), I. Daukste-Silasproģe (2003), Z. Frīde (2005), A. Cimdiņa (2008), G. Grīnuma (2011), V. Vāvere (2014), A. Rožkalne (2017).

RAINIS (1865–1929) — an outstanding Latvian poet, philosopher, and public figure. The first poet to express the 20th century trends. His monumental plays had a strong impact on the development of Latvian dramatic art.

By his activities in the Constituent Assembly and in three convocations of Saeima (Parliament) of the independent Latvia, and also as director of the National Theatre and the Minister of Education (1926–1927), Rainis developed the idea of loyalty to Latvia and presented the people's aspirations towards an ideal progress of society. He also supported the idea of forming an academy of sciences.

A broad philosophical, humanist outlook, lack of any kind of chauvinism or national isolation, and deep respect for the identity of his own and other nationalities form the greatness and imperishability of Rainis.

The LAS considers the Rainis Prize to be the second most prestigious award of the LAS after the LAS Grand Medal.

The Rainis Prize has been awarded to I. Ranka (1998), I. Ziedonis (2001), A. Eglītis (2006), J. Streičs (2008), V. Hausmanis (2012), J. Strupulis (2013), F. Fjodorovs (2015).

Edgars SILIŅŠ (1927–1998) — one of the most outstanding Latvian physicists, full member of the LAS. In collaboration with the leading chemists of Rīga, he established and developed the school of organic solid state physics. During the seven last years of his life, he became interested in the basic principles of the world cognition. In 1998, his fundamental monograph *Searches of the Great Truths — Essays on History of Ideas and Paradigms* was completed.

The winners of the Edgars Siliņš Prize are I. Muzikante (1999), A. Gailītis, P. Prokofjevs (2001), L. Skuja (2003), A. Cēbers (2006), J. Purāns (2008), L. Grigorjeva (2010), J. Žukovskis (2012), V. Kuzovkovs (2014), R. Eglītis (2016).

Heinrichs SKUJA (1892–1972) — an outstanding Latvian biologist, investigator of flora. In 1944, he emigrated to Sweden, *Doctor honoris causa* of the Uppsala University (1958). He has carried out wide-scale studies of the algae flora in the Baltic Sea, lakes of Latvia and Sweden, etc., discovering and giving scientific descriptions of more than 700 new varieties. A member of the Uppsala Royal Learned Society. Has been awarded the Grand Berkjen's Prize (1961).

The Heinrichs Skuja Prize has been awarded to M. Selga (1994), A. Piterāns (1996), M. Beķers (1998), A. Āboliņa (2001), M. Balode (2004), E. Parele (2007), A. Barševskis (2009), G. Springe (2015), E. Vimba (2017).

Margers SKUJENIEKS (1886–1941) — a scientist and politician, Prime Minister, minister, organiser, and director of the State Board of Statistics (1919–1940).

The winners of Margers Skujenieks Prize are P. Zvidriņš (2004), O. Krastiņš (2008), J. Krūmiņš (2014).

Pauls STRADIŅŠ (1896–1958) — a prominent Latvian surgeon, oncologist, and historian of medicine. Has carried out remarkable studies on peripheral nerve surgery, early diagnostics of cancer, and on history of medicine of Latvia. Has organised, formed, and headed the Pauls Stradiņš Clinical University Hospital. On the basis of his private collection, under his leadership, the Museum of History of Medicine was formed in Rīga (1957).

The Pauls Stradiņš Prize follows up the traditions of the Museum of History of Medicine (MHM) Pauls Stradiņš Prize, established in 1993. Since November 1991, the Prize is awarded jointly by the LAS and the MHM.

The Pauls Stradiņš Prize in medicine has been awarded to V. Rudzīte, V. Utkins (1992), K. J. Keggi (1994), J. O. Ērenpreiss (1996), I. Lazovskis, K. Zariņš (1998), J. Kļaviņš (2000), J. Volkolākovs (2002), A. Bļugers (2004), A. Skaģers (2006), B. Zariņš (2008), J. Gardovskis (2010), V. Pīrāgs (2011), R. Lācis (2014), A. Pētersons (2016).

During 1983–1998, the prize in the history of medicine was awarded to V. Kaņeps, J. Stradiņš (1983), P. Gerke, B. Petrov (1984), V. Derums, A. Georgiyevsky (1985), Ņ. Stradiņa, P. Zabudovsky (1986), K. Ārons, J. Lisitsin (1987), K. Vasiljev, A. Vīksna (1988), A. Kaikaris, V. Kalniņš (1989), H. Millers-Dics, I. Krūmāls, J. Krūmāls (1990), J. Āboliņš, A. Alksnis (1991), Dz. Alks (1993), A. Dirbe (1995), J. Strupulis (1997), Z. Čerfass, E. Larsens (1999), J. Salaks, V. Kalnbērzs (2001), J. Vētra (2003), K. Habriha, V. Jākobsons (2005), E. Platkājs (2007), J. Gaujēns (2009), F. Ungers (2009) L. Alikmets (2011), G. Belēvičs (2013), R. Šengelia (2015), D. Baltiņa, M. Baltiņš (2017).

Mārtiņš STRAUMANIS and Alfrēds IEVIŅŠ — prominent Latvian chemists, authors of the fundamentally new and widely used in due course roentgenographic (asymmetric) method for determination of crystal lattice parameters (1935).

Mārtiņš Eduards Straumanis (1898–1973) — graduate from the University of Latvia (1925), lecturer at the University of Latvia (1927–1944), professor of the University of Missouri (USA). Well-known investigator of the metal corrosion, of complex compound chemistry and electrochemistry. M. Straumanis studied also the properties of metals applied in the novel technologies, his achievements in this field being recognised internationally.

Alfrēds Ieviņš (1897–1975) — graduate from the University of Latvia (1924), Doctor of Chemical Sciences (1938), full member of the LAS (1960). His scientific and pedagogical activities were connected with the University of Latvia (till 1958) and the Rīga Polytechnic Institute. Scientific interests of A. Ieviņš have been very wide — he has worked in roentgenography, in analytic chemistry, in chemistry of boron compounds. A. Ieviņš has paid great attention to work with young chemists; during nineteen years (1956–1974),

he headed the organisation of the contests on chemistry for pupils, lectured for the teachers of chemistry. He was one of the founders of the LAS Institute of Chemistry being also the first Director of the Institute (1946–1953, 1959–1962).

The Mārtiņš Straumanis–Alfrēds Ieviņš Prize has been awarded to M. Turks (1999), T. Ivanova (2000), V. Mihailovs (2001), R. M. Meri (2002), K. Zihmane (2003), I. Juhņeviča (2004), K. Edolfa (2005), L. Černova (2006), E. Erdmane (2007), E. Kolodinska (2008), J. Petuškova (2009), L. Grigorjeva, A. Maļeckis (2010), K. Traskovskis (2011), D. Rasiņa (2012), E. Priede (2013), O. Stepanova (2014), M. Skvorcova (2015), A. Grigaloviča (2016), R. Alekšis (2017).

Arveds ŠVĀBE (1888–1959) — a historian, lawyer, and writer. Has written on folklore, literary criticism, history of literature, has prepared biographical reviews (essays). Also a poet, prosaist, publicist, and translator.

The Arveds Švābe Prize has been awarded to A. Zeids (1996), J. Bērziņš (1998), I. Šterns (2000), I. Šneidere (2003), A. Zariņa (2007), A. Varslavāns (2009), Ē. Mugurēvičs (2015).

Kārlis ULMANIS (1877–1942) — an economist and statesman, the first Prime Minister of the Republic of Latvia. The prize was established in 2003 at the initiative of Professor J. Labsvīrs, Doctor *honoris causa* of the LAS.

The first winners of the prize were V. Bērziņš, V. Strīķis (2004), A. Boruks (2006), A. Caune (2008), B. Rivža (2010), D. Bleiere (2013), P. Eglīte (2017).

Gustavs VANAGS (1891–1965) — an outstanding Latvian scientist of organic chemistry. He has created the Latvian school of organic chemistry in chemistry of cyclic beta-diketones. He was among the founders of the Institute of Organic Synthesis, and has developed several preparations and reagents used in medicine, agriculture, and analytical chemistry.

The Gustavs Vanags Prize follows up the best traditions of the Gustavs Vanags Award, established on 7 December 1967. It has been awarded to A. Ārens (1971), E. Gudriniece, A. Strakovs (1972), V. Oškāja (1974), J. Freimanis (1976), O. Neilands (1978), J. Bankovskis (1980), R. Valters (1982), G. Duburs, E. Stankeviča (1984), E. Lukevics (1986), B. Puriņš (1988), M. Līdaka (1990), G. Čipēns (1992), J. Stradiņš (1994), F. Avotiņš, M. Šimanska (1996), T. Millers (1998), M. Kalniņš (2000), I. Kalviņš (2003), E. Liepiņš (2005), A. Zicmanis (2007), G. Veinbergs (2009), V. Kampars (2011), V. Kauss (2012), E. Sūna (2014), M. Turks (2016).

Tāivaldis VILCIŅŠ (1922–1997) — historian and sociologist, professor of history. He graduated from the Faculty of History of the University of Latvia as a correspondence student (1953). Beginning with 1963, he had worked at the Institute of History of the LAS, was the first one to introduce sociological

methods in the humanities in Latvia (monograph *The Prestige of Occupations and the Choice of Occupations Nowadays*, 1968). He gave a lecture course, “The Mathematical Methods in Sociology,” published more than 60 scientific works including several books.

The winners of Tālivaldis Vilciņš Prize are B. Zepa (2002), A. Tabuns (2007), T. Tisenkopfs (2011), I. Koroļeva (2016).

Alfrēds VĪTOLS (1878–1945) — an expert in hydromechanics, the first doctor of engineering sciences in Latvia (1923). From 1919 to 1944, associate professor and professor (from 1924) at the University of Latvia. He has taken part in the development of projects for Ķegums and Dole power plants, for Rīga–Liepāja railway, as well as in a number of other technical projects, intertwining the theoretical foundations of engineering sciences (hydraulics) with practice. In 1944, he emigrated to Sweden; he died in Uppsala.

The winners of Alfrēds Vītols Prize are J. Ekmanis (1999), V. Zēbergs (2002), N. Zeltiņš (2003), J. Barkāns (2004), K. Timermanis (2005), L. Ribickis (2006), J. Gerhards (2007), J. Dirba (2008), V. Gavars (2009), J. Inde (2010), V. Pugačevs (2011), A.S. Sauhats (2012), V. Krēšliņš (2013), Z. Krišāns (2014), K. Brinķis (2015), J. Rozenkrons (2017).

PRIZES AND GRANTS OF THE LATVIAN ACADEMY OF SCIENCES AWARDED IN SPONSORSHIP

<i>Sponsor</i>	<i>Prizes</i>
European Academy of Sciences and Arts	<p>The European Prize of the European Academy of Sciences and Arts (Felix Prize) and 2 incentive prizes for remarkable achievements in the humanities</p> <p>The Prize has been awarded since 2001. The first winner is V. Viķe-Freiberga, incentive prizes — I. Ose and I. Šuvajevs. In 2003 — M. Kūle, supporting prizes D. Baltaiskalna, Ē. Jēkabsons, in 2006 — V. Zariņš, supporting prizes — R. Blumberga, A. Sprūds. In 2009 — J. Vētra, — supporting prizes R. Bičevskis, A. Irmejs, in 2011 — I. Blumbergs, supporting prizes — K. Ābele, R. Spirģis, in 2013 — A. Jurkāne, supporting prizes — S. Laime, P. Daija, in 2015 — I. Lancmanis, supporting prizes — I. Lībiete, D. Zigmunde.</p>

- Joint stock company “Grindex” *3 annual prizes* to the most prominent scientists for outstanding achievements or life-long contribution
- The winners are: M. Līdaka, U. Ulmanis, S. Cimermanis (1998), E. Lukevics, O. Lielausis, K. Arājs (1999), O. Neilands, V. Tamužs, V. Bērziņš (2000), V. Kluša, E. Blūms, A. Caune (2001), T. Millers, J. Kristapsons, O. Spārītis (2002), R. M. Freivalds, E. Gudriniece, P. Guļāns (2003), G. Čipēns, I. Knēts, Ē. Mugurēvičs (2004), J. G. Bērziņš, E. Kagaine, A. Strakovs (2005), V. Baumanis, P. Eglīte, J. Dehtjars (2006), V. Kauss, V. Skujiņa, J. Spigulis (2007), G. Duburs, J. Stradiņš, I. Lācis (2008), I. Jansone, R. Ferbers, E. Liepiņš (2010), G. Bārzdīņš, J. Krastiņš, R. Valters (2012), M. Dambrova (2014), I. Kalviņš (2016).
- Public joint stock company “Latvenergo” *2 annual prizes* to remarkable scientists for outstanding achievements or life-long contribution in power engineering sciences
- The winners are: Z. Krišāns, I. Staltmanis (1999), K. Briņķis, A. Grundulis (2002), A. S. Sauhats, P. Šipkovs (2003), E. Tomsons, J. Dirba, J. Rozenkrons (2004), D. Blumberga, V. Pugačevs (2005), V. Čuvičins, A. Šnīders (2006), G. Šlihta (2007), G. Kaškarova, Ā. Žīgurs (2009), A. Mutule (2010), L. Bisenieks (2011), L. Latkovskis (2012), I. Raņķis (2013), K. Ketners, I. Stuklis (2014), G. Bažbauers, U. Sarma (2015), R. Arājs, A. Laizāns (2016).
- Joint-stock company “Exigen Services Latvia” and the Rīga Technical University Development Fund *2 annual prizes* to remarkable scientists for outstanding achievements or life-long contribution in computer sciences and informatics are granted
- The winners are: J. Bārzdīņš, A. Anspoks (1999), J. Osis, M. Treimanis (2000), L. Niceckis, A. Vasiļjevs (2001), I. Kabaškins, A. Brūvelis (2002), J. Bičevskis, E. Karnītis (2003), P. Rivža, A. Virtmanis (2005), I. Ilziņa (2007), A. Kalniņš, S. Skusovs (2015), A. Lorencs, V. Lokenbahs (2016).

Joint stock company “ITERA Latvija” and Rīga Technical University Development Fund

2 annual prizes to remarkable scientists and specialists — practitioners of Latvia for outstanding achievements or life-long contribution in environmental sciences, earth sciences, and geography or for the advancement of significant systems of environmental development are granted

The winners are: G. Andrušaitis, A. Melluma (2001), G. Eberhards, R. Kondratovičs (2002), A. Andrušaitis, M. Kļaviņš (2003), E. Kaufmane, J. Viksne (2004), V. Jansons, V. Melecis (2005), G. Pētersons, P. Zālītis (2006), O. Āboltiņš, D. Blumberga (2007), O. Nikodemus, I. Veidenbergs (2008), I. Liepa, N. Zeltiņš (2010), U. Sedmalis, D. Zigmunde (2011), P. Šipkovs, S. Strautiņa (2012), L. Legzdiņa, G. Lināre (2013), T. Juhna, A. Ziemeļniece (2014), N. Ņitavska, S. Treija (2015), L. Ikase, U. Īle (2016).

Joint stock company “Latvijas gāze” and Rīga Technical University Development Fund

2 annual prizes to remarkable scientists and practitioners for outstanding series of papers or life achievement in gas and heat technologies, and the related fields, and in the sciences of cardiac surgery and cardiology, and organ transplantation

The winners are: R. Lācis, A. Krēsliņš (2002), J. Anšelevičs, E. Dzelzītis (2003), J. Volkolakovs, V. Zēbergs (2004), I. Siliņš, N. Zeltiņš (2005), V. Rudzīte, D. Turlajs (2006), A. Kalvelis, I. Platais (2007), R. Rozentāls, P. Graudiņš (2009) V. Dzērve-Tāluts, A. Lešinskis (2010), J. Gardovskis (2011), A. Kokins, A. Ješinska, J. Raibarts (2012), O. Kalējs, R. Kolītis, J. Volkolākovs jun. (2013), J. Romanova, G. Freibergs, A. Rudzītis (2014), J. Bažbauers, I. Lubaua, I. Krūmiņa (2015), J. Jušinskis, A. Borodiņecs, A. Maļcevs, J. Tihana (2016).

The Rīga City Council and the Rīga Prize Society

Annual “Rīga Prize” for the most significant scientific study in the history, history of culture, history of architecture and art, in ethnography, demography and ethnic relations, geography, ecology, and in other fields related with the development of Rīga

The Prize has been awarded to J. Krastiņš, K. Radziņa, A. Celmiņš, incentive prize — V. Bebre, R. Spirģis (2002), A. Caune, O. Spārītis, O. Zanders (2003), L. Balodis, J. Stradiņš, M. Zunde (2004), J. Bērziņš, V. Vīķe-Freiberga, A. Holcmanis, J. Vīksne, J. Savickis (2005), V. Apsītis, J. Ekmanis, I. Knēts, V. Jākobsons (2006), Z. Gaile, V. Mihailovskis, I. Ose, J. Stabulnieks, A. Vārpa (2007), E. Grēns, I. Indāns, J. Gombergs, ISC “Sīdrabe” (2009). A. Henriņš, A. Kapenieks, I. Ranka (2009), I. Kalviņš, Z. Skujiņš (2010).

Since 2011, the annual prize has been awarded by Rīga Prize Society and S/C “ITERA Latvija”. The winners are: M. Barzdeviča, J. Erenštreits I. Gerčikovs, L. Šēnbergs (2011), L. Ribickis, R. Pauls, A. Taimiņa, Rīga National Zoo (2012).

D. A. Loeber has been awarded Honorary Diploma “Rīga Prize” (post mortem). Honorary Diploma has been awarded to:

Institute of the History of Latvia, University of Latvia, Academic Library of the University of Latvia, Rīga State Gymnasium No. 1 (2011), D. Īvāns, E. Hrščenoviča, D. Leimane (2012). Since 2013, awarding has been suspended.

The Rīga City Council Rīga City Council annual prize for the most significant scientific studies in humanities and natural sciences, related with the development of Rīga.

The winners are: A. Šternbergs (2011), T. Jundzis (2012), A. Caune (2013), A. Cimdiņa (2014), R. Kondratovičs (2015), A. Gailītis (2016).

Patent Office of the Republic of Latvia

The *Walter Zapp Prize* — to the best inventor. The prize is awarded biennially

The winners are: B. Joffe, R. Kalniņš (2005), J. Upatnieks (2007), M. Ābele, K. Lapuška (2011), J. Spīrgulis (2013), I. Kalviņš (2015).

<p>SIA “L’OREAL BALTIC,” Latvian National Commission for UNESCO</p>	<p><i>3 years grant</i> “To Women in Science” for carrying out scientific research in life sciences and materials sciences.</p> <p>Grants have been given to R. Muceniece, A. Linē, A. Zajakina (2005), M. Dambrova, O. Starkova, M. Plotniece (2006), L. Grinberga, B. Jansone, A. Plotniece (2007), I. Aulika, J. Pupure, T. Voronkova (2008), K. Siliņa, T. Glaskova, L. Zvejniece (2009), I. Čakstiņa, E. Pajuste, U. Riekstiņa (2010), L. Ņikitina-Zaķe, M. Dunce, B. Švalbe (2011), D. Loča, I. Smeltere, E. Škapare (2012), Z. Kalniņa, J. Sokolovska, L. Širmāne (2013), D. Pjanova, A. Aleksejeva, M. Makrečka (2014), L. Beķere, I. Mihailova, A. Hūna (2015), K. Šalma-Ancāne, J. Lugiņina, I. Dimanta (2016).</p>
<p>JSC “Latvijas dzelzceļš” and Rīga Technical University Development Fund</p>	<p><i>Yearly prize for outstanding merits or life-long work in Latvian Railway transport.</i></p> <p>The winners are: V. Junovičs (2007), M. Mezītis, B. Pernikis (2008), T. Lukonens, I. Korago (2010), J. Ceicāns, N. Petuhova (2011), A. Poča, A. Plešaunieks (2012), J. Strods, J. Švabs (2014), J. Luceničs, I. Rezgorina (2015), G. Semjonova, D. Sergejevs (2016).</p>

PRIZES AND AWARDS TO YOUNG SCIENTISTS

LATVIAN ACADEMY OF SCIENCES PRIZES AND AWARDS TO YOUNG SCIENTISTS

Awards based on competition of works are granted to Master’s degree students or post-graduate students, or young scientists who have defended their Master’s or Doctoral thesis recently. Only papers written individually by scientists not older than 30 years at the moment of application are admissible. Nine awards are granted annually, including three in chemical, biological, agricultural, and medical sciences, three in physical, mathematical, engineering, and computer sciences, and three in the humanities and social sciences. Among them there are prizes dedicated to the continuity of Latvian science traditions and to the memory of outstanding personalities in science and culture:

Ludvigs and Māris Jansons Prize — for the best work in physics,

Mārtiņš Straumanis–Alfrēds Ieviņš Prize — for the best work in chemistry,

Zenta Mauriņa Prize — for the best work in literary studies and philosophy.

The papers for the young scientists' contest should be submitted by 30 September every year at the secretariat or scientific divisions of the LAS, Akadēmijas laukums 1, 2nd floor, Rīga, LV 1524. Tel.: (371) 67223931.

PRIZES AND GRANTS OF THE LATVIAN ACADEMY
OF SCIENCES AWARDED IN SPONSORSHIP TO YOUNG
SCIENTISTS AND STUDENTS

<i>Sponsor</i>	<i>Prizes</i>
Emīlija Gudriniece	<i>To the best young scientist</i> in chemistry or chemical technology
Emīlija Gudriniece	Emīlija Gudriniece–Alfrēds Ieviņš <i>annual grant</i> to the students of Bachelor's, Master's degrees and engineering programmes in chemistry and chemical technology
JSC "Grindex"	<i>3 prizes</i> to the best young scientists
JSC "Latvenergo"	<i>5 yearly prizes</i> to the best young scientists for the works in energy sciences or respective engineering sciences
JSC "Latvija Gāze" and the Rīga Technical University Development Fund	<i>2 fellowships</i> to the Doctoral students of gas and thermo-technical technologies and coronal surgery — cardiology
JSC "Latvijas Dzelzceļš" and the Rīga Technical University Development Fund	<i>annual prize</i> to the student of Master's, Doctoral degree, scientist for research work in the field of railway transport

WINNERS OF ACADEMY AWARDS AND OTHER AWARDS
2016–2017

WINNERS OF THE GRAND MEDAL OF THE LATVIAN ACADEMY
OF SCIENCES

(LAS Senate decision of 14 March 2017)

LAS Full Member **Jānis Bārzdīņš** (University of Latvia) — for fundamental research in algorithm theory and significant development of computer science research in Latvia.

LAS Full Member **Baiba Rivža** (Latvia University of Agriculture) — for significant contribution in the studies of Latvian countryside and regional development.

WINNERS OF THE LAS PRIZES IN 2016–2017

LAS Full Member **Oļģerts Dumbrājs** (Institute of Solid State Physics, University of Latvia) — the *Arturs Balklavs* Prize, for outstanding achievements in the popularisation of science.

LAS Corresponding Member **Aleksandrs Šostaks** (Institute of Mathematics and Computer Science, University of Latvia) — the *Piers Bohl* Prize in mathematics, for a series of research “Multi-valued topological structures and approximate systems: theoretical foundations and applications”.

LAS Corresponding Member **Pārsla Eglīte** (Institute of Economics, Latvian Academy of Sciences, Ltd.) — the *Kārlis Ulmanis* Prize established by Jānis Labsvīrs in national economy, for a comprehensive contribution in the theoretical research on the population of Latvia.

Dr.philol. **Anita Rožkalne** (UL Agency, UL Institute of Literature, Folklore, and Art) — the *Vilis Plūdonis* Prize in literary criticism for the monograph *Lauva. Dzejniece Astrīde Ivaska (The Lion: Poetess Astrīde Ivaska)*.

Dr.biol. **Edgars Vimba** (Faculty of Biology, University of Latvia) — the *Heinrichs Skuja* Prize in biological sciences for life contribution in the research of Latvian flora.

Dr.agr. **Dainis Lapiņš** (professor emeritus, Latvia University of Agriculture) — the *Paulis Lejņš* Prize in agricultural sciences for a series of research “Optimisation Possibilities of Science-Based Agricultural Technologies”.

WINNERS OF THE LAS PRIZES AWARDED IN SPONSORSHIP

Dr.habil.math. **Aivars Lorencs** (Institute of Electronics and Computer Science, University of Latvia) — LAS, Joint Stock Company “Exigen Services Latvia”, and the Rīga Technical University Development Fund, the *Eižens Āriņš Prize* in computer sciences and their applications, for significant theoretical contribution in the development of computer science in Latvia.

Dr.h.c. **Valdis Lokenbahs** (IT consultant) — LAS, Joint Stock Company “Exigen Services Latvia”, and the Rīga Technical University Development Fund, the *Eižens Āriņš Prize* in computer sciences and their applications, for significant practical contribution in the development of computer science in Latvia

LAS Full Member **Jurijs Merkurjevs** — LAS, JSC “Exigen Services Latvia”, and the Rīga Technical University Development Fund Certificate of Recognition for investment in the development of Latvian computer science theory.

Dr.arch. **Una Īle** (Latvia University of Agriculture) — LAS, JSC “ITERA Latvija”, and the Rīga Technical University Development Fund prize for the work “The Landscape Quality of the Residential Area Courtyards in the Cities of Latvia”.

Dr.biol. **Laila Ikase** (Institute of Horticulture, Latvia University of Agriculture) — LAS, JSC “ITERA Latvija”, and the Rīga Technical University Development Fund prize for the series of research “Horticultural Science for Establishment of Environmentally-Friendly Orchards”.

Dr.med. **Jānis Jušinskis** (Laboratory of Transplantology, Rīga Stradiņš University) — LAS, the Joint-Stock Company “Latvijas Gāze”, and the Rīga Technical University Development Fund prize for the contribution to the development of organ transplantation of high-risk donors.

Dr.sc.ing. **Anatolijs Borodņecis** (Institute of Heat, Gas, and Water Technology, Rīga Technical University) — LAS, JSC “Latvijas Gāze”, and the Rīga Technical University Development Fund prize for the life contribution in the fields of gas, heat engineering, and related sectors for the new research and study direction “Modern Zero-Energy Buildings”.

LAS Full Member **Ivars Kalviņš** (Latvian Institute of Organic Synthesis) — LAS and the Joint-Stock Company “Grindeks” Prize “Zelta Pūce”(“Golden owl”) for the development and performance evaluation of the novel cardioprotective medications.

Dr.sc.ing. **Jānis Rozenkrons** (Faculty of Power and Electrical Engineering, Rīga Technical University) — LAS and the Joint-Stock Company “Latvenergo”, *Alfrēds Vītols Prize* for outstanding life contribution to power industry in Latvia.

Dr.sc.ing. **Rolands Arājs** — LAS and the Joint-Stock Company “Latvenergo” Annual Prize for a significant contribution to power industry.

Dr.sc.ing. **Aigars Laizāns** (Engineering Faculty, Latvia University of Agriculture) — LAS and the Joint-Stock Company “Latvenergo” Annual Prize for a significant contribution to the power industry.

LAS Full Member **Agris Gailītis** (Institute of Physics, University of Latvia) — LAS and Rīga City Council Prize for fundamental research in magnetohydrodynamics and the promotion of Rīga in the world.

Dr.sc.ing. **Kristīne Šalma-Ancāne** (Institute of General Chemical Engineering, Rīga Technical University) — Ltd. L'ORÉAL Baltic grant “For Women in Science” (jointly with UNESCO Latvian National Committee) for research “Development of Nanostructured Biocomposites with Antosteoporotic Properties”.

Mg.sc.ing. **Jevgenija Lugiņina** (Institute of Organic Chemistry and Technology, Rīga Technical University) — Ltd. L'ORÉAL Baltic grant “For Women in Science” (jointly with UNESCO Latvian National Committee) for research “Reactions of Organic Compounds on Liquid Sulphur Dioxide”.

Mg. biol. **Ilze Dimanta** (Institute of Solid State Physics, University of Latvia) — LtD.L'ORÉAL Baltic grant “For Women in Science” (jointly with UNESCO Latvian National Committee) for research “Use of Metal Hydride Materials for Biologically Produced Hydrogen Storage and a New Type of Bioreactor Design”.

Galīna Semjonova (JSC “Latvijas Dzelzceļš”) — LAS, JSC “Latvijas Dzelzceļš”, and the Rīga Technical University Development Fund prize for outstanding work in the Latvian railway transport industry.

Assoc. Professor **Dijs Sergejevs** (Faculty of Mechanical Engineering, Transport and Aeronautics, Rīga Technical University) — LAS, JSC “Latvijas Dzelzceļš”, and the Rīga Technical University Development Fund prize for outstanding work in the training the new specialists for the Latvian railway.

WINNERS OF THE PRIZES AND AWARDS OF THE LATVIAN ACADEMY OF SCIENCES TO YOUNG SCIENTISTS

Dr.phys. **Edgars Nitišs** (researcher, Institute of Solid State Physics, University of Latvia) — the *Ludvigs and Māris Jansons* Prize in physics for the work “Investigations of Nonlinear Optical Organic Glass Waveguides and Their Applications”. Supervisor LAS Full Member M. Rutkis.

Mg. **Rihards Alekšis** (doctoral student, Faculty of Chemistry, University of Latvia) — the *Mārtiņš Straumaņis – Alfrēds Ieviņš* Prize in chemistry for the work “Lunasin Structural Studies Using NMR Spectroscopy”. Supervisor *Dr.chem.* K. Jaudzems.

Mg. Agnese Stikute (SIA “Environmental Audit” chemist-analyst) — the *Emīlija Gudriniece* Prize in chemistry for the work “Application of Element Organic Compound-Derived Allylsulfonates in Organic Synthesis”. Supervisor LAS Full Member M. Turks.

Mg. Krišjānis Lācis (doctoral student, Faculty of History and Philosophy, University of Latvia) — *Zenta Mauriņa* Prize in philosophy for the work “The Epistemology of Love in the Works of Søren Kierkegaard”. Supervisor *Dr.phil.* R. Bičevskis.

Dr.chem. Gunta Kunakova (researcher, Institute of Chemical Physics, University of Latvia, postdoctoral researcher, Chalmers University of Technology — *Prize for Young Scientists* for the work “Charge Transport in Bismuth Chalcogenide Nanowires: Effect of the Surface and the Bulk”. Supervisors LAS Full Member D. Erts, Prof. Floriana Lombardi.

Mg. Sindija Briča (researcher, Faculty of Chemistry, University of Latvia) — *Prize for Young Scientists* for the work “Synthesis and Characterisation of New Surfactants”. Supervisor LAS Full Member A. Zicmanis.

Dr.philol. Marija Semjonova (Faculty of Humanities, University of Latvia) — *Prize for Young Scientists* for the work “Autobiographicity and its Genre Forms in Women’s Prose of Latvia and Finland in the 20th Century”. Supervisor *Dr.philol.* I. Novikova.

Mg. Tatjana Lejava (Aviation safety inspector, Security Department, the SJSC International Airport “Rīga”) — *Prize for Young Scientists* for the work “Youth Unemployment in Jelgava City and Jelgava Municipality: Analysis and Decrease Opportunities”. Supervisor LAS Full Member B. Rivža.

WINNERS OF THE LAS PRIZES FOR YOUNG SCIENTISTS AWARDED IN SPONSORSHIP

Dr.pharm. Marina Makrečka-Kūka (researcher, Latvian Institute of Organic Synthesis) — LAS and Joint Stock Company “Grindeks” Prize “Silver owl” for the work “Study of Acyl-Carnitine Induced Mitochondrial Metabolic Damage and Possible Pharmacological Therapy”. Supervisor LAS Full Member M. Dambrova,

Bc. Kristers Ozols (Master’s Degree student, Faculty of Materials Science and Applied Chemistry, Rīga Technical University) — LAS and Joint Stock Company “Grindeks” Prize “Silver owl” for the work “Employment of 2,6-Bis-Triazolyl Purine Nucleozides for the Synthesis of Natural Product Derivatives”. Supervisors *Dr.chem.* Ē. Bizdēna, *Mg.* I. Novosjolova.

Mg. Edijs Vāvers (doctoral student, Rīga Stradiņš University, assistant, Latvian Institute of Organic Synthesis) — LAS and Joint Stock Company “Grindeks” Prize “Silver owl” for the work “Pharmacological Evaluation of Novel 4,5-Disubstituted Piracetam Derivate, Positive Allosteric Modulator of Sigma-1 Receptor”. Supervisor LAS Full Member M. Dambrova.

Dr.sc.ing. Jeļena Tihana (researcher, Faculty of Civil Engineering, Rīga Technical University) — LAS, the Joint-Stock Company “Latvijas Gāze”, and the Rīga Technical University Development Fund Prize for the work “Constructional Design of Heating Systems”. Supervisor LAS Corresponding Member A. Krēsliņš.

Aleksandrs Maļcevs (surgeon transplantologist, Pauls Stradiņš Clinical University Hospital, researcher, Laboratory of Transplantology, Rīga Stradiņš University) — LAS, JSC “Latvijas Gāze”, and the Rīga Technical University Development Fund prize for the work “Kidney Transplantation from a Donor After CardioCirculatory Death”. Supervisor LAS Full Member R. Rozentāls, *Dr.med. J. Jušinskis*.

Mg. Einārs Jaunzems (Joint-Stock Company “Latvijas Dzelzceļš”) — LAS, JSC “Latvijas Dzelzceļš”, and the Rīga Technical University Development Fund prize for studies in the rail transport sector.

Dr.chem. Liene Grigorjeva (Latvian Institute of Organic Synthesis) — LAS, “Olainfarm”, and the Rīga Technical University Development Fund prize for the Doctoral Thesis “C-Heteroatom Bond Formation in Lewis Acid Catalysed Allylic Substitution Reaction”. Supervisor LAS Corresponding Member A. Jirgensons.

Dr.phys. Dmitrijs Bočarovs (Institute of Solid State Physics, University of Latvia) — LAS and the Joint-Stock Company “Latvenergo” Prize for Young Scientists for achievements in the power industry, for the series of scientific works “Quantum Chemistry Calculations of UN and UO₂ Materials for Nuclear Energetics and TiO₂ Nanotubes for Hydrogen Energetics”. Supervisor *Dr.chem. J. Žukovskis*.

Dr.sc.ing. Nauris Jankovskis (Faculty of Power and Electrical Engineering, Rīga Technical University, JSC “Sadales tīkls”) — LAS and JSC “Latvenergo” prize for Young Scientists for the achievements in the field of power engineering and for the Doctoral Thesis “Techniques of Using Smart Technologies in the Distribution Networks of Latvia”. Supervisors LAS Corresponding Member Antans Sauhats, *Dr.sc.ing. S. Berjozkina*.

Dr.sc.ing. Jevgeņijs Kozadajevs (Faculty of Power and Electrical Engineering, Rīga Technical University) — LAS and JSC “Latvenergo” Prize for Young Scientists for the achievements in power engineering and for the Doctoral Thesis “Turn-to Turn Fault Protection for Power Transformers”. Supervisor *Dr.sc.ing. A. Dolgicers*.

Dr.sc.ing. Uģis Sirmelis (Faculty of Power and Electrical Engineering, Rīga Technical University, Ltd. “Hansa Matrix Innovation”) — LAS and JSC “Latvenergo” Prize for Young Scientists for the achievements in power engineering and for the Doctoral The-

sis “Urban Electric Transport System Modelling for the Selection of Optimal Energy Storage Parameters”. Supervisors *Dr.sc.ing.* L. Latkovskis, *Dr.sc.ing.* J. Zaķis.

Dr.sc.ing. **Laila Zemīte** (Faculty of Power and Electrical Engineering, Rīga Technical University, JSC “Latvijas elektriskie tīkli”) — LAS and JSC “Latvenergo” Prize for Young Scientists for the achievements in power engineering and for the Doctoral Thesis “Methods of Calculation of Electric Distribution Network Reliability and Their Realisation”. Supervisor *Dr.sc.ing.* J. Gerhards.

WINNERS OF OTHER SIGNIFICANT PRIZES IN SCIENCE AND HONOURS AWARDED TO THE LAS MEMBERS, 2016

LAS Full Member **Jānis Krastiņš** — *Award of the Cabinet of Ministers of the Republic of Latvia* for the merits in architectural and urban studies and publication of significant monographs.

LAS Full Member **Leonīds Ribickis** — *Award of the Cabinet of Ministers of the Republic of Latvia* for significant contribution in the quality improvement of engineering education.

LAS Honorary Member **Māra Lāce** — *Award of the Cabinet of Ministers of the Republic of Latvia* for the contribution in the development and international visibility of the Latvian National Museum of Art.

LAS Honorary Member **Pēteris Vasks** — *Award of the Cabinet of Ministers of the Republic of Latvia* for outstanding contribution to the field of academic music and excellent international achievements.

LAS Full Member **Rihards Kondratovičs** — *Certificate of Recognition of the Cabinet of Ministers of the Republic of Latvia* for long-standing and significant contribution to the selection of rhododendron variety, development of the garden design and the promoting Latvia to the world.

LAS Full Member **Maija Dambrova** — *The Baltic Assembly Award in science* for the research in the metabolism of energy, and her research of the working mechanisms of “Mildronate”, and the annual award “Scientist of the year”, Rīga Stradiņš University.

LAS Honorary Member **Jānis Streičs** — *The Cicero Prize*, in the national category for enduring contribution to the cinema art in Latvia and in the world.

LAS Full Member **Arvīds Barševskis** — *The Cicero Prize*, in the local category for achievements in biological research and a substantial increase in scientific prestige of Daugavpils.

LAS Full Member **Ivars Kalviņš** — Certificate of Appreciation, Ministry of Education and Science “For significant contribution to the science development in Latvia”, Certificate of Appreciation, Rīga City Council, for outstanding contribution to the development of chemistry science and successful international cooperation, promoting Rīga.

LAS Full Member **Baiba Rivža** — winner of the contest “Sējējs – 2016” in the nomination “Science for the rural development” on the basis of the scientific and research projects for rural development (2015–2016).

LAS Corresponding Member **Aleksandrs Rapoportis** — Certificate of Recognition, The Prime Minister, Republic of Latvia, for a significant contribution to the development of science in Latvia.

LAS Full Member **Bruno Andersons** — award of the Ministry of Agriculture “Zelta čiekurs” (Gold cone) in the nomination “For the life contribution” for significant life contribution to the development of the sector.

LAS Corresponding Member **Oļģerts Nikodemus** — Annual Award in Science, University of Latvia.

Dr.h.c.philol. **Pēteris Pildegovičs** — the commemorative cup and a certificate for a great contribution to translation and publishing of books devoted to the China and a commemorative medal and certificate on outstanding individual performance awarded by “The Headquarters of the Confucius Institute”.

LAS Honorary Member **Andris Nelsons** — 2016 Excellence Award in culture for outstanding academic performance in the field of academic music, leading prominent world’s orchestra with a high level of appreciation; Grammy award in the category “Best Orchestral Performance” for performance by the Boston Symphony Orchestra, and recorded and issued by “Deutsche Gramophon”, of 5th, 6th and 9th Symphonies of Dmitry Shostakovich: “Shostakovich: under Stalin’s Shadow — Symphonies Nos. 5, 8 & 9”.

HOLDERS OF THE SCHOLARSHIPS GRANTED BY THE LATVIAN ACADEMY OF SCIENCES, 2016/2017

Dace Cīrule, Kristers Ozols (Rīga Tehnical University) — *Emīlija Gudriniece – Alfrēds Ieviņš Scholarship in Chemistry*

HONORARY PATRONS OF THE LATVIAN ACADEMY OF SCIENCES

Private donators

LAS Honorary Member **Magda Staudinger-Woit** (1902–1997) and Nobel prize winner **Hermann Staudinger** (1881–1965)

Teacher **Erna Poča** (1920–2001) and LAS Doctor *honoris causa* **Konstantīns Počs** (1912–1994)

LAS Foreign Member **Dietrich André Loeber** (1923–2004)

Economist **Jānis Sadovskis** (1904–2006) and teacher **Austra Sadovska** (1913–1999)

LAS *Doctor honoris causa* **Jānis Labsvīrs** (1907–2002)

LAS Full Member **Emīlija Gudriniece** (1920–2004)

Entrepreneur **Atis Sausnītis**

Entrepreneur **Ivars Strautiņš**

Entrepreneur **Pēteris Avens**

Entrepreneur **Guntis Belēvičs**

Representatives of companies and institutions

Dr.sc.ing. **Adrians Dāvis** (JSC “Latvijas Gāze”)

LAS Honorary Member **Valdis Jākobsons** (JSC “Grindeks”)

Dr.chem. **Imants Meirovics** (1930–2015) (target programme “For Education, Science, and Culture” of the Latvian Education Foundation)

Juris Savickis (Ltd. “ITERA Latvija”)

The Boris and Ināra Teterev Foundation

Kirovs Lipmans (JSC “Grindeks”)

Āris Žīgurs (JSC “Latvenergo”)

SCIENTIFIC DIVISIONS OF THE ACADEMY

DIVISION OF PHYSICAL AND TECHNICAL SCIENCES

Akadēmijas laukums 1, Rīga, LV 1050, Latvia

Tel.: (371) 67223633 Fax: (371) 67821153

E-mail: fizteh@lza.lv

Board of the Division

Chair of the Division Jānis SPĪGULIS

Vice-Chair of the Division Andris OZOLS

Scientific Secretary Sofja NEGREJEVA

Board members

Donāts ERTS, Modris GREITĀNS, Vjačeslavs KAŠČEJEVS, Māris KNITE,
Andrejs KRASŅIKOVŠ, Mārtiņš RUTKIS, Juris ŽAGARS

The Division unites 105 LAS members, among them 41 full, 3 honorary, 26 foreign,
and 35 corresponding members.

The Division has conferred the title of *Dr. honoris causa* to 16 scientists.

MEMBERS OF THE DIVISION AND THEIR FIELD OF SPECIALISATION

Astronomy

Māris Ābele, cor.mem

Edgars Bervalds, cor.mem.

Juris Žagars, cor.mem.

Dainis Draviņš, for.mem.

Kārlis Čerāns, cor.mem.

Jānis Grabis, cor.mem.

Modris Greitāns, cor.mem.

Igors Kabaškins, cor.mem.

Audris Kalniņš, cor.mem.

Leonīds Novickis, cor.mem.

Uldis Sukovskis, cor.mem.

Pēteris Videnieks, cor.mem.

Jānis Osis, hon.mem.

Gilles Brassard, for.mem.

Alvis Brāzma, for.mem.

Juris Hartmanis, for.mem.

Andris Padegs, for.mem.

Computer Science

Andris Ambainis, full mem.

Jānis Bārzdiņš, full mem.

Ivars Biļinskis, full mem.

Jānis Grundspeņķis, full mem.

Jurijs Merkurjevs, full mem.

Guntis Arnicāns, cor.mem.

Guntis Bārzdiņš, cor.mem.

Juris Borzovs, cor.mem.

Engineering

Vilis Vītols, hon.mem.

Informatics (Science of Science)

Jānis Kristapsons, cor.mem.

Mathematics

Andris Buiķis, full mem.

Agnis Andžāns, cor.mem.

Andrejs Reinfelds, cor.mem.

Felikss Sadirbajevs, cor.mem.

Aleksandrs Šostaks, cor.mem.

Aivars Zemītis, cor.mem.

Raimondas Čiegis, for.mem.

Tarmo Soomere, for.mem.

Mechanics

Ivars Knēts, full mem.

Andrejs Krasņikovs, full mem.

Egons Lavendelis, full mem.

Imants Matīss, full mem.

Rolands Rikards, full mem.

Kārlis Rocēns, full mem.

Vitauts Tamužs, full mem.

Jānis Auziņš, cor.mem.

Andris Čate, cor.mem.

Vladimirs Kašjanovs, cor.mem.

Roberts Maksimovs, cor.mem.

Jānis Rudzītis, cor.mem.

Narimants Salenieks, cor.mem.

Jānis Vība, cor.mem.

Jūri Engelbrecht, for.mem.

René Moreau, for.mem.

Jānis Varna, for.mem.

Physics

Mārcis Auziņš, full mem.

Jānis Guntis Bērziņš, full mem.

Elmārs Blūms, full mem.

Andrejs Cēbers, full mem.

Jurijs Dehtjars, full mem.

Oļģerts Dumbrājs, full mem.

Donāts Erts, full mem.

Ruvins Ferbers, full mem.

Agris Gailītis, full mem.

Jevgeņijs Kotomins, full mem.

Māris Knite, full mem.

Andris Krūmiņš, full mem.

Aleksejs Kuzmins, full mem.

Ivars Lācis, full mem.

Oļģerts Lielausis, full mem.

Andris Ozols, full mem.

Juris Purāns, full mem.

Uldis Rogulis, full mem.

Mārtiņš Rutkis, full mem.

Andrejs Siliņš, full mem.

Linarsds Skuja, full mem.

Jānis Spīgulis, full mem.

Andris Šternbergs, full mem.

Kurts Švarcs, full mem.

Ivars Tāle, full mem.

Juris Zaķis, full mem.

Imants Bērsons, cor.mem.

Roberts Eglītis, cor.mem.

Jevgeņijs Joļins, cor.mem.

Vjačeslavs Kaščejevs, cor.mem.

Gita Rēvalde, cor.mem.

Jūras Banys, for.mem.

Antonio Bianconi, for.mem.

Herman Branover, for.mem.

Niels Egede Christensen, for.mem.

Till von Egidy, for.mem.

Roberts Evarestovs, for.mem.

Paul Albert Janmey, for.mem.

Marco Kirm, for.mem.

Aleksandr Lushchik, for.mem.

Ivars Melngailis, for.mem.

Jānis Melngailis, for.mem.

Jacques Simon, for.mem.

Pauls Stradiņš, for.mem.

Juris Pēteris Svenne, for.mem.

Aleksandrs Šļugers, for.mem.

Juris Upatnieks, for.mem.

Power Engineering

Leonīds Ribickis, full mem.
Pēteris Šipkovs, full mem.

Andris Krēsliņš, cor.mem.
Antans Sauļus Sauhats, cor.mem.
Namejs Zeltiņš, hon.mem.

Activities of the Division of Physics and Technical Sciences

This year the Division experienced essential changes. The following Academy members passed away: the former president of the LAS (2004–2012), Chairman of the Division (1991–2004) LAS Full Member Juris Ekmanis, Chairman of the Division (2004–2016) LAS Full Member Juris Jansons, a prominent Latvian computer scientist and mathematician, winner of the LAS Grand Medal LAS Full Member Rūsiņš Mārtiņš Freivalds, an outstanding expert in power engineering, LAS Honorary Member Viktors Zēbergs, and two foreign members of the LAS — an outstanding engineer from Sweden Ralejs Tepfers (2015) and an outstanding mechanics scientist from the USA Jānis Dundurs. The new Chairman of the Division LAS Full Member Jānis Spīgulis, Vice-Chair, LAS Full Member Andris Ozols, and the new Council started work in the Division. The LAS foreign members Antonio Bianconi, Robert Evarestov, Juris Upatnieks, Dainis Draviņš, Pauls Stradiņš, Jānis Vārna, and Tarmo Soomere were involved in the activities of the Division.

In 2016, 11 meetings of the Division were held, including the traditional extended joint meetings with Latvian specialists in power engineering. Members of the Division have organised five popular-scientific meetings (three of the LAS and two of the DPTS) and actively participated in the general meetings of the LAS and other events.

Meetings

27 January — meeting–discussion “Oscillations of Neutrino. From the Origins to the Nobel Prize in 2015”, organised by LAS Full Member Oļģerts Dumbrājs.

28 January — emergency meeting, where LAS Full Member Māris Knite was released from his duties as Vice-Chair of the Division and two candidates — LAS full members Jānis Spīgulis and Andris Ozols — were nominated to the election of the Chair on 2 March. It was decided that during the illness of J. Jansons, at the meetings of LAS Presidium and Senate, the Chairman of the Division would be substituted by A. Ozols or J. Spīgulis. Looking forward to the LAS General Meeting on 7 April, Ojārs Spārītis was nominated as a candidate to the position of the LAS President.

2 March — full meeting of the DPTS. Members of the Division discussed the report on Division’s activities in 2015, acknowledged it and accepted the proposals for the Division’s activities in 2016. In blind election, LAS Full Member Jānis Spīgulis

was appointed as Chair of the Division. LAS full members Andris Šternbergs, Leonīds Ribickis, Mārcis Auziņš, and LAS Corresponding Member Juris Borzovs were nominated as members of the LAS Senate.

27 April — meeting with the report delivered by the NASA scientist Ilmārs Dāliņš, “Earth Superficial Convulsions, Initiated by Powerful Rocket Actions”. The speaker shared his research experience in the USA and Canada, including collaboration with the legendary rocket designer Wernher von Braun.

24 May — traditional out-meeting at the Institute of Solid State Physics with presentation of LAS Foreign Member Pauls Stradiņš, “Photovoltaics: Global Perspective and Highly Efficient Silicon PV”. He is a researcher at the National Renewable Energy Laboratory, USA, and a professor at Colorado School of Mines. Current state-of-the-art and the development trends of photovoltaics were described, as well as physical phenomena driving the operation of silicon photovoltaic elements. One of the main conclusions was: non-organic photovoltaic elements are more promising if compared with the organic ones, as the latter face problems of aging and durability.

30 August — Chair of the Division Jānis Spīgulis informed about the challenges and plans of the Division for the years 2016–2017. Andris Ozols was elected as Vice-Chair of the DPTS, and the following Council members were elected: Donāts Erts, Modris Greitāns, Vjačeslavs Kasčejevs, Māris Knite, Andrejs Krasņikovs, Mārtiņš Rutkis, and Juris Žagars. LAS Honorary Member Namejs Zeltiņš reminded that the LAS is a corporate member of the National Committee of World Energy Council, and invited the members of DPTS to participate in a study and to fill the questionnaires related to energy monitoring. Latvian data will be compared to the global and European data in order to specify the expert calculations and decisions.

28 September — Director of the Institute of Physical Energetics (IPE) *Dr.sc.eng.* I. Oļeiņikova reported on “IPE Development 2020+: Smart Energy, Smart Materials, Technologies and Engineering Systems”. She informed on the LAS and IPE activities, the achieved results, research priorities corresponding the Smart Specialization Strategy of Latvia and the gaining of external funding in order to reach the planned goals. IPE development strategy envisages special attention to creation of stronger ties between research and innovation, based on the already existing collaboration with industry and attracting new industrial partners. IPE performs complex studies in the field of power industry that are important for Latvia’s policies of climate, environmental protection, power engineering, and the research strategy proposes to further develop them in future. Department members voted to support retaining IPE as an independent State research institute.

5 October — two presentations by LAS member candidates: *Dr.phys.* Aleksejs Kuzmins, leading researcher of the Institute of Solid State Physics (ISSP), University of Latvia (UL), reported on “Contemporary X-ray Absorption Spectroscopy — When Theory Meets Experiment”; and *Dr.habil.phys.* Uldis Rogulis, head of the laboratory at

ISSP and professor at the UL, reported on “Optically Detectable Magnetic Resonance Spectroscopy in Crystals, Glasses and Glass Ceramics”. LAS Vice President, LAS Full Member A. Krasņikovs informed about research achievements of the candidate to LAS Foreign Member, professor of Lulea Technical University (Sweden) *PhD* Jānis Vārna and his collaboration with Latvia.

12 October — two more presentations of LAS member candidates: *Dr.chem.* Donāts Erts, Director of the Institute of Chemical Physics and associated professor at the UL, and *Dr.phys.* Gita Rēvalde, leading researcher of the Smart Technology Centre, Ventspils University College, and associated professor of Rīga Technical University. After the discussion, blind voting on all LAS member candidates took place.

9 November — joint meeting with the Division of the Humanities and Social Sciences, “Problems and Solutions of Machine Translation”. LAS Doctor *honoris causa Dr.philol.* Sarma Kļaviņa reported on “Mathematical, quantitative, and computer linguistics in Latvia, 1960s–1990s”. After her presentation, the young scientists *Dr.sc.comp.* Inguna Skadiņa, *Dr.sc.comp.* Normunds Grūzītis, *Dr.sc.comp.* Raivis Skadiņš, and *Dr.sc.comp.* Andrejs Vasiļjevs continued with a joint presentation “Latvian Language in the Digital Era — From Investigations to Applications”. The conclusion was that Latvian language is not under immediate danger, but the situation can change radically if the new technologies efficiently adapt human languages. The condition for survival of a language (even with a small number of speakers) will be wide access to language technology solutions of acceptable quality. Therefore, investments in the field of state language technologies are necessary.

24 November — LAS Autumn General Meeting elected three new LAS full members — Donāts Erts, Aleksejs Kuzmins, and Uldis Rogulis, as well as LAS Corresponding Member Gita Rēvalde and LAS Foreign Member Jānis Vārna.

2 December — extended meeting of the Division and the Latvian National Committee of the World Energy Council, in memory of the LAS President (2004–2012) Juris Ekmanis and dedicated to his 75th anniversary. His widow Astrīda Ekmane participated at this meeting.

LAS meetings

19 January — authors of the most outstanding scientific achievements of the year 2015 were celebrated and awarded in the Portrait Hall of the LAS. Among the laureates, there were three academicians of the Division — Mārcis Auziņš, Ruvins Ferbers, and Juris Purāns, along with their PhD students. As usually, this event gained wide attention of the mass media.

20 January — lecture of the LAS Foreign Member of the Division, Professor Antonio Bianconi “From Quantum Complex Matter to Quantum Biology: The Emergence of a New Physics in the XXI Century” in the Portrait Hall of the LAS.

26 May — awarding ceremony of the Eižens Āriņš Prize in computer science 2016. *Dr.h.c.* Valdis Lokenbahs, one of the IT pioneers in Latvia, received this prize for significant practical input in the development of computer science in the country. He has created hundreds of IT job positions in Latvia and by his professional activities has promoted development of IT export from Latvia, as well as has been a founder of several significant IT organisations (LIKTA, RITI). A Certificate of Appreciation was granted to Professor of Rīga Technical University, LAS Full Member Juris Merkurjevs under whose guidance efficient solutions in applied modelling and simulation technologies have been elaborated, as well as integrated simulations with industrial applications.

16 September — archives of the psychologist and pedagogue Eleonora Upatniece (1893–1980) was ceremonially handed to the Academic Library of the University of Latvia. Her son, LAS Foreign Member Juris Upatnieks participated with an address.

21 September — traditional LAS meeting–discussion, moderated by the laureate of LAS Grand Medal, LAS Full Member Kurts Švarcs — “Light: Euclide, Einstein and quantum computers” (see *Zvaigžņotā Debess*, No.14, 12.09.2016; No. 15, 23.09.2016).

4 October — joint event of the LAS and the journal *Zvaigžņotā Debess* (The Starry Sky), “*Zvaigžņotā Debess* joins Latvia and the world”. Reports were delivered by astronomers — authors of the journal: LAS Foreign Member, professor of Lund Observatory (Sweden) Dainis Draviņš and *PhD* Andris Slavinskis, Head of Space Technology Department of the Tartu Observatory (Estonia) (see *Zvaigžņotā Debess*, No. 16, 10.10.2016).

Presentations of the Division members at the LAS Senate meetings

LAS Full Member Aleksejs Kuzmins, “Contemporary X-ray Absorption Spectroscopy — When Theory Meets Experiment”;

LAS Full Member Uldis Rogulis, “Optically Detectable Magnetic Resonance Spectroscopy in Crystals, Glasses and Glass Ceramics”.

LAS Full Member Donāts Ertis, “Synthesis, Properties, and Potential Applications of Nanomaterials”.

Members of the Division have made significant contribution to the development of scientific research in Latvia

Three of the announced 11 most significant scientific achievements in 2016 are authored by members of the Division — LAS full members Andrejs Cēbers, Aleksejs Kuzmins, and LAS Corresponding Member Guntis Bārzdīņš.

Some other most important research results nominated in the category “Theoretical research”:

- Theoretical study has been made of defective and sub-dimensional structures of technologically important materials. LAS full members J. Kotomins, J. Purāns, A. Kuzmins, LAS Corresponding Member R. Eglītis, LAS Foreign Member R. Evarestov.
- The oldest regularly active sub-commission of the LAS Terminology Commission. LAS Corresponding Member J. Borzovs, LAS Doctor *honoris causa* I. Ilziņa.
- For the first time, the problem of coherent states in bi-atomic molecules has been solved with high precision, which enables optimisation of the laser excitation to ensure applications in quantum technologies. LAS Full Member R. Ferbers.
- Methods have been developed for synthesis of nano-structured bismuth chalcogenides, their features as topological isolators were determined as well as the potential for thermo-electrical applications. LAS Full Member D. Erts.
- A new DC electro-supply system for production industry has been developed and demonstrated. LAS Full Member L. Ribickis.
- Enlargement of functionality of intellectual structural modelling tool I4S, involving method concept maps for evaluation of system complexity and significance of the concepts. LAS Full Member J. Grundspeņķis.
- Determination of local symmetry for rare-earth ions in oxy-fluoride glass ceramics by the hyper structure of Gd³⁺ ion EPR spectra. LAS Full Member U. Rogulis.
- The book was published: Žagars, J. *Orbītu teorija* (Theory of Orbits). Ventspils Augstskola, 2016. 310 lpp. ISBN 978-9984-648-59-0
- The book was published: Jansons, J. *No Latvijas Universitātes Fizikas institūta (1919) līdz Cietvielu fizikas institūtam (1978)* (From the Institute of Physics at the University of Latvia (1919) to the Institute of Solid State Physics (1978)). Rīga: LU Akadēmiskais apgāds, 2016. 196 lpp.
- A Latvian patent received — LAS Full Member J. Spīgulis (Method and device for chromophore mapping under illumination by several spectral lines) (LV 15106 B)
- 13 PhD Theses defended. Supervisors: LAS Full Member R. Ferbers – 1, LAS Full Member L. Ribickis – 2, LAS Full Member U. Rogulis – 2, LAS Full Member P. Šipkovs – 1, LAS Honorary Member N. Zeltiņš – 1, LAS Corresponding Member M. Greitāns – 1, LAS Corresponding Member J. Borzovs – 1, LAS Corresponding Member A. Sauhats – 2, LAS Corresponding Member L. Novickis, LAS Corresponding Member U. Sukovskis – 1, LAS Doctor *honoris causa* J. Bičevskis – 1.

A number of Division’s members are editorial board members and experts of international scientific journals.

LAS Full Member A. Ambainis has become the “European of the Year in Latvia”. LAS Full Member R. Ferber was awarded the Three-Star Order, the Cross of Recognition was awarded to LAS doctors *honoris causa* E. Karnītis and J. Bičevskis. Certificate of Recognition of the Republic of Latvia Ministry of Education and Science and Special Distinction Diploma of the World Cultural Council was received by LAS Full Member J. Grundspenķis. The Cabinet of Ministers Award for significant contribution to improvement of education quality in the field of engineering sciences was awarded to LAS Full Member L. Ribickis. Certificate of Recognition of the Cabinet of Ministers was awarded to LAS Honorary Member V. Vītols; the award of Rīga City Council and the LAS was presented to LAS Full Member A. Gailītis. Student parliament’s award MTAF 2015 of the Rīga Technical University — Professor of the Year — was presented to LAS Full Member M. Knite. Arturs Balklavs Prize of the LAS for science outreach was granted to LAS Full Member O. Dumbrājs, and LAS Piers Bohl Prize in mathematics — to LAS Corresponding Member A. Šostaks.

The Council of the Division has invested a lot of time and efforts in evaluation of the most significant scientific achievements and applications of award candidates, as well as in organisation of the award presentations.

Chair of the Division *Jānis Spīgulis*
Scientific Secretary *Sofja Negrejeva*



Scientia et potentia humana in idem coincidunt

/Francis Bacon/

Stairways to excellence in modern materials research in the Institute of Solid State Physics, University of Latvia

Materials since mankind's conscious life precede the economic growth, prosperity, security, and quality of life. Our modern world with computers, with mobile communications, with advanced means of transport from cars, trains, planes, and even up to the International Space Station, with renewable energy harvesting technologies and economic use of energy, and predictable thermal fusion power plants under development is implausible without modern materials. **Nanoscience** and **nanotechnology** are fields of materials research, where by controlling and manipulating with material building blocks in the scale of atoms, molecules, and macromolecules, new parameters of matter are achieved, which can differ significantly from the structure and characteristics in macro dimensions, and which are attractive for development of innovative products.

Strategy of the Institute of Solid State Physics, University Latvia (ISSP UL), **founded in 1978**, was based on scientific experience, quality of performance, and an original interdisciplinary approach. Priority research directions and selected objects were determined as follows: (i) theoretical and experimental studies of electronic and ionic processes in wide-gap materials with different degree of structural ordering; (ii) inorganic single crystals, ceramics, glasses, and thin films.

In 2001, the Centre of Excellence at the ISSP UL was established through implementation of the EC FP5 project CAMART (Excellence Centre of Advanced Material Research and Technology at the Institute of Solid State Physics, University of Latvia). The planned objectives of CAMART Excellence Centre were: (i) research on functional materials and new technologies for microelectronics and photonics; (ii) furthering the visibility of the Institute by publishing high-quality papers and attendance at international meetings; (iii) adoption of the best experience in collaboration with European colleagues; (iv) attracting young researchers and fostering co-operation with SMEs.

ISSP scientists actively joined in with fusion issues and in the same **year 2001** initiated the establishment of **Latvian EURATOM Association (AEUL)**.

In 2006, ISSP UL launched the Conference "Functional Materials and Nanotechnologies" (**FM&NT**), which nowadays has become an internationally well recognised brand. The Conferences at the beginning were held in Rīga, but now they are cyclically travelling between the Baltic States — Latvia, Lithuania, and Estonia; this year the FM&NT-2017 will be held at the University of Tartu on 24–27 April. The Joint

Conference **FM&NT-RCBJSF-2014** was organised in 2014, from 29 September to 2 October, comprising the 9th FM&NT and the 12th Russia/CIS/Baltic/Japan Symposium on Ferroelectricity, which was held in the premises of National Library of Latvia, significantly expanded the scientific and geographical dimension of FM&NT.

Starting from 2005, ISSP UL organised and led the first two National Research Programmes (NRP) in materials science, “Development of modern functional materials for microelectronics, nanoelectronics, photonics, biomedicine and constructive composites, as well as the appropriate technologies” (2005–2009); “Development of innovative multi-functional materials, signal processing and information technologies for competitive science-intensive products – IMIS” (2009–2014). ISSP UL coordinates as well the third National Research Programme “**Multifunctional materials and composites, photonics and nanotechnology (IMIS2) (2015–2017)**”. The programme comprises four projects: (i) Photonics and materials for photonics; (ii) Nanomaterials and Nanotechnologies; (iii) Nanocomposites; (iv) Nanomaterials and Nanotechnologies for medical application. The third and the fourth projects are implemented mostly by scientists from Rīga Technical University (RTU).

Together with partners from the University of Latvia and Rīga Technical University, the ISSP UL was the leading institution in the development and successful implementation of the project of **the National Research Centre (NRC), “Nanostructured and multifunctional materials, design and technology” (2012–2015)**. Within the frame of NRC project ISSP UL has developed **LATNANO-C** (centre) — method-oriented cleanroom laboratory complex (730 m²): (i) for Research; (ii) for Education (master’s, doctoral, and post-doctoral studies); (iii) for Innovation (technology transfer in close cooperation with companies); (iv) for International cooperation.

ISSP UL participates as a research partner in the **Competence Centres (CC)** oriented for material development, as well as being employed as expert in CC Boards. Currently, **from 2016** ISSP UL contributes in series of CC: (i) CC for Smart materials and technology (VMT KC); (ii) CC for Intelligent materials, technology and engineering (MASOC KC); (iii) CC for Information and communication technology: engineering (electronics) (LEO KC). However, the development strategy of NRCs and, accordingly of CCs lack sustainable investment synergy. Thus, in the case of NRCs: (i) there is infrastructure, but there is no funding for “soft” activities (salaries); (ii) the acquisition of the infrastructure does not take into account the business interests; (iii) the use of infrastructure in CC programme is made difficult. In its turn, CCs: (i) lack infrastructure; (ii) entrepreneurs lack qualified scientific staff; (iii) the participation of research institutions in CC programme is burdened. Successful cooperation between scientists and entrepreneurs in innovative product development is a crucial problem to be solved in real time without any delay. One of the solutions how to promote cooperation between companies and the academic staff will be proposed further in the layout of the EC “**Teaming**” project **CAMART²** mission, tasks and goals to be reached.

In 2013, the international evaluation exercise of scientific activities was carried out in Latvia. **ISSP UL was ranked as the second highest** among all research institutions as: “Leading research centre in Latvia that can provide an internationally comparable excellent research in materials science, educate students in modern technology and material studies, and provide innovative solutions for industrial applications” (Technopolis group research assessment).

CAMART² – “The Excellence Centre of Advanced Material Research and Technology Transfer”. Project with such a title was submitted by ISSP UL, in 2014, for the European Commission (EC) programme “Horizon-2020” within the framework of the Work Programme 2014-15: “Spreading Excellence and Widening Participation Call: Widespread 1-2014: Teaming”. Teaming project aims to foster knowledge transfer via partnership between internationally leading scientific institutions by supporting the creation of new centres of excellence or upgrading the existing ones in low R&D&I performing countries making strong collaboration with businesses and building a strong infrastructure base for enabling business-oriented research and **technology transfer (TT)** activities. With an emphasis on technology transfer and motivated **upgrade of the existing CAMART centre to CAMART²** project proposal had won the first bonus. Another significant plus factor was a choice of strong, active, and responsible partner, who agreed to take part in this challenging action. **The Swedish Royal Institute of Technology (KTH)** is the oldest, largest, and most prestigious higher education institution in Sweden. KTH is among a hundred universities in the world (according to the *Times Higher Education World University Rankings*), and is an internationally recognised leader in innovative activities. While the other partner — research Institute **Acreo Swedish ICT** is an expert and successful institution in creating new start-up companies.

On 23 November 2016, the EC announced the 10 winners of the tender “Widespread 1-2014: Teaming”. 169 submitted proposals were evaluated in a two-stage process, and a multinational group of experts selected ten out of these to be funded. **CAMART² was ranked as number five**, and is the only project in the Baltic Sea region, which has got support. Project **implementation period is seven years (from 2017 to 2023)** and the total budget is 31 million euro. The programme “Horizon-2020” with a budget of 15 million euro will support institutional development-related costs of the Centre including that for the planned increase of scientific capacity near twofold. In addition to this, 16 million euros from the EC Structural Funds, provided by the Latvian state, is expected to invest for the complementary development of scientific infrastructure.

Mainstream development of the project is defined in line with the Latvian Smart Specialisation Strategy (**RIS3**) “Smart materials, technology, and engineering systems” and Key Enabling Technologies (**KET**) defined by EC: Smart materials; Smart production; Photonics; Nanotechnology; Micro- and Nano electronics. **CAMART² R&D&I activities** will focus on: (i) Functional materials for electronics and photonics;

(ii) Nanotechnology, nano-composites, and ceramics; (iii) Thin films and coating technologies; (iv) Computational material science by atomistic scale modelling of technologically important materials and devices.

The mission of CAMART² is to serve as a knowledge base and key enabler for materials physics development relevant for academia and industry: (i) by promoting scientific excellence; (ii) by forming strong networks with academia and industry for knowledge exchange; (iii) educating new generations of students; (iv) triggering new entrepreneurship, and; (iv) facilitating technology transfer to industry. (*See colour images in supplementary sheets.*)

The goal of CAMART² together with partners is to strengthen **ISSPUL** emplacement in the field of advanced materials to become the most important Centre of Excellence in the field: (i) for education, research, innovation, and technology transfer in the Baltic States; (ii) that will flourish with respect to scientific results, economic growth, and increased competitiveness. In the Centre the approach of “**Open access laboratories**” will be implemented, which is of tremendous importance to increase the research and innovation commercialisation level in Latvia. Firstly, elaboration of innovative products and technologies in existing high-tech enterprises, such as “Sidrabe”, “GroGlass”, “EuroLCDs” and others will be considered, as well in parallel looking for a new high-tech enterprises (start-ups) to set up. The Baltic Sea regions public-funded academic and research institutions, as well as innovation-oriented companies on both sides of the Baltic Sea will take advantage of open access laboratories.

The creation of a Rīga–Stockholm Collaboration and Technology Transfer Platform (**RIX-STO**) will be started for applied materials physics research and innovations related to high-tech developments and corresponding industries in the region. In cooperation with the Latvian University educational programmes for highly qualified professionals in the field of nanomaterials, photonics, and high technology will be developed. The centre of excellence will set up a smart ecosystem for students, researchers, and entrepreneurs, for them to cooperate for a common cause, thus creating high value-added products and establishing new companies.

Large-scale research infrastructures (LSRI) are today an essential part of the research landscape. The activities at such facilities are and will be centred on the frontline research in the hottest topics, most likely to generate breakthrough in knowledge. LSRI are complementary to small-scale research infrastructure, which in turn are essential in enhancing the contribution of the scientific community to the big European projects. As important LSRI for the Latvian science community, as well as in the context with CAMART², **MAX-4** (synchrotron radiation centre) in Lund should be noted, and a complementary facility — **ESS** (European Spallation Source). ESS is under construction in Lund.

As an Outlook of this story — CAMART² implementation strategy is proposed to be oriented in line with the new paradigm for “**Science with and for Society**”

(SwafS)”. This is a way no longer being restricted to University (Institute) – Industry – Government triangle, but by involving citizens, customers, investors, and corporations, will explore and support science by engaging new perspectives, new talents in research and innovation.

LAS Full Member *Andris Šternbergs*

DIVISION OF CHEMICAL, BIOLOGICAL, AND MEDICAL SCIENCES

Akadēmijas laukums 1, Rīga, LV 1050, Latvia

Tel.: (371) 67220725. Fax: (371) 67821153

E-mail: chem@lza.lv

Board of the Division

Chair of the Division Pēteris TRAPENCIERIS

Vice Chairs of the Division Gunārs DUBURS

Vija KLUŠA

Scientific Secretary Daina DAIJA

Board members

Bruno ANDERSONS, Jekaterina ĒRENPREISA, Elmārs GRĒNS,
Aleksandrs JEMEĻJANOVŠ, Uldis KALNENIEKS, Mārtiņš KALNIŅŠ,
Tālis MILLERS, Jānis STRADIŅŠ, Andris STRAKOVŠ,
Jānis VOLKOLĀKOVŠ, Henriks ZENKEVIČŠ

The Division unites 121 LAS members, among them 45 full, 2 honorary, 30 foreign, and 44 corresponding members.

The Division has conferred the title of *Dr. honoris causa* to 25 scientists.

MEMBERS OF THE DIVISION AND THEIR FIELD OF
SPECIALISATION

Agricultural Sciences

Aleksandrs Jemeljanovs, full mem.

Edīte Birģele, cor.mem.

Jānis Latvietis, hon.mem.

Biology

Arvīds Barģevskis, full mem.

Jekaterina Ērenpreisa, full mem.

Elmārs Grģens, full mem.

Jānis Kloviņģš, full mem.

Rihards Kondratoviģš, full mem.

Aija Linģ, full mem.

Indriķis Muiģnieks, full mem.

Īzaks Raģšals, full mem.

Nikolajs Sjakste, full mem.

Kaspars Tārs, full mem.

Uldis Kalnenieks, cor.mem.

Tatjana Kozlovska, cor.mem.

Imants Liepa, cor.mem.

Viesturs Melecis, cor.mem.

Aleksandrs Rapoportš, cor.mem.

Maija Rukliģa, cor.mem.

Gunta Sprinģe, cor.mem.

Andris Zeltiņģš, cor.mem.

Henriks Zenkeviģš, cor.mem.

Māris Hartmanis, for.mem.

Vitauts Kalniņģš, for.mem.

Uldis Streips, for.mem.

Richard Villems, for.mem.

Kurt Wüthrich, for.mem.

Biotechnology

Andrejs Daugulis, for.mem.

Chemistry

Gunārs Duburs, full mem.
Mārtiņš Kalniņš, full mem.
Ivars Kalviņš, full mem.
Valdis Kampars, full mem.
Ēriks Kupče, full mem.
Edvards Liepiņš, full mem.
Tālis Millers, full mem.
Uldis Sedmalis, full mem.
Jānis Stradiņš, full mem.
Andris Strakovs, full mem.
Edgars Sūna, full mem.
Pēteris Trapencieris, full mem.
Māris Turks, full mem.
Raimonds Valters, full mem.
Nikolajs Vederņikovs, full mem.
Grigorijs Veinbergs, full mem.
Andris Zicmanis, full mem.
Edgars Ābele, cor.mem.
Pāvels Arsenjans, cor.mem.
Aigars Jirgensons, cor.mem.
Māra Jure, cor.mem.
Valerjans Kauss, cor.mem.
Valdis Kokars, cor.mem.
Aivars Krauze, cor.mem.
Aiva Plotniece, cor.mem.
Osvalds Pugovičs, cor.mem.
Pēteris Bolšaitis, for.mem.
Nicodemus E. Boyer, for.mem.
Olafs Daugulis, for.mem.
Benediktas Juodka, for.mem.
Georgs Pauls Kreišmanis, for.mem.
Arnis Kuksis, for.mem.
Gottfried Otting, for.mem.
Valdemars Razums, for.mem.
Edvīns Vedējs, for.mem.
Regina Žuka, for.mem.

Ecology, Environmental Science

Pēteris Cimdiņš, full mem.
Māris Kļaviņš, full mem.
Tālis Juhna, cor.mem.
Aija Melluma, cor.mem.

Forestry

Pēteris Zālītis, cor.mem.

Geography

Guntis Eberhards, cor.mem.
Zaiga Krišjāne, cor.mem.
Oļģerts Nikodemus, cor.mem.
Edmunds Bunkše, for.mem.

Geology and Water Management

Ervīns Lukševičs, cor.mem.
Vitālijs Zelčs, cor.mem.

History of Science

Yuri Solovyov, for.mem.

Materials Science

Bruno Andersons, full mem.
Jānis Grabis, full mem.
Jānis Grāvītis, cor.mem.
Elsa Reichmanis, for.mem.

Medicine

Georgs Andrejevs, full mem.
Andrejs Ērglis, full mem.
Dace Gardovska, full mem.
Jānis Gardovskis, full mem.
Viktors Kalnbērzs, full mem.
Vija Kluša, full mem.
Aivars Lejnietis, full mem.
Ruta Muceniece, full mem.
Modra Murovska, full mem.
Jānis Priedkalns, full mem.
Rafails Rozentāls, full mem.
Arnis Vīksna, full mem.
Jānis Volkolākovs, full mem.

Igors Aksiks, cor.mem.
Andris Ferdats, cor.mem.
Dainis Krieviņš, cor.mem.
Mārcis Leja, cor.mem.
Sandra Lejniece, cor.mem.
Alfrēds Miltiņš, cor.mem.
Māra Pilmane, cor.mem.
Valdis Pīrāgs, cor.mem.
Ingrīda Rumba-Rozenfelde, cor.mem.
Andrejs Skaģers, cor.mem.
Pēteris Stradiņš, cor.mem.
Uldis Vikmanis, cor.mem.
Ludmila Vīksna, cor.mem.
Aija Žilēviča, cor.mem.

Kristaps Juris Keggi, hon.mem.
Meinhard Classen, for.mem.
Harald zur Hausen, for.mem.
Jānis Kļaviņš, for.mem.
Ruta Kundziņa, for.mem.
Andreas Oksche, for.mem.
Felix Unger, for.mem.
Jarl Wikberg, for.mem.
Bertrams Zariņš, for.mem.
Kristaps Zariņš, for.mem.

Pharmacology

Maija Dambrova, full mem.
Edgars Liepiņš, cor.mem.

Activities of the Division of Chemical, Biological and Medical Sciences

In 2016, nine (9) meetings of the Division of Chemical, Biological, and Medical Sciences (DCBMS) were held.

5 February — extended meeting of the LAS Division of Chemical, Biological, and Medical Sciences, together with the Institute for Breath Research, University of Innsbruck, the University of Latvia, the Latvian Institute of Organic Synthesis (LIOS), the UL Institute of Solid State Physics, and the Rīga East Clinical University Hospital in connection with the Sniffphone project “The analysis of volatile bonds in medicine, metabolemics”. The meeting was chaired by Dāvids Frīdmans and Ilva Nakurte, opening remarks were made by LAS Full Member Raimonds Valters. Six reports were presented: by LAS Corresponding Member Līga Grīnberga, *Dr.phys.* Jānis Kleperis, “Electronic Nose and Gas Analysis Systems — Research and Applications at ISSP UL and Rīga”; LAS Corresponding Member Mārcis Leja, “The Principles of Volatile Marker Diagnostics Research. Research of Digestive System Tumors”; Immanuels Taivans, “The Analysis of Exhaled Air Using Gas Chromatography and Artificial Smell Sensors in Diagnosis of Lung Cancer”; Pawel Mochalski, Alex Schmid, “Analysis of Human Volatolome: a New Potential Tool for Medicine, Toxicology and Safety and Security Applications”; LAS Corresponding Member Osvalds Pugovičs, “Metabolomics — Magic Wand or Tailor-made Analysis”; LAS Full Member Nikolajs Sjakste, “How to Create a Link Between Genomics and Proteomics”.

12 February — general meeting of the Division of Chemical, Biological, and Medical Sciences. LAS Full Member Raimonds Valters presented an overview of

Division's activities in 2015 and LAS Corresponding Member Edgars Liepiņš presented a lecture on "The Metabolism of Energy: Health, Food and Physical Activity". A new Chair of the DCBMS was elected. LAS Full Member Raimonds Valters nominated LAS Corresponding Member Pēteris Trapencieris and the Division, voting by secret ballot, confirmed P. Trapencieris as the Chair of the DCBMS.

26 February — extended meeting of the Division of Chemical, Biological, and Medical Sciences as part of the lecture series "The most significant achievements in Latvian science in 2015" together with the University of Latvia, Rīga East Clinical University Hospital, and Digestive Disorders Centre GASTRO, on the topic "Research of Malignant Tumour Prevention and Screening in Latvia" (Chair LAS Corresponding Member, Prof. Mārcis Leja). Seven reports were presented: LAS Corresponding Member Mārcis Leja, "Stomach and Intestine Cancer Prevention Study GISTAR — achievements and prospects"; *Dr. P. Kriķe* "Biomarker Research in the Identification of Stomach Cancer Risk"; *Dr. R. Škapars*, "Volatile Marker Research"; Assoc. Professor. I. Daugule, "Research into the Main Cause of Stomach Cancer, *H.pylori*"; *Dr. I. Kikuste* "The Use of Modern Endoscopic Systems in Early Stomach Disorder Diagnostics"; *Dr. S. Isajevs* "Pathology in Stratification of Pre-cancer Conditions and Cancer Risk" and *Dr. D. Šantare* "Intestine Cancer Screening Pilot Research in Latvia".

The GISTAR study researches the prevention of digestive tract (stomach cancer, intestine cancer) tumours and is the only one of its kind in Europe. 3360 inhabitants of Cēsis, Alūksne, Ludza, and Saldus took part in the study. The goal of the study is to decrease tumour-induced mortality by testing familiar opportunities and seeking for new ones. After a successful completion of the pilot study, it is planned to start the main research involving 30 000 individuals both in Latvia and abroad. The existing methods for early tumour diagnosis are analysed and new methods are sought for.

Plans are to focus a lot of attention on microbiom research, because it is significantly affected by the use of antibiotics. Considering the aforementioned, a series of studies has been done as part of GISTAR. This work has been done in collaboration with the Latvian Biomedicine Research and Study Center (LBRSC), Digestive Disorders Center GASTRO, the Academic Histology Laboratory, and Rīga East Clinical University Hospital (tumour autoantibody research, biomarker research, stomach cancer risk stratification research). In genetic research our main collaborative partners have been the Health Sciences University of Lithuania (Kaunas, Lithuania) and Magdeburg University (Germany). Significant work in volatile marker research has been done in collaboration with the Israel Technology Institute TECHNION (Haifa, Israel), Madrid University in Spain as well as many other partners within the Sniffphone project. In the field of microbiome research successful collaboration has been maintained with Karolinska University and the LBRSC. Considering future plans to open potential new centers, collaboration has been established with institutions in Belarus, Ukraine, Russia, and Kazakhstan.

The participants of the general meeting of the DCBMS expressed their appreciation and gratitude to Professor Mārcis Leja for his successful project leadership and ability to involve many specialists and productive collaboration with foreign colleagues.

Additional information about the GISTAR project — www.gistar.eu

18 March — a meeting continuing the discussion of the most significant scientific achievements of 2015, together with the University of Latvia, Rīga East Clinical University Hospital, and the Digestive Disorders Center GASTRO. Two reports on the topic were presented: “New Catalytic Processes in the Conversion of Biomass in Fuels” (Head Researcher LAS Full Member V. Kampars): *Dr.chem.* Kristaps Māliņš “Development of New Catalytic Processes in the Conversion of Biomass in Fuels”, and *Mg.chem.* Kristīne Lazdoviča, “Catalytic Pyrolysis”.

The research was conducted at the Applied Chemistry Institute of the Faculty of the Materials Science and Applied Chemistry, Rīga Technical University. The reports presented detailed information about the research of first-generation biofuel production using local natural resources — rapeseed oil and fatty acids and second generation biofuel (hydrocarbons) and research of the production using local biomass (biooil).

Another achievement of 2015 presented at this meeting was LAS Corresponding Member Pāvels Arsenjans’ report “The Original Anti-cancer Drug Candidates Containing Selenium”. *Dr.chem.* P. Arsenjans’ group has developed a methodological guarantee for the synthesis of selenium-containing heterocycles. This has allowed the discovery of new chemical substances showing interesting biological characteristics and demonstrate the special role of selenium in the human organism.

The chairman of LAS Division of Chemical, Biological, and Medical Sciences LAS Full Member Raimonds Valters informed the meeting that at the LAS Spring General Meeting, on 7 April, election for the post of the LAS President and for LAS Senate would take place. The Division had to nominate five candidates for the Senate from its membership. The following candidates were proposed: LAS Full Member Ivars Kalviņš, LAS Full Member Jānis Kloviņš, LAS Full Member Indriķis Muižnieks, LAS Full Member Modra Murovska, LAS Full Member Jānis Stradiņš. Voting openly the Division members expressed their support for all the candidates to the LAS Senate.

15 April — as he opened the Division meeting, LAS Full Member Raimonds Valters asked for a moment of silence in honour of the late Juris Ekmanis (1941–2016) who was president of LAS from 2004 to 2012. The meeting continued with a look at the nominated works for “Significant achievements in Latvian science in 2015” that had not received awards. The nomination from the University of Latvia in the field of applied science was the work “Research of organic substances (humic substances) of natural origin, their practical application and production” (head researcher LAS Full Member Māris Kļaviņš).

Studies of humic substances that have been performed by the University of Latvia since 1993 are a significant internationally recognised direction of research aimed at the

use of the natural resources of Latvia and seeking their new applications. The research has reached significant scientific and applied results and deserved to be named as the applied science achievement of 2015.

Five reports were presented on research of peat, sedimentation, and their uses: Ingrīda Krīgere, Director of the Peat Producers Association of Latvia, “Peat Bogs, Peat Harvestation and Its Use in Latvia and Europe”; LAS Full Member Māris Kļaviņš, “Research on Bogs and Peat: Potential Value and Innovation”; *Dr.geogr.* Laimdota Kalniņa, “Investigation of Latvia’s Bogs: History, the Present and the Future”; *Dr.geogr.* Oskars Purmalis, “Humic Substance Characteristics of Peat”; *Dr.geogr.* Jānis Krūmiņš, “Lowland Bog Peat and Its Possible Application”; *Mg.* Karīna Stankeviča, “Sedimentation: Practical Significance and Prevalence in Latvia”.

The LAS DCBMS participants expressed their gratitude and appreciation to LAS Full Member Māris Kļaviņš for the well-prepared reports about these significant investigation results in Latvia and for involving investigators of this research themselves in the presentations.

7 September — in his opening remarks the new Chair of the DCBMS Corresponding Member Pēteris Trapencieris thanked LAS Full Member Raimonds Valters and scientific secretary *Dr.chem.* Baiba Ādamsons for their excellent leadership of the DCBMS and organisation of scientific activities.

On the agenda for the meeting was the lecture by *Dr.habil.biol.* Dmitrijs Babarikins on “Food Supplements and Human Health. A Vision of Future Innovations”. Co-author LAS Full Member *Dr.habil.biol.* Rafāils Rozentāls supplemented the lecture with his comments. Following the lively debates participants expressed their gratitude to the author for the extensive information about significant research of food supplements.

Then the Chair of the Division LAS Corresponding Member Pēteris Trapencieris presented the action plans for 2016–2017: DCBMS meetings would adhere to the present thematic lecture format, but inviting more foreign member to participate, discussions involving representatives of various public organisations were planned, and all Award recipients would be given the opportunity to present their work at Division meetings. Scientists were encouraged to take part in different activities in Latvia and Europe and actively participate in work groups. The topics for upcoming meetings include: “Experimental Use of Animals in Pharmacology and Biology Research” (LAS Full Member N. Sjakste), “Granting Procedures” (LAS Full Member J. Erenpreisa).

13 October — two LAS corresponding members’ reviews about scientific, paedagogical, and organisational activities: *Dr.sc. ing.* Dagnija Loča, Director of the Rīga Technical University (RTU) Rūdolfs Cimdiņš Rīga Centre for Biomaterial Innovation and Development, Lead Investigator, “Biomaterials Containing Calcium Phosphates — Engineering of Bone Implants or a Tool for Active Local Substance Supply?”; and *Dr.chem.* Aiva Plotniece, Lead Investigator at the Laboratory of the Membrane-active

Compounds and β -diketones, LIOS, “Synthetic Lipids as Prospective Drug Transport Forms in Nanoscience”.

LAS Full Member Maija Dambrova expressed her approval of the scientific work of both Dagnija Loča and Aiva Plotniece who received L’Oreal scholarships showing that the candidates are among the leading respected natural science investigators in Latvia. LAS Full Member Ivars Kalviņš pointed out that both Dagnija Loča and Aiva Plotniece have a successful collaboration with LIOS: it is now possible to pursue new scientific directions so that experiments in chemistry can move on to experiments of nanostructures, biology, and genes, thus merging several areas of science. LAS Full Member Gunārs Duburs noted Aiva Plotniece’s growth from a timid student into a responsible scientist, and LAS Full Member Ruta Muceniece characterised Aiva Plotniece as an erudite scientist with a broad range of scientific interests: 40% chemistry, 60% other areas of science. Her work had started with experiments in melanocortin receptors made in Uppsala and Prof. Muceniece recommended Aiva Plotniece as a candidate for LAS corresponding member; LAS Corresponding Member Pēteris Trapencieris characterised both applicants as high-class professionals, excellent individuals, meeting all the criteria to be elected as LAS corresponding members. Unfortunately, there was only one corresponding member vacancy in material sciences in 2016.

Voting by secret ballot the members of the DCBMS voted to support both Dagnija Loča and Aiva Plotniece as candidates for LAS corresponding member status.

27 October — member candidates of the LAS presented their overviews of scientific, pedagogical, and organisational activities: candidate for the status of LAS corresponding member *Dr.biol.* Andris Zeltiņš, Head and leading investigator of the Plant Virology Group, LBRSC, “Plant Viruses in Recombinant Biotechnology” and candidate for LAS full member Pēteris Trapencieris, Head and leading investigator of the Laboratory of Chemistry, Latvian Institute of Organic Synthesis, “Dual Inhibitors in the Design of Anti-cancer Drugs”.

LAS Full Member Elmārs Grēns expressed support for Andris Zeltiņš whom he characterised as independent and self-reliant, precise and fast worker, whose scientific work is original in its development of complex methodology since plant viruses differ from other viruses. One might say that there is a rebirth of recombinant virus research in Latvia. LAS Full Member Jānis Kloviņš recommended Andris Zeltiņš, according to him, Andris Zeltiņš’ results are always 100% verified. At first he conducted basic experiments followed by more modern methods and potencial application of indepth research.

LAS Full Member Ivars Kalviņš characterised Pēteris Trapencieris as a good specialist and Head of the LIOS Organic Chemistry Laboratory who has acquired considerable experience outside Latvia (Germany, France, the USA). In his scientific work he develops modifications of natural materials that have the potential of becoming

medicines. Pēteris Trapencieris has been a lecturer since 1995 and has organised creative and informative conferences — the Paul Walden symposia in organic chemistry and the *Balticum Organicum Syntheticum* (BOS) conferences in Latvia. I. Kalviņš went on to recommend Trapencieris as an erudite scientist with broad scientific interests and good organisational skills who is able to attract people and achieve collaboration between young students and experienced researchers on a local and international level. LAS Full Member Raimonds Valters proposed that the DCBMS scientists vote for Pēteris Trapencieris as LAS full member.

LAS Corresponding Member Pēteris Trapencieris shared information about LAS foreign member candidates Professor Viktors Sniečkus from Queens University in Canada and Professor Vladimir Gevorgyan. This year at the ninth *Balticum Organicum Syntheticum* conference in Rīga President of the LAS Ojārs Spārītis had expressed surprise that Viktors Sniečkus was not yet a LAS foreign member and recommended that he be elected this year. In 2000, Viktors Sniečkus initiated the organisation of a new-format chemists' conference in the Baltic States, the BOS. The second BOS conference took place in Vilnius and since then they alternate on a regular basis between Latvia, Estonia, and Lithuania. In October 2003, Viktors Sniečkus was present at the unveiling of the monument in honour of Paul Walden. Thanks to Professor Viktors Sniečkus and LAS Foreign Member Professor Edvīns Vedējs, BOS-format conferences have become very significant in the development of Latvia's chemists. In his motivational words to BOS lecturers Professor Sniečkus once said: "One of the prerequisites to receiving the Nobel Prize is to be a BOS lecturer". These words became reality earlier this year, since organic chemist Ben Feringa from the Netherlands, who received the Nobel Prize in chemistry in 2016, was a lecturer at the BOS conference in Vilnius in 2008. LAS Full Member Ivars Kalviņš noted that since 2000 the activities of Professor Sniečkus have helped raise the level of Baltic scientists and brought them world wide recognition. He was also instrumental in establishing contacts with scientists abroad.

LAS Full Member Māris Turks recommended LAS Foreign Member Professor Vladimir Gevorgyan at Chicago characterising him as an erudite, internationally well-known scientist who excels in various areas of organic chemistry and assists the editorial staff of the journal *Chemistry of Heterocyclic Compounds*. The role of Professor Gevorgyan in raising the journal's impact factor is invaluable. LAS Corresponding Member Pēteris Trapencieris briefly commented Professor Gevorgyan's work at the Latvian Institute of Organic Synthesis in the late 1980s and several of his projects at scientific institutes and universities in Japan, Italy, and the US.

In a secret ballot vote the DCBMS members stated their support to the following candidates: Andris Zeltiņš for election as LAS corresponding member, Pēteris Trapencieris — as LAS Full Member, and Viktors Sniečkus and Vladimir Gevorgyan — as LAS foreign members.

19 December — the open meeting of the DCBMS took place at the Latvian Institute of Organic Synthesis with the main point on the agenda being the lecture by LAS Foreign Member, Professor Vladimir Gevorgyan (University of Illinois at Chicago, USA) on the “Development of Novel Synthetic Methodologies”.

LAS Corresponding Member Pēteris Trapencieris gave an overview of Professor Gevorgyan’s early career at the Latvian Institute of Organic Synthesis in the 1980s starting with his Doctoral studies there. Several ideas that he developed while working in Japan were adapted to the experimental needs of our chemists in the 1990s, for example, work with thin layer chromatography plates significantly reduced in size. After his studies in the USA, young scientists in Latvia started to join his group in 2004. The first two to present their doctoral theses were two young LIOS scientists — Natālija Čerņaka (2010) and Dmitrijs Čerņaks (2011). Following his post-doctoral studies, Dmitrijs Čerņaks returned to work in Latvia.

The members of the Division expressed their appreciation and gratitude to Professor Gevorgyan for his contribution to the professional development and growth of Latvia’s young chemists as well as for his active involvement in the editorial work at the journal *Chemistry of Heterocyclic Compounds* and wished him continuing success in the collaboration of the University of Illinois at Chicago with LIOS and LAS.

Members of the Division have actively participated in the organisation of several noteworthy events

1. **19 February 2016** — the grand opening of the LIOS Biopharmacy Centre attended by high-ranking government officials, university representatives, and collaborative partners. Saeima Speaker Ināra Mūrniece, the Minister of Economics and Deputy Prime Minister Arvils Ašeradens, and the Minister of Education and Science Kārlis Šadurskis cut the ceremonial ribbon formally opening the facility.
2. **16–17 May 2016** — the international conference in organic chemistry and the chemistry of medicine in honour of Professor Gustavs Vanags’ 125th anniversary at the Albert Hotel in Rīga, 95 scientists from nine countries took part. The five main themes of the conference were: from the past into the future, organic synthesis, rational neuromedicine design, stem cells and regenerative medicine, bioprotectors. In the section on the history of chemistry lectures were presented by Prof. Vanags’ former students at the UL: LAS Full Member G. Duburs, LAS Full Member J. Stradiņš, LAS Full Member A. Zicmanis, LAS Full Member V. Kampars, and *Dr.chem.* G. Tirzītis. The appreciation of Professor Vanags, a brilliant scientist, educator and person, expressed by today’s young chemists was the highlight of the conference.
3. **3–6 July 2016** — the international conference *Balticum Organicum Syntheticum* (BOS-2016) took place at the National Library of Latvia, 335 scientists from 25

countries took part. President of the LAS Ojārs Spārītis opened the conference. During the four days of the conference, 19 guest lecturers from 10 countries delivered reports. 186 scientists presented their work in the poster session. For everyone's enjoyment an extensive cultural programme was organised at the National Library and the Ziemeļblāzma Culture Center. *Thieme Publishers* organised the Best Students in the Baltics awards ceremony; awards were received by Artis Kinēns (LIOS), Sandra Kaabel (Tallin Technological University), and Aurelija Urvanaite (University of Vilnius). The conference successfully reached its three goals: to organise an international forum in organic chemistry on today's significant scientific problems, offering a venue for dialogue between scientists in the academic and business environment continuing a successful collaboration between the two, and introduce conference participants to an extensive Latvian culture, language, and social experience.

The contribution of DCBMS members to the development of science in Latvia

LAS Corresponding Member **V. Pīrāgs** is the leader of the national research programme "Biomedicine for a Healthy Society". LAS Full Member **I. Kalviņš** is the Chair of the Innovation Association of Latvia and coordinator of the EU project "InnovaBalt" of the 7th Framework Programme.

Latvian Science Council (LSC) members include: LAS full members J. Kloviņš and K. Tārs and LAS Honorary Member I. Ozolanta. LSC scientific expertise commission members include: LAS full members I. Muižnieks, M. Murovska, K. Tārs, and A. Zicmanis. LSC strategic commission members include: LAS Full Member J. Kloviņš and G. Veinbergs. LSC expert commission members include LAS full members Ī. Rašals, K. Tārs, M. Turks, and A. Zicmanis, LAS corresponding members P. Arsenjans, A. Jirgensons, and E. Liepiņš. LAS Senate members include: LAS full members A. Ērglis, E. Grēns, I. Kalviņš, J. Kloviņš, I. Muižnieks, M. Murovska, Ī. Rašals, J. Stradiņš, and P. Trapencieris.

Division members participate in numerous international and Latvian scientific projects as leaders or participants. They present lectures at universities and scientific institutes in Latvia and abroad and supervise doctoral work; more than 30 doctoral theses were defended in 2016. Currently division members are supervising elaboration of more than 95 doctoral theses.

Our division members are authors or co-authors on three of the "Significant Achievements in Science in 2016" named by the LAS: LAS Full Member M. Dambrova, LAS Full Member K. Tārs, LAS Corresponding Member A. Jirgensons, LAS Corresponding Member E. Liepiņš. LAS Full Member M. Turks was among the scientists receiving the Certificate of Appreciation by the President of the LAS for their work.

1. Compilation of fundamental research about the pharmacological effects of meldonium (Mildronate) and an explanation of mechanisms of its accumulation in the organism. Authors: LAS Full Member Maija Dambrova, *Dr.pharm.* Marina Makrečka-Kūka, *Dr.pharm.* Reinis Vilšķērsts, *Dr.pharm.* Elīna Makarova, *Dr.pharm.* Jānis Kūka, LAS Corresponding Member Edgars Liepiņš. LIOS.
2. Ascertaining the three-dimensional structure of single-thread RNA bacteriophages AP205 and MS2. Authors: *Bc.* Mihails Šišovs, *Dr.biol.* Jānis Rūmnieks, *Dr.biol.* Andris Kazāks, *Mg.* Svetlana Koteloviča, *Bc.* Ināra Akopjana, LAS Full Member Kaspars Tārs. LBRSC in collaboration with scientists from the Netherlands, France, and Spain.
3. Development of a new leader-compound class of anti-malaria medications. Authors: *Dr.chem.* Dace Rasiņa (LIOS), *Mg.* Mārtiņš Otikovs (LIOS), *Mg.* Jānis Leitāns (LBRSC), *Dr.* Rosario Recacha (LIOS), *Dr.chem.* Oleksandr V. Borysov (LIOS), *Mg.* Iveta Kaņepe-Lapsa (LIOS), *Dr.chem.* Ilona Domračeva (LIOS), *Mg.* Teodors Panteļevs (LIOS), LAS Full Member Kapars Tārs (LBRSC), *Dr.chem.* Kristaps Jaudzems (LIOS), LAS Corresponding Member Aigars Jirgensons (LIOS). LIOS in collaboration with the LBRSC and Francis Crick Institute in Great Britain.

President of the LAS Certificates of Appreciation were received by:

1. Use of sulphur dioxide in synthesis of high added value products. Authors: LAS Full Member Māris Turks (RTU), *Mg.* Jevgeņija Luģiņina (RTU), *Dr.chem.* Irina Novosjolova (RTU), *Bc.* Krista Suta (RTU), *Mg.* Daniels Posevins (RTU), *Mg.* Agnese Stikute (RTU), *Bc.* Dace Cīrule (RTU), *Mg.* Jevgeņija Uzuleņa (RTU), *Dr.chem.* Dmitrijs Stepanovs (LIOS). Institute of Organic Chemistry Technology, RTU.
2. New material and technology for solar energy collectors. Authors: *Dr.habil.sc.ing.* Gundars Mežinskis (RTU), *Dr.sc.ing.* Laimons Bīdermanis (RTU), *Dr.sc.ing.* Ilona Pavlovska (RTU), *Dr.sc.ing.* Andris Cimmers (RTU), *Dr.sc.ing.* Jānis Liepiņš (RTU), *Dr.sc.ing.* Kaspars Mālnieks (RTU), *Dr.phys.* Jevgēnijs Gabrusenoks (Institute of Solid State Physics, UL). Institute of Silicate Materials, RTU; Institute of Solid State Physics, UL.

Other noteworthy achievements of Division members

It is with great interest that we follow the developments in the field of cardiology, and this year was no exception. We were pleased that a 3D heart model was successfully used for planning an operation along with new materials for the construction of heart valves.

Division members are actively involved in various international and Latvian associations, commissions, and scientific journal editorial boards. They also participate in discussions, interviews in the media about issues concerning the development of

science and education, innovations, and the need to invest in the development of technologies and innovations.

New optimal reproduction methods and six new evergreen rhododendra were developed at the University of Latvia Experimental and Breeding Nursery of Rhododendrons ‘Babīte’: ‘AURA’, ‘GUNITA’, ‘LELDE’, ‘BALTIJA’, ‘CĪRAVA’, and ‘MONTA’ (breeder LAS Full Member **Rihards Kondratovičs**), students and doctoral candidates of the UL Faculty of Biology were also involved. All the abovementioned varieties have been successfully tested for many years and in 2016 they were entered in the International Rhododendron Register of the Royal Horticultural Society of Great Britain. All of the varieties are highly decorative, cold-resistant, and wintergreen which make them suitable for planting throughout Latvia. According to inventory data, as of December 2016, there are 53 757 plants growing at the UL Experimental and Breeding Nursery of Rhododendrons “Babīte”. In 2015, 4416 plants were processed, 5291 seedlings were planted. 21 perspective hybrids were identified in 2016; in the near future they will undergo the test for distinctiveness, homogeneity, and stability and the best among them will be developed as varieties. Five different varieties were donated for planting around the Latvian Academy of Science: ‘Ilze’, ‘Madame Debene’, ‘Rīga’, ‘Babītes Anita’, ‘P.J. Mezitt’, a total of 10 plants. The UL Foundation received 11 varieties for planting at the Latvian Embassy in Germany (Berlin): ‘Babītes Kompaktais’, ‘Babītes Lavanda’, ‘Irina’, ‘Ilma’, ‘Rīga’, ‘Babītes Anita’, ‘Babītes Indra’, ‘Vilhelmīne Petkevičs’, ‘Doktors Babarikins’, ‘Rudīte’, ‘Teterevi Latvijai’, a total of 13 plants. Five varieties were planted at the Latvian Embassy in the Netherlands (the Hague): ‘Kārlis Ulmanis’, ‘Ilma’, ‘Vilhelmīne Petkevičs’, ‘Mammadaba’, ‘Cīrava’. Plants were also sold to the municipalities of Priekule, Smiltene, and Lēdurga as part of the project “Good deeds of local authorities in the parks in honour of Latvia’s 100th anniversary”.

LAS Full Member **Ivars Kalviņš** presented lectures in cardiology and neurology conferences on the role of citoprotection and vazoprotection in treating ischemia and heart vascular disorders; on the significance of virotherapy in treating cancer; on the interrelationship of education, science, and the business sector; lectures on the issues of intellectual property. Lectures were presented at meetings and conferences regarding the issue of doping in connection with the addition of Mildronate to the list of forbidden substances for athletes. Kalviņš explained that Mildronate is not doping but an effective medication that protects the heart, muscle, and brain cells in cases of oxygen shortage, for example, heart-vascular disease, stress, and overload. This effect has helped not only to maintain but also increase Mildronate export figures. International coverage of the Mildronate issue showed that we are capable of synthesis and research of active medicinal substances on an international level. Ivars Kalviņš’ main achievements: development of a prescription for the drug and mushroom mixture “Faccex” for treatment of chronic alcoholism (Conference of the Associations of Drug Therapists and Psychiatrists, Rīga, 11.11.2016), discovery of a new substance for the

inhibition of protein disulfide isomerase, which can be the basis of new blood clot prevention medication and development of new leader compounds analogue to anti-cancer immunostimulator leakadine.

The research results of LAS Corresponding Member **Mārcis Leja** in the field of volatile markers received high international acclaim. The collaborative projects between UL and partners in Israel have been named among the 10 potentially most valuable scientific discoveries.

The research results of LAS Full Member **Mārtiņš Kalniņš** and his colleagues in innovative composite systems on the base of silyl-terminated polymers and their use in procuring adhesive, hermetic, and other compounds were significant.

LAS Corresponding Member **Jānis Grāvītis** received a Latvian patent for his invention “The transformation of TS treated hemp sheaves into high quality heat and sound insulation materials”.

LAS Corresponding Member **Dainis Krieviņš** and his group have researched a new implant-prosthesis meant for the treatment of abdominal aorta aneurisms (Altura) and Nellix: it has been implanted in 125 patients forming the clinical test group to study the sustainability of the product and anatomic and haemo-dynamic peculiarities in humans. An innovative strategy was developed for treatment of abdominal aorta aneurisms and it was announced in leading scientific publications and forums.

LAS Full Member **Ruta Muceniece's** scientific achievement in 2016 was the differentiation of the surface protein profile of cancer cells that appears when cells are grown in hypoxia conditions. A report on the achievements in pharmacology in general appeared in the series *Focus on Baltic Countries* in the prestigious pharmacology journal *Pharmacological Research*.

LAS Corresponding Member **Aigars Jirgensons'** most significant achievement in 2016 was his series of works leading to the discovery of a new class of plazmepsin inhibitors. The most active representatives of the new class have given positive results in blood cell tests, which makes us hopeful that the research will also have practical application. His work is also methodologically significant because he used both inhibitor fragment NMR scanning as well as computer modelling methods and protein chromatography data. He successfully formed an effective research consortium.

LAS Corresponding Member **Māra Pilmane's** doctoral student I. Saulīte received an award for her work “TNF- α expression in nails suffering psoriasis” at the Congress of the European Academy of Allergology and Clinical Immunology in Vienna and the Best Presentation award for her research on local immunity in healthy nails and nails suffering psoriasis at the 13th BADV congress, 21–23 July in Rīga. On 12 May 2016, M. Pilmane organised and led the XXI Students' Morphology Scientific Conference.

LAS Corresponding Member **Olģerts Nikodemus**, at the UL Faculty of Geography and Earth Sciences, investigated various factors involved in the overgrowth of farmland.

These factors include: climate change, the role of land drainage on the hydrological regime of rivers; the effect of increased forestation is difficult to separate out. The obtained results open the door to developing more precise river runoff models.

LAS Full Member **Nikolajs Vedernikovs**, professor at the Latvian State Institute of Wood Chemistry, researched deacetalisation of wheat straw hemicellulose polysaccharides as well as changes in the pentozane hydrolysis and pentose monosaccharide dehydration process. This was the first time in the history of world science that furfural and bioethanol were gained from wheat straw.

LAS Corresponding Member **Valdis Kokars** led the equipping and grand opening, in 2016, of the new Laboratory for Organic Photonics Materials Synthesis on the premises of the Faculty of Materials Science and Applied Chemistry, RTU, at 3 Pauls Valdens Street.

Publications authored or co-authored by Division members

Kondratovičs, R., Kondratovičs, U., Riekstiņa, G. *The Online Journal of the World's Rhododendron Organizations*. 2016, vol. 1, part 2: European rhododendron organizations, pp. 77–87.

Kondratovičs, U., **Kondratovičs, R.**, Riekstiņa, G. Die Geschichte der Rhododendron-Kultur in Lettland. *Jahrbuch der Deutschen Rhododendron Gesellschaft*, 2016, Band 21, S. 40–57.

Purviņa, S., Henke, L., **Lejnieks, J.** *Bioloģiskas zāles, bioloģiski līdzīgas zāles un to lietošanas klīniskā izpratne* [Biological medicines, biologically similar medicines and understanding their clinical use]. Rīga: Zāļu infocentrs, 2016. 111 lpp.

Melecis, V. Klimatisko faktoru ietekme uz dzīvajiem organismiem [The Influence of Climatic Factors on Living Organisms]. Grām.: *Klimats un ilgtspējīga attīstība* [Climate and Sustainable Development]. Red. M. Kļaviņš, J. Zaļoksnis. Rīga: Latvijas Universitāte, 2016, 115.–148. lpp.

Pilmane, M., Pļaviņa, L., Kavak, V. *Embryology and Anatomy for Health Sciences*. Rīga: Rīga Stradiņš University, 2016. 511 pp.

Žileviča, A. *Medicīnas mikrobioloģija*. 1. d. [Microbiology of Medicine]. *Vispārīgā mikrobioloģija un infekcijas imunoloģija* [General Microbiology and Infection Immunology]. Rīga: LU Akadēmiskais apgāds, 2016. 365 lpp.

Vikmanis, U. *Atsperšanās. Bibliogrāfija* [Pushing off. Bibliography]. Rīga: LU Akadēmiskais apgāds, 2016. 271 lpp.

Vīksna, A. *Ārsti. Latvija. Laiks* [Doctors. Latvia. Time]. Rīga: Medicīnas apgāds, 2016. 176 lpp.

Awards and recognitions received in 2016

LAS Corresponding Member **Aleksandrs Rapoport**s, for his scientific work, received RL Prime Minister's Speaker Certificate of Appreciation and Cross of Recognition (3rd Class)

LAS Corresponding Member **Oļģerts Nikodemus** received the Cross of Recognition (3rd Class) for his contribution to Latvian science

LAS Full Member **Arvīds Barševskis** received the Cicero Award, the Latvian Orthodox Church Holy Martyr John, Archbishop of Rīga and Latvia 3rd Class Order.

LAS Full Member **Maija Dambrova** received the Baltic Assembly Award in Science for her work on the metabolism of energy and her research of Mildronate, the Rīga Stradiņš University annual award Scientist of the Year.

LAS Corresponding Member **Andrejs Skaģers** became honorary member of the Latvian Doctors' Association.

LAS Full Member **Rihards Kondratovičs** received the RL Cabinet of Ministers Certificate of Recognition for "Lengthy and noteworthy investment in the field of varietal breeding".

LAS Full Member **Ivars Kalviņš** received the Ministry of Education and Science Certificate of Recognition for "Outstanding contribution to the development of science in Latvia", LAS and Grindeks award "the Golden Owl", Certificate of Recognition from the Rīga City Council for "Outstanding contribution to the development of chemistry and successful international collaboration while promoting Rīga".

LAS Full Member **Bruno Andersons** received the RTU Certificate of Recognition.

LAS Corresponding Member **Tālis Juhna** received the Special Recognition Award of the Cultural Council.

LAS Corresponding Member **Valdis Pīrāgs** received the UL Faculty of Medicine student diploma "Inspiration of the Year".

Chair of the Division *Pēteris Trapencieris*
Scientific Secretary *Daina Daija*

Main achievements of the State Research Programme “Biomedicine for Public Health” in 2016

The programme covers eight multidisciplinary research projects whose themes are corresponding to major Latvian health system development priorities and focus on population survival, research of pathologies restricting the quality of life, and development of new treatment strategies. The researchers consortium unites medical experts, molecular biologists, chemists, pharmacologists, and public health specialists from the University of Latvia (UL), Rīga Stradiņš University (RSU), Latvian Institute of Organic Synthesis (LIOS), Latvian Biomedical Research and Study Centre (BMC), Rīga East Clinical University Hospital (RECUH), and Pauls Stradiņš Clinical University Hospital (PSCUH, the coordinating partner).

Project No. 1 **“Research of personalised monitoring, diagnostics, and treatment of events caused by atherosclerosis”** (leader Andrejs Ērglis) is devoted to implementation of new invasive technologies in real practice of personalised medicine. In the framework of this project, research of safety and suitability of the new approach of stenting of lesions of bifurcation of the left main coronary artery was continued in 2016. The implantation of bioresorbable stent in the side branch of bifurcation and implantation of drug-filled stent in the main branch of bifurcation were applied. Modification of the atherosclerotic plaque before stenting and intravascular imaging have to be performed to ensure the effectiveness of the procedure.

The aim of the second research was to evaluate the functional status changes of arterial and venous circulation in patients with occlusion of *a. femoralis* before and after innovative intravascular bypass procedure (a fully percutaneous procedure that places endografts from the femoral artery through the adjacent venous conduit and back to the popliteal artery). The short- and long-term improvement of arterial circulation was confirmed. The most relevant finding is that the venous outflow is intact in 81% of patients.

The aim of the third research was to elaborate and implement the mini-invasive mitral heart valve corrections without the artificial circulation. This new approach combines the effectiveness of well-verified chord replacement method and minimal surgical trauma by new transapical approach using the *Neochord* device. The registry for record keeping and evaluation of operation results continues.

The identified problems of stem cell transplantation were patiently resolved. The main problem now is to find the most suitable method for the extraction of specific cells. The new method of extraction of mesenchymal cells was implemented. The cell propagation using the laminar flow bioreactor was carried out. The screening of Latvian population to find individuals with family hypercholesterolemia (FH) was carried out in 2016. The development of registry of FH and implementation of effective treatment system were the main issues addressed. There are 82 patients in the FH registry, 56%

of patient relatives during the cascade screening had elevated low density lipoprotein cholesterol level, which confirm the hereditary FH.

Project No. 2 **“Research of the molecular mechanisms and pharmaco-genetics of Diabetes mellitus and cardiovascular diseases, and search for new therapeutic targets”** (leader Ivars Kalviņš) is aimed on research of pathogenic changes in cardiac metabolism associated with cardiovascular diseases. For prevention and treatment of atherosclerosis, the way to find simultaneous lowering of cholesterol and triglycerides in the blood is needed. Nicotinic acid (NA) and receptors of fatty acids (FFAR3, FFAR2, HCA2) are involved in the control of triglycerides level. Therefore, potent modulators of NA and short chain free fatty acid receptors (FFAR3, FFAR2, HCA2) with nanomolar activity were discovered and may serve as a basis for the development of new drug substances. Original studies on the role of trimethylamine oxide (TMAO) in the development of atherosclerosis were continued. TMAO derives from trimethylamine (TMA), generated by intestine bacteria destroying choline and carnitine occurring in fat and meat. Reduction of TMAO concentration to inhibit the formation of TMA by gastrointestinal bacteria (microbiota) is necessary. It should be established which enzymes in bacteria are responsible for the formation of TMA, how they are built and how they operate. Therefore, TMA-producing enzymes in bacteria *Klebsiella pneumoniae* — carnitine oxygenase and choline lyase were isolated and characterised. Obtained pattern data on the three-dimensional structure of choline lyase are useful for design of potential new drug substances.

TMAO biochemical mechanism studies were continued to characterise signalling pathways linking TMAO with cardiovascular risk and diabetes. It was found that TMAO inhibits pyruvate and fatty acid oxidation in the heart muscle cells (cardiomyocytes). Therefore, increased TMAO concentration decreases the efficiency of energy metabolism, leading to the development of heart failure. These results showed that one of possible causes of atherosclerosis could be excessively high levels of carnitine in the body, and Meldonium promotes excretion of carnitine. Therefore, part of the sub-projects were devoted to the investigation of energy production processes impaired by carnitine-controlled accumulation of activated fatty acids in the cells. It was found that carnitine and GBB accelerates the elimination of meldonium from host body, which can reduce the efficacy of meldonium in treatment of cardiovascular diseases. New data on acylcarnitine role in glucose and fatty acid metabolism and the regulation of the pathogenesis of diabetes were also obtained.

Research on the impact of statin therapy on TMAO and acylcarnitine concentration in the blood of patients was continued, and analysis of biochemical indicators in 12 patients was performed. Search for potential inhibitors controlling enzyme ϵ -trimethyllysine hydroxylase (TMLH), the first step in the carnitine biosynthesis, were performed as well. For that, 22 trimethyllysine (TML) structural analogues were studied by NMR method.

Virtual models of the ligand interaction with TML catalytic centre were designed which allows generating new medicines for control of carnitine biosynthesis.

An important role in cardiovascular disease pathogenesis is played by diabetes, which is widely treated with metformin. Therefore, the explanation of the reasons why metformin's sugar-lowering effects significantly differs in different groups of patients with diabetes is needed. New data about relationship of metformin's therapeutic efficiency with its influence on the intestinal flora, as well as on the white blood cell gene methylation were obtained. Genetic, DNA methylation and microbial 16S RNA analysis data combination were used for creation of personalised therapy algorithm and protocol models that can serve as a basis for clinical trials and the development of individualised therapies.

The search for possible ways to control diabetes-induced changes on the gene level led to an investigation of the effect of metcarbato_{ne}, etcarbato_{ne}, stiry_lcarbato_{ne}, and glutapyrone AV-153-Na on *Psmα6* gene expression. The data obtained will help to understand the structure–activity relationships and design more active drugs for diabetes prevention and treatment.

Project No. 3 “**Development of novel anticancer drugs and immunotherapeutic approaches**” (leader Aija Linē) was focussed on the exploration of the immune contexture of tumour microenvironment, synthesis of new drug substances with anti-cancer or immunostimulatory activity, development of new gene delivery systems, testing the compounds using *in vitro* test systems, and the development of mice tumour models for preclinical trials. Among the new anti-cancer therapeutic targets were selected carbonic anhydrase (CAIX), matrix metalloproteases (MMP), 2,3-dioxogenase (IDO) as well as new transport systems by using nanotechnology to artificial liposomes area.

In collaboration with the University of Zurich and RECUH Pathology Centre, a study on the prognostic role of tertiary lymphoid structures (TLS) in lung cancer patients was conducted. We found out what cell types and signals are involved in the formation of TLS and showed that high density and TLS activity in tumour tissue correlates with significantly improved survival. The obtained results support our hypothesis that TLS are local hubs for the immune cell activation and can serve as a basis for a fundamentally new cancer treatment strategy based on the induction of TLS formation in the tumour microenvironment.

By investigating the effects of double-stranded RNA (dsRNA) on tumour cells and immune cell activation we found that dsRNA directly reduced the mitotic activity in a portion of cancer cell lines, and showed that dsRNA effect on the cytokine profile of *ex vivo* cultured immune cells in different patients differ significantly. These results allow a better understanding of the dsRNA-based immunomodulatory mechanism of action and points for the need of a personalised approach.

We continued to study various gene delivery strategies in murine tumour models, including the alphavirus vectors, liposomal compounds, and magnetic nanoparticles. Preliminary results on the therapeutic potential of alphaviruses showed that mIFN- γ -encoding alphavirus is able to reprogram existing tumour macrophages in cancer suppressive phenotype, thus paving the way for future preclinical studies.

Good interdisciplinary cooperation was found by investigating CAIX inhibitors. Thus, LIOS has developed a new method for the synthesis of bicyclic pyrazole and pyridine coumarin analogues and obtained novel bicyclic pyrazole and pyridine coumarins. Pyridine coumarin analogues have shown CAIX and CAXII isoform selective inhibition in submicromolar level. In turn, BMC has investigated how CAIX inhibition affects breast cancer cell adaptation to hypoxia conditions, which will allow a better understanding of mechanism of action of the CAIX inhibitors.

Based on the SAR data design and synthesis of 24 novel selenophencoumarins were optimised, their inhibitory properties were tested on the isolated MMP1-MMP14, but the cytotoxicity of the 10 cell lines (carcinomas, sarcomas, hepatomas) tested *in vitro*. After the screening results, compounds with selective MMP2 and MMP14 inhibitory activity were selected for further tests on various types of cancers cells. The resulting compounds exhibit modest cytotoxicity, and at the same time very low basal toxicity.

There were started studies aimed at the design and synthesis of new indolamine 2,3-dioxy-genase (IDO) inhibitors on the base of N-acyl- and N-aroyle-aminoacrylic esters and amides and their cyclic analogues. In each structural type compounds with IDO inhibiting properties were discovered. The most potent ones were represented by N-acyl-4-aryl-3-pyrrolin-2-ones (IDO inhibition up to 70%), which demonstrated potent antiproliferative activity *in vivo*.

Synthesis of novel substituent containing heteroaryldihydropyrimidines (HAP) as hepatitis B virus (HBV) inhibitors was performed. A group of novel compounds of original amphiphilic nanoparticles based on the 1,4-dihydropyridine (DHP) core with 3,5-branched alkyl substituents were synthesised for development of putative transport molecules.

Project No. 4 “**Evaluation of the possibilities to decrease mortality caused by the gastric cancer in Latvia**” (leader Mārcis Leja) is aimed to develop public health and medical intervention approach to decrease the mortality from gastric cancer and the burden caused by the related premalignant conditions.

The current international guidelines recommend eradication of *H.pylori* in all the infected individuals. In Latvia, this would mean prescribing antibiotic therapy to 70–79% of the entire population. Currently the most accurate non-invasive method for detection of precancerous lesions (atrophy) is the measurement of pepsinogen levels in blood, however the method’s sensitivity is too low. A targeted survey was performed for obtaining data on *H.pylori* eradication in the real-life situation: indications, eradication

regimens, frequency of adverse events, effectiveness of the therapies. The results will allow to evaluate the conformity of the Latvian practice with international guidelines and to plan further educational activities. At the same time the information is included in the European register allowing the data to be compared with other countries.

Furthermore, clinical data and samples from patients with gastric cancer, precancerous lesions as well as control group (40–65 years old healthy individuals of both genders) are being collected for further research. The latter includes study of the *H.pylori* and precancerous lesion (serologically detected atrophy) prevalence in the group of >1000 subjects. By considering that only 1–2% of those infected with *H.pylori* are developing gastric cancer, identification of the persons at increased risk is of importance to avoid the use of antibiotics in subjects without significant benefit from eradication. Therefore, the project is addressing identification of *H.pylori* virulence factors (including CagA) in Latvian patients.

For appropriate treatment selection at the national level, it is needed to ascertain *H. pylori* resistance to antibiotics used in eradication schemes, as well as the clinical efficacy of treatment. Both these issues are being addressed within the current project, since data of qualitative research are not available in Latvia. The results of eradication effectiveness were achieved and their analysis is in the process. In order to assess the potential gain from mass *H.pylori* eradication strategy under the conditions of Latvia, a cost-effectiveness analysis was performed.

Project No. 5 “**Personalised cancer diagnostics and therapy efficiency determination**” (leader Jānis Gardovskis) focusses on early diagnostics of cancer and identification of markers of therapeutic efficacy for patients with the most common cancer localisation in Latvia (breast cancer, colorectal cancer). The project has three main directions — breast cancer epidemiology, clinically useful efficacy markers, and study of heterogeneity of primary breast tumour cell lines in individual patients.

Incidence of a number of risk alleles in Latvian population was determined. The available clinical and genetic information was supplemented by a sociological survey data. The aim is to develop a new diagnostic algorithm to identify persons belonging to high-risk group of sporadic breast cancer.

Patient response to applied chemotherapy is one of the biggest challenges in clinical oncology, as there is no available reliable markers evaluation of efficacy of therapy. Therefore, identification of new markers is necessary. We have shown that breast cancer patients with high expression of mir-214 have significantly worse event free survival.

Project No. 6 “**Research on acute and chronic diseases in children to develop diagnostic and therapeutic algorithms to reduce mortality, prolong survival and to improve the quality of life**” (leader Aigars Pētersons) carried out a complex analysis of 205 newborns with necrotising enterocolitis (NEC) evaluating the diagnostic and treatment factors on the outcome of the disease. It was conducted in a prospective 24 NEC

patient clinical and molecular biological investigation defining the early inflammatory mediators IL-1 β , IL-6, IL-8, IL-10, TNF- α , EGF, MCP 1, and INF α . The monitoring of abdominal circumference and intra-abdominal pressure (IAS) was made to healthy preterm and term newborns (430 measurements) and in the NEC cases. Invention of IAP increases effects on the newborn NEC treatment choices was developed.

Retrospective analysis of acute appendicitis (AA) and acute mesenteric lymphadenitis (AML) patients was performed on 2300 patients in different age groups. Different aspects of diagnostic and treatment parameters were analysed. The results were patented to work out modified Alvarado scale in differentiation between AA and AML patients in clinical practice. Identified cytokines as inflammatory markers have made easier the AA and AML differential diagnosis. For the first time, complex retrospective clinical and molecular biological analysis in 384 patients with acute appendicitis was made in a wide range of ages to determine the impact of various diagnostics and treatments on treatment outcome. The inflammation indicators were identified, as well as the response of oxidative stress parameters in correlation to treatment method.

In the second study group the multiple search of new indicators in hospitalised sepsis patients, as well as the expression optimisation of the ADMANTS13 protease's active domain was carried out. Special attention is paid to the translation of the obtained results in clinical practice with the subsequent evaluation of the influence of implemented algorithms on the doctor's antibacterial treatment prescription habits and treatment outcomes.

The third group of researchers showed that *H.pylori* prevalence in children in Latvia has not changed significantly in the last 10 years, however it is higher in East European countries compared to Western countries. We have gathered and analysed the composition of breast milk samples of neonates' mothers. An association between different factors (gestational age, birth weight, diseases etc.) and breast milk composition was studied. We could recommend that the composition of breast milk should be detected individually among neonates with inadequate weight increase to assess the necessity for fortification of breast milk.

More detailed analysis was done not just about prematurity and newborn mortality but also about trends among timely births and data analysis about still births. Trends of low birth weight of newborns among timely births showed statistically significant slight mortality reduction from 2000 to 2013. The same tendency was observed also for stillbirths. To assess the mother risk factors for at-term small for gestational age newborns, higher odds were associated with intrauterine growth restriction, preeclampsia, hypertension, maternal smoking during pregnancy. Guidelines for pregnant women for diminishing the abovementioned risk factors are defined.

Project No. 7 “**Searching for innovative strategies of regulation and modulation of infection mechanisms**” (leader Modra Murovska) was carried out on investigation of new pathogenesis stages during the course of infectious diseases caused by RNA

viruses. The main emphasis was laid on the use of approbated laboratory techniques for analysis of biomaterial obtained within the study groups of patients with HIV, HCV, and tick-borne encephalitis.

Involvement of persistent viral infections in modulation of the immune system and development of autoimmune diseases had been investigated. Additional evidence on parvovirus B19 implication in rheumatoid arthritis (RA) development was obtained. In the presence of B19 infection markers RA patients' peripheral blood mononuclear cells (PBMC) responded with proliferation to the virus antigens more quickly than apparently healthy persons, albeit the methotrexate treatment significantly lowered the response. It has been shown that active and latent HHV-6 and HHV-7 infection has impact on the disease activity and aggressiveness, but reactivation of viruses may be a consequence of immunosuppressive treatment. Evidence of HHV-6 infection association with autoimmune thyroiditis (AIT) development (expression of viral mRNA in thyroid tissue; presence of HHV-6 antigens in intra-follicular cellular clusters and thyrocytes in the follicle wall) has been found.

Characteristics of *M. tuberculosis* lines circulating in Latvia should be taken into account when carrying out analysis of aminoglycoside resistance genes polymorphism. In collaboration with Russian scientists the phylogeography of LAM sub-lineages has been assessed suggesting that LAM family is originated in the Western Mediterranean region and human mass migration is a major factor influencing the spread of this line. High probability of size homoplasmy revealed by the mathematical model of simulated *M. avium* populations suggested that the similar MIRU-VNRT profiles from strains even in close geographical proximity should be interpreted with caution.

In a cohort study carried out in PSCUH during two years 52 patients with community-acquired severe sepsis and septic shock were enrolled. Intra hospital mortality rate was 52–60%. Respiratory tract infections, particularly pneumonia, skin/soft tissue and abdominal infections were the most common sites of origin. Gram-positive bacteria (*S.pneumoniae*, *MS S.aureus*) sensitive to commonly used antibiotics were more frequently isolated and only one case of ESBL positive *Klebsiella pneumoniae* was recorded. Overall 98% of patients initially received appropriate antibiotic treatment according to local guidelines.

Project No. 8 **“Assessment and reduction of the burden of major mental disorders and health issues caused by cognitive dysfunction”** (leader Elmārs Rancāns) was carried out on the largest and the most comprehensive psychiatry project on the prevalence and treatment of depression in Latvia in primary care. It has been estimated that non-recognition and insufficient treatment of depression accounts for annual losses of 105 million EUR for Latvian economy due to reduced productivity and premature mortality. Study of 2015 (in 24 primary care (PC) practices) revealed that each year approximately 70 000 of persons have clinically significant depression and ~90 000 have various anxiety disorders. A special algorithm for GPs in recognising and

treating depression in PC, an educational material and a lecturer kit were developed in 2016. In collaboration with the Department of Psychiatry and Narcology, RSU, Latvian Psychiatric Association, Latvian Association of Family Physicians and Rural Family Doctors Association of Latvia, 10 interactive workshops for 280 GPs were carried out.

The sub-project ENABLE-LV is dedicated to the study of potentially adjustable risk factors of Alzheimer's disease and dementia, emphasising the effects of long-term regular physical activity on cognitive functioning. The project is implemented in cooperation with the University of Sussex, School of Psychology. In the context of public health, the objective of ENABLE-LV is to promote physically active lifestyle throughout life and to provide substantiated arguments to policymakers and practitioners for successful implementation of healthy aging strategies. At this stage of research full clinical examination and psychological testing has been carried out for the first 35 participants.

Sub-project MethBrain is focussed on the study of movement disorders in intravenous methcathinone abusers and the project is implemented in collaboration with Universities of Oxford and Tartu. Active work on the implementation of the project's clinical phase and data analysis was continued in 2016. The Latvian Clinical Personality Inventory (LCPI) is a new, for our cultural environment adapted, psychological tool for detection of various psycho-emotional and behavioural disorders and analysis of the most relevant aspects of functioning. The project is implemented in cooperation with the Ministry of Defence (MoD) and the Department of Psychodiagnostics of the National Armed Forces. The beta-version of test has been developed and transferred for clinical approbation. In collaboration with the MoD, this project has been approved as a part of international research within NATO STO on suicide prevention in military.

The key research results of the State Research Programme "Biomedicine for Public Health" in 2016 are: 1) finding of a new cause (trimethylamine oxide – TMAO) in cardiovascular pathogenesis and clarification of TMAO mechanism of action and its connection with carnitine, mildronate, and trimethyllysine; 2) introduction of heart mitral valve correction as a new innovative surgical technology, and 3) BMC and LIOS exploring joint cooperation — synthesis and mechanistic studies of CAIX inhibitors in breast cancer treatment. Number of the programme "Biomedicine for Public Health" publications in 2016: 29 research articles, published in *WEB of Science* or *SCOPUS* databases, 3 research monographs, 5 PhD thesis and 16 MSc thesis were defended.

LAS Corresponding Member *Valdis Pīrāgs*, project manager

Introduction and Breeding of Rhododendra in Latvia (1957–2017)

Rhododendra are outstanding decorative plants of the heather family that have established themselves as a permanent element in landscape gardening and greening. Rhododendra plantings are an essential part of contemporary park design as well as public and private gardens. Rhododendra deserve their immense popularity due to the diversity of their habitat, size and type of blossoms and leaves, and their flowering season. In the wild we see species that extend just a few centimetres above the ground, many species are miniature shrubs, bushes, small trees and some even grow to a height of 30 meters. Similar diversity exists regarding colour, size and form of the blossoms. We cannot imagine a single colour or shade that cannot be seen in rhododendra blossoms. The same is true for their leaves. They can be tiny, just about 1 cm long, while the average length of rhododendra leaves is 10–20 cm. There are, however, some species with leaves of 70–100 cm long. This extensive diversity offers landscape artists and gardeners ample opportunity to realise the most daring of ideas when designing landscapes, public green areas, or individual gardens.

The rhododendra family is extensive and diverse. In the wild these plants can be found in the cold and moderate regions of the Northern hemisphere. They grow mainly in mountainous areas as well as near large bodies of water: near oceans, seas and lakes as well as large river valleys. Rhododendra are not found on the continent of Africa or South America. Easy inter-crossbreeding is one of the typical characteristics of rhododendra. This trait presents breeders great opportunities to create new varieties. Breeders from various nations take full advantage of these opportunities. Botanists today have discovered and described 1200–1300 rhododendra species in the wild whereas breeders in various countries have created more than 30 000 varieties. Thus, the number of varieties created by humans exceeds the number of rhododendra species in the wild by a factor of 23.

The history of the rhododendron as a cultivated plant in Europe goes back almost three and one half centuries. In 1656, the acrid haired rhododendron (*Rh. Hirsutum L.*), introduced from the Alps, was first cultivated in gardens.

The origins of introduction of the rhododendron genus in Latvia can be traced back to the 1820s when the K. Vāgners company first offered their clients two rhododendra plant species. The J. Cigra and C. Šohs companies also played an important role in the introduction of rhododendra. In the early 20th century, rhododendra started to appear in the parks and green areas of Rīga and Jūrmala. Rhododendra collections were established at the Bulduri School of Horticulture and the University of Latvia Botanical Gardens in the 1930s. In 1952, the Dubulti Fruit and Vegetable Farm started mass production of three rhododendra species for the parks in Rīga and Jūrmala: the

Japanese (*Rh. Japonicum* Suring), the yellow (*Rh. Luteum* Sweet), and the Catawba (*Rh. Catawbeinse* Michx).

To create new varieties it is vital to have enough high quality raw material which is used in generative hybridisation to acquire a large number of seedlings from which new varieties are created using artificial selection.

Intensive rhododendra introduction in Latvia started in 1957 when R. Kondratovičs, Director of the University of Latvia Botanical Gardens at the time, started his scientific work on the introduction and acclimatisation of rhododendra and later, after the establishment of the rhododendra collection, started to create new varieties himself. Along with the introduction of rhododendra, crop management methodology was developed, augmentation techniques were developed, physiological and biochemical processes were studied as was organogenesis in the rhododendra adaptive process and informative marketing efforts were popularising the use of rhododendra in private and public parks and gardens.

Along with wild rhododendra species and variety introduction a collection of greenhouse azaleas (*Rhododendron simsii*) was created with breeding of new varieties being an active aspect of the collection. As the result of many years of work, the University of Latvia Botanical Gardens collection has 124 varieties including 24 original locally bred varieties (breeder R. Kondratovičs): ‘Auseklītis’, ‘Columba’, ‘Duets’, ‘Dzīge’, ‘Dzirkstelīte’, ‘Eldze’, ‘Ginta’, ‘Grācija’, ‘Ilva’, ‘Inta’, ‘Jolanta’, ‘Kārlis Sūniņš’, ‘Laima’, ‘Māsa Kerija’, ‘Meri’, ‘Momo’, ‘Ritenītis’, ‘Rožainā Zvaigznīte’, ‘Sarkangalvīte’, ‘Sārtais Dzintars’, ‘Saulriets’, ‘Sniegbaltīte’, ‘Sniegpārsla’, ‘Violetā Zvaigznīte’. The last varieties of *Rhododendron simii* (greenhouse azaleas) were internationally registered in 2013. At present no breeding of *Rhododendron simii* is taking place.

Following the development of an extensive collection of wild rhododendra species and varieties, the development of new varieties was begun. The first cross-breeding of wild rhododendra was done in 1957. This work continued in the 1960s and was especially intense in the 1970s. Up to and including 2016, a total of 656 cross-breedings in various combinations had been performed crossing species with species, species with varieties, varieties with species and varieties with varieties. Besides this, hybrid seedlings, acquired from seeds resulting from free pollination, were also used in the breeding process. Several tens of thousands of hybrid seedlings were acquired from all the 656 cross-breedings. A large expanse of land was required to grow these seedlings to maturity. Since the University of Latvia Botanical Gardens did not have this amount of land, it became necessary to establish a specialised nursery to successfully continue and further develop the breeding of rhododendra. In support of the University of Latvia request, the government allocated the university 12.1 hectares of pine forest land in Babīte for the purpose of developing a rhododendra nursery. The preliminary work was commenced immediately: the general plan for the nursery was devised by the head

landscape architect of Rīga K. Barons, a reservoir measuring 0.5 hectares was excavated for watering purposes, a road network was created, 3 m long firebreaks, which divided the territory into 136 sections (20 × 30 m), were cleared, a chain link fence was set up around the perimeter of the territory. After this preliminary work, the University of Latvia Rhododendra Breeding and Experimental Nursery “Babīte” was officially opened on 1 July 1980 by order of the rector of the University. Associate Professor of Biology Rihards Kondratovičs was entrusted with the development and management of the nursery. Along with the establishment of the specialised rhododendra nursery, work with the rhododendra genus mainly took place at the nursery while the Botanical Gardens retained the rhododendra exhibition and some breeding materials.

Several goals were set forth for the newly established nursery which it has successfully attained over its 36 years of existence:

- To perform the introduction and breeding of rhododendra in order to create decorative and cold-resistant varieties of rhododendra suited for the agroclimatic conditions of Latvia;
- To improve the existing methods and develop new effective methods of generative and vegetative augmentation of species and varieties;
- To improve the crop management of rhododendra cultivation, to develop effective methods of disease and pest control;
- To study the physiological and biochemical processes of increasing plant hardiness;
- To participate in the educational process by organising work-study programmes and supporting bachelors, masters, and Doctoral thesis work;
- To make use of mass media to market rhododendra;
- To provide plants and literature about rhododendra to all interested parties.

The nursery continues to meet the above goals. An extensive collection of wild rhododendra, which consists of 76 species and 262 varieties, including 106 varieties created in Latvia, has been established.

Registration of new varieties was begun in 1999 upon the confirmation of the first nine wild rhododendra varieties. Testing and rating of potential hybrids continues and every year new wild rhododendra varieties are entered in the international rhododendra register of the Royal Horticulture Association of Great Britain. The creator of all the new varieties is breeder Professor R. Kondratovičs. (*See colour images in supplementary sheets.*)

The following 106 varieties of wild rhododendra have been developed, confirmed and registered up to and including 2016:

In 1999, 9 annual rhododendra varieties were confirmed and registered: ‘Rubīns’, ‘Rīta Zvaigzne’, ‘Polārzvaigzne’, ‘Pasaciņa’, ‘Mazais Jefiņš’, ‘Babītes Līva’, ‘Babītes Indra’, ‘Babītes Inga’, ‘Babītes Astra’.

- In 2000, 4 annual varieties: ‘Babītes Anita’, ‘Babītes Laura’, ‘Uguns’, ‘Babītes Alīna’ and 6 evergreen rhododendra varieties: ‘Irina’, ‘Babītes Lavanda’, ‘Lita’, ‘Līgo’, ‘Sprīdītis’, ‘Uldis’.
- In 2001, 5 annual varieties: ‘Ilze’, ‘Liene’, ‘Liesma’, ‘Skaidrīte’, ‘Teika’ and 6 evergreen rhododendra varieties: ‘Dace’, ‘Eduards Smiļģis’, ‘Emīls’, ‘Babītes Ginta’, ‘Jānis’, ‘Kārlis’.
- In 2002, 5 annual varieties: ‘Saule’, ‘Madame Debene’, ‘Austra’, ‘Lorija’, ‘Ina’.
- In 2003, 3 annual varieties: ‘Francisa’, ‘Polonia’, ‘Rīga’ and 5 evergreen varieties: ‘Zinātnu Akadēmija’, ‘Alma Mater’, ‘Babītes Baltais’, ‘Emeritus’, ‘Babītes Kristīne’.
- In 2005, 3 annual varieties: ‘Dzintra’, ‘Babītes Lidija’, ‘Arta’ and 3 evergreen varieties: ‘Agris’, ‘Feja’, ‘LU Rolands’.
- In 2007, 2 annual varieties: ‘Pērlīte’ and ‘Vija’ and 3 evergreen varieties: ‘Kārlis Ulmanis’, ‘Robis’, ‘Rudīte’.
- In 2009, 3 evergreen varieties: ‘Atis’, ‘Aivars Lasis’, ‘Ilma’.
- In 2010 2 annual varieties: ‘Dita Krenberga’, ‘Rasma’ and 10 evergreen varieties: ‘Viesturs’, ‘Sofija’, ‘Egons’, ‘Toms’, ‘Andris’, ‘Miks’, ‘Imants’, ‘Biruta’, ‘Babītes Sarkanais’, ‘Tālavija’.
- In 2012, 4 annual varieties: ‘Ance’, ‘Baiba’, ‘Selga’, ‘TTT’ and 5 evergreen varieties: ‘Babītes Kompaktais’, ‘Bulduri’, ‘Jānis Sproģis’, ‘Vilhelmīne Petkevičs’, ‘Vizma’.
- In 2013, 4 annual varieties: ‘Latvijas Itera’, ‘LU Solveiga’, ‘Ringla’, ‘Santa’ and 4 evergreen varieties: ‘Doktors Babarikins’, ‘Dzidra’, ‘Indriķis’, ‘Valdis’.
- In 2014, 2 annual varieties: ‘Ausma’, ‘Ināra’ and 5 evergreen varieties: ‘Babītes Antons’, ‘Babītes Elita’, ‘Elza Radziņa’, ‘Kristaps Morbergs’, ‘Ogre’s White Dream’.
- In 2015, 7 evergreen varieties: ‘Aldonis Vēriņš’, ‘Babītes Aiga’, ‘Ilgonis’, ‘Mammadaba’, ‘Māra’, ‘Rektors’, ‘Teterevi Latvijai’.
- In 2016, 3 annual varieties: ‘Aura’, ‘Gunita’, ‘Lelde’ and 3 evergreen varieties: ‘Baltija’, ‘Cīrava’, ‘Monta’.

Breeding wild rhododendra is ongoing and in the years to come Latvian gardeners, landscape artists, and architects will continue to receive new decorative and cold-resistant wild rhododendra varieties.

LAS Full Member *Rihards Kondratovičs*

DIVISION OF HUMANITIES AND SOCIAL SCIENCES

Akadēmijas laukums 1, Rīga, LV 1050, Latvia

Tel.: (371) 67225889 Fax: (371) 67821153

E-mail: humana@lza.lv

Board of the Division

Chair of the Division Raita KARNĪTE

Vice Chair of the Division Juris URTĀNS

Scientific Secretary Līva GRIŅEVIČA

Board members

Saulvedis CIMERMANIS, Māra GRUDULE, Tatjana KOĶE,

Oļģerts KRASTIŅŠ, Juris KRŪMIŅŠ, Maija KŪLE, Dace MARKUS,

Guntis ZEMĪTIS

The Division unites 155 LAS members, among them 37 full, 51 honorary, 35 foreign, and 32 corresponding members.

The Division has conferred the title of *Dr. honoris causa* to 38 scientists.

MEMBERS OF THE DIVISION AND THEIR FIELD OF SPECIALISATION

Anthropology

Raisa Denisova, hon.mem.

Archaeology

Andris Caune, full mem.

Ēvalds Mugarēvičs, full mem.

Ieva Ose, full mem.

Guntis Zemītis, full mem.

Ilze Biruta Loze, cor.mem.

Andrejs Vasks, cor.mem.

Architecture

Jānis Krastiņš, full mem.

Gunārs Asaris, hon.mem.

Andris Kronbergs, hon.mem.

Gunārs Birkerts, for.mem.

Art

Mārtiņš Brauns, hon.mem.

Uldis Dumpis, hon.mem.

Maija Einfelde, hon.mem.

Guntis Gailītis, hon.mem.

Alvis Hermanis, hon.mem.

Imants Kalniņš, hon.mem.

Gidons Krēmers, hon.mem.

Arturs Maskats, hon.mem.

Aleksejs Naumovs, hon.mem.

Andris Nelsons, hon.mem.

Jānis Andris Osis, hon.mem.

Raimonds Pauls, hon.mem.

Indulis Ojārs Ranka, hon.mem.

Māris Sirmāis, hon.mem.

Džemma Skulme, hon.mem.

Jānis Streičs, hon.mem.

Jānis Strupulis, hon.mem.

Pēteris Vasks, hon.mem.

Andris Vārpa, hon.mem.

Uldis Zemzaris, hon.mem.

Art Studies

Ojārs Spārītis, full mem.
 Silvija Radzobe, cor.mem.
 Eduards Kļaviņš, cor.mem.
 Arnolds Klotiņš, hon.mem.
 Gunārs Krollis, hon.mem.
 Māra Lāce, hon.mem.

Bibliography

Andris Vilks, hon.mem.
 Jānis Krēslis, for.mem.

Demography

Juris Krūmiņš, full mem.
 Pārsla Eglīte, cor.mem.

Economics

Arnīs Kalniņš, full mem.
 Raita Karnīte, full mem.
 Oļģerts Krastiņš, full mem.
 Remīgijs Počs, full mem.
 Baiba Rivža, full mem.
 Inna Šteinbuka, full mem.
 Edvīns Vanags, full mem.
 Pēteris Zvidriņš, full mem.
 Konstantīns Didenko, cor.mem.
 Imants Kirtovskis, cor.mem.
 Uldis Osis, cor.mem.
 Pēteris Guļāns, hon.mem.
 Valdis Jākobsons, hon.mem.
 Nikolajs Balabkins, for.mem.

Ethnology

Saulvedis Cimermanis, full mem.
 Gunita Zariņa, cor.mem.
 Renāte Blumberga, for.mem.
 Karl Pajusalu, for.mem.

History

Valdis Bērziņš, full mem.

Inesis Feldmanis, full mem.
 Aivars Stranga, full mem.
 Ilga Apine, cor.mem.
 Ēriks Jēkabsons, cor.mem.
 Anna Jurkāne, hon.mem.
 Norbert Angermann, for.mem.
 Andrievs Ezergailis, for.mem.
 Erwin Oberländer, for.mem.
 Gert von Pistohlkors, for.mem.
 Andrejs Plakans, for.mem.
 Enn Tarvel, for.mem.
 Eberhard Winkler, for.mem.

History of Art

Jānis Zilgalvis, full mem.
 Imants Lancmanis, hon.mem.

History of Culture

Juris Tālivaldis Urtāns, full mem.
 Karina Pētersone, hon.mem.
 Vyacheslav Ivanov, for.mem.

History of Science

Anto Leikola, for.mem.

Journalistics

Oskars Gerts, hon.mem.

Law

Juris Bojārs, full mem.
 Kalvis Torgāns, full mem.
 Ringolds Balodis, cor.mem.
 Ārija Meikalīša, cor.mem.
 Andris Plotnieks, cor.mem.
 Erki Hollo, for.mem.

Linguistics

Aina Blinkena, full mem.
 Ina Druvieta, full mem.
 Ilga Jansone, full mem.
 Dace Markus, full mem.
 Andrejs Veisbergs, full mem.

Brigita Bušmane, cor.mem.
 Benita Laumane, cor.mem.
 Daina Nītiņa, cor.mem.
 Anna StafECKa, cor.mem.
 Jānis Valdmanis, cor.mem.
 Aleksey Andronov, for.mem.
 Dzintra Bonda, for.mem.
 Michael Branch, for.mem.
 Pietro U. Dini, for.mem.
 Trevor Fennell, for.mem.
 Tomass Gamkrelidze, for.mem.
 Baiba Metuzāle-Kangere, for.mem.
 Lembīt Vaba, for.mem.
 Zigmas Zinkevičius, for.mem.

Literary Criticism

Māra Grudule, full mem.
 Viktors Hausmanis, full mem.
 Viktors Ivbulis, full mem.
 Benedikts Kalnačs, full mem.
 Janīna Kursīte-Pakule, full mem.
 Vera Vāvere, full mem.
 Maija Burima, cor.mem.
 Ausma Cimdiņa, cor.mem.
 Fjodors Fjodorovs, cor.mem.
 Lalita Muižniece, for.mem.
 Valters Nollendorfs, for.mem.
 Radegast Parolek, for.mem.
 Jana Tesařová, for.mem.

Literature

Alberts Bels, hon.mem.
 Uldis Bērziņš, hon.mem.
 Leons Briedis, hon.mem.
 Roalds Dobrovenskis, hon.mem.
 Guntars Godiņš, hon.mem.
 Dainis Īvāns, hon. mem.
 Juris Kronbergs, hon.mem.
 Jānis Peters, hon.mem.
 Jānis Rokpelnis, hon.mem.

Valdis Rūmnieks, hon.mem.
 Knuts Skujenieks, hon.mem.
 Zigmunds Skujiņš, hon.mem.
 Māra Zālīte, hon.mem.
 Anna Žīgure, hon.mem.

Pedagogics, Psychology

Ivars Austers, cor.mem.
 Tatjana Koķe, cor.mem.

Philosophy

Maija Kūle, full mem.
 Andris Rubenis, cor.mem.
 Igors Šuvajevs, cor.mem.
 Ivans Vedins, cor.mem.
 John Talivaldis Ozolins, for.mem.
 Pavel Štoll, for.mem.
 Arvīds Ziedonis, for.mem.

Political Studies

Tālavš Jundzis, full mem.
 Jānis Ikstens, cor.mem.
 Artis Pabriks, cor.mem.
 Aina Nagobads-Ābola, hon.mem.
 Juris Dreifelds, for.mem.
 Jānis Peniķis, for.mem.
 Rasma Šilde-Kārklīņa, for.mem.

Folklore Studies

Vaira Vīķe-Freiberga, full mem.
 Sandis Laime, cor.mem.
 Valdis Muktupāvels, cor.mem.

Sociology

Aivars Tabuns, cor.mem.
 Tālis Tisenkopfs, cor.mem.

Theology

Valdis Tēraudkalns, cor.mem.
 Juris Rubenis, hon.mem.
 Zbigņevs Stankevičs, hon.mem.

Activities of the Division of Humanities and Social Sciences

The strategic objectives of the Division of Humanities and Social Sciences (DHSS) include: observation and contribution to equal development, as well as representation and involvement in the work of Latvian Academy of Sciences (LAS) of scientists from all science directions of humanities and social sciences; organisation of actions aimed at promotion of the scientific achievements and exchange of knowledge; strengthening of the identity of the LAS and Latvian scientists and paying tribute to prominent scientists; developing of the cooperation with the young scientists; selection and commending of the best publications and achievements; informing about the measures and activities online; cooperation with the journal *Latvijas Zinātņu Akadēmijas Vēstis, A daļa* (Proceedings of Latvian Academy of Sciences, Section A) by publishing articles reflecting the activities of humanities and social sciences.

Management of the DHSS collaborated with the national authorities and made the required experts reports in line with the competencies of the humanities and social sciences; as far as possible involved in the international cooperation.

The Council of the Division, representing all disciplines of the humanities and social sciences, worked as a consultative body. The work of the Council was organised in the form of electronic communication, taking into account the fact that attendance of meetings was shackled due to the intensive lecturing activity of several members of the Council.

Changes in the composition of the Division

In 2016, elections at the LAS, the composition of DHSS was creatively supplemented in various science directions. As full members of the LAS were elected the following scientists: professor of the Faculty of Humanities of the University of Latvia (UL), pro-rector of humanities and education sciences at the UL, senior researcher of the Latvian Language Institute, UL, *Dr.habil.philol.* Ina Druviete; Professor of macroeconomic subsector of the UL, advisory board member of the Centre of European and Transition Studies, *Dr.habil.oec.* Inna Šteinbuka; dean, professor and senior researcher of the Faculty of Engineering Economics and Management of Rīga Technical University; Head of the Department of International Economic Relations, Transport Economics and Logistics, *Dr.habil.oec.* Remigijs Počs.

As honorary members were elected: composer Mārtiņš Brauns and music researcher *Dr.art.* Arnolds Klotiņš.

As corresponding members were elected: professor of the Faculty of History and Philosophy, UL, senior researcher of the Institute of Latvian History, UL, *Dr.hist.* Ēriks Jēkabsons, and professor of the Faculty of Education, Psychology, and Art, UL, head of the Department of Psychology, *PhD* Ivars Austers.

LAS Doctors *honoris causa* degree was awarded to Gundega Grīnuma (field of research — creative and private life of famous Latvian poets Rainis and Aspazija), Kārlis Kangeris (historian), and Ivars Ločmelis (historian).

Undertakings of the Division

In 2016, the Division held 8 meetings and one joint meeting with the LAS Division of Physical and Technical Sciences, as well as organised several other events, among them, four art exhibitions and two poster exhibitions (research projects by LAS members and projects of scientists who received the L'Oréal grant “Women in Science” in Latvia) in the premises of the Presidium of the LAS. These events had open access for members of the LAS, visitors and guests.

Meetings of the Division

20 January — participants of the meeting listened to the presentation of *Dr.* Vadims Mantrovs, whose monograph “EU Law on Indications of Geographical Origin” was included in the TOP 10 Latvian Scientific Achievements in 2015. After the presentation, Head of the Division, LAS Full Member Raita Karnīte informed about the Division's work in 2015 and work plans for 2016, as well as discussed the changes in the Board of the Division.

5 February (a meeting before election the new management of the LAS) — participants of the meeting listened to the report on the Division's activities within the full election period (May 2012 – May 2016) by LAS Full Member Raita Karnīte and supported in voting her candidacy as a Head of the Division for the next election period; and also, they voted for presidential candidates of the LAS and nominated Senate members of the Division for the next election period. The participants also listened to the presentation of three authors who were nominated for the TOP 10 Latvian Scientific Achievements in 2015. *Dr.art.* Guna Zeltiņa, *Shakespeare. With A Baltic Accent*; *Dr.habil.art.* Silvija Radzobe, the collective monograph *Latvian New Directors*; *Dr.habil.arch.* Jānis Krastiņš, the monograph *Liepāja: Art Nouveau Architecture*.

23 March — changes of the Division's Statute were approved. *Dr.art.* Elita Grosmane reported about Agnese Bergholde's monograph *Medieval Architecture and Analogies in Construction Plastic Arts of the Riga Cathedral in the European Context*. At the end of the meeting participants listened to reflections of artist Inguna Krolle-Irbe on her series of drawings and acrylic paintings “Frequency Modulation” and opened the exhibition.

21 April and 26 May — at these meetings members of the Division and participants of the meetings continued listening to authors who participated in the competition for TOP 10 Latvian Scientific Achievements in 2015. *Dr.phil.* Andrejs Balodis, monograph *Unfinished Past. Study on Philosophy of Henri Bergson*; *Dr.hist.* Harijs Tumans, book

Heroes and Heroism in Ancient Greece; *Dr.phil.* Māra Kiope, monograph *Presence. Life and Work of Latvian and Brazilian Jesuit Philosopher Staņislavs Ladusāns*; *Dr.iur.* Jānis Lazdiņš and *Dr.iur.* Gunārs Kusiņš, monograph *State of Latvia: Sources of Law. State Formation — Restoration of Independence. Documents and Commentaries*; *Dr.iur.* Jānis Rozenfelds, publication *Civil Laws of 1864 (Part III of the Codification of Local Laws) and Latvian Legal Science on Legal Regulation of Invalidation of Transactions*; *Dr.iur.* Edvīns Danovskis on the monograph *Meaning of the Division between the Public and Private Law and Application Problems in Latvia*; *Dr.habil.iur.* Kalvis Torgāns, publication *Crash of Penalties “Bubble” in Latvia*.

22 September — at the meeting participants listened to the report “Historical Memory of Latvian Population. Historiography in Latvia in the Years of Independence” by the LAS Honorary Member *Dr.hist.* Leo Dribins, *Dr.sc.comm.* Mārtiņš Kaprāns, and *Dr.hist.* Jānis Ķeruss.

27 October — the meeting was devoted to the introduction of candidates for LAS membership and their evaluation. At the meeting participants heard the following reports: “Latvian Sociolinguistic Research in the Context of the Language Policy of the European Union and its Member States” by Corresponding Member of LAS *Dr.habil.philol.* Ina Druviete; “Macroeconomic Modelling and Latvian Macro-econometric Model’s Development” by LAS Corresponding Member *Dr.habil.oec.* Remigijs Počs; “Innovation and Promotion of Research in Europe and Latvia” by LAS Corresponding Member *Dr.habil.oec.* Inna Šteinbuka; “Latvian War of Independence 1918–1920: Known, Forgotten, Unknown” by *Dr.hist.* Ēriks Jēkabsons; “Can We Guess what Others Think?” by *Dr.psych.* Ivars Austers.

9 November — a joint meeting with the LAS Division of Physical and Technical Sciences was organised on the topic “Machine Translation Problems and Solutions”. The programme of the meeting included: report on “Mathematical, Quantitative and Computer-Linguistics in Latvia from the 1960s to 1990s” by LAS Doctor *honoris causa*, *Dr.philol.* Sarma Kļaviņa; report on “Latvian Language in the Digital Age — from Research to Applications” by *Dr.sc.comp.* Inguna Skadiņa, *Dr.sc.comp.* Normunds Grūzītis, *Dr.sc.comp.* Raivis Skadiņš, and *Dr.sc.comp.* Andrejs Vasiļjevs.

Other undertakings of the Division

LAS administers two state research programmes – Letonika (Letonics – History of Latvia, Languages, Culture, Values) and EKOSOC-LV (Economic Transformation, Smart Growth, Governance, and Legal Framework for the State and Society for Sustainable Development — a New Approach to the Creation of a Sustainable Learning Community). In these programmes many of the project leaders are members of the DHSS.

In 2016, the Division launched a new form of action — public evaluation by independent expert councils who discussed the current social problems. The council has four fundamental groups of participants: representatives of the public authorities who inform the experts about the official position regarding the discussed issue and give competent answers to questions raised by experts; experts who comprehensively analyse the discussed issue; representatives of the media who inform the society about the discussion; interested people who want to listen the discussion on the spot. The results of the discussion are prepared as a kind of the Minutes of Council's Conclusion and disseminated within the public authorities, experts themselves, and media, as well as published in the newspaper *Zinātnes Vēstnesis* (Science Bulletin).

10 February – the Division organised the expert council on “Openly About the Gas Market Liberalisation in Latvia”. The aim of the council was to understand the benefits and risks from the liberalisation (release) of the natural gas market. The topic of the council was proposed by the contradictory statements of the process facilitators in mass media — managers and specialists from the Ministry of Economics of Latvia, and their seeming secrecy regarding important aspects of the liberalised gas market.

28 April — the Division organised the expert council on “Latvian Integration Policy: Continuation of the Current Form or Creation of a Conceptually New One”. The aim of the council was to understand if the implemented integration policy in Latvia's society is comprehensive and effective and whether it contributes to a cohesive society.

10 May — in cooperation with the National Library of Latvia the Division organised the expert council “National Encyclopaedia (NE), the Nature and Pace of Writing”. The council took place in the premises of the National Library of Latvia. The aim of the council was to understand the conception of the NE, the achieved progress, quality criteria and assurance mechanisms, the results expected and their compliance with the expectations of Latvian society about the National Encyclopaedia.

1 June — the Division organised an event “An afternoon with the Director Dzintra Geka and Composer Pēteris Vasks”. The audience watched the documentary film “Fathers There” (“Tēvi Tur”) by Director Dzintra Geka, composer Pēteris Vasks. At the end of event there were a discussion with Dzintra Geka and Pēteris Vasks.

20 June — the Division organised an event “Midsummer welcome”, within the framework of which No. 1 “Aspects of Sacrality and Challenges of the 21st Century” of the journal *Latvijas Zinātņu Akadēmijas Vēstis, A daļa* and *Proceedings of the 14th Baltic Intellectual Cooperation Conference* were opened.

14 July — the Division organised a business trip to the Administration Centre of JSC “Latvijas Gāze” at Vagonu Street, where participants listened to the reports about the company by Adrians Dāvis and Aigars Kalvītis, and visited Administration Centre of JSC “Latvijas Gāze”. Afterwards they visited the Dispatcher Centre and the Gas Storage Facility “Inčukalns” of JSC “Latvijas Gāze”.

19 December — the LAS held a traditional Christmas event that was officially opened by President of the LAS Ojārs Spārtis. At the event the audience listened to the speeches of the Latvian Evangelical Lutheran Church Archbishop Jānis Vanags and Rīga Archdiocese Archbishop – Metropolitan, LAS Honorary Member Zbigņevs Stankevičs. Afterwards, the newly elected members of LAS received diplomas. The event saw participation of the free will folk ensemble “Strong Wives”.

20 December — Division members visited the exhibition “Taste of Colours” in Dubulti created by artist, LAS Honorary Member Džemma Skulme.

21 December — Head of the Division Raita Karnīte organised a council “Causes of European Civilisation Crisis and Possible Solutions to the Crisis”. The aim of the council was to understand the causes of the crisis of civilisation, further procedure and solutions for limiting the undesirable consequences.

Exhibitions organised by the Division

12 January — interested persons were invited to visit and be present at the opening event of the illustration exhibition of the academic edition *Latvian Folk Songs* named “Similarity” by artist Dainis Rožkalns. Both the artist and the preparer of the academic edition of folk songs and representative of Latvian Folklore Repository Baiba Krogzeme invited to perceive the presented collection not as an art exhibition, but instead, as a meditation on the ethical and aesthetic content and values of the Latvian folk songs.

16 February — the Division opened the research project exhibition of LAS members.

19 May — the poster exhibition was opened which showed the research carried out by the most successful women in science who received L’Oréal grant “Women in Science” with support of the Latvian National Commission UNESCO and LAS.

14 June — the Division opened the commemorative exhibition “Pastel Shades” devoted to painter Jānis Zemītis (1940–2008). Painter’s wife Silvija Zemīte said that “pastel was a favourite technique of the artist. He had the ability to spot nice places in his neighbourhood, sometimes maybe plain-looking, which people pass by every day, but seeing is reflected in a pastel painting can be surprisingly appealing. Probably it is this ability to see ordinary things in an extraordinary way that makes a person an artist”.

5 August — the Division put up a photo exhibition “Mārtiņš Buclers — 150”. Exhibition was officially opened on September 13.

8 November — the Division opened the exhibition of paintings “World Cities”, by LAS Honorary Member Aleksejs Naumovs.

Awards

On 21 April 2016, the Turība University, within the Year Award “Freedom. Ingestion. Competence”, for the first time granted the title of Doctor *honoris causa* to the former President of Latvia, LAS Full Member **Vaira Viķe-Freiberga**, and Honorary Professor’s title that was also awarded for the first time to the Director of the Institute of Latvian History at the Latvian University, LAS Full Member **Guntis Zemītis**.

On 11 July 2016, in the Academic Library of the University of Latvia, medals issued by Ivane Javakhishvili, Tbilisi State University, were awarded to LAS full members **Baiba Rivža**, **Raita Karnīte**, **Tālav Jundzis**, **Guntis Zemītis**, and LAS Doctor *honoris causa* **Venta Kocere**, as well as Ambassador of Georgia to the Republic of Latvia **Teimuraz Janjalia**.

On 12 October 2016, the Chapter of Orders decided to grant the IV Class Cross of Recognition to professor of Faculty of Engineering Economics and Management of Rīga Technical University, LAS Corresponding Member **Konstantīns Didenko**, for particular merit to the State of Latvia, and was appointed as an Officer of the Order.

Cooperation with the journal Latvijas Zinātņu Akadēmijas Vēstis, A daļa

In 2016, Head of the LAS Division of Humanities and Social Sciences, LAS Full Member Raita Karnīte was appointed as the editor-in-chief of the journal *Latvijas Zinātņu Akadēmijas Vēstis, A daļa*. In 2016, the journal was included in the CEJSH database (the Central European Journal of Social Sciences and Humanities).

Cooperation with local authorities

In 2016, a compilation of research articles *Cultural and Historical Sources and Mālpils Municipality* (Mālpils: Mālpils novada dome; Zinātne, 2016, 432 pp.), edited by LAS Full Member Saulvedis Cimermanis, was published. The preparation of the book was financed by Mālpils local government. The book is part of the regular book series “Letonics Library” issued under the supervision and of the LAS. The launch of the book is marked with the scientific conference held in Mālpils in 2013. The book describes the cognitive sources of Latvian regions, the life style and working methods of Latvian peasants, their interaction with the German manor culture, the contributors to the country’s culture, art, and other fields.

Regular activities (commemoration weeks, exhibitions), aimed at remembrance of the famous painter, LAS Honorary Member Jāzeps Pīgoznis, were held in Latgale (the eastern part of Latvia).

Gifts and gratitude

The Division thanks the Institute of Philosophy and Sociology, UL (LAS Full Member Maija Kūle), the Institute of Latvian History, UL (LAS Full Member Guntis Zemītis), the Latvian Language Institute, UL (LAS Full Member Ilga Jansone), the National Library of Latvia (LAS Honorary Member Andris Vilks), the Latvian Academic Library (LAS Doctor *honoris causa* Venta Kocere), the Institute of Art History, Latvian Academy of Art, the Institute of Literature, Folklore, and Art, UL, the management and staff of JSC “Latvian Gas”, members of the LAS and research institutions, for their participation and support to the Division’s activities.

The Division is grateful for the gifts received from its members and partners:

- the book *Manor Phases of Epochs. 1900–1939* (Tukums: Museum of Tukums, 2016, 200 pp.), from LAS Doctor *honoris causa* Inta Dišlere;
- the book *Magical Realism of Jānis Streičs* (Rīga: Dienas Grāmata, 2016, 493 pp.) by Daira Āboliņa, from LAS Honorary Member Jānis Streičs;
- the book *Cultural Sources and Mālpils Municipality* (Mālpils: Mālpils municipality council; Zinātne, 2016, 432 pp.), from LAS Full Member Saulvedis Cimermanis;
- the book *Sacrificial Cave by the Livs of Svētupe* (Jelgava: Nordik, 2016, 216 pp.), compiled by LAS Corresponding Member Sandis Laime, from LAS Full Member Juris Urtāns;
- the book *13th–15th Century Population of Ikšķile* (Rīga: Zinātne, 2016, 136 pp.), from LAS Corresponding Member Gunita Zariņa;
- the scientific collection *Gender Construction. Volume IV* (Rēzekne: Avens, 2016, 232 pp.), compiled together with Ingus Baranovskis and Vladislavs Malahovskis, from Eva Eglāja-Kristsonsone;
- the book *Under the Dome of the LCP. Insight into the Zig-zags of the Latvian Communist Party (1945–1991)* (Rīga: Jumava, 2016, 184 pp.), from journalist Voldemārs Hermanis;
- the monograph *The Economic Crisis in Latvia: Aftertaste of Success* (Rīga: Rīga Stradiņš University, 2016, 225 pp.) presenting the results achieved by the researchers of the Rīga Stradiņš University from 2013 to 2015 in the study “Overcoming the Crisis in Latvia: Economic, Social, and Communication Aspects”, from Sergejs Kruks, professor of the Department of Communication Studies, Rīga Stradiņš University;
- the monograph *Improving of the Competitiveness of Latvian Industrial Enterprises on the Market of the People’s Republic of China* (Rīga: University of Latvia, 2016, 165 pp.), co-authors Roberts Škapars and Daina Šķiltere, from Aldis Bulis, representative of the Association of Latvian Young Scientists;

- the monograph *Nationalism Ideology and its Manifestations in Latvia* by Vilnis Zariņš (Rīga: Institute of Philosophy and Sociology, UL, 2016, XII, 266 pp.), from the Institute of Philosophy and Sociology of the UL;
- the monograph *Architecture of Rīga and Urban Development in the Second Half of the 17th Century* (Rīga: Institute of Art History, Art Academy of Latvia; Art History Research Support Foundation, 2016, 447 pp.), by Anna Ancāne, from the Institute of Art History, Art Academy of Latvia;
- the book *Latvian Art History. Vol. V: Period of Classical Modernism and Traditionalism. 1915–1940* (Rīga: Institute of Art History, Latvian Academy of Arts 2016, 694 p.) from the Institute of Art History, Art Academy of Latvia.

We express our special thanks to artists who delighted people of the LAS and visitors with their work and presence.

The Division thanks all colleagues for their cooperation and support.

Chair of the DHSS *Raita Karnīte*
Scientific secretary *Līva Griņeviča*

Turaida Museum Reserve — Outstanding in Humanitarian and Social Sciences in 2016

What is the Turaida Museum Reserve

The Turaida Museum Reserve is a Specially Protected Cultural Monument established in the Historical Centre of Turaida, on the basis of the Sigulda Local History Museum, by Decree No. 361 of the Council of Ministers of the Latvian SSR, adopted on 4 November 1988, “On the Establishment of the Turaida Museum Reserve.” Its territory of 43.63 ha includes monuments of archaeology, architecture, history, and art revealing the developments over the course of 1000 years, dating back to the 11th century. The museum reserve has been established to encompass the rich environmental, tangible and intangible cultural heritage of the Historical Centre of Turaida.

Operation of the Turaida Museum Reserve is aimed at the maintenance of historical memory, formation of public view and purposeful acquisition of the museum reserve’s collection by studying and documenting the nature and cultural environment of the Turaida Historical Centre and the region, its monuments, tangible and intangible cultural heritage, developing by means of research an exciting, interesting message about the Historical Centre of Turaida, the history and people of Latvia in the context of European developments enshrined in the environment and the restored buildings–monuments.

Construction of the stone castle of Turaida, the most recognisable object of the Museum Reserve, was started in 1214 on the former site of the wooden stronghold of Kaupo, the leader of Turaida Livs. The Historical Centre of Turaida includes nearly all the elements of cultural and historical centres of Latvia: a hill-fort with the castle, church, cemetery, estate buildings, the centre of collective farm, surrounded by the park, a system of ponds, green areas, roads, paths, trails united by cultural and historical landscape. Each location, each building is marked by stories and historical events reflected in exhibitions. The church building accommodates the exhibition “The History of the Turaida Church and Congregation”, and the estate buildings and their arrangement depict the lives of their inhabitants during 300 years.

Gradual renewal and restoration of the historical buildings of the museum reserve continues. The recent restoration sites include the old living house of the Turaida estate manager with interior exhibition displayed inside. The parish storehouse also has been restored. According to the operation and development strategies of the Turaida Museum Reserve for 2014–2023, public interests require preservation and maintenance of the Historical Centre of Turaida with the characteristic natural, cultural, and historical environment, monuments, tangible and intangible heritage and musealisation of its values.

To accomplish this purpose, restoration and renewal of the House for Peasants liable to corvee, the only clay adobe building of the Turaida estate, was commenced in 2016.

Parallel work is taking place on the transformation of the shed and stable complex into a multifunctional Visitor Centre with a courtyard and separate functioning of the estate building. The preliminary design layout has already been prepared and discussed for restoration/renewal and territorial improvement.

Folk Song Hill (Dainu Hill), established in 1985 with 26 sculptures created by sculptor Indulis Ranka on the subject of Latvian folk-songs, is gradually forming its story as well as the Folk Song Garden established in 1990 where a number of events are held for popularisation of intangible heritage.

Contribution of the Turaida Museum Reserve to society

The importance of the Turaida Museum Reserve in the preservation and popularisation of the cultural heritage in Latvia and abroad is increasing, as well as its role in the national economy. The museum reserve is annually visited by more than 260 thousand local and foreign tourists, thus bringing income for the State and museum's budget. Visitors from different countries help to distribute globally the message about the cultural heritage of Latvia. Increase in the number of visitors of the museum reserve is fostered by cooperation with nearly 90 tourism agencies in Latvia and abroad.

Preservation and opening up of the buildings to the public is only one aspect of activities of the museum reserve. Apart from that, the museum reserve plays a key role in preservation and popularisation of tangible and intangible cultural heritage, history studies, and cultural processes. Anna Jurkāne, Director of the Turaida Museum Reserve and honorary member of the Latvian Academy of Sciences, says that "In the course of years, the activities of the museum staff have been based on studies through the trinity of science, culture, and education. Application of exclusively most advanced technologies as key support tool only adds varnish to exhibitions. No gratifying results can be achieved without research work in the museum and thoroughly considered exhibition content rooted in scientific work."

Preservation and popularisation of the cultural heritage

Priorities of the museum reserve include protection and preservation of the cultural and natural heritage in the Historical Centre of Turaida as well as popularisation of general human values and Latvian wisdom and experience of life, and education of society through the cultural and natural heritage of the region and Historical Centre of Turaida accumulated during the past millennium.

Understanding of the essence of general human values is crucial. The ten key values selected by the museum reserve and based mainly on the value system and worldview reflected in folk-songs are equally alive among the nation as the core of Latvian culture.

They include: language, family, freedom, life, morality/ecology, love, belief, dignity, nature, and identity.

Popularisation of Latvian folk-songs and traditional culture at Folk Song Hill; organisation of Latvian annual custom celebration, in particular Summer Solstice; promotion of Latvian traditions, customs, and rituals; the provision of the venue for the International Folklore Festival “BALTICA”; popularisation of the story about the Rose of Turaida; upholding of the wedding traditions; and presentation of ancient crafts in collaboration with a smith are the most popular activities pursued by the Turaida Museum Reserve in the field of preservation of intangible cultural heritage. At the 17th Scientific Conference of the Turaida Museum Reserve, the Director Anna Jurkāne emphasised that intangible cultural heritage is composed of knowledge, skills, values, and behavioural patterns inherited from generation to generation, including verbal traditions and patterns, play arts, customs, rituals, celebrations; knowledge of nature and the Universe, and the traditional craft skills, as well as the related tools, artefacts, and cultural space — historical places and population centres.

Research activities

The key research topics are derived from the five complexes of the Historical Centre of Turaida: Folk Song Park, the Gauja Livs, the Turaida Stone Castle, the Church Hill, and the Economic Centre of the Turaida estate.

Seven key research topics shall be pursued by the museum reserve in the development period of 2014–2023: *Spiritual heritage, role of the wisdom of life and religion in human life: the Gauja Livs in the cultural history of Latvia; the Turaida Castle — medieval cultural heritage; the Turaida estate — 300 years in the history of Latvia; landscape and cultural environment of the Historical Centre of Turaida; the Turaida Museum Reserve throughout space and time; heritage of the recent past.*

The research work shall be aimed at identifying the cultural heritage of the historical centre, historical developments in the context of developments in Latvia and worldwide, and at substantiating restoration of monuments, cultural environment, organisation of permanent and temporary exhibitions, educational programmes, guided tours, and multiform communication with society. The museum is also attracting specialists from other research and cultural institutions to cover the relevant topics in good quality of research work.

Findings also occur in the process of restoration work. In 2016, for example, a specific approach to construction was identified upon exposure of the foundations of the House of Peasants Liable to Corvee: two round timber beams had been placed parallel to each other under the foundations. Such an approach was most probably preferred because of the sandy, springs-perforated soil in Turaida. Boulders were laid on the beams without any binder, followed by stones fastened together with lime mortar, and

clay adobe building was constructed above them. Dendrochronological analysis of the foundation beams shall be made to determine the exact time of their cutting which most probably coincides with the beginning of the construction works of the building. No similar construction approach has been found in any other buildings of the Turaida estate.

Exhibitions

The Turaida Museum Reserve displays over 40 indoor and open-air exhibitions during the summer season. New exhibitions are created every year. They combine traditional and contemporary methods and application of digital technologies.

The centenary of Latvia shall be marked by exhibition “Spiritual Awakening and Civil Awareness in the 19th Century and its Impact on the Foundation of the State of Latvia in Early 20th Century” in the House of Peasants Liable to Corvee in the form of narration about the foundation of the State of Latvia in 1918. The content of exhibition is based on the historical themes continuously studied at the museum: *peasant liable to corvee, landlord, citizen and the Turaida estate – 300 years in the history of Latvia*. The exhibition is intended to cover the period from the abolition of serfdom in Vidzeme, in 1819, till the enactment of the Agrarian Reform Law of the Republic of Latvia, in 1920.

The design and multimedia concept of the exhibition present an exciting manner of displaying the liberation of peasants in Vidzeme in 1819, formation of an educated middle class in the second half of 19th century, and fate of the nation during the First World War, as well as other themes. Anna Jurkāne, Director of the Museum Reserve, is the author of exhibition concept, and the scientific concept is developed by Vija Stikāne, Deputy Director for Scientific Affairs, and Edgars Ceske, Chief Specialist of the Museum Reserve.

The following exhibitions have been designed and held at the Museum Reserve in 2016: “On the Way to the State of Latvia”, “The Turaida Museum Reserve through Time and Space”, “The Swiss House of the Turaida Estate”, “150th Birthday of Mārtiņš Buclers. Lifelong Commitment to Photography”, “Annual Celebrations in Turaida”, “Preservation of the intangible cultural heritage in the Turaida Museum Reserve”, exhibition of the collection “The Anatomy of Doors”, exhibition of digital photo art “Door. The Beginning”.

Publishing of the research results

Scientific processing of the museum reserve’s collection and publishing of collection catalogue present a major part of work. The stock is formed of 53 collections including the objects excavated on Turaida hill-fort. Research work conducted at the museum

reserve has resulted in recent years in several catalogues of the collections: in 2012, the catalogue *The Krimulda's Ragana Hoard*; in 2013, the catalogue *Stove Tile Ceramics of the Turaida Castle, 16th–18th Centuries*; in 2015, *Building Ceramics of the Turaida Castle in the 13th–17th Centuries*; and *Baltic and Baltic Finnic Antiquities in the collection of the Turaida Museum Reserve*. The catalogue *Coins Unearthed in the Archaeological Excavations at Turaida Castle. 2nd, 11th–19th Centuries* has been published in 2016 in collaboration with numismatist Tatjana Berga. The Catalogue consists of two parts — the paper “Coins Unearthed in the Archaeological Excavations at Turaida Castle” as well as the coin catalogue with photographs and figure captions. It provides information about 238 coins including 230 coins excavated in the territory of hill-fort and two hoards found on the slopes of hill-fort with 12 and 23 coins, respectively. The museum reserve ensures periodic publishing of materials from national and international conferences.

A special *David's Book of Stories and Games of Turaida Castle* for the youngest visitors of the museum has been compiled by the museum reserve in 2016 to encourage their interest in history, including stories about history of the castle, games and riddles that foster the drive for cognition, develop reading and writing skills, and narrate about the Turaida Castle and the exhibitions and objects there. The book was presented on 7 August 2016 as part of the event “Children’s Day in the Castle – Ancient Coins”.

Seminars and conferences

The museum reserve has developed a vast cooperation network with various cultural heritage research and protection institutions and non-governmental organisations towards promotion of the protection of heritage values in a wider sense. The Museum Reserve collaborates with the State Inspection for Heritage Protection, Society for Protection of Natural and Cultural Heritage, the Institute of Latvian History at the University of Latvia, Vidzeme Tourism Association, the Association of Latvian Castles and Estates, the Foundation “Māras loks”, and others. Conferences and seminars are arranged not only for discussion of issues but also for developing proposals. On 12 September 2016, for example, a seminar “Heritage Landscape of Latvia” has been organised by the State Inspection for Heritage Protection of Latvia in collaboration with the French Institute in Latvia and the museum reserve as a part of European Heritage Days and adopted a resolution as a result of that seminar. Participants of the seminar agreed on 12 common positions as basis for amendments to regulatory acts, development of guidelines for development and preservation of territories and research and cooperation projects with the view to draw attention to the protection and quality of heritage landscape.

On 20 October 2016, the museum reserve arranged the seminar “Intangible Cultural Heritage — the Added Value of Tourism Product” in collaboration with Vidzeme Tourism Association. It formed as part of the CHRISTA (Culture and Heritage for Responsible,

Innovative and Sustainable Tourism Actions) project. The role of cultural heritage and its importance for development of tourism product offer was discussed at the seminar.

Scientific practical conferences organised at the Turaida Museum Reserve every spring and autumn are devoted to discussion of cultural heritage, history studies, and topical issues in the work of museum.

Awards and appreciations

In 2016, the Turaida Museum Reserve was awarded the first prize at the European competition “Sustainable Culture Tourism Destination 2016” for preservation and popularisation of intangible cultural heritage. It was arranged by the European Cultural Tourism Network. The conjunctive topic of the competition was tourism and intangible cultural heritage. It brought together 23 applicants from 9 European countries. The Turaida Museum Reserve applied to the competition by over 35 years long contribution to preservation of intangible cultural heritage. The award was presented in Guimaraes, Portugal, on 23 September as a part of the 9th International Cultural Tourism Conference “Intangible Heritage: Incomparable Asset for Sustainable and Responsible Tourism Development”.

The Ministry of Culture of the Republic of Latvia has conferred the Award for Excellence in Culture 2016 and monetary bonus (EUR 7000) to the Turaida Museum Reserve for the first prize won at the ECTN competition that crowns the continuous, diligent, and systematic work on the preservation, studies, and popularisation of intangible cultural heritage — traditions and skills, thus developing Turaida into one the most popular and favourite destinations of national and international tourism.

Future visions of the Turaida Museum Reserve

The success story of the Turaida Museum Reserve is based on fair, selfless, creative day-to-day work of its staff. Each and every staff member under the leadership of Anna Jurkāne, Director of the Museum Reserve, perform their duties devoting the most of their inventive and creative abilities to the development of museum day after day, month after month, and year after year, each at their place: managers and administrative personnel, education and communication specialists, history researchers and archaeologists. Well-weighed decisions and innovations introduced in the understanding of goals, strategies and methods and organisation of the work contribute to effective operation of the museum reserve.

The Turaida Museum Reserve is a memory institution responsible for storing tangible as well as intangible cultural heritage: data, information, knowledge, and material evidence; it provides access to facts and events in human life during a certain period as well as the experience of other generations. The staff of the Turaida Museum

Reserve believe their museum to constitute unique formation — the storage of heritage memory, since the memory is stored there in the form of objects. Acquisition of objects for the museum's collection requires understanding of the values or even ideals characterised and symbolised by the exhibits. Thanks to research work carried out by the museum staff, the whole set of data that characterise the man-made tangible and intangible value of any object is assessed before this object becomes a museum value. The material world means materialisation of human thoughts, their spiritual activity in the environment and objects. Things and objects created by humans have helped them to provide their existence in most various conditions. A museum exhibit may be described as unique value, historical value, antique value; a single object can personify events of national importance; it may have memorial as well as social and economic value and numerous other qualities the recognition and evaluation of which requires special knowledge. It is therefore crucial to recognise, document, collect data and information about items, their history and the general heritage qualities.

Based on human experience, museums since their very opening demonstrate to the community the values that are venerable and significant in the life of the nation, state, and people. A museum created in memory of specific event, fact, or personality is the highest degree of appreciation. It can also be observed that thinking, reasoning, and analysing gains increasing importance in the field of culture as well as preservation of natural and cultural heritage that forms grounds for creative expressions and adds harmony and concordance to human lives.

Along with preservation and maintenance of natural, tangible, and intangible cultural heritage, the key operational tasks of the Turaida Museum Reserve include musealisation of natural and cultural heritage of the Historical Centre of Turaida and development of open-air exhibitions in the whole territory. Musealisation of heritage means the result of human endeavours to preserve the elements of reality that personify and serve as evidence to the cultural values the society seeks to preserve. The whole territory of the Specially Protected Cultural Monument constitutes a museum, an exhibition.

The key principles and guidelines adopted ten years ago for development of operation and development content of the museum reserve, and for preservation of tangible and intangible cultural heritage, as well as the model of organisational scheme of the focused work of museum are time-proven and remain constant. Organisational scheme of the focused work starts from research because research work is an inseparable part of successful operation of the museum reserve as a cultural heritage institution. It is followed by replenishing of stock, restoration of monuments, and development of cultural environment, and then by creation of exhibitions, educative work, and visitor-focused work.

The conceptual vision of the museum reserve for the new stage of work is focused on people and the key values of their existence, the principles of existence that have

enabled the continuation of human society throughout centuries. This will be the topic of exhibitions scheduled for the following years.

The Director Anna Jurkāne addressed the personnel on the New Year's Eve, before the implementation of the new development concept: "The new stage of our work is related to both the eternal and the changeable." The focused, innovative style of work and future vision of the museum staff helps to assure the sponsors of museum that their contribution would be efficiently applied to increase the cultural wealth of Latvia and bring benefit to the Latvian nation.

Chair of the DHSS *Raita Karnīte*

DIVISION OF AGRICULTURE AND FORESTRY SCIENCES

Akadēmijas laukums 1, Rīga, LV 1050, Latvia

Tel.: (371) 67223448 Fax: (371) 67821153

E-mail: lmzn@lza.lv

Board of the Division

Chair of the Division Baiba RIVŽA

Deputy Chair of the Division Bruno ANDERSONS

Scientific Secretary Viktorija ZAIĻŪKSNE

Board members

Aleksandrs JEMEĻJANOVŠ, Īzaks RAŠALS

The Division currently unites 33 LAS members, among them 9 full, 2 honorary, 3 foreign, and 19 corresponding members. In its activities the Division has involved 1 Doctor *honoris causa*.

MEMBERS OF THE DIVISION AND THEIR FIELD OF
SPECIALISATION

**Agriculture and Processing
Technologies**

Aleksandrs Jemeljanovs, full mem.

Edīte Kaufmane, full mem.

Aldis Kārkliņš, full mem.

Ina Alsiņa, cor.mem.

Biruta Bankina, cor.mem.

Edīte Birģele, cor.mem.

Inga Ciproviča, cor.mem.

Zinta Gaile, cor.mem.

Daina Kārkliņa, cor.mem.

Dalija Segliņa, cor.mem.

Ilze Skrabule, cor.mem.

Juris Skujāns, cor.mem.

Jānis Latvietis, hon.mem.

Sandra Muišniece-Brasava cor.mem.

Zenonas Dabkevičius, for.mem.

Biology and Biotechnology

Īzaks Rašals, full mem.

Economics

Arnis Kalniņš, full mem.

Oļģerts Krastiņš, full mem.

Baiba Rivža, full mem.

Irina Pilvere, cor.mem.

Vladimirs Gusakovs, for.mem.

**Forestry Science and Wood
Technologies**

Bruno Andersons, full mem.

Nikolajs Vederņikovs, full mem.

Tatjana Dižbite, cor.mem.

Tālis Gaitnieks, cor.mem.

Āris Jansons, cor.mem.

Imants Liepa, cor.mem.

Dainis Edgars Ruņģis, cor.mem.

Pēteris Zālītis, cor.mem.

Aivars Žūriņš, cor.mem.

Oscar Faix, for.mem.

Uģis Cābulis, cor.mem.

Art

Arta Dumpe, hon.mem.

Division of Agriculture and Forestry Sciences

The Division's activity was organised based on a letter of intent signed on 17 February 2016 among the Latvian Academy of Sciences (hereinafter the LAS), the Latvian Academy of Agricultural and Forestry Sciences (hereinafter the LAAFS), and the Ministry of Agriculture (hereinafter the MoA).

The letter of intent provides for cooperation in the exchange of information on higher education and science matters among the MoA, the LAS, and the LAAFS; cooperation in the development of recommendations for policy makers regarding enhancements 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 preparation of new scientists in the fields within the competence of MoA; cooperation in the organisation of young scientist contests in agricultural sciences; cooperation in providing assistance in the organisation of the harvest festival "Vecauce – 2016"; cooperation in evaluating scientific works submitted to the contest "Sējējs" (Sower) of the MoA in the section "Science for Rural Development"; international cooperation and cooperation in holding annual surveys of institutes of agricultural and forestry sciences.

In 2016, the LAS Division of Agricultural and Forestry Sciences cooperated with the MoA of the Republic of Latvia, the Latvian Academy of Agricultural and Forestry Sciences, the Council of Directors of Latvian Scientific Agricultural Institutions (CDLSAI), the Latvian Agricultural Organisation Cooperation Council (LAOCC), the Nordic Association of Agricultural Scientists, the Union of European Academies for Sciences applied to Agriculture, Food, and Nature (UEAA) and other institutions.

19 January — a scientific and practical seminar dedicated to the scientific heritage of Professor Ervids Grinovskis, "Innovation: Theory and Practice" at the Faculty of Economics and Social Development, Latvia University of Agriculture (LUA). LAS Full



Minister of Agriculture Jānis Dūklavs, Secretary of State of the Ministry of Agriculture Dace Lucaua, Chair of the LAS DAFS Baiba Rivža, LAS President Ojārs Spārītis. *Photo by K. Funts (MoA)*

Member Baiba Rivža familiarised the participants with the achievements made at Stage 2 of the National Research Programme EKOSOC-LV and the contribution to social innovation as well as plans for Stage 3 of the research. The head of the LUA Technology and Knowledge Transfer Department, Sandra Muižniece-Brasava, made a presentation about knowledge transfer practices and the resources available to LUA for this process. LUA researcher Ilga Gedroviča presented the best success stories that were possible due to cooperation between food technology scientists and entrepreneurs.

25–26 February — the conference “Balanced Agriculture”, in cooperation with the LUA Faculty of Agriculture, the Association of Latvian Agronomists, and the LAAFS. The purpose of the conference was to popularise the latest scientific achievements and practical experience and exchange ideas about sustainable management in the rural areas of Latvia. The plenary session of the conference was moderated by LAS Full Member, LUA Professor Aldis Kārklīš.

10 March — a meeting of the Council of Directors of Latvian Scientific Agricultural Institutions was held in Dobele at the LUA Institute of Horticulture, in which the president of the LAS, LAS Full Member Ojārs Spārītis and the Chair of the Division of Agricultural and Forestry Sciences (DAFS), LAS Full Member Baiba Rivža participated. In his address, the president encouraged scientists to actively familiarise entrepreneurs with their findings. In this respect, the LAS is ready to become a bridge of cooperation between scientists and entrepreneurs. LAS Full Member Baiba Rivža introduced the participants to the content of the Letter of Intent that was signed by the MoA of the Republic of Latvia, the LAS, and the LAAFS, as well as the nearest scientific work contests, and encouraged them to participate in the contests as well as request doctoral students and new doctors of science to take part.

22 April – 14 June — expositions of field and laboratory experiments were held according to the schedule for 2016; members of the LAS DAFS participated in the expositions and evaluated the institutions exhibiting their experimental results. The winners in 2016 were the Research Centre Ulbroka of the Faculty of Engineering, LUA, and the LUA Institute of Horticulture.

28 September — an international forestry conference “Forestry Industry for the Bioeconomy: Opportunities and Challenges in the Century of Climate Change” was held at the Centre of Architecture and Media H2O, Riga. To define more accurately the potential way of development for the forest industry of Latvia and to gain new ideas, high-level experts from Sweden and Finland made presentations on the latest trends in management in the forest industry as well as recognised specialists from Estonia and Latvia shared their experience and conclusions. Both foreign and national experts outlined opportunities for the forestry sector in sustainable economic growth, stressing the need for effective land management. At the same time, the latest experience in wood processing and application was analysed and simulated, especially highlighting the

renaissance of modern wooden construction in the world. A considerable contribution to the conference was made by the forestry scientists of the LAS DAFS.

26–29 September — a meeting of the 3rd section of agronomy and physiology was held in Riga, in which LAS Full Member Baiba Rivža participated and made an address. In the meeting, LAS Corresponding Member Ilze Skrabule, a researcher of the Priekule Research Centre, presented a report “Research on Potato in Latvia”.

28 October — a commemorative event dedicated to Jānis Lielmanis at the Institute of Agricultural Resources and Economics of the Stende Research Centre. Commemorating the 100th anniversary of the long-term head of the Institute, famous breeder and agronomist Jānis Lielmanis (1895–1970), the LAS DAFS, the LAAFS, and LUA Research Institute of Agriculture and Institute of Agricultural Resources and Economics honoured the lifelong work done by *Dr.agr.* Gaļina Kaļiņina. Gaļina Kaļiņina dedicated twenty-seven years of her life to selection of barley. She was a co-author of eight barley varieties, including the varieties grown today: ‘Ansis’, ‘Druvis’, ‘Kristaps’, and ‘Austris’.

Within international cooperation activities, LAS Full Member Baiba Rivža, as a co-author, participated in the development of a conception for the circular economy managed by the European Academies Science Advisory Council. Two reports were made within this activity: “Indicators for a Circular Economy” and “Priorities for Critical Materials for a Circular Economy”. Both reports were presented in Brussels on **30 November 2016**.

Within cooperation with the Union of European Academies for Sciences applied to Agriculture, Food, and Nature, LAS Full Member Baiba Rivža participated in a scientific colloquium with a report “Outcome and Benefits of Scientific Research on Development in Latvia” in Paris.

The Division of Agricultural and Forestry Sciences is the implementer and administrator of the National Research Programme EKOSOC-LV at the Latvian Academy of Sciences. The Programme is managed by LAS Full Member Baiba Rivža.

The LAS DAFS, in cooperation with the LAAFS, implement the following international projects:

- HORIZON 2020 project “Data Driven Dairy Decisions for Farmers” (4D4F). (2016–2019);
- ERA – NET SUMFOREST (“Tackling the Challenges in the Implementation of Sustainable and Multifunctional Forestry through Enhanced Research Coordination for Policy Decisions”) (2014–2016);
- a thematic partnership project of the Swedish Institute “ICE — Innovation Creativity Equality” (2014–2016).

In 2016, the LAS DAFS in cooperation with the LAAFS held meetings of the Division as well as offsite seminars, in which both experienced scientists and new

doctoral and master students associated with agricultural and forestry sciences made their presentations.

The most important activities:

25 January — a joint meeting of the LAS DAFS and the LAAFS presidium. A winner of the Top 10 Scientific Achievements 2015, *Dr.sc.ing.* Ilga Gedrovica, reported at the meeting, explaining the way made by a product from its development at a laboratory to a well-known brand. Ilga Gedrovica familiarised the participants with the products: “Milzu!”, “BEE BITE” and “Garden Snack”, which were developed in cooperation with entrepreneurs and the LUA Technology and Knowledge Transfer Department. LAS Full Member Baiba Rivža acquainted the participants with the activities of the LAS Division of Agricultural and Forestry Sciences and the Latvian Academy of Agricultural and Forestry Sciences in 2015, about the work done within the research project ERANET SUMFOREST and the thematic project of the Swedish Institute “ICE — Innovation Creativity Equality”. She also informed the participants that a new research project “Data Driven Dairy Decisions for Farmers” (4D4F) focusing on dairy farms would be started in April. Latvia is going to participate in the project as a partner country and work on data collection and processing, and to ensure that the project’s results are introduced in dairy farms of Latvia.

29 February — a joint meeting of the LAS DAFS and the LAAFS presidium. *Dr.habil.chem.* Gaļina Teliševa, a winner of the Top 10 Scientific Achievements 2015 reported at the meeting. The scientist familiarised the participants with an innovative process developed at the Latvian State Institute of Wood Chemistry, which involved the pre-processing of plant biomass granules in a microwave field and a further modification of their surface by means of oils of natural origin or used oil products, thereby considerably increasing the energy value of granulated plant biomass and enhancing other consumption characteristics. The agenda of the meeting included voting to express support to the chairwoman of the Division and the nomination of a candidate to the president of the Latvian Academy of Sciences. LAS Full Member Baiba Rivža was nominated as a candidate to the head of the Division by secret ballot. At the meeting, unanimous support was expressed to the current president of the Latvian Academy of Sciences, LAS Full Member Ojārs Spārtis, to continue the work started. The LAS president familiarised the participants with his vision of the further activity of the LAS and the role of the LAS Division of Agricultural and Forestry Sciences in uniting agricultural scientists. The LAS president informed the audience about a call and initiative of the Latvian Chamber of Commerce and Industry (LCCI) to hold an exposition of products being at the stage of development in cooperation with the LAS DAFS aimed at potentially commercialising the products in future.

15 April — the first contact exchange “The Scientist Meets the Entrepreneur” was held for entrepreneurs and agricultural scientists at the hall of the LCCI, which was

organised as an offsite meeting of the Division. In their presentations and conversations, the agricultural scientists familiarised the entrepreneurs with the new technologies, crop varieties, and food processing processes developed at their institutes as well as the products already being on the market. The presentations were made to entrepreneurs who might be potentially interested in introducing the products or technologies in production. LAS Full Member Baiba Rivža acquainted the audience with representatives of LUA institutes. The academician also talked about the consolidation of agricultural research institutions and the large role of Latvia University of Agriculture in raising the scientific capacity of the institutions.

Opportunities for the LUA Technology and Knowledge Transfer Department were presented by its head, *Dr.sc.ing.* Sandra Muižniece-Brasava. As part of cooperation, scientists can offer entrepreneurs to perform theoretical and practical research studies in such sciences or fields as food, forestry, multifunctional agriculture, electrical power, information technologies, sustainable rural development, etc.

The director of the LUA Institute of Horticulture, *Mg.oec., Mg.sc.soc.* Inese Ebele, reported that the institute currently actively cooperated with entrepreneurs, and it was due to the active research work done by LAS Corresponding Member *Dr.biol.* Edīte Kaufmane, LAS Corresponding Member *Dr.sc.ing.* Daliņa Segliņa, and other scientists of the Institute. Cooperation between entrepreneurs and the Institute has yielded already now well-known brand products: juices “Verry Berry”, candied fruits “Rāmkalni”, a series of vitamin-rich products “Mežrozītes.lv”, and other products. The Institute of Agroicultural Resources and Economics which was represented by *Dr.agr.* Arta Kronberga and LAS Corresponding Member *Dr.agr.* Ilze Skrabule, focused on two priorities: breeding of high quality varieties of cereals and development of related products, breeding of varieties of legumes and potatoes, and development of related products. The Institute bred and grew varieties of husk-free barley, wheat and oats, the advantage of which was a possibility to harvest “pure grains” that could be processed into flakes or flour without doing a mechanical husking operation. A leading researcher of the LUA Research Centre Ulbroka, *Dr.sc.ing.* Ādolfs Ruciņš, reported on the centre’s cooperation with the Institute of Physical Energetics. The scientists have jointly developed and patented a technology that allows producing 100% bioethanol. The new technology allows saving energy up to 70% and ensures a continuous bioethanol production process. In view of the fact that Latvia introduced a 5% mandatory admixture of bioethanol to A95 petrol sold at petrol stations in Latvia, this could result in several million EUR savings per year.

2 May — a joint meeting of the LAS DAFS and the LAAFS presidium, in which various organisational issues were discussed in respect to the general meeting of the Division to be held on 10 June and the election of new LAAFS members. The chairman of the executive board of the CDLSAI, *Mg.agr.* Ģedimins Siliņš, introduced the participants to a plan regarding holding an exposition of field and laboratory experiments

in 2016. LAAFS president Baiba Rivža reported on developments in the projects ICE and SUMFOREST and work in the project 4D4F. The latest developments in respect to contests in which members of the LAS DAFS and the LAAFS would participate as judges and organisers were discussed as well. In cooperation with the MoA, ALTUM, and LUA, members of the LAS DAFS participated in the following contests: a contest “Sējējs”, held by the MoA, in the section “Science for Rural Development”, a contest for the prize named after J. Lielmanis, a contest for young scientists “Harvest Festival”, a contest for the prize named after Pauls Lejiņš, held by the LAS and the LAAFS, and a contest for young scientists, held by the LAS.

10 June — the general meeting of the LAAFS was held, in which the members of the LAS DAFS and the LAAFS took part. LAS Full Member Baiba Rivža introduced the participants to the work done by the LAAFS and the LAS DAFS in research and in popularising science, the achievements made during the year, the success and new challenges. At the general meeting, presenters came up with valuable proposals on agriculture, the bioeconomy, forestry, and food production technologies. LUA rector *Dr.oec.* Irina Pilvere reported on opportunities for the development of the bioeconomy in Latvia. The deputy director of Latvian State Forest Research Institute “Silava”, *Dr.silv.* Jurģis Jansons, familiarised the audience with the development of knowledge-based forestry and the work done by Latvian forestry scientists in relation to sustainable forestry. A new LUA doctor of engineering science and a winner of the prize of the LAAFS, LUA, and JSC Development Finance Institution Altum, *Dr.sc.ing.* Laila Vilmane, reported on research on gluten-free flour and its products.

The LAS general secretary, LAS Full Member Andrejs Siliņš, and the foreign member of the LAAFS, Professor Jonas Jasaitis (Siauliai University), made welcome addresses to the participants of the LAAFS general meeting.

29 September — a corresponding member candidate of the LAS, *Dr.sc.ing.* Uģis Cābulis whose scientific activity is associated with the Latvia State Institute of Wood Chemistry, reported at the meeting. The candidate familiarised the audience with his long-term work and achievements in research on polymers from renewable sources. A participant of the LAAFS contest for young scientists “Harvest Festival”, *Mg.agr.* Baiba Lāce, reported on her “Investigation into Pear — Juniper Rust (ier. *Gymnosporangium sabinae* (Dicks.) G. Winter) in Latvia”. A candidate for the Pauls Lejiņš Prize, *Dr.agr.* Dainis Lapiņš, reported as well. The professor presented a set of research works “Opportunities for Scientifically Justified Optimisation Technologies for Field Crops”. Pauls Lejiņš’ Prize is awarded to individual scientists for their fundamental research that has significantly contributed to the development of rural areas in Latvia. The chairperson of the Division, LAS Full Member Baiba Rivža acquainted the audience with plans for a forum “Smart Growth. Challenges and Solutions” to be held under the National Research Programme EKOSOC-LV in the autumn of 2016, as well as the latest developments in the projects ICE, 4D4F, and Sumforest.

31 October — a joint meeting of the LAS DAFS and the LAAFS presidium, in which a candidate for a corresponding member of the LAS, *Dr.sc.ing.* Sandra Muižniece-Brasava, reported on “Contribution of Cooperation between the Latvia University of Agriculture Scientists and Entrepreneurs to the National Economy of Latvia in the Field of Food Production”. A participant of the LAAFS contest for young scientists and doctoral students “Harvest Festival 2016”, *Mg.agr.* Laila Dubova, reported as well. Her research focused on factors determining the productivity of faba beans (*Vicia faba L.*). At the end of the meeting, greetings were made to LAS Full Member Edīte Kaufmane, on her birthday, and to a winner of the MoA contest “Sējējs-2016”, LAS Full Member Baiba Rivža.

28 November — a joint meeting of the LAS DAFS and the LAAFS presidium summarised the work done during the year. Newly elected corresponding members of the LAS — *Dr.sc.ing.* Sandra Muižniece-Brasava and *Dr.sc.ing.* Uģis Cābulis — were greeted in a formal atmosphere. A newly elected foreign member of the Division, *Dr.habil.agr.* Zenonas Dabkevičius, was sent an invitation to visit Latvia and take part in the ceremony of giving LAS diplomas. The meeting had a small exposition of products developed by the LUA Food Technology Faculty and the LUA Institute of Horticulture, which were created in cooperation with entrepreneurs. Among the products, there were the flakes “MILZU!”, the apple chips “Garden Snack”, children puree “Rūdolfš”, the bee bread “BEE BITE”, etc. Participants of a contest jointly held by JSC Development Finance Institution Altum and the LAAFS, young scientists — *Dr.agr.* Līga Vilka and *Mg.* Lāsma Aļeksējeva — whose work was recognised as a considerable contribution to research on rural development, presented their findings.

Dr.agr. Līga Vilka reported on “Cranberry Fruit Rot and its Agents in Latvia”, while *Mg.* Lāsma Aļeksējeva reported on “Innovation Development Potential in Organic Farming in Latvia”. Both reports aroused the interest of the audience and prompted scientific discussion, and the young scientists gave professional and pithy answers to the questions asked by the audience.

Prizes awarded to members of the LAS DAFS

LAS Corresponding Member LLU rector **Irina Pilvere** was awarded an Order of the Three Stars, Class III.

The prize of the MoA “Golden Cone” in the nomination “For Contribution to the Education of the Society” was awarded to a leading researcher of Latvian State Forest Research Institute “Silava”, doctor of forest science, **Jurģis Jansons**.

A winner of a prize at the MoA contest “Sējējs – 2016” in the nomination “Science for the rural development” was LAS Full Member, Professor *Dr.hab.oec.* **Baiba Rivža** (LUA) — for her scientific work and research projects on rural development done during the last years.

The Pauls Lejiņš Prize in agricultural sciences was awarded to Professor of the Faculty of Agriculture, LUA, *Dr.agr.* **Dainis Lapiņš** — for long-term scientific research work and a set of research works “Optimisation Possibilities of Science-Based Agricultural Technologies”.

The Arvīds Kalniņš Prize in forestry, wood research and processing was awarded to *Dr.habil.chem.* **Gaļina Teliševa** for her large contribution to the development of wood science in Latvia and a set of research works “Production of Innovative Products from Lignin, Semi-molecular Polyphenol Compounds and Timber/Wood Processing Waste Containing Polyphenols to Establish a Wood Bio-refinery Chain”.

The LAS Prize for Young Scientists in 2016 was awarded to:

Mg.biol., Mg.silv. **Astra Zajuma** for her research “Susceptibility of *Pinus contorta* var. *latifolia* and *Pinus sylvestris* to *Heterobasidion annosum* sensu lato”, scientific supervisors: *Dr.silv.* Tālis Gaitnieks, *Dr.silv.* Āris Jansons.

The LAS Prize for Young Scientists in 2017 was awarded to:

Mg.oec. **Tatjana Lejava** for her research “Analysis of and Opportunities to Reduce Youth Unemployment in Jelgava City”, scientific supervisor LAS Full Member Baiba Rivža.

Winners of the three top positions in the LAAFS contest “Harvest Festival – 2016”:

Baiba Lāce — “Investigation into Pear — Juniper Rust (ier. *Gymnosporangium sabinae* (Dicks.) G. Winter) in Latvia”, scientific supervisor LAS Corresponding Member, *Dr.biol.* Biruta Bankina; proposed for the contest by the LUA Institute of Horticulture.

Laura Jeroščenkova — “Use of Cultural Heritage in the Development of Rural Tourism”, scientific supervisor LAS Doctor *h.c.*, *Dr.agr.* Voldemārs Strīkis; proposed for the contest by the Institute of Economics and Regional Development of ESAF, LUA.

Laila Dubova — “Assessment of the Effectiveness of the Symbiotic System in Areas under Faba Beans (*Vicia faba* L.)”, scientific supervisor LAS Corresponding Member, *Dr.biol.* Ina Alsiņa; proposed for the contest by the LUA Faculty of Agriculture.

Participants and winners of the contest for young scientists held by JSC Development Finance Institution Altum, the LAAFS, and LUA

Young scientists group:

Līga Vilka, for her doctoral dissertation: “Cranberry Fruit Rot and its Agents in Latvia”

Master degree group:

1st position: **Inga Šarenkova**, research: “Optimisation of the Production of Lactic Acid Concentrate from Milk Whey”

2nd position: **Lāsma Aļeksēja**, research: “Innovation Development Potential in Organic Farming in Latvia”

3rd position: **Katrīna Tihonova**, research: “Analysis of Eco-innovation Capacity in Latvia”

4th position: **Madara Darguža**, research: “Formation of Winter Wheat Yield Depending on the Application of Fungicides”

5th position: **Sintija Krievāne**, research: “Problematic Aspects of Lending to Agriculture in Latvia”

Changes in the staff of the Department

In 2016, new corresponding members were elected to the LAS: *Dr.sc.ing.* Sandra Muižniece-Brasava and *Dr.sc.ing.* Uģis Cābulis, and a foreign member *Dr.habil.agr.* Zenonas Dabkevičius.

Chair of the Division, LAS Full Member *Baiba Rivža*
Scientific secretary *Viktorija Zaļūksne*

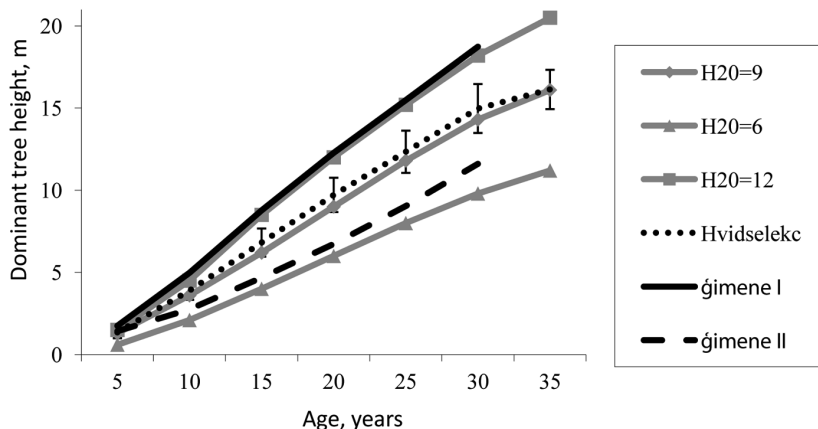
The foundation of future forests: current tree breeding

In Latvia forest tree breeding work began in the 1950s, when the former Forestry Problems and Wood Chemistry Institute established the Forest Breeding Section, whose task was to create a seed collection of the main Latvian tree species. In the first stage of forest breeding, the existing gene pool was surveyed, a forest inventory was undertaken, and superior stands (plus stands) and trees (plus trees) were identified for breeding purposes. Plus trees were selected as the tallest and largest-diameter trees with fast growth and stem quality growing in even-aged stands. Since 1957, plus trees have been selected for pine (~ 1400), spruce (~ 2300), birch (~ 800), as well as oak, linden, common alder, aspen, and hybrid larch. Thus, forest tree breeders had access to reproductive material with high genetic diversity representing high-value trees from all Latvian regions. Plus trees were vegetatively propagated, and the first-generation seed orchards were established. In the second stage of forest breeding, heritability of traits were assessed, as well as geographical differences. Following implementation of progeny testing, the fastest growing and highest quality individuals were designated as superior trees. Superior trees were included in further breeding efforts by controlled crossing and the establishment of next generation seed orchards. The third stage of forest breeding in Latvia started after the restoration of independence in 1990, when the Forest Ministry of the Republic of Latvia was established, which coordinated and funded forest breeding research and forestry activities. At this stage, major efforts were implemented in birch breeding, selecting the majority of plus trees and installing a wide range of progeny tests. The fourth forest breeding stage began in 2000, when “Latvian State Forests” (LVM) created the “Seeds and Plants” unit, dealing with seed and plant production, as well as providing support for the development of forest breeding. In cooperation with the Latvian Forest Research Institute (LSFRI) “Silava”, seed orchard inventories and genetic evaluations were performed.

Seed orchards enable cross-pollination of valuable genotypes and facilitate the collection of seeds. Seed orchards have been established for pine (~ 700 ha), spruce (~ 170 ha), birch (~ 1 ha), as well as small areas of common alder, larch, and oak. The proportion of seed harvested from seed orchards of the total amount used in forest tree nurseries comprises 72% for spruce, 48% for birch, 88% for common alder, and for many decades pine reproductive material is grown almost exclusively from genetically high-quality seeds. In general, seed orchards annually produce more than 40 million seedlings, i.e. more than 80% of the total production of forest reproductive material. Molecular genetic studies have shown that forest tree breeding (use of reproductive material derived from seed orchards) has had minimal to no negative impact on genetic diversity.

The use of forest reproductive material derived from seed orchards provides significant practical benefits for forest owners: the stock exceeds the offspring of forest

stocks by 15–25%, e.g., a higher volume of timber ($\text{m}^3 \text{ha}^{-1}$) can be obtained at harvest age or the target diameter can be achieved in a shorter period of time. For example, target diameter for birch can be achieved in 40 years (for comparison, the rotation period of naturally renewed stands is longer than 70 years). The practical result of forest breeding can most accurately be described by the quality index of stands established using improved reproductive material (Fig. 1), i.e. genotypes, which are characterised by rapid growth, are faster growing throughout the entire observation period, not just one part of it.



H6, H9, H20 — site index classes; ġimene I (Family I) — tree breeding material demonstrating high productivity, that will be included in the selection for propagation and continuous breeding work; ġimene II (Family II) — slow growing genotypes that will not be recommended for propagation or retained in the breeding population

Fig. 1. Growth of different Scots pine genotypes (families — progenies of plus-trees) in progeny trials in comparison to the standardised site index classes curves (data from LSFRI “Silava”).

Research results indicate that the projected impacts of climate change are not expected to reduce the improvement margin of forest breeding, that is, improved material will continue to be more productive and resilient than naturally renewed forest stands. To some extent, this is because the selection of more productive genotypes (e.g. “Family I” in Fig. 1) occurs (will be selected) in similar climatic conditions to those where their offspring will grow, while natural forest renewal will occur from trees that have adapted to the climatic conditions of the past (100–200 years ago), but their descendants might not be adapted to current climatic conditions or even less — to predicted climate changes. It is also important to be aware that the fast growth of trees is dependent on the length of the used growing season and growth rate (mm per

Table 1

Area of established progeny trials, ha

Species	Year of establishment		
	1961–2016	prior to 2013	2014–2016
Scots pine	352	337	14.6
Norway spruce	197	192	524
Birch	160	159	1.42
Hybrid aspen, aspen	28.5	24	4.52
Black alder	25.1	25	0.05
Oak	18.2	17	1.2
Lodgepole pine	11	11	–
Other species	27.2	25	2.2
Total	819	790	29.2

day). In the context of climate change, it is essential to ensure the most efficient use of growth period, which can be achieved by selecting the appropriate breeding material. In order to ensure selection of this material (productive, vital, high quality), large areas of comparative progeny tests have been established, maintained and are periodically surveyed (Table 1).

Branching quality can be assessed in these progeny trials, excluding individuals with progeny having multiple stems from further propagation, and also wood properties can be selected for. In general, it has been determined that forest breeding does not have a negative impact on wood strength, i.e. improved reproductive material will not have lower wood densities than that of natural stands, therefore the timber can be used for construction purposes.

Forest tree breeding has been established as a long-term project in the Latvian Forest Research Institute “Silava”, and is periodically updated and implemented within the Latvian State Forests Programme “Breeding of Economically Important Tree Species (Pine, Spruce, Birch) and Hybrid Aspen”. The obtained results are not only implemented for practical use, but are also disseminated to the wider scientific community via participation in, and the organisation of, international conferences. For example, in recent years, international scientific conferences (attended by scientists from a total of 12 countries): “Genetic Aspects of Adaptation and Mitigations: Forest Health, Quality Wood and Biomass Production” (IUFRO & AdapCAR SNS), “Genetic Variation of Adaptive Traits” were organised. Scientific workshops are organised for Baltic and Nordic university (NOVA-BOVA) graduate students. The Institute’s Forest Breeding and Adaptation Group researchers have published more than 30 articles in international scientific journals over the past three years; a monograph about pine

breeding in Latvia has also been published: Baumanis, I., Jansons, A., Neimane, U. (2014) *Pine. Breeding, Genetics and Seed Production in Latvia*.

In forest breeding, it is important to analyse a wide range of tree characteristics and parameters, therefore research is mostly interdisciplinary and conducted in collaboration with other scientific institutions. For example, as a result of the projects “Forestry Adaptation to Climate Change” and “Importance of Genetic Factors Adaptability and Qualitative Wood Properties of Forest Stands“ a database of projected climate changes in Latvia has been created, including important parameters for forest ecosystems (e.g. length of growing season, drought period frequency and length) and particular aspects of adaptation of forest trees to be used for strategic decision-making. This information can be utilised to develop implementation and risk models (e.g. for development of important tree diseases, prognosis of pest migration and expansion, preparation of detailed fire risk forecasting models). These studies are implemented in collaboration with the Physics and Mathematics, Biology, and Geography and Earth Sciences faculties at the University of Latvia, as well as the Latvian State Institute of Wood Chemistry. Also, cooperation is carried out within the institutional framework of the LSFRI “Silava”, studying the role of genetic factors in the resistance to disease and insects; in collaboration with the Genetic Resource Centre, molecular genetic methods are utilised to investigate a wide range of population and functional genetic aspects of forest tree species.

Forest tree breeding provides a potential opportunity to achieve high yielding stands, however, this potential cannot be realised without the use of appropriate silvicultural methods. Therefore, growth, stem quality, and other quality parameters have been evaluated in different genotypes (trees) in a range of growing conditions. For example, genotype x planting density interactions were analysed within the National Research Programme “Forest and Subsoil Exploration and Sustainable Development — New Products and Technologies”, concluding that lower planting density can have a significant positive effect on tree diameter increments. However, differences between clones remained notable and significant also in the trials with low density and the average value (EUR) of timber of the same age can vary between the clones up to three-fold. This confirms the practical significance of the use of improved breeding material, particularly for plantation forests with short rotation periods, where high productivity from year one is essential.

In recent years, a number of doctoral studies related to forest breeding and adaptation have been completed, ensuring a new generation of forest researchers.

Linards Sisenis “Perspective for Introduction of Lodgepole Pine (*Pinus contorta* Douglas. Can latifolia Engelm.) to Latvia” (*Dr.silv.*). Evaluation of Lodgepole pine provenances (productivity, branching, and wood quality characteristics, resistance to risk factors, suitability for industrial timber or biomass production), in comparison with Scots pine.

Mārtiņš Zeps “Growing Potential of Hybrid Aspen (*Populus tremuloides* Michx. × *Populus tremula* L.) in Latvia” (*Mg.silv.*). The thesis summarises and comprehensively assesses all available information on aspen hybrid clonal breeding in Latvia, clone productivity, quality characteristics and wood properties, describing the meteorological factors influencing growth in the context of predicted climate change, and the recommended clone number (clone area) in plantations, based on genotype prevalence analysis of ordinary aspen stands.

Angelika Voronova “Retrotransposon Structure and Function in the Scots Pine (*Pinus sylvestris* L.) Genome” (*Dr.biol.*). The activation and potential functional significance of retrotransposable elements was investigated. Principal coordinate analysis of IRAP data distinguished individuals growing in environmental gradients. The differential activation of retrotransposon families in response to various stress conditions was determined.

Doctoral thesis development through the implementation of joint research project results has also been done achieved in the collaboration partner institution — Latvian State Institute of Wood Chemistry.

Inese Šāble “Improvement of Wood Fiber Binding Capacity” (*Dr.sc.ing.*). Opportunities for improving the binding capacity of wood fiber of Latvian tree species by mechanical pre-treatment and use of additives extracted from local natural resources were investigated.

Uldis Grīnfelds “Suitability of Latvian Tree Species for Cellulose Sulphate Production” (*Dr.sc.ing.*). Evaluation of the physical properties and main chemical component indicators of various species (pine, spruce, birch, common aspen, hybrid aspen, lodgepole pine) growing in a range of Latvian regions and forest types; correlation between small size sawlogs and cellulose sulphate content.

Overall, the implemented studies can be described as ambitious, practical and of scientific importance, as evidenced by the awards granted by the Ministry of Agriculture “For scientific contribution to development of the industry” to the leading researchers — Arnis Gailis and Āris Jansons as well as their participation in leading scientific organisations: Āris Jansons is a corresponding member of the Latvian Academy of Sciences and a full member of the Latvian Academy of Agricultural and Forestry Sciences.

Dr.silv. Āris Jansons,

LAS corresponding member,

Latvian Forest Research Institute “Silava”

INTERNATIONAL COLLABORATION

In 2016, the Latvian Academy of Sciences (LAS) continued collaboration with other academies of sciences, represented Latvian science in various international organisations and established scientific collaboration with the Baltic States and other countries. The function performed by the LAS, based on contractual agreement with the Ministry of Education and Science (MES), was performed by the LAS Centre for European Programmes and has, as of 3 March 2014, been taken over by the National Education Development Agency, therefore, in 2016, the LAS finished introducing the ERA-NET project in Latvia. The LAS international relations leadership changed on 1 May 2016 with *Dr.habil.sc.pol.*, *Dr.iur.* Tālavš Jundzis becoming the new foreign affairs secretary replacing *Dr.habil.phys.* Andrejs Siliņš.

1. Activities in international scientific organisations

- **ALLEA** (European Federation of Academies of Sciences and Humanities), established in Paris in 1994, unites 58 academies of sciences from more than 40 European countries. A significant aspect of the ALLEA mission is development and enactment of scientific policy in Europe and beyond (www.allea.org);
- **EASAC** (European Academies of Science Advisory Council) — its mission is to promote the recognition and use of scientific achievements in developing EU policy. Its three main areas of activity are environmental sciences, biosciences, and energy (<http://www.easac.org>);
- **ICSU** (International Council for Science), established in 1931, is now comprised of 120 scientific organisations from 140 countries, mainly academies of sciences, and 31 international scientific associations. LAS joined the ICSU in 1992 (<http://www.icsu.org>);
- **UAI** (The Union Académique Internationale) unites more than 60 national academies of sciences worldwide. LAS joined the UAI in 1997 (<http://www.uai-uai.org>);
- **IAP** (The InterAcademy Partnership) — since 2015, unites three global networks: 1) IAP: the global network of science academies; 2) The InterAcademy Medical Panel; 3) The InterAcademy Council (<http://www.interacademies.org>).

ALLEA — European Federation of Academies of Sciences and Humanities — is the most significant party in the development and implementation of European science policy. In 2016, work continued on the EU basic programme “Horizon 2020”, especially as regards the integration of social and humanities sciences into the new programme. Two permanent commissions continued their work in 2016 (intellectual property rights; science and ethics) and work groups that address the issues of (1) education in the natural sciences, (2) humanities sciences, (3) social and humanities sciences. LAS is not

represented in any commissions or work groups because no funding was assigned for these activities. In 2016, LAS representatives participated in the following activities:

- **18–19 April** — President Ojārs Spārītis participated in the ALLEA General Assembly in Vienna. On the first day, the scientific conference “The Freedom of Scientific Research in the Face of Political and Societal Demands” took place. The De Stahl award presentation ceremony took place following the conference. This year’s award was presented to French philosopher Rémi Brague by Johannes Hahn, EU Commissioner for European Neighbourhood Policy and Enlargement Negotiations. The second day was devoted to a closed work session of partner academies with presentation of financial reports and acceptance of the budget for the next financial period.
- **18 July** — the ALLEA Permanent Work Group on Intellectual Property Rights published the report “Patent-Related Aspects of CRISPR-Cas Technology”, and it is concluded that the existing legal regulations are adequate to distribute the report to interested parties in Latvia.
- **25 July** — ALLEA published the report “Science is Global”, with the conclusion that today important problems are global in nature and that international collaboration in research and science would significantly improve access to information and suggestions for resolving these problems.

EASAC — European Academies of Science Advisory Council — works in three broad areas (environmental sciences, biosciences, and energy). Based on their mission of promoting the recognition and use of scientific achievements in the development of EU policy, the EASAC Council meets biannually: in spring and in autumn. Every EASAC Council meeting takes place in the academy of sciences of the country that is to be the presiding country in the EU the following year. In 2016, the LAS participated in the following EASAC activities:

- **13 April** — the European Academies of Science Advisory Council, represented in Latvia by the Latvian Academy of Sciences, published the report “Greenhouse Gas Footprints of Different Oil Feedstocks”. The main theses of the report are reflected in the press release: “European Union legal regulations regarding transportation fuel must take into account the diverse intensity of fuel greenhouse gases which depends on the source of the raw material — signals from the low carbon dioxide emissions market”.
- **17–18 November** — LAS President Ojārs Spārītis participated in the EASAC autumn meeting in London which was organised by the Royal Society of Great Britain. In his opening remarks EASAC President Jos van der Meer stated that the main event that took place between meetings was the signing of a Memorandum of Understanding by academies of sciences of five European countries (*Academia Europea*, ALLEA, EASAC, Euro-CASE, FEAM). EASAC is considered the leader in this association. During the meeting there was discussion of the projects underway

as part of the EASAC Energy Programme: the management of used nuclear fuel, shale gas, accumulation of electricity, balanced use of forests, smart villages, leading technologies, and energy for transportation. The report on the activities of the Joint Research Centre (JRC) was presented by its General Director Vladimír Šucha. Active collaboration is ongoing between the JRC and EASAC, joint reports are being prepared. Environmental and Bioscience programme activities were widely discussed.

- **24 November** — EASAC published the report “Priorities for Critical Materials for a Circular Economy”. It notes that many critically necessary raw materials still have very low recycling indicators, which increases the demand for new materials thus decreasing the materials’ life cycle. EASAC has managed to achieve a general agreement regarding criteria proposed by the EU to be used when compiling the 2017 list of critically necessary raw materials. They emphasise, however, that extraction of rare raw materials significantly affects the environment and must be evaluated very seriously. EASAC points out restrictions regarding available data which would allow the European Commission to define the effect on the environment and risks connected with extraction and processing of the materials, but urges the European Commission to continue its work to develop methodology while evaluating environmental and social considerations outside the European Union as well.
- **24 November** EASAC published the report “Indicators for a Circular Economy”. The report lists the main guidelines for the change from a linear to a circular economy. The main priorities of a circular economy are the separation of resources used in economic activities and those used for the effect of the surrounding environment, thus achieving the efficacy of resource use and the decrease of waste material. The key element of the economy is the flow of material inventory. These basic concepts, however, do not reflect the effect on the environment, raw material acquisition or recycling.

LAS Full Member Baiba Rivža, the leader of the national research programme EKOSOC-LV participated in the development of the concept of a circular economy in the work group led by EASAC. During the second phase of the process, two reports were issued — “Indicators for a Circular Economy” and “Priorities for Critical Materials for a circular economy”.

ICSU — International Council for Science. The year 2016 was significant for Latvia in that:

- **15–16 September** — LAS Foreign Affairs Secretary Tālavš Jundzis represented the LAS at the ICSU European group meeting in Dublin. ICSU planned activities for the period 2018–2023 were discussed along with the pending merger with the International Social Sciences Council (ISSC). The next ICSU European group meeting will take place in Rīga on 11–12 May 2017.

- **24 October** — a special ICSU general assembly meeting took place in Oslo, and the LAS was represented by Foreign Affairs Secretary Tālavš Jundzis. The main purpose of the meeting was to discuss the issue of ICSU and ISSC merging into one organisation. 76.4% of ICSU membership voted for the merger including the three Baltic countries and 79.9% of ISSC members. The vote was a political decision and will be followed by a legally binding vote in October 2017 in Taipei when the practical aspects of the merger will be presented by the merger work group.
- Due to a lack of funding Latvian scientists do not participate in any of the ICSU work groups on major global research programmes.

UAI — Union Académique Internationale. In 2016, like in the previous years, the LAS was not involved in projects supported by the UAI. Since 2013, UAI general assemblies take place biennially, therefore, preparation for the 89th General Assembly of the UAI scheduled for 22–26 October 2017 in Tokyo was begun in 2016.

IAP — The InterAcademy Partnership.

- **28 February – 2 March** — the InterAcademy Partnership was officially established at the IAP General Assembly in South Africa hosted by the South African Academy of Sciences. The Partnership was founded to promote collaboration of academies in the resolution of global problems such as provision of food, climate change, and others.
- **27 September** — IAP published the report “A Call to Action to Improve the Reproducibility of Biomedical Research”. The report discusses the causes of irreproducible results and admits that academies can play a leading role in resolving the problem in their countries as well as worldwide.
- **29 September** — the IAP global medicine sciences academies organised the General Assembly in Peking, the main topic of discussion being the issue of “Promoting Health”.

Inadequate financial resources for international collaboration limits the participation of the LAS in these activities. National academies cover the cost of participation in work groups.

European Scientific Advice Mechanism

13 December — in Brussels, during the meeting of the association of five European academies of sciences (ALLEA, FEAM, EASAC, Academia Europae, and Euro-CASE) and General Director of the European Commission of Research and Innovation, Dr. Robert-Jan Smits, it was announced that the SAPEA (Scientific Advice to Policy by European Academies) project was underway. This project, part of the EU programme “Horizon 2020”, is the beginning of SAM (European Scientific Advice Mechanism), whereby representatives of various areas of science will offer their contribution to

the EU through independent, inter-disciplinary, and evidence-based scientific work. Representatives of more than 100 European academies of sciences will be involved in the project including the Latvian Academies of Sciences as members of ALLEA and EASAC.

UNESCO — United Nations Educational, Scientific, and Cultural Organisation. The LAS has signed an agreement of scientific collaboration with the intergovernmental organisation UNESCO and collaborates with the UNESCO Latvian National Commission (LNC). The LAS representative in the LNC assembly is LAS General Secretary Andrejs Siliņš.

- **22 January** — LAS President Ojārs Spārītis, UNESCO LNC vice president and Minister of Education and Science Mārīte Seile and Jarl Johan Kristian Berg, L'OREAL Baltic General Director, signed a protocol of collaboration at the Latvia Academy of Science regarding the annual competition for the L'OREAL Latvia scholarship “Women in Science”. In 2016, three scholarships were awarded with the support of the UNESCO Latvian National Commission and the Latvian Academy of Sciences. One scholarship for 6000 EUR is for a doctoral student up to 40 years of age for the purpose of continuing her research, the other two, for doctoral students up to 33 years of age as dissertation support.
- **10 October** — UNESCO published a scientific overview *UNESCO Science Report: Towards 2030*. This overview, for the first time, provides a more in-depth look at data accumulated from 2009 to the middle of 2015 and places emphasis on the national development of science as well as the role of technology and innovation policy and the government in science.

2. Collaboration with academies of sciences / scientific organisations from other countries

The LAS has 31 standing scientific collaboration documents with: the Austria Academy of Sciences (AS), the Azerbaijan AS, the National AS of Belarus, the Berlin-Brandenburg Academy of Sciences and Humanities, the British Academy, the Bulgaria AS, the Czech AS, the European Science and Art Academy, the French AS, the Georgia National AS, Hankou University International Innovation Centre, the Estonian AS, the National Academy of Sciences of Italy, the Israel Academy of Sciences and Humanities, the Royal Society of Canada, the China Social Sciences Academy, the Russian AS, the Lithuanian AS, the Royal Society of London, the Montenegrin AS, the Polish AS, the Saxon AS, the Slovakia AS, the Slovenian AS, the Finland Academy of Sciences, the Swiss AS, the Taiwan (Republic of China) National Science Council, the National Academy of Sciences of Ukraine, the Hungarian AS, the Academy of Sciences of Uzbekistan, and the Royal Swedish Academy of Letters, History and Antiquities. Many

of the agreements of collaboration do not expire, but protocols regarding administration of scientific visits are renewed regularly.

22 August — Prof. Peter Sachsenmeier, Vice President of Hankou University, visited the LAS. During the visit, an agreement of collaboration was signed between the Latvian Academy of Sciences and the Hankou University International Innovation Centre.

4 November — during the visit of Prof. Wang Weiguang, President of the China Social Sciences Academy, and his delegation an agreement of collaboration was signed between the LAS and the China Social Sciences Academy.

Some of the collaboration agreements provide for short exchange visits for the scientists involved. These visits take place as defined by the Regulations regarding short mobility visits and hosting foreign visitors within the framework of LAS collaborative agreements (confirmed by the LAS Board on 17 June 2015).

In collaboration with the academies of sciences of Bulgaria, the Czech Republic, Poland, and Hungary, priority is given to visits involving joint projects.

In 2016, there were 23 short-term visits by Latvian scientists abroad (147 days) and 44 scientists from abroad visited Latvia (321 days). Classification of the visits based on goals of the visits:

- Work on joint projects or regular scientific collaboration (from Latvia 12 people/79 days; to Latvia 21 people/230 days);
- Participation in conferences/seminars (from Latvia 6 people/26 days; to Latvia 14 people/63 days);
- Individual research (from Latvia 0; to Latvia 1 person/6 days);
- Work in archives and museums (from Latvia 1 person/7 days; to Latvia 3 people/28 days).

3. Joint projects with foreign Academies of Sciences

LAS – Bulgarian AS joint projects 2015–2017

- Methods and measures for the preservation of cultural heritage (Dr. Mila Santova, Folklore Institute with the Open-air Museum, Bulgarian AS; Dr. Aija Jansone, UL Institute of the History of Latvia)
- Research and development of the chemical synthesis of plasma (Dr. Slavcho Rakovsky, Institute of Catalysis, Bulgarian AS; Dr. Jānis Grabis, Institute of Inorganic Chemistry, RTU)
- Bulgaria and Latvia: the dynamics of religious change in post-socialistic space as influenced by the euro integration process (Dr. Ekaterina Anastasova, Institute

of Folklore Studies with the Open-air Museum, Bulgarian AS; Dr. Inese Runce, Institute of Philosophy and Sociology, UL)

- Viral infection and the occurrence of auto-immune diseases (Dr. Russy Rusev, Institute of Experimental Morphology, Pathology, and Anthropology, Bulgarian AS; Dr. Modra Murovska, A. Kirhenšteins Institute of Microbiology and Virology, RSU)
- Introduction of Digital Libraries in Education and Culture (Prof. Radoslav Petrov, Institute of Mathematics and Informatics, Bulgarian AS; Gita Senka, Latvian Culture College)
- Light-induced phenomena in chalcogenide glass used in opto-electronics (Prof. Zoja Ivanova, Institute of Solid State Physics, Bulgarian AS; Dr. Jānis Teteris, Institute of Physics, UL)
- The sustainability of wheat (*Triticum aestivum L.*) genetic material against various fungal diseases (Prof. Rossitza Rodeva, Institute of Plant Physiology and Genetics, Bulgarian AS; Prof. Biruta Bankina, Latvia University of Agriculture)
- *Colletotrichum/Glomerella* on cultivated plants in Bulgaria and Latvia; their genotypical and phenotypical characterisation (Prof. Rossitza Rodeva, Institute of Plant Physiology and Genetics, Bulgarian AS; Jūlija Volkova, Latvian Plant Protection Research Centre)

LAS – Czech AS joint projects 2015–2017

- National minorities and ethnic groups — past and present experience in the Czech Republic and Latvia (Dr. Nadežda Pazuhina, Institute of Philosophy and Sociology, UL; Dr. Petr Bednarik, Institute of Contemporary History, CAS)
- Thin membranes for optoelectronics — preparation and defect studies (Prof. Jurijs Dehtjars, Institute of Biomedical Engineering and Nanotechnologies, RTU; Dr. Mihails Novotnijs, Institute of Physics, CAS)

LAS – Polish AS joint projects 2015–2017

- The Past in the Present. The Post-Soviet Heritage in Poland and Latvia (Dr. Ilze Boldāne, Institute of Latvian History, UL; Prof. Dagnoslaw Demski, Institute of Archaeology and Ethnology, Polish AS)
- Livonia and the Polish–Lithuanian Commonwealth (Rzeczpospolita) in the 16th–18th centuries (Prof. Boguslaw Dybaś, Institute of History, Polish AS; Dr. Māriete Jakovļeva, Institute of Latvian History, UL)
- Polish–Latvian, Latvian–Polish linguistic and cultural ties (Dr. Anna Stafecka, Latvian Language Institute, UL; Dr. Malgorzata Ostrowka, Slavic Language Institute, Polish AS)

- Generation change in a changing world — a transitional country example (Dr. Dina Bite, Institute of Social Sciences and Humanities, Latvian University of Agriculture; Krystyna Szafraniec, Institute of Rural and Agriculture Development, Polish AS)

LZA – Hungary Academy of Sciences joint project 2014–2016

- Catalytic application of metalorganic peptides and metalorganic proteins with emphasis on zinc (II) (Prof. Bela Gyurcsik, Hungarian AS and Biological Research Centre, University of Szeged; Dr. Ilze Vosekalna, Latvian Institute of Organic Synthesis)

4. Calendar of scientific activities 2016

23 January — LAS President Ojārs Spārītis, UNESCO LNK vice president and Minister of Education and Science Mārīte Seile, and Jarl Johan Kristian Berg, General Director of L'OREAL Baltic SIA, signed a protocol of collaboration at the Latvian Academy of Sciences regarding the annual competition for the L'OREAL Latvia scholarship “Women in Science”.

23 February — LAS delegation led by President Ojārs Spārītis went to Vilnius to take part in the 75th anniversary celebration of the Lithuanian AS. The delegation included LAS members A. Siliņš and B. Rivža. A three-volume set of *Latvju raksti* and an official address of congratulations were presented as a gift. Diploma of Valdemaras Razumas (elected at the 2015 autumn meeting as LAS foreign member) was also granted in Lithuania.

21–25 March — LAS President Ojārs Spārītis and representatives of the International Virotherapy Centre Jurgis Auziņš and Andrejs Repiševskis visited Pakistan. During a visit at the Pakistan AS an agreement of collaboration was signed with its president Anwar Nasim. The delegation met with the Higher Education Commission of Pakistan Prof. Mukhtar Ahmed and other representatives of science and education and discussed collaboration between our two countries in these fields including agriculture and cancer virotherapy. The delegation also visited the Shaukat Khanum Memorial Cancer Hospital and Research Centre in Lahor.

29 March — LAS President Ojārs Spārītis sent a greeting to LAS Foreign Member Harald zur Hausen on the occasion of his 80th birthday. Professor zur Hausen received the Nobel Prize in medicine in 2008.

18–19 April — President Ojārs Spārītis participated in the ALLEA General Assembly in Vienna. On the first day, the scientific conference “The Freedom of Scientific Research in the Face of Political and Societal Demands” took place.

26 April — LAS President Ojārs Spārītis was elected Foreign Member of the Lithuanian Academy of Sciences.

27 June — a delegation of Japanese scientists led by Prof. emeritus Teruo Kishi visited the LAS to discuss the activation of scientific collaboration between Latvia and Japan.

11 July — Ivane Javakhishvili Tbilisi State University medals for collaboration in science were presented at the UL Academic Library to LAS full members Baiba Rivža, Raita Karnīte, Tālav Jundzis, Guntis Zemītis, and LAS Doctor *honoris causa* Venta Kocere, as well as to the Georgian Ambassador to Latvia Teimuraz Janjalia.

22 August — Prof. Peter Sachsenmeier, Vice President of Hankou University, visited the LAS. During the visit an agreement of collaboration was signed between the Latvian Academy of Sciences and the Hankou University International Innovation Centre. The goal of the collaboration is to promote interest in methods of learning and research direction at both institutions as well as develop an in-depth understanding of the economy, culture, and social issues in both countries.

15–16 September — LAS Foreign Affairs Secretary Tālav Jundzis represented the LAS at the ICSU European Group meeting in Dublin. Planned activities of ICSU for the period 2018–2023 were discussed along with the pending merger with the International Social Sciences Council (ISSC).

23–24 September — LAS President Ojārs Spārītis participated in the annual meeting of the German National Academy of Sciences *Leopoldina*, the main topic was “Science as Part of Inter-cultural Dialogue”.

1–5 October — Koji Omi, founder and chairman of the forum “Science and Technology in Society”, invited LAS President Ojārs Spārītis to participate in the 13th world forum “Science and Technology in Society” in Kyoto, Japan. During the forum, Spārītis also attended the meeting of world academies of sciences presidents organised by the Science Council of Japan.

24–25 October — LAS Foreign Affairs Secretary Tālav Jundzis participated in a special meeting of the ICSU called to discuss the merger of ICSU and the ISSC.

4 November — during the visit of Prof. Wang Weigung, President of the Chinese Academy of Social Sciences, and his delegation an agreement of collaboration was signed between the LAS and the Chinese Academy of Social Sciences.

17–18 November — LAS President Ojārs Spārītis represented the LAS at the autumn meeting of the European Academies of Science Advisory Council (EASAC) in London organised by the Royal Society of London.

29 November — Chung-Yung Keng, head of the Taipei mission in Latvia, visited the LAS. LAS President Ojārs Spārītis and LAS external affairs organiser Kristaps Broks hosted the visit. Collaboration to date was discussed and new areas of collaboration were explored.

5. LAS member affiliation with foreign academies of sciences

Many LAS members also belong to other academies of sciences in Europe and beyond:

Academia Scientiarum et Artium Europaea (Salzburg): M. Auziņš, E. Blūms, A. Caune, J. Ekmanis, T. Jundzis, I. Kalviņš, V. Kluša, I. Knēts, R. Kondratovičs, M. Kūle, T. Millers, O. Spārītis, J. Stradiņš, J. Volkolākovs, P. Zvidriņš, LAS doctors *honoris causa* R. Lācis, J. Vētra and LAS honorary members I. Lancmanis, Z. Stankevičs, and A. Naumovs.

Academia Europea: M. Auziņš, A. Cēbers, E. Grēns, V. Tamužs, A. Linē — full members.

Academia dei Georgofili (Italy): B. Rivža — foreign member.

European Academy of Sciences in Support of Excellence in Science and Technology: V. Tamužs, A. Krūmiņš, LAS Corresponding Member A. Šostaks — full members.

Georgian National Academy of Sciences: J. Stradiņš — foreign member.

Estonian Academy of Sciences: J. Stradiņš — foreign member.

Royal Society of Canada: V. Viķe-Freiberga — member.

Russian Academy of Sciences: E. Grēns — corresponding member, B. Rivža — foreign member.

Lithuanian Academy of Sciences: O. Spārītis, J. Stradiņš, J. Ekmanis, B. Rivža, and LAS Dr.h.c. V. Strīķis — foreign members.

Saxon Academy of Sciences: J. Stradiņš — corresponding member.

Ukrainian Medical Stomatological Academy: I. Kalviņš — Honorary Academician.

Germany Academy of Sciences *Leopoldina*: J. Stradiņš — member of *Leopoldina*.

Royal Swedish Academy of Agriculture and Forestry: B. Rivža and LAS Dr.h.c. P. Rivža — foreign members.

Kristaps Broks

LAS External Affairs Organiser

Dr.habil.sc.pol., Dr.iur. Tālavš Jundzis

LAS Foreign Affairs Secretary

MEMBERS OF THE ACADEMY

FULL MEMBERS

Andris AMBAINIS (Computer Science), b. 18.01.1975, elected 22.11.2007. Grand Medal of the LAS (2013). DPTS¹. *University of Latvia*. Tel.: (371) 67034517. E-mail: ambainis@lanet.lv; andris.ambainis@lu.lv

Bruno ANDERSONS (Material Science), b. 22.07.1951, elected 25.11.2004. DCBMS; DAFS. *Latvian State Institute of Wood Chemistry*. Tel.: (371) 67552554, (371) 29472010. E-mail: bruno.andersons@edi.lv

Georgs ANDREJEVS (Medicine), b. 30.10.1932, elected 10.11.1995. DCBMS. *Latvian Academy of Sciences*. Tel.: (371) 26402512. E-mail: georgsandrejevs@gmail.com

Mārcis AUZIŅŠ (Physics), b. 11.01.1956, elected 27.11.1998. Grand Medal of the LAS (2010). DPTS. *University of Latvia*. Tel.: (371) 67033700. E-mail: marcis.auzins@lu.lv

Arvīds BARŠEVSKIS (Biology), b. 20.09.1965, elected 24.11.2011. Grand Medal of the LAS (2015). DCBMS. *Daugavpils University, Latvia*. Tel.: (371) 65422180, (371) 26339994. E-mail: arvids.barsevskis@du.lv

Jānis BĀRZDIŅŠ (Computer Science), b. 23.01.1937, elected 09.04.1992. Grand Medal of the LAS (2017). DPTS. *Institute of Mathematics and Computer Science, University of Latvia*. Tel.: (371) 67224363. E-mail: janis.barzdins@lumii.lv

Jānis Guntis BĒRZIŅŠ (Physics), b. 19.01.1936, elected 25.11.2004. DPTS. *Institute of Solid State Physics, University of Latvia*. Tel.: (371) 67261304, (371) 26632768. E-mail: jberzins@latnet.lv

Valdis BĒRZIŅŠ (History), b. 18.06.1935, elected 27.11.1998. DHSS. *Institute of History of Latvia, University of Latvia*. E-mail: berzinsv@yahoo.com

Ivars BIĻINSKIS (Computer Science), b. 23.10.1934, elected 06.12.1990. DPTS. *Institute of Electronics and Computer Science*. Tel.: (371) 67558190. E-mail: bilinskis@edi.lv

Aina BLINKENA (Linguistics), b. 05.09.1929, elected 09.01.1992. DHSS. *Latvian Academy of Sciences*. Tel.: (371) 67574288, (371) 29572160. E-mail: blinkena@gmail.com

Elmārs BLŪMS (Physics), b. 05.02.1936, elected 09.01.1992. Grand Medal of the LAS (2005). DPTS. *Institute of Physics, University of Latvia*. Tel.: (371) 67944664. E-mail: eblums@sal.lv; eblums@latnet.lv

Juris BOJĀRS (Law), b. 12.02.1938, elected 24.11.1992. DHSS. *University of Latvia*. E-mail: j.bojars@lanet.lv

Andris BUIKIS (Mathematics), b. 15.03.1939, elected 21.11.1997. DPTS. *Institute of Mathematics and Computer Science, University of Latvia*. *RL Saeima*. E-mail: buikis@latnet.lv

¹ DPTS – Division of Physical and Technical Sciences; DCBMS – Division of Chemical, Biological, and Medical Sciences; DHSS – Division of Humanities and Social Sciences; DAFS – Division of Agriculture and Forest Sciences.

- Andris CAUNE** (Archaeology), b. 27.06.1937, elected 10.11.1995. Grand Medal of the LAS (2001). DHSS. *Tel.:* (371) 22068879.
- Andrejs CĒBERS** (Physics), b. 15.12.1947, elected 26.11.1993. DPTS. *Institute of Physics, University of Latvia. Tel.:* (371) 67033767, (371) 29195961. *E-mail:* aceb@sal.lv; aceb@lanet.lv
- Pēteris CIMDIŅŠ** (Ecology), b. 21.08.1944, elected 09.04.1992. DCBMS. *Latvian Academy of Sciences. Tel.:* (371) 67220725. *E-mail:* cimdins@inbox.lv
- Saulvedis CIMERMANIS** (Ethnology), b. 03.07.1929, elected 09.04.1992. DHSS. *Institute of History of Latvia, University of Latvia. Tel.:* (371) 67565265, (371) 26223068. *E-mail:* kameel@inbox.lv
- Maija DAMBROVA** (Pharmacy), b. 03.05.1968, elected 29.11.2012. DCBMS. *Latvian Institute of Organic Synthesis. Tel.:* (371) 67702408. *E-mail:* md@biomed.lu.lv
- Jurijs DEHTJARS** (Physics), b. 19.06.1947, elected 20.11.2008. DPTS. *Rīga Technical University. Tel./Fax:* (371) 67089383. *E-mail:* dekhtyar@latnet.lv
- Ina DRUVIETE** (Linguistics), b. 29.05.1958, elected 24.11.2016. DHSS. *University of Latvia. Tel.:* (371) 67034595, (371) 26352167. *E-mail:* ina.druviete@lu.lv
- Gunārs DUBURS** (Chemistry), b. 12.06.1934, elected 09.04.1992. DCBMS. *Latvian Institute of Organic Synthesis. Tel.:* (371) 67014946. *E-mail:* gduburs@osi.lv
- Olģerts DUMBRĀJS** (Physics), b. 16.02.1942, elected 26.11.2009. DPTS. *Institute of Solid State Physics, University of Latvia. Tel.:* (371) 26359386. *E-mail:* olgerts.dumbrajs@lu.lv
- Donāts ERTS** (Physics), b. 22.11.1954, elected 24.11.2016. DPTS. *Institute of Chemical Physics, University of Latvia. Tel.:* (371) 67033936, (371) 26313360. *E-mail:* Donats.Erts@lu.lv
- Jekaterina ĒRENPREISA** (Biology), b. 13.02.1945, elected 20.11.2003. DCBMS. *Latvian Biomedical Research and Study Centre. Tel.:* (371) 67808220, (371) 28744535. *E-mail:* katrina@biomed.lu.lv
- Andrejs ĒRGLIS** (Medicine), b. 25.12.1964, elected 20.11.2015. DCBMS. *Institute of Cardiology, University of Latvia. Tel.:* (371) 67069575, (371) 29293376. *E-mail:* a.a.erglis@stradini.lv
- Inesis FELDMANIS** (History), b. 01.08.1949, elected 20.11.2003. DHSS. *University of Latvia. Tel.:* (371) 67033825. *E-mail:* inesis.feldmanis@lu.lv
- Ruvins FERBERS** (Physics), b. 13.12.1946, elected 07.12.2006. DPTS. *University of Latvia. Tel.:* (371) 67033754. *E-mail:* ferber@latnet.lv
- Agris GAILĪTIS** (Physics), b. 18.11.1935, elected 29.11.2001. DPTS. *Institute of Physics, University of Latvia. Tel.:* (371) 28878453. *E-mail:* gailitis@sal.lv
- Dace GARDOVSKA** (Medicine), b. 30.12.1952, elected 28.11.2013. DCBMS. *Rīga Stradiņš University. Tel.:* (371) 67621730. *E-mail:* dace.gardovska@rsu.lv
- Jānis GARDOVSKIS** (Medicine), b. 11.05.1955, elected 24.12.2006. DCBMS. *Rīga Stradiņš University. Tel.:* (371) 67409224, (371) 67069745. *E-mail:* rector@rsu.lv

- Jānis GRABIS** (Material Science), b. 18.08.1943, elected 20.11.2003. DCBMS. *Institute of Inorganic Chemistry, Rīga Technical University. Tel.: (371) 29450343. E-mail: Janis.Grabis_3@rtu.lv*
- Elmārs GRĒNS** (Biology), b. 09.10.1935, elected 12.02.1987. Grand Medal of the LAS (1995). DCBMS. *Latvian Biomedical Research and Study Centre. Tel.: (371) 29226029. E-mail: grens@biomed.lu.lv*
- Māra GRUDULE** (Literary Criticism), b. 01.03.1963, elected 26.11.2015. DHSS. *University of Latvia. Tel.: (371) 67033850, (371) 26520096. E-mail: mara.grudule@lu.lv; maragru@latnet.lv*
- Jānis GRUNDSPEŅĶIS** (Computer Science), b. 19.06.1942, elected 20.11.2003. DPTS. *Rīga Technical University. Tel.: (371) 67089506, (371) 29453128. E-mail: janis.grundspenkis@rtu.lv*
- Viktors HAUSMANIS** (Literary Criticism), b. 06.12.1931, elected 06.04.1989. Grand Medal of the LAS (2007). DHSS. *Institute of Literature, Folklore, and Art, University of Latvia. Tel.: (371) 67357912. E-mail: viktors.hausmanis@lulfmi.lv*
- Viktors IVBULIS** (Literary Criticism), b. 31.05.1933, elected 26.11.1999. Grand Medal of the LAS (2014). DHSS. *Latvian Academy of Sciences. Tel.: (371) 67674634, (371) 26350663. E-mail: ivbulis@lanet.lv*
- Ilgā JANSONE** (Linguistics), b. 20.06.1958, elected 22.11.2007. DHSS. *Latvian Language Institute, University of Latvia. Tel./Fax: (371) 67227696, (371) 29550647. E-mail: ilgajan@lza.lv*
- Aleksandrs JEMEĻJANOVŠ** (Agricultural Sciences), b. 05.02.1938, elected 26.11.1999. DCBMS; DAFS. *Latvian Academy of Sciences. Tel.: (371) 67970236, (371) 29408433. E-mail: AJjemeljanovs@gmail.com*
- Tālavš JUNDZIS** (Political Studies), b. 04.10.1951, elected 23.11.2000. Grand Medal of the LAS (2016). DHSS. *Baltic Centre for Strategic Studies, Latvian Academy of Sciences. Tel./Fax: (371) 67227555, (371) 29489249. E-mail: bspc@lza.lv*
- Benedikts KALNAČS** (Literary Criticism), b. 25.02.1965, elected 24.11.2005. DHSS. *Institute of Literature, Folklore, and Art, University of Latvia. Tel.: (371) 29610407, (371) 29610407. E-mail: benedikts.kalnacs@lulfmi.lv*
- Viktors KALNBĒRZS** (Medicine), b. 02.07.1928, elected 09.01.1992. DCBMS. *Latvian Academy of Sciences. Tel.: (371) 26359060. E-mail: iraras@inbox.lv*
- Arnīs KALNIŅŠ** (Economics), b. 24.01.1935, elected 10.02.1987. DHSS; DAFS. *Latvian Academy of Sciences. Tel.: (371) 67568319, (371) 26480029. E-mail: arnisk8@inbox.lv*
- Mārtiņš KALNIŅŠ** (Chemistry), b. 25.02.1939, elected 09.04.1992. DCBMS. *Rīga Technical University. Tel.: (371) 67089218. E-mail: martinsk@parks.lv*
- Ivars KALVIŅŠ** (Chemistry), b. 02.06.1947, elected 25.11.1994. Grand Medal of the LAS (2009). DCBMS. *Latvian Institute of Organic Synthesis. Tel.: (371) 67551822, (371) 67553233. E-mail: kalvins@osi.lv*

Valdis KAMPARS (Chemistry), b. 05.10.1944, elected 21.11.1997. DCBMS. *Rīga Technical University*. Tel.: (371) 29230958. E-mail: valdis.kampars@rtu.lv

Raita KARNĪTE (Economics), b. 16.10.1949, elected 07.12.2006. DHSS. *Economy Forecast Centre Ltd*. Tel.: (371) 29411607. E-mail: raita@epc.lv

Edīte KAUFMANE (Agricultural Sciences), b. 14.10.1954, elected 24.11.2011. DAFS. *Institute of Horticulture, Latvia University of Agriculture*. Tel.: (371) 63722294, (371) 63724926. Fax: (371) 63781718. E-mail: kaufmane@latnet.lv

Aldis KĀRKLIŅŠ (Agricultural Sciences), b. 06.02.1951, elected 28.11.2013. DAFS. *Latvia University of Agriculture*. Tel.: (371) 63005634, (371) 29182992. E-mail: Aldis.Karklins@llu.lv

Jānis KLOVIŅŠ (Biology), b. 26.09.1969, elected 28.11.2013. DCBMS. *Latvian Biomedical Research and Study Centre*. Tel.: (371) 26438469. E-mail: klovinis@biomed.lu.lv

Vija KLUŠA (Medicine), b. 05.09.1940, elected 24.11.1992. DCBMS. *University of Latvia*. Tel.: (371) 29276263. E-mail: vijaklus@latnet.lv

Māris KĻAVIŅŠ (Environmental Sciences), b. 12.03.1956, elected 26.11.1999. DCBMS. *University of Latvia*. Tel.: (371) 29479430. E-mail: mklavins@lanet.lv

Ivars KNĒTS (Mechanics), b. 17.09.1938, elected 09.04.1992. DPTS. *Rīga Technical University*. Tel.: (371) 67089340, (371) 29199301. E-mail: ivars.knets@rtu.lv

Māris KNĪTE (Physics), b. 02.04.1955, elected 25.11.2012. DPTS. *Rīga Technical University*. Tel.: (371) 67089181. E-mail: knite@latnet.lv

Jevgeņijs KOTOMINS (Physics), b. 20.09.1949, elected 24.11.2011. DPTS. *Institute of Solid State Physics, University of Latvia*. Tel.: (371) 67187480. E-mail: kotomin@latnet.lv

Andrejs KRASŅIKOVŠ (Mechanics), b. 27.07.1956, elected 26.11.2015. DPTS. *Rīga Technical University*. Tel.: (371) 67223644, (371) 67089159, (371) 67089473, (371) 29436518. E-mail: akrasn@latnet.lv

Jānis KRASTIŅŠ (Architecture), b. 23.06.1943, elected 25.11.1994. Grand Medal of the LAS (1998). DHSS. *Rīga Technical University*. Tel.: (371) 67089115, (371) 26406066. E-mail: janis.krastins_1@rtu.lv

Oļģerts KRASTIŅŠ (Economics), b. 27.08.1931, elected 10.11.1995. DHSS, DAFS. *Latvian Academy of Sciences*. Tel.: (371) 67273489, (371) 22014838. E-mail: okrast@inbox.lv

Andris KRŪMIŅŠ (Physics), b. 31.03.1943, elected 29.11.2001. DPTS. *Institute of Solid State Physics, University of Latvia*. Tel.: (371) 67187816. E-mail: krumins@latnet.lv

Juris KRŪMIŅŠ (Demography), b. 17.11.1947, elected 20.11.2008. DHSS. *University of Latvia*. Tel.: (371) 67034794. E-mail: Juris.Krumins@lu.lv

Aleksejs KUZMINS (Physics), b. 12.08.1968, elected 24.11.2016. DPTS. *Institute of Solid State Physics, University of Latvia*. Tel.: (371) 67251691. E-mail: a.kuzmin@cfi.lu.lv

Maija KŪLE (Philosophy), b. 21.04.1951, elected 22.11.1996. DHSS. *Institute of Philosophy and Sociology, University of Latvia*. Tel.: (371) 28385810. E-mail: maija.kule@lu.lv

- Ēriks KUPČE** (Chemistry), b. 11.10.1955, elected 24.11.2011. Grand Medal of the LAS (2008). DCBMS. *Latvian Institute of Organic Synthesis. Bruker Ltd, UK.* Tel.: (44) 7880 173 061. E-mail: eriks.kupce@bruker.com
- Janīna KURSĪTE-PAKULE** (Literary Criticism), b. 08.03.1952, elected 21.11.1997. DHSS. *University of Latvia.* Tel.: (371) 67033850. E-mail: janina.kursite-pakule@lu.lv; kursite@hotmail.com
- Ivars LĀCIS** (Physics), b. 11.02.1949, elected 23.11.2000. DPTS. *University of Latvia.* Tel.: (371) 67261068. E-mail: Ivars.Lacis@lu.lv
- Egons LAVENDELIS** (Mechanics), b. 20.12.1934, elected 06.04.1989. Grand Medal of the LAS (1994). DPTS. *Rīga Technical University.* Tel.: (371) 29255019. E-mail: lavendelis.egons@gmail.com
- Aivars LEJNIEKS** (Medicine), b. 26.05.1957, elected 27.11.2014. DCBMS. *Rīga Stradiņš University.* Tel.: (371) 29554397. E-mail: lejnieks@latnet.lv
- Oļģerts LIELAUSIS** (Physics), b. 02.09.1930, elected 24.11.1992. Grand Medal of the LAS (1999). DPTS. *Institute of Physics, University of Latvia.* Tel.: (371) 26333689. E-mail: mbroka@sal.lv; lielausis@sal.lv
- Edwards LIEPIŅŠ** (Chemistry), b. 01.07.1944, elected 27.11.1998. DCBMS. *Latvian Institute of Organic Synthesis.* Tel.: (371) 67014900. E-mail: edv@osi.lv
- Aija LINĒ** (Biology), b. 19.11.1973, elected 27.11.2014. DCBMS. *Latvian Biomedical Research and Study Centre.* Tel.: (371) 67808208, (371) 29357839. E-mail: aija@biomed.lu.lv
- Dace MARKUS** (Linguistics), b. 13.11.1950, elected 23.11.2000. DHSS. *Liepāja University.* Tel.: (371) 26442598. E-mail: markus@latnet.lv
- Imants MATĪSS** (Mechanics), b. 29.04.1935, elected 09.01.1992. DPTS. *Certification Centre, Latvian Academy of Sciences.* Tel.: (371) 67225996. Tel./Fax: (371) 67212807. E-mail: certcn@latnet.lv
- Jurijs MERKURJEVS** (Computer Science), b. 30.04.1954, elected 27.11.2014. DPTS. *Rīga Technical University.* Tel.: (371) 67089514. E-mail: merkur@itl.rtu.lv
- Tālis MILLERS** (Chemistry), b. 04.01.1929, elected 09.01.1992. President: 01.03.1994 – 28.02.1998. Grand Medal of the LAS (2002). DCBMS. *Latvian Academy of Sciences.* Tel.: (371) 67225361. E-mail: talism@inbox.lv
- Ruta MUCENIECE** (Medicine), b. 24.03.1950, elected 20.11.2008. DCBMS. *University of Latvia.* Tel.: (371) 26437377, (371) 67033944. E-mail: Ruta.Muceniece@lu.lv; rutam@lanet.lv
- Ēvalds MUGURĒVIČS** (Archaeology), b. 06.04.1931, elected 09.04.1992. Grand Medal of the LAS (2011). DHSS. *Institute of History of Latvia, University of Latvia.* Tel.: (371) 67944113; (371) 26750623.
- Indriķis MUIŽNIEKS** (Biology), b. 09.07.1953, elected 23.11.2000. DCBMS. *University of Latvia.* Tel.: (371) 67034401. E-mail: Indrikis.Muiznieks@lu.lv

- Modra MUROVSKA** (Medicine), b. 16.07.1949, elected 29.11.2012. DCBMS. *Augusts Kirhenšteins Institute of Microbiology and Virology, Rīga Stradiņš University. Tel.: (371) 67427920, (371) 29554119. E-mail: modra.murovska@rsu.lv; modra@latnet.lv*
- Ieva OSE** (Archaeology), b. 08.06.1961, elected 25.11.2004. DHSS. *Institute of History of Latvia, University of Latvia. Tel.: (371) 67034518. E-mail: ieva@lza.lv*
- Andris OZOLS** (Physics), b. 06.12.1944, elected 25.11.2010. DPTS. *Rīga Technical University. Tel.: (371) 67089456, (371) 67089201. E-mail: aozols@latnet.lv*
- Remigijs POČS** (Economics), b. 08.09.1947, elected 24.11.2016. DHSS. *Rīga Technical University. Tel.: (371) 67089010. E-mail: remigijs.pocs@rtu.lv*
- Jānis PRIEDKALNS** (Medicine), b. 28.03.1934, elected 27.11.1998. DCBMS. *Latvian Academy of Sciences. Tel.: (371) 26496128. E-mail: jpuika@chariot.net.au*
- Juris PURĀNS** (Physics), b. 29.08.1952, elected 28.11.2013. DPTS. *Institute of Solid State Physics, University of Latvia. Tel.: (371) 67251691. E-mail: purans@cfi.lu.lv*
- Īzaks RAŠALS** (Biology), b. 29.06.1947, elected 29.11.2001. DCBMS; DAFS. *Institute of Biology, University of Latvia. Tel.: (371) 29516935. E-mail: izaks.rasals@lu.lv*
- Leonīds RIBICKIS** (Power Engineering), b. 24.08.1947, elected 22.11.2007. DPTS. *Rīga Technical University. Tel.: (371) 67089300. E-mail: leonids.ribickis@rtu.lv*
- Rolands RIKARDS** (Mechanics), b. 15.12.1942, elected 21.11.1997. DPTS. *Rīga Technical University. Tel.: (371) 67089124. E-mail: rikards@latnet.lv*
- Baiba RIVŽA** (Economics), b. 01.12.1949, elected 26.11.1999. Grand Medal of the LAS (2017). DAFS; DHSS. *Latvia University of Agriculture. Tel.: (371) 63021041, (371) 29254469. E-mail: baiba.rivza@llu.lv*
- Kārlis ROCĒNS** (Mechanics), b. 03.03.1939, elected 21.11.1997. DPTS. *Rīga Technical University. Tel.: (371) 67089184. E-mail: rocensk@latnet.lv*
- Uldis ROGULIS** (Physics), b. 25.05.1957, elected 24.11.2016. DPTS. *Institute of Solid State Physics, University of Latvia. Tel.: 67260553. E-mail: uldis.rogulis@lu.lv, rogulis@latnet.lv*
- Rafails ROZENTĀLS** (Medicine), b. 27.09.1937, elected 23.11.2000. DCBMS. *P. Stradiņš Clinical University Hospital. Tel.: (371) 29241308. E-mail: rafails.rozents@stradini.lv; rafail_rozent@inbox.lv*
- Mārtiņš RUTKIS** (Physics), b. 08.08.1957, elected 26.11.2015. DPTS. *Institute of Solid State Physics, University of Latvia. Tel.: (371) 67854986. E-mail: martins.rutkis@cfi.lu.lv*
- Uldis SEDMALIS** (Chemistry), b. 22.05.1933, elected 09.04.1992. DCBMS. *Rīga Technical University. Tel.: (371) 26403286. E-mail: gaida-maruta.sedmale@rtu.lv*
- Andrejs SILIŅŠ** (Physics), b. 12.10.1940, elected 09.01.1992. DPTS. *Latvian Academy of Sciences. Tel.: (371) 67211405. E-mail: silins@lza.lv*
- Nikolajs SJAKSTE** (Biology), b. 11.05.1955, elected 25.11.2010. DCBMS. *University of Latvia. Tel.: (371) 29198804. E-mail: Nikolajs.Sjakste@lu.lv*

- Linards SKUJA** (Physics), b. 08.02.1952, elected 20.11.2003. DPTS. *Institute of Solid State Physics, University of Latvia. Tel.: (371) 67260756. E-mail: skuja@latnet.lv*
- Ojārs SPĀRĪTIS** (Art Studies), b. 28.11.1955, elected 25.11.2004. DHSS. LAS President: 27.12.2012–. *Latvian Academy of Sciences. Tel.: (371) 67225361. E-mail: lza@lza.lv*
- Jānis SPĪGULIS** (Physics), b. 09.05.1950, elected 29.11.2012. DPTS. *University of Latvia. Tel.: (371) 67223633, (371) 67228249. E-mail: Janis.Spigulis@lu.lv; janispi@latnet.lv; janis.spigulis@lza.lv*
- Jānis STRADIŅŠ** (Chemistry), b. 10.12.1933, elected 06.07.1973. President: 01.03.1998 – 30.04.2004. Grand Medal of the LAS (1993). DCBMS. *Latvian Academy of Sciences; Latvian Institute of Organic Synthesis; Institute of History of Latvia, University of Latvia. Tel.: (371) 67213663. E-mail: stradins@lza.lv*
- Andris STRAKOVS** (Chemistry), b. 27.06.1934, elected 10.11.1995. DCBMS. *Rīga Technical University. Tel.: (371) 67560615. E-mail: strakovs@latnet.lv*
- Aivars STRANGA** (History), b. 15.06.1954, elected 26.11.2009. DHSS. *University of Latvia. Tel.: (371) 67033825. E-mail: aivars.stranga@lu.lv*
- Edgars SŪNA** (Chemistry), b. 07.06.1970, elected 27.11.2014. DCBMS. *Latvian Institute of Organic Synthesis. Tel.: (371) 67014895. E-mail: edgars@osi.lv*
- Pēteris ŠIPKOVS** (Power Engineering), b. 16.06.1944, elected 25.11.2010. DPTS. *Institute of Physical Energetics. Tel.: (371) 67553537. E-mail: shipkovs@edi.lv*
- Inna ŠTEINBUKA** (Economics), b. 08.10.1952, elected 24.11.2016. DHSS. *European Commission Representation in Latvia. Tel.: (371) 67085400. E-mail: inna.steinbuka@ec.europa.eu*
- Andris ŠTERNBERGS** (Physics), b. 13.05.1944, elected 24.11.2005. Grand Medal of the LAS (2015). DPTS. *Institute of Solid State Physics, University of Latvia. Tel.: (371) 67187810. E-mail: stern@lanet.lv*
- Kurts ŠVARCS** (Physics), b. 27.04.1930, elected 06.12.1990. Grand Medal of the LAS (2010). DPTS. *Darmstadt, Deutschland. Tel.: (496159) 712169. E-mail: k.schwartz@gsi.de*
- Ivars TĀLE** (Physics), b. 23.01.1936, elected 22.11.1996. DPTS. *Institute of Solid State Physics, University of Latvia. Tel.: (371) 67260639. E-mail: iatale@latnet.lv*
- Vitauts TAMUŽS** (Mechanics), b. 02.12.1935, elected 09.01.1992. Grand Medal of the Latvian Academy of Sciences (2008). DPTS. *Institute for Mechanics of Materials, University of Latvia. Tel.: (371) 29410902. E-mail: tamuzs@pmi.lv*
- Kaspars TĀRS** (Biology), b. 25.10.1971, elected 26.11.2015. DCBMS. *Latvian Biomedical Research and Study Centre. Tel.: (371) 67808200, (371) 27076237. E-mail: kaspars@biomed.lu.lv*
- Kalvis TORGĀNS** (Law), b. 31.03.1939, elected 21.11.1997. DHSS. *University of Latvia. Tel.: (371) 67034527. E-mail: kalvis.torgans@lu.lv*
- Pēteris TRAPENCIERIS** (Chemistry), b. 14.03.1952, elected 24.11.2016. DCBMS. *Latvian Institute of Organic Synthesis. Tel.: (371) 67220725, (371) 67014936, (371) 29158550. E-mail: peteris@osi.lv*

- Māris TURKS** (Chemistry), b. 11.03.1976, elected 27.11.2014. DCBMS. *Rīga Technical University*. Tel.: (371) 67089251, (371) 26001234. E-mail: maris.turks@rtu.lv
- Juris Tāivaldis URTĀNS** (History of Culture), b. 15.12.1952, elected 24.11.2011. DHSS. *Latvian Academy of Culture*. Tel.: (371) 67114816; (371) 29485326. E-mail: urtans@lka.edu.lv
- Raimonds VALTERS** (Chemistry), b. 27.05.1938, elected 09.04.1992. DCBMS. *Latvian Academy of Sciences*. Tel.: (371) 26537092. E-mail: rvalters@latnet.lv
- Edvīns VANAGS** (Economics), b. 12.07.1938, elected 26.11.1999. DHSS. E-mail: inga.vilka@ppk.lv
- Vera VĀVERE** (Literary Criticism), b. 31.12.1929, elected 09.04.1992. DHSS. *Latvian Academy of Sciences*. Tel.: (371) 67246908, (371) 28449816. E-mail: lifom@lza.lv
- Nikolajs VEDERNIKOVS** (Chemistry), b. 08.02.1937, elected 24.11.1992. DCBMS; DAFS. *Latvian State Institute of Wood Chemistry*. Tel.: (371) 67553760. E-mail: nik.vedernikov@edi.lv
- Grigorijs VEINBERGS** (Chemistry), b. 17.07.1941, elected 25.11.2010. DCBMS. *Latvian Institute of Organic Synthesis*. Tel.: (371) 67014941. E-mail: veinberg@osi.lv
- Andrejs VEISBERGS** (Linguistics), b. 22.02.1962, elected 28.11.2013. DHSS. *University of Latvia*. Tel.: (371) 67034820; (371) 29482396. E-mail: anveis@lanet.lv; andrejs.veisbergs@lu.lv
- Arnīs VĪKSNA** (Medicine), b. 25.02.1942, elected 29.11.2001. DCBMS. *Pauls Stradiņš Museum of the History of Medicine*. Tel.: (371) 67222667. E-mail: Arnis.Viksna@mvm.lv
- Vaira VĪĶE-FREIBERGA** (Psychology, Folklore Studies), b. 01.12.1937, elected 05.07.1999. Grand Medal of the LAS (1997). DHSS. *Pils laukums 3, Rīga, LV 1050*. Tel.: (371) 67092191; (371) 28320939. E-mail: daina.lasmane@president.lv
- Jānis VOLKOLĀKOVS** (Medicine), b. 28.04.1931, elected 25.11.1994. DCBMS. *Latvian Academy of Sciences*. Tel.: (371) 67605546.
- Juris ZAKĪS** (Physics), b. 04.11.1936, elected 06.12.1990. DPTS. *Rīgas dome*. Tel.: (371) 29299188. E-mail: juris.zakis@apollo.lv; juris.zakis@riga.lv
- Guntis ZEMĪTIS** (Archaeology), b. 13.06.1955, elected 27.11.2014. DHSS. *Institute of History of Latvia, University of Latvia*. Tel.: (371) 67223715, (371) 26416884. E-mail: guntis.zemitis@lu.lv
- Andris ZICMANIS** (Chemistry), b. 21.04.1941, elected 22.11.2007. DCBMS. *University of Latvia*. Tel.: (371) 26149853. E-mail: zicmanis@latnet.lv
- Jānis ZILGALVIS** (Art), b. 23.05.1955, elected 29.11.2012. DHSS. *State Inspection for Heritage Protection of Latvia*. Tel.: (371) 67224519, (371) 29451090. E-mail: janis.zilgalvis@inbox.lv
- Pēteris ZVIDRIŅŠ** (Economics), b. 31.05.1943, elected 09.04.1992. DHSS. *University of Latvia*. Tel.: (371) 67767305, (371) 29103629. E-mail: peteris.zvidrins@lu.lv

HONORARY MEMBERS

Gunārs ASARIS (Architecture), b. 23.06.1934, elected 29.11.2001. DHSS. *Rīga Technical University, Latvia. Tel.: (371) 67272691; (371) 26557533. E-mail: gunars.asaris@rtu.lv*

Alberts BELS (Literature), b. 06.10.1938, elected 26.11.1999. DHSS. *Latvia. Tel.: (371) 22019638. E-mail: albertsbels@apollo.lv*

Uldis BĒRZIŅŠ (Literature), b. 17.05.1944, elected 24.11.1993. DHSS. *Latvia. Tel.: (371) 29397630. E-mail: uldis.eba@gmail.com*

Mārtiņš BRAUNS (Art), b. 17.09.1951, elected 24.11.2016. DHSS. *Latvia. E-mail: humana@lza.lv*

Leons BRIEDIS (Literature), b. 16.12.1949, elected 21.11.2007. DHSS. *Latvia. Tel.: (371) 27012711. E-mail: kentaurXXI@inbox.lv*

Raisa DENISOVA (Anthropology), b. 30.08.1930, elected 27.11.1998. DHSS. *Latvia. Tel.: (371) 67451842, (371) 29818171. E-mail: lvi@lza.lv*

Roalds DOBROVENSKIS (Literature), b. 02.09.1936, elected 28.11.2002. DHSS. *Latvia. Tel.: (371) 29419203. E-mail: veroa@inbox.lv*

Arta DUMPE (Art), b. 26.05.1933, elected 25.11.2010. DAFS. *Latvia. Tel.: (371) 67674634, (371) 20362051. E-mail: ivbulis@lanet.lv*

Uldis DUMPIS (Art), b. 03.10.1943, elected 20.11.2008. DHSS. *Latvia. Tel.: (371) 67006304. E-mail: info@teatris.lv*

Maija EINFELDE (Art), b. 02.01.1939, elected 29.11.2001. DHSS. *Latvia.*

Guntis GAILĪTIS (Art), b. 11.02.1949, elected 24.11.2011. DHSS. *Latvia. Tel.: (371) 29244251, (371) 67181691. E-mail: guntis.gailitis@riga.lv*

Oskars GERTS (Journalistics), b. 28.12.1940, elected 21.11.1997. DHSS. *Latvia. Tel. (371) 29491340. E-mail: gertsoskars@gmail.com*

Guntars GODIŅŠ (Literature), b. 26.04.1958, elected 28.11.2013. DHSS. *Tel.: (371) 26143924. E-mail: guntars.godins@inbox.lv*

Pēteris GUĻĀNS (Economics), b. 08.09.1920, elected 20.11.2003. DHSS. *Institute of Economics, Latvian Academy of Sciences. Tel.: (371) 67567909, (371) 26027055. E-mail: gulans@apollo.lv*

Alvis HERMANIS (Art), b. 27.04.1965, elected 22.11.2007. DHSS. *The New Rīga Theatre, Latvia. Tel: (371) 67283225.*

Dainis ĪVĀNS (Literature), b. 25.09.1955, elected 29.11.2012. DHSS. *Latvia. Tel.: (371) 26554414. E-mail: dainis.ivans@inbox.lv*

- Valdis JĀKOBSONS** (Economics), b. 04.06.1938, elected 22.11.1996. DHSS. *Latvia. Tel.: (371) 29210625. E-mail: valdisjakobsons@inbox.lv*
- Anna JURKĀNE** (History), b. 30.06.1944, elected 28.11.2002. DHSS. *Latvia. Tel.: (371) 67971402, (371) 20278317. E-mail: anna.jurkane@turaida-muzejs.lv*
- Imants KALNIŅŠ** (Art), b. 26.05.1941, elected 22.11.1996. DHSS. *The Latvian Composers Union. Latvia. Tel.: (371) 66901070. E-mail: komponisti.lv@gmail.com*
- Kristaps Juris KEGGI** (Medicine), b. 09.08.1934, elected 05.07.1990. DCBMS. *Yale School of Medicine, New Haven, USA. Tel.: 203- 737-5656 . E-mail: kristaps.keggi@yale.edu*
- Arnolds KLOTIŅŠ** (Art Studies), b. 10.04.1934, elected 24.11.2016. DHSS. *Institute of Literature, Folklore and Art of the University of Latvia. Tel.: (371) 26440579. E-mail: arnolaim@inbox.lv*
- Eduards KĻAVIŅŠ** (Art Studies), b. 23.09.1937., elected 27.11.2014. DHSS. *Institute of Art History of the Art Academy of Latvia. Tel.: (371) 67227852. E-mail: eduards_klavins@tvnet.lv; eduards.klavins@lma.lv*
- Gidons KRĒMERS** (Art), b. 27.02.1947, elected 25.11.1999. DHSS. *KREMERata Baltica, Latvia. Tel.: (371) 67224055. E-mail: kb@kremeratabaltica.lv*
- Gunārs KROLLIS** (Art), b. 23.06.1932, elected 26.11.2015. DHSS. *Latvia. Tel.: (371) 29179864*
- Andris KRONBERGS** (Architecture), b. 11.01.1951, elected 28.11.2013. DHSS. *Latvia. Tel. (371) 67225852. E-mail: arhis@arhis.lv*
- Juris KRONBERGS** (Literature), b. 09.08.1946, elected 20.11.2003. DHSS. *Sweden. Tel.: (4673) 5676229, (371) 26050561. E-mail: juris.kronbergs@comhem.se*
- Imants LANCMANIS** (History of Art), b. 29.07.1941, elected 09.01.1992. Grand Medal of the LAS (2004). DHSS. *Rundāle Castle Museum, Latvia. Tel.: (371) 63962272, (371) 29454360. E-mail: lancmanis@rundale.net*
- Jānis LATVIETIS** (Agricultural Sciences), b. 15.02.1928, elected 09.01.1992. DCBMS; DAFS. *Latvia University of Agriculture. Tel.: (371) 63081163, (371) 26343120. E-mail: ilzelatviete@gmail.com*
- Māra LĀCE** (Art Studies), b. 18.02.1954, elected 26.11.2015. DHSS. *Latvian National Museum of Art. Tel.: (371) 67325051. E-mail: Mara.Lace@lnmm.lv*
- Arturs MASKATS** (Art), b. 20.12.1957, elected 27.11.2014. DHSS. *Jāzeps Vītols Latvian Academy of Music, Latvijas Koncerti. E-mail: artursmaskats@yahoo.com*
- Aina NAGOBADS-ĀBOLA** (Political Studies), b. 09.06.1920, elected 24.11.2011. DHSS. *Latvia. E-mail: baibapaulsone@inbox.lv*
- Aleksejs NAUMOVŠ** (Art), b. 10.01.1955, elected 28.11.2013. DHSS. *Art Academy of Latvia. Tel.: (371) 67326068, (371) 26387212. E-mail: aleksejs.naumovs@lma.lv*

- Andris NELSONS** (Art), b. 18.11.1978, elected 29.11.2012. DHSS. *Latvia. Tel.: (371) 67073715. E-mail: info@opera.lv*
- Jānis OSIS** (Computer Science), b. 06.04.1929, elected 27.11.1998. DPTS. *Rīga Technical University. Tel.: (371) 67089523, (371) 22023399. E-mail: janis.osis@rtu.lv*
- Jānis Andris OSIS** (Art), b. 04.10.1943, elected 28.11.2002. DHSS. *Art Academy of Latvia. Tel.: (371) 28311929. E-mail: jaosis@inbox.lv*
- Raimonds PAULS** (Art), b. 12.01.1936, elected 24.11.1992. DHSS. *The Latvian Composers Union. Tel.: (371) 66901070. E-mail: komponisti.lv@gmail.com*
- Jānis PETERS** (Literature), b. 30.06.1939, elected 06.12.1990. DHSS. *Latvia. Tel.: (371) 67339350.*
- Karina PĒTERSONE** (History of Culture), b. 19.11.1954, elected 27.11.2014. DHSS. *Saeima of the Republic of Latvia. E-mail: petersone.karina@gmail.com*
- Indulis Ojārs RANKA** (Art), b. 15.04.1934, elected 24.11.1992. DHSS. *The Rainis Prize of the LAS (1998). Latvia. Tel.: (371) 25150916. E-mail: marcat@inbox.lv*
- Jānis ROKPELŅIS** (Literature), b. 02.10.1945, elected 27.11.2014. DHSS. *Latvian Academy of Sciences. Tel.: (371) 26385252. E-mail: janis.rokpelnis@gmail.com*
- Juris RUBENIS** (Theology), b. 20.12.1961, elected 28.11.2002. DHSS. *Latvia. Tel.: (371) 67601564, (371) 29434906. E-mail: j.rubenis@icloud.com*
- Valdis RŪMNIĒKS** (Literature), b. 06.10.1951, elected 24.11.2005. DHSS. *Latvia. Tel.: (371) 67519393, (371) 29491073. E-mail: valdis.rumnieks@gmail.com*
- Māris SIRMAIS** (Art), b. 27.06.1969, elected 24.11.2005. DHSS. *State Choir "Latvija". Tel.: (371) 67223839. E-mail: info@koris.lv*
- Knuts SKUJENIEKS** (Literature), b. 05.09.1936, elected 09.01.1992. DHSS. *Latvia. Tel.: (371) 67980189, (371) 26226668. E-mail: knutsskujenieks@hotmail.com*
- Zigmunds SKUJIŅŠ** (Literature), b. 25.12.1926, elected 27.11.1998. DHSS. *Latvia. Tel.: (371) 28635372. E-mail: zigmundsskujins@inbox.lv*
- Džemma SKULME** (Art), b. 20.09.1925, elected 24.11.1992. DHSS. *Latvia. Tel.: (371) 67519086, (371) 27111310. E-mail: dzenmaskulme@gmail.com*
- Zbignevs STANKEVIČS** (Theology), b. 15.02.1955, elected 29.11.2012. DHSS. *Mazā Pils iela 2a, Rīga, LV 1050, Latvia. Tel.: (371) 67227266, (371) 29948353. E-mail: metropolitan@catholic.lv*
- Jānis STREIČS** (Art), b. 26.09.1936, elected 25.11.1999. DHSS. *The Rainis Prize of the LAS (2008). Latvia. Tel.: (371) 67339569, (371) 29444308. E-mail: janis.streics@gmail.com; janis@streich.lv*
- Jānis STRUPULIS** (Art), b. 28.01.1949, elected 25.11.1994. *The Rainis Prize of the LAS (2012). DHSS. Latvia. Tel.: (371) 26811186. E-mail: janis.strupulis@gmail.com*

HONORARY MEMBERS

Andris VĀRPA (Art), b. 19.02.1950, elected 20.11.2003. DHSS. *Latvia. Tel.: (371) 29111420. E-mail: andrisvarpa@inbox.lv*

Pēteris VASKS (Art), b. 16.04.1946, elected 25.11.1994. DHSS. *Latvia. Tel.: (371) 67629960. E-mail: peterisv@inbox.lv*

Andris VILKS (Bibliography), b. 16.05.1957, elected 28.11.2013. DHSS. *National Library of Latvia. Tel.: (371) 67806100. E-mail: andris.vilks@lnb.lv*

Vilis VĪTOLS (Engineering Sciences), b. 14.02.1934, elected 26.11.2009. DPTS. *Latvia. Tel.: (371) 67289535. E-pasts: vilis.vitols@latnet.lv*

Māra ZĀLĪTE (Literature), b. 18.02.1952, elected 27.11.1998. DHSS. *Latvian Writer's Union. <http://www.marazalite.lv/>*

Uldis ZEMZARIS (Art), b. 24.02.1928, elected 20.11.2008. DHSS. *Latvia.*

Namejs ZELTIŅŠ (Power Engineering), b. 12.08.1935, elected 25.11.2010. DPTS. *Institute of Physical Energetics, Latvia. Tel.: (371) 67558636, (371) 29363105. SKYPE: namejs.zeltins. E-mail: zeltinsh@edi.lv*

Anna ŽĪGURE (Literature), b. 25.08.1948, elected 24.11.2005. DHSS. *Latvia. Tel.: (371) 26675202. E-mail: veleda48@gmail.com*

FOREIGN MEMBERS

- Aleksey ANDRONOV** (Linguistics), b. 12.12.1972, elected 22.11.2007. DHSS. *Russia*.
Tel.: (7-812) 3289762, (7-962) 6913162. E-mail: baltistica@gmail.com
- Norbert ANGERMANN** (History), b. 02.11.1936, elected 24.11.1992. DHSS. *Germany*.
Tel.: (49-40) 428384833. E-mail: norbertangermann@t-online.de
- Nikolajs BALABKINS** (Economics), b. 17.07.1926, elected 27.06.1991. DHSS. *College of Business and Economics, Lehigh University, USA*. *E-mail: nib2@lehigh.edu*
- Jūras BANYS** (Physics), b. 30.12.1962, elected 28.11.2013. DPTS. *Vilnius University, Lithuania*. *Tel.: (370) 528 2234536. E-mail: juras.banys@ff.vu.lt*
- Antonio BIANCONI** (Physics), b. 19.12.1944, elected 26.11.2015. DPTS. *Rome International Center for Materials Science Superstripes (Italy)*. *Tel.: (+39) 3388438281. E-mail: antonio.bianconi@ricmass.eu*
- Gunnar BIRKERTS** (Architecture), b. 17.01.1925, elected 27.06.1991. Grand Medal of the LAS (2000). DHSS. *FAIA, USA*. *Tel.: (1-781) 2354901. E-mail: gunnarbirk@aol.com*
- Renāte BLUMBERGA** (Ethnology), b. 26.02.1971, elected 27.11.2014. DHSS. *University of Helsinki, Finland*. *Tel.: (358) 408336002. E-mail: renate.blumberga@gmail.com*
- Pēteris BOLŠAITIS** (Chemistry), b. 12.07.1937, elected 05.07.1990. DCBMS. *Latvia*. *Tel.: (371) 67283955, (371) 29101062. E-mail: irapeteris@aol.com*
- Dzintra BONDA** (Linguistics), b. 01.09.1940, elected 29.11.2001. DHSS. *Ohio University, USA*. *Tel.: (1-740) 5915019. E-mail: bond@ohiou.edu*
- Nicodemus E. BOYER** (Chemistry), b. 01.06.1925, elected 10.11.1995. DCBMS. *Delta Scientific Consultants, USA*. *Tel.: (1-269) 2781098. E-mail: studeophile@live.com*
- Michael BRANCH** (Linguistics), b. 24.03.1940, elected 23.11.2000. DHSS. *UK*. *E-mail: MBr1504092@aol.*
- Herman BRANOVER** (Physics), b. 13.12.1931, elected 09.01.1992. DPTS. *USA*. *Tel.: (1-347) 7157644.*
- Gilles BRASSARD** (Computer Science), b. 20.04.1955, elected 27.11.1998. DPTS. *Université de Montreal, Canada*. *Tel.: (1-514) 3436807. E-mail: brassard@iro.umontreal.ca*
- Alvis BRĀZMA** (Computer Science), b. 26.06.1959, elected 25.11.2010. Grand Medal of the LAS (2013). DPTS. *European Bioinformatics Institute, Cambridge, UK*. *Tel.: (440) 1223 494658. E-mail: brazma@ebi.ac.uk*
- Edmunds BUNKŠE** (Human Geography), b. 29.07.1935, elected 26.11.1993. DCBMS. *University of Delaware, USA; University of Latvia*. *Tel.: (371) 25427900. E-mail: ebunkse@udel.edu; edmundsvaldemars.bunkse@lu.lv*

Raimondas ČIEGIS (Mathematics), b. 18.10.1958, elected 25.11.2004. DPTS. *Vilnius Gediminas Technical University, Lithuania. Tel.: (370-85) 2744828. E-mail: raimondas.ciegis@vgtu.lt*

Niels Egede CHRISTENSEN (Physics), b. 05.04.1943, elected 28.11.2013. DPTS. *University of Aarhus, Denmark. Tel.: (+45) 8715 5627. E-mail: nec@phys.au.dk*

Meinhard CLASSEN (Medicine), b. 12.08.1936, elected 21.11.1997. DCBMS. *Technical University of Munich, Germany. Tel.: (49-89) 41402257. E-mail: meinhard.classen@tum.de*

Zenonas DABKEVIČIUS (Agricultural Sciences), b. 26.08.1954, elected 24.11.2016. DAFS. *Lithuanian Research Centre for Agriculture and Forestry (LAMMC), Lithuania. Tel.: (370) 347 37057. E-mail: dabkevicius@lammc.lt*

Andrew DAUGULIS (Biotechnology), b. 01.09.1951, elected 09.01.1992. DCBMS. *Queen's University, Canada. Tel.: (1-613) 5332784. E-mail: andrew.daugulis@chee.queensu.ca*

Olafs DAUGULIS (Chemistry), b. 11.09.1968, elected 24.11.2011. DCBMS. *University of Houston, USA. Tel.: 832-842-8180. E-mail: olafs@uh.edu*

Pietro Umberto DINI (Linguistics), b. 05.10.1960, elected 20.11.2003. DHSS. *Dipartimento di Linguistica Università di Pisa, Italy. E-mail: pud@ling.unipi.it*

Dainis DRAVIŅŠ (Astronomy), b. 10.09.1949, elected 09.01.1992. Grand Medal of the LAS (1998). DPTS. *Lund Observatory, Sweden. Tel.: (46-46) 2227297. E-mail: dainis@astro.lu.se*

Juris DREIFELDS (Political Studies), b. 17.04.1942, elected 26.11.1999. DHSS. *Department of Political Science, Brock University, Canada. Tel.: (1-905) 6853998. E-mail: jdreifelds@brocku.ca*

Till von EGIDY (Physics), b. 23.12.1933, elected 21.11.1997. DPTS. *Technische Universität München, Germany. Tel.: +49(89) 28912510. E-mail: t.v.egidy@tum.de; Egidy@Physik.TU-Muenchen.de*

Jüri ENGELBRECHT (Mechanics), b. 01.08.1939, elected 22.11.1996. DPTS. *Estonian Academy of Sciences, Estonia. Tel.: (372) 6204160, (372) 6442013. E-mail: j.engelbrecht@akadeemia.ee; je@ioc.ee*

Robert EVARESTOV (Physics), b. 23.07.1937, elected 20.11.2003. Grand Medal of the LAS (2007). DPTS. *St. Petersburg State University, Russia. Tel.: (7-812) 4286755. E-mail: re1973@re1973.spb.edu; evarest@hm.csa.ru*

Andrievs EZERGAILIS (History), b. 10.12.1930, elected 05.07.1990. Grand Medal of the LAS (2012). DHSS. *Dept. of History, Ithaca College, USA. Tel.: (1-607) 2743597. E-mail: ezergail@ithaca.edu*

Oscar FAIX (Forestry Science), b. 15.06.1942, elected 25.11.2010. DAFS. *University of Hamburg, Germany. Tel.: (049) 407110866. E-mail: o.faix@holz.uni-hamburg.de*

Trevor FENNELL (Linguistics), b. 16.07.1940, elected 06.12.1990. Grand Medal of the LAS (2006). DHSS. *Flinders University of South Australia, Australia. E-mail: fenn0013@flinders.edu.au; Trevor.Fennell@flinders.edu.au*

- Tamaz (Thomas V.) GAMKRELIDZE** (Linguistics), b. 23.10.1929, elected 20.11.2008. DHSS. *Georgian National Academy of Sciences, Honorary President (19.06.2013–). Georgia.* Tel./Fax: (99532) 998891. E-mail: t.gamkrelidze@science.org.ge
- Vladimir GEVORGYAN** (Chemistry) b. 12.08.1956, elected 24.11.2016. DCBMS. *University of Illinois at Chicago (ASV).* Tel.: (312) 355-3579. E-mail: vlad@uic.edu
- Vladimirs GUSAKOV** (Economics), b. 12.02.1953, elected 26.11.2015. DHSS. *The National Academy of Sciences of Belarus, Belarus.* Tel.: (+375) 2841801. E-mail: nasb@presidium.bas-net.by
- Juris HARTMANIS** (Computer Science), b. 05.07.1928, elected 06.12.1990. Grand Medal of the LAS (2001). DPTS. *Cornell University, USA.* Tel.: (1-607) 2559208. E-mail: jh111@cornell.edu; jh@cs.cornell.edu
- Māris HARTMANIS** (Biology), b. 21.09.1953, elected 21.11.1997. DCBMS. *Sweden.* Tel.: (468) 4076430. E-mail: maris.hartmanis@biophausia.se
- Harald zur HAUSEN** (Medicine), b. 11.03.1936, elected 28.11.2013. DCBMS. *Deutsches Krebsforschungszentrum, Heidelberg, Germany.* Tel.: (+49) 6221420. E-mail: zurhausen@dkfc-Heidelberg.de
- Erkki Johannes HOLLO** (Law), b. 28.11.1940, elected 20.11.2003. DHSS. *Faculty of Law, University of Helsinki, Finland.* Tel.: (358) 50369 5696. E-mail: erkki.hollo@helsinki.fi
- Vyacheslav IVANOV** (History of Culture), b. 20.08.1929, elected 26.11.1993. DHSS. *Dept. of Slavic Languages and Literatures, University of California, USA.* Tel.: (1-310) 8256397. E-mail: ivanov@ucla.edu
- Paul Albert JANMEY** (Physical Chemistry), b. 30.04.1953, elected 24.11.2005. DPTS. *University of Pennsylvania, USA.* Tel.: (1-215) 5737380. E-mail: janmey@mail.med.upenn.edu
- Benediktas JUODKA** (Chemistry), b. 13.01.1943, elected 25.11.1994. DCBMS. *Lietuvos Respublikos Seimas, Lithuania.* Tel.: (370-5) 2396649. E-mail: benediktas.juodka@lrs.lt
- Vitauts KALNIŅŠ** (Biology), b. 12.01.1938, elected 24.11.1992. DCBMS. *Canada.* Tel.: (1-416) 2257530. E-mail: vitauts.kalnins@utoronto.ca
- Marco KIRM** (Physics), b. 27.12.1965, elected 29.11.2012. DPTS. *University of Tartu, Estonia.* Tel.: (372) 7374601, (372) 53427170. E-mail: Marco.Kirm@ut.ee
- Jānis KĻAVIŅŠ** (Medicine), b. 06.05.1921, elected 05.07.1990. DCBMS. *Albert Einstein College of Medicine, USA.* Tel.: (1-914) 4722116.
- Georgs Pauls KREIŠMANIS** (Chemistry), b. 28.01.1946, elected 23.11.2000. DCBMS. *University of Latvia, Latvia.* Tel.: (371) 26171478. E-mail: jpk@lanet.lv
- Jānis KRĒSLIŅŠ** (Bibliography), b. 19.09.1924, elected 27.11.1998. DHSS. *USA.* Tel.: (1-718) 5480755. E-mail: jkreslins@aol.com
- Arnīs KUKSIS** (Chemistry), b. 03.12.1927, elected 22.11.1996. DCBMS. *University of Toronto, Canada.* Tel.: (1-416) 9782590. E-mail: arnis.kuksis@utoronto.ca

Ruta KUNDZIŅA (Medicine), b. 30.07.1916, elected 27.06.1991. DCBMS. *USA*. Tel.: (1-617) 3280611. E-mail: rbkundsin@aol.com

Anto LEIKOLA (History of Science), b. 08.06.1937, elected 09.01.1992. DHSS. *Tempelikutu 14 A5 Fin00100 Helsinki, Finland*. Tel.: (358) 094543208. E-mail: anto.leikola@welho.com

Aleksandr LUSHCHIK (Physics), b. 22.06.1952, elected 29.11.2012. DPTS. *University of Tartu, Estonia*. Tel.: (372) 7374619, (372) 53304502. E-mail: luch@fi.tartu.ee; aleksandr.lushchik@ut.ee

Ivars MELNGAILIS (Physics), b. 13.11.1933, elected 27.06.1991. DPTS. *Lincoln Laboratory, Massachusetts Institute of Technology, USA*. Tel.: (1-617) 9817804. E-mail: melngailis@ll.mit.edu

Jānis MELNGAILIS (Physics), b. 04.02.1939, elected 06.12.1990. DPTS *University of Maryland, USA*. Tel.: (1-301) 4054916. E-mail: melng@umd.edu

Baiba METUZĀLE-KANGERE (Linguistics), b. 30.03.1942, elected 24.11.1994. DHSS. *Sweden. Latvia*. Tel.: (371) 67270635, (371) 20027790. E-mail: baiba.kangere@gmail.com

René MOREAU (Mechanics), b. 27.10.1938, elected 22.11.1996. DPTS. *Institut National Polytechnique de Grenoble, France*. E-mail: rene.moreau@simap.grenoble-inp.fr

Lalita MUIŽNIECE (Literary Criticism), b. 11.08.1935, elected 09.01.1992. DHSS. *USA*. Tel.: (1-978) 3526328, (371) 67518174. E-mail: muizniece@wmich.edu

Valters NOLLENDORFS (Literary Criticism), b. 22.03.1931, elected 05.07.1990. DHSS. *Museum of the Occupation of Latvia*. Tel.: (371) 67212715. E-mail: valters.nollendorfs@lu.lv

Erwin OBERLÄNDER (History), b. 19.03.1937, elected 20.11.2008. DHSS. *Germany*. Tel.: (0049) 228218483. E-mail: oberlandere@gmx.de

Andreas OKSCHE (Medicine), b. 27.07.1926, elected 26.11.1993. DCBMS. *Giessen, Germany*. Tel.: (49-641) 77328.

Gottfried OTTING (Biology, Biophysics), b. 07.09.1958, elected 24.11.2005. DCBMS. *Australian National University, Australia*. Tel.: (61-2) 6125 6507. E-mail: Gottfried.Otting@anu.edu.au

Jānis (John) Tāivaldis OZOLIŅŠ (Philosophy), b. 10.09.1950, elected 28.11.2013. DHSS. *School of Philosophy, Australian Catholic University, Australia*. Tel.: (61) 99533140. E-mail: john.ozolins@acu.edu.au

Andris PADEGS (Computer Science), b. 27.03.1929, elected 27.06.1991. Grand Medal of the LAS (2004). DPTS. *USA*. Tel.: (1-845) 4623317. E-mail: apadegs@optonline.net; apadegs@tilts.org

Karl PAJUSALU (Linguistics), b. 20.06.1963, elected 26.11.2015. DHSS. *University of Tartu, Estonia*. Tel.: (372) 7376124. E-mail: karl.pajusalu@ut.ee

Radegast PAROLEK (Literary Criticism), b. 01.12.1920, elected 25.11.1994. DHSS. *Univerzita Karlova, Czech Republic*. Tel.: (420-2) 741426.

- Jānis PENIĶIS** (Political Studies), b. 29.07.1933, elected 21.11.1997. DHSS. *USA*. Tel.: (1-574) 2877090. E-mail: jpenikis@iusb.edu
- Gert von PISTOHLKORS** (History), b. 17.12.1935, elected 05.07.1990. DHSS. *Germany*. Tel.: (49-551) 541296. E-mail: pistohlkors@01019freenet.de
- Andrejs PLAKANS** (History), b. 31.12.1940, elected 05.07.1990. DHSS. *USA*. Tel.: (1-319) 3382911. E-mail: aplakans@iastate.edu
- Valdemaras RAZUMAS** (Chemistry), b. 17.07.1955, elected 26.11.2015. DCBMS. *Lithuanian Academy of Sciences, Lithuania*. Tel.: (370-5) 2613651. E-mail: v.razumas@lma.lt; valdemaras.razumas@bchi.vu.lt
- Elsa REICHMANIS** (Material Science), b. 09.12.1953, elected 25.11.2004. DCBMS. *Georgia Institute of Technology, School of Chemical and Biomolecular Engineering, USA*. Tel.: (1-404) 8940316. E-mail: elsa.reichmanis@chbe.gatech.edu
- Alex SHLUGER** (Physics), b. 28.06.1954, elected 25.11.2010. DPTS. *University College London, UK*. Tel.: (44) 2076 791312. E-mail: a.shluger@ucl.ac.uk
- Jacques SIMON** (Physics), b. 12.12.1947, elected 22.11.1996. DPTS. *France*. Tel.: (33-1) 45926732. E-mail: Jacques.Simon@espci.fr
- Victoras Algirdas SNECKUS** (Chemistry), b. 01.08.1937, elected 24.11.2016. DCBMS. *Queen's University Bader Chair Emeritus, Snieckus Innovations, Canada*. E-mail: snieckus@chem.queens.ca; info@snieckusinnovations.ca
- Yurij SOLOVJOV** (History of Science), b. 30.09.1924, elected 10.11.1995. DCBMS. *Russia*. Tel.: (7-495) 4383063.
- Tarmo SOOMERI** (Mathematics), b. 11.10.1957, elected 26.11.2015. DPTS. *Estonian Academy of Sciences, Estonia*. Tel.: (372) 620 4176, E-mail: soomere@cs.ioc.ee
- Pauls STRADIŅŠ** (Physics), b. 05.02.1963, elected 29.11.2012. DPTS. *National Renewable Energy Laboratory, USA*. Tel.: (1-303) 3846774. E-mail: Pauls.Stradins@nrel.gov
- Uldis STREIPS** (Biology), b. 01.02.1942, elected 09.01.1992. DCBMS. *University of Louisville, USA*. Tel.: (1-502) 8525365. E-mail: unstre01@louisville.edu
- Juris Pēteris SVENNE** (Physics), b. 14.02.1939, elected 29.11.2001. DPTS. *Dept. of Physics and Astronomy, University of Manitoba, Canada*. Tel.: (1-204) 4747354. E-mail: Svenne@physics.umanitoba.ca
- Rasma ŠILDE-KĀRKLĪŅA** (Political Studies), b. 07.06.1946, elected 24.11.1992. DHSS. *Latvia*. *USA*. Tel.: (371) 67205472. E-mail: Rasma.Karklina@saeima.lv
- Pavel ŠTOLL** (Literary Criticism), b. 18.07.1964, elected 27.11.2014. DHSS. *Charles University in Prague, Czech Republic*. Tel.: (420) 221 619 274, (420) 602 539 392. E-mail: pavel.stoll@ff.cuni.cz; pavel.stoll@tiscali.cz
- Enn TARVEL** (History), b. 31.07.1932, elected 10.11.1995. DHSS. *Estonia*. Tel.: (372) 6726189. E-mail: tarvel@hot.ee

Jana TESAŘOVÁ (Literary Criticism), b. 16.02.1953, elected 22.11.1996. DHSS. *Institute of World Literature of the Slovak Academy of Sciences, Slovakia. Tel.: (421) 904823917. E-mail: jana.tesarova16@gmail.com*

Felix UNGER (Medicine), b. 02.03.1946, elected 09.01.1992. DCBMS. *Academia Scientiarum et Artium Europaea, Austria. Tel.: (43-662) 841345. E-mail: presidential.office@euro-acad.eu; felix.unger@euro-acad.eu*

Juris UPATNIEKS (Physics), b. 07.05.1936, elected 27.06.1991. Grand Medal of the LAS (1999). DPTS. *USA. Tel.: (1-734) 6639598. E-mail: juris@upatnieks.com; Latvia: Tel.: (371) 63269070. jupatnks@latnet.lv*

Lembit VABA (Linguistics), b. 27.05.1945, elected 28.11.2013. DHSS. *Estonia. Tel. (372) 56459217. E-mail: phorest45@gmail.com*

Jānis VĀRNA (Mechanics), b. 14.08.1951, elected 24.11.2016. DPTS. *Luleå University of Technology, Sweden. Tel.: (+46) 920 491649. E-mail: Janis.Varna@LTU.SE*

Edvīns VEDĒJS (Chemistry), b. 31.01.1941, elected 09.01.1992. Grand Medal of the LAS (2005). DCBMS. *University of Michigan, USA. Tel.: (1-734) 6152177. E-mail: edved@umich.edu*

Richard VILLEMS (Biophysics), b. 28.11.1944, elected 24.11.2005. Grand Medal of the LAS (2011). DCBMS. *Estonian Biocentre, Estonia. Tel.: (372) 7375064. E-mail: rvillems@ebc.ee*

Jarl WIKBERG (Medicine and Pharmacology), b. 04.11.1949, elected 23.11.2000. DCBMS. *Uppsala University, Sweden. Tel.: (46-18) 4714238, (46-70) 3449549. E-mail: Jarl.Wikberg@farmbio.uu.se*

Eberhard WINKLER (History), b. 31.07.1955, elected 24.11.2011. DHSS. *Georg-August Universität Göttingen, Germany. E-mail: ewinkle@gwdg.de*

Kurt WÜTHRICH (Biophysics), b. 04.10.1938, elected 25.11.2004. DCBMS. *Institute of Molecular Biology and Biophysics, Switzerland. Tel.: (41-44) 6332473. E-mail: kurt.wutrich@mol.biol.ethz.ch*

Bertrams ZARIŅŠ (Medicine), b. 22.06.1942, elected 27.06.1991. DCBMS. *Massachusetts General Hospital, USA. Tel.: (1-617) 7263421. E-mail: bzarins@partners.org*

Kristaps ZARIŅŠ (Medicine), b. 02.12.1943, elected 06.12.1990. Grand Medal of the LAS (2009). DCBMS. *Stanford University School of Medicine, USA. Tel.: (1-650) 4731794, (1-650) 4986039. E-mail: zarins@hearthflow.com; zarins@stanford.edu*

Arvīds ZIEDONIS (Philosophy), b. 08.03.1931, elected 10.11.1995. DHSS. *USA. Tel.: (1-570) 6296349. E-mail: ziedonis@ptd.net*

Zigmas ZINKEVIČIUS (Linguistics), b. 04.01.1925, elected 10.11.1995. DHSS. *Institute of Lithuanian Language, Lithuania. Tel.: (370-5) 2410877, (370-5) 2346472. E-mail: lki@lki.lt*

Regina ŽUKA (Chemistry), b. 06.12.1936, elected 23.11.2000. Grand Medal of the LAS (2014). DCBMS. *Rimonyx Pharmaceuticals, Ltd., Israel. Tel.: (972-8) 9389505. E-mail: reginazhuka@gmail.com*

CORRESPONDING MEMBERS

Edgars ĀBELE (Chemistry), b. 22.01.1962, elected 25.11.2010. DCBMS. *Latvian Institute of Organic Synthesis*. Tel.: (371) 67014943. E-mail: abele@osi.lv

Māris ĀBELE (Astronomy), b. 27.04.1937, elected 29.11.2001. DPTS. *Institute of Astronomy, University of Latvia*. Tel.: (371) 26419372.

Igors AKSIKS (Medicine), b. 11.07.1948, elected 07.12.2006. DCBMS. *University of Latvia*. Tel.: (371) 29238422. E-mail: igors.aksiks@lu.lv

Ina ALSIŅA (Agricultural Sciences), b. 26.07.1960, elected 26.11.2015. DAFS. *Latvia University of Agriculture*. Tel.: (371) 28636175. E-mail: ina.alsina@llu.lv

Agnis ANDŽĀNS (Mathematics), b. 19.08.1952, elected 24.11.2005. DPTS. *University of Latvia*. Tel.: (371) 67033738, (371) 26566419. E-mail: agnis.andzans@lu.lv

Iīga APINE (History), b. 13.03.1928, elected 16.03.1978. DHSS. *Institute of Philosophy and Sociology, University of Latvia*. Tel.: (371) 67034520. E-mail: fsi@lza.lv

Guntis ARNICĀNS (Computer Science), b. 02.08.1968, elected 27.11.2014. DPTS. *University of Latvia*. Tel.: 67034475. E-mail: guntis.arnicans@lu.lv

Pavel ARSENYAN (Chemistry), b. 29.05.1975, elected 26.11.2015. DCBMS. *Latvian Institute of Organic Synthesis*. Tel.: (371) 29849464. E-mail: pavel.arsenyan@hycos.com; pavel@osi.lv

Ivars AUSTERS (Psychology), b. 14.06.1967, elected 24.11.2016. DHSS. *University of Latvia*. Tel.: (371) 67034475. E-mail: austers@lu.lv

Jānis AUZIŅŠ (Mechanics), b. 25.07.1950, elected 20.11.2008. DPTS. *Rīga Technical University*. Tel.: (371) 26348750. E-mail: auzinsjp@latnet.lv

Ringolds BALODIS (Law), b. 09.01.1966, elected 24.11.2011. DHSS. *University of Latvia*. Tel.: (371) 67034447. E-mail: Ringolds.Balodis@lu.lv

Biruta BANKINA (Agricultural Sciences), b. 23.06.1960, elected 27.11.2014. DAFS. *Latvia University of Agriculture*. Tel.: (371) 63021985, 26391893. E-mail: biruta.bankina@llu.lv

Guntis BĀRZDIŅŠ (Computer Science), b. 23.12.1962, elected 25.11.2010. DPTS. *Institute of Mathematics and Computer Science, University of Latvia*. Tel.: (371) 29206943. E-mail: guntis.barzdins@lumii.lv

Edgars BERVALDS (Astronomy), b. 13.09.1936, elected 23.11.2000. DPTS. *Latvian Academy of Sciences*. Tel.: (371) 26371390. E-mail: berv@latnet.lv

Imants BĒRSONS (Physics), b. 11.12.1935, elected 24.11.1992. DPTS. *University of Latvia*. E-mail: bersons@latnet.lv

Edīte BIRĢELE (Agricultural Sciences), b. 14.08.1937, elected 26.11.1999. DCBMS; DAFS. *Latvia University of Agriculture*. Tel.: (371) 29527276

Juris BORZOVS (Computer Science), b. 17.04.1950, elected 22.11.2007. DPTS. *University of Latvia*. Tel.: (371) 67034490, (371) 29257530. Skype: jborzovs. E-mail: juris.borzovs@lu.lv

Maija BURIMA (Literary Criticism), b. 10.03.1971, elected 29.11.2012. DHSS. *Daugavpils University*. Tel.: (371) 65422611, (371) 29789096. Fax: (371) 65422611. E-mail: maija.burima@du.lv

Brigita BUŠMANE (Linguistics), b. 04.09.1939, elected 23.11.2000. DHSS. *Institute of Latvian Language, University of Latvia*. Tel.: (371) 67227696. Tel./Fax: (371) 67227696. E-mail: brigita.busmane@inbox.lv

Uģis CĀBULIS (Forestry Science), b. 15.05.1963, elected 24.11.2016. DAFS. *Latvian State Institute of Wood Chemistry*. Tel.: (371) 29272658. E-mail: cabulis@edi.lv

Ausma CIMDIŅA (Literary Criticism), b. 30.09.1950, elected 20.11.2003. DHSS. *University of Latvia*. Tel.: (371) 67033850. E-mail: ausma.cimdina@lu.lv

Inga CIPROVIČA (Agricultural Sciences), b. 03.08.1969, elected 24.11.2011. DAFS. *Latvia University of Agriculture*. Tel.: (371) 63021075, 63005729. E-mail: inga.ciprovica@llu.lv

Andris ČATE (Mechanics), b. 05.07.1952, elected 25.11.2004. DPTS. *Rīga Technical University*. Tel.: (371) 67089124. E-mail: and_cate@latnet.lv; Andris.Cate@rtu.lv

Kārlis ČERĀNS (Computer Science), b. 21.12.1965, elected 28.11.2013. DPTS. *Institute of Mathematics and Computer Science, University of Latvia*. Tel.: (371) 67213716. E-mail: karlis.cerans@lumii.lv

Konstantīns DIDENKO (Economics), b. 23.08.1946, elected 24.11.2005. DHSS. *Rīga Technical University*. Tel.: (371) 67089344. E-mail: konstantins.didenko@rtu.lv

Tatjana DIŽBITE (Forestry Science), b. 12.01.1949, elected 22.11.2007. DAFS. *Latvian State Institute of Wood Chemistry*. Tel.: (371) 67555916. E-mail: ligno@edi.lv

Guntis EBERHARDS (Geography), b. 08.02.1936, elected 09.01.1992. DCBMS. *University of Latvia*. Tel.: (371) 29437990, (371) 67334096.

Pārsla EGLĪTE (Demography), b. 22.12.1934, elected 27.11.1998. DHSS. *Latvian Academy of Sciences*. Tel.: (371) 26577103. E-mail: spiceina@lza.lv

Roberts EGLĪTIS (Physics), b. 01.02.1966, elected 27.11.2014. FTZN. *Institute of Solid State Physics, University of Latvia*. Tel.: 67187480. E-mail: reglitis@gmail.com

Andris FERDATS (Medicine), b. 11.06.1941, elected 09.01.1992. DCBMS. *Latvian Academy of Sciences*. Tel.: (371) 29495937. E-mail: fandris11@inbox.lv

Fjodors FJODOROVŠ (Literary Criticism), b. 28.09.1939, elected 10.11.1995. The Rainis Prize of the LAS (2015) DHSS. *Daugavpils University, Latvia*. Tel.: (371) 29195869. E-mail: fedor.fedorov@gmail.com

Zinta GAILE (Agricultural Sciences), b. 07.02.1958, elected 20.11.2008. DAFS. *Latvia University of Agriculture*. Tel.: (371) 63005679, (371) 29135525. E-mail: zinta.gaile@llu.lv

Tālis GAITNIEKS (Forestry Science), b. 08.09.1957, elected 26.11.2009. DAFS. *Latvian State Forestry Research Institute "Silava"*. Tel.: (371) 26463738. E-mail: talis.gaitnieks@silava.lv

- Jānis GRABIS** (Computer Science), b. 22.10.1974, elected 29.11.2012. DPTS. *Rīga Technical University*. Tel.: (371) 67089594. E-mail: grabis@rtu.lv
- Jānis GRĀVĪTIS** (Material Science), b. 11.02.1948, elected 07.12.2006. DCBMS. *Latvian State Institute of Wood Chemistry*. Tel.: (371) 67553137. E-mail: jgravit@edi.lv
- Modris GREITĀNS** (Computer Science), b. 29.12.1964, elected 24.11.2011. DPTS. *Institute of Electronics and Computer Science*. Tel.: (371) 67554500. E-mail: modris_greitans@edi.lv
- Līga GRĪNBERGA** (Material Science), b. 21.09.1977, elected 26.11.2015. DPTS. *Institute of Solid State Physics, University of Latvia*. Tel.: (371) 27038016. E-mail: ligagr@cfi.lu.lv
- Jānis IKSTENS** (Political Studies), b. 05.01.1970, elected 28.11.2013. DHSS. *University of Latvia*. Tel.: (371) 67034322, (371) 27331144. E-mail: janis.ikstens@lu.lv
- Āris JANSONS** (Forestry Science), b. 30.10.1980, elected 27.11.2014. DAFS. *Latvian State Forestry Research Institute "Sīlava"*. Tel.: (371) 67976701, (371) 29109529. E-mail: aris.jansons@silava.lv
- Ēriks JĒKABSONS** (History), b. 14.01.1965, elected 24.11.2016. DHSS. *University of Latvia*. Tel.: (371) 67033825. E-mail: eriks.jekabsons@lu.lv
- Aigars JIRGENSONS** (Chemistry), b. 14.09.1973, elected 28.11.2013. DCBMS. *Latvian Institute of Organic Synthesis*. Tel.: (371) 29334948. E-mail: aigars@osi.lv
- Jevgeņijs JOĻINS** (Physics), b. 04.09.1937, elected 26.11.1993. DPTS. *USA*. Tel.: (1-215) 6733252. E-mail: eiolin@netzero.net; eui206@lehigh.edu
- Tālis JUHNA** (Environmental Sciences), b. 22.01.1972, elected 24.11.2011. DCBMS. *Rīga Technical University*. Tel.: (371) 29226441, (371) 67089415. E-mail: talis.juhna@rtu.lv
- Māra JURE** (Chemistry), b. 13.09.1961, elected 24.11.2005. DCBMS. *Rīga Technical University*. Tel.: (371) 67089220. E-mail: mara.jure@rtu.lv
- Igors KABAŠKINS** (Computer Science), b. 06.08.1954, elected 27.11.1998. DPTS. *Transport and Telecommunication Institute*. Tel.: (371) 29215392. E-mail: igor.kabashkin@gmail.com
- Uldis KALNENIEKS** (Biology), b. 28.04.1957, elected 22.11.2007. DCBMS. *Institute of Microbiology and Biotechnology, University of Latvia*. Tel.: (371) 26393245. E-mail: kalnen@lanet.lv
- Audris KALNIŅŠ** (Computer Science), b. 14.08.1942, elected 26.11.1999. DPTS. *Institute of Mathematics and Computer Science, University of Latvia*. Tel.: (371) 67211014. E-mail: audris@mii.lu.lv
- Vladimirs KASJANOVŠ** (Mechanics), b. 10.09.1946, elected 24.11.2005. DPTS. *Rīga Stradiņš University, Rīga Technical University*. Tel.: (371) 67089126. E-mail: kasyanov@latnet.lv
- Vjačeslavs KAŠČEJEVS** (Physics), b. 16.03.1978, elected 28.11.2013. DPTS. *University of Latvia*. Tel.: (371) 67033742. E-mail: slava@latnet.lv

- Valerjans KAUSS** (Chemistry), b. 28.08.1954, elected 22.11.2007. DCBMS. *Latvian Institute of Organic Synthesis*. Tel.: (371) 67014815. E-mail: valerjan@osi.lv
- Daina KĀRKLĪŅA** (Agricultural Sciences), b. 12.07.1950, elected 07.12.2006. DAFS. *Latvia University of Agriculture*. Tel.: (371) 63005720. E-mail: daina.karklina@llu.lv
- Imants KIRTOVSKIS** (Economics), b. 24.01.1930, elected 12.02.1987. DHSS. *Latvian Academy of Sciences*. Tel.: (371) 67320892
- Valdis KOKARS** (Chemistry), b. 10.09.1951, elected 26.11.2009. DCBMS. *Rīga Technical University*. Tel.: (371) 26579172. E-mail: valdis.kokars@rtu.lv
- Tatjana KOĶE** (Pedagogics), b. 09.05.1955, elected 23.11.2000. DHSS. *Rīga Stradiņš University*. Tel.: (371) 67409088. E-mail: Tatjana.Koke@rsu.lv
- Tatjana KOZLOVSKA** (Biology), b. 12.08.1955, elected 20.11.2003. DCBMS. *Latvian Biomedical Research and Study Centre*. Tel.: (371) 67808211. E-mail: tatyana@biomed.lu.lv
- Aivars KRAUZE** (Chemistry), b. 16.03.1952, elected 07.12.2006. DCBMS. *Latvian Institute of Organic Synthesis*. Tel.: (371) 67014870, (371) 29462189. E-mail: krauze@osi.lv
- Andris KRĒSLIŅŠ** (Power Engineering), b. 25.03.1938, elected 24.11.1992. DPTS. *Rīga Technical University*. Tel.: (371) 29284950. E-mail: andris.kreslins@rtu.lv
- Dainis KRIEVIŅŠ** (Medicine), b. 28.06.1967, elected 24.11.2011. DCBMS. *P. Stradiņš Clinical University Hospital, University of Latvia*. Tel.: (371) 67069604. E-mail: dainis.krievins@stradini.lv; dainiskk@yahoo.com
- Jānis KRISTAPSONS** (Science of Science (Informatics)), b. 23.06.1939, elected 10.11.1995. DPTS. *Latvian Academy of Sciences*. Tel.: (371) 29331211. E-mail: jtk@lza.lv
- Zaiga KRĪŠJĀNE** (Geography), b. 12.12.1963, elected 25.11.2010. DCBMS. *University of Latvia*. Tel.: (371) 29153746. E-mail: zaiga.krisjane@lu.lv
- Sandis LAIME** (Folklore Studies), b. 12.06.1982., elected 27.11.2014. DHSS. *Institute of Literature, Folklore, and Art, University of Latvia*. Tel.: (371) 26306230. E-mail: sandis.laime@gmail.com
- Benita LAUMANE** (Linguistics), b. 03.06.1937, elected 10.11.1995. DHSS. *Liepāja University, Latvia*. Tel.: (371) 63454183, (371) 26077061. E-mail: benita.laumane@liepu.lv
- Mārcis LEJA** (Medicine), b. 26.05.1957, elected 29.11.2012. DCBMS. *University of Latvia*. Tel.: (371) 29497500, (371) 67040367. E-mail: marcis.leja@aslimnica.lv; cei@latnet.lv
- Sandra LEJNIECĒ** (Medicine), b. 26.11.1963, elected 28.11.2013. DCBMS. *Rīga Stradiņš University*. Tel.: (371) 29203397. E-mail: lejniece@latnet.lv; sandra.lejniece@rsu.lv
- Imants LIEPA** (Biology), b. 18.02.1937, elected 21.11.1997. DCBMS, DAFS. *Latvia University of Agriculture*. Tel.: (371) 63026322, (371) 63081630. E-mail: imants.liepa@llu.lv
- Edgars LIEPIŅŠ** (Pharmacy), b. 02.01.1978, elected 27.11.2014. DCBMS. *Latvian Institute of Organic Synthesis*. Tel.: (371) 29342361. E-mail: ledgars@farm.osi.lv

- Ilze Biruta LOZE** (Archaeology), b. 03.03.1936, elected 21.11.1997. DHSS. *Institute of History of Latvia, University of Latvia. Tel.: (371) 67034509; (371) 26822972. E-mail: neoilze@lza.lv*
- Ervīns LUKŠEVIČS** (Geology), b. 19.11.1955, elected 20.11.2008. DCBMS. *University of Latvia. Tel.: (371) 29608514. E-mail: ervins.luksevics@lu.lv*
- Roberts MAKSIMOVŠ** (Mechanics), b. 02.07.1938, elected 12.02.1987. DPTS. *Institute for Mechanics of Materials, University of Latvia. E-mail: maksimov@edi.lv*
- Ārija MEIKALIŠA** (Law), b. 25.05.1952, elected 07.12.2006. DHSS. *University of Latvia. Tel.: (371) 67034552; (371) 20046013. E-mail: arija.meikalisa@lu.lv*
- Viesturs MELECIS** (Biology), b. 10.11.1950, elected 25.11.2004. DCBMS. *Institute of Biology, University of Latvia. Tel.: (371) 29191557. E-mail: v.melecis@lu.lv*
- Aija MELLUMA** (Ecology), b. 13.10.1935, elected 06.12.1990. DCBMS. *Latvian Academy of Sciences. Tel.: (371) 67451514, (371) 29134075. E-mail: aimella@inbox.lv*
- Alfrēds MILTIŅŠ** (Medicine), b. 06.01.1939, elected 21.11.1997. DCBMS. *Latvian Academy of Sciences. Tel.: (371) 29507004. E-mail: inara.ancupane@bkus.lv*
- Sandra MUIŽNIECE-BRASAVA** (Food Science), b. 18.06.1977, elected 24.11.2016. DAFS. *Latvia University of Agriculture. Tel.: (371) 63021075. E-mail: sandra.muizniece@llu.lv*
- Valdis MUKTUPĀVELS** (Folklore Studies), b. 09.11.1958, elected 24.11.2011. DHSS. *University of Latvia. Tel.: (371) 67033848, (371) 29147903. E-mail: valdis.muktupavels@lu.lv*
- Oļģerts NIKODEMUS** (Geography), b. 29.09.1954, elected 24.11.2005. DCBMS. *University of Latvia. Tel.: (371) 67033910, (371) 29484996. E-mail: olgerts.nikodemus@lu.lv; nikodemu@lanet.lv*
- Daina NĪTIŅA** (Linguistics), b. 05.04.1942, elected 06.12.1990. DHSS. *Latvian Academy of Sciences. Tel.: (371) 29410399. E-mail: daija@apollo.lv*
- Leonīds NOVICKIS** (Computer Science), b. 11.12.1950, elected 07.12.2006. DPTS. *Rīga Technical University. Tel.: (371) 67089575, (371) 67089572, (371) 29514066. E-mail: lnovickis@gmail.com*
- Uldis OSIS** (Economics), b. 10.04.1948, elected 25.11.2004. DHSS. *Konsorts, Ltd. Tel.: (371) 67216793. E-mail: uldis.osis@gmail.com*
- Artis PABRIKS** (Political Studies), b. 22.03.1966, elected 25.11.2004. DHSS. *European Parliament. E-mail: artis.pabriks@europarl.europa.eu*
- Māra PILMANE** (Medicine), b. 22.05.1962, elected 21.11.1997. DCBMS. *Rīga Stradiņš University. Tel.: (371) 67326526. E-mail: pilmane@latnet.lv*
- Irina PILVERE** (Economics), b. 03.03.1956, elected 25.11.2010. DAFS. *Latvia University of Agriculture. Tel.: (371) 63022584; (371) 29217851. E-mail: irina.pilvere@llu.lv; rektors@llu.lv*

- Valdis PĪRĀGS** (Medicine), b. 20.02.1961, elected 26.11.2009. DCBMS. *University of Latvia*.
Tel.: (371) 67069307, (371) 29237760. E-mail: pirags@latnet.lv; valdis.pirags@lu.lv
- Aiva PLOTNIECE** (Chemistry), b. 13.11.1967, elected 24.11.2016. DCBMS. *Latvian Institute of Organic Synthesis*. Tel.: (371) 29124379. E-mail: aiva@osi.lv
- Andris PLOTNIEKS** (Law), b. 19.06.1938, elected 06.12.1990. DHSS. *Latvian Academy of Sciences*. Tel.: (371) 29217143. E-mail: andrisplotnieks@inbox.lv
- Osvalds PUGOVIČS** (Chemistry), b. 16.07.1963, elected 29.11.2012. DCBMS. *Latvian Institute of Organic Synthesis*. Tel.: (371) 67551207. E-mail: osvalds@osi.lv
- Silvija RADZOBĒ** (Art Studies), b. 29.04.1950, elected 25.11.2004. DHSS. *University of Latvia*. Tel.: (371) 29408617. E-mail: radzobe@latnet.lv; silvija.radzobe@gmail.com
- Aleksandrs RAPOPORTS** (Biology), b. 13.10.1946, elected 26.11.1993. DCBMS. *Institute of Microbiology and Biotechnology, University of Latvia*. Tel.: (371) 29504215. E-mail: rapoport@mail.eunet.lv
- Andrejs REINFELDS** (Mathematics), b. 02.06.1942, elected 26.11.1999. DPTS. *Institute of Mathematics and Computer Science, University of Latvia*. Tel.: (371) 29144961. E-mail: reinf@latnet.lv; andrejs.reinfelds@lu.lv
- Gīta RĒVALDE** (Physics), b. 09.10.1965, elected 24.11.2016, DPTS. *Rīga Technical University*. Tel.: (371) 29353247. E-mail: gita.revalde@rtu.lv; gitar@latnet.lv
- Andris RUBENIS** (Philosophy), b. 08.04.1951, elected 20.11.2003. DHSS. *Art Academy of Latvia*. Tel.: (371) 26541215. E-mail: ruben@latnet.lv
- Jānis RUDZĪTIS** (Mechanics), b. 18.10.1938, elected 21.11.1997. DPTS. *Rīga Technical University*. Tel.: (371) 67089701. E-mail: arai@latnet.lv
- Maija RUKLIŠA** (Biology), b. 01.05.1943, elected 20.11.2003. DCBMS. *Institute of Microbiology and Biotechnology, University of Latvia*. Tel.: (371) 67423097. E-mail: coryne@inbox.lv
- Ingrīda RUMBA-ROZENFELDE** (Medicine), b. 16.09.1959, elected 24.11.2005. DCBMS. *University of Latvia*. Tel.: (371) 67034377. E-mail: ingrida.rumba@lu.lv
- Dainis Edgars RUNĢIS** (Forestry Science), b. 26.06.1972, elected 28.11.2013. DAFS. *Latvian State Forestry Research Institute "Silava"*. Tel.: (371) 28344201. E-mail: dainis.rungis@silava.lv
- Feliksšs SADIRBAJEVS** (Mathematics), b. 20.11.1951, elected 20.11.2008. DPTS. *Institute of Mathematics and Computer Science, University of Latvia*. Tel.: (371) 67229213. E-mail: felix@latnet.lv
- Narimants SALENIEKS** (Mechanics), b. 13.02.1938, elected 25.11.1994. DPTS. *Rīga Technical University*. Tel.: (371) 67536160, (371) 29263587. E-mail: narimants@gmail.com; lsq@latnet.lv
- Antans-Sauļus SAUHATS** (Power Engineering), b. 14.03.1948, elected 20.11.2003. DPTS. *Rīga Technical University*. Tel.: (371) 67089930. E-mail: sauhatas@eef.rtu.lv

- Dalija SEGLIŅA** (Agricultural Sciences), b. 01.08.1961, elected 29.11.2012. DAFS. *Institute of Horticulture, Latvia University of Agriculture. Tel.: (371) 63722294, (371) 26482677. E-mail: dalija.seglna@lvai.lv*
- Andrejs SKAĢERS** (Medicine), b. 03.08.1940, elected 26.11.1999. DCBMS. *Rīga Stradiņš University. Tel./Fax: (371) 67455523, (371) 27028427. E-mail: andrejs.skagers@rsu.lv*
- Ize SKRABULE** (Agricultural Sciences), b. 22.03.1959, elected 28.11.2013. DAFS. *Institute of Agricultural Resources and Economics, Latvia University of Agriculture. Tel.: (371) 64130162, (371) 26365268. E-mail: ilze.skrabule@priekuliselekcija.lv*
- Juris SKUJĀNS** (Engineering Sciences), b. 08.09.1952, elected 20.11.2008. DAFS. *Latvia University of Agriculture. Tel.: (371) 63028791, (371) 29266775. E-mail: juris.skujans@llu.lv*
- Gunta SPRINĢE** (Biology), b. 29.01.1955, elected 24.11.2011. DCBMS. *Institute of Biology, University of Latvia. Tel.: (371) 29403305. E-mail: gunta.springe@lu.lv; gspringe@email.lubi.edu.lv*
- Anna STAFECKA** (Linguistics), b. 15.12.1953, elected 20.11.2008. DHSS. *Institute of Latvian Language, University of Latvia. Tel.: (371) 67226345, (371) 28604876. E-mail: anna.stafecka@inbox.lv*
- Pēteris STRADIŅŠ** (Medicine), b. 24.02.1971, elected 27.11.2014. DCBMS. *Rīga Stradiņš University; P. Stradiņš Clinical University Hospital. Tel.: (371) 67069421, (371) 29457817. E-mail: peteris.stradins@stradini.lv*
- Uldis SUKOVSKIS** (Computer Science), b. 08.07.1952, elected 20.11.2008. DPTS. *Rīga Technical University. Tel.: (371) 67089303. E-mail: uldis.sukovskis@rtu.lv*
- Aleksandrs ŠOSTAKS** (Mathematics), b. 05.12.1948, elected 25.11.2004. DPTS. *University of Latvia. Tel.: (371) 67033725. E-mail: sostaks@latnet.lv; sostaks@lanet.lv*
- Igors ŠUVAJEVS** (Philosophy), b. 07.04.1963, elected 23.11.2000. DHSS. *University of Latvia. Tel.: (371) 26734581; (371) 67033825. E-mail: igors.suvajevs@lu.lv*
- Aivars TABUNS** (Sociology), b. 22.03.1953, elected 29.11.2001. DHSS. *University of Latvia. Tel.: (371) 67140233. E-mail: aivars.tabuns@lu.lv*
- Valdis TĒRAUDKALNS** (Religion), b. 25.06.1964, elected 26.11.2015. DHSS. *University of Latvia. Tel.: (371) 67034433. E-mail: valdis.teraudkalns@lu.lv*
- Tālis TISENKOPFS** (Sociology), b. 28.07.1957, elected 27.11.1998. DHSS. *University of Latvia. Tel.: (371) 67140233; (371) 29417173. E-mail: talis.tisenkopfs@lu.lv*
- Jānis VALDMANIS** (Linguistics), b. 21.04.1948, elected 21.11.1997. DHSS. *Latvian Language Agency. Tel.: (371) 67201680. E-mail: janis.valdmanis@valoda.lv*
- Andrejs VASKS** (Archaeology), b. 13.06.1947, elected 23.11.2000. DHSS. *University of Latvia. Tel.: (371) 67033825; (371) 29411980. E-mail: andrejs.vasks@lu.lv*
- Ivans VEDINS** (Philosophy), b. 12.05.1946, elected 21.11.1997. DHSS. *Latvian Academy of Sciences. Tel.: (371) 20010746*

- Pēteris VIDENIEKS** (Computer Science), b. 05.01.1940, elected 12.02.1987. DPTS. *Latvian Academy of Sciences. Tel.: (371) 29203933. E-mail: peteris.videnieks@gmail.com*
- Uldis VIKMANIS** (Medicine), b. 13.11.1943, elected 26.11.1999. DCBMS. *University of Latvia. Tel.: (371) 29233538, (371) 67034356. E-mail: Uldis.Vikmanis@lu.lv*
- Jānis VĪBA** (Mechanics), b. 23.12.1937, elected 24.11.1992. DPTS. *Rīga Technical University. Tel.: (371) 67089332, (371) 67089473. E-mail: janis.viba@rtu.lv*
- Ludmila VĪKSNA** (Medicine), b. 22.10.1946, elected 20.11.2003. DCBMS. *Rīga Stradiņš University. Tel.: (371) 67014777. E-mail: ludmila.viksna@rsu.lv*
- Gunita ZARIŅA** (Archaeology), b. 03.05.1958, elected 27.11.2003. DHSS. *Institute of Latvian History, University of Latvia. Tel.: (371) 26482893, (371) 67034509. E-mail: zarina.gunita@gmail.com*
- Pēteris ZĀLĪTIS** (Forestry Sciences), b. 13.06.1937, elected 26.11.1993. DCBMS, DAFS. *Latvian State Forestry Research Institute "Silava". Tel.: (371) 29136962.*
- Vitālijs ZELČS** (Geology), b. 03.07.1952, elected 23.11.2000. DCBMS. *University of Latvia. Tel.: (371) 29113300. E-mail: Vitalijs.Zelchs@lu.lv*
- Andris ZELTIŅŠ** (Biology), b. 09.02.1959, elected 23.11.2016. DCBMS. *Latvian Biomedical Research and Study Centre. Tel.: (371) 26517172. E-mail: anze@biomed.lu.lv*
- Aivars ZEMĪTIS** (Mathematics), b. 23.05.1954, elected 20.11.2000. DPTS. *Fraunhofer Institute for Industrial Mathematics, Germany. Tel.: (49-631) 316004452. E-mail: zemitis@itwm.fraunhofer.de*
- Henriks ZENKEVIČS** (Biology), b. 04.07.1937, elected 24.11.1992. DCBMS. *Latvia. Tel.: (371) 29236127. E-mail: henriks.zenkevics@gmail.com*
- Juris ŽAGARS** (Astronomy), b. 09.02.1949, elected 20.11.2003. DPTS. *Ventspils University College. Tel.: (371) 29441737. E-mail: yzh@venta.lv; yzh@latnet.lv*
- Aija ŽILEVIČA** (Medicine), b. 14.05.1940, elected 25.11.1994. DCBMS. *University of Latvia. Tel.: (371) 67366306, (371) 29481607. E-mail: aija.zilevica@gmail.com; aija.zilevica@lu.lv*
- Aivars ŽŪRIŅŠ** (Forestry Sciences), b. 04.07.1956, elected 24.11.2005. DAFS. *Latvian State Institute of Wood Chemistry. Tel.: (371) 67550635. E-mail: aivars@edi.lv*

**DOCTORS HONORIS CAUSA
OF THE ACADEMY**

Andris ACTIŅŠ (Chemistry), b. 04.05.1945, conferred 27.10.2015. DCBMS. *University of Latvia. Tel.: (381) 29498924. E-mail: andris.actins@lu.lv; actins@latnet.lv*

Pēteris ALBERTS (Medicine), b. 08.12.1953, conferred 19.10.1999. DCBMS. *Head R&D, SIA Rigvir, Latvia. Tel. (371) 28330092. E-mail: peteris@virotherapy.eu*

Edward ANDERS (Chemistry), b. 21.06.1926, conferred 18.04.2000. DCBMS. *USA. Tel.: (1-650) 3436910*

Zigrīda APALA (History), b. 02.10.1936, conferred 12.10.2006. DHSS. *Institute of History of Latvia, University of Latvia. Tel.: (371) 29543770. E-mail: z.apala@inbox.lv*

Pēteris APINIS (Medicine), b. 25.11.1958, conferred 14.03.2017. DCBMS, *Latvian Medical Association. Tel.: (+371) 29486586. E-mail: editorin-chief@wma.net; peteris@arstubiedriba.lv*

Romāns APSĪTIS (Law), b. 13.02.1939, conferred 05.03.2002. DHSS. *Latvia. Tel. (371) 20231036. E-mail: romans.apsitis@gmail.com*

Larisa BAUMANE (Chemistry), b. 21.01.1946, conferred 20.03.2012. DCBMS. *Latvian Institute of Organic Synthesis. Tel.: (371) 67014887. E-mail: lbaumane@osi.lv*

Ilgonis BĒRSONS (Literary Criticism), b. 11.06.1931, conferred 11.03.2003. DHSS. *Latvia. Tel.: (371) 27841937*

Jānis BIČEVSKIS (Computer Science), b. 21.07.1944, conferred 22.09.2010. DPTS. *University of Latvia. Tel.: (371) 67034472, (371) 29173629. E-mail: Janis.Bicevskis@lu.lv*

Ērika BIZDĒNA (Chemistry), b. 14.06.1942, conferred 17.01.2012. DCBMS. *Rīga Technical University, Latvia. Tel.: (371) 67089251, (371) 26585435. E-mail: erbi@ktf.rtu.lv*

Jānis BOLIS (Law), b. 02.02.1936, conferred 09.02.2010. DHSS. *USA. Tel.: (371) 67212066, (401) 3980523. E-mail: bolisjohn2@gmail.com*

Jānis ČAKULS (History), b. 04.07.1926, conferred 02.10.2002. DHSS. *Curia Metropolitana Rigensis, Latvia. Tel.: (371) 67224314.*

Jose Antonio CASTILHO-ALCARAS (Physics), b. 12.10.1937, conferred 24.08.2007. DPTS. *Instituto de Fisica Teorica Universidade Estadual Paulista, Brazil. Tel.: (55)(11) 33937853. E-mail: jaca@ift.unesp.br*

Raul CHILACHAVA (Literary Criticism), b. 15.05.1948, conferred 17.04.2008. DHSS. *Ukraine. E-mail: r.chilacava@gmail.com*

Eduards Bruno DEKSNIS (Physics), b. 15.10.1947, conferred 21.10.1997. DPTS. *Latvia. Tel.: (371) 29327027. E-mail: ebd.riga@apollo.lv*

Inta DIŠLĒRE (History), b. 28.07.1947, conferred 10.03.2015. DHSS. *Durbe Castle of the Tukums Museum, Latvia*. Tel.: (371) 63181754; (371) 26287380. E-mail: idislere@yahoo.com

Leo DRIBINS (History), b. 03.11.1931, conferred 03.11.2009. DHSS. *Institute of Philosophy and Sociology, University of Latvia*. Tel.: (371) 28385810, (371) 29600580. E-mail: fsi@lza.lv

Guntis ENIŅŠ (Geography), b. 18.06.1933, conferred 15.02.2000. DCBMS. *Depository of Natural Rarities, Latvian Nature Heritage Fund, Latvia*. Tel.: (371) 29424396. E-mail: guntis.enins@inbox.lv

Imants Fridrihs FREIBERGS (Computer Science), b. 12.03.1934, conferred 27.06.1991. DPTS. *Latvia*. E-mail: imantsfreiberqs@inbox.lv

Astrīds FREIMANIS (Geology), b. 21.11.1935, conferred 06.02.1996. DCBMS. *Latvia*. Tel.: (371) 67267344. E-mail: astrids.freimanis@gmail.com

Valdis GAVARS (Engineering Sciences), b. 10.05.1934, conferred 30.10.2012. DPTS. *Latvia*. Tel.: (371) 29425013. E-mail: v.gavars@inbox.lv

Gundega GRĪNUMA (Literary Criticism), b. 27.11.1948, conferred 16.02.2016. DHSS. *Institute of Literature, Folklore and Art, University of Latvia, Latvia*. Tel.: (371) 29472347. E-mail: gundega.grinuma@gmail.com

Egils GRĪSLIS (Philosophy), b. 19.02.1928, conferred 03.11.2005. DHSS. *Canada*. Tel.: (1-204) 4523844. E-mail: egrislis@shaw.ca

Harro fon HIRSCHHEYDT (Literature, Publishing), b. 14.04.1925, conferred 17.02.2004. DHSS. *Domus Rigensis, Latvia*. Tel./Fax: (371) 67211015. E-mail: domus.rigensis@latnet.lv

Kamil IDRIS (Intellectual Property Rights), b. 26.08.1945, conferred 22.02.2005. DPTS. *Sudan*. E-mail: kamil@uum.edu.my

Ilze Irēna ILZIŅA (Computer Science), b. 02.01.1934, conferred 15.10.2008. DPTS. *Institute of Mathematics and Computer Science, University of Latvia*. Tel.: (371) 29296884. E-mail: ilze.ilzina@lumii.lv; ilze.ilzina@lu.lv

Georgs JANKOVSKIS (Medicine), b. 19.04.1921, conferred 16.02.2016. DCBMS. *Latvian Osteotherapist Association*. Tel.: (371) 67766578, (371) 29762001. E-mail: georgsjankovsky@inbox.lv; osteoreflksoterapija@gmail.com

Jānis JANSONS (Physics), b. 29.08.1944, conferred 22.10.2013. DPTS. *Institute of Solid State Physics, University of Latvia*. Tel.: (371) 67187511. E-mail: jansonsj@cfi.lu.lv

Nikolai (Niko) JAVAKHISHVILI (History), b. 12.09.1972, conferred 10.06.2014. DHSS. *Ivane Javakhishvili Tbilisi State University, Georgia*. Tel.: (995) 322990682; (599) 907355. E-mail.: nikolai.javakhishvili@tsu.ge

Benjamin JOFFE (Physics), b. 23.02.1931, conferred 06.09.2000. DPTS. *USA*. Tel.: (1-408) 6216949. E-mail: benjamin.joffe@sbcglobal.net

Kārlis KANGERIS (History), b. 04.06.1948, conferred 10.11.2015. DHSS. *Government Commission for KGB Research, Latvia*. Tel.: (371) 26366696. E-mail: carolusk@inbox.lv

- Edvīns KARNĪTIS** (Computer Science), b. 30.09.1940, conferred 01.11.2007. DPTS. Latvia. E-mail: Edvins.Karnitis@lza.lv
- Edgars KATAJS** (Linguistics), b. 03.02.1923, conferred 21.05.2004. DHSS. Latvia. Tel.: (371) 67261961, (371) 26554008.
- Ģirts KAUGARS** (Chemistry), b. 15.01.1938, conferred 15.03.1994. DCBMS. USA. Tel.: (1-414) 2103462. E-mail: glkaugars@gmail.com
- Indulis KĒNIŠ** (History), b. 13.11.1931, conferred 12.06.2007. DHSS. Latvia. Tel.: (371) 63276772; (371) 22074631. E-mail: inrex@inbox.lv
- Jānis KLĒTNIKS** (Engineering Sciences), b. 23.06.1929, conferred 17.05.2005. DPTS. Latvia. Tel.: (371) 26565104. E-mail: janis.kletnieks@geostar.lv
- Sarma KĻAVIŅA** (Linguistics), b. 21.02.1941, conferred 26.04.2009. DHSS. Latvia. Tel.: (371) 29927971. E-mail: sarmak@latnet.lv
- Yukio KOBAYASHI** (Pharmacy), b. 26.06.1931, conferred 21.05.1992. DCBMS. Taiho Pharmaceutical Co., Ltd, Japan. Tel.: (81-3) 32944523.
- Venta KOCERE** (Literary Criticism), b. 05.06.1954, conferred 20.03.2008. DHSS. Academic Library of the University of Latvia. Tel.: (371) 67323261, (371) 29549145. E-mail: venta.kocere@lu.lv
- Jacques KOOLEN** (Medicine), b. 02.02.1950, conferred 18.04.2000. DCBMS. Catharina Hospital, Netherlands. Tel.: (31-40) 2230430.
- Aris LĀCIS** (Medicine), b. 01.08.1936, conferred 20.03.2012. DCBMS. Children's Clinical University Hospital, Latvia. Tel.: (371) 26446113. E-mail: aris.lacis@apollo.lv
- Romans LĀCIS** (Medicine), b. 01.01.1946, conferred 11.06.2002. Grand Medal of the LAS (2016). DCBMS. Pauls Stradiņš Clinical University Hospital, Latvia. Tel.: (371) 67069546. E-mail: valentina.soboleva@stradini.lv
- Visvaldis LĀCIS** (History), b. 12.03.1924, conferred 10.06.2014. DHSS. Latvia. Tel.: (371) 64800359; (371) 26549988. E-mail: visvaldis.lacis@inbox.lv
- Aivars LAGZDIŅŠ** (Engineering Sciences), b. 20.06.1937, conferred 15.03.1994. DPTS. Institute for Mechanics of Materials, University of Latvia. Tel.: (371) 26349509.
- Paulis LAZDA** (History), b. 04.05.1938, conferred 22.09.1998. DHSS. University of Wisconsin-Eau Claire, USA. E-mail: lazdapi@uwec.edu
- Atis LEJIŅŠ** (Political Studies), b. 28.09.1942, conferred 17.02.2004. DHSS. RL Saeima. Tel.: (371) 29238256. E-mail: atislejins@gmail.com; atis.lejins@saeima.lv
- Egils LEVITS** (Law), b. 30.06.1955, conferred 05.03.2002. DHSS. European Court of Justice. Latvia. E-mail: egils@curia.eu.int
- Ivars LOČMELIS** (History), b. 08.11.1955, conferred 16.02.2016. DHSS. Institute of History of Latvia, University of Latvia. Tel.: (371) 67034508. E-mail: ivarsl@lza.lv

- Valdis LOKENBAHS** (Computer Science), b. 06.12.1951, conferred 04.11.2003. DPTS. Latvia. Tel.: (371) 29205124. E-mail: vlokenbahs@gmail.com
- Juhan MAISTE** (Art), b. 10.08.1952, conferred 26.04.2009. DHSS. University of Tartu, Estonia. Tel.: (372) 7376507. E-mail: maiste.juhan@hotmail.com
- Jack MATLOCK** (Political Studies), b. 01.10.1929, conferred 11.06.2002. DHSS. USA. Tel.: (1-609) 2521953. E-mail: jmatlock@princeton.edu; jim10@columbia.edu
- Mykolas MICHELBERTAS** (History), b. 09.03.1939, conferred 21.05.2004. DHSS. Lithuania. Tel.: (370) 2687284.
- Jerzy MICHNA** (Power Engineering), b. 17.11.1929, conferred 19.10.1999. DPTS. Germany. Tel./Fax.: (49-62) 2433528. E-mail: lucia.von.tansela@t-online.de; mail@ikwz.de
- Iveta OZOLANTA** (Medicine), b. 05.07.1948, conferred 03.11.2009. DCBMS. Rīga Stradiņš University, Latvia. Tel.: (371) 67409116, (371) 29106328. E-mail: iveta.ozolanta@rsu.lv
- Pēteris PILDEGOVIČS** (Linguistics), b. 15.07.1938, conferred 26.09.2013. DHSS. Latvia. Tel.: (371) 67034366, (371) 26601550. E-mail: peteris.pildegovics@hotmail.com
- Raimo PULLAT** (History), b. 03.04.1935, conferred 22.02.2005. DHSS. Estonia. Tel./Fax: (372) 6485774. E-mail: raimopullat@hotmail.ee
- Jēkabs RAIPULIS** (Biology), b. 07.03.1939, conferred 03.10.1997. DCBMS. Rīga Teacher Training Education Management Academy, Latvia. Tel.: (371) 67808120. E-mail: jekabs.raipulis@rpiva.lv
- Pēteris RIVŽA** (Computer Science), b. 19.10.1947, conferred 01.11.2007. DPTS. Latvia University of Agriculture. Tel.: (371) 63005633, (371) 29171449. E-mail: Peteris.Rivza@llu.lv
- Jānis RUKŠĀNS** (Biology), b. 05.09.1946, conferred 11.03.2003. DCBMS. Latvia. Tel.: (371) 29418440. E-mail: janis.bulb@hawk.lv
- Līga RUPERTE** (Pedagogics), b. 16.10.1932, conferred 05.11.1992. DHSS. USA. Tel.: (1-616) 4568023. E-mail: liga3x3@iserv.net
- Andris SALTUPS** (Medicine), b. 15.06.1935, conferred 18.04.2000. DCBMS. Cabrini Medical Centre, Victoria, Australia. Tel.: (61-3) 95097840.
- Gene SHARP** (Political Studies), b. 21.01.1928, conferred 02.06.2005. DHSS. The Albert Einstein Institution, USA. Tel.: (1-617) 2474882. E-mail: sharp@aeinstein.org
- Boris SIMKHOVICH** (Medicine), b. 26.07.1947, conferred 30.10.2012. DCBMS. University of Southern California, USA. Tel.: (818) 4006138. E-mail: borissimk@yahoo.com
- Jānis STRADIŅŠ** (History of Science), b. 10.12.1933, conferred 09.01.1992. DHSS. Latvian Academy of Sciences. Tel.: (371) 67213663. E-mail: stradins@lza.lv
- Ivars STRAUTMANIS** (Architecture), b. 19.07.1932, conferred 27.11.2001. DHSS. Latvia. Tel.: (371) 29454249.

- Voldemārs STRĪKIS** (Agricultural Sciences), b. 24.02.1936, conferred 06.02.1996. DCBMS; DAFS. *Latvia University of Agriculture*. Tel.: (371) 29286497, (371) 63027239. E-mail: voldemars.strikis@llu.lv
- Agnis ŠTIFTS** (Medicine), b. 13.09.1923, conferred 13.10.1998. DCBMS. *Latvia*. Tel.: (371) 67403636, (371) 26308478.
- Kaspars TŪTERS** (Medicine), b. 31.10.1937, conferred 24.10.1995. DCBMS. *University of Toronto, Canada*. Tel.: (1-416) 9646777. E-mail: k.tuters@utoronto.ca
- Lilita VANAGA** (History), b. 29.07.1953, conferred 02.06.2005. DHSS. *Institute of History of Latvia, University of Latvia*. Tel.: (371) 26809527. E-mail: livanaga@gmail.com
- Mihkel VEIDERMA** (Chemistry), b. 27.12.1929, conferred 14.11.2006. DCBMS. *Estonian Academy of Sciences, Estonia*. Tel.: (372) 6202801. E-mail: Mihkel.Veiderma@akadeemia.ee
- Mārgers VESTERMANIS** (History), b. 18.09.1925, conferred 12.06.2007. DHSS. *Museum "Jews in Latvia", Latvia*. Tel.: (371) 67283484. E-mail: m.vestermanis@gmail.com
- Ēvalds VĒCIŅŠ** (History), b. 04.01.1931, conferred 10.03.2015. DHSS. Tel.: (371) 67574059.
- Aldonis VĒRIŅŠ** (Biology), b. 06.01.1929, conferred 06.11.2001. DCBMS. *Latvia*. Tel.: (371) 67616483, (371) 29233608. E-mail: aldonis.verins@inbox.lv
- Jānis VĒTRA** (Medicine), b. 19.07.1959, conferred 26.10.2004. DCBMS. *Rīga Stradiņš University, Latvia*. Tel.: (371) 67326203, (371) 29241380. E-mail: janis.vetra@rsu.lv
- Mārīte (Māra) VĪKSNA** (Folklore Studies), b. 22.03.1949, conferred 22.02.2005. DHSS. *Institute of Literature, Folklore, and Art, University of Latvia*. Tel.: (371) 67357913, (371) 28634119. E-mail: mara.viksna@lulfmi.lv
- Valdis VILLERUŠS** (Art Studies), b. 06.05.1942, conferred 05.03.2002. DHSS. *Art Academy of Latvia*. Tel.: (371) 29507374. E-mail: valdisvill@inbox.lv
- Māris VĪTIŅŠ** (Computer Science), b. 10.12.1948, conferred 10.11.2015. DPTS. *University of Latvia*. Tel.: (371) 67034471, 29287349. E-mail: maris.vitins@lu.lv
- Līvija VOLKOVA** (Literary Criticism), b. 09.06.1931, conferred 09.02.2010. DHSS. *Latvia*. Tel.: (371) 29139840.
- Ojārs Jānis ZANDERS** (Literary Criticism), b. 11.03.1931, conferred 09.01.2001. DHSS. *Latvia*. Tel.: (371) 67317109.

IN MEMORIAM

Juris Ekmanis

Physicist

Born 02.12.1941. Died 09.04.2016. Corresponding member of the LAS since 09.01.1992, full member of the LAS since 09.04.1992. President of the LAS 01.05.2004.–26.12.2012. Vice president of the LAS 26.12.2012.–09.04.2016.

Algirdas Sabaliauskas

Linguist

Born 26.07.1929. Died 17.04.2016. Foreign member of the LAS since 24.11.1992.

Friedrich Scholz

Literary scholar

Born 01.03.1928. Died 27.05.2016. Foreign member of the LAS since 24.11.1992.

Rūdolfs Dumbravs

Agricultural scientist

Born 27.04.1931. Died 17.06.2016. Doctor *honoris causa* of the LAS since 13.10.2009.

Juris Silenieks

Literary scholar

Born 29.05.1925. Died 22.06.2016. Foreign member of the LAS since 24.11.1992.

Ernst Neizvestny

Sculptor

Born 09.04.1926. Died 09.08.2016. Foreign member of the LAS since 21.11.1997.

Juris Jansons

Mechanical engineering scientist

Born 16.09.1939. Died 19.09.2016. Corresponding member of the LAS since 26.11.1999. Full member of the LAS since 29.11.2001.

Jānis Dundurs

Mechanical engineering scientist

Born 13.09.1922. Died 21.09.2016. Foreign member of the LAS since 06.12.1990.

Ģirts Zaķis

Chemist

Born 26.05.1935. Died 08.12.2016. Doctor *honoris causa* of the LAS since 17.02.2009.

Rolfs Ekmanis

Literary scholar

Born 10.02.1929. Died 12.01.2017. Foreign member of the LAS since 27.11.1998.

Biruta Baumane

Painter

Born 06.06.1922. Died 21.01.2017. Honorary member of the LAS since 25.11.1994.

Rihards Kondratovičs

Biologist, rhododendron breeder

Born 12.05.1932. Died 17.02.2017. Corresponding member of the LAS since 06.04.1989. Full member of the LAS since 09.01.1992.

Jānis Bērziņš

Historian

Born 29.04.1941. Died 19.02.2017. Corresponding member of the LAS since 27.11.1998. Full member of the LAS since 23.11.2000.

Andrejs Alksnis

Astronomer

Born 15.07.1928. Died 11.03.2017. Doctor *honoris causa* of the LAS since 25.05.1999.

THE MAIN SCIENTIFIC INSTITUTES AND AGENCIES OF LATVIA

This chapter aims to give a general view of the structure of Latvian sciences; from scientific institutes, it contains only those who have a legal right of a person, not listed in other university departments.

Ministry of Education and Science of the Republic of Latvia (<http://www.izm.gov.lv>). Vaļņu iela 2, Rīga, LV 1050, Latvia. Tel.: (371) 67226209. Fax: (371)67223905. E-mail: pasts@izm.gov.lv. Minister Kārlis ŠADURSKIS

Department of Higher Education, Science, and Innovation. Department Director Agrita KIOPA. Tel.: (371) 67047983. E-mail: agrita.kiopa@izm.gov.lv

Ministry of Foreign Affairs of the Republic of Latvia (<http://www.mfa.gov.lv>). K. Valdemāra iela 3, Rīga, LV 1395, Latvia. Tel.: (371) 67016201. Fax: (371) 67828121. E-mail: mfa.cha@mfa.gov.lv. Minister Edgars RINKĒVIČS

Ministry of Economics of the Republic of Latvia (<http://www.em.gov.lv>). Brīvības iela 55, Rīga, LV 1519, Latvia. Tel.: (371) 67013100. Fax: (371) 67280882. E-mail: pasts@em.gov.lv. Minister Arvils AŠERADENS

Ministry of Agriculture of the Republic of Latvia (<http://www.zm.gov.lv>). Republikas laukums 2, Rīga, LV-1981, Latvia. Tel.: (371) 67027010. Fax: (371) 67027512. E-mail: zm@zm.gov.lv. Minister Jānis DŪKLAVS

Latvian Council of Science (<http://www.lzp.gov.lv>). Akadēmijas laukums 1, Rīga, LV1050, Latvia. Tel.: (371) 67225164, (371) 67223211. Fax: (371) 67228421. E-mail: lzp@lzp.gov.lv. Chair LAS Full Member, *Dr.biol.* Jānis KLOVIŅŠ. Tel.: (371) 67808003, (371) 26438469. E-mail: klovins@biomed.lu.lv. Vice-Chair LAS Corr. Member Tālis JUHNA. Tel.: (371) 67089415, (371) 29226441. E-mail: talis.juhna@rtu.lv. Scientific Secretary *Dr.chem.* Arnis KOKOREVIČS. Tel.: (371) 29473753. E-mail: arnis.kokorevics@lzp.gov.lv

Council of Higher Education (<http://www.aip.lv>). Zigfrīda Annas Meierovica bulvāris 12, Rīga, LV 1050, Latvia. Tel.: (371) 67223392. Fax: (371) 67220423. E-mail: ip@latnet.lv. Chair *Dr.habil.med.* Jānis VĒTRA

Latvian Union of Scientists (<http://www.lvzs.lv>). Akadēmijas laukums 1 – 611a, Rīga, LV 1050, Latvia. Tel.: (371) 67225361. E-mail: lza@lza.lv. Chair LAS Full Member, *Dr.habil.chem.* Ivars KALVIŅŠ. Chair of the Board *Dr.paed.* Uldis GRĀVĪTIS

Association of Latvian Young Scientists (<http://www.lja.lv>). Akadēmijas laukums 1, Rīga, LV 1050, Latvia. Tel.: (371) 29175735. E-mail: info@lja.lv. Chair of the Board *Dr.sc.ing.* Ieva KRŪMIŅA

LATVIAN UNIVERSITIES

University of Latvia (<http://www.lu.lv/>). Raiņa bulvāris 19, Rīga, LV 1586, Latvia. Tel.: (371) 67034444. Fax: (371) 67225039. E-mail: lu@lu.lv. Rector LAS Full Member, *Dr.habil.biol.* Indriķis MUIŽNIEKS. Vice-rector for Humanities and Educational Sciences, LAS Full Member, *Dr.habil.philol.* Ina DRUVIETE. Vice-rector for Social and Legal Sciences, LAS Corr. Member, Jānis IKSTENS. Vice-rector for Exact Sciences, Life and Medical Sciences, *Dr.geol.* Valdis SEGLIŅŠ

Rīga Technical University (<http://www.rtu.lv/>). Kaļķu iela 1, Rīga, LV 1658, Latvia. Tel.: (371) 67089333. Fax: (371) 67820094. E-mail: rtu@rtu.lv. Rector LAS Full Member, *Dr.habil.sc.ing.* Leonīds RIBICKIS. Vice-rector for science, LAS Corr. Member, *Dr.sc.ing.* Tālis JUHNA

Latvia University of Agriculture (<http://www.llu.lv/>). Lielā iela 2, Jelgava, LV 3001, Latvia. Tel.: (371) 630 22584. Fax: (371) 630 27238. E-mail: rektors@llu.lv. Rector, LAS Corr. Member, *Dr.oec.* Irina PILVERE. Vice-rector for science *Dr.med.vet.* Arnis MUGURĒVIČS

Rīga Stradiņš University (<http://www.rsu.lv/>). Dzirciema iela 16, Rīga, LV 1007, Latvia. Tel.: (371) 67409105. E-mail: rsu@rsu.lv, infocentrs@rsu.lv. Rector LAS Full Member, *Dr.habil.med.* Jānis GARDOVSKIS. Vice-rector for science *Dr.habil.med.* Iveta OZOLANTA

Daugavpils University (<http://www.du.lv/>). Vienības iela 13, Daugavpils, LV 5401, Latvia. Tel.: (371) 65422180, (371) 65422922. Fax: (371) 65422890. E-mail: du@du.lv. Rector, LAS Full Member, *Dr.biol.* Arvīds BARŠEVSKIS. Vice-rector for research *Dr.biol.* Inese KOKINA

Liepāja University (<http://www.liepu.lv/>). Lielā iela 14, Liepāja, LV 3401, Latvia. Tel.: (371) 634 23568. Fax: (371) 634 24223. E-mail: liepu@liepu.lv. Rector, LAS Full Member, *Dr.habil.philol.* Dace MARKUS. Vice-rector for research *Dr.philol.* Ieva OZOLA

SCIENTIFIC INSTITUTES

INSTITUTES OF PHYSICS, MATHEMATICS, AND TECHNICAL SCIENCES

Institute of Electronics and Computer Sciences (<http://www.edi.lv/>). Dzērbenes iela 14, Rīga, LV 1006, Latvia. Tel.: (371) 67554500. Fax: (371) 67555337. E-mail: info@edi.lv. Director Ieva TENTERE. Head of the Scientific Council, LAS Corr. Member, *Dr.sc.comp.* Modris GREITĀNS

Institute of Physical Energetics (www.fe-i-web.lv/). Krīvu iela 11, Rīga, LV 1006, Latvia. Tel.: (371) 67552011. Fax: (371) 67550839. E-mail: energija@edi.lv. Director *Dr.sc.ing.* Irina OĻEINIKOVA. Head of the Scientific Council *Dr.sc.ing.* Gaidis KLĀVS

Institute of Solid State Physics, UL (<http://www.cfi.lu.lv/>). Ķengaraga iela 8, Rīga, LV 1063, Latvia. Tel.: (371) 67187816. Fax: (371) 67132778. E-mail: issp@cfi.lu.lv. Director, LAS Full Member, *Dr. phys.* Mārtiņš RUTKIS. Head of the Scientific Council *Dr.phys.* Laima TRINKLERE

Physics Institute, UL (<http://ipul.lv/>). Miera iela 32, Salaspils, LV 2169, Latvia. Tel.: (371) 67944700. Fax: (371) 67901214. E-mail: fizinst@sal.lv. Director *Dr.phys.* Leonīds BULIGINS. Head of the Scientific Council, LAS Full Member, *Dr.phys.* Agris GAILĪTIS

Institute of Mathematics and Computer Sciences, UL (<http://www.lumii.lv/>). Raiņa bulvāris 29, Rīga, LV 1459, Latvia. Tel.: (371) 67224730. Fax: (371) 67820153. E-mail: imcs@lumii.lv. Director Ināra OPMANĒ. Head of the Scientific Council, *Dr.sc.comp.* Rihards BALODIS-BOLUŽS

Institute of Astronomy, UL (<http://www.astr.lu.lv/>). Raiņa bulvāris 19, Rīga, LV 1586, Latvia. Tel.: (371) 67034580. Fax: (371) 67034582. E-mail: astra@latnet.lv. Director *Dr.phys.* Ilgmārs EGLĪTIS. Head of the Scientific Council *Dr.paed.* Ilgonis VILKS

Ventspils International Radio Astronomy Centre (<http://virac.venta.lv/>). Irbene, Anceš pagasts, Ventspils novads, LV 3601, Latvia. Tel.: (371) 63656081. Inženieru iela 101, Ventspils, LV 3601, Latvia. Tel.: (371) 63629656, (371) 29230818. Fax: (371) 63629660. E-mail: virac@venta.lv, infovirac@venta.lv. Director *Dr.chem.* Valdis AVOTIŅŠ. Head of the Scientific Council, *Dr.phys.* Juris FREIMANIS

INSTITUTES OF CHEMICAL AND BIOLOGICAL SCIENCES

Latvian Institute of Organic Synthesis (<http://www.osi.lv/>). Aizkraukles iela 21, Rīga, LV 1006, Latvia. Tel.: (371) 67014801. Fax: (371) 67550338. E-mail: sinta@osi.lv. Director LAS Corr. Member, *Dr.chem.* Osvalds PUGOVIČS. Head of the Scientific Council, LAS Full Member, *Dr.habil.chem.* Ivars KALVIŅŠ

Latvia State Institute of Wood Chemistry (<http://www.kki.lv/>). Dzērbenes iela 27, Rīga, LV 1006, Latvia. Tel.: (371) 67553063. Fax: (371) 67550635. E-mail: koks@edi.lv. Director LAS Corr. Member, *Dr.sc.ing.* Uģis CĀBULIS. Head of the Scientific Council, LAS Full Member, *Dr.chem.* Bruno ANDERSONS

Institute of Inorganic Chemistry, Faculty of Materials Science and Applied Chemistry, RTU (until 2016 — **Institute of Inorganic Chemistry, RTU**) (<http://www.rtu.lv/>). Paula Valdena iela 3/7, Rīga, LV 1048, Latvia. Tel.: (371) 67089151. E-mail: velta.lapika@rtu.lv, jgrabis@rtu.lv. Director, LAS Full Member, *Dr.habil.sc.ing.* Jānis GRABIS

Latvia Biomedical Research and Study Centre (<http://bmc.biomed.lu.lv/>). Rātsupītes iela 1, Rīga, LV 1067, Latvia. Tel.: (371) 67808200. Fax: (371) 67442407. E-mail: bmc@biomed.lu.lv. Director, LAS Full Member, *Dr.biol.* Jānis KLOVIŅŠ. Scientific Director, LAS Full Member, *Dr.biol.* Aija LINĒ. Head of the Scientific Council, LAS Full Member, *Dr.biol.* Andris ZELTIŅŠ

Latvian Institute of Aquatic Ecology (<http://www.lhei.lv/>). Voleru iela 4, Rīga, LV 1048, Latvia. Tel./Fax: (371) 67601995. E-mail: hydro@latnet.lv. Director, *Dr.biol.* Anda IKAUNIECE. Head of the Scientific Council, *Dr.biol.* Solvita STRĀĶE

Institute of Biology, UL (www.lubi.edu.lv/). Miera iela 3, Salaspils, LV 2169, Latvia. Tel./Fax: (371) 67944988. E-mail: liga.jankevica@lu.lv. Director, *Dr.biol.* Līga JANKEVICA. Head of the Scientific Council, *Dr.biol.* Gunta ČEKSTERE

National Botanic Garden (<http://www.nbd.gov.lv/>). Miera iela 1, Salaspils, LV 2169, Latvia. Tel.: (371) 67945460. Fax: (371) 67945459. E-mail: nbd@nbd.gov.lv. Director Andrejs SVILĀNS. Head of the Scientific Council, *Dr.biol.* Dace KĻAVIŅA

INSTITUTES OF AGRICULTURAL AND FORESTRY SCIENCES

Latvian State Forest Research Institute “Silava” (<http://www.silava.lv>). Rīgas iela 111, Salaspils, Salaspils novads, LV 2169, Latvia. Tel.: (371) 67942555. Fax: (371) 67901359. E-mail: inst@silava.lv. Director *Dr.silv.* Jurgis JANSONS. Head of the Scientific Council, LAS Corr. Member, *Dr.silv.* Tālis GAITNIEKS

Institute of Horticulture (<http://www.lvai.lv>). Graudu iela 1, Ceriņi, Krimūnu pagasts, Dobeles novads, LV 3701, Latvia. Tel.: (371) 63722294. Fax: (371) 63781718. E-mail: lvai@lvai.lv. Director, *Mg.sc.soc., Mg.oec.* Inese EBELE. Head of the Scientific Council, LAS Full Member, *Dr.biol.* Edīte KAUFMANE

Institute of Agricultural Resources and Economics (<http://www.arei.lv>). Strukturu iela 14, Rīga, LV 1039, Latvia. Tel.: 67552909. E-mail: arei@arei.lv; legal address: Zinātnes iela 2, Priekuļi, Priekuļu pagasts, Priekuļu novads, LV 4126. Tel.: (371) 67552909. Fax: (371) 6751789. Director Roberts STAFECKIS. Chair of the Scientific Council, *Dr.oec.* Ligita MELECE

Research Institute of Agriculture, LUA (<http://www.zzi.llu.lv>). Zemkopības institūts 7, Skrīverī, Skrīveru novads, LV 5125, Latvia. Tel.: (371) 65197512. Fax: (371) 65197954. E-mail: szc@inbox.lv. Director, *Dr.agr.* Jānis VIGOVSKIS. Chair of the Scientific Council, *Dr.med.vet.* Arnis MUGUREVIČS

Research Institute of Agricultural Machinery, LUA (<http://www.llu-ltzi.lv>). Institūta iela 1, Ulbroka, Stopiņu novads, LV 2130, Latvia. Tel.: (371) 67910879. Fax: (371) 67910873. E-mail: uzc@apollo.lv. Director, *Dr.sc.ing.* Semjons IVANOVŠ. Head of the Scientific Council, *Dr.med.vet.* Arnis MUGUREVIČS

INSTITUTES OF HUMANITIES AND SOCIAL SCIENCES

Institute of Philosophy and Sociology, UL (<http://www.fsi.lu.lv>). Kalpaka bulvāris 4, Rīga, LV 1050, Latvia. Tel.: (371) 67034520, (371) 28385810. E-mail: fsi@lza.lv. Acting Director LAS Full Member, *Dr.habil.phil.* Maija KŪLE. Head of the Scientific Council, *Dr.phil.* Solveiga KRŪMIŅA-KOŅKOVA

Latvian Language Institute, UL (<http://www.lulavi.lv>). Akadēmijas laukums 1, Rīga, LV 1050, Latvia. Tel./Fax: (371) 67227696. E-mail: latv@lza.lv. Director, LAS Full Member, *Dr.habil.philol.* Ilga JANSONE. Head of the Scientific Council, LAS Corr. Member, *Dr.philol.* Anna STAFECKA

Institute of the History of Latvia, UL (<http://www.lvi.lv/>). Kalpaka bulvāris 4, Rīga, LV 1050, Latvia. Tel.: (371) 67034509. Fax: (371) 67034510. E-mail: lvi@lza.lv. Acting Director LAS Full Member, *Dr.hist.* Guntis ZEMĪTIS. Head of the Scientific Council, *Dr.hist.* Guntis GERHARDS

Institute of Literature Folklore and Art, UL (<http://www.lfmi.lu.lv>). Mūkusalas iela 3, Rīga, LV 1423, Latvia. Tel./Fax: (371) 67229017. E-mail: litfom@lza.lv. Director, *Dr.philol.* Dace BULA. Head of the Scientific Council, LAS Full Member, *Dr.habil.philol.* Benedikts KALNAČS

Institute of Economics, SIA, LAS (<http://www.ei.lza.lv/>). Akadēmijas laukums 1, 15th floor, Rīga, LV 1050, Latvia. Tel.: (371) 20207092. E-mail: ei@lza.lv. Chair of the Board, Director *Dr.* Nīna LINDE. Head of the Scientific Council, LAS Hon. Member, *Dr.habil.oec.* Pēteris GUĻĀNS

OTHER SCIENTIFIC INSTITUTIONS

Academic Library, UL (<http://www.acadlib.lv>). Rūpniecības iela 10, Rīga, LV 1235, Latvia. Tel.: (371) 67323649, (371) 26373599. E-mail: acadlib@lib.acadlib.lv. Director, *Dr.h.c.philol.* Venta KOCERE

Latvian Technological Centre (www.innovation.lv/lte). Aizkraukles iela 21, Rīga, LV 1006, Latvia. Tel.: (371) 67558771. Fax: (371) 67541218. E-mail: ltc@latnet.lv. Director, *Dr.habil.* sc.ing. Jānis STABULNIEKS

State Education Development Agency (<http://www.viaa.gov.lv>). Vaļņu iela 1 (3rd floor), Rīga, LV 1050, Latvia. Tel.: (371) 67814322. Fax: (371) 67814344. E-mail: info@viaa.gov.lv. Director Dita TRAIIDĀS. Science, Research and Innovation Policy Support Department, Director Elita ZONDAKA

EURAXESS Latvia (<http://www.euraxess.lv/>). Dzērbenes iela 27 – 316, Rīga, LV 1006, Latvia. Tel.: (371) 29473753. E-mail: info@euraxess.lv. Director, *Dr.chem.* Arnis KOKOREVIČS

Latvian Academy of Agricultural and Forestry Sciences (<http://www.lmza.lv>). Republikas laukums 2-2314, Rīga, LV 1981, Latvia. Tel.: (371) 67223448. E-mail: lmzn@lza.lv. President, LAS Full Member, *Dr.habil.oec.* Baiba RIVŽA. Vicepresidents: LAS Full Member, *Dr.habil.biol.* Īzaks RAŠALS, LAS Corr. Member, *Dr.oec.* Irina PILVERE. Scientific secretary *Dr.oec.* Viktorija ZAIČŪKSNE

SCIENTIFIC PUBLISHING

“Zinātne” Ltd. Publishers (<http://www.zinatnesgramatas.lv>). Akadēmijas laukums 1, Rīga, LV 1050, Latvia. Tel.: office (371) 67212797, “Zinātne” bookshop (371) 67225767. Fax: (371) 67227825. E-mail: zinatne@zinatne.com.lv. Chair of the Management Board Ingrīda SEGLIŅA

Latvijas Zinātņu Akadēmijas Vēstis, A / Proceedings of the Latvian Academy of Sciences, B (<http://www.lza.lv>). Akadēmijas laukums 1, Rīga, LV 1500, Latvia. Tel.: (371) 67229830 Fax: (371) 67821153. E-mail: vestis@lza.lv; lzavestis@inbox.lv; proceed@lza.lv. Editor-in-charge Arno JUNDZE. The journal publishes reports in Latvian and in English

Latvian Journal of Physics and Technical Sciences (<http://fei-web.lv/lv/zurnali>). Krīvu iela 11, Rīga, LV 1006, Latvia. Tel.: (371) 67551732, (371) 67558694. E-mail: ezerniec@edi.lv. Editor-in-chief Irina OĻEINIKOVA. The journal publishes reports in English.

Journal Mechanics of Composite Materials (<http://www.pmi.lv/html/LvJournalAbout.html>). Aizkraukles iela 23, Rīga, LV 1006, Latvia. E-mail: mcm@pmi.lv. Editor-in-chief Vitauts TAMUŽS. The journal is published in Russian and in English

Journal Magnetohydrodynamics (<http://mhd.sal.lv/>). Miera iela 32, Salaspils - 1, LV 2169, Latvia. Fax: (371) 67901214. E-mail: zhuk@sal.lv; aceb@sal.lv. Editor-in-chief Andrejs CĒBERS. The journal publishes reports in English.

Journal Automatic Control and Computer Sciences (<http://www.edi.lv/en/scientific-journal>). Dzērbenes iela 14, Rīga, LV 1006, Latvia. Tel.: (371) 67558164. Fax: (371) 67555337. E-mail: avt@edi.lv. Editor-in-chief Modris GREITĀNS. The journal is published in Russian and in English

Journal *Chemistry of Heterocyclic Compounds* (<http://hgs.osi.lv/index.php/hgs/index>). Aizkraukles iela 21, Rīga, LV 1006, Latvia. Tel.: (371) 67014921. Fax: (371) 67550338. E-mail: hgs@osi.lv. Editor-in-chief Ivars KALVIŅŠ. The journal is published in Russian and in English

Journal of the Institute of History of Latvia (*Latvijas Vēstures Institūta Žurnāls*) (<http://www.lvi.lv/lv/LVIZ.htm>). Kalpaka bulvāris 4, Rīga, LV 1050, Latvia. Tel.: (371) 29486005. Fax: (371) 67034510. E-mail: lvi@lza.lv. Editor-in-chief Ineta LIPŠA. The journal publishes reports in Latvian, English, and German. (The journal was founded in 1936, restored in 1991.)

Zvaigžņotā Debess (*The Starry Sky, popular scientific seasonal issue of the Latvian Academy of Sciences and the Institute of Astronomy, University of Latvia*) (<http://www.lu.lv/zvd/>, the digital archive: <http://ejuz.lv/zvd/>). Raiņa bulvāris 19, Rīga, LV 1586, Latvia. Tel.: (371) 67034581. E-mail: astra@latnet.lv. Editor-in-chief Agnis ANDŽĀNS. The journal is published in Latvian from 1958.

Zinātnes Vēstnesis (*Science Bulletin, newspaper of the Latvian Council of Science, Latvian Academy of Sciences, and Latvian Union of Scientists*) (<http://www.lza.lv/>). Akadēmijas laukums 1, Rīga, LV 1050, Latvia. Tel.: (371) 67212706, (371) 67225361, (371) 26593299. Fax: (371) 67821153. E-mail: zinatnes.vestnesis@lza.lv; lza@lza.lv. Editor-in-chief Ilze BOLDĀNE-ZEĻENKOVA. The newspaper is published in Latvian

Journal *Ilustrētā Zinātne (Illustrated Science Magazine)* (<http://www.ilustretazinatne.lv/>). Andrejostas iela 4A, Rīga, LV-1045, Latvia. Tel.: (371) 67292644. E-mail: ilustretazinatne@dienaszurnali.lv. Editor-in chief Dina BĒMA. The journal is published in Latvian.

Journal *Ilustrētā Pasaules Vēsture (Illustrated World History)* (<http://www.ilustretavesture.lv/>). Andrejostas iela 4A, Rīga, LV 1045, Latvia. Tel.: (371) 67273311. E-mail: ilustreta.vesture@dienaszurnali.lv. Editor-in chief Aiva LAPIŅA. The journal is published in Latvian.

Journal *Akadēmiskā Dzīve (Academic Life)* (<http://www.lu.lv/adz/>). Ģertrūdes iela 123, Rīga, LV 1009, Latvia. Tel.: (371) 67217124. E-mail: akademiskadzive@austrums.lv. Editor-in chief Ainars DIMANTS. The journal is published in Latvian.

Journal *Energija un Pasaule (Energy and the World)* (<http://www.eunp.lza.lv/>). Dzirciema iela 121, Rīga, LV 1055, Latvia. Tel.: (371) 29446806. E-mail: energijaunpasaule@gmail.com. Editor-in chief Andžela ŠUVAJEVA. The journal is published in Latvian.