



South Ural  
State University

National Research  
University

5100



ANNUAL REPORT



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**SMART-UNIVERSITY** | **2017**  
WHICH UNITES EUROPE AND ASIA

# INTRODUCTION



The presented materials of the Annual Report are intended to give an opportunity for the widest range of stakeholders of South Ural State University to get a visual demonstration of the university's operation within the past period: evaluate its experience, analyze particular and general goals for the upcoming 2018, and reveal reserves that have to be used in the future.

The Annual Report can and should become a foundation for maximal consideration of possible difficulties and risks when addressing results of the current activity, and get oriented at successful solving of global problems which the modern system of higher education is facing today.



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**«I AM SURE, BY HAVING A POWERFUL AND PROFESSIONAL  
TEAM, THE UNIVERSITY WILL ACHIEVE EVEN MORE  
SIGNIFICANT SUCCESS!»**



**DEAR COLLEAGUES!**

In 2017, South Ural State University made a confident step towards entering the number of leading universities of the world. Specific achievements within the current period prove this statement.

SUSU significantly moved forward by improving its positions in the QS University Rankings: Emerging Europe and Central Asia international ranking. According to Webometrics Ranking of World Universities, in 2017 we improved our positions for 213

points, especially in such indicators as «openness» and «excellence»; and among Russian universities SUSU climbed up from the 40<sup>th</sup> to the 23<sup>rd</sup> place. Moreover, according to Interfax university ranking, the university got included in 22 best universities of Russia, having improved its indicators for 16 positions. Also, SUSU for the first time got included in the RUR world university ranking and the top-10 of the Expert Analytical Center's ranking of inventive activity of domestic universities.

We introduced a new brand-concept of SUSU as a multinational and multicultural university, which is understandable and congenial for our partners from many countries of the world. We declared ourselves as of a university uniting Europe and Asia and became the venue for hosting the Forum of Rectors of leading universities of Russia and Kazakhstan, which was held within the 14th Russia-Kazakhstan Interregional Cooperation Forum featuring Presidents of the Russian Federation and the Republic of Kazakhstan.

Last year, SUSU successfully demonstrated its scientific, innovative and educational potential to the international community. At the international EAIE Conference and Exhibition in Spain the university signed a series of very important agreements with European universities.

We globally strengthened our positions thanks to active implementation of more than 30 projects of the program for enhancement of South Ural State University's competitiveness. Today, the new organizational structure is efficiently operating at the university. SUSU's Institutes and Higher Schools came up to the international level by attracting foreign colleagues to teaching and research activity, by starting to actively use programs and technologies of distant learning, working on implementation of elite training programs for talented students, creating customized courses, having prepared for development a series of MOOC courses.

In 2017, SUSU set up channels for attracting students and postgrads from the near abroad, China and the Near East countries. A bilingual environment, which became a foundation of a new model for English language training for more than 1500

students, lecturers and employees, was created using the Cambridge University Press method.

Inventions of SUSU scientists in the sphere of supercomputing, engineering, natural sciences and human sciences get actively introduced to industry. Eight international laboratories supervised by leading international scientists from Australia, Great Britain, Germany, India, Canada, Mexico, USA, and France are successfully operating at the university. The number of publications in international scientific editions with high citation index is noticeably growing.

The created at the university International Scientific Council and Supervisory Board demonstrate high-performance work. Work of the Council members help the university holding a high bar and enhance dynamics for improvement of its educational, scientific and innovative activity. Having continued its work on extending of collaboration with leading companies of Russia and the world, the university in 2017 signed new agreements on strategic partnership with SMS group (Germany) and Kaspersky Laboratory (Russia); started implementing new innovative projects for Russian Helicopters Corporation (Russia); an academic laboratory of Siemens PLM Software Company was opened on the grounds of SUSU.

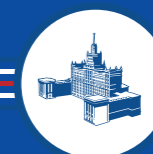
Without a doubt, these events are an intermediate result on the way to the big goal – the inclusion of SUSU to the elite of the world's education and science. I am sure that by having a powerful and professional team of scientists, teachers and employees who put out their all efforts and energy for development of their home university, the university will achieve even more significant success on this way in the future!

**Rector of South Ural State University,  
Doctor of Sciences (Engineering), Professor  
Chairman of the Council of Rectors of the Ural Federal District**

**Alexander SHESTAKOV**



## SMART- concept



Since 2015 South Ural State University (NRU) has been the participant of the competitiveness enhancement program (Project 5-100).

# 28 000

students

# > 2 200

teachers and employees





## SMART-CONCEPT – GENERAL CHARACTERISTICS



### COMPETITIVENESS ENHANCEMENT PROGRAM OF THE UNIVERSITY



SUSU actively introduces ideas connected with understanding of the global processes of Industry 4.0 and implements the transition to a new innovative model of the scientific and educational process, which corresponds to basic provisions of the Roadmap concept of Project 5-100.

### 1 || New Management System

The university introduces modern Information and Communication SMART technologies of educational process management. The International Scientific Council and the Supervisory Board were created in the university. Leading foreign and Russian scientists, leaders of public authorities and business leaders have become the members of new management bodies of the university. Among them you can see Victor Khristenko, the President of the Business Council of the Eurasian Economic Union, Boris Dubrovskiy, the Governor of the Chelyabinsk region, Edward L. Monser, the President of Emerson corporation, and other world famous scientists.

### 2 || Concentration of Resources

Interdisciplinary collaborations, links with the market have been developing, the teaching resource is used more effectively. SUSU has optimized the administrative personnel, has created a new structure, which includes 10 higher schools and institutes. They conduct training in intramural, intra-extramural and extramural forms of study. Training and education are also carried out with the use of online learning technologies. Students have an opportunity to do an internship at 3,000 enterprises in Russia and abroad.

### 3 || Elite Educational Programs

Elite educational programs developed in cooperation with employers are implemented in the university for talented students in the sphere of economics, computer sciences and engineering. The essence of the project is to give the chance for the future specialists to acquire additional professional skills and to immerse themselves into the world of science and practice, hence, to enhance their prospects for career growth. These programs include advanced study of mathematics, computer science, the English language, the formation of communication skills and mastering of vocational subjects. Due to supplementary knowledge, the students of SUSU elite educational system were involved into science earlier than other students and have contacts with leading Russian and foreign scientists of the university.

### 4 || Leading Academic Staff

SUSU provides young scientists with research grants, attracts young prospective employees to manage Projects 5-100, and invites leading foreign and Russian graduates, young scientists and teachers.

### 5 || New Technologies in Education

SUSU implements the program of distance learning based on e-learning system with the help of the latest information internet-based technologies and multimedia. The university is actively working at mass online open courses (MOOC), development of the learning management system (LMS), organization of interaction of academic staff with the students through online sources, development of the «cloud» access to the supercomputer for teachers and students.

### 6 || International Activity

SUSU International Affairs Division implements the general strategy for the development of international activity of the university, interacts with foreign partners, international organizations, national embassies and consulates, performs information-and-analysis support, etc. In 2016 the Center for Sociocultural Adaptation was created in the university to prepare foreign citizens for

admission to SUSU, and to adapt foreign students. Here students have the opportunity to learn the spoken Russian language, learn about local culture and customs, and make friends with students from different countries.

### 7 || Breakthrough Scientific Solutions

Science and research is a powerful vector of the university's development. About 40 research and educational centers and laboratories, including 8 international laboratories under the leadership of leading foreign scientists, operate on the basis of SUSU.

Supercomputer Simulation Laboratory is the leading one; three powerful supercomputers with a total processing capacity of 606 TFlops are installed here. Supercomputer simulation is actively used to solve educational, scientific and production tasks of not only the Russian but also foreign customers. Among them you can find Emerson corporation (USA), SIEMENS (Germany), SMS Group (Germany), Magnitogorsk Iron and Steel Works (Russia), etc.

SUSU includes the Center for Computer Engineering, on the basis of which the Siemens laboratory was opened in 2017. The key clients of the Center are KAMAZ, ChTZ-Uraltruck, Ural Mechanical Plant and other industrial giants. Laboratory of Additive Technologies is successfully functioning in the university, it has a joint project with SMS Group and National Engineering School of Saint-Etienne, as well as Endress+Hauser laboratory, which makes it possible to study advanced solutions in industrial process management, acquire technical skills in operation with control and measurement equipment and automation devices from the leading manufacturer – Endress+Hauser corporation (Switzerland).

### 8 || Innovation Policy

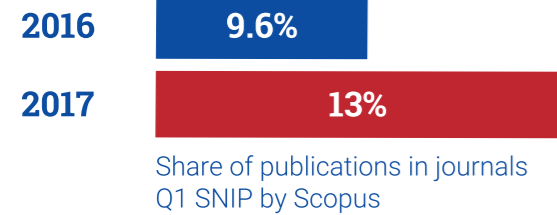
The university promotes the development of the balanced relationship between scientific research and innovative entrepreneurship. The university has created innovative infrastructure that includes 68 small innovative enterprises, a business incubator, consulting centers, intellectual property management, etc. In the context of integrating digital science and digital industry technologies SUSU successfully develops an entrepreneurial environment to attract investments and enter the global market.



# PERFORMANCE TARGETS FULFILLMENT IN 2017 (FIGURES AND FACTS)

## EFFECTIVE CONTRACTS

- KPI system is implemented



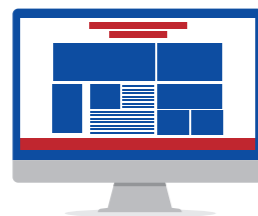
## RESEARCH: NEW APPROACH

- SUSU International Scientific Council and experts of foreign universities are involved into evaluation of SUSU projects.

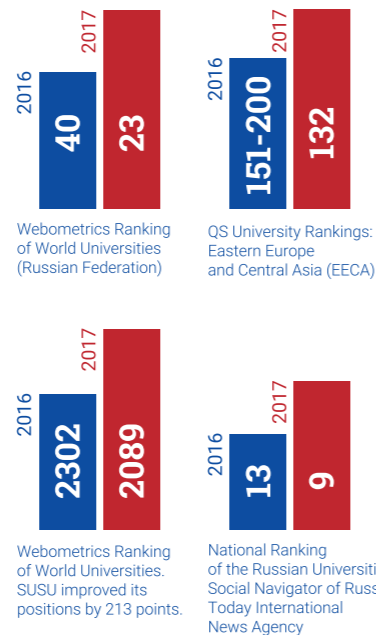


## SUSU WEB-SITE UPGRADE

- The content and format of the web-site are reoriented to the international space and key stakeholders of the university in accordance with the marketing strategy of the university.



## RANKING STANDING IMPROVEMENT



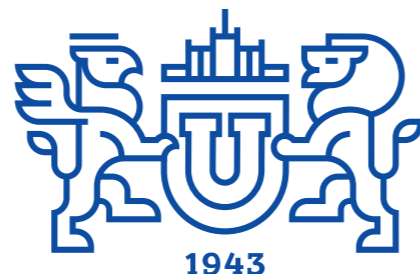
EXPERT Analytic Center  
**TOP-10**  
Ranking of the Inventive Activity of the Universities in the Country

INTERFAX Ranking  
**TOP-22**  
of the National Ranking of the Universities

SUSU first entered the RUR World Ranking  
**RUR**  
Round University Ranking

## REBRANDING

- An essential rebranding of the University as a multinational and a multicultural university uniting Europe and Asia was implemented.

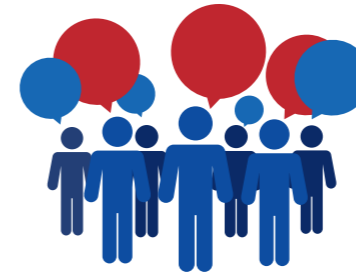


South Ural State University

National Research University

## BILINGUAL ENVIRONMENT FORMATION

**>1 500** students and academic staff are trained on a new model of the English language training, based on the methodology of Cambridge University Press



## INTERNATIONAL ACADEMIC STAFF ENGAGEMENT

- The requirements for academic staff are developed and open competitions are held on their basis.



## CONCEPT OF BREAKTHROUGH PRIORITY AREAS

- The research activity of the university is focused on the development and implementation of strategic academic units.

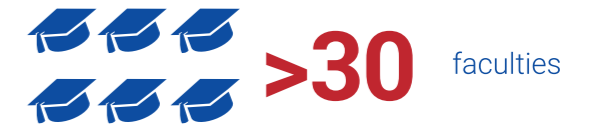
SAU Smart Industry



SAU Smart Education



## LARGE-SCALE TRANSFORMATION OF ORGANIZATIONAL STRUCTURE



## SCALING OF THE LEARNING MANAGEMENT SYSTEM (LMS)

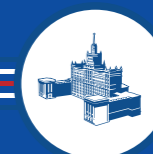
- The interaction of students and academic staff through online resources was introduced.



**33%** of teachers use technologies of blended learning



## SUSU Brand Platform



«SUSU aims to be one of the leading universities of the greatest continent of the Earth – the continent of Eurasia. In accordance with the objectives of Project 5-100 the university strives to strengthen its positions as a national research, educational and innovation center among the world universities».

Alexander Shestakov,  
SUSU Rector, Chairman  
of the Council of Rectors  
of the Ural Federal District

**1943**

University foundation

**2015**

Entering Project 5-100





## MISSION, VALUES, LOGO



SUSU motto is Smart University which unites Europe and Asia

### SUSU Mission

Our mission is the creation and the use of scientific knowledge and training of a new generation of leaders capable of meeting global challenges of sustainable development and changing the world for the better.

### Values of Entrepreneurial University

In carrying out our mission we rely on the values of the entrepreneurial university.

We believe that a versatile, motivated team is the heart of South Ural State University, and we **cherish the uniqueness** of every student and employee, attracting people of different fates and aspiration. We provide students with the opportunity to choose their own way in the University, the employees and research teams with the freedom and autonomy in scientific research. We are sure that world-class breakthrough is made only when our scientists work on projects that inspire them.

In SUSU we understand and accept **global challenges**: giving young people the opportunity to receive quality education and an interesting profession; fighting against poverty, social and gender inequality; enhancing the ecological and social and economic sustainability of cities and local communities; establishment of intercultural dialogue and bridging the digital divide.

**We benefit from global trends**: thanks to globalization distances are declining and SUSU becomes a full-fledged part of world scientific and educational process, a «portal», connecting our community with global leaders. Increasing global mobility makes it possible to attract talented scientists and students from all over the world, who share our vision and goals. We understand that to solve global problems it is necessary to use new approaches and are **ready to accept the risk** associated with the implementation of new projects. In our history we have repeatedly argued this by opening new areas of activity, eventually transforming the polytechnical institute into a classical university. In all our projects we are focused on achieving results and following the best traditions of our engineering school we

create the final product and are responsible for it. This trait is decisive in our culture, and we pass it on to our young scientists, students and graduates, together creating a meritocratic environment and daily motivating each other.

We value the community of which we are the part, and strive to develop it, as we believe that we can change the life in the region. **Relying on local advantages** we are creating a smart university for sustainable development of the Ural, which attracts talents from the surrounding regions and countries of Central Asia, the Middle East and from China.

**The ability to master, apply and distribute new technologies** is one of our key competencies, and we are proud to bring the most advanced technological solutions and approaches to the Ural. New technologies will radically change our University for the better allowing us to introduce a qualitatively new approach to academic activity, management systems and cooperation with partners. Together we can revive the economy of the region and make it one of the growth centers in Russia.

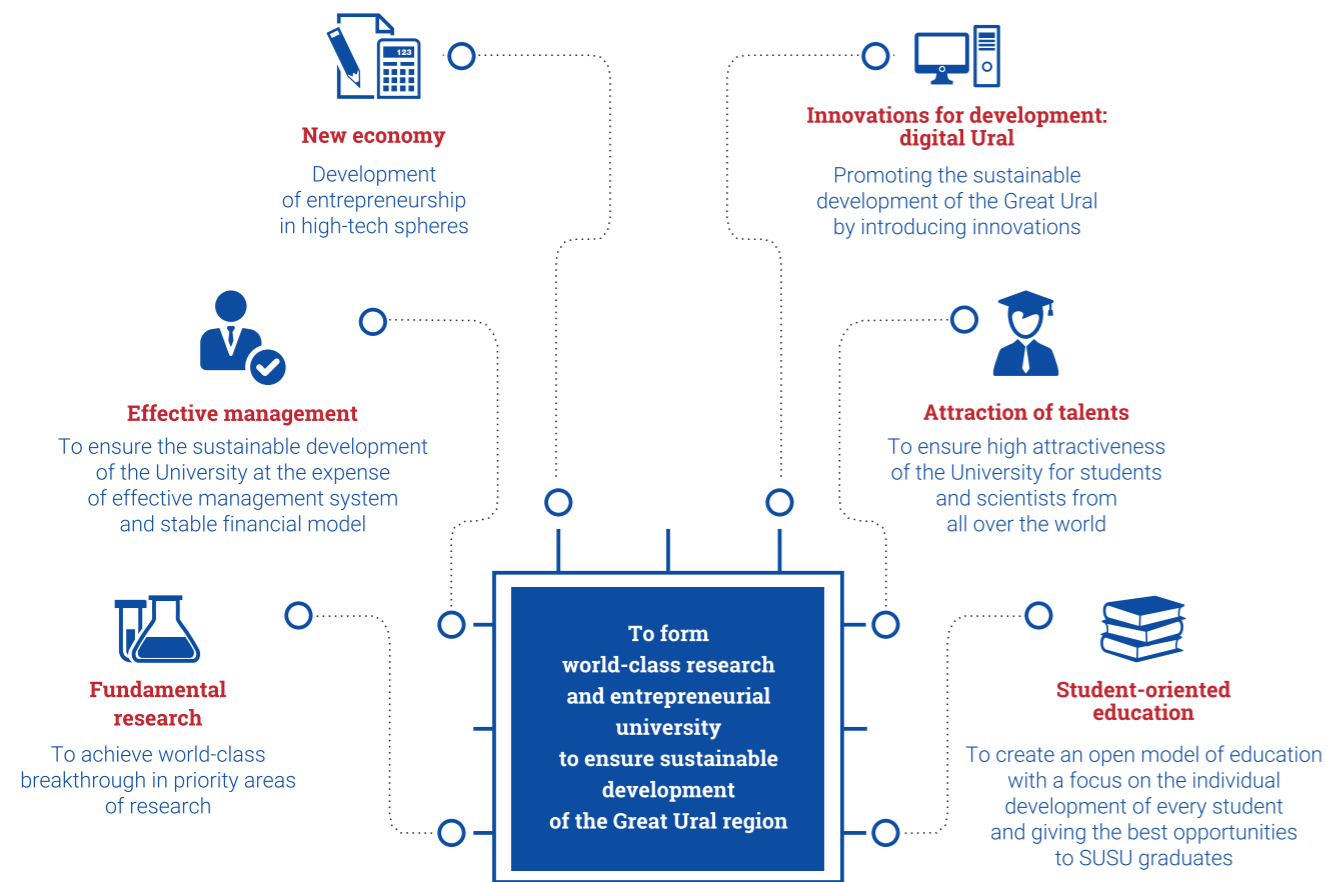




### SUSU Objectives

The mission and values form the strategic vision of SUSU, which determines our objectives. The formation of a world-class research and entrepreneurial university to ensure sustainable development of the Great Ural region is an integral strategic objective of the university, in accordance with which the goals for key activities are defined. The achievement of breakthrough in

research will allow us to use these breakthrough solutions to increase the efficiency of the Ural industry and raise the recognition of the university in the world. Transformation of the learning process and attraction of talents will attract the best personnel to the region; thus, provide a basis for its sustainable development. A stable financial model and an effective management system will make it possible to implement initiatives to achieve all the above objectives successfully.



### SUSU Brand

Nowadays SUSU is a «SMART-university which unites Europe and Asia». This is justified by the geographical position of the university and historical traditions. SUSU is located in the heart of the Southern Ural, at the intersection of two parts of the world – Europe and Asia, where in the ancient times the Great Silk Way connecting the countries of Western Europe and China passed. At the present stage of development SUSU has

become the foundation of positive social and economic changes in the region: development of powerful industry, preservation of unique nature, creation of multicultural and multinational environment which favors to new discoveries and development of international collaboration.

Today the tendency to developing new connections between countries of different civilizations and social and economic systems of Europe and Asia is the leading trend of internal and foreign policy of Russia.

These key circumstances became the basis of the new corporate brand mark of the university. The new logo preserves continuity of the best university's traditions; at the same time it reflects the new development path of SUSU – the multinational, multicultural university situated at the intersection of Europe and Asia. Today, students of more than a hundred nationalities from 48 world's countries are studying at the largest Russian university. The university, in the frameworks of the strategy for entering the world's educational space, is performing the task of vast cultural interaction

and mutual exchange between Eastern and Western nations.

SUSU sets a goal to be one of the leading universities of the largest continent of the Earth – the Eurasia continent. According to the objectives of Project 5-100, the university aspires to strengthening its positions as a scientific-and-research, educational and innovative center among the world's universities, which would allow it to implement significant theoretical and practical contribution to innovative development and global competitiveness of Russia in Eurasia and around the world.

### Gryphon is EUROPE

A symbol of velocity strength, bravery, interdisciplinary scientific knowledge of the world.

### Lion is ASIA

Символ мудрости, справедливости, покровительства, добра и просвещения

### University's Main Building



1943

### Shield with the letter «U»

«University»  
«Ural»  
«Union»

### Date of the university's establishment

### SUSU Logo

Leading position of the university, its striving to take dominant positions in educational, scientific and innovative activity are reflected on the logo in the form of mythical creatures – a Gryphon and a Lion, which symbolize Europe and Asia.

The logo of SUSU is a demonstration of commitment to traditions, respect to the history and culture of European and Asian nations. This is the university's aspiration to create a common Eurasian future which would be based on the priority of scientific knowledge, respect to personality, and belief in creative powers. Such future should be formed in the present.

3

## New Management System



SMART-university achieves its goals to the maximum by concentrating its resources

10  
Schools  
and Institutes

85  
Departments





# STRUCTURE OPTIMIZATION



«The changed number of departments and more than 30 classical faculties transformed into 10 schools - is what you have made! It is really not so easy. It is truly demonstration of leader skills as if the whole team said: «Yes, we will do it!», – **Edward Monser**, President of Emerson Corporation, Head of SUSU International Scientific Council

South Ural State University has transformed organizational structure, the purpose of which is the concentration of basic resources of the university.

In accordance with the program to improve the competitiveness of Project 5-100 the structure of the university has undergone global changes:

- restructuring of academic departments;
- more than 30 faculties were transformed into 10 schools and institutes;
- the number of departments was reduced from 145 to 85;
- systems for project management and change management were created

Year 2017

1442

Year 2015

1637

41%

of optimization

The number of rates

- KPI system for higher education teaching personnel and heads of departments was introduced.

Due to the competent redistribution of the workload per scientific and pedagogical worker

the wage growth was achieved in its basic part, the system of additional individual incentive, the size of which is determined by the quality of teaching, was introduced.

## SUSU Schools and Institutes

### Engineering



### Natural Science



### Social Sciences and Humanities

The changes have also allowed the university to evenly distribute the time sheet between teaching and research of academic staff.

SUSU has optimized the structure of application of student to the Bachelor's/ Specialist's degree programs as well as Master's degree programs in accordance with the market expectations of the employer.

Today higher Schools and Institutes are the flagships of science and innovations in SUSU in the spheres of engineering, natural, social sciences and humanities. They conduct training in intramural, intra-extramural and extramural forms of study. Learning process is carried out with the use of modern distant technologies e-learning and b-learning. Within the project of development and implementation of mass open

online courses (MOOC) in English and Russia on the basis of the Russian and international sites SUSU has prepared 8 courses to be developed. The first approbation of the course Renewable Energy Sources was held at the Lektorium site. In total SUSU remote education portal hosts more than 100 different courses for school and university students, graduates, teachers and public officers. The new structure has made it possible to build a fundamentally new modern management model based on the following principles

- Development of interdisciplinary collaborations;
- Efficient use of teaching resources;
- Provision communication with the market.



## SUPERVISORY BOARD



«SUSU has a huge potential and it is obvious. The university does not need to try to become like someone, but it is necessary to cultivate its advantages, in our case it is a high-quality engineering education, which is in demand on the market and among potential employers». – **Victor Khristenko**, President of the Business Council of the Eurasian Economic Union, Supervisory Board Chairman

The Supervisory Board is the supervisory committee of the University, created in South Ural State University in accordance with the Federal Act No.174-FL «On Autonomous Institutions» as of November 3, 2006, and the University Charter.

The order assigning the Supervisory Board members was signed by the Minister of Education and Science of the Russian Federation O.I. Vasilyeva on November 11, 2016.

The Supervisory Board is responsible for the regulation of financial and economic activities of

the university, asset management, participation in other legal entities, and other spheres.

### Supervisory Board Members

The Board includes the representatives of state bodies and public organizations, recognized experts and authoritative experts in various spheres:

- **Andrey Boginskiy** – Deputy Minister of Trade and Industry of the Russian Federation;

- **Arseniy Brikin** – Deputy General Director of Ruselectronics;
- **Alla Vuchkovich** – Executive Director for Personnel and Social Policy of Roscosmos;
- **German Vyatkin** – President of SUSU, Doctor of Sciences (Chemistry), Professor, Corresponding Member of RAS;
- **Vladimir Gutenev** – First Deputy Chairman of the Russian Engineering Union National Sector Association Employers;
- **Boris Dubrovskiy** – Governor of the Chelyabinsk Region;
- **Irina Pazenko** – Deputy Director of the Department of Network management of Subordinate Organizations of the Ministry of Education and Science of Russia;
- **Oleg Sienko** – General Director of Uralvagonzavod named after F.E. Dzerzhinskiy Research and Development Corporation;
- **Alexander Sobolev** – Director of the Department of the State Higher Education Policy of the Ministry of Education and Science of the Russian Federation;
- **Victor Khristenko** – President of the Business Council of the Eurasian Economic Union;
- **Alexander Chumikov** – General Director of International Press Club. Chumikov PR and Consulting LLC.

### Supervisory Board Meetings

At the first meeting of the Supervisory Board of SUSU held on December 9, 2016, the Chairman of the Board – Victor Khristenko, President of the Business Council of the Eurasian Economic Union, was elected; SUSU Rector Alexander Shestakov presented the strategy of the university's development up to 2020. In 2017 three more meetings of SUSU Supervisory Board were held.

On January 30, 2017 the meeting of SUSU Supervisory Board was held in the format of absentee voting.

Positive decisions on all issues on the agenda

of the meeting were made by positive votes: rules and regulations of the Supervisory Board were approved, the Board approved the draft plan of financial and economic activity of FSAEI HE SUSU (NRU) for 2017 and the planned period 2018–019, and the decision to open the current account in Sberbank of Russia.

The next meeting was held on April 3, 2017 in absentia. The following issues were considered on the agenda:

- introduction of changes to the plan of SUSU financial and economic activity;
- conclusion of contracts for disposal of property, which the University is not entitled to dispose of independently in accordance with the legislation of the Russian Federation;
- introduction of changes to the Charter of the University.

Positive decisions on all issues of the agenda of the meeting were made by the majority of votes of the members of the Supervisory Boards.

On June 13, 2017 at the fourth meeting the changes to the plan of financial and economic activity of the university were introduced for 2017; the plan of SUSU financial and economic activity was approved for the planned period of 2018–2019; the annual financial statements were approved for 2016; a report on the results of activity and the disposition of SUSU property was approved for 2016.

This year a separate program block was devoted to the strategy of development of the university for the coming years. Details of current trends of development of the university were discussed at the working meeting with the Rector Alexander Shestakov, and later within the framework of the session of strategic planning, that completed business program of the Board.

Members of the Supervisory Board highly appreciated the work of the team of the university, having stressed that the scientists and employees of SUSU felt the demands of the time and understood the importance of continuous development of the university in the coordinates of international educational space.



## INTERNATIONAL SCIENTIFIC COUNCIL



«Resources of the university make it possible to conduct advanced research. Young scientists and students need to work and spend a lot of time to achieve high results in the scientific field». – **Panayotis A Koutentis**, Professor of Organic Chemistry Department, University of Cyprus, member of SUSU International Scientific Council

### Goal and Members of the International Scientific Council

The International Scientific Council was established at SUSU to coordinate science and research in accordance with the best world practices.

Establishment of the Council is one of the most important initiatives under the University Roadmap.

Edward L. Monser, a President of Emerson, is the Chairman of the Council.

The Council members are the leading scientists with rich research experience in, supercomputing, aerospace engineering, chemistry, nanomaterials, biomedicine, optics and quantum information: Dr. Thomas Ludwig, Dr. Earl H. Dowell, Dr. Ashokkumar Muthupandian, Dr. Panayotis A. Koutentis, Dr. Jack Dongarra, Dr. Santiago Garcí-Granda, Dr. Ron de Kloet, Dr. Marí Josefa Yzuel, Dr. Jaewan Kim, Dr. Mohammed Milad.

### Meetings of the International Scientific Council

The first meeting of the International Scientific Council was held in SUSU in October 2016. Within three days the members of the International Scientific Council visited the scientific laboratories and centers of the university, learnt the material and technical facilities and got acquainted with the employees of the university. Foreign scientists gave expert assessment to the major scientific projects of the University, which were included in the list of activities implemented within the framework of the Roadmap of Project 5-100. Members of the Council also delivered open lectures. In 2017 two more meetings of the International Scientific Council were held.

In March 2017 at the meeting of the ISC, which took place in the format of the teleconference, South Ural State University administration discussed the results of the university's performance in Project 5-100 for 2016 with the members of the Council.

Dr. Jaewan Kim, Dr. Panayotis A. Koutentis, Dr. Thomas Ludwig, Dr. Ashokkumar Muthupandian, a president of Emerson Edward L. Monser and the representatives of international consulting company PwC took part in the online meeting.

Participants of the online meeting approved the trajectory of the university's development and initiated proposals for further improvement of the efficient performance of the university.

At the third meeting of the ISC held in June 2017 the scientists arrived in Chelyabinsk: Edward L. Monser, President of Emerson; Dr. Jaewan Kim, Acting President of the University KIAS in Seoul, whose research is connected with quantum information; Dr. Ron de Kloet, Professor of the University of Leiden and the Royal Netherlands Academy of Arts and Sciences – he has studied the increase in human vulnerability to

stress induced diseases and is known for his discoveries in the study of the effects of stress on brain; Dr. Panayotis A. Koutentis, University of Cyprus, a specialist in in the field of organic chemistry, a scientific editor of *Molecules* and *ARKIVOC*; Dr. Ashokkumar Muthupandian, expert in physical chemistry, specialized in sonochemistry, who made a great contribution to the production of materials for food dairy industry, University of Melbourne. Prof Maria Josefa Yzuel, a physicist, expert in the field of optics, Professor of the University of Barcelona participated in the meeting by video communication.

Curators of international research laboratories from SUSU, representatives of higher schools and institutes presented the results of work and strategy for promoting the university in international subject rankings to foreign scientists.

Members of the ISC delivered open lectures for students and workshops for university staff. The President of Emerson dedicated his speech to the fourth industrial revolution and Industrial Internet of Things, Dr. Panayotis A. Koutentis – to the promising directions of the development of chemistry, Dr. Ron de Kloet spoke about stress psychoneuroendocrinology, Dr. Ashokkumar Muthupandian spoke about the fundamentals and methods of applying ultrasonic treatment in food production and functional materials technologies, Dr. Jaewan Kim plunged future IT-specialists into the world of quantum information.

Within three days the members of the International Scientific Council studied the process of implementation major research projects in SUSU in details, discussed possible ways of entering the general and subject QS rankings and gave detailed recommendations on further positioning of the university.

## Achievements of SUSU Schools and Institutes



SUSU schools and institutes are flagships of research and innovations of the university in the fields of natural sciences, engineering, social sciences and the humanities.

**>200**  
research projects

**>250**  
scientific educational  
and extracurricular  
activities





### INSTITUTE OF ARCHITECTURE AND CONSTRUCTION

#### Research

- 5 major research projects were implemented in 2017: Determination of the Quality of Metallurgical Slag for Its Use in Cement, Concrete, Dry Mix Mortars; Analysis of Causes of Destruction of Concrete Cornices of Office Buildings; Development of a Magnesite Sheet and the Study of Its Properties, etc. for enterprises of the Chelyabinsk Region.

- A grant was awarded for development of the topic on Research of Thermal Profile Properties within the Promotion of SUSU Young Scientists competition.

#### Education

- A new Master program Constructional Engineering and Mechanics of Structures was opened. The claimed program was introduced at the intersection of design and construction.

#### International Activity

- The International Science and Technology Conference on Construction, Architecture and Technosphere Safety was organized, 213 reports, published in «IOP Conference Series: Materials Science and Engineering (MSE)» (Scopus) were presented.
- 15 students of the Department of Architecture attended architectural workshop of Thomas Kern (Newcastle, Great Britain) and received Certificate of Successful Completion.



### SCHOOL OF ECONOMICS AND MANAGEMENT

#### Research

- As part of the development of the Strategy of social and economic development of the Chelyabinsk Region up to 2035 the School acted as a co-developer of the analytical block of the Strategy.
- SUSU and USUE joint Dissertation Council in the specialties Economics and Management of the National Economy (Management, Marketing),

as well as Finance, Money Circulation and Credit was opened.

#### Education

- The 6th School of Economic Analysis was held by the Association of Independent Centers of Economic Analysis (AICEA) with the support of the Ministry of Economic Development of the Chelyabinsk Region and Center of Strategic Development «Strategic Development of the Industrial Region up to 2035: Priorities, Goals and Scenarios for the Development of the Chelyabinsk Region».

#### International Activity

- The 2nd International Conference on Problems of Economic Security and Customs Regulation: Effective Solutions was held with the participation of scientists from the USA, Italy, Chile, Kazakhstan, Armenia.
- The implementation of the master's program in the field of Management, as well as the program Strategic and Innovation Marketing started.



### SCHOOL OF MEDICAL BIOLOGY

#### Research

- 3 projects were implemented with industrial partners of REC of Healthy Food Products and Industrial Technologies: Development of the Technology of the Quick-cooking Food Concentrate; Analysis of Grain of Different Cultures for the Technology of Obtaining Products of Deep Processing; Ultrasonic Modification of Cereals and Potato Starch.

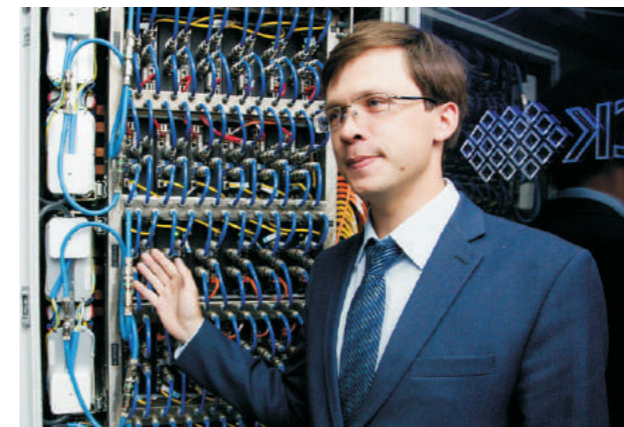
- Participation in the Zolotaya Osen (Golden Autumn) Russian Agroindustrial Exhibition. Results: 2 gold medals for developing a method of production of yoghurt product with an increased content of kefir polysaccharide and for developing of fruit starch drink production based on the use of plant adaptogens. 1 silver medal for development of bread production technologies, increasing the resistance of the body to stress factors.

#### Education

- Small Academy of Biotechnologies was opened.
- A joint educational program for postgraduate education in neurorehabilitation with the Medical University (Varna, Bulgaria) was developed.

#### International Activity

- Participation in 7 international exhibitions, conferences and forums: the 8th International Conference on Biosystems Engineering (Tartu, Estonia), the 3rd International Conference of Asia-Oceania Sonochemical Society (Chennai, India), etc.



### SCHOOL OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

#### Research

- Two new international research laboratories were launched under leadership of famous foreign scientists: the Laboratory of Technical Self-Diagnostics and Self-Control for Instruments and Systems and the Laboratory of Problem-Oriented Cloud Spaces.
- Kaspersky Lab REC of Information Security was opened.
- 6 students and postgraduates of SEECS

became winners of UMNIK competition, having been awarded investments to implement their innovative ideas.

#### Education

- Online SUSU system was introduced, and the knowledge of the students of the senior courses in Bachelor's, Master's and Specialist's programs was evaluated.
- New educational program Data Analysis and Artificial Intelligence Methods was opened in the field of Master's program Informatics and Computer Engineering.

#### International Activity

- The team of SEECS has successfully competed in the international competition for the intellectual data analysis of SMS-Group Data Challenge, and become the winner.
- On the basis of SEECS of SUSU international school Mathematical and Computational Bases of Software Engineering within the Erasmus+ project was organized. Its participants are more than 50 postgraduates and teachers from 13 universities of Great Britain, Germany, Finland, Denmark, Jordan, Luxembourg, Mexico and Russia.





### INSTITUTE OF LINGUISTICS AND INTERNATIONAL COMMUNICATION

#### Research

- Within the Federal Target Program the project Development of a Robotic Interactive System for Study of the Russian Language by Various Listeners with the Use of Electronic Support of the System to Learn the Russian Language and Distance Learning in Russian was completed.
- Research was carried out within 8 grant projects of RSF, SUSU, V. Potanin Charity Foundation.

- The tasks were performed according within 16 contracts of research with agricultural manufacturers of the Chelyabinsk Region on the introduction of geoinformation systems.

#### Education

- A pilot project of multilevel model of foreign language training in Bachelor's degree program based on blended learning was introduced.
- A multilevel module model of development of a linguistic competence of the university academic staff was introduced.
- 4 online courses to implement blended learning were developed.

#### International activity

- Collaboration was established with 3 new universities in China: North China electric Power University (Beijing), China University of Petroleum (Beijing), Huazhong University of Science and Technology (Hubei).
- Framework agreements on cooperation were signed with the universities of Kazakhstan, Italy, Lithuania, and the Czech Republic. An Agreement of intent was signed with the Government of the Philippines, etc.



### INSTITUTE OF SOCIAL SCIENCES AND HUMANITIES

#### Research

- By the results of international competition of the National Association for Mass Media Researchers a multi book entitled Social Media as a Resource of Integrated Communicative Practices edited by SUSU professor L.P. Shesterkina was named the best project and received a special prize.
- A grant on the topic Stress Resistance in

Project Activity: Psychophysiological Resources and Mathematical Models was awarded within the SUSU Support of Young Science contest.

#### Education

- 4 new teaching technologies were introduced for the programs of extended education and proficiency enhancement of psychologists.
- The distance form of learning was opened in the field of Theology.

#### International activity

- Institutional membership in the European Journalism Training Association was implemented with the visit of the President of EJTA Nico Drok to SUSU.

A foreign scientist, prof. J. Sahadeo (Canada) was invited to deliver lectures in the University.

- PHD, professor from the Sofia University (Bulgaria) was attracted to deliver lectures in philological subjects.
- It took part in the International Research and Practice Conference on Discourse: Methodology, Theory, Practice.



### INSTITUTE OF NATURAL SCIENCES

#### Research

- An import-substituting project was developed for the technologies of heat treatment of the parts of oil pumps made of steel 13X11H2B2MΦ for Konar enterprise
- An import-substituting project was implemented for ChelPipe to develop a new 12X11H2 steel composition for corrosion resistant pipes and a heat treatment regime, based on the stabilization of austenite in bainitic

transformation and tempering.

- The projects on the development of energy efficient film electric heaters, as well as the heating of medical stretchers for combat vehicles in the Arctic region were implemented in cooperation with the company UPS Technologies.

#### Education

- The first admission to the Master's degree program Pedagogical Techniques of In-depth Training in Mathematics and Computer Science for the working and future teachers of Mathematics and Computer Science took place.
- A new cycle of interactive video lectures on Mathematical Analysis was developed.

#### International activity

- Participation in the 12th International Conference on Interaction of Radiation with a Solid Body (Belarus, Minsk).
- SUSU Journal of Computational and Engineering Mathematics began to be indexed by the international base EBSCO.



### INSTITUTE OF SPORT, TOURISM AND SERVICE

#### Research

- The scientific journal of the Institute «Man. Sport. Medicine» is included into Web of Science database.
- The implementation of the project by the state targets Technique of Early Diagnosis of Walking and Running Pattern Violations Using Thermographic and Biomechanical Parameters of Human Locomotion, as well as Activity of

Serotonergic Neurons at PTSD started.

- The patent «Method of Preparation of Sauce with Canola Meal» was registered.

#### Education

- Graduates in the field of Tourism won the All-Russian competition of graduation thesis, taking all prizes.
- The student of the college became the winner of the open regional championship Young Professionals (World Skills Russia) South Ural 2016–017 in the competence of Web-design, Software Business Solutions.

#### International Activity

- 3 foreign professors from the Serbian Academy of Sciences and Arts (Belgrade) were involved in cooperation.
- The 2nd International Conference on Innovations in Sport, Tourism and Education was held.
- The 11th International Youth Cooking Festival was held.



### INSTITUTE OF LAW

#### Research

- The monograph «Principles of Civil Law and Their Implementation» was published, and the collection of research papers «Contemporary Issues of Jurisprudence» was prepared for publication.

#### Education

- An educational program in the new speciality Judicial Activity and Procuracy was developed.
- Students of the Institute became holders of the

scholarship of the President of the Russian Federation and the Government of the Russian Federation, winners and awardees of the All-Russian Student Olympiad in the field of Jurisprudence, and the International Student Internet Olympiad.

- Together with the State Agency of the State Traffic Safety Inspectorate of the Chelyabinsk Region the Voluntary People's Guard was established. Within training with the representatives of the Department of Internal Affairs participation was made in the program We Are on Duty Together and in the crime prevention operation the Night.

#### International activity

- Two international science and practice conferences on Topical Issues of Law in Russia and CIS countries-2017, and Contemporary Issues of Legal Science were held.
- Agreements on research and international cooperation with the National Center for Legislation under the President of the Republic of Tajikistan and M. Esbulatov Almaty Academy of MIA of the Republic of Kazakhstan were completed.



### INSTITUTE OF OPEN AND DISTANCE EDUCATION

#### Research

- Participation in 5 international conferences and 3 conferences and forums devoted to inclusive education.

#### Education

- The Institute has acted as a developer of strategic academic units Smart Education, which is aimed at the development of modern technologies in education, selfdevelopment and

socialization of student's personality.

- The online project Children Internet University was launched for school students.
- 8 new supplementary education programs were opened for proficiency enhancement of teaching staff.
- 8 mass open online courses were prepared for development in Russian and English. The first approbation of the course on Renewable Energy Sources was conducted at the site of Lektorium (Polytechnic Institute).
- Web-site New Technologies in Education - nte.susu.ru was created for teachers and employees of the University.
- A unique technology for Russia to customize e-courses were developed.

#### International Activity

- 129 foreign students from 7 countries: Azerbaijan, Georgia, Kazakhstan, Tajikistan, Turkey, Uzbekistan, the Ukraine were attracted to distance learning at the Institute.



### POLYTECHNIC INSTITUTE

#### Research

- Laboratory for Mechanics, Laser Processing and Digital Technology was opened in cooperation with SMS Group and National Engineering School of Saint-Etienne (ENISE, France).
- With the active participation of the Department of Foundry Production Foundry-2017 the 13th Congress of Foundry Workers from Russia and the International Exhibition took place in Chelyabinsk. About 700 Russian and foreign specialists including from the SCO countries: China, India, Kazakhstan, Uzbekistan, Mongolia, Belarus, as well as experts from Germany, Italy, the USA, Great Britain, Turkey, the Czech Republic, the Ukraine and other countries participated in the work of the Congress and exhibition. The main organizers were the Russian Foundry Association, the Government of the Chelyabinsk Region and the Chelyabinsk Regional Department of the Russian Foundry Association with the support of the Ministry of Industry and trade of the Russian Federation.
- Together with Drive Systems company a project Creation of a High-tech Foundry Production for Gasified Models with the Use of Exothermic Processes and Nanostructured Materials was implemented within the Decree No.218 of the Government of the Russian Federation.
- Project Development of a Mathematical Model of the Flow Part of the Vortex Flowmeter and the

Optimization Method Based on It was implemented for Metran engineering company.

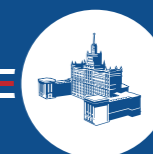
#### Education

- Roadmap in the sphere of personnel training was signed with ChelPipe.
- Participation in Erasmus+ project Development of the university education in the field of heat energy systems to reduce emissions to the environment, strengthening and developing the skills of postgraduates (2017–019).
- A textbook Dangerous goods transportation /N.K. Goryaev, Y.I. Averianov, Z.V. Almetova was published with the stamp of AMA.
- Distance education technologies in 4 fields of the Bachelor's program: Construction Engineering, Informatics and Computing Engineering, Electric Power Engineering and Electrical Engineering, Design and Technological Support of Mechanical Engineering was introduced.
- Educational programs of masters training in the fields Technological Machines and Equipment, Hydraulic, Vacuum and Compressor Equipment were developed in Russian and English.

#### International Activity

- A group of students from South Ural State University was directed to the Zhejiang Ocean University (China) within exchange education program.
- 15 students from China studied one year Master's degree program Electric Power Engineering and Electrical Engineering, specialization Power Engineering.
- 2 professors of the Technical University of Sofia (Bulgaria) were engaged to deliver lectures in the Institute.
- An application was submitted for a joint grant of RFBR and the National Research Fund of Bulgaria – Synthesis and Tribological Studies of Promising Biodegradable Lubricants for Friction Units of Machines and Mechanisms.
- Participation in 6 international conferences in Serbia, Hungary, France, Kazakhstan, China.

## Human resource development



«It is hard to overestimate the importance of education and professional skills of a person when solving modern problems. Thorough selection of employees who bring into reality the ideas of development of international education space has a significant influence on its implementation. That is why the university intends to have the most high-qualified team of teaching staff, and is ready to constantly improve its level».

Alexander Shestakov,  
Rector of SUSU, Chairman  
of the Council of Rectors  
of the Ural Federal District

> 60

defenses of doctor  
and candidate dissertations

> 126

professional development



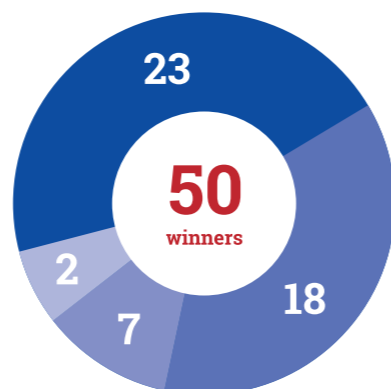
## INTRODUCTION OF GRANT SUPPORT SYSTEM YOUNG ACADEMIC STAFF AND STUDENT



«I see hope in people who are here pursuing science. The most valuable is, specialists at SUSU are very active; supervisors are quite young; the university is dynamically developing – all of this, in totality, opens the widest opportunities of science development in the future». – **Jaewan Kim**, Professor of the School of Computational Sciences of the Korea Institute of Advanced Study, member of the SUSU ISC

A project Support of Young Academic Staff and Students with Grants for Research Projects, Including Internships in the Leading Research Organizations of the University was developed at SUSU. Three contests of financial support were conducted: for students – Forward to Discoveries – 2017; for postgraduates – Scientific Potential – 2017; young academic staff – Beginning of Big Science – 2017.

- Big data
- Economic, social and liberal arts sciences and human sciences
- Natural and exact sciences
- Engineering



### Forward to Discoveries Contest



**50**  
thousand rubles

the amount of financing for a project

The Forward to Discoveries contest was held for providing financial support for research projects of students of full-time mode of study (bachelors, masters, specialists) with the goal to involve talented students into research activity, enhance the quality of their training for publication activity and creation of intellectual property objects.

The university's students of all years of study (bachelors, masters, specialists) who are studying on full-time mode on the basis of budgetary allocations of the federal budget participated in the contest.

20 leaders of projects in the field of chemistry, material science, electrical power engineering, biotechnology and engineering became winners of the contest.

### Scientific Potential Contest



**200**  
thousand rubles

the amount of financing for a project

The Scientific Potential contest is targeted at providing financial support to postgraduate students with the goal to conduct research projects and enhance publication activity of young scientists of the university. By the results of implementation of postgraduates' projects, articles in the world's leading journals will be published.

32 applications were submitted for the contest. Among them: 17 applied for engineering; 8 – for social and liberal arts sciences; 4 – for natural and exact sciences; 3 – for big data, intellectual data analysis.

### Beginning of Big Science Contest



**400**  
thousand rubles

the amount of financing for a project

The Beginning of Big Science contest was held in order to enhance publication activity of SUSU's young academic staff in the world's leading journals.

31 applications were submitted for the contest. Among them: 16 applied for engineering; 10 – for social and liberal arts sciences; 5 – for natural and exact sciences.

By the results of work and application of financial support, all contestants presented a detailed report on primal research results within the given scientific project.

### UMNIK Contest



**500**  
thousand rubles

the amount of financing for a project

On November 29-30, the final of the UMNIK research and innovation contest was held on the grounds of the university. Thanks to participation in the UMNIK contest, young researchers received an opportunity to test relevance of their project, as the contest is targeted at support of commercially-oriented research and technology projects.

The goal of the contest is to encourage young people for development in research-and-technology and innovative activity, introduction of their own inventions in production.

5 sections were organized: information technologies, new materials and technology for their creation, biotechnologies, new devices and apparatus complexes, and medicine of the future. 183 projects took part in the contest. 83 projects, 61 of which belonged to representatives of SUSU, made it to the final.



## HIGHLY QUALIFIED PERSONNEL TRAINING



«The labor market is constantly changing, therefore each of us should regularly enhance the level of one's knowledge in order to be successful at work». – **Miroslav Procházka**, Professor of the University of South Bohemia

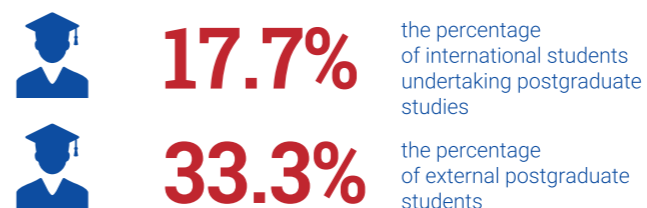
### Student Body of Postgraduate and Doctoral Studies

**738** people constitute the student body of postgraduate and doctoral studies

Among them are 618 postgraduate students, 93 of which are citizens of foreign countries (Iraq, PRC, Yemen, USA, Sri Lanka, Algeria, Ecuador, Kazakhstan, Tajikistan, Mongolia), 103 applicants for a degree of a Candidate or Doctor of Sciences and 15 doctoral students.

The program for development of SUSU's cadre potential, which included 58 participants in 5 areas of development of the national research university, proved itself to be worthy. During the period since March of 2011 and till the present time, 19 doctoral dissertations have been defended, which amounts 33% from total number of participants. Participants of the program receive financial support from the Rector's Fund.

### Postgraduate Studies



In 2017, 43 dissertations for candidacy of the degree of Candidate of Sciences were defended; 9 more dissertations were admitted for defense till April of 2018.

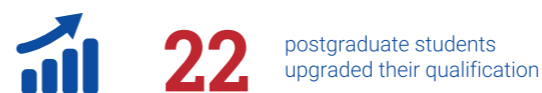
Postgraduate studies include a wide range of training areas. Admission is carried out for 26 programs which include 82 specializations.

186 people were admitted for postgraduate studies for 2017-18 academic year; among them 33 people are citizens of Iraq, China, Algeria, Tajikistan, Kazakhstan; 29 people are from universities of the Russian Federation.

The majority of postgraduates who got enrolled in 2017 academic year have a sufficient experience of research activity. 67 of them are SUSU graduates; 12 are graduates from other universities.

Thus, the percentage of postgraduates who have experience of research activity amounts to 42%. Percentage of postgraduates who are SUSU graduates is 54%; 19% are graduates from other universities.

### Institute of Open and Distance Education



Cooperation with the SUSU Institute of Open and Distance Education provides conditions for distant completion by doctoral students, postgraduates and degree applicants a series of courses of education program in postgraduate study. Also, cadres with higher qualification have the possibility for free education on advanced training courses organized by the Institute of Open and Distance Education.

### Programs of advanced training courses and professional retraining



In 2017, 3178 attendees completed programs of advanced training and 429 attendees completed programs of vocational retraining at the Institute of Open and Distance Education.

**Programs of advanced training:** Improvement of Quality of Cast Sections; Manufacture Using the Cold Hardening Mixture Technique; Command and Measuring Complex on the Basis of Measuring Machines and Electronic Apparatus and Devices, etc.

**Programs of vocational retraining:** Creation of High-tech Production of New Technical Objects; Industrial and Civic Construction. Process Control and Engineering Activity, etc.

On October 12-13, the Institute held **the 3<sup>rd</sup> International Conference on A 21<sup>st</sup> Century University in the System of Continuing Education**. The goal of the Conference was to extend international and interdisciplinary cooperation of pedagogues, researchers and organizers of education system in the sphere of continuing education through exchange of opinions and discussion of global and particular problems of continuing education.

Within the Conference, a teleconference with Saint Petersburg was organized.

During two days of the Conference operation, three sections were organized. Within these sections, issues regarding continuing education at the university, continuing education of academic staff, mastering the MOOC technologies, continuing education of engineering cadre, and improvement of training of specialists for prioritized spheres of municipal entities' economy and search of the ways for their solution were considered.



## LECTURE COURSES BY INTERNATIONAL SCIENTISTS



«Lectures of international scientists is an efficient tool of organizing the scientific cooperation, developing the possibilities for exchange of experience and knowledge between students and lecturers of different countries». – **Manus Henry**, Professor of the University of Oxford (Great Britain)



> 50

lecture courses  
by international scientists

In 2017 academic year, more than 50 lecture cycles delivered by scientists of the world level from the USA, Great Britain, Germany, Australia, Bulgaria, India, Slovakia and Netherlands were held at SUSU. All institutes, higher schools and subdivisions of the university took active part in organizing and holding the lecture courses featuring international scientists.

Edward Monser, the President of Emerson

Company, formally visited SUSU and held a lecture and a master class on the topic of leadership, establishment and management of an international corporation.

Lecture of the Chief Operating Officer excited unprecedented interest among Chelyabinsk residents. Master class of Edward Monser was attended not only by students and lecturers of SUSU but also by representatives of business community, by scientists from the region's universities and by school students.

Director of Technology Centre of the University of Oxford, Doctor Manus

Patrick Henry, also held lectures for employees and students of SUSU. Within his visit to the university, Professor of the world's leading English university delivered a lecture for SUSU students on Techniques for Processing Signals for the New Generation of Intelligent Sensors and Measurement Systems.

Together with Christo Radev and Roald Taymanov, Professor Manus Patrick Henry took part in the Second International Science-to-Practice Conference on Measurements: Status and Development Prospects, and held master classes for SUSU students and employees.

One third of workshops and master classes of international scientists were organized upon the Rector's initiative, including: lectures by Professor Muthupandian Ashokkumar (Australia), Professor Ron de Kloet (Netherlands), Professor Panayiotis Koutentis (Cyprus), and Professor Jaewan Kim (Korea). Moreover, within the International School of Software Engineering, the university was visited by Franck Leprévost, Vice-President of the University of Luxembourg.

International scientists delivered lecture courses in the following spheres:

- Computer sciences and programming; natural and exact sciences;
- Engineering sciences;
- Medical and biological sciences;
- Social and liberal arts sciences; linguistics and international communication;
- Architecture and construction.

### Computer Sciences and Programming; Natural and Exact Sciences

A cycle of lectures on the topic of Extended Structural Model – Substance – Enhanced Properties of the Material was held for SUSU students by Professor from the University of Central Florida, Artem Masunov, Head of the SUSU International Research Laboratory of

Multiscale Modeling of Polyfunctional Compounds.

An important role in development of international activity at SUSU played visits of Professor Janet Read from the University of Central Lancashire (Great Britain), who held a master class on child-computer interaction (ChiCI).

A course of lectures on chemoinformatics Increasing Efficiency of Chemistry in Chemoinformatics was held at SUSU by a well-known German chemist Johann Gasteiger.

An impressive amount of international professors and postgraduates from European countries, Jordan and Russia (more than 50 people) took part in the international project Erasmus+, dedicated to development of software engineering in postgraduate study programs. Lectures by scientists within the frameworks of the International Software Engineering School at SUSU should be specially noted. For example, Professor Franck Leprévost, a world-class specialist in the sphere of cryptology, held a cycle of lectures dedicated to encryption for School attendees and SUSU students.

Professor from Mexico, Andrey Chernykh, held a workshop on a relevant-at-the-moment topic Energy-efficient Computations.

Besides, a workshop featuring international lecturers, where issues of education and teaching of software engineering were discussed, was held in the frameworks of the School. International participants of the workshop on Innovative Approaches in Computer Science within Higher Education were: Janet Read with a lecture on PhD Progress – Beyond the University Benchmarks; Peter Forbrig with a report on Getting a PhD in Software Engineering in Germany and Especially at the University of Rostock; Anke Dittmar et.al. with a report on Focusing on Two Different Aspects of Collaboration in Software Engineering: Supporting Collaborative Modelling and Specification of Collaborative Activities.



A visit of Professor of the University of Innsbruck (Austria), Radu Prodan, within which an open lecture on Modeling and Optimizations of Applications Using Distributed Calculation Systems was organized. Also, the Professor held a workshop on Distributed Cloud Calculations: Big Data Processing Methods, where students, postgraduates and lecturers of SUSU presented their reports on their research topics.

### Engineering Sciences

An open lecture on Optical Control in Chemistry and Biology was held by Aleksei Gun, a PhD and Professor of the Department of Chemistry from Princeton University (USA). Topic of the lecture was dedicated to modern methods of research and control in living tissues and cells, in particular, the use of physical laws while substantiating interrelated biological and chemical processes, and excited a great interest among attendees.

### Medical and Biological Sciences

A course of lectures was held by Julio Licinio (Australia), the Head of the SUSU Laboratory for Neurohepathology. Experience of Professor Julio Licinio is being actively researched and widely applied by SUSU scientists.

On the grounds of the SUSU Laboratory for Synthesis and Analysis of Food Ingredients, supervised by Professor Shirish Sonawane (National Institute of Technology in Warangal, India), lectures by the Professor were held; the lectures concerned areas related with implementation of ultrasonic technologies in a part of synthesis of food ingredients, extraction of food ingredients, and possibilities for their restoring.

Also, a master class on electrophysiology was held for SUSU students and teaching staff by Head of the Laboratory of Neuropharmacology from the Institute of Molecular Physiology and Genetics of the Slovak Academy of Sciences, Doctor Eliyahu Dremenkov. He lectured employees of the Biomedical Technologies REC about registering activity of certain neurons of the head brain. The scientist mastered the new model developed at the REC of Biomedical Technology and introduced it in his laboratory in Bratislava.

Moreover, a cycle of lectures on chemoinformatics was held by Professor Johann Gasteiger.

Besides, lectures by Professor, PhD, research fellow of the Geographical Institute Jovan Cvijic of the Serbian Academy of Sciences and Arts, Marko D. Petrović, were held at SUSU.

Professor, PhD, Director of the Geographical Institute Jovan Cvijic of the Serbian Academy of Sciences and Arts, Milan M. Radovanović, also read lectures for SUSU students.

### Humanities and Social Sciences; Linguistics and International Communication

Scientists-historians Dakota Dean Irvin (USA), Rosibel Roman (USA), Professor of Sofia University, Orlin Stefanov, visited SUSU with lectures, master classes and workshops.

Also, a cycle of lectures, workshops and master classes was held under supervision of Canadian historian and politologist, Jeff Sahadeo.

A visit of Professor Nico Drok (Netherlands), the President of the European Journalism Training Association (EJTA), became the key visit which allowed putting into practice the institutional membership of SUSU in the largest association of leading European schools of journalism.



*«For me, it's an honor and a pleasure to be here, at your university. SUSU experience in cloud calculations, our common interest to information security, and trust are the key factors in our cooperation». – Franck Leprévost, Vice-President of the University of Luxembourg*

Professor Drok was admitted to Honorary Professors of the SUSU Faculty of Journalism. He delivered a report on new competencies of a journalist at the 2nd International Forum.

Also, lectures for SUSU students were held featuring Director of the Confucius Institute, Ning Huaiying, and called Grant Support of Studying in China and Requirements while Passing the HSK Exam.

### Architecture and Construction

SUSU students attended a course of lectures by Kirsten Ritchie, Director of Sustainable Design

from Gensler Company (USA), the largest architectural company in the world. She also held a master class for students and academic staff on the topic of green construction.

Future architects took part in a master class by Thomas Kern, the leader of the Architecture Programme at Newcastle University (Great Britain).

Thus, lecture courses, workshops, and master classes of international scientists on prioritized scientific areas of the university – engineering, supercomputing, natural sciences and human sciences – are bringing SUSU at the educational level of the best world's universities.

## International Activity



Strategic goal of Project 5-100 is to enter the international education space.

> **1 800**  
international  
students

from **48**  
countries of the world





## DOUBLE DEGREE PROGRAMS



Double degree programs as a tool for achieving goals of the Bologna Declaration is a proof of comprehensive training, acknowledgement in professional environment, and high level of trust among potential employers.

SUSU implements joint double degree programs with such universities as:

### Clark University (USA)

The unique Russian-American Master's double degree program with Clark University has been implemented at SUSU for over 6 years.

Advantages of the program are: obtaining of two diplomas – American and Russian – after successful completion of the program; intensive

English language training; evening classes which allow combine studying with working; the possibility of internships in large American companies; the opportunity to stay at the USA after finishing the study for a period from 12 to 36 months in order to obtain practical experience on the specialty; and high status of the both universities.

#### Fields of education:

- Management: IT Management;
- Management: Marketing Communications.

### Lappeenranta University of Technology (Finland)

Advantages of the program are: obtaining of two diplomas – Finnish and Russian – after successful completion of the program; intensive English language training; evening classes which allow combine studying with working; SUSU scholarship and LUT grant; and the possibility to apply for postgraduate studies at LUT.

#### Fields of education:

- Fundamental Computer Science and Information Technology;
- Electrical Engineering (Electric Drives and Electric Drive Systems);
- Power Engineering (Complex Use of Renewable Energy Sources);
- Innovation (Innovation Project Management).

### Al-Farabi Kazakh National University (Kazakhstan)

Advantages of the program are: obtaining of two diplomas – American and Kazakh – after successful completion of the program; high status of the both universities; intensive English language training; the opportunity to receive two scholarships (one from SUSU and one from Al-Farabi KazNU).

#### Fields of education:

- Technosphere Safety;
- Heat Power Engineering and Thermal Engineering;
- Ecology and Environmental Management.

### Chinese Universities

- Master's degree in Management with Zhejiang Ocean University;
- Master's degree in Food Technology with Sichuan University.

## LANGUAGE AND PROFESSIONAL SUMMER SCHOOLS

SUSU has many international partners, cooperation with whom helps supplementing and developing key fields of knowledge in the frameworks of joint research and educational projects.

### Summer School of German language in Freiberg (Germany)

The School is organized upon an agreement between SUSU and the Student Mutual Assistance Community (Saxony, Germany) on student exchange between **Freiberg Mining Academy** and South Ural State University.

The year of the beginning of the program's implementation – 2008.

Level: Bachelor – Master – Postgraduate studies.

Fields of education: Philology (specialization in Russian as a Foreign Language) and Linguistics (specialization in Linguistics and International Communication (German language)).

### Summer Schools in China

#### Yellow River Conservancy Technical Institute and Xuchang University

The program is implemented in the frameworks of admission of students from China to SUSU.

Fields of education: Philology (specialization in Russian as a Foreign Language).

Level: Bachelor – Master – Postgraduate studies.

#### Shanghai University of Foreign Languages

This program is implemented within admission of SUSU students for studying Chinese language.

Level: Bachelor – Master – Postgraduate studies.

The majority of participants of these programs are international students. As a notice, implementation of some of these programs started in 2017.



## ACADEMIC MOBILITY PROGRAMS



Academic mobility of students is one of tools for the university's integration into the international education space. Students, studying on academic mobility programs, are mastering education program in two universities according to the previously coordinated integrated study plan.

During 2016-2017 academic year, more than 300 students took part in academic mobility programs, at that, more than 170 students came to study at SUSU, and the number of SUSU students who went to other countries for studying was more than 120. Academic mobility programs are a compulsory condition of Memorandums of understanding between SUSU and partner universities. Nowadays, within the two-side agreements, South Ural State University is implementing 15 academic mobility programs with the following universities:

### Heihe University (China)

Heihe offers one of the most popular Chinese language programs. This program is compulsory for SUSU students majoring in Foreign Studies, in the field of Asian Research. Russian students have 9 study courses, including taiji, spoken Chinese, politics, economy and culture of China, Chinese arts and ideography, simultaneously studying images and sounds of Chinese culture.

SUSU, in turn, welcomes Chinese students from the Heihe University, who come for studying

on the specialty of Philology, in the field of Russian as a Foreign Language.

### Zhejiang Ocean University (China)

This program is intended for students obtaining Bachelor's degree on such specialties as Linguistics, Chemistry, Ecology and Environmental Management, Architecture, Civil Engineering, Mechatronics and Robotic Engineering, Electrical Power Engineering, Finance and Credit, Accounting, Analysis and Audit, Management, and Mechanical Engineering.

### Dalian University of Foreign Languages (China)

This program is characterized by requirements to the level of Chinese language among Russian students participating in the academic mobility program. The language level a priori should be high. Participation in the program is implemented for such fields of study as Foreign Studies: Asian Research, and Philology.

### China University of Petroleum (China)

The program is targeted at Master's degree students majoring in Mechatronics and Robotics, and Chemical Nanotechnologies.

### Huazhong University of Science and Technology (China)

The program is intended for Bachelor's and Master's degree students majoring in Architectural Design; Urban Planning and Landscape Architecture, and Alternative Energy Sources.

### North China Electric Power University (China)

The program is applicable to Master's degree students majoring in Electrical Power Engineering and Electrical Engineering, and Thermal Power Engineering and Thermal Engineering.

### L.N. Gumilyov Eurasian National University (Kazakhstan)

This program is intended for Bachelor's degree students majoring in Journalism, sphere of Television and Radio Journalism.

### Erasmus+ program

In the frameworks of Erasmus+ program, academic mobility programs are implemented with the following universities:

Polytechnic University of Catalonia (Spain), Friedrich Schiller University in Jena (Germany), Radboud University in Nijmegen (Netherlands), the University of Glasgow (Great Britain), the University of Granada (Spain), the University of Duisburg-Essen (Germany), the University of Poitiers (France), the University of Siena (Italy), Slovak University of Agriculture in Nitra (Slovakia), Jagiellonian University (Poland), the University of Genoa (Italia), and National Engineering School of Saint-Étienne (France).

### Programs Implemented in the Frameworks of Network University of the Shanghai Cooperation Organization (SCO)

The programs are intended for Master's degree students majoring in Ecology and Environmental Management, Power Engineering, Economics, and IT Technologies.

SUSU partners are key universities of Kazakhstan, Tajikistan and Kirgizstan: Al-Farabi Kazakh National University, L.N. Gumilyov Eurasian National University, Kyrgyz National Agrarian University named after K.I. Skryabin, Osh State University, Osh Technological University named after M.M. Adyshev, Tajik Agrarian University, Kazakh National Technical University named after K.I. Satpayev, South Kazakhstan State University named after M. Auezov, Karaganda State Technical University, and Tajik Technical University named after M.S. Osimi.



## CENTER FOR SOCIOCULTURAL ADAPTATION



The Center for Sociocultural Adaptation (CSA) was created in 2016. It provides support to more than 2,000 international students from 48 countries of the world, who are studying at SUSU on various programs and specialties. Head of the CSA is Elena Doronina.

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The main goal of the Center is creating comfortable stay conditions for international students. Bilingual environment is developing at SUSU.

The Center for Sociocultural Adaptation holds the following events: Days of National Culture, Information days, sport events (skiing, skating, tubing, track and field, volleyball, etc.), music classes and interactive lessons.

The CSA provides international students with academic and social assistance; organizes excursions, tourist trips, visiting of parks, and participation in various events of the university and city scale. There is a Conversation Club operating within the Center, where volunteers and students from different countries discuss up-to-date topics in Russian language.

Master classes in dancing and playing the guitar, and educational workshops are also held. Mass events of the CSA include: Halloween and the GTO (Ready for Labor and Defense) competitions.

Events held by the CSA favor to integration of international students into the Russian cultural and language environment.

## CENTER OF INTERNATIONAL STUDENTS TRAINING



In the current year, the Department of Russian as a Foreign Language of the Institute of Linguistics and International Communication taught 216 international attendees within pre-university training and Russian language courses for enrollment to SUSU.

The Center of International Student Training performs teaching of Russian language for foreign citizens, and provides pre-university training on general education disciplines in accordance with chosen specialization.

During the entire year, the Department provided education on Bachelor's degree programs to international students from Algeria, Afghanistan, Bangladesh, Venezuela, Vietnam, Ghana, Egypt, India, Jordan, Iraq, Cameroon, China, Columbia, Congo (DRC), Korea, Morocco, Nepal, Nigeria, Ruanda, Sudan, Turkey, Sri Lanka,

and Equatorial Guinea in the following areas of study:

- Natural Sciences;
- Engineering and Technological Studies;
- Humanities;
- Economic Studies;
- Medical and Biological Studies.

Also, 28 Master's degree students from China, Iraq, and Turkey completed their education at SUSU; half of them defended their graduation qualification works and obtained diplomas of SUSU graduates.



## MEETINGS AND ROUNDTABLE DISCUSSIONS WITH INTERNATIONAL PARTNERS



In 2017, more than 30 meetings and roundtable discussions on the issues of science, education, authority, and business with representatives of 20 countries including USA, Canada, Great Britain, Ireland, China, Korea, Germany, France, Italy, Sweden, Netherlands, Cyprus, Romania, Mexico, Cuba, Israel, Iraq, Tajikistan, Uzbekistan and Kazakhstan were held at South Ural State University.

### Science

The university was visited by internationally-known scientists:

- Professor of Oxford University, Manus Patrick Henry (Ireland);
- Professor of the School of Media from the Windesheim University of Applied Science, Nico Drok (Netherlands);
- PhD, Master of Psychology, practicing philosopher of Johnson State College, Lahav Ran (USA);
- Associate Professor of the Department of History and Political Science, Associate

Director of EURUS Institute at the Carleton University, Sahadeo Jeffery Frank (Canada);

- Professor of Leiden University, Edo Ronald de Kloet (Netherlands);
- Professor of the University of Cyprus, Koutentis Panayiotis (Republic of Cyprus);
- Professor of the University of Melbourne, Ashokkumar Muthupandian (Australia);
- Professor of KIAS University, Kim Jaewan (Republic of Korea), and others.

Newest technologies and inventions of universities, prospects of work over joint research projects, and participation of students in international scientific forums were discussed with the international colleagues.

### Education

Discussion of topical issues of education was held during meetings and roundtable discussions featuring:

- Advisor to the Institute of Personnel Management on health and psychology issues, Sigman Aric (USA);
- Rector of Namangan State University, Umarov Abdulsalam Vakhitovich (Uzbekistan);
- Rector of Energy Institute of Tajikistan, Nazarzoda Khayrullo (Tajikistan);
- Cofounder and Science Director of Mirnova Academy, Dudziak Martin Joseph (USA);
- Rector of the University of Guantanamo, Alberto Turro (Cuba);
- Rector of the University of Zanjan, Najafian Mohsen (Islamic Republic of Iran);
- Vice-President for Student Affairs and International Cooperation from Nazarbayev University, Dairova Kadisha (Kazakhstan), and others.

Within these meetings, issues on international cooperation prospects, elaboration of double degree programs, exchange of Master's degree students and postgraduates for conducting joint research were discussed.

### Authorities

In 2017, SUSU welcomed representatives of authorities from various countries of the world:

- Administrative and Financial Officer of the Cultural Bureau, Authorized Representative of Ambassador for Iraqi students affairs in the Russian Federation, Alaa Ammar Talib Al-Hamdave (Iraq);
- Ambassador Extraordinary and Plenipotentiary of the Republic of Iraq in the Russian Federation, Haidar Mansour Hadi Avis (Iraq);
- UK Deputy Consul General in the city of Yekaterinburg, Osborne Matthew James (Great Britain);
- Director of the Studentenwerk Student Organization (Freiberg), Schmalz Torsten Thomas (Germany);
- Director of the International Department from the College of Humanities and Communications, Sun Zhiwei (PRC);

- Director of the Russian-Iberoamerican International Center of RSSU, Cervantes Berenice Nájera (Mexico);
- Vice-Governor of Heilongjiang Province, Hu Yafeng (PRC);
- Deputy Secretary General of Provincial government, Li Mingchun (PRC);
- Head of the Committee of Industry and Information Support, Ne Yunling (PRC);
- Head of Science and Technology Department, Yang Tingshuang (PRC);
- Consul for Education, Zhao Yan (PRC).

Within the meetings, the university authorities and power representatives discussed issues concerning SUSU's policy towards the stay of international students at the territory of the Russian Federation, creation and implementation of programs for Russian language learning, assistance for international students provided by consulates, and the possibility of work over joint projects and prospects of bilateral cooperation.

### Business

A special spot in the general schedule of meetings and roundtable discussions belonged to representatives of business and enterprise management. SUSU was visited by:

- Vice-Consul Monser Edward Lomax (USA);
- Representative of the Nord-Lock International AB Company, Kalmykova Lena (Sweden);
- Director General of SMS Metallurgical Service LLC, Jeffrey David Rogers (Great Britain);
- Director General of SMS Metallurgical Service OOO, Regional Vice-President (Russian and CIS countries) of SMS group, Vitaliy Gontarev;
- Head of the Department for Development of Components and Techniques for Steel Casting, Doctor Liftuht Dirk Clemens (Germany);
- Head of SMS Digital Sales Department, Doctor Mellentin Esper (Germany), and others.

The main topics of meetings and roundtable discussions with business representatives were innovative technologies, discussion of the university's activity results, getting recommendations of the International Scientific Council members on further development of the university.

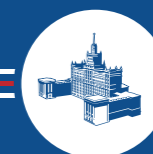


**> 100**  
universities of Russia  
and Kazakhstan

**> 300**  
participants



## Forum of Rectors of Russian and Kazakh Universities



«Such meetings are very important; the scale of our Forum and the fact that authorities of more than 100 universities participated in it prove the high level of interest to the development of international dialogue and the search of new cooperation forms. I remind you once again that human capital is, first of all, the totality of knowledge, abilities and skills used for satisfying multiple needs of a human and society as a whole. At that, the core of human capital was, is and will be an educated, creative and initiative person who possesses a high level of professionalism».

Olga Vasilyeva, Minister of Education  
and Science of the Russian Federation



## FORUM OF RECTORS OF RUSSIAN AND KAZAKH UNIVERSITIES WITHIN THE 14<sup>TH</sup> RUSSIA-KAZAKHSTAN INTERREGIONAL COOPERATION FORUM FEATURING THE HEADS OF STATES



«We appreciate the vote of confidence given to SUSU when choosing the future venue for holding the Forum. I am sure that the Forum will allow not only establishing new contacts between the two countries' universities, but also help showing the international community the possibilities of our university». – **Alexander Shestakov**, Rector of SUSU, Chairman of the Council of Rectors of the Ural Federal District

Within the 14<sup>th</sup> Russia-Kazakhstan Interregional Cooperation Forum featuring Presidents of the Russian Federation and the Republic of Kazakhstan, the Forum of Rectors of the two countries' universities was held at SUSU. By its results, a joint resolution on cooperation in the sphere of science and education, students' training and education, joint usage of laboratories and technical equipment of universities, and implementation of joint projects was accepted. Leaders of Russian and Kazakh universities signed more than 40 memorandums on collaboration.

SUSU signed 20 agreements on cooperation with the following universities of Kazakhstan: L.N. Gumilyov Eurasian National University (Astana), Al-Farabi Kazakh National University (Almaty), Kazakh National Technical University named after K.I. Satpayev (Almaty), Atyrau Oil and Gas University (Atyrau), Karaganda State Technical University (Karaganda), Kostanay State University (Kostanay), and others.

SUSU implements academic mobility programs within the frameworks of bilateral agreements with L.N. Gumilyov Eurasian National

University in the specialty of Journalism. SUSU implements a master's double degree program with Al-Farabi Kazakh National University in the specialty of Ecology and Environmental Management. The main topic of the Forum was educational initiatives, development of human capital, implementation of modern digital educational technologies into the education process, and cooperation in research work organizing.

The Forum of Rectors of Russian and Kazakh Universities was widely covered by federal and regional mass media: TASS.ru, Fedpress.ru, Nakanune.ru, 1obl, Znak.com, Minobr74.ru, etc. Within two days, more than 200 positive materials about the Forum were published and received more than a million reviews.

The powerful intellectual Forum of Rectors of leading universities of Russia and Kazakhstan became an example for other communities in the sphere of cooperation development between the countries connected by common history, language and culture.

### Feedback of the Forum Participants

**Olga Vasilyeva, Minister of Education and Science of the Russian Federation:** «The scale of our Forum and the fact that authorities of more than 100 universities participated in it prove the high level of interest to the development of international dialogue and the search of new cooperation forms. Human capital is, first of all, the totality of knowledge, abilities and skills used for satisfying multiple needs of a human and society as a whole. At that, the core of human capital was, is and will be an educated, creative and initiative person who possesses a high level of professionalism».

**Boris Dubrovskiy, Governor of the Chelyabinsk Region:** «There are 'horizontal' connections established between universities of the

Chelyabinsk region and the Republic of Kazakhstan. In this area, the activity of SUSU is of a special importance. We and our Kazakhstan colleagues have mainly similar conditions in economy, in the sphere of science and culture, and in healthcare. We clearly understand the importance of mutual complementary competencies in science and education sphere, and we aspire to constant exchange of experience and educational technologies».

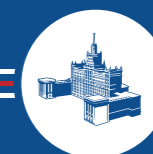
**Victor Sadovnichy, President of the Russian Union of Rectors, Rector of the Lomonosov MSU:** «This Forum became special for me: here we had the atmosphere of cooperation, the desire to exchange experience and achieve certain agreements. This Forum is distinctive by its powerful, intellectual, sincere composition of top figures in the sphere of education of Russia and Kazakhstan. Its success exceeded all my expectations. Prospects of cooperation between Russia and Kazakhstan are very strong».

**Erlan Sydykov, Chairman of the Council of University Rectors of the Republic of Kazakhstan, Rector of the L.N. Gumilyov Eurasian National University:** «We are pleased that today SUSU is discussing the issue of human capital development which is impossible without science. Russia and Kazakhstan are two friendly countries, and it will help us developing international and political relations. Education, knowledge and science should have no boundaries».

**Viktor Grishin, Rector of Plekhanov Russian University of Economics:** «Cooperation of the two countries has good prospects of development. We have quite tight connections in the Eurasian economic space. In my report I note that fact that we have many joint enterprises, a serious joint production. Students in both Russia and Kazakhstan should study on approximately similar programs so that they could work in any of our countries».



**Training of Leaders  
of the 21st Century:  
New Models and Technologies  
of Education**



Nowadays, SUSU is the only Russian member of the National Collegiate Honors Council (NCHC) American Association of Elite Education.

**> 90**

students are studying on elite training programs

**> 3 500**

distance learners



## NEW TECHNOLOGIES IN EDUCATION



Within implementation of Project 5-100 events, new technologies in education become especially relevant; their primary goal is to form a community of professionals which would be constantly expanding in the future.

For South Ural State University, creation of educational digital environment is one of prioritized areas of development. Within the event on Motivation of Academic Staff to Using New Education Technologies, a website New Education Technologies in Education nte.susu.ru has been created, where experience of SUSU teaching staff using new technologies of education in professional activity is presented.

The project's goal is not just popularization of new education tools and their demonstration, but

also formation of a community of professionals which would be expanding in the future.

New educational technologies intend informational and pedagogical types of training.

- Informational types of training are systems of distant training, platforms for organizing public open online courses or MOOC, various shells and mediums for creation of electronic educational courses, etc.

- Pedagogical types of training are the so-called E-Learning 2.0, or customization of education,

and B-learning, or blended learning, including the use of MOOC; C-Learning, or combined learning.

During 2017, 9 master classes were held with the use of informational and pedagogical technologies; 7 tools for elaboration of educational content were proposed; 5 specialized projects were organized, including 3 contests for teachers; Festival of electronic learning, an innovative project Electronic SUSU in 5 Minutes (a series of short video lessons about how to use the portal), was launched.

In order to enhance qualification of teaching staff, the following 8 new programs of additional education were opened: Active Methods in Electronic Learning; Achievement Tests: Approbation, Statistics and Correction; Achievement Tests: Adaptive Testing; MOOC: Modern Teaching Formats; Coordinator of Education Process in Moodle System of Distance Education; Development of Customized Courses (retraining program).

### Children's Internet University of SUSU

A project Children's Internet University of SUSU, which allows school students get additional education in a new format anywhere and anytime, started at SUSU. Records of lectures are presented at the official website of the Children's Internet University and on the YouTube channel; there you can also ask lecturers questions. Children at the age from 7 to 18 can become students of the CIU.

### SUSU E-Learning 2.0: Customization of Online Learning on the Basis of Intellectual Analysis of Education Patterns

Within the project, a technology for customization of electronic courses, targeted at

improvement of electronic education quality due to orientation on educational and professional needs of students and potential employers when developing courses, has been elaborating. Such technology at the moment has no analogs in Russian universities. In September, testing of first 5 courses for students will begin.

### LMS System

A system of coordinators of electronic education in higher schools and institutes of SUSU has been elaborating in order to provide on-site operative assistance to teachers. Templates of courses for reducing the load of teachers on courses development and their uploading to the Electronic SUSU portal have been elaborated.

### Smart Education Strategic Academic Unit (SAU)

According to the university's concept to be student-oriented, Smart Education SAU, first of all, is targeted at complying with students' interests and developing modern technologies of education. A complex of tools targeted at self-development and personal socialization is formed around a student. The SAU systems aspire to form features which the most valuable among employers: the ability for self-education and skills for working in a team. Together with Smart Industry SAU, the Smart Education SAU significantly contributes to attracting talented university applicants by forming a competitive educational offer for university applicants of Russia and the world, and providing a comfortable and adjustable format of education process.

New technologies in education allow making the system of education more comfortable and effective for efficient mastering of material and control of one's knowledge, which naturally favors for development of a modern leader.





## ELITE TRAINING PROGRAMS



Elite education is a unique opportunity for maximum mastering of theoretical and applied knowledge, and developing of leader's qualities. Students of elite training system, due to high level of their knowledge, climb to a principally new level of competitiveness and are completely in-demand on labor markets of the region, country and the world.

System of elite education at South Ural State University includes special training of students and gives powerful potential to a university graduate for his or her career growth. The project of elite education was launched in August of 2017. Nowadays, SUSU is the only-in-Russia member of the National Collegiate Honors Council (NCHC) American Association of Elite Education.

### Establishment of the Center of Elite Education (CEE)

First elite academic groups were created at the Institute of Architecture and Construction, at School of Economics and Management and at the Institute of Law. Within the education programs, for which apply the majority of university applicants with high level of school training, separate academic groups of elite training are formed. Programs of elite education,

implemented in such groups, consist of the general program and elective disciplines.

Project activity, targeted at future employers, gets organized. At the following stage, multidisciplinary elite groups started getting created at the Polytechnic Institute and the SUSU School of Electrical Engineering and Computer Science. Starting from February of 2017, the university's School of Medical Biology, Institute of Linguistics and International Communication, and Institute of Social Sciences and Humanities joined the list.

Multidisciplinary groups of elite education are formed out of well-trained students of allied educational programs, where the number of university applicants with high level of school training is not enough for forming separate groups. Students of such groups are studying on elite training programs simultaneously with studying on their major educational programs.

Multidisciplinary elite groups are unique for Russia. They give the possibility to educate graduates, competitive on the Russian and international labor markets, on all range of specialties.

In February of 2017, the SUSU Center of Elite Education was established in order to implement general policy and concept of elite education in all subdivisions of the university.

#### Functions of the Center of Elite Training include:

- Providing necessary procedural and informational support to subdivisions in the sphere of elite education;
- Participating in the process of elaboration of programs of additional academic disciplines together with heads of corresponding subdivisions;
- Holding regular meetings with subdivisions responsible for elite education;
- Conducting educative work with students of elite groups;

- Coverage of the work of elite groups in mass media, on the university's website and in social networks.

Organization of classes in multidisciplinary elite groups includes:

- Providing assistance to subdivisions in organization of student admissions to elite groups;
- Selection of teachers for elite training groups;
- Elaborating the schedule of classes compatible with the main study;
- Controlling the teaching process in elite groups and organizing consultations on studied courses.

By the present time, there are more than 200 students from 8 institutes studying in the system of elite education in 9 academic elite groups and 6 multidisciplinary elite groups. In February of 2018, 8 more multidisciplinary elite groups will join the list.

Students of elite groups are studying more than 20 additional special disciplines lectured by more than 30 professors and specialists of the university.

#### SUSU's system of elite education gives students a higher level of knowledge:

- During initial years of study, students of elite education groups obtain advanced fundamental training;
- During senior years of study, students are mastering various special disciplines, adjusted for their future occupation;
- During the entire period of study, classes of foreign language in professional occupation are held;
- Education is of elective nature: a student can choose himself the totality of courses that are interesting and useful to him or her;

Students who have obtained elite education at SUSU are given certificates on completing courses of elite education at South Ural State University, and all the mastered additional subjects get included to diploma transcript.



### Forms of the CEE's Cooperation with Employers

External connections with employers should be noted in the system of SUSU's elite education. This sphere is mentored by Directors of SUSU Schools and Institutes under supervision of Vice-Rector for Academic Affairs, A.A. Radionov, and the Center of Elite Education.

For each potential-for-cooperation enterprise, the demand in cadres gets specified, and a list of competencies, which graduates should possess in order to be in-demand and successfully build a career, gets determined. For that, SUSU signs agreements on internships of students at enterprises.

Having obtained the list of competencies necessary for a certain enterprise, leading representatives of SUSU, together with the enterprise and the CEE, elaborate programs of major disciplines necessary for mastering a profession. The programs get approved by the Council of an Institute and the profile Vice-Rector, and get transferred for execution to the Center of Elite Training where lectors get selected and comfortable schedule gets elaborated.

In cases when project activity is required, leadership of an Institute chooses a leading specialist based on topic of a given project and appoints him as a supervisor. He coordinates requirements specifications, financing, grants for

paying for students' work, and other details with the enterprise.

Then the project supervisor together with Deputy Director of the Institute providing elite education and the Center of Elite Education forms a project group out of the most appropriate students of elite training groups, and starts working. Students of the CEE regularly visit the enterprise and meet with its executives.

At present, negotiations on cooperation are conducted with the following leading enterprises of Chelyabinsk and the Chelyabinsk Region: Metran, State Rocket Centre, Chelyabinsk Pipe Rolling Plant, Elektromashina, Ural DSTS, Chelyabinvestbank, etc.

### Perspective plan of cooperation:

- Excursions of the CEE students to the most prospective enterprises (as chosen by a student);
- Internship of the CEE students at the most prospective enterprises (as chosen by a student);
- Forming a list of competencies of elite graduates by an Enterprise;
- Forming by an Enterprise a relevant-for-it list of project topics and inventions which will be conducted by the CEE students under supervision of the university's specialists;
- Organizing grant support by an Enterprise for execution of ordered projects.



## EXTRACURRICULAR ACTIVITY



The system of extracurricular and educational work with students is actively forming and developing at the university, which is an integral part of the process of qualitative training of specialists, creation of corresponding conditions

for active lifestyle of students, their self-determination and self-fulfillment, and for maximum satisfaction of needs in intellectual, spiritual, cultural, creative and moral development.

The system of extracurricular and educational work at South Ural State University is a totality of events on civic and national education and spiritual and moral development, research and vocational work, mass cultural and creative activity of students, sport and recreational work, promotion of physical culture and healthy lifestyle, organization of psychological-and-counseling and preventive work.



### EVENTS OF SUSU STUDENT AND LABOR SQUADS

- Student squads of SUSU took part in Autumn stage of All-Russian Kosmodrom Vostochny construction and Winter stage of All-Russian Mirny Atom student construction.
- The Orange pedagogical squad of SUSU students took the 3rd place in the contest for Best Squad of Russia, and the leader of the Wheel of Fortune team of passenger carriage attendants

became the winner among squad leaders of the Chelyabinsk region.

- The Poisk scouting squad of SUSU took part in an expedition within the AI-Russian Memory Watch-2017 campaign. By the results of the expedition in the Kirovsky district of Leningradskaya oblast, representatives of scouting forces of the Chelyabinsk region found remains of 44 soldiers and 2 medallions. Among them, 16 soldiers and 1 medallion were found by members of the Poisk SUSU student scouting squad.
- Headquarters of SUSU student labor squads became the best headquarters of student labor squads of the Chelyabinsk region.
- 570 people got employed in 4 spheres: teams of marine lifeguards, teams of passenger carriage attendants, construction teams, and pedagogical teams.



### A SERIES OF CIVIC- AND-NATIONAL AND SPIRITUAL- AND-MORAL EVENTS

Development and education are two closely related processes. The system of civic education of SUSU students intends forming and development of socially important values, and development of a person who possesses qualities of a patriotic citizen.

#### Events dedicated to Victory Day:

- The Victory Waltz project;
- Ceremonious parades and formations in front of the Eternal Flame;
- Parade near the Eternal Flame and laying of flowers and garlands;
- Ceremonious meeting and a celebratory concert at the university's Activity Hall;
- Organizing and holding of a photo exhibition The History of the Great Victory in cooperation with Rodina ChROO UBD.

#### Events dedicated to the Unknown Warrior Day:

- Opening of an exhibition of showpieces found during scouting works;
- Meeting of the university students with veterans of the Great Patriotic War;
- Meeting of the university students with veterans of the Great Patriotic War who took part in the fighting for Moscow;
- Organizing and holding of a photo exhibition The History of the Fatherland in Pictures.

Afghanistan in Our Hearts in cooperation with Rodina ChROO UBD;

- Holding a celebratory event dedicated to the Day of Russian Heroes;
- Bullet-shooting competition among staff of the university.тета.

**Within these events, the following activities were also organized:**

- A visit by 1st year students of the university's museum in the frameworks of the excursion program entitled The Year of Birth-1943;
- Conducting a roundtable discussion on experience exchange in organizing the work of civic-and-national education of students Civic-and-national Education of Students. Practical Aspect;
- Conducting the 6th sport-and-military competitions dedicated to the memory of Hero of Russia S.A. Kislov in cooperation with Rodina ChROO UBD;
- Opening of photo exhibition Antiterror in cooperation with Rodina ChROO UBD;
- Opening of book exhibition My Russia without Terrorism;
- Participation in celebratory events on the occasion of the City Day;
- Organizing celebratory events on the occasion of the University Day;
- Participation in the All-Russian class of Ecology and Power Saving within the All-Russian festival of power saving #TogetherBrighter#.





### MASS CULTURAL EVENTS

Within student philharmonic hall, concerts were held by:

Malahit State Russian Folk Orchestra, the Ural State Dance Team, and Symphonic orchestra (Chelyabinsk).

#### SUSU performance groups:

**Music:** Jazz Orchestra Conducted by Georgiy Anokhin, Russian Folk Orchestra, Body and Soul Vocal and Instrumental Band, Pianist Studio.

**Vocals:** Primavera Choir, Choir of the Automobile

and Tractor Faculty, Singer-Songwriter Club, Pop Music Vocals Studio. **Choreography:** Ballroom Dancing Group, L-Classic Classical Dance Studio, The Deep Vision Modern Dance Group, Crazy Family SUSU Dance Crew, The Paradox Dance Group, Urban Dance Studio. **Theatre:** The Mannequin Theatre Studio, Folk-ton Music Theatre, Valkiria Fashion Show Theatre.

Within the Art Center, SUSU students organized, held and took part in more than 270 mass culture, theatrical entertainment and concert events of the university.

Performance groups of our university successfully performed at the city and regional rounds of the Student Spring festival.

The Deep Vision Modern Dance Group became prize winner at the 25th festival of Russian Student Spring (Tula) and took part in gala concert held in Kremlin (Moscow).

By the Decree of the Ministry of Culture of the Chelyabinsk region, the male Choir of the Automobile and Tractor Faculty was officially awarded with the «People's» title.



### SPORT AND RECREATIONAL ACTIVITY

A series of sport and recreational clubs and projects are functioning at SUSU: Mass Sports Committee, the Ural Hawk Sports Club, Tourist Club, Paradelta Hang Gliding Club, Orienteering Club, Steering Wheel Virtuoso Project, Katalitsa Project, SUSU Club of Physical Culture and Sport.

In 2017, SUSU students as part of Russia National Team participated in the World Cup of

College Hockey and became the world champions.

Recreational complex of the university includes Berezka Children's Recreational Camp, Olymp Sports and Recreation Camp, and Nauka recreational compound for academic staff.

For SUSU students and staff, the SUSU House of Health medical center has been established; it includes: outpatient care department, rehabilitation unit for people with spinal diseases, manual therapy room, massage room, therapeutic exercise room, ozone therapy room, urology department, ultrasonic diagnostics department, and physiotherapy room. The SUSU House of Health medical center offers a wide range of laboratory examinations.

The House of Health medical center every day renders services to more than 100 patients, among whom are employees and students of SUSU, and residents and guests of the city.



### PARTICIPATION IN CONTEST PROJECTS

SUSU students took part in more than 80 regional, all-Russian and international contests, festivals, forums, workshops and trainings. Among them are:

- All-Russia Forum Informational Society – 2017: Smart Region. Security and Innovations;
- District stage of engineering competencies contest of the Praise the Man of Labor! project in the competency of the best construction engineer;



### STUDENTS' CREATIVE ACTIVITY

By the results of the KiViN-2017 28th International Festival (Sochi), SUSU Girls' Team made it to the KVN Premier-League.

Employees of South Ural State University got included into the membership of Regional Preparatory Committee of the World Festival of Youth and Students held in Sochi from 14th through 22nd of October 2017.

- All-Russian club tournament of Russian Student Sport Clubs Association (more than 220 participants from 28 teams from all around the country);
- TopGames 2017 International tournament of parliament debates, with more than 100 participants from 15 cities of Russia and the CIS countries;
- The Kaktus 3<sup>rd</sup> Open Regional Festival of street choreography;
- All-Russian project Day of Trainings in Chelyabinsk – 2017;
- VuzEcoFest-2017 all-Russian project;
- Miss and Mister of Russian Studentship all-Russian contest of intellect, creativity and beauty;
- Organizing and holding such contests as SUSU's Best Representatives – 2017 and Mister SUSU;
- The World Festival of Youth and Students – 2017 (Sochi).

Team of delegates representing the Chelyabinsk region included 100 people. Among them, 30 members were SUSU student and staff.

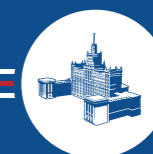
More than 250 SUSU volunteer students took part in organizing and holding the Russia-Kazakhstan Interregional Cooperation Forum and the Forum of Rectors of Russian and Kazakh Universities.

SUSU took part in organization and implementation of the Total Dictation – 2017 project. The university was placed the 1st in Russia by the number of international participants of the total dictation.

47 students from more than 30 regions of the country took part in the Miss and Mister of Russian Studentship all-Russian contest. By the results of the competition, SUSU student Vladislav Novikov won the title of Mister Sport.

More than 500 contestants took part in the contest SUSU's Best Representatives – 2017 which was held in 12 nominations.

## Breakthrough Fields of Scientific Research



«Development of science and modern technologies in Russia shall be on a par with the National Security Strategy».

Vladimir Putin,  
President of the Russian  
Federation

**>900 000** thousand  
rubles

Research & Development  
activities income

**917**

research papers indexed  
at WoS and Scopus  
(without duplicating)



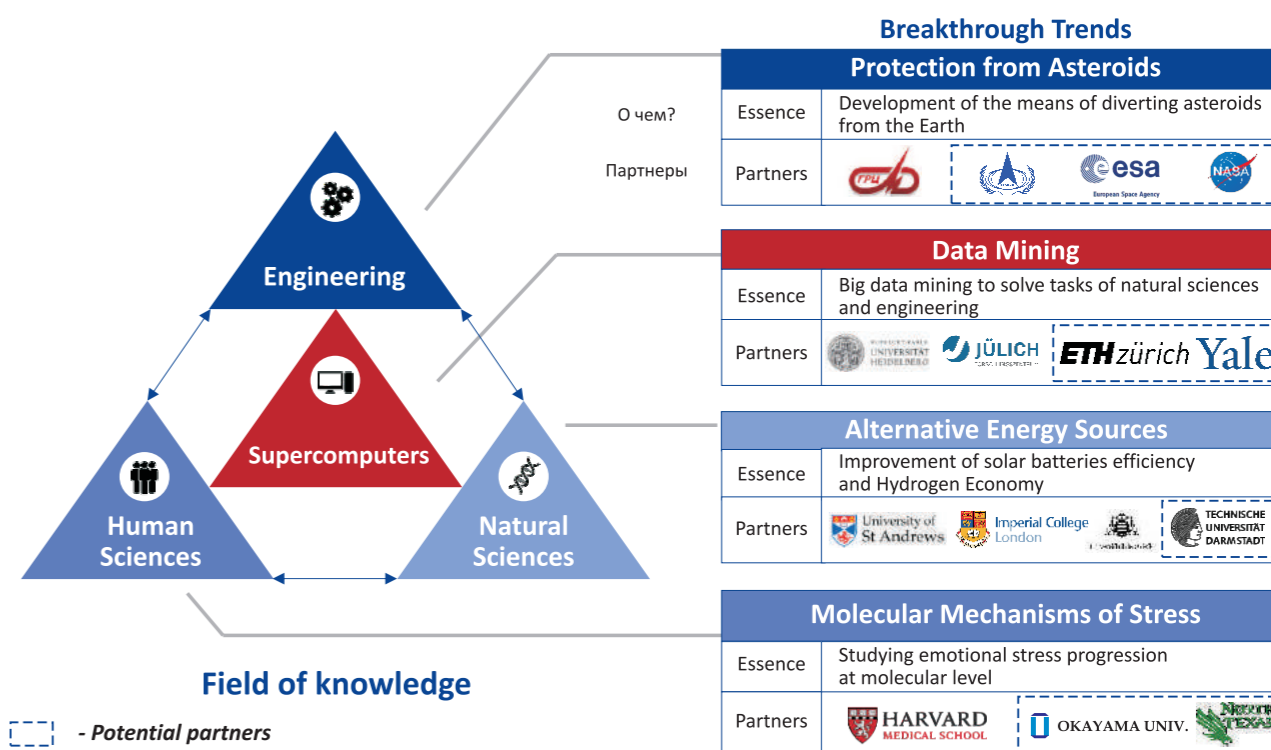
## SCIENTIFIC RESEARCH TRENDS



«My visit to SUSU is an indicator of strengthening of relations between University of Oxford and SUSU. I'm always very happy to come back to your university to appreciate the results achieved in development».  
– **Manus Henry**, Professor at University of Oxford (Great Britain)

Today the SUSU research studies focus on 4 main fields of knowledge and breakthrough research trends at which all the efforts are directed: engineering, supercomputing, natural sciences and human sciences. In the field of engineering the most important breakthrough trend is space engineering, and in particular, development of Earth protection from asteroids. Its relevance for Chelyabinsk and SUSU was confirmed by a meteor strike in 2013. The

university is engineering various spacecrafts which could interfere with the trajectories of potentially hazardous celestial bodies to prevent their collision with the Earth, and also the means of launching these apparatus to space. The project by the SUSU scientists called «CleanSpace» is based on unique university experience in rocket engineering and is being fulfilled jointly with the Roscosmos Corporation enterprises and the Russian Academy of Sciences.



The research of paramount importance in the **field of natural sciences** relates to material science. The university is working on creating alternative energy sources, including materials for solar batteries (photosensitizers) allowing to improve their efficiency and reduce specific expenses on power generation. By the present moment the research team has achieved results of scientific and practical value. Besides photosensitizers, additive technologies of composite materials are being studied, as well as sorbing agents, metal-oxide single crystals, and other materials being of high demand in the market.

In the **field of supercomputing** main attention is paid to data mining, development of Industry 4.0 technologies for the enterprises of the international hi-tech industry, what includes studying and developing methods of diagnostics and self-diagnostics of measurement instruments and actuating mechanisms, studying new methods, ways and technologies of

measuring physical values in industry, and other. As an example of the industry «digitalization» we may mention an original methodology of process control as per criteria of minimizing energy and raw materials consumption, which was developed by the SUSU scientists for OJSC Magnitogorsk Iron & Steel Works. In this field SUSU closely collaborates with the world's leading manufacturer of sensor systems for Industry 4.0 enterprises, Emerson Corporation.

The primary breakthrough trend in the **field of human sciences** is the research on molecular mechanisms of chronic emotional stress progression, which may be of interest to the society in the context of the widely spreading chronic stress in the modern world and the absence of means of fighting it. Stress studying is one of the fields of the university's interdisciplinary research. Psychologists, biologists, and specialists in instrument engineering and measurements are jointly working on this issue.



## INTERNATIONAL RESEARCH LABORATORIES



«South Ural State University has set itself a difficult task of entering the Top 100 universities of the world. Though this university has all the resources required to achieve this goal». – **Edward Monser**, President of Emerson Corporation, Head of the SUSU International Scientific Council

Under the guidance of the world's leading scientists 8 unique international research laboratories were created at SUSU, as well as scientific-and-educational clusters of new level are being formed. Those include:

■ **Laboratory for Multiscale Modeling of Polyfunctional Compounds**

Head of the Laboratory: Artem Masunov, Ph.D., University of Central Florida, USA.

■ **Laboratory for Molecular Electronics**

Head of the Laboratory: Wolfgang Haase,

Prof., Dr., Darmstadt University of Technology, Germany

■ **Laboratory for Migration Studies**

Head of the Laboratory: Jeff Sahadeo, Ph.D., Carleton University, Canada

Research interests: History and Archaeology

■ **Laboratory for Synthesis and Analysis of Food Ingredients**

Head of the Laboratory: Shirish H. Sonawane, Dr., National Institute of Technology Warangal, India

■ **Laboratory for Neurohepatology**

Head of the Laboratory: Julio Licinio, Prof., Flinders University, Australia

■ **Laboratory for Mechanics, Laser Processing, and Digital Technology**

Head of the Laboratory: Philippe Bertrand, PhD, National Engineering School of Saint-Étienne, France

■ **Laboratory for Self-Monitoring and Self-Validating Sensors and Systems**

Head of the Laboratory: Manus Henry, Dr., University of Oxford, UK

■ **Laboratory for Problem-Oriented Cloud Computing Environments**

Head of the Laboratory: Andrei Tchernykh, PhD, Prof., CICESE Research Center, Mexico

### Achievements of the International Research Laboratories

In 2017 the international research laboratories performed studies which resulted in publication of 22 papers and indexing them in Scopus and Web of Science (Q1, Q2), with 6 papers thereof in TOP 10% for SNIP.

**Publication Activity:**

■ «Microstructure and Physical Properties of Iron-Nickel Superalloy Produced by Selective Laser Melting» (A. Domashenkov, A. Plotnikova, I. Movchan, P. Bertrand, N. Pelson, B. Deplank, S. Sonier, K. Desrayo) in Additive Manufacturing Magazine, SNIP = 3.634 (TOP-1%).

■ «Sonochemical Synthesis of Persistent Acid in Reactor with Microstructured Continuous Flow» (P.D. Jole, B.A. Vanveis, V.S. Patil, Sh. Sonawane, I. Potroko) in Ultrasonics Sonochemistry, SNIP = 1.766 (TOP-10%)

■ «Constant Activation of LHPA (limbic-hypothalamus-pituitary-adrenal) in Bodies of People of German Origin in the Context of Parental Overprotection» (E. Ulman, J. Licinio, A. Bartel, K. Petrovsky, T. Stadler, K. Kirshbaum, S.R. Boshtein) in Scientific Reports Magazine, SNIP = 1.401 (TOP-10%).

**Up-to-date Research:**

■ reconstruction and technical re-equipment of procurement, mechanical-assembly and testing

production at PJSC «Proton-PM»;

■ development of new methods and technologies of manufacturing goods of electrotechnical and structure designation from carbon-graphite composite materials by means of high-speed dynamic formation, within the framework of fulfilling the government task by the Russian Federation;

■ studying the mechanisms of development of hypocorticosteroid state in case of posttraumatic stress disorders (PTSD) syndrome in order to elaborate new approaches to correcting behavioral disorders and visceral injuries; with support from the Russian Science Foundation.

**International Activity:**

In 2017 the staff of the international research laboratories took part in international conferences, actively worked in laboratories of the USA, India, Mexico, Great Britain, Germany; and performed joint research. Scientists M.P. Henry, A.N. Tchernykh, A.E. Masunov, J. Sahadeo, P. Bertrand, and S. Shirish delivered open lectures at SUSU. Manus Patrick Henry also took part in the 2nd International Science-to-Practice Conference on Measurement: Status and Prospects of Development held at SUSU.



## RESEARCH AND EDUCATION DIVISIONS



SUSU strategy in the field of research and innovations is oriented at three long-term goals: making international-level breakthroughs in priority fields of research, facilitating our country's sustainable development by implementing innovations, as well as developing entrepreneurship in high-technology sectors. Applied projects on digital technologies related to development of the «Industrial Internet of Things» will be the basis of developing the SUSU's scientific activity.

### Research and Education Centers

The university structure comprises over 10 research and education centers: Aerospace Technology, Geoinformation Systems, Nanotechnologies and others.

In 2017 research and education centers were involved in fulfillment of such big projects as:

- «Creation of High-technology Lost Foam Casting Using Exothermal Processes and Nanostructured Materials» being guided by and within the framework of the Government Resolution No.218;

- «Engineering of a Russian-made Mass Coriolis Flowmeter for Oil-and-Gas Industry with a Function of Measuring the Flow Rate of Multi-phase Flows» within the framework of Federal Targeted Programs on Research and Development for 2014–2020;

- «Engineering of Structures and Technology of the Full Cycle of Manufacturing Metal-and-Concrete Base Elements for Metal-cutting Machine Tools» within the framework of Federal Targeted Programs on Research and Development for 2014–2020.

### Experimental Mechanical Engineering Public Research Institute

The Institute comprises:

- Laboratory of Physical Modeling of Thermomechanical Processes;
- Laboratory of Experimental Mechanics;
- Laboratory of Composite Materials;
- Laboratory of Mechanical Engineering;
- Laboratory of Electronic Control Systems Covers Design;
- Resource Center of Special Metallurgy.

In 2017 Test Mechanical Engineering Public Research Institute performed works for such customers as PJSC ChMK (Mechel), ChTZ-Uraltrac LLC, OJSC RosNITI. Works were performed on manufacturing of product samples, in particular of a test sample of steel piston head  $\Theta$ -42697, and works on studying deformation capacity of samples made of various alloys, and other.

### Educational Equipment and Technology Scientific and Production Institute

Development of the SUSU Scientific and Education Industry Production Complex allowed to increase the production output by 12% as compared to 2011/2012. Meanwhile, in the federal universities, research-and-development institutions and universities being members of Project 5-100 this increase amounted to 196%, and in foreign countries – 317%.

The number of emulator simulators increased from 118 to 410.

A new catalogue «Emulator Simulators» was published.

The nomenclature of the offered products increased from 4,100 to 6,000 items.

A specialized catalogue «Educational Equipment – Defense Industry» was published.

In order to form an interactive educational infrastructure for gifted children a catalogue «SUSU Quantoriums. Technoparks for Children» was published.

In 2018 it is planned to supply SUSU produce to Chelyabinsk and Magnitogorsk Quantoriums for the amount of 43 mln. roubles.

Supplies of typical training laboratories on a turnkey basis were expanded. The number of the offered packages for such laboratories increased from 118 to 143.

The «Accessible Education Environment» program was formed, and work was started on forming the system of distance online learning in order to create an interactive high-technology environment for people with disabilities.

The markets of Azerbaijan, Georgia and Iran were successfully approached. Among the promising markets are Iraq and Syria.

### Laboratories

The university structure also comprises the following laboratories: Supercomputer Simulation Laboratory, Laboratory for Siemens Digital Engineering Technologies, Laboratory for Numerical Program Control and Digital Production, and others.

Over 200 contracts on research and development services have been fulfilled by all the university research divisions. Many works are performed involving the Supercomputer Simulation Laboratory. The scope of the assets attracted for research and development activities using the supercomputer amounted to over 85 mln. roubles.

#### Big-scale Projects:

- «Borderzone of Cultural Worlds (South Ural from Ancient Times to Modern Period)» under the government task by the Russian Federation;
- «New Nanostructured Catalysts for Energy-saving Technologies» under the government task by the Russian Federation;
- «Studying the State of Serotonin-ergic Neurons in Case of Posttraumatic Stress Disorders» under the government task by the Russian Federation;
- «Method of Early Diagnostics of Disorders in Walking and Running Patterns by Using Thermographical and Biomechanical Parameters of Human Locomotion» under the government task by the Russian Federation;
- «Molecular-dynamic Study of the Effects of Stress on Martensitic Transformation in Fe-C Solid Solutions» under support by the Russian Foundation for Basic Research.





### SCIENTIFIC JOURNALS OF THE UNIVERSITY



In 2017 the university released 24 periodic publications including 20 SUSU scientific journals listed among peer-reviewed journals and publications of the Higher Attestation Commission.

Presently 17 series of the Bulletin of South Ural State University are being published. Two series of the Bulletin of South Ural State University are indexed at Scopus database: «Mathematical Modeling and Programming» and «Supercomputing Frontiers and Innovations». And two series of the Bulletin of South Ural State University are indexed at Web of Science database (Emerging Sources Citation Index): «Mathematical Modeling and

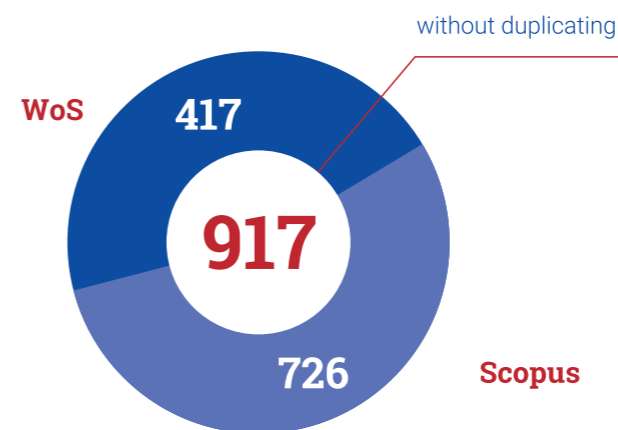
Programming», as well as «Humans. Sports. Medicine».

In 2017 SUSU became one of the co-founders of the New Philological Bulletin scientific journal which is indexed at Web of Science database, and also at ERIHPLUS, a prestigious abstract database on humanities and social sciences.

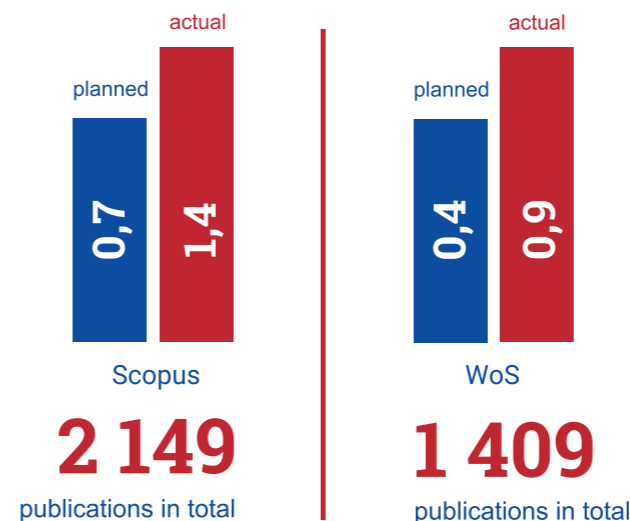
SUSU's Journal of Computational and Engineering Mathematics is now indexed at EBSCO international database.

### SCIENTIFIC PUBLISHING ACTIVITIES AND PUBLICATIONS

#### PUBLICATIONS OF ACADEMIC STAFF

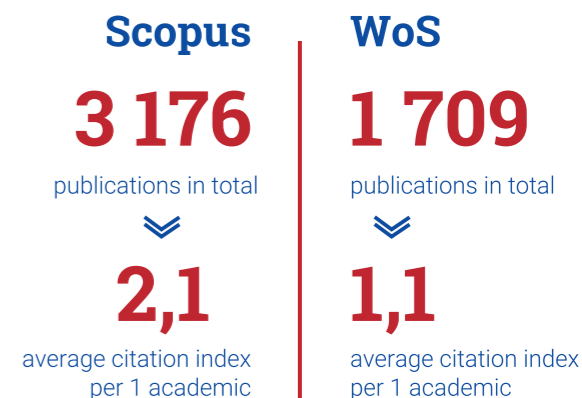


#### NUMBER OF PUBLICATIONS FOR ONE ACADEMIC (over full 5 years)

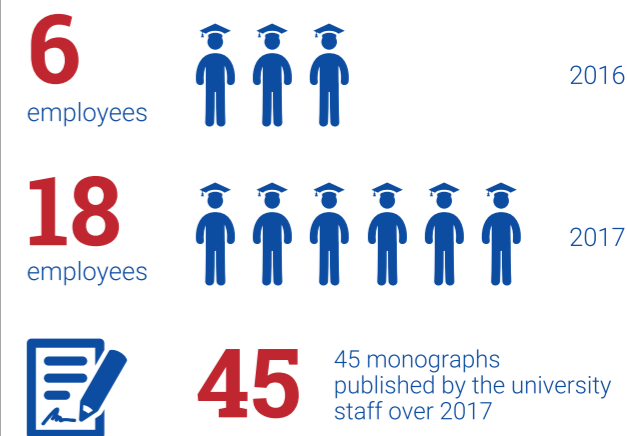


Publications by the university scientists feature in the most cited foreign journals «Nature», «Cell», «Journal of Alloys and Compounds», «Journal of Plasticity», «Ore Geology Reviews», etc.

#### SCIENTIFIC PAPERS' CITATION INDEX (total)



#### HIRSCH INDEX OF ACADEMICS Employees with Hirsch index >10



Over 2017 the university employees published 45 monographs. Among those the following ones are worth mentioning: a multi-author monograph «Linguistic Persona in Modern Communicative Field» written with participation of postgraduate A.R. Wegner (University of North Texas, USA) and the Head of the Department of Russian as a Foreign Language E.V. Kharchenko, as well as the most cited monograph «Civil Law Principles and Their Fulfillment» edited by associate professors of the Department of Civil Law and Civil Legal Procedures T.P. Podshivalova and G.S. Demidova.



## SCIENTIFIC EVENTS



By participating in Russian and international exhibition events South Ural State University on practice strengthens relations with partner universities, expands collaboration geography, develops joint education programs and scientific research; and also by attracting international students and specialists it facilitates internationalization of higher education.

### January

An internationally renowned distinguished scholar Manus Patrick Henry visited SUSU and delivered a lecture on modern measuring systems.

The university welcomed a delegation of representatives of the defense-industry complex of Russia.

### February

SUSU celebrated the Day of Science by presenting scientific achievements of

researchers and promising fields of development under Project 5-100. February 8th through 11th SUSU Science forum was held along with the traditional scientific conference for postgraduate and doctoral students. «SUSU Scientific Developments» anthology was presented to professors and employees, a round table Science and Innovations of the Ural Region. Young Scientists' Perspective was held, as well as a training seminar Businesses Based on the Intellectual Property of the University.

### March

The Second International Scientific and Educational Forum on Communication Leader of the 21<sup>st</sup> Century was held at SUSU under guidance by the European Journalism Training Association (EJTA).

### April

SUSU students and graduates presented their innovation developments in various fields of national economy to Skolkovo Foundation.

### May

The International Scientific and Technical Conference on Prom-Engineering opened at SUSU and was devoted to discussing modern achievements in the field of industrial engineering. The conference aims at providing information for scientists and practitioners on the most promising research fields and achievements in industrial engineering.

### June

In the People's Republic of China (Harbin) a forum and exhibition China-Russia EXPO 2017 opened. Organizations and enterprises of the Chelyabinsk Region presented their stands within the framework of the region's general exhibition display. SUSU's stand excited special interest with the official representatives of the Chinese part and top figures of the region's Government.

### July

The university took part in INNOPROM Exhibition of Industrial Innovations (Yekaterinburg) and presented projects by Educational Equipment and Technology Scientific and Production Institute for organization of educational process and industrial application; developments by the SUSU Center of Computer Engineering (projects for PJSC Kamaz); projects performed by various structural divisions of the university under Research and Innovations Federal Targeted Program.

### September

An exhibition on Sustainable Tourism – a Tool for the Region's Development was held at the Department of Tourism and Socio-Cultural Service of the Institute of Sport, Tourism and Service.

### October

The 2nd International Science-to-Practice Conference on Measurement: Status and Prospects of Development was held at the University and was visited by Manus Patrick Henry, Professor of the University of Oxford. The event was devoted to topical issues in metrology, as well as development, manufacture and application of measurement instruments.

### December

Innovative developments of the SUSU scientists were presented at the annual national exhibition VUZPROMEXPO (Moscow). The SUSU stand featured high-technology exhibits: test prototype of shut-off valves, cold plasma generator, honeycomb core and heat-shielding composite material RB-Endokomb.

In December SUSU organized a ceremony of awarding the winners of contest on data analysis SMS Group Data Challenge.

The contest's task was to develop an algorithm for metal rolling process based on big data mining.

8 teams from SUSU and 2 teams from Germany took part in the contest. The team from the School of Electrical Engineering and Computer Science under the guidance of Mikhail Tsymler, which included Aleksey Porozov and Yana Kraeva, were chosen as the winners. Their algorithm used machine learning based on neural networks, and turned out to be the most accurate one. The winners received a cup, certificate, and a check for 4,000 euro from the SMS Group company.



## THESIS COUNCILS



«Once I complete my postgraduate studies, I will return to my country and will be teaching. I like Pedagogy very much. I think I will be a good teacher. Thanks to SUSU I feel capable of conveying knowledge to people». – **Abdula Hoshan Farhad Abdula**, 2017 SUSU postgraduate alumnus (Iraq)



**4** theses were defended by foreign citizens to obtain a Candidate of Sciences academic degree:

- citizen of Iraq (Council Д 212.298.14, Specialization 05.13.18 – Mathematical Modeling, Numerical Methods and Program Complexes (Physics and Mathematics sciences, Engineering sciences), Chairman - A.L. Shestakov);
- citizens of Kazakhstan (Council Д 212.298.01, Specialization 05.16.02 – Metallurgy of Ferrous, Non-ferrous, and Rare Metals (Engineering sciences), Chairman - G.P. Vyatkin)).



**49** theses were defended to obtain a Candidate of Sciences and Doctor of Sciences academic degrees:

Opening of Unified Thesis Council Д 999.118.02 (Specializations 08.00.05 – Economics and Management of National Economy (Marketing, Management) (Economics sciences); 08.00.10 – Finances, Currency Circulation and Crediting (Economics sciences)) at Ural State University of Economics and South Ural State University (National Research University).

■ **Д 212.298.01**

05.16.01 – Metal Science and Thermal Treatment of Metals and Alloys (Engineering sciences);

05.16.02 – Metallurgy of Ferrous, Non-ferrous and Rare Metals (Engineering sciences);

05.16.05 – Pressure Metal Treatment (Engineering sciences).

■ **Д 212.298.03**

05.13.01 – System Analysis, Management and Processing of Information (Industry) (Engineering sciences);

05.13.06 – Automation and Control of Processes and Productions (Industry) (Engineering sciences);

05.13.10 – Management in Social and Economic Systems (Engineering sciences).

■ **Д 212.298.04**

02.00.04 – Physical Chemistry (Chemical, Physics and Mathematics, Engineering sciences);

01.04.07 – Condensed Matter Physics (Physics and Mathematics sciences).

■ **Д 212.298.05**

05.09.03 – Electrical Engineering Complexes and Systems (Engineering sciences);

05.09.12 – Power Electronics (Engineering sciences);

05.26.01 – Labour Safety (Electric Power Generation Sector) (Engineering sciences).

■ **Д 212.298.07**

08.00.05 – Economics and Management of National Economy (Economics, Organization and Management of Enterprises, Sectors and Complexes - Industry; Innovations Management) (Economics sciences).

■ **Д 212.298.09**

05.02.02 – Machines Science, Actuating Systems and Machine Parts (Engineering sciences);

05.04.02 – Heat Engines (Engineering sciences);

05.05.03 – Wheeled and Track Vehicles (Engineering sciences);

■ **Д 212.032.01**

05.07.02 – Engineering, Design and Manufacture of Aircrafts (Engineering sciences);

05.07.07 – Controlling and Testing of Aircrafts and Their Systems (Engineering sciences);

05.13.01 – System Analysis, Management and Processing of Information (Industry) (Engineering sciences).

■ **Д 212.298.13**

07.00.02 – History of Russia (History sciences);

07.00.09 – Historiography, Sources Studying and Methods of Historical Research (History sciences).

■ **Д 212.298.14**

05.13.18 – Mathematical Modeling, Numerical Methods and Program Complexes (Engineering, Physics and Mathematics sciences).

■ **Д 212.298.15**

08.00.05 – Economics and Management of National Economy (in sectors and fields of activity, including Regional Economics; Labour Economics) (Economics sciences).

■ **Д 999.060.02**

19.00.01 – General Psychology, Personality Psychology, Psychology History (Psychological sciences);

19.00.05 – Pedagogical Psychology (Psychological sciences).

■ **Д 212.298.18**

05.13.11 – Mathematical and Software Support for Computing Machines, Complexes and Computer Networks (Physics and Mathematics sciences);

05.13.17 – Theoretical Foundations of Computer Science (Physics and Mathematics sciences).

■ **Д 999.118.02**

08.00.05 – Economics and Management of National Economy (Marketing, Management) (Economics sciences);

08.00.10 – Finances, Currency Circulation and Crediting (Economics sciences)



## OFFICE OF ACADEMIC WRITING



The activity of the Office of Academic Writing aims at improvement of academic literacy in English among the university academic staff and postgraduate students, as well as at supporting authors willing to publish their papers in top-ranking scientific journals indexed at Scopus and Web of Science scientometric databases.

The Office of Academic Writing project was created to develop skills of publishing activity and professional communications within the frameworks of strategic initiatives under the SUSU's Competitiveness Enhancement Program Project 5-100.

The tasks set before the Office of Academic Writing of South Ural State University (SUSU) are being fulfilled by interaction of the following divisions:

- Administrative block;
- Consulting block;

- Translation block;
- Educational block.

Over the reporting year the specialists of the Office of Academic Writing have rendered the following services to the SUSU professors and employees:

- - More than 100 consultations on the issues of writing articles and selection of Scopus/Web of Science journals were held;
- Tutoring support was provided (selecting, special training and educating) by 18 tutors;
- Over 20 research papers were fully prepared

for publishing in English in top-ranking editions, including those indexed at Scopus and WoS.

### Organizing Special Courses on Academic Writing

In the reporting year training programs were introduced aiming at improvement of skills in academic English, writing of articles in compliance with the requirements of scientific editions indexed at international databases.

Those courses included:

- English Language – Introductory Course on Writing Papers;
- English Language – Scientometric Databases;
- English Language – Research Paper;
- English Language – Publishing Strategy.

More than 60 university employees (academics) undertook training at the Office of Academic Writing.

- Workshop on Academic Writing: Structuring a Scientific Text in Compliance with International Requirements with participation of the Head of the Department of English Language of the Moscow School of Social and Economic Sciences, Associate Professor of the Russian

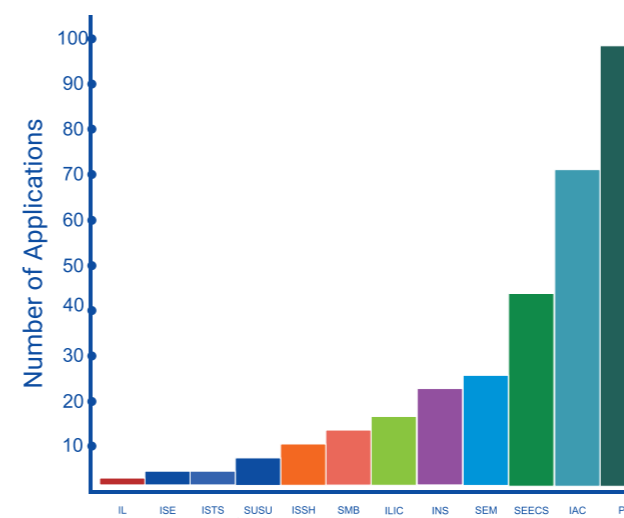
Presidential Academy of National Economy and Public Administration I.B. Korotkina. Over 80 SUSU employees took part in the workshop.

More than 300 articles and conference materials have been prepared with the assistance of the Office of Academic Writing over 2017.

With 69 papers thereof for the Institute of Architecture and Construction, 11 – for School of Medical Biology, 25 – for School of Economics and Management, 44 – for School of Electrical Engineering and Computer Science, 20 – for Institute of Natural Sciences, 16 – for Institute of Linguistics and International Communication, 10 – for Institute of Social Sciences and Humanities, 3 – for Institute of Sport, Tourism and Service, 98 – for Polytechnic Institute, 1 – for Institute of Law, 4 – for Institute of Supplementary Education, and 6 – for the branches of South Ural State University.

Research papers are prepared for such international scientific journals as:

- Acta Crystallographica Section B;
- Ceramics International;
- Diamond and Related Materials;
- Journal of Mechanical Science and Technology;
- Journal of Materials Science: Materials in Electronics;
- International Journal of Mechanical Science;
- International Journal of Fatigue;
- World Customs Journal;
- Research in Agricultural Engineering (RAE);
- Journal of Raman Spectroscopy;
- Journal of Inverse and Ill-Posed Problem;
- Molecular Physics.





10

## Innovations Development Trend



SUSU facilitates growth of entrepreneurial activity in high-technology fields of economics of the region and our country.

68

small innovation enterprises

> 570

contracts with the university partners



## RESEARCH AND INNOVATIVE ACTIVITY INFRASTRUCTURE



«You need more actively seek support for your research within the industrial sector. I think you may find an industrial partner for each of your publications, and joint publications may bring means for developing international research activity». – **Muthupandian Ashokkumar**, Professor at the University of Melbourne, member of the SUSU International Scientific Council

Within the framework of Project 5-100 an infrastructure was created in the SUSU Research and Development Department in charge of publishing activity and citation of the SUSU employees. This infrastructure is also responsible for creating comfortable conditions for attracting non-budgetary financing of research activity, preserving and developing the university' intellectual potential, implementing innovative technologies in the Russian and global markets, rendering marketing support of

research and innovation developments.

The innovative technologies transfer is performed by the following divisions:

- research and education institutes comprising departments, research and education centers and laboratories generating new scientific developments and innovation projects;
- service of preparing and supporting projects which attracts non-budgetary assets to the university by commercializing research developments;

- patenting department preserving and developing
- the university' intellectual potential for its scientific-and-technical and economical development;
- business incubator, which fulfills projects of young entrepreneurs aimed at solving socially important problems of the region, for developing the system of contests for young professionals by involving community and employers;

- small innovation enterprises created with a SUSU's interest in their equity capital, and which are the key element in the final stage of an innovation process.

The number of job places in the innovation infrastructure is 17, number of job places in economy societies is 153. The total number of students, postgraduates and young scientists participating in work of economy societies is 332 people.

### RESULTS OF PATENTING ACTIVITY

Over the 2017 academic year the specialists of the Patenting Department with direct participation of the authors of inventions performed work on revealing and confirming the rights of the university for intellectual property (inventions, utility models, computer software):



**38** applications for inventions/utility models were filed

Among those:

- composition for manufacture of electrical engineering goods;
- autonomous multi-purpose device of signaling and detecting a transportation vehicle and its control using GPS/Glonass system;
- device for human ECG tracing for continuous monitoring;
- device for protecting a solar module against pollution;
- method of producing a yoghurt drink with added fucoidan;
- consumable electrode for melting refractory metals in vacuum arc furnace;
- device for accurate registering of variations of heart rate and dynamics of cardiac cycle phases in fetus;



**68** for inventions/utility models were obtained

For example:

- rotary anti-icing device for blades of a wind-driven power plant;
- swirl burner for a gas turbine;
- device for collecting oil products from water surface;
- mayonnaise with functional properties.



**118** of registration for computer software and databases were obtained

- algorithm of reducing production losses based on the «lean production» technology;
- algorithm of implementing a system of upgrade for metal treatment technology based on a complex solution;
- algorithm of low-cost production of hydrogen fuel for independent sources;
- computation of parameters and characteristics of an alternating-current electric engine.



**32** licensing contracts were prepared and forwarded for state registration



**25** licensing contracts were registered



## ACHIEVEMENTS OF SMALL INNOVATION ENTERPRISES



SUSU promotes the growth of entrepreneurial activity in high-tech industries through the creation of small innovative enterprises for the sustainable development of Chelyabinsk Region and Russia as well as the launch of the Youth Business Incubator.

SUSU's youth teams participate in acceleration programs Generation-S; You Are an Entrepreneur; Factor. Innovation projects of SUSU receive support in the contests of Skolkovo Foundation, RVC InfraFund, and Foundation on Innovations Facilitation.

In 2017 a small innovative enterprise was created with participation of SUSU – Non-contact Electrical Diagnostics Limited Liability Company (El-beko LLC) the tasks of which include:

- engineering of software and hardware for non-

contact ECG tracing for population, in particular: for newborns, athletes, people with disabilities;

- developing algorithms for functional state diagnostics via multichannel ECG and with maximum accuracy;
- engineering of software for means of data transmission, information infrastructure.

**In total, over the period of 2016 through 2017 the following small innovative enterprises with SUSU participation became the most efficient ones:**

- Regional Engineering Center for Laser and Additive Technologies LLC: a government contract was signed in 2017 with Perm Engines Company for development and implementation of two robotic complexes for mechanical and laser treatment; a contest was won for defense procurement with OJSC Kompozit from Korolev; jointly with SUSU and SMS SIEMAG investment is being provided for creation of a SUSU laboratory of wire-cladding robotic complex. The value of the three mentioned contracts amounts to 100 mln. roubles.
- Uctech-Profi LLC: educational equipment was supplied by the company for Young Professionals National Competition (WorldSkills Russia). Samples of the company's products were presented at the International Education Equipment Exhibition (World Education Days) and at the 5<sup>th</sup> National Exhibition VUZPROMEXPO 2016.



68

small innovative enterprises were created at SUSU (+1 newly created in 2017)



126

received support for development of their ideas under UMNIIK program over the last 10 years



202

intellectual property assets were registered by students, postgraduates and graduates of the university over the last 10 years

- Grid-engineering LLC: this company designed graphics for animated films Booba and Nikita Kozhemyaka, and movies Flight Crew, The Icebreaker, Attraction; obtained its first foreign contract for a Sony Pictures Final Fantasy movie; participated in an international computer graphics conference CG Event 2016.
- StandUp Innovations LLC: the company entered the Japanese market having signed a contract with its Japanese partner. Currently the company's product is being adapted to the Japanese market requirements.

for everyday wearing and allows to monitor the state of the human cardiovascular system.

A test prototype is being engineered for a software and hardware complex of model-feedforward control of energy consumption based on a concept of a distributed energy-saving power plant. It is planned to implement a test prototype being a full-scale model of a power supply system at the SUSU Campus and in a heat-and-power complex of Magnitogorsk Iron and Steel Works industrial enterprise.



## JOINT PROJECTS WITH FOREIGN AND RUSSIAN PARTNERS



SUSU collaborates with Russian and foreign universities, global transnational corporations, Russian industrial enterprises and government authorities, participates in innovative development programs of state corporations, and fulfills partnership within the frameworks of various technological platforms.

The total number of contracts signed with all the university partners as part of its innovative activities amounted to 572 over 2017.

### Partnership with Industrial Leaders

The following research-and-innovation projects became the most efficient ones in 2017:

- Engineering of a Russian-made mass Coriolis flowmeter for oil-and-gas industry with a function

of measuring the flow rate of multi-phase flows within the framework of Federal Targeted Program on Performing Applied Research for Development of Economic Sectors. This work is devoted to designing of Coriolis flowmeters properly functioning in the mode of multi-phase and pulse flows, and is being carried out in the context of the international collaboration with the University of Oxford (Great Britain) for ElMetro Group LLC.

- Creation of a high-technology production of a new generation of energy-efficient transmissions for motor trucks and buses for PJSC KAMAZ.
- Creation of high-technology lost foam casting using exothermal processes and nanostructured materials for OJSC Propulsion Systems.
- A complex of projects on developing and implementing systems of automated regulation of the modes of technological processes under the program on energy efficiency improvement at OJSC Magnitogorsk Iron & Steel Works. The research resulted in development of an original methodology of process control as per criteria of minimizing energy and raw materials consumption.
- Jointly with the global leader in electronics and electrical engineering, Siemens PLM Software company, an academic laboratory was created for training students, as well as specialists in engineering and control of production and lifecycle of goods of modern technologies and solutions based on Siemens software. At the laboratory works are performed in the field of wheeled and track machinery, and applied methods for CAD systems are being developed for the region's industrial enterprises.
- Jointly with the world's leading manufacturer of metallurgy equipment, SMS Group, the Laboratory for Mechanics, Laser Processing, and Digital Technology was opened. The laboratory will be solving two main tasks: performing the required research, as well as practical application of innovations in the up-to-date equipment.
- Information Security Research and Education Center of Kaspersky Laboratory was opened at the SUSU School of Electrical Engineering and Computer Science. This project provides new possibilities for training specialists in protection

of information infrastructure for the Ural enterprises and organizations, and much more.

### Partnership within the Framework of Innovative Development

SUSU actively participates in various government programs and contests related to creating high-technology productions and attracting leading scientists to Russian universities, etc. In 2017 three projects were fulfilled at the university:

- development of the modes of laser alloying (in part of laser cladding) during production of complex-shape 3D part blanks from BT6c, BT14, BT2 and ЭП741НП 3alloys and based on titanium aluminide for Roscosmos State Space Corporation;
- reconstruction and technical re-equipment of procurement, mechanical-assembly and testing production at PJSC Proton-PM (buildings No.58, 30A, 1,2 and 44) for Roscosmos State Space Corporation;
- creation of a high-technology production of a new generation of energy-efficient transmissions for motor trucks and buses for PJSC KAMAZ.

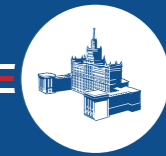
### Partnership within the Framework of Technological Platforms

In 2017 became member of 14 technological platforms:

- Aviation Mobility and Aviation Technologies;
- National Space Technological Platform;
- New Polymer Composite Materials and Technologies;
- Lightweight and Reliable Structures;
- Clean Transportation «Green Car»;
- Integrated Safety of Industry and Power Sector, and others.



## Improving Reputation among Prospective Students and in the Academic Community



«SUSU has set itself a goal of being one of major universities not only in Russia, but also in the international educational space. And everyone enrolling into our university today already can see those prospects. Fulfilling the tasks of Project 5-100 the university is rapidly improving its standing as an innovative research and education center in the academic community of the world's leading universities».

Alexander Shestakov, SUSU Rector,  
Chairman of the Council of Rectors of  
the Ural Federal District

> **36 000**  
candidates filed  
their applications  
to the university

> **7 600**  
were accepted  
as freshmen in 2017

ЮЖНО-УРАЛЬСКИЙ ГОСУДАРСТВЕННЫЙ УНИ  
НАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ



## MAIN EVENTS ON PROFESSIONAL NAVIGATION



These events aim at helping student candidates choose their specialization, prepare to enrolling into university, develop creative and research talents in pupils of educational institutions. Also the tasks include participation in shaping the image of the university, and promoting SUSU specializations in the Russian and international markets of educational services.

### Activities of Pre-university Training Faculty

Forming of motivation for early occupational choice, Olympiad movement, career guidance, organizing work of the School of Physics and Mathematics.

### Forming of Motivation for Early Occupational Choice

Fulfilling the projects on SUSU's Summer School and Winter School.

Organizing and teaching at classes in the centers of prevocational training:

#### Engineering and Technical specializations:

Engineering School, School for Constructors, Mechatronics School, School of Rocket Engineering and Robotics, School of Mechanical Engineering.

#### Humanities specializations:

Mediageneration Club for Enrollees, School of Young Lawyer, School of Humanities Knowledge, School of Young Economist.

Physics and Mathematics specializations: university classes in 10 schools.

#### Natural Science specializations:

Minor Academy of Chemistry, Minor Academy of Geology.

### Olympiad Movement

The university organizes a number of specialized Olympiads, as well as competitions included in the list of Olympiads for school pupils approved by the Russian Federation Ministry of Education and Science. For instance, the Star Multidisciplinary Engineering Olympiad, in which over 250 thousand 6-11th-grade pupils from 80 regions of Russia take part.

SUSU organizes Project Management Open Championship for School Pupils, Cup of the Chelyabinsk Region's Governor and regional competitions of the Odyssey of the Mind International Program for Developing Creative Thought and Team Spirit.

The following specialized Olympiads are held at the university schools and institutes: Light Wings Olympiad for School Pupils (Institute of Architecture and Construction), Motor Vehicles and Safety Olympiad (Polytechnic Institute), Young Progressors Aerospace Open Championship (Polytechnic Institute), International Youth Cooking Festival (Institute of Sport, Tourism and Service), Green Apple Advertising Festival (School of Economics and Management), and others.

### Career Guidance

In the reporting year, within the framework of the Enrollment Campaign 2017 foresight sessions were held aiming at providing the enrollees with detailed information on prospects of studying, as well as relevant scientific and educational master classes at the SUSU Schools and Institutes were attended.

Within the framework of the Friday Meetings project school pupils met the representatives of employers from metallurgical, mechanical engineering, automotive, food, power generation, construction, and IT sectors.

Specialized exhibitions of the SUSU faculties and key employers were held: city interactive exhibition at the Palace of the Pioneers and School Pupils Municipal Autonomous Institution of Supplementary Education; Honour Students' Ball for Chelyabinsk pupils who finished schools;

Preserving Traditions Brings More Victories Forum.

The university held Open House Days, presentations of Master Degree programs, as well as travel presentations for students of educational institutions and their parents on the territories of the Chelyabinsk, Sverdlovsk, Kurgan regions and Republic of Kazakhstan; master classes on preparing to Olympiads and passing of the Unified State Exam for students and teachers of educational institutions in Chelyabinsk, Magnitogorsk, Satka and Zlatoust; educational project and presentation of SUSU in International Children's Camp Artek; We Remember and We Are Proud Festival among cadet classes of Chelyabinsk schools.

Together International Festival of Creativity was organized, a ground for creative self-realization and development of personality traits of the participants.

The enrollees and their parents were especially interested in the event called Rector's Hour where the university Rector Alexander Shestakov answered topical questions of the enrollees.

### School of Physics and Mathematics

In the reporting year the School of Physics and Mathematics signed 2,262 contracts on rendering fee-based educational services.

The SUSU School of Physics and Mathematics offers the following programs of supplementary education: preparation to passing of the Unified State Exam (10-11th grades); preparation to passing of the Basic State Exam (9th grade); advanced studies in physics, mathematics, Russian language, chemistry, history, social science (8-11th grades); preparation to participating in Olympiads; preparation to creative tests: graphics, drawing; professional training in computer science and programming (10-11th grades); development of logic and creative thinking (5-7th grades).

**7 study guides were prepared and published, including:** A.Yu. Evnin, A.V. Kungurtseva «Mathematics: Study Guide for 8th-grade Pupils»; T.V. Neznaeva «Physics»: Problem Book for Pupils of 9th and 10th Grades; N.M. Bauer «Physics»: Study Guide for 8th-grade Pupils, and others



## ATTRACTING TALENTED STUDENTS AND POSTGRADUATES



Attracting talented students, graduates having experience in research activity, as well as graduates from other universities including international ones to our university is its priority task.

### Scholarships for Freshmen

Starting from this year, in order to support talented students, those freshmen who after three exams receive high Unified State Exam scores (250 scores and higher for technical and natural science specializations, and 270 scores and higher for humanities), and those enrollees who pass internal entrance examination and receive total score of 270 will be paid a monthly scholarship of 8,000 roubles for the period of the

first semester, September through January. The university scholarships are paid to students receiving education both on commercial and contractual bases.

### Osadchiy Scholarship

To support talented students of metallurgical specialization, a Ya.P. Osadchiy Scholarship was established. On November 28th a ceremony of awarding scholarships was held at the Chelyabinsk Pipe-Rolling Plant. For their

achievements in studies, science and sports four outstanding students of the Polytechnic Institute were awarded.

### SUSU President Vyatkin Scholarship

For their outstanding achievements in education and research the scholarships in the amount of 5,000 roubles were awarded to 2 postgraduates and 2 students of the Faculties of Physics, Physics and Metallurgy, as well as of the Faculty of Material Science and Metallurgical Technologies. The total amount of the moneyed assistance equaled 120,000 roubles a year.

### Dual Postgraduate and Dual Mentoring Programs

In order to attract talented graduates to postgraduate studies Dual Postgraduate Programs are offered which provide an opportunity to obtain a Candidate of Sciences Degree and Ph.D., expand empirical research base through access to foreign research platforms.

At the enrollment the priority is given to postgraduates with publications indexed at Scopus, WoS, BAK and others; or patents, computer software, certificates from events of regional level and higher.

Agreements on training postgraduates under Double Mentoring Model between SUSU and foreign countries:

- National Presidential Legislation Center of the Republic of Tajikistan;
- Kostanay Social and Technical University in honour of Academician Zakaray Adamar (Kazakhstan);
- Kostanay Social and Technical University in honour of Academician Zulkharnay Aldzhamar (Kazakhstan).

This year contracts were signed with Saint Etienne Doctoral School (France) and SUSU

aiming at fulfilling postgraduate programs under Double Mentoring Model, PhD in Engineering Mechanics, Metallurgy and Material Science in Saint Etienne Doctoral School and postgraduate programs in Metal Science and Thermal Treatment of Metals and Alloys, Plastic Metal Working at SUSU.

Contracts on postgraduates training were signed with M. Osimi Tajikistan University of Technology and Dushanbe National Research University.

### Collaboration with Industrial Enterprises

12 contracts were signed with industrial enterprises for postgraduate studies (PJSC ChelPipe, JSC Volzhski Tube Works, UralGis LLC, Eva Mobile LLC, Your Accountant Non-profit Organization LLC, Amiks-Rus LLC, UPTK LLC (Production and Technical Procurement Management), Apriory-stroy LLC, TMK NTTs LLC (Research and Development Center of Pipe and Iron-and-Steel Company), Energy Institute of Tajikistan, Non-profit Joint Stock Company Zhangir khan West Kazakhstan Agrarian-Technology University).

### State Grants and Scholarships

The following prestigious scholarships are awarded to students and postgraduates: Presidential Scholarship for Young Scientists, Russian Federation Government Scholarship, Scholarship of the Chelyabinsk Region Legislative Assembly and Administration.

12 postgraduates were awarded these scholarships.

The postgraduates are also offered an opportunity of free-of-charge studying at the advanced training courses organized by the SUSU Institute of Open and Distance Education in the second term of this year. 22 postgraduates took these courses.



## RESULTS OF ENROLLMENT CAMPAIGN 2017



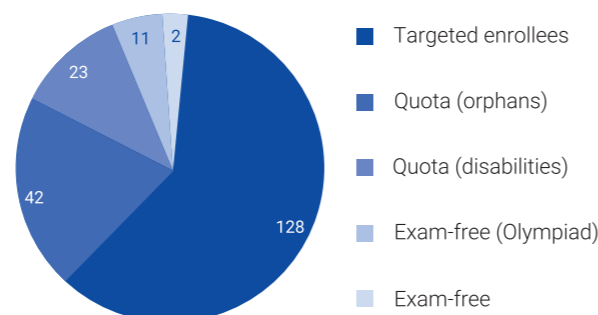
«The main principle of our Enrollment Campaign is selecting the best ones among the huge number of enrollees, that is those who will successfully represent our university at the regional, federal and international levels. This is a new generation of leaders capable of solving global tasks on sustainable development and changing this world for better». – **Andrey Shmidt**, SUSU Vice Rector for Academic Affairs

### TOTAL OF INTRAMURAL AND EXTRAMURAL ENROLLEES

>7 600 students

**127**  
entered SUSU  
with high scores

### SUBSIDY CATEGORIES (4%)



### SPECIALIST AND BACHELOR DEGREE PROGRAMS

**Intramural**  
>2 100 state-subsidized students

>1 500 contract-based students

**Extramural**  
>400 state-subsidized students

>1 600 contract-based students

### MASTER DEGREE PROGRAMS

**Intramural**  
>900 state-subsidized students

>200 contract-based students

**Extramural**  
>280 state-subsidized students

>700 contract-based students

### MINIMAL SCHOLARSHIP SCORE

#### Creativity Tests

Design	360+
Architectural Space Design	450+
Architecture	450+
Physical Education	270+
Technology of Material	
Artistic Processing	250+
Journalism	270+
Philology	270+
Customs Affairs	270+
Pedagogical Education	270+

### ENROLLMENT GEOGRAPHY

**Freshmen from foreign countries:** People's Republic of China, Kazakhstan, Tajikistan, Uzbekistan, Sudan, Jordan, Armenia, Yemen, Ukraine, Afghanistan, Venezuela, Azerbaijan, Cameroon, Georgia, Colombia, Indonesia, Nigeria.

>370 intramural students

>130 extramural students

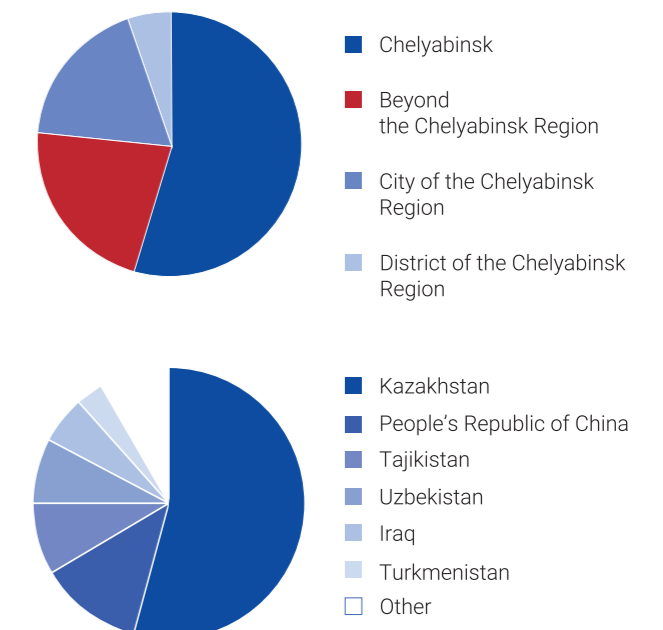
**Freshmen from regions of Russia:** Republic of Bashkortostan, the Kurgan Region, the Orenburg Region, the Khanty-Mansiysk Autonomous District, the Sverdlovsk Region, the Yamalo-Nenets Autonomous District, the Tyumen Region, the Perm Territory, Sevastopol, Republic of Adygeya, Republic of Sakha (Yakutia), and others.

>4 000 intramural students\*

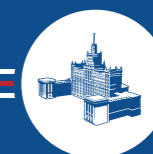
>2 100 extramural students\*

\*Not counting students enrolled to the Institute of Open and Distance Education and branches

### Students as per countries and regions



## Integrated Communications of the University Brand Promotion



«Two key tasks for 2017 are to preserve research activities dynamics and achieve good results in promoting our university's brand in the international community. This is very important for successful development of our university and obtaining of high standing in international rankings».

Alexander Shestakov, SUSU  
Rector, Chairman of the Council  
of Rectors of the Ural Federal  
District

> 1 000

publications about  
the university activities  
at the SUSU web-site

> 100

publications in federal  
and international Mass Media  
of China, Vietnam, Iran,  
Great Britain and other countries

Сегодня  
ДИДЕНТ ЮУРГУ –  
Завтра БОСС!



## DEVELOPMENT OF STRATEGIC COMMUNICATIONS

In March 2017 a Marketing and Strategic Communications Department was created at South Ural State University by the Decree of its Rector. Within the framework of fulfilling rebranding under Project 5-100 Roadmap the Marketing and Strategic Communications Department developed a brand platform of the

university as a SMART-University uniting Europe and Asia, a new logo and corporate style, a brand book of the university, as well as organized a SUSU logo multimedia presentation show. The main goal of the Marketing and Strategic Communications Department is promoting the university at the international information space.



### INTERNATIONAL COMMUNICATIONS

**50** publications in foreign languages in international Mass Media

- Publications are posted on international portals on research-and-development and educational activities of the SUSU schools and institutes:
- Sputnik International, Sputnik China, Sputnik Arabic, Sputnik Vietnam, Huanqiu Shibao (Global Times), Alpha Galileo, 3DPrintingIndustry.com, and others.**

The biggest interest of the foreign Mass Media was excited by paper «Unique Arctic-make Wind-mill Electric Generating Unit Is Being Engineered at SUSU».

The main English menu of the SUSU web-site was revised, a test susu.ru web-page in Chinese was created, news translation into English was organized, and the menu of abit.susu.ru portal was updated.

Jointly with Science and Technologies of South Ural Exhibition Center SUSU's participation in a number of international exhibitions and forums was prepared: 4<sup>th</sup> Moscow International education Fair (Moscow, April), 4<sup>th</sup> Forum and Exhibition China-Russia EXPO 2017 (People's

Republic of China, June), 8<sup>th</sup> INNOPROM Industrial Forum (Yekaterinburg, July), 5<sup>th</sup> Annual National Exhibition VUZPROMEXPO 2017 (Moscow, December).

At this exhibition the Marketing and Strategic Communications Department was awarded a Diploma of the **Winner in the MediaResonance contest** for offering education services through modern and non-standard methods of promotion.

Over 200 publications in English were posted at the SUSU web-site;

15 image-promoting videos showing feedback from international students on studying at the university were developed and posted at susu.ru.

### RESEARCH AND INNOVATIONS ISSUES

**> 160** publications on the university's research and innovations achievements posted at the SUSU web-site

Information and analytical publications in the following columns: Scientific Avantgarde (Young Scientists), A Step Ahead (Breakthrough Scientific Trends), Science Leaders, Science: A to Z (SUSU Laboratories and Research Centers), and others.

**54** publications on the university's research and innovations achievements in federal Mass Media

- TASS Information Agency
- Gazeta.ru
- Lenta.ru
- Expert online
- Interfax Information Agency
- RIA Novosti

### EVENTS-RELATED INFORMATION

**> 1 000** news posts at the SUSU web-site

- Practice of event agenda was implemented
- The following events were organized to be covered by the federal Mass Media: 14th Russia-Kazakhstan Interregional Cooperation Forum, as well as Forum on Heritage of P.A. Stolypin, Topical Basis for the Russian Federation Development, meetings of the International Scientific Council and of the Supervisory Board, 60th Anniversary of the Instrumentation Engineering Faculty (School of Electrical Engineering and Computer Science), QS Seminar, SUSU's participation in international exhibitions and forums, and many others.

### SOCIAL NETWORKS

**4 000 000** views of posts in SUSU's official web-pages

Image-promoting contests Physicists VS Lyricists, I Love SUSU, New Year's Photofest and others were held on the official I Love SUSU Vkontakte web-page.

### SOCIALLY IMPORTANT MEDIA PROJECTS

The following socially important media projects of SUSU were covered by Mass Media: The Heart of Victory, 10 Advantages of SUSU, TOP 15 in-Demand SUSU Specialities, Foresight Session for Enrollees, History of Success Our Graduates, School of Scientific Magic, Internship Marked Excellent!, as well as a series of image-promoting materials on the SUSU schools and institutes within the framework of Enrollment Campaign 2017, a series of image-promoting materials on graduates of the SUSU Instrumentation Engineering Faculty.

### MULTIMEDIA LONGREADS

A technology of creating the following multimedia longreads at the SUSU web-site was implemented: Forum of Rectors of Russia and Kazakhstan: Results; 65th Anniversary of the Faculty of Instrumentation Engineering & Computer Technologies, Control and Radio Engineering of the School of Electrical Engineering and Computer Science and others.

### VIRAL VIDEO-ADVERTISING

**85 000** views in social networks

- that is the ranking of a viral In the Loop video about directors of the SUSU schools and institutes which was developed by the Marketing and Strategic Communications Department.
- a promoting image bank of the university structural divisions was prepared.

### ANALYTICS

- A complex of studies was performed regarding perception of the university image by the key target groups
- A monthly analysis was performed of the efficiency of work of the SUSU enrollees' portal and of the university's official web-site, along with quarterly comparative reports on the indices dynamics, and the competitors' web-sites were analyzed.

### IMAGE-PROMOTING PRINTING PRODUCTIONS

Concepts of advertising-and-information carriers (fliers, leaflets, catalogues, poster boards, etc.) were developed for the university promotion, as well as catalogue «SUSU, SMART-University uniting Europe and Asia»; photo book «SUSU, A Bridge between the Present and the Future», leaflet «65th Anniversary of the Faculty of Instrumentation Engineering & Computer Technologies, Control and Radio Engineering of the School of Electrical Engineering and Computer Science» and others.



## MULTIMEDIA INTEGRATION OF INFORMATION CHANNELS



### SUSU-TV Television and Radio Company

- Federal TV channel Russia 24; national education channel Prosveshchenie (Enlightenment); regional Internet project 74.ru (Rugion.ru Group of Companies); regional TV channels Vashe TV (Your TV) (Chelyabinsk), Insit-TV (Kopeisk), TRK-Seti-24 (Kartaly), YouTube and SUSU-TV Television and Radio Company.

**720** videos about SUSU aired

- Editors Office of the Internet Broadcasting Department of SUSU-TV Television and Radio Company for English-language airing and English version of the university web-site jointly with the Marketing and Strategic Communications Department prepared: 13 documentaries, 10 informative videos, 7 topical TV-interviews with foreign guests of the university, and 6 special episodes of science and education program TabulaRasa
- 240 news releases of the informative program SUSU News were prepared;

- over 30 interviews with the world's leading scientists;
- 24 films on activities of research and education centers and laboratories of international level;
- 12 special reports on training specializations in the SUSU schools and institutes;
- 25 episodes of informative and entertainment program Avenue of the Young;
- special TV diaries on the results of work of the International and Supervisory Councils, a SUSU Calendar video-digest, and much more.

### SUSU Radio

- Elevate, a version of the SUSU Radio Studio (web-site: radio.susu.ru, in VKontakte and Instagram: radio\_susu, on Playcast: ради-о\_ЮУрГУ/about), StreetRadio city radio channel.

**35 000** audio materials

- were recorded for voice recognition by the neural networks of an automated program for the period of participating in the grant on Engineering Robotic Voice Dialog System for Studying Russian by Various Target Groups jointly with the Department of Russian as a Foreign Language of the SUSU Institute of Linguistics and International Communication.

**300** audio materials about SUSU aired

- Live radio broadcasts from the major university events and their broadcasting via social networks were fulfilled.
- Social StreetRadio audio-projects were fulfilled jointly with Azbuka Media Holding for the citizens of Chelyabinsk.

### Technopolis Newspaper

**28** newspaper issues were printed

The total of 50 materials were published

regarding fulfillment of Project 5-100, including those covering: the meetings of the International Scientific Council, workshops, conferences, strategic sessions and Roadmap discussions.

Over 80 materials were published on the issues of all the aspects of the university research activities (forums, conferences, innovations, contests, Olympiads, exhibitions).

### Production Photostudio Laboratory

Opened in December 2017 for the purpose of training students on the basics of professional photoshoot and creation of professional photo materials required to shape the university image, its successful promotion in the international education space.

The SUSU image bank holds more than 10,000 photos.

### SUSU's 360-Degree Multimedia Newsroom

**6 000** SUSU students took part in the Science Film Festival

SUSU's 360-Degree Multimedia Newsroom is a world-class media complex, which fulfills multimedia integration of the university Mass Media in the digital information space.

- SUSU Newsroom acts as the organizer of the All-Russian Topical Science Film Festival (FANK).
- The media complex became participant of the Terra Scientia on Klyazma River All-Russian Youth Educational Forum.
- The university media laboratory is the base media venue for organizing and holding of the International Scientific and Educational Forum on Communication Leader of the 21st Century at SUSU.
- Multimedia longread on Russian Language and Education in Russian was awarded a winner's diploma at the Best University Mediacenter in Russia 2017 All-Russian Contest.



## TOP 36 SUSU Events



«Every person, all the events of your life are there because you have drawn them there. What you choose to do with them is up to you».

Richard Bach, writer





## KEY EVENTS OF THE YEAR



Every day the main web-site of the university forms an informative agenda about the major and big-scale events under fulfillment of Project 5-100 and competitiveness enhancement of SUSU in the international educational space.

### January

- On Tatiana's Day, the holiday of Russian students, Rector Alexander Shestakov traditionally granted three wishes of students.
- A distinguished international scientist, Manus Patrick Henry, visited SUSU and delivered a lecture on modern measuring systems.
- SUSU welcomed a delegation from the military-industrial complex of Russia.

### February

- SMS Group German Metallurgy Company decided to invest in the creation of a unique laboratory of additive technologies at SUSU.
- SUSU student Anna Nechaevskaya took gold and silver at the International Winter Universiade.
- A Conversation Club for international students opened at the SUSU Center of Sociocultural Adaptation.

### March

- Under the guidance of the European Journalism Training Association, the Second International Scientific and Educational Forum on Communication Leader of the 21st Century was held at SUSU.
- Kaspersky Lab's Research and Education Center of Information Security opened at SUSU.
- For the first time SUSU was listed among the TOP 600 universities of the RankPro 2016/2017 Worldwide Professional University Rankings.

### April

- SUSU students created a race car with internal combustion engine.
- Graduates and students of SUSU presented their innovative developments in various fields of national economy to Skolkovo Foundation.
- SUSU Rector Alexander Shestakov together with the President of Emerson Company, Edward Monser had a business visit to the University of Oxford (Great Britain).

### May

- The Victory Waltz, dedicated to the 72nd Anniversary of the Great Victory and heroes of the Great Patriotic War, was held on the square in front of SUSU's main building. Students of the Institute of Social Sciences and Humanities and the Faculty of Military Education participated in this Waltz.
- Researchers from the SUSU Institute of Sport, Tourism and Service created a unique device for heart monitoring, an ECG-shirt allowing to monitor heart functioning and collect data for doctors.
- SUSU students successfully participated in the Putnam Olympiad, which is founded and organized by the Mathematical Association of America. Participants from SUSU were awarded one 1<sup>st</sup> place diploma and two 2<sup>nd</sup> place diplomas.

### June

- A robot named Vanya was created at SUSU to help international students study Russian.
- The International Scientific Council was held at SUSU, where the work performed over the year was summed up, and the university's major research projects were assessed by the experts.
- SUSU RSK Tornado supercomputer participated in the creation of the first Russian aircraft, MC-21.

### July

- Staff of the SUSU Geoinformation Technologies Research and Education Center participated in the Field Day 2017 international exhibition, where they presented the Geoinformation Systems software and hardware complex.
- South Ural State University became an International Member of the National Collegiate Honors Council.
- SUSU took part in the major international exhibitions Yekaterinburg EXPO 2017 and INNOPROM among the participants of which are the leading enterprises in industry and technologies.

### August

- SUSU began work on executing innovative projects for the Vertolety Rossii (Helicopters of Russia) holding company. The result of this partnership of our country's major university and leader of the helicopter industry will be unique technologies analogs for which do not yet exist in Russia.
- The SUSU Laboratory for Computer Simulation of Medications participated in the Drug Discovery and Therapy World Congress in Boston (USA).
- A new university brand platform was developed for South Ural State University. A presentation was held of the new logo of SUSU as a university which unites Europe and Asia.



### September

- Modern Digital Technologies in Industry 4.0: Trends and Challenges Science-to-Practice Conference was organized at SUSU. A Center of Computer Engineering was opened.
- SUSU took part in the Conference of the European Association for International Education in Seville and signed a series of international agreements with the world's leading universities.
- At the Strategy 2035 economical forum SUSU participated in elaboration of the strategy of the Chelyabinsk Region development.

### October

- SUSU was listed in the TOP 10 of the inventive activity ranking among the universities of our country in the Degree of Demand for Intellectual Property Facilities Created at the University and Basic Conditions for Inventive Activity sections.
- Measurement: Status and Prospects of Development Science-to-Practice Conference was held at SUSU. The most prominent scientists in the field of metrology from Great Britain, Bulgaria, Russia, and other countries took part in this forum.
- SUSU entered the Pushkin Institute partner network. Development of this network is a crucial infrastructure project under the Russian Language federal targeted program.

### November

- Forum of Rectors of Russian and Kazakhstan Universities was held at SUSU. A joint resolution, as well as 40 agreements on collaboration in the fields of science and education were signed.
- SUSU improved its standing in the QS World University Rankings BRICS 2018, a ranking of the top universities in the BRICS countries, which takes into account the university reputation with employers, total number of publications, citations, and other parameters.
- Within the framework of the Industry 4.0 technology SUSU launched the fulfillment of its Industrial Cloud Platform project.

### December

- The winners of the SMS Group Data Challenge contest on data analysis were awarded at South Ural State University.
- Two innovative laboratories were opened in December. One of those was created at the Institute of Open and Distance Education. And the second one was a Laboratory for Mechanics, Laser Processing, and Digital Technology for training engineers of the 21st century.
- SUSU was listed in the top ten of the ranking of the classical universities of Russia.

# SUSU (NRU) ANNUAL REPORT 2017



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