

POINTS OF EXCELLENCE



RIGA TECHNICAL
UNIVERSITY



www.rtu.lv

Riga Technical University, 2016

Published by: International Relations Department

Design and layout: Arnis Grinbergs

Photo credits: Arturs Pērkons, Eduards Lapsa,
Edgars Špengelis, Aleksandrs Kendenkovs,
Andris Eglītis, Jānis Knāķis, Edijs Pālēns / LETA,
Imants Urtāns, Valts Kleins



POINTS OF EXCELLENCE

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RTU – STRATEGIC PARTNER FOR EXCELLENCE

University should not just react at changes in the society; it should be the driving force for change! Riga Technical University adheres to this principle in the field of tertiary education and is constantly developing to become an internationally recognized, modern, leading research and innovation University in the Baltic States.

Creating one campus in Ķīpsala means – we have developed a comfortable and creative study environment housing the most modern Laboratory Building in the Baltics, Design Factory – the place, where new ideas emerge and get implemented, with modern faculty buildings and one of the greenest campuses in Europe.

In the course of our transformation from a classic academic university into a third generation university, we are promoting synergy between science, academic studies, innovation and valorization, educating and training engineers for the future.

The quality of education provided by RTU is greatly respected by both Employers' Confederation of Latvia, which unites leading enterprises in the industry, and foreign companies – CERN, Daimler AG, ESA and other, who employ RTU Doctoral students, research staff and alumni.

Owing to a wide range of study programs implemented in English, in the last three years the number of international students at RTU has tripled, amounting to 11% from the total number of students.

Despite a marked focus on engineering, we pay much attention to sports and cultural activities – RTU teams in basketball, volleyball and floorball have won medals in both Latvian and European championships. The cultural scene at RTU is represented by numerous artistic groups including male choir "Gaudeamus", the winner of "Grand Prix" at numerous international competitions.

Our constant striving for excellence is the factor that best characterizes the quality of our work. In this book we summarized 30 points of RTU excellence in studies, research, and extra-curricular activities and we invite you to appreciate the top achievements of RTU.

Let this book be your guide into the world of RTU studies, research and innovation, providing insights into development history of the oldest technical university in the Baltic States and its points of excellence!

Welcome to RTU!



RTU Rector
Academician Dr. habil. sc. ing.
Leonids Ribickis

LATVIA AND RIGA – ADDED VALUE OF RTU

RTU is developing in lockstep with Latvia and Riga – the city that for several years is ranked among the most popular tourist destinations as one of the most beautiful cities on the Baltic Sea coast.

The Republic of Latvia

The Republic of Latvia – a country on the coast of the Baltic Sea founded in 1918.

Latvia consists of fertile lowland plains and moderate hills, with most of its territory situated about 100m above sea level. The country has vast forested areas, an extensive network of rivers, thousands of lakes, and hundreds of kilometers of seashore, lined with pine forests, dunes, and white sandy beaches. The country's strategic location between Scandinavia and Russia has made it an international crossroad for trade, commerce, and cultural exchange since ancient times.

The Capital City – Riga

Riga, founded in 1201, has always been the political, economic, and cultural center. Nowadays, around one third of Latvia's population lives and works there. The Historical Centre of Riga is listed by UNESCO as one of the world's most important cultural and architectural sites. Riga has hosted a NATO

summit, a World Ice Hockey Championship, the Eurovision song Contest, and many other large-scale international events: in 2014, Riga was the European Capital of Culture; in 2015, Riga was home to the Latvian Presidency of the Council of the European Union.

Riga is the city where centuries meet. Riga cityscape represents the multi-layered history of Latvia from the Middle Ages until today. Art Nouveau and wooden buildings of the 19th century are trademarks of Riga, although overall its architecture represents an eclectic mix – from medieval houses to apartment blocks of the Soviet times, and the contemporary architecture. That all makes Riga so special.

Riga International Airport is one of the fastest-growing travel hubs in Europe; it provides direct flights to more than 80 destinations.

Riga is a cultural hub, where all forms of culture are part of everyday life; it is a European city with a unique historical feel. Riga has many faces, new and old, contrasting and complimentary, creative and traditional. Once you are here, it will take you by surprise.



The Republic of Latvia





18 November – Proclamation Day of the Republic of Latvia



Rundale Palace – the Latvian pearl of Baroque and Rococo architecture

The Capital City – Riga



Old Riga
Town Hall Square, the statue of Roland,
the House of Blackheads



The Latvian National Opera



Freedom Monument



Old Riga at night

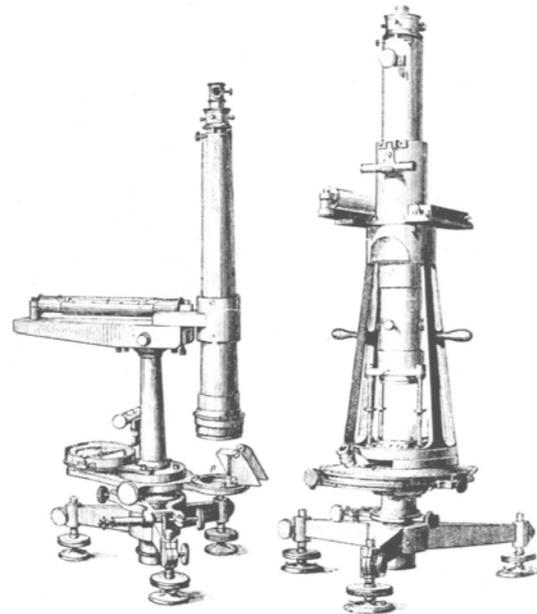


Fireworks over the Daugava, Riga





HISTORY OF RTU



History of RTU dates back almost 155 years. The establishment of RTU, then Riga Polytechnicum (later – Riga Polytechnic Institute), was closely connected with the economic and political changes in Europe in the middle of the 19th century: rapid development of manufacturing and railway transport, erection of bridges and other engineering constructions. Riga was rapidly transforming itself into a developed industrial centre. The main task of the school was to educate and train technical intelligentsia who would be capable of working with new manufacturing equipment and proposing new ideas for new achievements.

After taking into account recommendations by numerous representatives from German universities, a decision was made to support the establishment of a private polytechnic higher school in Riga. It was the first higher education establishment in the current territory of Latvia, then part of the Russian Empire.

A permission from the Russian Tsar Alexander II to establish a high school was received in May 1861, and on 14 October 1862, the first students enrolled in preparatory course and commenced their studies. This day is celebrated as RTU birthday.

The first instructors mainly came from Germany, Switzerland and Austria-Hungary, and German was the language of instruction. Physicist Ernst Nauk became the first Rector of the higher school.



Emperor Nikolay II decreed on 6 May 1896 that turned the higher school into a state-owned institution – Riga Polytechnic Institute (RPI). From the turn of the century and the first decade of the 20th century RPI flourished. The institute played a major role in turning Riga City into a modern metropolis, its professors and graduates taking part in developing gas and electricity supply systems, as well as tramcar transport system. Hundreds of brick houses were built, including real gems of Art Nouveau,

mainly designed by local architects – graduates of RPI School of Architecture. People associated with RPI facilitated the advances of the most modern technical fields in Riga, such as aviation and automobile industry. RPI graduate Friedrich Zander became one of the founders of the rocket and space science in Russia.

Many other prominent scientists worked at the University: August Toepler, Étienne Laspeyres, George Armitstead, Wilhelm Ritter, Mikhail Dolivo-Dobrovolsky, Engelbert Arnold, Paul Walden and Wilhelm Ostwald – the only Nobel Prize Laureate from the Baltic States.

The work of the high school was interrupted by World War I. Political regime changed several times, and along changed the name of the high school. By 1918, RPI faculties were included into a newly established Latvian Higher School (University of Latvia, State University of Latvia).

Riga Polytechnic Institute renewed its work on 1 September 1958 and in the mid-1970ies, RPI became the largest higher educational institution in Latvia.

In March 1990, RPI was renamed as Riga Technical University (RTU). On its way to the united European education area, RTU had already in 1991 started educating and training international students, as well as provided its academic staff and students the opportunity to work and study in different European universities. Gradually the system of education was transformed into a three-level higher education format at Bachelor, Master and Doctoral levels and RTU fully integrated into the European Higher Education Area.



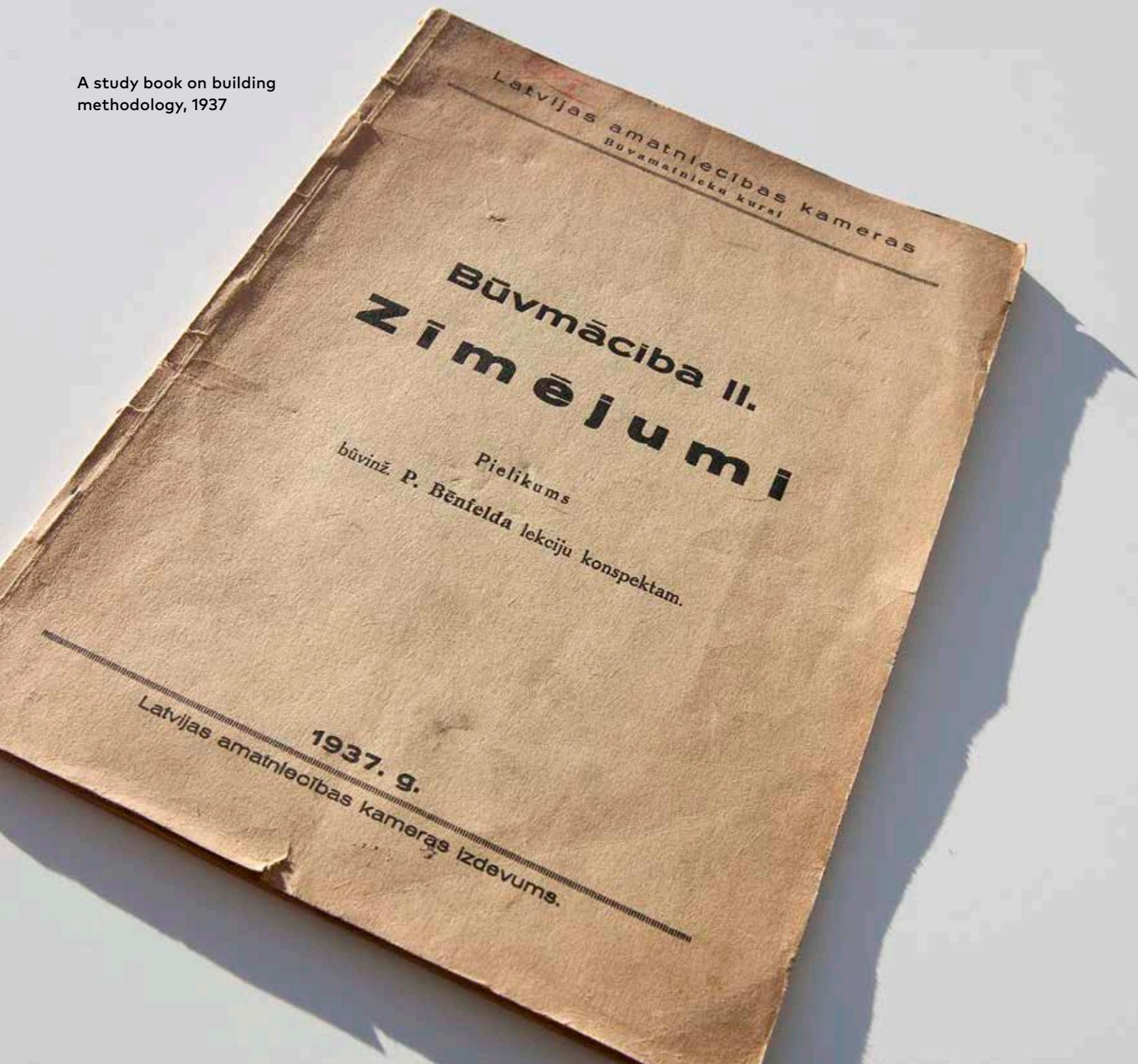
The cap of "Selonija" student corporation



Members of the student corporation "Selonija" during the 1899/1900 academic year



A study book on building methodology, 1937



Many other prominent scientists worked at the University: August Toepler, Étienne Laspeyres, George Armitstead, Wilhelm Ritter, Mikhail Dolivo-Dobrovolsky, Engelbert Arnold, Paul Walden and Wilhelm Ostwald – the only Nobel Prize Laureate from the Baltic States.

1862–1896

Riga Polytechnicum

1896–1919

Riga Polytechnic Institute

1919–1958

Technical faculties within

Latvian Higher School / 1919–1922

University of Latvia / 1922–1945

State University of Latvia / 1945–1958

1958–1990

Riga Polytechnic Institute

Since 1990

Riga Technical University



RTU headquarters in 1960's

RTU RECTORS



**ERNST
NAUCK**

In office from
1862 to 1875



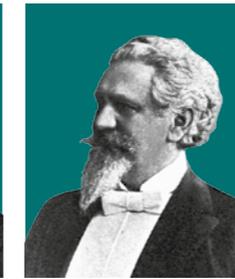
**GUSTAV VON
KIESERITZKY**

In office from
1875 to 1885



**AUGUST KARL
LIEVENTHAL**

In office from
1886 to 1891



**THEODOR
GROENBERG**

In office from
1891 to 1902



**PAULS
VALDENS**

In office from
1902 to 1905 and
from 1917 to 1919



**VOLDEMAR
VON KNIERIEM**

In office from
1906 to 1916



**KRISTAPS
NEILANDS**

In office from
1958 to 1960



**ALEKSANDRS
MĀLMEISTERS**

In office from
1961 to 1963



**ALEKSANDRS
VEISS**

In office from
1963 to 1985



**EGONS
LAVENDELIS**

In office from
1985 to 1999



**IVARS
KNĒTS**

In office from
1999 to 2011



**LEONĪDS
RIBICKIS**

In office from
2011

RTU IN THE 21ST CENTURY

RTU is a modern internationally recognized university. It is the only polytechnic university in Latvia as well as the largest university in the country – it educates and trains almost 15 thousand students.

RTU is focused on becoming a third generation university that not only provides high quality education, but also conducts advanced research and ensures innovation and technology transfer, in such a way practically implementing scientific discoveries.

At nine faculties of RTU it is possible to obtain high quality education not only in engineering, but also in social sciences and humanities. Study programs implemented by RTU have been positively evaluated by international experts and are officially accredited. The quality of education provided by the University has been attested by

the Employers' Confederation of Latvia, which recommends RTU as the priority university for obtaining a higher education in Latvia.

RTU is constantly developing its infrastructure constructing a campus in Ķīpsala Island. On completion, the campus will be the most advanced engineering study center in the Baltic Region.

POINT OF EXCELLENCE IN INFRASTRUCTURE

RTU Ķīpsala Campus

RTU is the first university in Latvia, which in 2007 started to implement an ambitious project to develop a university campus that would unite education and research facilities.

To accomplish the project "RTU – City within a City", the university is developing the most advanced engineering study center in the Baltic Region. The campus will unite all units of RTU in one place – almost in the center of Riga.

Ķīpsala Campus also houses a renovated student hostel, equipped apartments for guest professors and a small conference center.



Fantastic view of Old Riga from the terrace of RTU Student Hostel in Ķīpsala

RTU Ķīpsala Campus

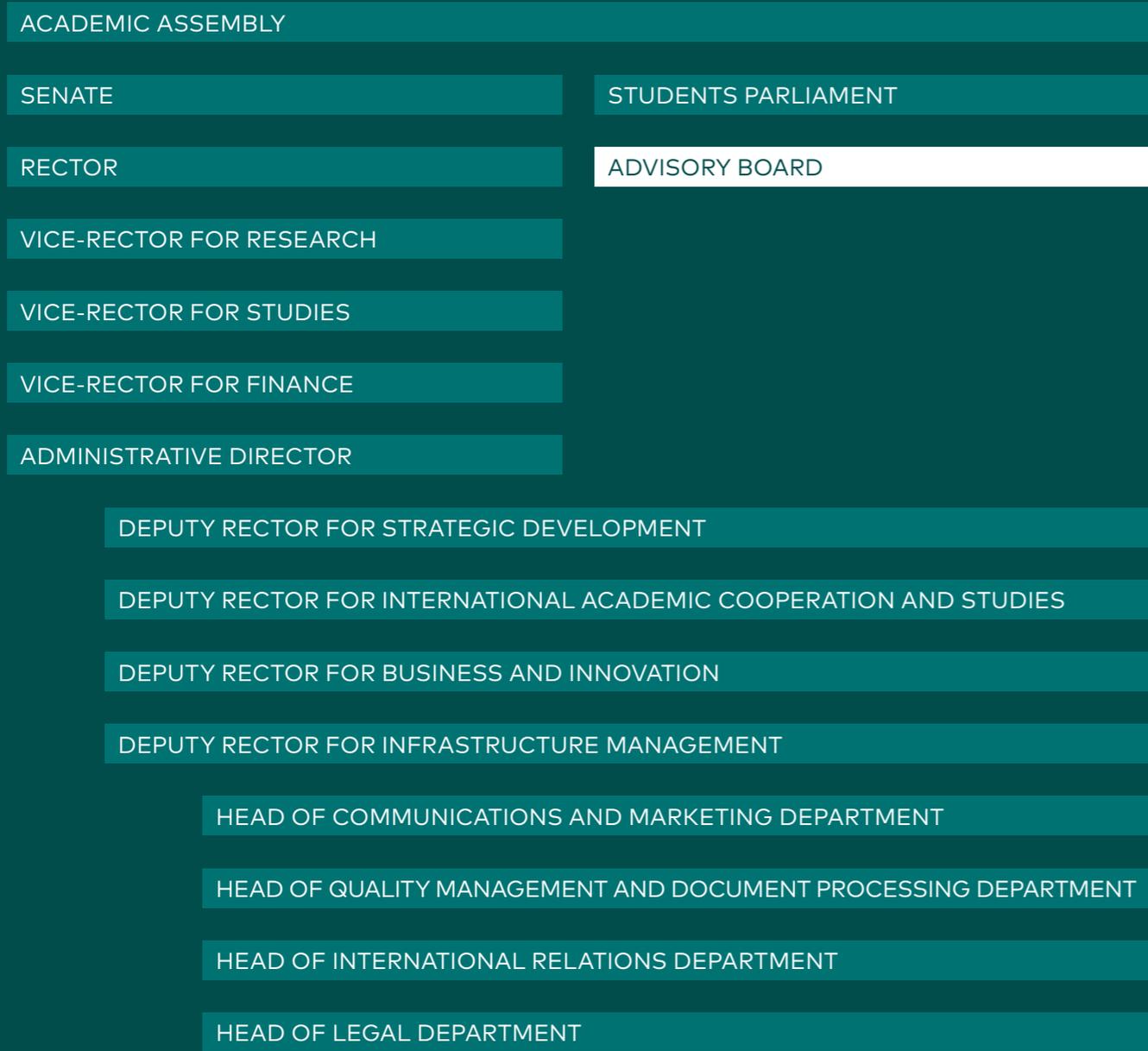
The design of RTU Campus –
"City within the City"



RTU Ķīpsala Campus



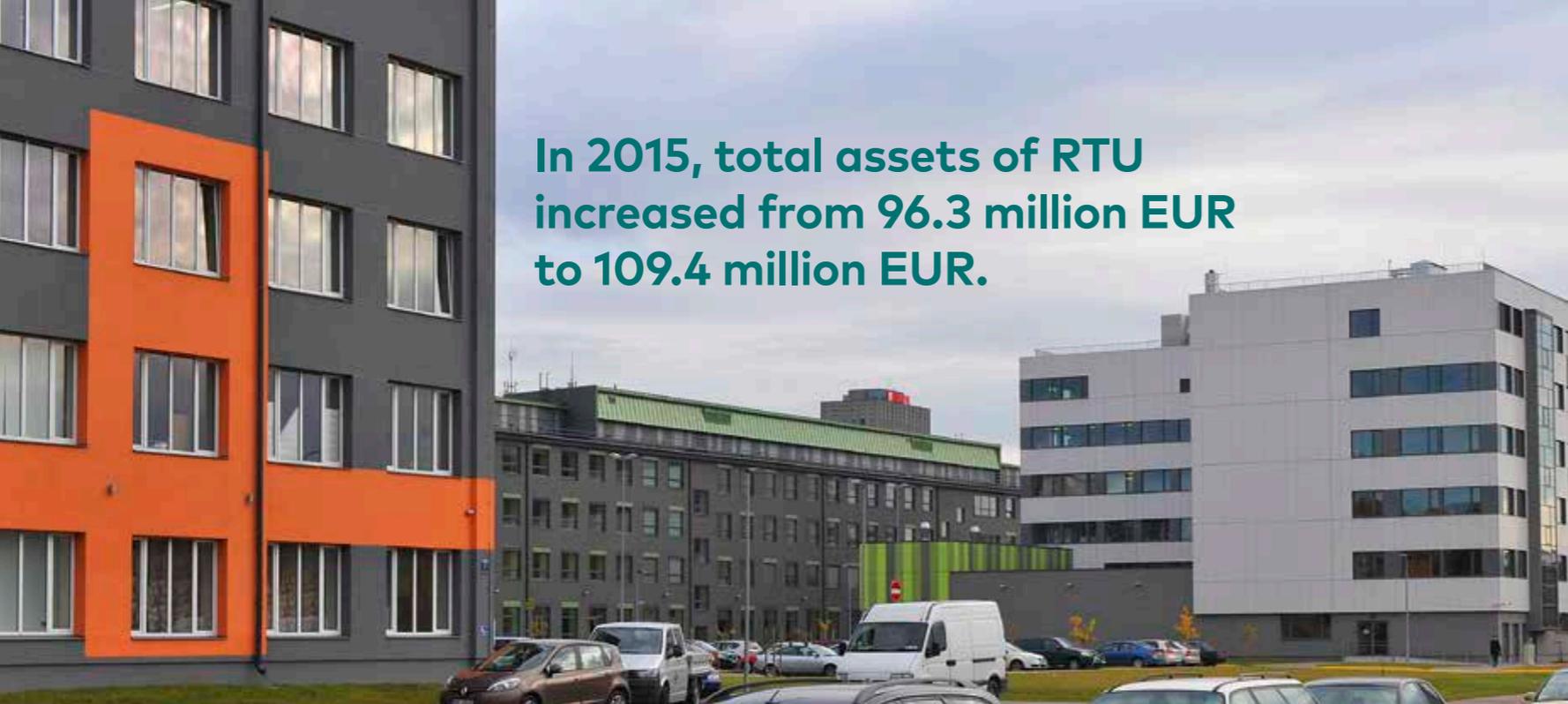
RTU Structure



FACULTIES



In 2015, total assets of RTU increased from 96.3 million EUR to 109.4 million EUR.



RTU Strategy

RTU Strategy includes the most important policies for RTU development in the period till 2020.

The Strategy is based on three main goals of the University – high quality study process, excellence in research, and sustainable innovation and commercialization.

RTU Advisory Board is an essential partner

of RTU in Strategy implementation. It is an elected body that unites specialists in the field of research, education, culture, or national economy, which consults RTU Senate and Rector on the issues concerning University Strategy and supports developing RTU capacity. The Advisory Board evaluates University performance and provides advice on the overall development of RTU.



RTU is a modern, internationally recognized science and technology university, which in its capacity of an education, research, life-long learning and innovation center educates and trains highly qualified engineering specialists for the Latvian national economy. Comprehensive modernization and adoption of the world's best practices ensure dynamic and sustainable development of RTU, allow RTU and its alumni to compete internationally.

RTU has been developing in accordance with the RTU Strategy 2014–2020. In 2015, total assets of RTU increased from 96.3 million EUR to 109.4 million EUR, the funds were invested in infrastructure development, purchase of equipment and machines, etc. In turn, RTU equity grew from 62.3 million EUR to 65.8 million EUR, RTU revenue also increased by 2.6 million EUR.



Chair of RTU Senate professor Dr. oec. **Elīna Gaile-Sarkane**



RTU Vice-Rector for Finance Dr. oec. **Ingars Eriņš**

STUDIES AT RTU

Study Process Management

Studies at RTU are implemented by nine faculties, including 33 institutes.

RTU has affiliations in Daugavpils, Liepaja, Ventspils and Cesis; it comprises Riga Business School, BALTECH – a consortium of seven engineering universities from the Baltic Sea Region, as well as Engineering High School.

RTU trademark is high quality internationally competitive engineering education based on more than a century-and-a-half old academic traditions appropriate to meet new technological challenges.

Study programs at RTU have been persistently developed in cooperation with employers to provide tertiary education in cutting-edge technologies and engineering that meets the needs of the global labor market. It helps RTU graduates to easily integrate in the labor market and to develop a successful professional career. At the same time, RTU provides opportunities to pursue a career in science to the alumni who are interested in research, offering them the chance to enroll for Doctoral studies.

RTU is the largest university in Latvia by number of students and one of the largest universities in the Baltic States by number of foreign students. We are very proud because the number of students willing to study at RTU attests high quality of education we provide that has been recognized by both local and foreign students.



RTU Vice-Rector for Studies
Dr. sc. ing. **Uldis Sukovskis**



FACULTY OF ARCHITECTURE AND URBAN PLANNING

RTU Faculty of Architecture and Urban Planning educates and trains specialists in architecture. Possible fields of specialization – spatial planning, restoration of historical monuments, interior design and landscape architecture.



Dean of the Faculty of Architecture and Urban Planning professor Dr. arch. **Uģis Bratuškins:**

As the society takes a more active part in the development of high quality environment, an architect should be able to reconcile the interests of all stakeholders. It is virtually not possible to be a solo player in the contemporary architecture.

The architect of the 21st century is like a conductor holding an orchestral score in his hands and managing design and construction processes so that the result meets expectations. That is why a modern architect should set ambitious goals, be able to think critically and respect opinion of the others.

The priority of the Faculty of Architecture and Urban Planning is educating and training specialists for the Latvian market. However, we also recommend our students to gain academic experience in other countries and willingly enroll foreign students at our Faculty for international study semesters.

Study Program:

- Architecture

Major Research Areas:

- Synthesis of Art and Architecture as a facilitating factor in human environment development
- Territory planning systems in the context of spatial parameters of urban development
- Latvian architecture and urban development in the context of European architecture
- Artistic and socio-economic aspects of urban planning
- Aspects of sustainable development of residential environment
- Spatial and social aspects of harmonious development of urban environment identity

POINT OF EXCELLENCE

Exhibition of Student Diploma Projects

Every year the Faculty organizes exhibitions of student Diploma Projects presenting student works on display to initiate public discussion. The interested public may get acquainted with the signature and aptitude of future architects.

Diploma Projects are normally dedicated to topical public and urban development issues: contemporary development of historical environment, transformation of former industrial sites, public use of water's edges, etc.

Young architects introduce themselves by presenting spatial, functional, and engineering solutions for major construction objects and original environment development scenarios. They are not afraid to raise public interest and attract attention to the places where the clashing manifestations of radically different urban development concepts have left their colorful marks. It is the reason why exhibition of student Diploma Projects is a much-awaited annual event in Riga.



Atrium of the building of the Faculty of Architecture and Urban Planning

The architect of the 21st century is like a conductor holding an orchestral score in his hands and managing design and construction processes so that the result meets expectations



FACULTY OF CIVIL ENGINEERING

RTU Faculty of Civil Engineering provides academic and professional education in civil engineering, geodesy and cartography, as well as heat, gas, and water technology.



Dean of the Faculty of Civil Engineering professor Dr. sc. ing. **Juris Smirnovs:**

A builder should not only have empathy with people, but also with nature and history. It is the greatest magic of the work of a builder.

Before implementing constructions works it is necessary to both assess the long term impact of environmental factors building design and consider what is hiding beneath. Several years ago, a secret cable laid by Germans during WW2 used for communication with Berlin was discovered in the process of constructing a road in Latvia. Thus, builders again and again come into direct contact with history and artifacts. Each builder, who in the course of professional career wants to create many new buildings that will serve several generations of residents for many years, should thoroughly explore climatic conditions of the respective region. In Latvia, it is necessary to learn to account for freeze-thaw cycles, additional loads imposed by snow, etc. It is possible to learn all this at the Faculty of Building and Civil Engineering.

Study Programs:

- Civil Engineering
- Construction Management
- Geomatics
- Innovative Road and Bridge Engineering
- Innovative Solutions in Geomatics
- Heat, Gas, and Water Technology
- Transportation Engineering

Major Research Areas:

- Composite materials and constructions, thin-walled structures
- Structural analysis, technical condition monitoring and defect detection
- Efficient, high strength concretes, geopolymers and porous ceramics
- Road traffic safety, roadway surfaces, research on bridge construction safety and durability
- Remote sensing of the Earth's surface
- Geotechnical investigations
- Building envelope and structural physics investigations
- Development of new generation of composite structures
- Oscillation analysis and forecast of building structures, oscillation damping systems
- Didactics of graphical communication, computer aided design in architecture, civil engineering and mechanical engineering
- Heating, ventilation and air conditioning systems
- Use of solar, wind, geothermal energy sources in power supply, low-energy building design
- Biological stability and control in drinking water distribution systems
- Impact of floods on engineering constructions – stability, risks and assessment
- Water supply and sewage systems and equipment

POINT OF EXCELLENCE

Prototypes developed by a new generation of composite engineers

New generations of excellent composite engineers are purposefully trained at the Department of Composite Materials and Constructions. Every year student teams get involved in the development of end-use composite material products.

Designing product prototypes, students learn how to use vacuum infusion technology or

to do computer simulation software and prototype testing. At the Institute of Materials and Structures, where Latvian scientists have designed the construction of the wing for the largest passenger airplane Airbus A380, students develop, for example, innovative snowboard and skateboard prototypes. In such a way students learn how to employ technologies that are used in high level scientific research.

FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

The Faculty of Computer Science and Information Technology educates and trains specialists in all fields of computer science and information technology (IT) who will be capable to work in the areas, where new information systems and other IT solutions should be developed and applied.



Dean of the Faculty of Computer Science and Information Technology professor Dr. habil. sc. ing. **Jānis Grundspenķis:**

For several consecutive years, the Employers'

Confederation of Latvia compiles a list of educational establishments and study programs most recommended by employers. RTU and the program "Computer Systems" implemented by the Faculty of Computer Science and Information Technology are convincing winners.

IT sector is one of the most rapidly developing industries in the world – integration of technology in almost all spheres of human activity ensures that this tendency will continue and that there will be a constant demand for IT professionals in the labor market.

It is a common mistake to think that IT specialists spend their day working only with newest technologies and computers. They spend a lot of time communicating with people, that is why a

professional should have excellent cooperation and communication skills, as well as language skills, the knowledge of English in particular. It is necessary to know how to set goals, be pragmatic and responsible as the work of contemporary IT specialists influences the way people think, changes their behavioral patterns and their lives.

Study Programs:

- Automation and Computer Engineering
- Business Informatics
- Computer Systems
- Financial Engineering
- Information Technology
- Intelligent Robotic Systems
- Logistics and Supply Chain Management

Major Research Areas:

- Integrated intelligent computing for evolving digital enterprises
- Ambient intelligence for smart autonomous and distributed system design and integration
- Integrated data processing (communications, computing and management) in complex distributed environments
- Mathematical modeling

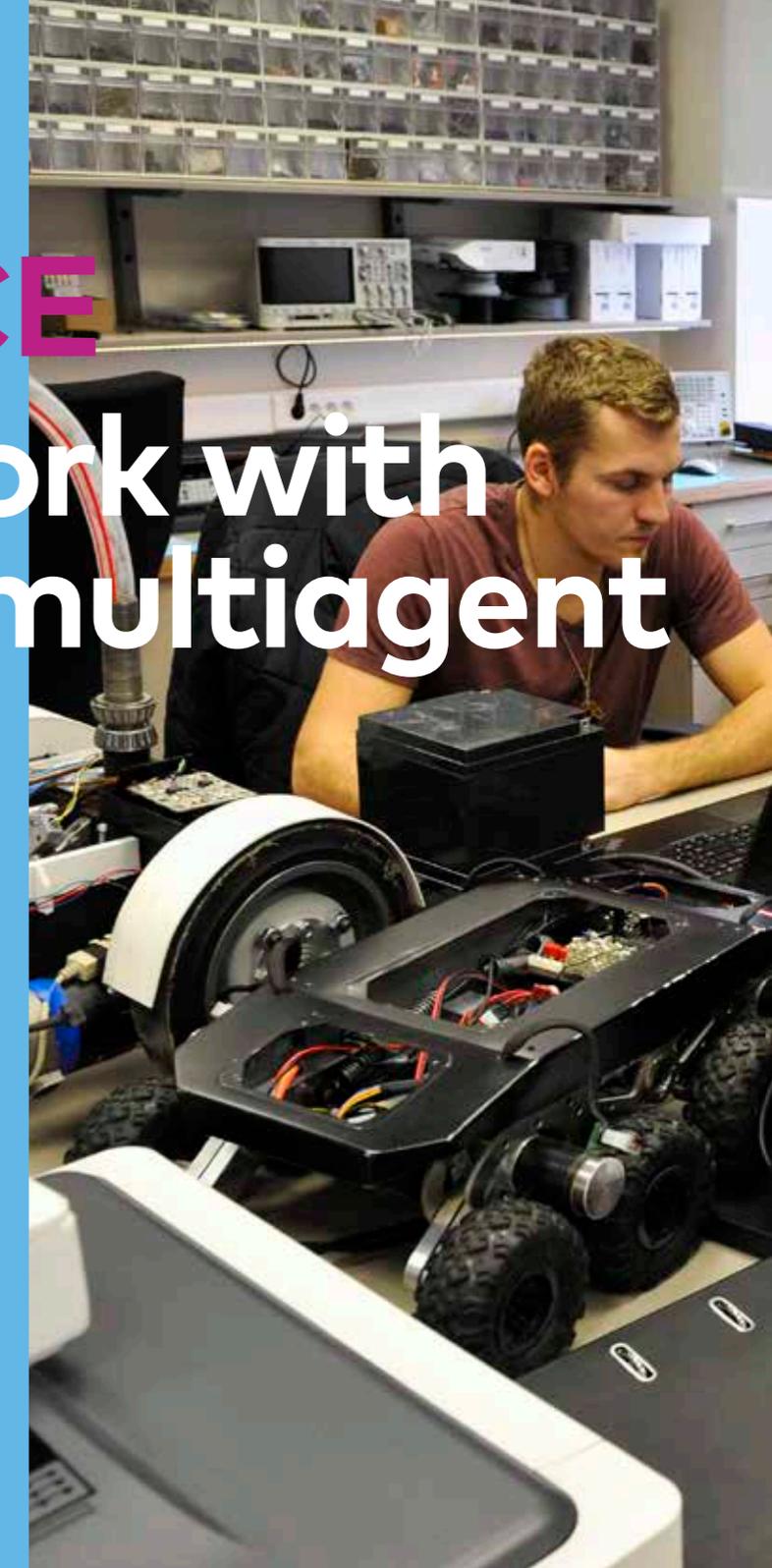
POINT OF EXCELLENCE

Student work with intelligent multiagent systems

Developing various autonomous intelligent systems, Faculty researchers have managed to captivate students' interest and involve them in research on artificial intelligence and robotics.

While researchers create robots for industrial and household purposes, students studying engineering create robots for fun and competitions, promoting the interest of youngsters, schoolchildren in particular, in robotics and engineering. Students actively participate in the work of Robot School and Robotics Club supported by the Faculty.

Students organize Latvian Robotics Championship; they also won at numerous World and Japan Robot Tournaments.



FACULTY OF ELECTRONICS AND TELECOMMUNICATIONS

The Faculty of Electronics and Telecommunications educates and trains specialists in electronics, mobile communications and telecommunications, trains professionals in the field of computerized transport control, information and electronic systems, as well as specialists in telematics.



Dean of the Faculty of Electronics and Telecommunications professor Dr. sc. ing. **Jurgis Poriņš:**

We have to deal with various smart devices and computers on a daily basis, and in the future we will use them at a much greater scale. However, any smart device is first and foremost electronics and only after that – software. Moreover, while application software changes, electronic hardware remains unchanged, thus, along with growing speed new tasks arise, and so the requirements with respect to electronic backup keep constantly changing.

Electronics is very versatile and multifaceted – ranging from semi-conductor 3D chips in nanotechnologies to supercomputers, from camcorders at the eagle's nest to electromobiles. It is a multi-billion industry, the market covers both large international companies and small start-ups. All industry players strive to develop new generation technologies, and the competences and skills necessary to accomplish that can be obtained at the Faculty of Electronics and Telecommunications.

Study Programs:

- Electronics
- Electronics and Mobile Communication
- Telecommunications
- Transport Electronics and Telematics

Major Research Areas:

- New generation of optical communication networks and their components
- Research and development of cyberphysical systems technologies using the innovative high-speed optical transmission system technologies
- High density wavelength division multiplexing (HDWDM) and passive optical network (PON) modeling, characterization and optimization
- Development and assessment of energy-efficient communication systems
- Multicarrier modulation format design for communication systems
- Development and assessment of new generation microwave transmission systems
- Signal processing for 4G and 5G wireless technologies
- Research on transportation communication systems and complex data processing
- Mathematical modeling of telecommunications networks and systems
- Development of switching power converters and improvement of electromagnetic compatibility

We have a long-standing expertise, for instance, our internationally competitive acoustics school.

We have long-standing expertise, for instance, our internationally competitive acoustics school. The manufacturing enterprise established by our graduate Jānis Zariņš "JZ Microphones" has produced microphones for such world famous artists as Madonna, Nelly Furtado, Lady Gaga, The Offspring. Company "SAF Tehnika" founded by the Faculty graduates Normunds Bergs and Didzis Liepkalns has become one of the world largest manufacturers of data transmission equipment.

The Latvian Electronic Equipment Testing Center operates at the Faculty, it is an accredited body, which performs RF radiated emission, conducted immunity, magnetic field and other tests, as well as temperature tests.

POINT OF EXCELLENCE

Student experience in fiber-optic transmission systems

The Faculty comprises High-Speed Optical Transmission System and Non-Linear Fiber Optics Laboratory conducting world-class research on high-speed optical wavelength-division multiplexing (WDM) transmission system element design and testing, data transmission speed up to 56 Gbit/s per channel.

Using the opportunities provided by the laboratory, students in the course of their studies develop competences and skills in the field of fiber-optic transmission systems.

This is the only laboratory of this kind in the Baltic States. Using advanced equipment and optical measurement bench, the researchers develop and test innovative components and solutions

for fiber-optic transmission systems, examine the existing and develop new testing methods to analyze non-linear processes in optic fibers and WDM transmission systems. Research results are registered by respective patents, as well as reflected in publications and lecture courses.

Research results are registered by respective patents, as well as reflected in publications and lecture courses.

FACULTY OF POWER AND ELECTRICAL ENGINEERING

The Faculty of Power and Electrical Engineering educates and trains engineering specialists in the field of power engineering, electrical engineering and environmental science, who are competent in electrical power transmission and distribution systems and their control, electric machines and apparatus, power electronics and electric drives, industrial automation and computerized control, issues of energy efficiency, as well as, environment protection and management.



Dean of the Faculty of Power and Electrical Engineering professor Dr. sc. ing. **Oskars Krievs:**

Power engineering and clean environment play a fundamental role in the

development of any society. At present, in the context of energy resource depletion and climate change, these areas have become a priority both in Latvia and the world, with the demand for innovative ideas and highly qualified workforce in the field of power engineering growing.

Power engineering is one of the industries that characterize the quality of life and economic development of the society: the demand for energy grows along with higher demands with respect to the quality of life. Today it is difficult to name a field that does not make use of electrotechnical devices and automatic computer control systems – electric drive, different power converters and telemechanic systems can be encountered in power generation, transmission and distribution, in electric transport and

Study Programs:

- Adaptronics
- Computerized Control of Electrical Technologies
- Power and Electrical Engineering
- Environmental Science

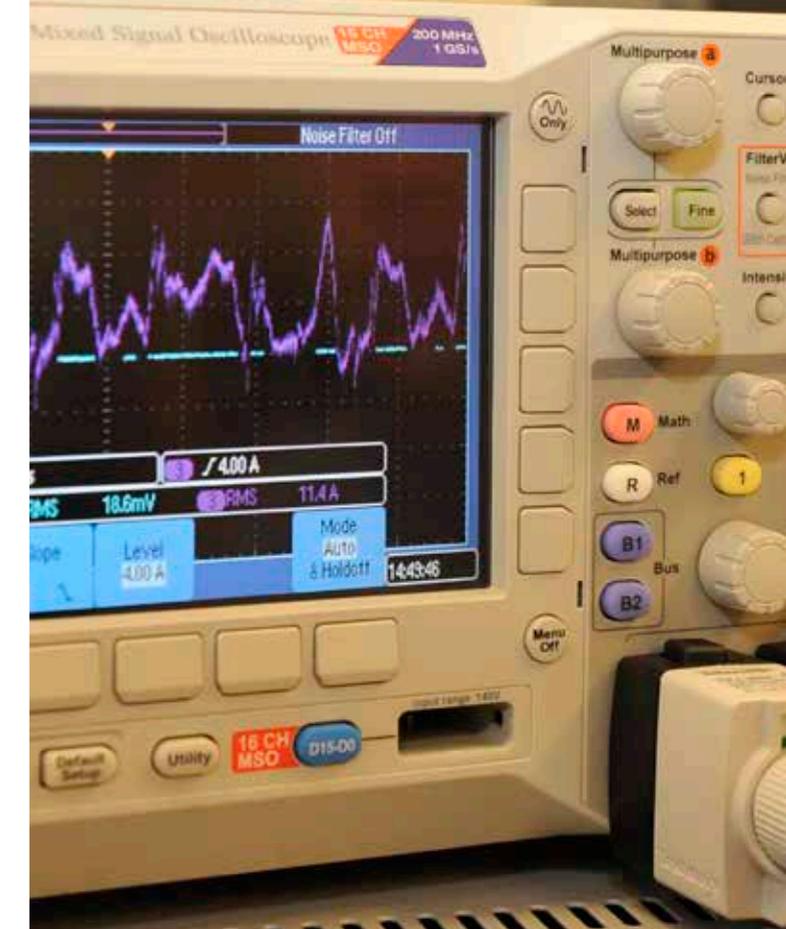
Major Research Areas:

- Management, optimization and automation of power generation and supply
- Innovative design of electrical machines, electrical apparatus and electrical devices
- Development, synthesis and verification of methodologies, recommendations, algorithms, software for participants of power supply system
- Power electronic converters and their control algorithms in modern power supply systems, electric drive and renewable resource usage
- Smart electric technologies in lighting systems, manufacturing automation and energy efficiency improvement
- Smart electric transport systems
- Knowledge-intensive science of climate and bio-economy
- Analyses of power supply circulation cycles and development of planning instruments
- Development of new sources of renewable energy and technologies
- Reduction of pollution by energy equipment, technological and environmental aspects of reduction of greenhouse gas emissions, as well as their trapping and storage

The most stable employers can be found in the field of power engineering that guarantee secure work in the long term

industrial and household automation. Along with the rapid change and technological development, it is getting more and more topical to account for the occurring climate change and manage the environment so as to sustain its quality also in the 21st century. Qualified specialists are in high demand in all spheres named, and the Faculty of Power and Electrical Engineering educates and train them.

Development of any industry is not possible without power engineering, that is the reason why considerable investment is poured into power engineering and respective technologies are constantly developing. Therefore, the most stable employers can be found in the field of power engineering that guarantee secure work in the long term.



POINT OF EXCELLENCE

Creative Laboratory

The Faculty has established a Student Creative Laboratory, where students create prototypes of electrical equipment and implement their engineering ideas.

Anyone can realize one's technical ideas at the laboratory, no matter whether it is a schoolchild developing one's research work or a student working on his/her Bachelor or Master paper, or simply an interested member of the public who wants to take a foray in designing an electrical machine.

Power supply enterprise "Latvenergo" supported 12 work places in the laboratory, they are equipped with various mechanical processing tools, gauges, and testing equipment.



Anyone can realize one's technical ideas at the laboratory.

FACULTY OF E-LEARNING TECHNOLOGIES AND HUMANITIES

The Faculty of E-Learning Technologies and Humanities educates and trains technical translators in the fields of mechanical engineering, logistics, power engineering, materials science, information technologies, telecommunications, civil engineering, architecture and urban planning, engineering economics and other domains, as well as providing training to highly qualified specialists introducing e-learning technologies in the enterprises and life-long learning system.



Dean of the Faculty of E-Learning Technologies and Humanities associate professor Dr. philol.

Marina Platonova:

Faculty of E-Learning Technologies and Humanities

is a unique example of successful synergy between engineering sciences and humanities; there are not many of this kind in Europe. Only a few European universities have similar experience, for example, the University of Manchester in the UK and Chemnitz Technical University in Germany, which offer students the opportunity to study technical disciplines simultaneously with humanities.

Future knowledge is interdisciplinary, and studies at the Faculty of E-Learning Technologies and Humanities have high added value because the interdisciplinary aspect is integrated in every study course. It is an interesting synergy.

Interdisciplinary aspect is also clearly manifested within Doctoral studies, as a future researcher

can develop one's Doctoral Thesis under supervision of two scientific advisers – a linguist and a technical discipline specialist.

We are the only educational institution in Latvia that implements the study program in technical translation. We are also the only RTU faculty, where the number of international students exceeds the number of local students.

Study Programs:

- Technical Translation
- E-Learning Technologies and Management

Major Research Areas:

- Information and communication technologies – new knowledge society products
- Multi-screen e-learning concept eBig3 (e-ecosystem of the lifelong learning target group)
- Smart cities and smart technologies
- Multimedia technology applications
- IT and digital media in linguistics and communication science
- Contrastive linguistics
- Translatology
- Terminology of particular fields
- Language for Special Purposes (LSP) teaching and learning

POINT OF EXCELLENCE

Distance Education Study Center

Distance Education Study Center is one of the units of the Faculty of E-Learning Technologies and Humanities. It develops distance learning opportunities and new generation e-education in Latvia designing and adjusting distance learning courses, as well as organizing the learning processes within these courses.

The Center is equipped with modern telecommunications (ISDN videoconferencing) and multimedia facilities.

The Center cooperates with distance learning centers from other countries, at present the staff of the Center is involved in 14 international projects in the field of distance learning course design.

Researchers of the Center have developed a prototype of a modern life-long learning support system, which will help the users in the learning process react to the user behavior in the e-environment.



FACULTY OF ENGINEERING ECONOMICS AND MANAGEMENT

The Faculty of Engineering Economics and Management provides higher education at all levels in various fields of economics and entrepreneurship – business management and economics, human resources management, civil construction management, real estate management, urban and regional economics, customs and tax administration, international business relations, occupational safety, quality management, marketing, logistics, finance, etc.



Dean of the Faculty of Engineering Economics and Management professor Dr. habil. oec. **Remigijs Počs:**

Since 2013 the Faculty of Engineering Economics and Management has been ranked among 1,000 world best business schools and universities by an international rating *Eduniversal*, being included in the 3 Palmes league, which comprises excellent business schools with reinforcing international influence in business and management education. There are 5 Palmes of Excellence leagues overall.

Excellent ranking was also received within *Eduniversal* international Master study program rating. Three Master study programs implemented by the Faculty of Engineering Economics and Management were ranked among the world best – "Administration of Customs and Taxes", "Civil Construction and Real Estate Management" and MBA program "Innovations and Entrepreneurship". At the same time, Master study programs "Business Finance" and "Economics" were ranked among 200 best university programs in economics and finance in Eastern Europe.

Study Programs:

- Human Resources Management
- Occupational Safety
- Safety Engineering
- Fire Safety and Civil Protection
- Economics
- Urban and Regional Engineering Economics
- Engineering of Regional Development and Urban Economics
- Innovations and Entrepreneurship
- Administration of Customs and Taxes
- Real Estate Management
- Civil Construction and Real Estate Management
- Organization and Management of International Economic Relations
- Business Logistics
- Entrepreneurship and Management
- Business Finance
- Management Science and Economics
- Total Quality Management

Major Research Areas:

- Development of entrepreneurship and innovations
- Management of civil engineering, real estate, urban and territory development
- Organizational and national safety
- Quality management of processes, products and systems
- Development of economic, mathematical and statistical models



A professional of the 21st century is a cross-disciplinary specialist

A professional of the 21st century is a cross-disciplinary specialist. The studies at the Faculty of Engineering Economics and Management have a clear interdisciplinary character. Every faculty student obtains integrated entrepreneurial competencies. Study process is oriented towards learning by doing or learning by developing and establishment of an integrated theoretical knowledge base. The Faculty implements a study course "New Product Design and Development Methodology", within which students develop competencies in new product design and technology transfer.

Students also participate in the work of entrepreneurship camp *Cambridge Venture Camp*, where students develop their business ideas, raise start-up financing and establish spin-off enterprises.

The Faculty participates in the UN initiative *Principles of Responsible Management Education – PRME*, paying particular attention to the principles of responsible education and integrating them in the aims, values, methods, study process, science and research, partnerships and social dialogue.

POINT OF EXCELLENCE

Student established spin-off enterprises and innovative products

Mobile application Infy.me

Faculty graduate, entrepreneur Oskars Putniņš developed a mobile application *Infy.me*, which was created to change the way how business world communicates. It is the first personal smartphone assistant, which stores and manages paper business cards. *Infy.me* stores digital copies of business cards in the cloud, and they can be accessed from any device. You can share your business cards via *Infy.me*, e-mail, SMS or social networks. Each business card has a unique QR code, which can be located in any place important for the business – electronically or in the printed form.

Breakfast cereals Milzu! (Giant!)

The student of the study program "Innovations and Entrepreneurship" Enno Ence during his studies developed and improved one of the most successful Latvian food products of the recent times – Milzu! breakfast cereals. Currently, Latvia is the main market for the breakfast cereals, but it is planned to export Milzu! products to Estonia and the Scandinavian countries.

Crazy Roller

Faculty students in the course of their studies invented and designed a crazy roller – a new device, which can be used to both roll down the hill and move on the ground or water surface. In total 12 basic versions and prototypes of the roller were developed in cooperation with RTU experts in mechanical engineering. An enterprise Trakais rotors Ltd was established to promote the product in the market. At present, the attraction works in many amusement parks in Latvia, however, about 700 European skiing resorts and Mediterranean water sports centers are among potential clients.

Faculty students in the course of their studies invented and designed a crazy roller – a new device, which can be used to both roll down the hill and move on the ground or water surface.

FACULTY OF MATERIALS SCIENCE AND APPLIED CHEMISTRY

The Faculty of Materials Science and Applied Chemistry educates and trains specialists in chemistry, materials science, chemical technology, clothes and textile technology, materials technology and design. The Faculty provides basic education courses in chemistry, materials science and physics to all students of RTU.



Dean of the Faculty of Materials Science and Applied Chemistry professor Dr. chem. **Valdis Kokars**

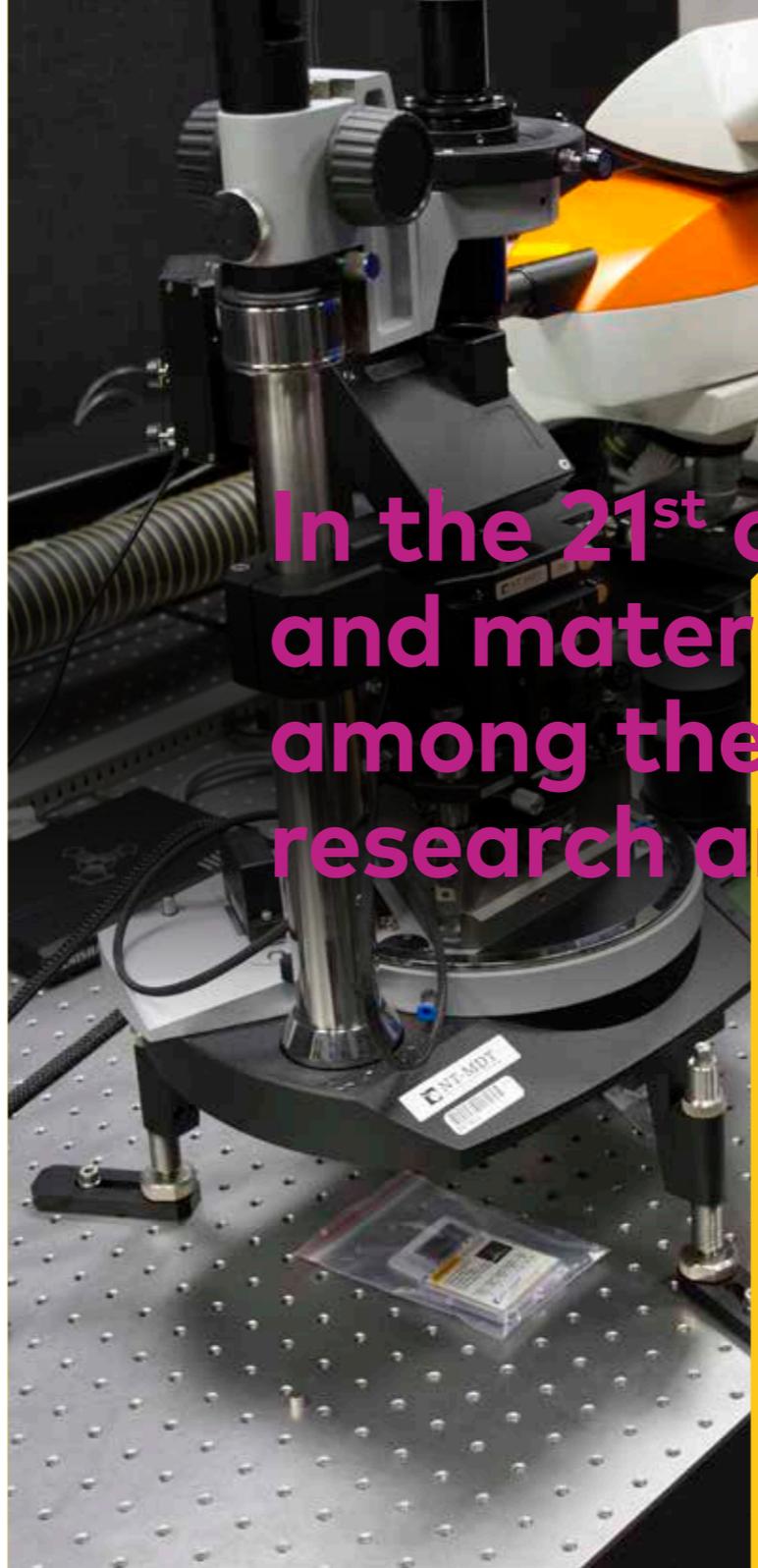
Latvia and RTU have long standing traditions in science and chemical industry, innovative materials and products manufacturing. The only Nobel Prize laureate coming from the Baltic States – Wilhelm Ostwald – was a professor of chemistry at RTU from 1881 to 1887. He received the Nobel Prize in 1909 for research on catalysis, chemical equilibrium and reaction velocities, which he conducted in Riga. The most famous chemist of Latvian descent Paul Walden also worked at RTU. He was the founder of dynamic stereochemistry and electrochemistry of non-aqueous solutions. In 2010, American Chemical Society awarded the *Award of Citation for Chemical Breakthrough* to P. Walden's publication on discovery of optical inversion (*Walden inversion*). P. Walden was nominated for the Nobel Prize six times, unfortunately, he never received it.

Study Programs:

- Clothing and Textile Technology
- Chemistry
- Applied Chemistry
- Chemical Technology
- Industrial Pharmacy
- Nanotechnologies of Materials
- Materials Science
- Material Technology and Design
- Material Design and Technology

Major Research Areas:

- Synthesis of multifunctional nanoparticles, nanofibres and catalysts, production technology and applications of nanocoatings and nanocomposites
- Synthesis of components and materials for electronics, photonics, optoelectronics and information technology, smart materials
- Innovative biomaterials, materials / biomaterials technology
- Synthesis of high-potential organic substances, studies of structure, technological solutions for pharmaceutical, medical and bioorganic chemistry
- Design of control principles for interphasial and boundary processes in order to design micro-, sub-micro- and nano-scale heterogeneous composite polymer and inorganic advanced materials with a theory-guided functionality
- Development, research and quality assurance of alternative, renewable and mixed fuels, lubricants and their components
- Modification of natural and chemical fibers and optimization of their properties, smart textiles and clothing
- Synthesis, modification, investigation and use of inorganic materials and composites for special applications and the specific needs of national economy
- Ecological solutions for chemistry, chemical engineering, materials science and related sectors
- Use of Latvian natural resources (mineral, forests and other renewable) for production of new products with high added value
- Improvement of the testing laboratories infrastructure for materials and products, extension of the testing scope for the quality and international competitiveness increase of products made by national producers



In the 21st century, chemistry and materials science are among the most important research areas

Pedagogical and research traditions have been maintained by several generations of researchers. The Faculty is still one of the leading units at RTU in terms of advanced scientific qualification, research infrastructure, scientific achievements, including student research activity.

In the 21st century, chemistry and materials science are among the most important research areas, their task is to find answers to innumerable topical questions of our age, which may even include the survival of humanity in the distant future.

POINT OF EXCELLENCE

Cooperation with the industry and student scholarships



The Faculty of Materials Science and Applied Chemistry works in close cooperation with industry, organizations and enterprises, which offer grants and scholarships to the best students and members of academic staff: Latvian L'Oreal grants For Women in Science, memorial scholarships of the Latvian Academy of Sciences named after Emīlija Gudriniece, Alfrēds Ieviņš, and Mārtiņš Straumanis, Gustavs Vanags scholarship, JSC Olainfarm Solomon Hiller scholarship in chemical technology, prizes for graduation theses of RTU Institute

of Technology of Organic Chemistry in chemistry, chemical technology, biologically active compounds and their dosage forms, SAKRET Ltd and Z-Light Ltd scholarships for students of study programs "Chemistry", "Chemical Technology", "Materials Science" and "Nanotechnologies of Materials", Riga Varnish and Paint Factory scholarship, JSC Grindeks and Tenax Ltd practical skill promoting scholarship, scholarship of the Latvian Institute of Organic Synthesis, JSC Inspecta Latvia internship scholarship.

Faculty students and alumni regularly win prizes and awards.

Faculty students and alumni regularly win prizes and awards.

STUDIES AT RTU



FACULTY OF MECHANICAL ENGINEERING, TRANSPORT AND AERONAUTICS

The Faculty of Mechanical Engineering, Transport and Aeronautics educates and trains specialists in engineering, mechanical engineering and machine building, engineering design, construction of mechanisms and appliances, mechatronics, logistics, automotive and railway transportation technology, technical maintenance of aircrafts in mechanical engineering and avionics, medical engineering and physics, heat-power engineering and heat engineering, and nanoengineering.



Dean of the Faculty of Mechanical Engineering, Transport and Aeronautics professor Dr. sc. ing. **Ēriks Geriņš:**

The fields, in which the Faculty of Mechanical

Engineering, Transport and Aeronautics educates and trains students, are of strategic importance: they create products with high added value and supply all other industries with machines, production systems, components and related services, as well as the necessary technologies and know-how.

The curricula of the study programs implemented by the Faculty are coordinated with the industry associations, including the Association of

Study Programs:

- Automobile Transport
- Aviation Transport
- Railway Electrical Systems
- Railway Transport
- Engineering Technology, Mechanics and Mechanical Engineering
- Industrial Design
- Mechanical and Instrumental Engineering
- Medical Engineering and Medical Physics
- Mechatronics
- Nanoengineering
- Production Engineering
- Heat Power and Thermal Engineering
- Transport Systems Engineering
- Transport

Major Research Areas:

- Aeronautics and space technologies
- Robotics: robot in the environment
- Fluid power systems
- Mechanical engineering manufacturing technologies
- Computer Aided design and manufacturing (CAD/CAM)
- Solid body contact mechanics
- Nanotechnologies
- Transport and transport systems
- Biomedical engineering and medical physics
- Mechanics of composites and elastomers
- Applied mechanics
- Reliability, non-destructive monitoring and technical diagnostics of constructions and machinery

Mechanical Engineering and Metalworking Industries of Latvia. Industry representatives participate in the development and improvement of all study programs, they also take part in the defense of graduation papers. This guarantees that the study programs correspond to the requirements of 21st century industry.

Faculty graduates work in Latvia, EU countries, USA, Switzerland and other countries. The work of the alumni of the study program "Aviation Transport" has an even more global character: they receive a certificate of an aviation transport

technical maintenance specialist, which attests that their competences and skills conform to general European requirements. The certificate is recognized in the international labor market. In Latvia, mechanical engineering and metalworking industries are clearly export-oriented, on average about 70% of production volume is exported to more than 100 countries, thus the export market and the geography of faculty graduates' activities is very wide.

Study programs correspond to the requirements of the industry of the 21st century.

Pneumobile designed and assembled by RTU students. In 2016, the pneumobile took part in the international competition in Hungary



POINT OF EXCELLENCE

Opportunities provided by BOSCH training center

The Faculty houses BOSCH training center, which at the same time is RTU Car Operation Laboratory.

Newest automotive technologies that can be employed at BOSCH training center allow educating and training of both faculty students and qualified car service station specialists, providing opportunity to work with the most up-to-date BOSCH car diagnostic tools.

In the training center, the students learn how to use and service modern car diagnostic tools, passenger compartment air conditioning and gasoline and diesel engine fuel injection systems, as well as vehicle electrical and electronic systems.



POINT OF EXCELLENCE

Opportunities offered to the students by Railway Microprocessor System Engineering Lab

The Faculty's Institute of Transport in cooperation with the technological company Siemens established the Railway Microprocessor System Engineering Lab.

Microprocessor system allows students to model train movement at railway junction stations, at the same time, it provides Doctoral students the opportunity to conduct research in the area of railway traffic safety.

Students were involved as engineering and technical personnel in the process of establishing the laboratory. Students not only had to assemble the components, but also since the very beginning could participate in railway infrastructure research and modeling.



RIGA BUSINESS SCHOOL

Riga Business School (RBS) has worked within RTU since 1991. It was established in cooperation among RTU, State University of New York at Buffalo, USA, and University of Ottawa, Canada.

RBS offers Bachelor and Master studies in English. MBA programs are envisaged for experienced specialists and managers willing to obtain an internationally recognized degree of Master of Business Administration. After secondary school, students can enroll for the Bachelor program and obtain a degree in international business management (*BBA – Bachelor of Business Administration*). RBS Bachelor program offers students the opportunity to obtain a double degree diploma from RTU and either BI Norwegian Business School or the University of Buffalo.

The School has more than 1,000 alumni, who have achieved managerial positions in Latvia and abroad.

The RBS English Language Centre is an internationally certified centre for administering ETS tests in Riga; it administers *TOEFL® iBT* as well as other international tests. It also runs English language courses.

Study Programs:

- International Business Management (BBA)
- General MBA studies
- Pre-MBA program – intensive preparatory course for MBA studies in Latvia or abroad



BALTECH STUDY CENTER

BALTECH Study Center works at RTU since 2000. It is the University Consortium for Science and Technology of the Baltic Sea Region uniting seven engineering universities, which offer graduates the opportunity to enroll for international Master study programs "Industrial Engineering and Management" and "Environmental Science".

Study programs have been developed jointly by Riga Technical University, Kaunas University of Technology, Linköping University, Lund University, KTH Royal Institute of Technology, Tallinn University of Technology and Vilnius Gediminas Technical University.

BALTECH also offers distant learning courses in natural sciences, technology, and industrial management. It provides students and staff mobility opportunities, as well as supporting research and academic projects.

University Consortium for Science and Technology BALTECH was founded in Riga in 1998. Its aims are to promote closer cooperation by developing compatible international study programs in natural sciences, technology, and industrial management, to promote student and academic staff mobility and to provide scholarship and grant support.

The work of the Consortium is coordinated by BALTECH Secretariat, and since 1 September 2015 this function is performed by RTU.

Study Programs:

- Industrial Engineering and Management
- Environmental Science



AFFILIATIONS

RTU has established a comprehensive network of branches outside the capital city Riga in order to promote intellectual development in the Latvian regions and to educate and train qualified workforce close to their place of residence in different parts of Latvia.

RTU affiliations have been established in four Latvian cities – Cesis, Daugavpils, Liepaja, and Ventspils. RTU affiliation development policy envisions implementing study programs adapted to the needs of the economy of each territory, as well as improving availability of higher education in the Latvian regions.



ENGINEERING HIGH SCHOOL

Taking responsibility for the development of engineering in Latvia, RTU established Engineering High School in 2014. The studies commenced in 2015.

It is the first general secondary education establishment in Latvia that has been founded within the framework of a university. RTU intends to give the most talented Latvian schoolchildren the opportunity to take study courses in exact and natural sciences at an advanced level preparing them for the engineering studies.

Special attention is paid to the integration of engineering studies and scientific research activities into the study process, using RTU faculties, motivating schoolchildren to get involved in research and creating a new generation of scientists.



RESEARCH AT RTU

RTU has become a modern internationally recognized university, which conducts internationally competitive research and cooperates with reputable international research institutions, such as the European Organization for Nuclear Research CERN, European Space Agency, Royal Institute of Technology, Sweden, Fraunhofer Institute, Germany, and other.

An important aim of RTU is to facilitate and support research-intensive entrepreneurship, including establishment of university spin-off enterprises. Therefore, cooperation with the industry is an essential aspect of RTU activities.

RTU researchers have closely cooperated with and have conducted research and developed new technologies for both large Latvian enterprises – Grindex, Latvenergo, Latvijas Finieris and Aerodium, and such international companies

as Daimler AG, KUKA Roboter GmbH, Airbus, Eurocopter SAS France and Astrium SAS France. RTU participates in nine state research programs, which aim at research of the issues important for the Latvian society and solution of topical problems.

This publication provides only a brief overview of some research projects implemented at RTU, however, we hope that it will give a general impression of the work conducted by RTU researchers and will inspire cooperation.



RTU Vice-Rector for Research
 Dr. sc. ing. **Tālis Juhna**

Research Management

Strategic aim of research conducted at RTU is to analyze and offer solutions to the most urgent and topical technical and social problems. The knowledge potential accumulated in the course of research is employed in entrepreneurship.

RTU has attracted the best Latvian researchers in the field of exact sciences and is purposefully educating and training a new generation of researchers.

RTU implements four-year Doctoral studies at 21 Doctoral study programs in engineering, natural sciences, architecture, social and service sciences. The total number of Doctoral students exceeds 500, and the development of Doctoral theses is supervised by experienced and professional academic personnel.

One of the aims of Doctoral studies is to involve students in research and innovation process. Doctoral students soon become highly qualified researchers looking for innovative solutions, creating new products and technologies.

RTU Doctoral School is actively involved in promoting the quality of Doctoral research, as well as professional advancement of scientific advisers of the theses.

The University promotes research and valorization in three areas.

First, the University commercializes knowledge and inventions created by researchers and promotes researcher cooperation with the largest enterprises in Latvia and international companies. RTU researchers offer enterprises

their innovative ideas, expertise and consultations in various fields. Enterprises, in their turn, are invited to invest in innovative knowledge and technology projects and together with RTU researchers work in the areas where new products with high added value are created.

Second, the University supports the establishment of new spin-off and start-up enterprises based on the innovations created by University researchers and students. Using its research base, technical facilities and resources, RTU offers new entrepreneurs the services of business incubators and the Design Factory, which provides access to rapid prototyping equipment.

Third, RTU ensures intellectual property protection, providing consultations to the researchers on patent application procedures.

Innovation and Technology Transfer Center and the Department of Business and Innovation coordinate and organize innovation and technology transfer, university growth and development.

The University makes every effort to ensure that each idea born at RTU laboratories has a success story of its own.

Research platforms and main research areas

Research at RTU is organized on six research platforms.

The objective of research platforms is to ensure multi-faculty and interdisciplinary research in the areas of great significance for the national economy and society.

Active and continuous analysis of market needs and commercial potential takes place within the research platforms.

Energy and Environment

- Safety of power supply systems and optimum operational modes for improvement of performance and economic return;
- Methods and technologies for improvement of power and thermal energy generation, transmission, distribution and consumption efficiency;
- Methods and technologies for promotion of renewables to increase the regional energy independence and reduce environmental impact;
- Climate technologies and environmental methods for a circular economy.

Cities and Development

- Sustainable environment;
- Efficient urban infrastructure;
- Research, protection and development of cultural heritage;
- Urban development (development of new technologies);
- Economy of urban planning;
- Risk assessment of urban infrastructure and its economic growth potential.

Information and Communication

- Usability studies of e-learning systems and development of new e-learning technologies, methods and systems;
- Research on the Internet of Things and Big Data transfer and processing, development of methods for improvement of energy efficiency of information transfer;
- Research on the use of ICT in linguistics;
- Development of smart cities and regional technologies and creation of new e-services to improve the quality of life;
- Research and development of technologies for cyber physical systems on the basis of innovative high-speed optic transmission system technologies;
- Research on comprehensive data processing studies in complex distributed environments;
- Comprehensive intelligence for the development and integration of smart and autonomous systems;
- High performance signal processing and rapid modifications;
- Development of next generation radio frequency and micro-wave communication systems;
- Research on transport communication systems and complex processing of information.

Transport

- Energy efficient and safe road and rail transport;
- Safe and financially efficient air transport;
- Efficient transport infrastructure;
- Reliable and safe methods for diagnostics of technical condition of vehicles and transport infrastructure.

Materials, Processes and Technologies

- Development and functionalization of bio-compatible and bio-degradable materials that can be integrated within the human body or expanded outside of the body;
- Development of high added value materials from local non-renewable and renewable resources;
- Smart materials for environmental monitoring and remediation - development, research and integration in the current infrastructure;
- Development of smart materials for generation of alternative energy (H₂O splitting, piezoelectric nano-structures)
- Electro-optical materials for construction, automotive and defence sectors - research and development.
- Organic chemistry and pharmaceutical processes and technologies.

Security and Defence

- Strategic products for international security;
- Boarder security;
- National economic security;
- Civil defence.

Selected Research Projects



POINT OF EXCELLENCE

Research on future spacecraft constructions

Researchers are developing a design and certification methodology for composite shells in cooperation with Airbus DS and European Space Agency.

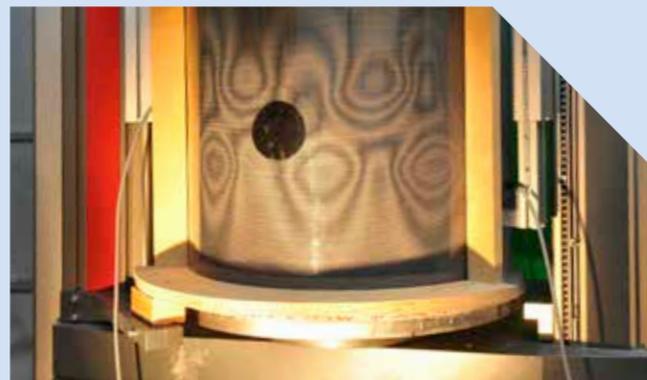
The researchers of the Institute of Materials and Structures of the Faculty of Civil Engineering in cooperation with company Airbus DS and the European Space Agency are developing a design and certification methodology, which can be used to determine the lowest robust load bearing capacity of thin-walled (radius/thickness ratio 400 to 1000) composite shells. The methodology will be used in manufacturing of the next generation of spacecrafts from composite materials.

Leading RTU researcher Kaspars Kalniņš, the first intern at the European Space Agency from Latvia, is looking for the ways how to optimize space craft weight and, respectively, its fuel consumption by using composite materials. In the process of a wide range of computer simulations and experimental testing of scale models of composite constructions, limit states of very thin

shell structures are determined – i.e., at what thickness limit cylindrical walls of an aircraft/ spacecraft are both light in weight and at the same time sufficiently durable.

The aim of the research is to develop an efficient design methodology for composite spacecraft constructions, assessing geometrical imperfections. Cylindrical thin-walled shells are most sensitive to product geometric tolerances, therefore the research focuses on the development and validation of design and certification methodology, which can be used to determine the lowest reliable design bearing capacity of thin-walled composite shells.

Project manager – leading researcher Dr. sc. ing. Kaspars Kalniņš.



POINT OF EXCELLENCE

Research on food staff quality diagnostics

Spin-off enterprise CONELUM launches an innovative methodology for mould detection in dairy goods.

The methodology for testing of food staff quality has been developed at the Water Research Laboratory of the Faculty of Civil Engineering for almost 10 years. It allows determining the presence of fungi and mould in the product in just 30 minutes. In comparison, microorganism testing methods currently used in the industry provide similar test results in 24 hours, or even longer.

RTU researchers united in the enterprise Conelum, and based on long-term research results have developed an innovative methodology, which allows quickly and efficiently – in just half an hour – to determine the presence of fungi and mould in the product.

Previously, it took more than 24 hours for food and drink producers to conduct such microbiological testing. During testing process, manufacturing was either suspended or

producers took risk continuing production. However, since the introduction of the innovative methodology in the industry, these problems have been solved.

Project managers – professor Dr. sc. ing. Tālis Juhna, leading researcher Dr. sc. ing. Linda Mežule.



POINT OF EXCELLENCE

Research on renewable energy technology

Top technology, which enables fuel to be produced from plant biomass and producing biogas from dairy processing by products.

Technology developed by researchers of the Faculty of Civil Engineering, which allows producing fuel from hogweed, the plant that is ranked among the most dangerous invasive species in Latvia, its leaves may cause burns and blistering if come into physical contact.

RTU researchers are developing the technology that will enable production of second generation biofuel – biobutanol – from hogweed biomass.

Researchers also analyze the opportunities to sustainably use industrial waste to generate energy and reduce environmental pollution. Whey, the main type of waste in milk processing, has attracted attentions of the scientists as a promising substance for biogas production.

It has high calorific value and is easily reprocessed by microorganisms. RTU has developed the technology for obtaining biogas from whey.

Project managers – professor Dr. sc. ing. Tālis Juhna, leading researcher Dr. sc. ing. Linda Mežule.



POINT OF EXCELLENCE

Research on Riga's Art Nouveau

Thanks to research into Art Nouveau, in 1997 historical center of Riga was included in the UNESCO List of World Heritage Sites.

Riga – one of the most beautiful pearls on the shores of the Baltic Sea – with its beautiful architecture enchants every newcomer. Professor of the Faculty of Architecture and Urban Planning Jānis Krastiņš in his studies investigates the role and significance of Art Nouveau in the urban environment of Riga. Art Nouveau architecture heritage was a determining factor for including the historical center of Riga in the UNESCO List of World Heritage Sites in 1997.

Art Nouveau is a style of art characteristic of the end of the 19th and the beginning of the 20th century. The facades and interior of Art Nouveau buildings were frequently decorated with elegant ornament. However, it was not a necessary element. The essence of the style was determined by the new creative method of the time – to ascribe artistic expression to the utilitarian objects.

Rental houses in Riga, Lāčplēša street 70, 70a, 70b. Architect Eižens Laube, 1909

In Riga, the majority of buildings in Art Nouveau period were commissioned by Latvian entrepreneurs, and they were designed almost exclusively by local architects. The majority of them graduated from the School of Architecture of Riga Polytechnic Institute, and Latvian architects were particularly active. They developed one of the most distinctive variants of Art Nouveau in the architecture of Riga – National Romanticism, an attempt of the Latvian architects to create their own national artistic style. Art Nouveau is now recognized and honored, it is a true Latvian national pride.

Project manager – professor Dr. habil. arch. Jānis Krastiņš.



POINT OF EXCELLENCE

Research on multiagent robotic systems

Multi-robot control system concordantly fulfils large tasks and allows robots to orient in the premises.

The researchers of the Department of Artificial Intelligence and Systems Engineering of the Faculty of Computer Science and Information Technology under the lead of a true enthusiast of robotics, associate professor Agris Ņikitenko, have developed a multi-robot control system architecture, which allows many robots to concordantly fulfill large tasks, for example, cleaning of large spaces, work in the greenhouses – plant monitoring, precise irrigation or chemical treatment, etc.

The technology ensures integration of the work of many robots, which includes task allocation, obstacle and collision avoidance, as well as the ability to orient in the premises, which are ensured by landmarks in combination with odometry of motion sensor data. Simplicity and relatively low costs are the main advantages of the developed technology.

Currently, the researchers of the Autonomous Systems Laboratory work on improvement

of the technology to introduce it into the enterprises of various profiles both in Latvia and abroad. Robotic Solutions Ltd has already been established, its aim is to introduce the technology in the dairy industry in Latvia, thus raising efficiency of defined operations. The aim of another company – ICD Latvija Ltd – is to adapt the technology for a wider scope of applications in automation solutions. The negotiations with numerous enterprises from Norway, Germany, and Spain are underway. Joint research projects have been submitted within H2020 program.

Taking into consideration the expected benefits offered by the technology, the research conducted at RTU has a great growth potential.

Technical project manager – associate professor Dr. sc. ing. Agris Ņikitenko.



POINT OF EXCELLENCE

Research on energy efficiency in fiber-optic transmission systems

The algorithm developed by the researchers of the Institute of Telecommunications allows reducing essentially ICT sector energy consumption.

Researchers of the Faculty of Electronics and Telecommunications investigate the next generation of fiber-optic communication systems and options to increase data transmission rate in the fiber-optic environment and, consequently, the related energy consumption reduction opportunities. The topicality of research is determined by demand for high speed Internet and 3D television, as well as exponentially growing energy consumption of the Information and Communications Technology sector.

As speeds of communication systems are increasing, energy consumption is growing significantly. To solve this problem, researchers under the lead of professor Vjačeslavs Bobrovs look for an algorithm that will allow

improving energy efficiency of any fiber-optic communication system. At present, a flexible communication system pilot model has been developed at the laboratory, it can be used to perform measurements and data analysis on various applications of the algorithm.

According to the estimates, if the developed algorithm is used in fiber-optic transmission systems, energy consumption in ICT sector will improve considerably.

Project manager – professor Dr. sc. ing. Vjačeslavs Bobrovs, Scientific project manager – professor Dr. sc. ing. Jurgis Poriņš.



POINT OF EXCELLENCE

Research on optimization of robotic production lines

Research by RTU scientists helps reduce energy consumption of Daimler robotic production lines up to 25 %.

Young researchers of the Institute of Industrial Electronics and Electrical Engineering of the Faculty of Power and Electrical Engineering Armands Šenfēlds and Dāvis Meike have developed a methodology that gives the Daimler plant the opportunity to reach the desired production volume, quality and speed, significantly reducing total energy consumption – up to 25 % – plus decreasing energy consumption of separate robotic production processes.

Energy optimization system conducts energy consumption analysis and increases energy efficiency of robotic production lines, allowing recompensing of the energy in motion braking processes. Application of mechanical brakes of industrial robots is also improved intelligently using production process intervals.

Growing energy prices and different political instruments in the industrial countries make energy efficiency one of the key stones of production company strategies and determine topicality of RTU research. Initial research results served as a basis for further activities within EU 7th Framework project AREUS, uniting six EU countries and ten partners from the industry and universities.

Project managers – Dr. sc. ing. Dāvis Meike and researcher Mg. sc. ing. Armands Šenfēlds.



POINT OF EXCELLENCE

Research on flue gas treatment equipment

RTU researchers are developing flue gas treatment equipment, which reduces air pollution and at the same time saves energy by 25 %.

One of the main tasks of power engineering is to reduce the impact of the industry on climate change. Therefore, an active transition from fossil fuels (natural gas) to biomass usage, mainly timber, is under way. Burning timber causes additional effect in the boiler room furnaces: through the smokestack, small dust particles enter atmosphere along with complete combustion products.

Researchers of the Institute of Environmental Protection and Heating Systems of the Faculty of Power and Electrical Engineering under the lead of professor Dagnija Blumberga have developed flue gas treatment equipment with the integrated evaporation and condensation processes. Flue gas fog generators produced in cooperation with Komforts Ltd are installed after wood chip boiler cyclones to capture small dust particles.

Industrial tests demonstrate that thanks to evaporation and condensation processes in the devices, fog generation is regulated, it is necessary to capture small dust particles (pm2.5 and pm10). These devices simultaneously allow increasing boiler energy efficiency and ensure up to 25 % fuel saving.

Producers call flue gas fog generators “two-in-one” devices, as they reduce air pollution and at the same time save energy.

Project manager – professor Dr. habil. sc. ing. Dagnija Blumberga.



POINT OF EXCELLENCE

Research on new intelligent street lighting technology

Using light-emitting diode technology in street lighting, energy consumption is reduced to 70 %.

The Distance Education Study Center of the Faculty of E-Learning Technologies and Humanities managed an EU research project LITES (Led-based intelligent street lighting for energy saving). The project united partners from France, Portugal and Italy. In the course of the project the researchers of RTU DESC, the Faculty of Power and Electrical Engineering and the partners have developed and tested energy efficient intelligent street lighting, using light-emitting diode technology.

Using intelligent led-technology in street lighting, it is possible to reduce energy consumption by up to 70 %.

The element that distinguishes the solution offered within the project is changing light intensity depending on the environment conditions. LITES sensors perceive motion, area

lighting and temperature. This data is processed by a smart system built in the lamps, which respectively regulates light intensity.

The most significant innovation of the project is the developed smart energy efficient system, which is built into the lamps and is capable of regulating light intensity, thus considerably reducing energy consumption. This system corresponds to the EU safety standards for public places.

Project manager in Europe –
MBA Jānis Kapenieks.



POINT OF EXCELLENCE

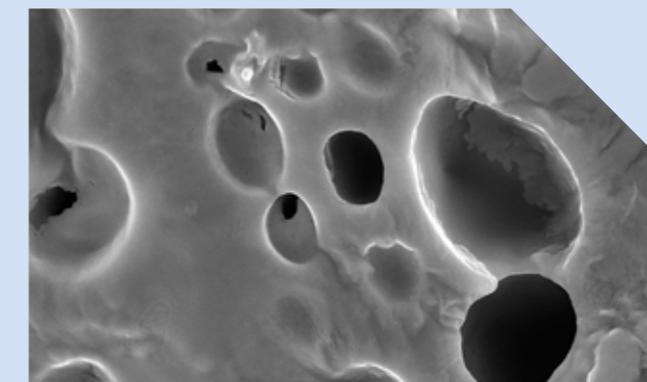
New and improved materials for bone tissue engineering, new locally targeted drug delivery systems

Locally targeted drug delivery systems ensure patient healing without a course of systemic antibiotics.

Researchers of the Institute of General Chemical Engineering of the Faculty of Materials Science and Applied Chemistry are developing materials topical for clinical implantology on the basis of calcium phosphate to replace, renew and treat bone tissues.

The methods developed by RTU are also studied. The methods allow delivering drugs to the implant material and depending on the type of method regulating drug flux speed. The advantage of the methodology is a significantly reduced drug dose and the action of the drug exactly in the place where it is needed. This method ensures healing of the patient without a course of systemic antibiotics, in contrast to the current practice in post-operative period.

Project managers – professor Dr. sc. ing. Līga Bērziņa-Cimdiņa, assistant professor Dr. sc. ing. Dagnija Loča, associate professor Dr. sc. ing. Jānis Ločs.



POINT OF EXCELLENCE

Biodegradable materials for packaging and 3D printing

Materials degrade in soil in one month time.

To reduce environmental pollution, the researchers work on developing alternative polymer materials, which fully biologically degrade after use without any harm to the environment.

A new biodegradable hybrid composite for 3D object printing and production of packaging was developed by the Institute of Polymer Materials, Faculty of Materials Science and Applied Chemistry. Biodegradable printer filaments for 3D printing contain only non-toxic

components, and the objects created from them are environmentally friendly, as they biologically degrade in soils without releasing any toxic substances. Costs are reduced as there is no need for waste recycling. A consumer of the new product, being environmentally friendly, can live to the principle – used it and forgot about it.

Project manager – researcher M. sc. ing. Velta Tupureina.



POINT OF EXCELLENCE

Research on intelligent materials – photocatalysts

Intelligent materials help purifying chemically or biologically polluted water.

Researchers of the Institute of Silicate Materials of the Faculty of Materials Science and Applied Chemistry have developed a photocatalyst, which in an innovative way purifies chemically or biologically polluted water.

RTU researchers have synthesized intelligent materials (photocatalysts), which act as an active ingredient in the sunlight, turning chemical or biological water pollution into clean water and carbon dioxide. Photocatalyst looks like a brown

powder. It has not only pollution elimination properties in the sunlight, but also magnetic properties, which allows the photocatalyst to be separated from the purified environment and used repeatedly.

Project manager – researcher Dr. sc. ing. Andris Šutka.



POINT OF EXCELLENCE

New catalytic processes for biomass conversion in fuels

The research is included in the list of most significant scientific achievements in Latvia.

The research conducted at the Institute of Applied Chemistry Faculty of Materials Science and Applied Chemistry allows improving biofuel production process using a new type of heterogeneous catalysts in transesterification reactions, as well as using chemical interesterification process in biofuel production. New biofuel synthesis methods have been developed, including full catalytic hydrogenation of rapeseed oil and catalytic pyrolysis and catalytic solvolysis of inferior biomass (sludge from water cleaning, straw, wood processing waste). Interrelations of these catalytic processes

have been established, which allows an increase in their efficiency and ensuring higher quality of the end products.

The research was included in the list of 10 most significant achievements in applied sciences in Latvia in 2015.

Project manager – professor Dr. habil. chem. Valdis Kampars.



POINT OF EXCELLENCE

Research on software for testing medical X-ray equipment radiation quality

X-ray radiation quality testing method has been approved in Latvian hospitals.

The quality of the X-ray image is important to ensure accurate diagnosis using digital X-ray radiogrammetry, and thus the quality should be regularly checked.

Researchers of the Institute of Biomedical Engineering and Nanotechnologies of the Faculty of Mechanical Engineering, Transport and Aeronautics under the lead of professor Jurijs Dehtjars have developed software, which analyzes statistics on digital image brightness, ensuring simple and quick monitoring of X-ray radiation quality. The software can be adapted to any medical X-ray apparatus.

Innovative software gives opportunity to avoid using any additional measuring devices for daily checks of radiation physical parameter stability.

The offered solution is easy to use, and medical personnel training can be done in a couple of minutes.

Method of analysis of digital image brightness statistics has been approved in seven hospitals in Latvia.

Project manager – professor Dr. habil. phys. Jurijs Dehtjars.



Cooperation with Enterprises

Both Latvian and foreign enterprises willingly invite RTU researchers to develop innovative solutions for business and to provide expert and consultations services. Investing in innovative knowledge and technology projects, enterprises in cooperation with researchers have implemented many successful projects and developed high value added products.

DUO AG Ltd.

Research team of the Department of Chemistry and Technology of Biologically Active Compounds, RTU Faculty of Materials Science and Applied Chemistry, has developed a technology that allows the production of extracts of different vegetable oils using ultrasound. The innovative oil extraction technology will let the company replace the old cold pressing method and expand their product range with a new product – oil extract containing avenanthramides of oats, which can be used in production of food, cosmetic and skin care products.

Terra Virtuala Ltd.

The researchers of the Department of Systems Theory and Design, RTU Faculty of Computer Science and Information Technology, have developed a module 'iRobot Roomba' for vacuum cleaners. Attaching the module to the vacuum cleaner makes it a member of the robot team and allows the division of large volumes of work into smaller tasks. The system lets allocate sub-tasks to definite robots, monitor performance and, if necessary, redistribute tasks. The use of a centralized server ensures summarizing the collected data on a single card. The system also ensures automatic charging of the robots. Robot

team can perform large premise cleaning, lawn mowing, premise and territory monitoring and other tasks.

Tehniskā Ortopēdija Ltd.

The researchers of the Department of Industrial Electronics and Electrical Technologies, RTU Faculty of Power and Electrical Engineering, have developed the prototype of a smart artificial limb, which the company plans to use in design and research of smart prosthesis implementation mechanisms, as well as feedback and control units. The prototype implements object capturing movements, and in the future, the developed prototype will be elaborated and offered as a commercial product.

Rešetilovs un Co Ltd.

The researchers from the Centre of Civil Engineering designed a compact mobile biofiltration system for deferrization of underground waters, which can be used in different climatic conditions. In the course of laboratory experiments, the researchers tested different filter materials and designed a prototype of a compact mobile biofiltration system, which is installed at a water purification station and ensures deferrization of underground waters. Using the new technology, it is possible to produce different types of water deferrization biofiltration equipment.

Centre Composite Ltd.

The researchers of RTU Laboratory for Machine and Mechanism Dynamics have developed software KEDRO for multicriteria optimization of composite elements. Using the capacity of KEDRO and commercial CAD/CAE software, it is possible to perform optimization of constructions

made from various composites, adapting their shape and elasticity parameters, testing their resistance to different types of stress in the virtual environment. Multistart modelled tempering, Pareto and robust optimization strategies are implemented into the software, which allows solving mixed integer non-linear programming tasks. Monte Carlo simulation and correlation analysis can be used for uncertainty quantification.

JSC Olainfarm

One of the recurring problems of the contemporary pharmaceutical chemistry is the necessity to use reactants with the predefined atomic configuration and the required reactive ability, but in the manufacturing process, these substances may be toxic and difficult to control. The researchers of the RTU Faculty of Materials Science and Applied Chemistry conducted research into alternative reaction conditions for obtaining quinuclidine derivatives to substitute a widely used but harmful phosgene with less toxic and better controllable substances: (bis(trichloromethyl) carbonate and easily replaceable phenyl chloroformates. When the appropriate reaction conditions (solvent, concentration, temperature, feed rate, length of the process) are identified, the above-mentioned reactants yield good results in obtaining quinuclidine derivatives. These results can be further used in the synthesis of real pharmaceutical agents.

Start-Up and Spin-Off Enterprises

The University has established numerous successful *start-up* and *spin-off* enterprises and launched several projects.

Conelum

Conelum is a technological enterprise, which was established in 2014 using the expertise of RTU researchers. The Conelum team has developed a method that is based on using fluorescent biomarkers to determine the presence of bacteria, fungi and mould in the product in the 30 minutes time, which is considerably faster than in case of the previously used methods.

QFER

Qfer is a mobile application, which is used to quickly find the best offers by the closest popular and interesting service providers. This application is already in use in Cyprus. Qfer has been developed by four RTU students: Jevgenijs Novickis and Arturs Burņins from the Faculty of Engineering Economics and Management, and Dmitrijs Angelovksis and Arturs Ņiķiforovs from the Faculty of Computer Science and Information Technology.

Motion Media Park

Motion Media Park is an enterprise that offers modern and interactive digital advertising opportunities and provides its customers up-to-date communications support. The main services include virtual tours, 360° object views and smart video recording, editing and processing. The enterprise was established by the students of the Faculty of Computer Science and Information Technology Armands Zagorskis and Pēteris Tīss.

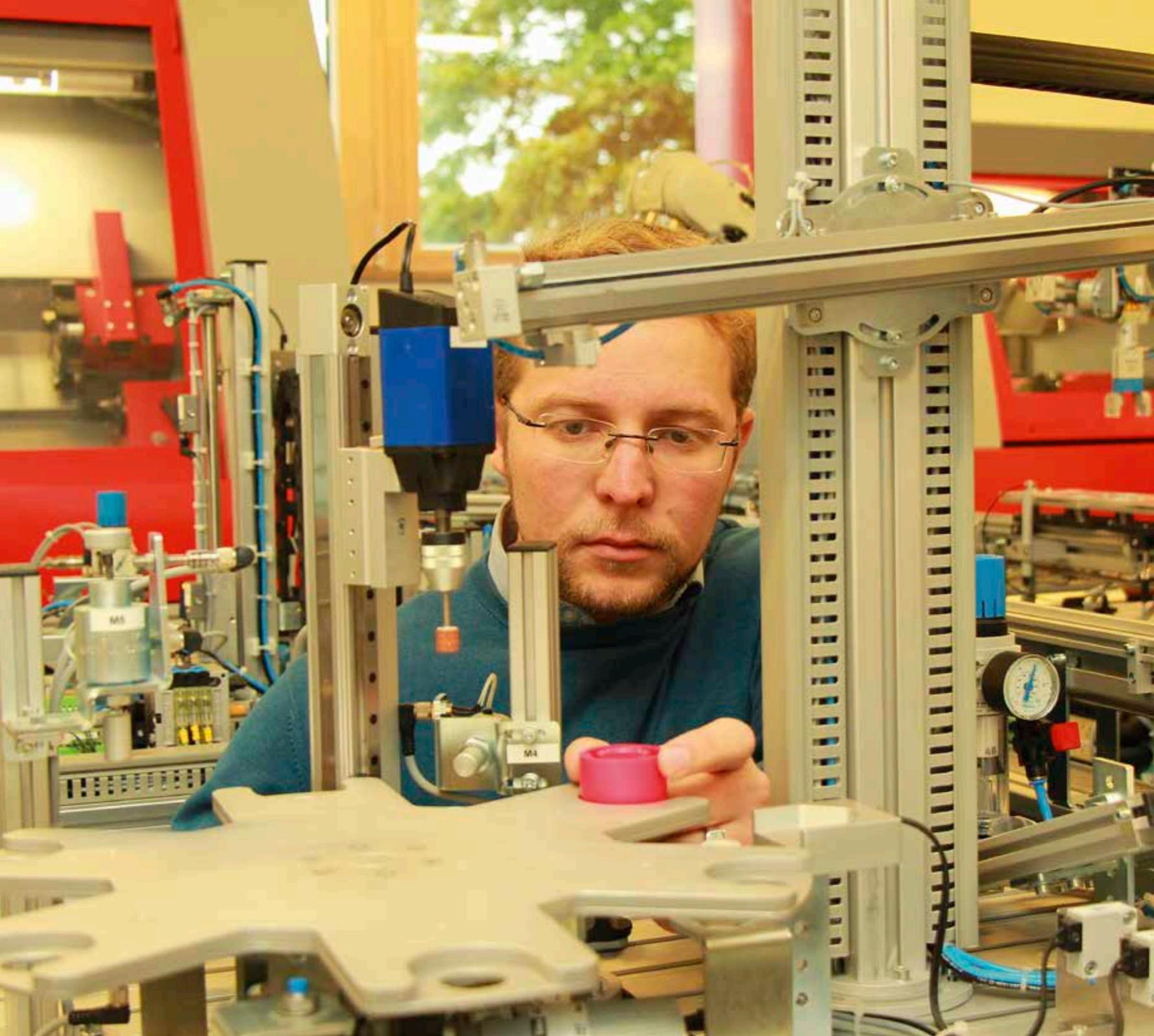
Business Incubators

Green Technology Incubator

The aim of Green Technology Incubator is to support and facilitate entrepreneurship that is connected with innovations in green manufacturing. It is a joint project of RTU, University of Latvia and Norwegian industrial development corporation SIVA that is aimed at interdisciplinary cooperation and promotion of knowledge flow among Universities, research institutions, and green manufacturing enterprises.

RTU Student Business Incubator

The aim of RTU Student Business Incubator is to promote practical implementation of new, perspective, creative, innovative, competitive business ideas, supporting RTU students and graduates. Start-up entrepreneurs have the opportunity to realize their business ideas, using benefits offered by the Business Incubator for the period of one year.



POINT OF EXCELLENCE

RTU Design Factory

RTU Design Factory is a lively place that brings together research, education and the industry, creating a new hands-on learning culture and opportunities for radical innovation. It is hosted under the RTU Vice-Rector for Science office, and is open to all faculties of the university.

We provide access for researchers and students to facilities, tools and services for prototyping that allow creating new and complex solutions. Technologies we offer range from laser cutting and engraving, 3D printing and scanning to high-speed CNC machining and post-processing.

We work with interdisciplinary student and researcher teams to solve real-life challenges from various industries. We also develop scientific equipment, demonstration models or fully functional prototypes to support scientists and staff of RTU.

Our team combines a variety of skills in mechanical engineering, robotics, creative thinking and methodologies, electronics, product development, design and business. And we happen to speak 10 different languages.



LAB

We are proud to be inspired by and be part of Design Factory Global Network, together with other Design Factories in Aalto, Shanghai, Melbourne, Geneva, Porto and a growing number of other places worldwide.

Our recent projects include creating such equipment as composite material test rigs, bio-cement molds, a unique water treatment system, a training device for wind music instruments, and fitting systems for smart textiles.

We are proud to be inspired by and be part of Design Factory Global Network.



SCIENTIFIC LIBRARY

The Scientific Library of RTU is an academic library of state significance accredited within the State United Library Information System with the largest collection of traditional sources on engineering and architecture in Latvia – approximately 1.5 million items. The library provides access to a number of electronic resources – databases with 47,000 e-journals and 148,000 e-books, which are available at the library premises and remotely to the registered users.

The Scientific Library of RTU is the first library in Latvia in terms of RFID (Radio Frequencies Identification) technology application. The

library's self-service system automates a quick and convenient issuing and collection of books including the opportunity to return books outside library working hours.

There is a spacious reading hall with library stock in open access, overnight reading room, reading and resource room for the academic staff, reading room for students with kids, silent reading room, individual booths and team rooms, cozy kitchenette for visitors, as well as a transformable conference hall. It is planned that in the future the users will also have access to rare book reading room displaying books dating back to the 17th century.



The library provides access to a number of electronic resources – databases with 47,000 e-journals and 148,000 e-books.



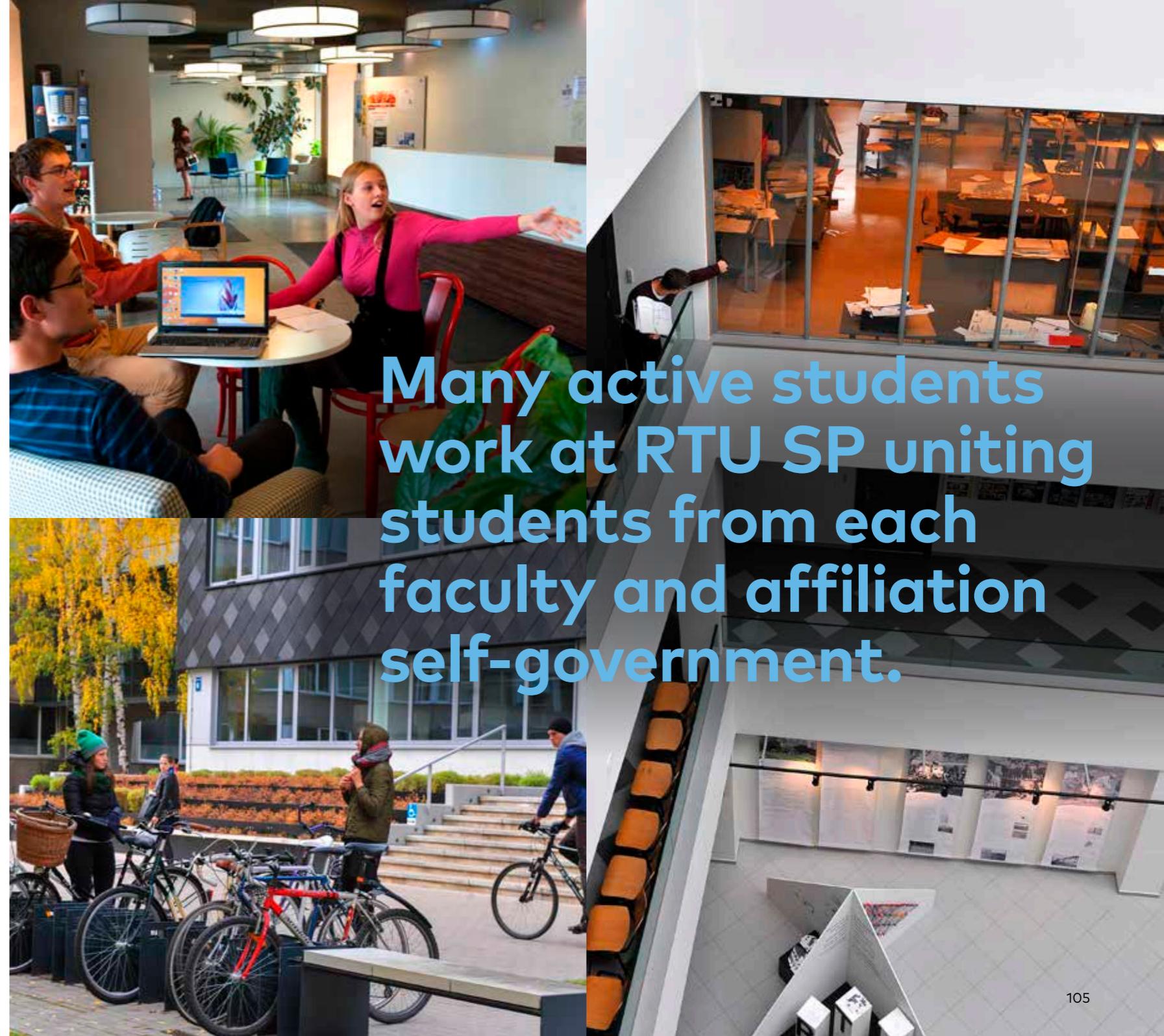
The Scientific Library of RTU is the first library in Latvia in terms of Radio Frequencies IDentification technology application.

STUDENT PARLIAMENT

Student Parliament – students who care about students!

Student Parliament is the oldest student self-government in Latvia, founded on 23 April 1992. Student Parliament is engaged in improvement of study quality and study environment, organizes different extra-curricular activities, consults the students on topical questions as well as cooperates with other student organizations in Latvia and abroad.

Many active students work at RTU SP uniting students from each faculty and affiliation self-government. Student Parliament deals with protecting students' interests in decision-making bodies of RTU, study quality monitoring, solution of various social issues, organization of study, research, sports and cultural activities, and cooperation with Latvian and foreign student organizations.



Many active students work at RTU SP uniting students from each faculty and affiliation self-government.

INTERNATIONAL RELATIONS

RTU is highly active in international affairs. The University is open to cooperation with foreign partners, it hosts guest delegations to launch joint projects and organize exchange of good practices.

With a slogan "Think global, be global!" RTU positions itself in the global education market as a modern university open to international cooperation.

RTU is represented at the largest European

and world education networks and actively participates in the work of specialized associations:

- European University Association – EUA
- European Society for Engineering Education – SEFI
- European Association for International Education – EAIE
- Association for International Educators – NAFFSA
- The University Consortium for Science and Technology – BALTECH
- Baltic University Programme – BUP

THINK GLOBAL BE GLOBAL!

- The Association «European Universities Public Relations and Information Officers – EUPRIO
- Romualdo Del Bianco Fund – Life Beyond Tourism
- Baltic Sea Region University Network – BSRUN

Currently RTU offers more than 45 study programs in English, and each year the range of programs is expanded. At present, the number of international students has reached 11 % of the total number of students.

RTU students actively use the opportunities offered by Erasmus+ program, choosing one of the numerous partner universities for their exchange studies.

It has become a tradition to organize International Weeks and thematic summer schools, uniting students and professors from all over the world.



INTERNATIONAL RELATIONS



Ice Breaking Party for the international students

Study Programs in English

Civil Engineering	BP / MP / D
Geomatics	BP
Innovative Road and Bridge Engineering	MA
Innovative Solutions in Geomatics	MA
Transportation Engineering	BP
Automation and Computer Engineering	D
Business Informatics	MA
Computer Systems	BA / MA / D
Logistics and Supply Chain Management	MA
Electronics	MA / D
Electronics and Mobile Communication	BA
Telecommunications	BA / MA / D
Adaptronics	BP
Computerized Control of Electrical Technologies	MA
Power and Electrical Engineering	D
Environmental Science	MA / D
Technical Translation	BP / MP
Urban and Regional Engineering Economics	MP
Innovations and Entrepreneurship	MP
Civil Construction and Real Estate Management	MP
Organization and Management of International Economic Relations	BP / MP
Entrepreneurship and Management	BA / MA
Business Finance	MA
Management Science and Economics	D

Clothing and Textile Technology	BP
Chemistry	BA / D
Applied Chemistry	MA
Chemical Technology	BA
Aviation Transport	BP / MP
Railway Electrical Systems	MP
Railway Transport	MP
Engineering Technology, Mechanics and Mechanical Engineering	BA / MA / D
Medical Engineering and Medical Physics	BP / MP
Nanoengineering	MP
Production Engineering	D
Heat Power and Thermal Engineering	MP
Transport Systems Engineering	BP
Transport	D
Industrial Engineering and Management	MA
Environmental Science	MA
International Business Management	BP / BBA
General MBA studies	MP / MBA
Pre-MBA program – intensive preparatory course for MBA studies in Latvia or abroad	

Designations:

BA – Academic Bachelor study program
BP – Professional Bachelor study program
BBA – Bachelor of Business Administration
MA – Academic Master study program
MP – Professional Master study program
MBA – Master of Business Administration
D – Doctoral study program

POINT OF EXCELLENCE

International Week

Every year RTU organizes an International Week – a major event, which is important for establishing new contacts and reinforcing cooperation with existing partners. Foreign cooperation partners are invited to participate in RTU International Week to gain a thorough understanding of study and research activities and industry specifics in Latvia, to get new ideas to develop new cooperation forms and improve the existing cooperation formats.

During the International Week, RTU organizes various thematic lectures, presentations and discussions, the participants make individual visits to RTU faculties and administrative units to meet colleagues and discuss concrete cooperation issues and plan tasks for the future. The program also includes cultural events so that the participants can better understand Latvian mentality and traditions.

Every year, the International Week results in new international cooperation agreements, which provide opportunity to RTU students and staff to participate in exchange study, internship, teaching and experience sharing trips.



INTERNATIONAL RELATIONS

International Week 2016





North America
7

Europe
366

Asia
1.079

Africa
93

South America
23

Australia
1

More than
1,500
students

from 70 countries study at RTU
(including 573 exchange students)

SPORTS ACTIVITIES

RTU promotes sports and healthy life style

At RTU, sports activities are compulsory for all first-year students, and each student can select the most attractive activity from a wide range of sports: swimming, boxing, track and field athletics, movement therapy, wrestling, artistic gymnastics, aerobics, basketball, volleyball or indoor football.

Every year, RTU allocates a certain number of athletic scholarships.

RTU has men's varsity teams in basketball, football, floorball, and volleyball. RTU also has a cheerleading team, which consists of both local and international students.

Every year RTU athletes participate in SELL Student Games and win prizes in many kinds of sports at various European and World Championships, World Student Universiade, and the Olympic Games.

RTU offers its students the opportunity to use a swimming pool, stadium, sport halls, and a sports, seminar and recreation centre Ronīši.

Sport traditions are the University quality badge; they unite generations, promote healthy sporting and competitive spirit of the students and facilitate internationalization. Moreover, sports activities play not only educational but also social role. Going in for sports, the students spend quality time and find new friends.

RTU is proud of its varsity teams:

- Volleyball team RTU/Robežsardze, which regularly competes in both the Baltic Volleyball League and Latvian Championship; it has won several medals, they are the winners of SELL Games, winners of the Latvia Universiade. The coach of the team is Raimonds Vilde, an Olympic silver medalist;
- Floorball team – medals in the Latvian Championship, winner of international SELL Games, winners of the Latvia Universiade.



The coach of the team RTU/Robežsardze is Raimonds Vilde, an Olympic silver medalist.

POINT OF EXCELLENCE

Olympic medals won by RTU students

RTU is proud of its Olympic champions

Gold:

- Pāvels Seļivanovs (volleyball, Moscow, 1980).

Silver:

- Cēzars Ozers (basketball, Rome, 1960);
- Pāvels Seļivanovs (volleyball, Montreal, 1976);
- Juris Bērziņš (rowing, Moscow, 1980);
- Artūrs Garonskis (rowing, Moscow, 1980);
- Zintis Ekmanis (bobsleigh, Sarajevo, 1984);
- Raimonds Vilde (volleyball, Seoul, 1988).

Bronze:

- Haralds Blaus (clay pigeon shooting – the name then used to denote trapshooting, Stockholm, summer of 1912).



SPORTS ACTIVITIES

RTU CULTURE

RTU Culture Centre helps promote talents

RTU has established the Culture Center to promote student solidarity, to create community spirit and provide the opportunity to develop one's talent. The Center helps students find the most appropriate kind of artistic self-expression.

12 artistic groups work within RTU Culture Center.

Artistic teams are welcoming to both local and foreign students and invite everyone to take part and enjoy a rich cultural life both in Latvia and abroad, where RTU artistic groups participate in international competitions and festivals.



**12 artistic groups work
within RTU Culture
Center.**

Daba San

POINT OF EXCELLENCE

Male choir Gaudeamus

RTU male choir Gaudeamus was founded in 1959; it is the leading male choir in Latvia.

In the last decade, the choir has released six CDs with classic Latvian choir and modern Latvian music, classic Western Europe choir music and Russian Orthodox Church pearls, including Sergey Rachmaninov monumental choir cycle *Vesperes*.

Gaudeamus has given more than 800 concerts in different European countries, USA, Australia, South Africa, and China, having performed in such world famous concert halls as Musikverein in Vienna and Beijing Forbidden City Concert Hall. Since 1989, the choir has participated in many international competitions winning medals and prizes, including gold medal at World Choir Games in China in 2006. The choir won the gold medal and became the champion in the male choir category also at the World Choir Games RIGA 2014.



Ivars Cinkuss



Gaudeamus

The best way to get acquainted with the country a person is staying at is exactly by learning its culture.

RTU male choir "Gaudeamus" conductor Ivars Cinkuss:

Cooperation with a British singer Robbie Williams in April 2015 was one of the most exciting adventures of the choir recently. The choir recorded two compositions with Robbie Williams, which would be released in 2016. Cooperation with the cult Finnish pop band *Leningrad Cowboys* can also be mentioned as the most interesting international event.

Many international students and guests from other countries sang in the choir – Danes,

Germans, Austrians, Americans, Swiss – those who stayed in Latvia for a longer period of time. We warmly welcomed them all. The best way to get acquainted with the country a person is staying at is exactly by learning its culture.

We still continue cooperation with one of our singers – Austria's commercial attaché in the Baltic States Herwig Palfinger. Although work made Helwig move to Helsinki, he fell so deeply in love with Latvia that every time he visits Riga on business, he comes to Gaudeamus rehearsals. He found his spiritual home in Gaudeamus choir.

Groups working at the Culture Centre

Student brass band SPO

Established in 1969.

Conductor Māris Martinsons

SPO is a cheerful band uniting both local and international students. For example, an exchange student from Germany, Thomas Kunze, during his Erasmus exchange studies was a rightful member of SPO. He participated in the concert dedicated to the 40th anniversary of the band. SPO participated in filming many motion pictures by Riga Cinema Studio (*Karalienes bruņinieki* (Queen's Knights), *Ceplis* (Ceplis Affair), *Dāvana vientuļai sievietei* (Present for a Lonely Woman) and other), recorded two long play records (1984, 1985) and a CD *Jauns un traks* (Young and Crazy) (2008).

Folk dance group Vektors

Established in 1958.

Art director Dagmāra Leja

Folk dance group Vektors is a group of 60 friends and fellow thinkers who dance Latvian folk dances in Latvia and abroad. For more than 55 years the group was led by a legendary Latvian choreographer Uldis Šteins. The group received a certificate from the Guinness Book of World Records in London for the new world record in the category 'Longest Dance', which was registered in Riga on 25 October 2008: 2,208 participants from 99 folk dance groups participated in this initiative by Vektors.

Female choir Delta

Established in 1959.

Conductor Inta Eizenberga-Cērmāne

Choir Delta participated in all Latvian Song and Dance Festivals, Baltic Students' Song and Dance Festival *Gaudeamus*, as well as in international competitions and festivals having won prizes.



Dagmāra Leja and Uldis Šteins



Female choir Delta



Student brass band SPO

Folk dance group Vektors is a group of 60 friends and fellow thinkers who dance Latvian folk dances in Latvia and abroad.



RTU ALUMNI ASSOCIATION

POINT OF EXCELLENCE

RTU Alumni

RTU has about 120,000 graduates united by RTU Alumni Association. It is a public organization established on 23 May 2012, and ever since its aims are to unite different generations of RTU alumni, to implement various support programs and to promote the sense of belonging to one's *alma mater*.

The work of the Alumni Association is based on three key concepts: contacts, knowledge and support. Firstly, contacts mean facilitating cooperation among members of the association, RTU units, employees and future alumni – the current students. Secondly, the association offers obtaining and reinforcing experience based-knowledge, organizing different educational,

The work of the Alumni Association is based on three key concepts: contacts, knowledge and support.



sports and inspirational activities for alumni – visits to innovative enterprises, tours to research laboratories. And thirdly, support, i.e. support provided to alumni by cooperation partners of the University and association, as well as the support the alumni offer to the University – their experience, funding, and bringing in new students. The association regularly informs the public about various activities at its web-page www.alumni.rtu.lv, via monthly newsletters to the member e-mails, as well as through social media.



Andris Dambis,

Director of Ogres Servisa centrs Ltd, founder of OSCar, owner of the enterprise OSC

In 1982 graduated from the Faculty of Mechanical Engineering (at present – the

Faculty of Mechanical Engineering, Transport and Aeronautics).

Andris Dambis is one of the most celebrated Latvian auto racers, race car engineers and constructors, who received international recognition for his projects – Dakar OSCar auto and American Pikes Peak Hill Climb electric car eO PP01. In summer 2015, the car eO PP03 designed by A.Dambis and assembled by "Drive eO" team became the first world electric car, which won the Pikes Peak Competition in the USA.

"In my life I have pursued only one aim – I have always wanted to build automobiles, to work with metal ware. Even in kindergarten I knew that I would be a vehicle engineer. I was lucky after the secondary school – Riga Polytechnic Institute just launched a program in vehicle engineering. The choice to study and obtain vehicle engineer qualification gave me the opportunity to go in for motoring, to think about cars and create them. I am absolutely sure that the knowledge I obtained at the higher school has helped me to achieve good results in my field. It is the foundation of my professional activity."



Dainis Dukurs,

Chairman of the Board of Sigulda Bobsleigh and Luge Track Ltd, Latvian Bobsleigh and Skeleton Federation, skeleton coach

In 1980 graduated from the

Faculty of Mechanical Engineering (at present – the Faculty of Mechanical Engineering, Transport and Aeronautics).

Mechanical engineer.

"The knowledge I obtained at Riga Technical University is very useful in my present work – sports, constructing skeleton bobsleds for the Latvian team. The second largest achievement is my course mates; they can be called the members of my team, as I regularly ask them for advice and consultations. "



Edvīns Bērziņš,

Chairman of the Board of SJSC "Latvijas dzelzceļš" (Latvian Railways), president

In 2007 graduated from the Faculty of Engineering Economics (at present –

the Faculty of Engineering Economics and Management).

E. Bērziņš headed the Department of International Cooperation in the Latvian Police Academy, managed Legal Department in JSC "Latvijas kuģniecība" (Latvian Shipping Company), he also was a member of the board. He has been a member of the board of the leader

in transport and logistics in the Baltic States – Latvian Railways – since 2011, and the chairman of the board since 2016.

"Master program "Innovations and Entrepreneurship" (MBA) implemented by RTU and BI Norwegian Business School was my second degree, which I was pursuing during a very busy period in my career. However, this program is designed for the people like me and allows students to simultaneously perform one's work tasks and to find time for studies. The program really inspired new ideas, allowed seeing any real life situation or a business problem from a different point of view and definitely widened my horizon. I consider that a person's career and life in general are a consequent result of the choices a person has made. If you permanently invest in your education and growth, expand your knowledge and practical experience, you can achieve even more. MBA was one of the turning points, which allowed me to get where I am now, and I am very grateful to my University for the knowledge I gained."



Ilmārs Rimšēvičs,

President of the Bank of Latvia

In 1990 graduated from the Faculty of Engineering Economics (at present – the Faculty of Engineering

Economics and Management).

Engineering economist.

"It can be stated for certain that now Riga Technical University, the knowledge it generates, engineers and chemists – same as 150 years ago –

play a decisive role in plotting Latvia on the world entrepreneurship map, ensuring that competitive goods with high added value are produced here and that the people become more intelligent, self-assured, and wealthy. I am sure that only the country with highly developed technical knowledge and education can produce bobsleighs and luges, which bring Olympic medals, can promote manufacturing that may bring us to the top of the rating of countries with the highest GDP."



Joseph Habib,

Vice-President of American company CommScope in Dubai, Service Providers for Middle East and Africa region

In 1997 graduated from the Faculty of Radio Technology

and Communications (at present – the Faculty of Electronics and Telecommunications).

Professional in telecommunications with 20 years of experience. Mainly worked in the Middle East, Africa and Australia regions. At present is working in Dubai. Held managerial positions in such companies as Alghanim Industries, Harris Stratex Networks, BT, Andrew Corporation, Integ, ADC and other.

"In order to come and feel comfortable in a foreign culture while studying abroad, a person is becoming more independent, self-assured and confident. Contacts with Latvians and other foreign students taught me to respect other cultures and cultural heritage. My leadership skills were also developed – leadership and business styles in different cultures considerably vary. In

interaction with a foreign culture I developed a more comprehensive and detailed understanding of the world and changed my opinions and values. Being involved in cross-culture communication, I learned about international standards, laws and regulations. This all helped me to develop my career. Studies abroad are a journey that starts in your native land and different experience gained in the course of this journey determines who you are at the end of your trip."



Juris Gulbis,

Chairman of the board of Lattelecom Ltd, Chief Executive Officer

In 1993 graduated from the Faculty of Civil Engineering (at present – the Faculty of Building and Civil Engineering) and the Faculty of Engineering Economics (at present – the Faculty of Engineering Economics and Management).

Worked as a senior economist in JSC Baltic Transit Bank, worked in Coopers & Lybrand, was a deputy financial director in JSC Ave Lat Grupa, member of the board, managing director and chairman of the board of JSC Latvijas balzams. Since 2007 – financial director of Lattelecom Ltd, member of the board. For his significant contribution to the development of telecommunications and IT sector, as well as for integrating young specialists in the labor market and educating Latvian society in 2013 J. Gulbis was awarded the title of the Honorary Alumnus of RTU.

"Education obtained at RTU has established

foundation and provided the necessary skills to become an expert in the industry and a high level strategic manager. The studies developed and improved the ability to think logically, solve complicated non-standard problems, as well as making decisions in the situations when only limited data is available. Thanks to the at the time unique program launched by RTU Rector Egons Lavendelis that allowed learning the basics of entrepreneurship along with studies of the major, I obtained the competencies to promote my career first in the field of finance, then in food processing and now – in telecommunications sector."



Juris Poga,

Member of the board of Arhitekta J. Pogas birojs (Architect's J. Poga Bureau) Ltd

In 1981 graduated from the Faculty of Architecture and Civil Engineering (at present – the Faculty of Architecture and Urban Planning).

Member of the Latvia Association of Architects since 1985. Received the annual Latvian Architecture Awards many times and was recognized as the winner of the competition "The Building of the Year in Latvia". Some most significant works include Russian Pavilion EXPO'92 in Seville (Spain, 1992); Liepaja multifunctional center Large Amber (Latvia, 2015) and many other.

"The main benefit obtained during studies at RTU is skills and understanding of often controversial factors that shape architecture. Knowledge gained

at RTU has helped me learn the art of developing the environment. In the beginning, it was general knowledge that helped in work, then – practical experience gained working for 13 years in the largest architecture and urban development enterprise of the Latvian SSR, Latvian building design institute "Pilsētprojekts" (1981–1993), where I held different positions, from a regular architect and to the head of the bureau."



Kārlis Šadurskis,

Minister of Education of the Republic of Latvia

In 1982 graduated from the Faculty of Automatics and Computing Technology (at present – the Faculty of Computer Science and Information Technology).

Graduated from RTU with distinction having obtained a degree in applied mathematics, later – degree of the candidate of technical sciences and Doctor degree in mathematics. Worked at RTU in different positions – starting with senior teacher to professor, headed RTU Chair of Probability Theory and Mathematical Statistics. The member of the Saeima several times, member of the European Parliament, head of the Saeima Commission on Budget and Finance (tax), Minister of Education and Science (2002-2004 and 2016).

"In the course of studies at RTU I received a high quality education in mathematics and information technology corresponding to the highest standards of that time. For example, within the mathematics study module there were about 20 different

courses on mathematics. Another important thing I learned is that education, gaining new knowledge and professional advancement should be lifelong. Studies at RTU and mainly post-graduate studies created both internal need and habit to keep up to date with the scientific progress in the field and to strive to be ahead of it in one specific sector. RTU developed critical thinking and internal need to employ logic, algorithmic and structured approach to any life situation. This approach is an absolute must in research work, but it can be very valuable in solving everyday problems."



Valdis Dombrovskis,

European Commissioner and European Commission Vice-President for the Euro and Social Dialogue

In 2007 graduated from the Faculty of Engineering Economics (at present – the Faculty of Engineering Economics and Management).

Latvian physicist, economist and politician. Former member of the Saeima, Minister of Finance, Prime Minister of the Republic of Latvia. Since 2014 – European Commissioner and European Commission Vice-President for the Euro and Social Dialogue headed by Jean-Claude Juncker. Lead Latvia in the period of financial crisis. In 2011 received the International Prize from Friedrich August von Hayek Stiftung Foundation for considerable contribution to restoring financial and economic stability of Latvia. In 2012 received the Vasek and Anna Maria Polak Charitable Foundation Award from the Fund for American Studies for contribution

in the capacity of the head of the government in overcoming the financial crisis. Several times was recognized the European Person of the Year in Latvia.

"Already at the secondary school it became clear that I could study physics, as I studied in the class with the focus on physics and mathematics. However, along with the change of political regime, it suddenly became possible to study economics rather than political economy of socialism, that is why in parallel to the study of physics I also studied economics at RTU. The main benefit I gained in the course of studies is exact thinking and structured problem solving skills, which help in many situations. I think that it is no coincidence that many Latvian politicians have physical-mathematical background – exact thinking is the factor that helps in politics."



Zbignevs Stankevičs,
Metropolitan Archbishop of
Roman Catholic Church of
Riga

In 1978 graduated from the Faculty of Automatics and Computing Technology (at present – the Faculty of Computer Science and Information Technology).

Ordinated a priest in 1996, consecrated as bishop and ingressed in 2010. Received PhD in Theology from Pontifical Lateran University in 2008. Since 2011, Z. Stankevičs is a member of the Commission of the Bishops' Conferences of the European Community. In 2012, Pope Benedict XVI appointed Z. Stankevičs a member

of Pontifical Council for Promoting Christian Unity. Z. Stankevičs is a member of the European Academy of Sciences and Arts (Academia Scientiarum et Artium Europaea) and an Honorary Member of the Latvian Academy of Sciences.

"Science has always interested me. At school I enthusiastically read popular scientific books and dreamt about space travels and contacts with extraterrestrial civilizations. At the last moment I decided to study automated control systems at RTU rather than nuclear physics. After I received my diploma, I worked as an engineer for 12 years. The most valuable thing I gained studying at RTU is logical thinking, systemic approach to problem solving, as well as the ability to gain new knowledge, structuring it and leaving the non-essential. At present I mainly concentrate on humanitarian dimension, and engineering education helps me unite it with practical, empirical aspects of life."



RTU has about 120,000 graduates united by RTU Alumni Association.

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