

THE MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION  
Federal State Financed Higher Professional Education Institution  
**"NATIONAL RESEARCH TOMSK POLYTECHNIC UNIVERSITY"**

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**TPU YEAR-BOOK**  
**Number 17**

2012

2012  
TPU Publishing House

UDK 378.661(571.16)  
BBK 74.58(253)  
T36

T36      **TPU Year-Book** / Tomsk Polytechnic University. – Tomsk, TPU Publishing House, 2012, N 17. – 60 p.

TPU Year -Book presents statistics and reference data on the results of the university activities in 2011. This edition is composed of the main routes of the university activities and information about its institutes.

TPU Year-Book is intended for a wide use of home and international readers interested in the higher education system in Russia.

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## Foreword

Dear Readers,

National Research Tomsk Polytechnic University is a modern, dynamic university which is targeted towards the competitive growth of the country. Our university traditionally takes its place among the Russian top of technical universities. Continuing its historical top ranking, Tomsk Polytechnic University forms and implements the foremost strategy of a higher school based on integration of research and elite education into the world community. For the first time in 2011 Tomsk Polytechnic University took place in the ranking of top-class universities of the world, bearing witness to correctness of the chosen path.

National Research Tomsk Polytechnic University offers about two hundred bachelor's, master's, and specialist's degree programmes within 7 scientific-and-educational and 4 teaching institutes. Research activity and the educational process conditions which have been created recently provided desired results. The annual demand in TPU graduates exceeds their output more than 1,5 times. Our young researchers make their way up: for the first time ever Pavel Strizhak proceeded Doctor of Science aged 26.

A range of international liaisons has been impressively broaden out. The Russian Federation represented by National research Tomsk Polytechnic University, the only one among Russian universities accessed to the CESAER Board of Directors, was permitted to

participate in and exert influence on the development of the European tertiary education system in the framework of Bologna process. Attaching significant importance to the elimination of contradictions between theory and practice of engineering education, TPU has joined the project initiated by MIT whose concept is directed to reformation of the fundamental level of tertiary education in the field of engineering and technology. The CDIO initiative (Conceive–Design–Implement–Operate) is an innovative educational framework for producing the next generation of engineers, which implies the introduction of problem-based and project education in the academic programme.

Scientific knowledge, technologies, and proficiency are the main resources of modern economy of any state. TPU has elaborated a unique system of training competitive specialists for hi-tech industries, which was awarded the Governmental Prize of the Russian Federation. Large Russian corporations are very interested in research developments and education provided by Tomsk Polytechnic University. Intentional learning for professionals is being successfully implemented as well as conjoint innovative developments in the framework of the agreement between TPU and OAO 'Gasprom'. In tandem with ZAO 'SIBUR Holding', the leader of Russian petrochemistry, created was the International Laboratory of Thermosetting Polymers. Dirk Wervake, an outstanding Belgium chemist, the

Chief Manager of ‘Management Advisory’ Company is the head of this laboratory. International cooperation in the field of science and commercialization of smart grid technologies allowed the Smart Grids Research Centre, the only one in Russia, to obtain Skolkovo resident status. This Centre plans to create an effective grid system for Skolkovo Science Town. The main task of this Centre is to train specialists in Hughes technologies VSAT designed by American company Hughes Network Systems, and also carry out research into this field.

Optimization and reformation are the drivers of Tomsk Polytechnic University in all kinds of activity. General tendencies have touched the student body as well. For the first time in Russia our students conducted elections of a campus manager. The Centre for Volunteer Services was opened for 22<sup>nd</sup> Olympic and 9<sup>th</sup> Paralympic Games in Sochi. In the future we plan to change the campus image, repair and build its infrastructure.

Federal budget assets, subsidy of the National Research University Program, project receipts in terms of the Governmental Resolution, Federal Target Program ‘Nuclear Safety’, and also extra-budgetary revenue allowed TPU in 2011 to set the consolidated budget in the amount of over 5 billion rubles. Due to this, the university could satisfy the needs of academic and research activities, increase the salary, and support students and employees.

One of the most important events of the past year was the 5<sup>th</sup> Complex Development Plan designed for the period of 2011–2015. Complex Development Plan is a basic document which defines policies and main trends of improvement of the academic, research, entrepreneurial, financial, and managerial activities, and formulates the priorities of problems faced by the university nowadays.



Representing our achievements, we often say ‘the first’ or ‘the only’. These are leader’s traits which Tomsk Polytechnic University really is. However, it is not a reason to rest on our laurels because the most important victories are still in the future!

*PETR CHUBIK, Rector of National Research Tomsk Polytechnic University*

## History and organization

### History

- 1896 Decision of the State Council to establish Tomsk Institute of Technology authorized by Nikolay II
- 1899 Prof. Zubashev was assigned the Director of Tomsk Emperor Nikolay II Institute of Technology
- 1900 Inauguration of Tomsk Institute of Technology
- 1904 Prof. Mendeleev was selected the first Honorary member of Tomsk Institute of Technology
- 1906 The first graduation of Siberian engineers from mechanical and chemical departments
- 1925 Tomsk Institute of Technology was reorganized in Siberian Institute of Technology
- 1930 Siberian Institute of Technology was divided into five institutes, three of which were remained in Tomsk (Siberian Mechanical Institute, Siberian Institute of Chemical Engineering, Tomsk Electromechanical Institute of Railway Engineers); Siberian Building Institute was moved in Novosibirsk; Siberian Metallurgical Institute – in Novokuznetsk
- 1934 Siberian Mechanical Institute, Siberian Institute of Chemical Engineering, Tomsk Electromechanical Institute of Railway Engineers were merged in Tomsk Industrial Institute
- 1939 Prof. Usov became the Academician of the Academy of Sciences of the USSR (the first in Siberia)
- 1940 Tomsk Industrial Institute was awarded the Order of the Red Banner of Labour
- 1944 Tomsk Industrial Institute was transformed to Tomsk Polytechnic Institute
- 1947 The first home betatron was invented
- 1953 The first NV centre in Siberia was put into operation
- 1965 Synchrotron ‘Sirius’, the largest in the country was invented



*E.L. Zubashev,  
the first Director of Tomsk Emperor Nikolay II  
Institute of Technology*

- 1967 Research nuclear reactor IRT-1000 was floated
- 1971 Tomsk Polytechnic Institute was awarded the Order of the October Revolution
- 1982 Prof. Nakoryakov, TPI graduate, was awarded the State Prize for research carried out into wave dynamics of liquid-gas system
- 1991 By the Ministry Order of the RSFSR Tomsk Polytechnic Institute was reorganized in Tomsk Polytechnic University
- 1992 Board of Trustees was opened at TPU
- 1997 Prof. Khandorin, TPU graduate, was awarded the State Prize in the field of science and engineering for the development and implementation of weapon-grade uranium processing in fuel for nuclear power stations
- By the President's Decree TPU was placed on Register of National Treasure of the Russian Culture
- 2001 TPU, first in Russia, underwent the international independent audit of the quality management system and creation of scientific products meeting the requirements of ISO 9001:2000
- 2005 TPU, first in Russia, accreted to the Conference of European Schools for Advanced Engineering Education and

- Research (CESAER) and Consortium Linking Universities of Science and Technology for Education and Research is a network of leading European Universities of Technology (CLUSTER)
- 2009 TPU was conferred with status of National Research University
- 2010 D. Medvedev, the President of the Russian Federation visited TPU
- 2011 TPU, the first one among the Russian universities, accessed to the largest international project CDIO (Conceive – Design – Implement – Operate)

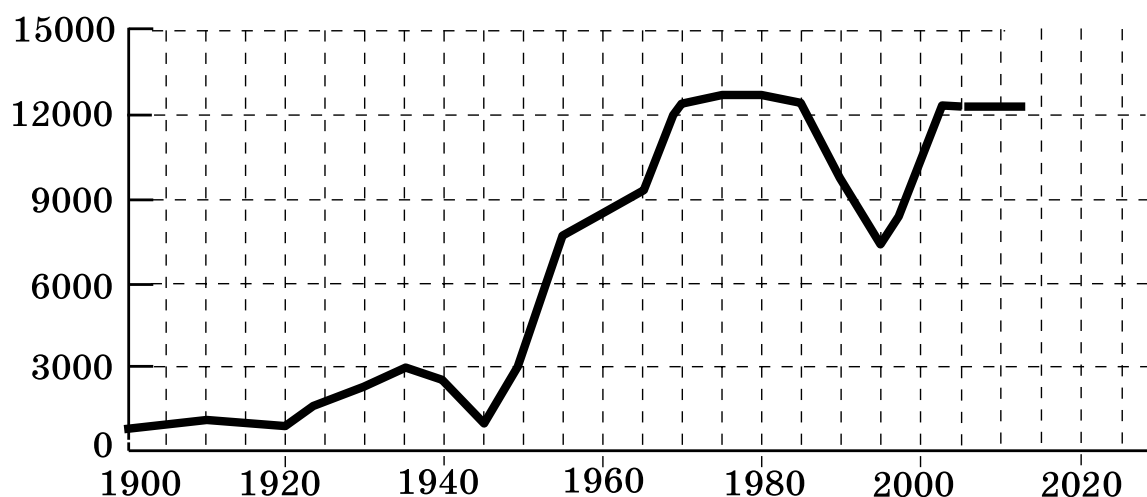
### From collection of laws of the Russian Empire

*... His Emperor Majesty, a decision about the establishment of Institute of Technology in Tomsk-city ensued at General Meeting of the State Council, assented and enjoined to execute*

### From the diary of S.Yu. Vitte, the Russian Minister of Finance

*March 5, 1896. Today I have removed the funds allocated for the battleship and gave them up to foundation of Tomsk Institute of Technology*

The number of full-time students



### Names

- **Segrey Vitte**, the Russian politician; Minister of finances; the Ministry Chairman of the Russian Empire, the count; an initiator of foundation of the Institute of Technology in Tomsk
- **Dmitry Mendeleev**, the outstanding Russian chemist; a member of Councils which developed the plan and the project of building of Tomsk Institute of Technology; Honorary Member of Tomsk Institute of Technology
- **Nikolay Beketov**, the Russian physicist-chemist; one of the founders of physical chemistry and chemical dynamics; laid the foundations for aluminothermy; Honorary Member of Tomsk Institute of Technology
- **Vladimir Obruchev**, the Russian geologist, palaeontologist, geographer, science-fiction writer (the author of such famous novels as ‘Sannikov Land’ and ‘Plutonia’); court councilor; a Hero of Socialist Labor; twice a laureate of the Lenin and the Stalin Prizes; the first Dean of the Mining Department of Tomsk Institute of Technology
- **Grigory Potanin**, the Russian geographer, ethnographer, one of the founders of the Siberian Oblast; Honorary Member of Tomsk Institute of Technology
- **Nikolay Kizhner**, the author of the scientific discovery in the field of organic chemistry – ‘Kizhner reaction’ – hydrocarbon synthesis; Professor in ordinary at the Department of Organic Chemistry; creator of the chemical laboratory of organic matters

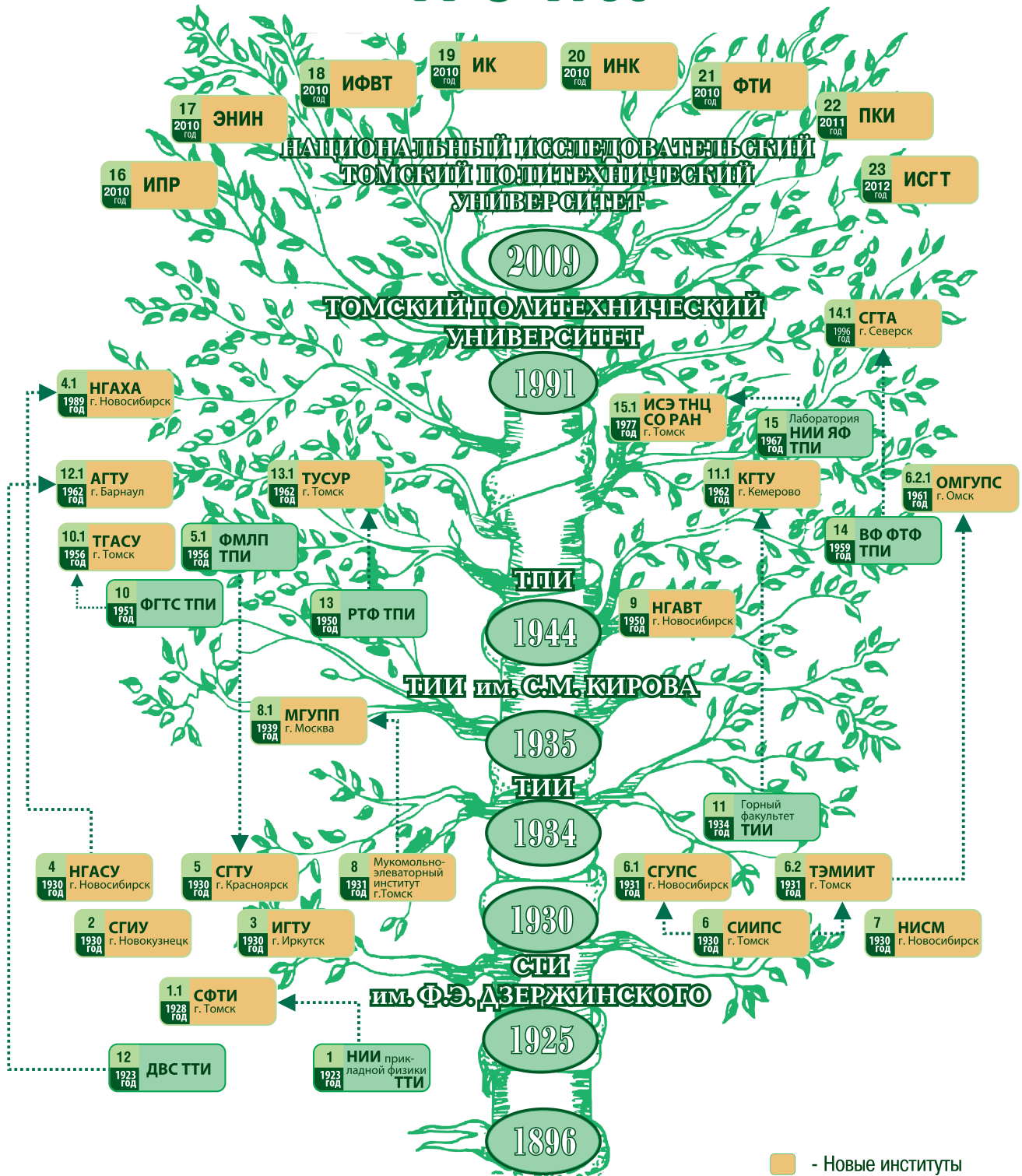




- **Boris Veinberg**, the organizer and the head of 23 expeditions in the field of the Earth magnetism; creator of the magnetic cushion train model; Professor in ordinary at the Department of Physics; creator of the meteorological station, the first aero study group at the Institute in 1910; one of the organizers and the Director of Tomsk Research Institute of Applied Physics
- **Nikolay Semenov**, the soviet physicist and physicist-chemist, a laureate of the Nobel Prize (1956); twice **the Hero of Socialist Labor**. Since December 1918 he had studied at postgraduate courses and worked as a teacher at the Department of Physics. In 1920 was invited by A. Ioffe to St.-Petersburg
- **Michael Mil**, the soviet constructor of helicopters and the scientist; the Hero of Socialist Labor; the laureate of Lenin prize and the State Award of the USSR. In 1925 he was enrolled in Siberian Institute of Technology, and had been studied there till 1928, then he transferred to Don Polytechnic Institute where he was admitted to aviation specialty
- **Konstantin Shmargunov**, professor at the Department of Mining Electromechanics; the Director of Tomsk Institute of Technology (1939–1944); actively participated in important events in Tomsk supporting the front; a member of the Scientific Committee of Tomsk created for assistance in the development of industrial enterprises and transport during the World War II. In 1946 he was appointed the Director of Polytechnic University in Leningrad
- **Grigory Zubarev**, the first Rector of Tomsk Institute of Radioelectronics and Electronic Engineering (Tomsk State University of Control Systems and Radioelectronics); graduate of Tomsk Polytechnic Institute; the Dean of Radio Engineering Faculty (1958–1961)
- **Sergey Kapitza**, the soviet scientist, television anchorman, one of the founders of Cliodynamics; a member of European Academy, World Academy of Art and Science, Roman Club and other learned societies; Honorary Professor of TPU
- **Michael Shadov**, the Minister of Coal Industry of the USSR (1985–1991); Honoured miner of the Russian Federation. Graduated from engineering courses at TPI in 1953; Honorary Professor of TPU
- **Leonid Filimonov**, the Minister of Oil and Gas Industry of the USSR (1989–1991); Honorary Member of TPU; till 2010 a member of TPU Board of Trustees
- **Metropolitan Pitirim (Konstantin Nechaev)**, Doctor Divinitatis, bishop of Russian Church, metropolitan Volokolamsky and Yurievsky; People's Deputy of the USSR; Honorary Professor of TPU
- **Peter Skaliski**, physicist, the Rector of Technical University of Vienna (2011–2012); Honorary Professor of TPU
- **Manfred Horvat**, the Director of the Department of European and International Programs of the Austrian Research Promotion Agency; Honorary Professor of TPU; a member of TPU Board of Trustees
- **Utkir Sultanov**, Prime Minister of Uzbekistan republic (1995–2003); Honorary Graduate of TPU; Honorary Professor of TPU
- **Vladimir Korotkevich**, the Director of OAO 'Siberian Chemical Combine'; correspondent member of the International Academy of Ecology, Man and Nature Protection Sciences; Honoured Chemist of the Russian Federation; Honorary Graduate of TPU

TPU has always met the needs of the times and settled relevant problems of the country. TPU has passed an age-long path from Tomsk Institute of Technology provided training of specialists for formation of industry and economy in Siberia to National research Tomsk Polytechnic University, the centre of science and education of the world standards.

## TPU Tree



## TPU Tree

1. Research Institute of Applied Physics
  - 1.1. Siberian Institute of Physics and Engineering (Tomsk)
2. Siberian State Industrial University (Novokuznetsk)
3. Irkutsk State Technical University
4. Novosibirsk State University of Architecture and Civil Engineering
  - 4.1. Novosibirsk State Academy of Architecture and Art
5. Siberian State University of Technology (Krasnoyarsk)
  - 5.1. Faculty of forest industries motorization of TPI; moved to Krasnoyarsk in 1956 to strengthen Siberian Institute of Forestry Engineering in Krasnoyarsk
6. Siberian Institute of Railway Engineers
  - 6.1. Siberian State Railway University
  - 6.2. Tomsk Electromechanical Institute of Railway Transport Engineers (1931)
    - 6.2.1. Omsk State Railway University
7. Novosibirsk Institute of Agricultural Engineering (1930)
8. Tomsk Milling Elevator Institute
  - 8.1. Moscow State University of Food Production
9. Novosibirsk State Academy of Water Transport
10. Faculty of Hydraulic Engineering TPI (1951)
  - 10.1. Tomsk State University of Architecture and Building
11. Mining Faculty TPI (1934). In 1962 moved to Kemerovo Mining Institute
  - 11.1. Kuzbass State Technical University, Kemerovo
12. Department of Explosion Engines of TPI was moved to Altai Polytechnic Institute in 1962/63
  - 12.1. Altai State Technical University
13. Radio Engineering Faculty TPI (1950)
  - 13.1. Tomsk State University of Control Systems and Radioelectronics
14. Seversk State Technological Academy
15. Laboratory of Research Institute of Nuclear Physics
  - 15.1. Institute of High-Current Electronics
16. Institute of Natural Resources
17. Institute of Power Engineering
18. Institute of high Technology Physics
19. Institute of Cybernetics
20. Institute of Non-Destructive Testing
21. Institute of Physics and Technology
22. Design Institute
23. Institute of Social and Humanitarian Technologies

## Graduates

During 116 years, TPU has trained almost 160 thousand specialists; of them over 300 are the laureates of Lenin and State Prizes, Heroes of Socialist Labor, academicians, Honoured masters of sciences and engineering.

Among the graduates:

- **Dmitry Bondarev**, creator of the first domestic automobile ‘Russobalt’
- **Michael Ter-Asaturov**, one of the designers of the first domestic lot production tractors; the Head of Putilovsky Plant in St.-Petersburg
- **Matvey Kapelushnikov**, inventor of the first in the world turbo-drill
- **Nikolay Urvantzev**, the pioneer of Norilsk ore field
- **Nikolay Kamov**, designer of the unique domestic helicopters
- **Nikolay Nikitin**, the author and builder of Ostankino TV tower
- **Kanysh Satpaev**, the pioneer of one of the largest in the world Dzhezkazgan copper-ore field; organizer and the first President of the Academy of Sciences of Kazakhstan
- **Oleg Alimov**, creator of a drilling device used for extraction of the moon soil by station ‘Luna-24’
- **Gennady Mesyatz**, the outstanding electrophysicist in the world; creator of several academic institutes, Vice-President of the Russian Academy of Sciences

## From the TPU Complex Development Plan for 2011–2015

*The challenges of the external environment and new socio-economic conditions require from the universities and the whole system of higher vocational education to adequately response to, and from Tomsk Polytechnic University to actualize its mission, strategic goals, and routes of development in preserving the motto ‘Knowledge. Liberty. Prosperity’.*

## Mission Statement

**The mission of Tomsk Polytechnic University** is to contribute to Russia’s prosperity through the pursuit of education, learning, and research at the highest international levels of excellence thus building and enhancing the competitive position of our country. We place special emphasis on advanced engineering education, generation of new knowledge, innovative ideas, creation of resource-efficient technologies, internationalisation and integration of research and academic activities. Our winning formula is synergism based on professionalism, creativity and harmony.

TPU core values:

- freedom and enthusiasm in expanding knowledge boundaries in priority fields of science for the benefit of humankind;
- innovations in the field of research and education when striving for professional excellence;
- independent thinking and creativity;
- staff involvement into all fields of university activities to reveal their potential to the best advantage;
- team spirit among alumni, students and employees based on traditions established throughout our history;
- transparent corporate culture ensuring comfortable working environment;
- personal freedom based on intolerance to any manifestation of racial, ethnic, religious, gender, political or other form of discrimination.

## Development Program

The goal of the Development Program of TPU in the capacity of a national research university is its formation as a university of the world-class level oriented towards staffing and engineering of technology for resource-efficient economy.

The goal achievement requires the solving of the following problems:

- Training of top specialists for engineering and implementation of resource-efficient technologies
- Creation of the infrastructure of scientific and innovative activities
- Peopleware development
- Improvement of the university management system

## Priority Research Fields

All the priority research fields are oriented towards solving the problems of resource efficiency.

- Wildlife management and advanced processing of natural resources
- Traditional and nuclear power engineering, alternative technologies of power generation
- Nanotechnologies and beam-plasma technologies of tailor-made materials
- Intelligent information-telecommunication systems of monitoring and control
- Non-destructive testing and diagnostics in production and social spheres

**Alumni Assembly is the supreme authority of the university management. It includes the Board of Trustees, Alumni Association Board, and the Academic Board of the university.**



The Alumni Assembly defines the development strategy of the university in the interests of a person, society, and the government; it provides interaction between the university and the external environment.

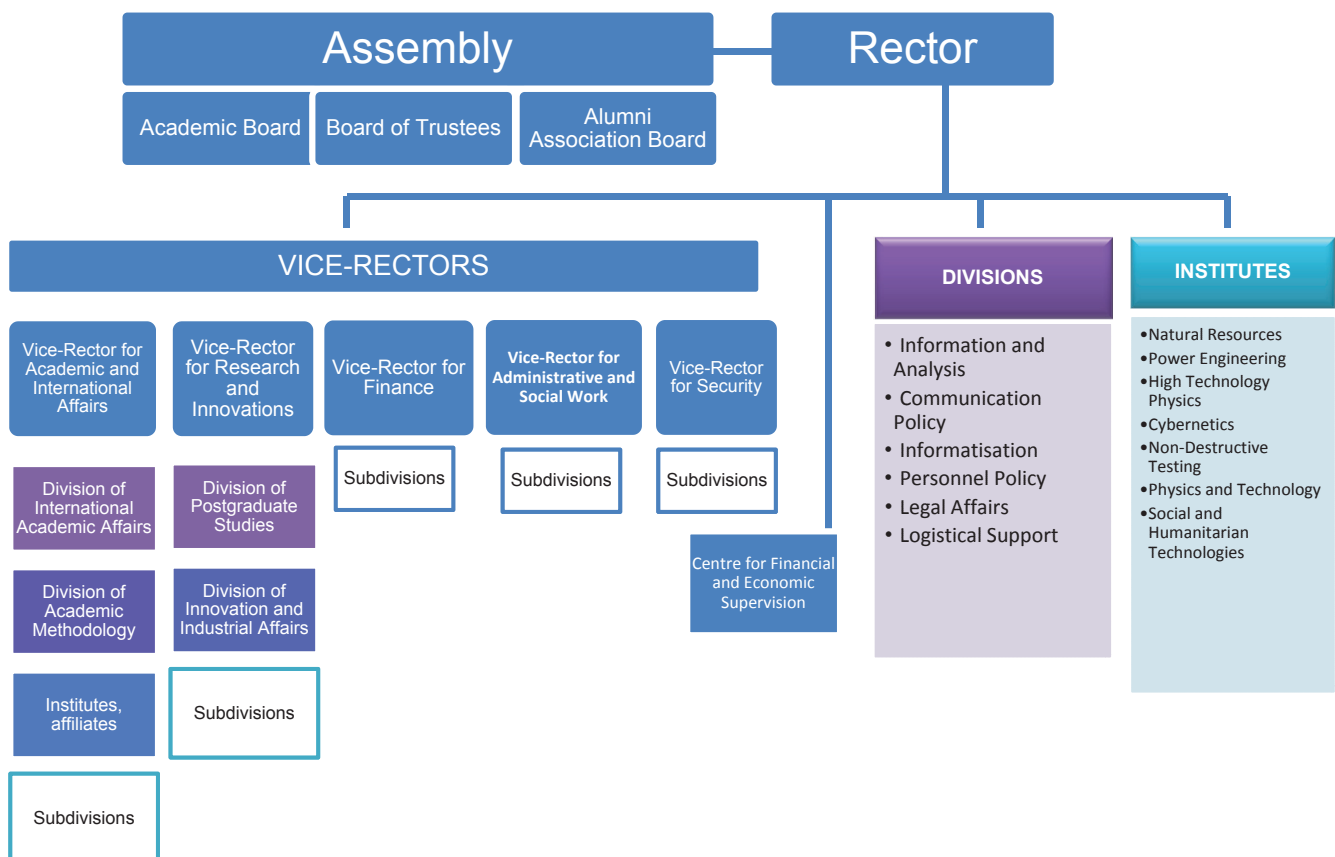
The Board of Trustees is a collegial body which provides consulting services and recommendations for the rector on the important issues concerning the university development. The activity of ten elders selected from the range of distinguished professors and famous university scientists should foster the further

improvement of the research and educational processes at TPU. The Elders' quorum is headed by Professor V. Moskalev, the Honoured master of sciences and engineering of Russia.

The Board of Trustees was set up in 1991. G. Mesyatz is the President of the Board of Trustees, the Vice-President of the Russian Academy of Science.

The Alumni Association Board was created in 1992. M. Kozyrev is its President, the adviser at TPU Rector's office.

## TPU Organization



## Administration

*Petr S. Chubik,  
Rector*

*Alexander I. Chuchalin,  
Vice-Rector for Academic  
and International Affairs*

*Alexey K. Mazurov,  
Vice-Rector for Finance*

*Ivan I. Solovyov,  
Vice-Rector for Security*

*Andrey Yu. Dmitriev,  
Vice-Rector, Director of the Institute  
of Natural Resources*

*Alexey N. Yakovlev,  
Vice-Rector, Director of the Institute  
of High Technology Physics*

*Vasily A. Klimenov,  
Vice-Rector, Director of the Institute  
of Non-Destructive Testing*

*Yuri S. Borovikov,  
Vice-Rector, Director of the Institute  
of Power Engineering*

*Sergey B. Mogilnitsky,  
Head of the Information and Analysis  
Division*

*Konstantin G. Kvasnikov,  
Head of the Informatization Division*

*Galina E. Simakhina,  
Head of the Legal Affairs Division*

*Viktor A. Vlasov,  
Vice-Rector for Research and  
Innovations*

*Maxim V. Vedyashkin,  
Vice-Rector for Administrative and  
Social Work*

*Michael A. Sonkin,  
Vice-Rector, Director of the Institute  
of Cybernetics*

*Oleg Yu. Dolmatov,  
Vice-Rector, Director of the Institute  
of Physics and Technology*

*Denis V. Chaikovsky,  
Vice-Rector, Director of the Institute  
of Social and Humanitarian Technologies*

*Liliya G. Kiryanova,  
acting Head of Communication Policy  
Division*

*Natalya V. Serkova,  
Head of Personnel Policy Division*

*Michael V. Ponomarenko,  
Head of Logistical Support Division*

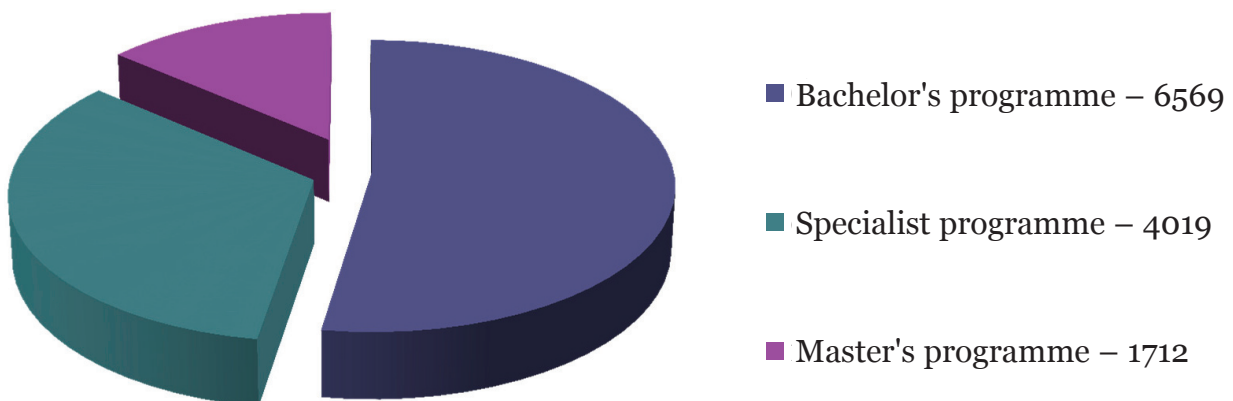
## Facts and figures

### The number of academics and students

<b>General academic number, including</b>	<b>2295</b>
• <b>DSc holders</b>	<b>325</b>
• <b>PhD holders</b>	<b>1340</b>
<b>General student population, including</b>	<b>22800</b>
• <b>full-time students</b>	<b>12300</b>
• <b>extra-mural students</b>	<b>1000</b>
• <b>part-time students</b>	<b>9500</b>

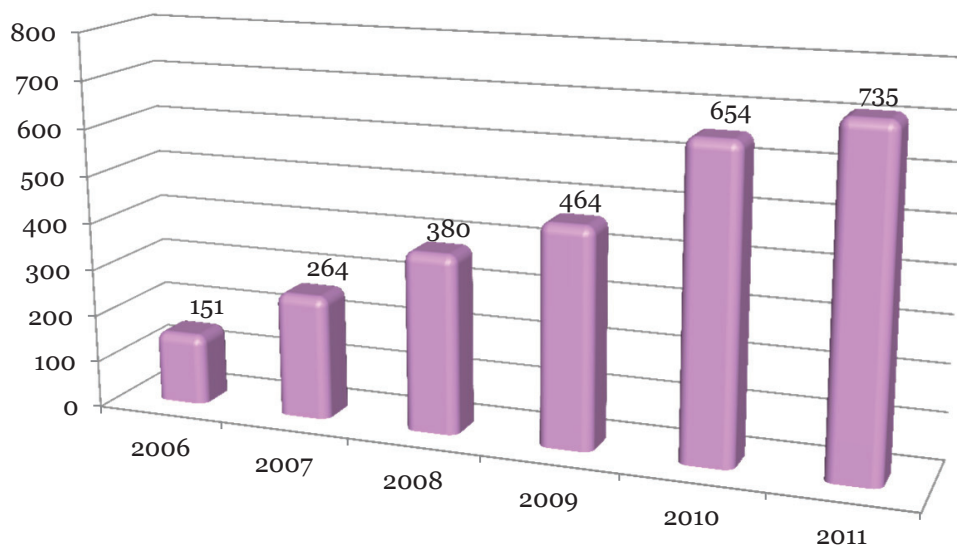
20 academicians and correspondent members of the Russian Academy of Sciences work at TPU

### Assignment of students

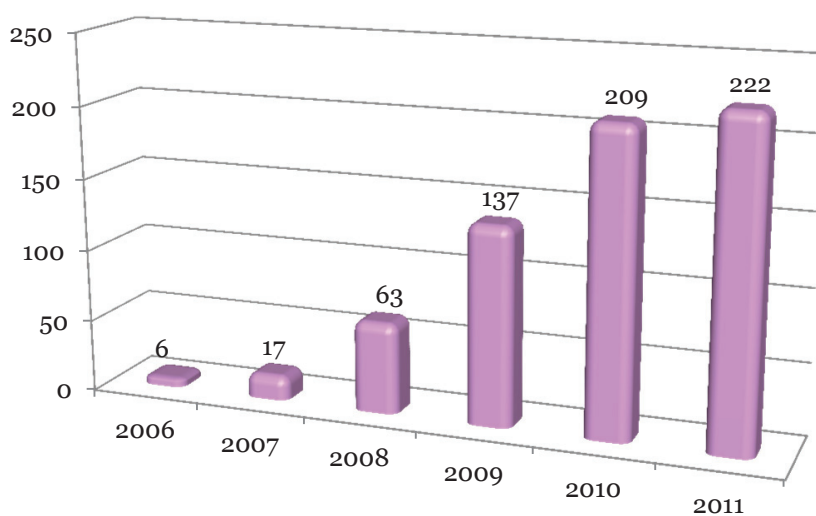




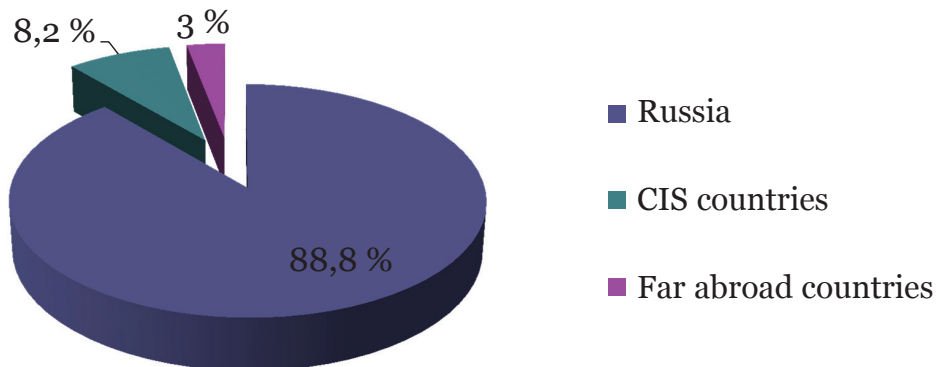
## State-Financed Graduate School



## Contractual Graduate School

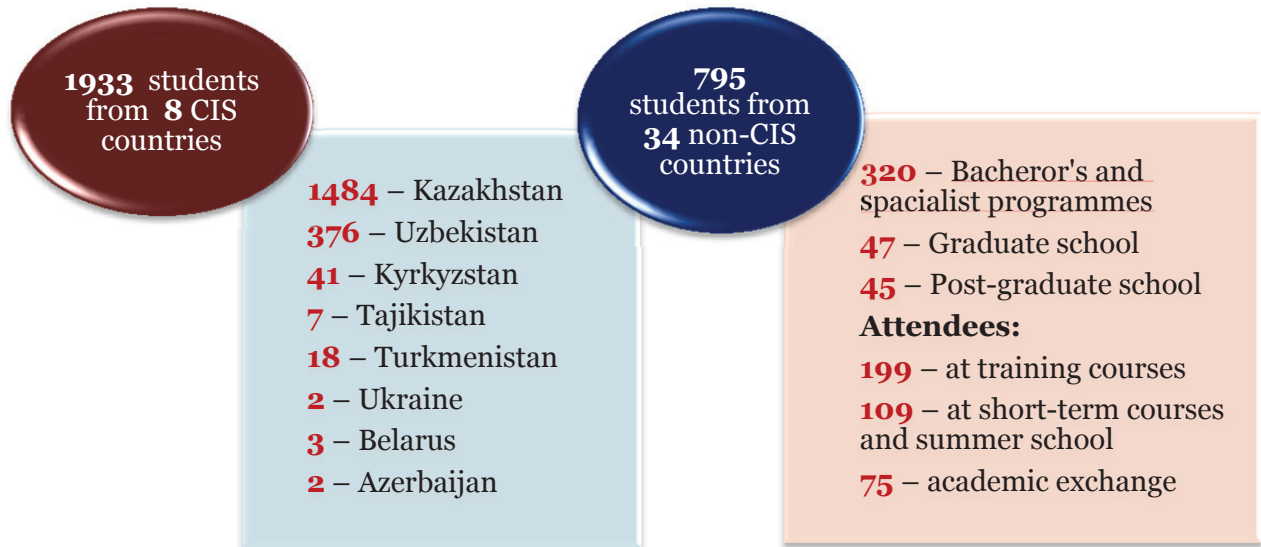


## International students



In 2011 TPU Diplomas were granted to 65 international students from far abroad countries (46 bachelors, 3 specialists, and 16 masters).

## International student population

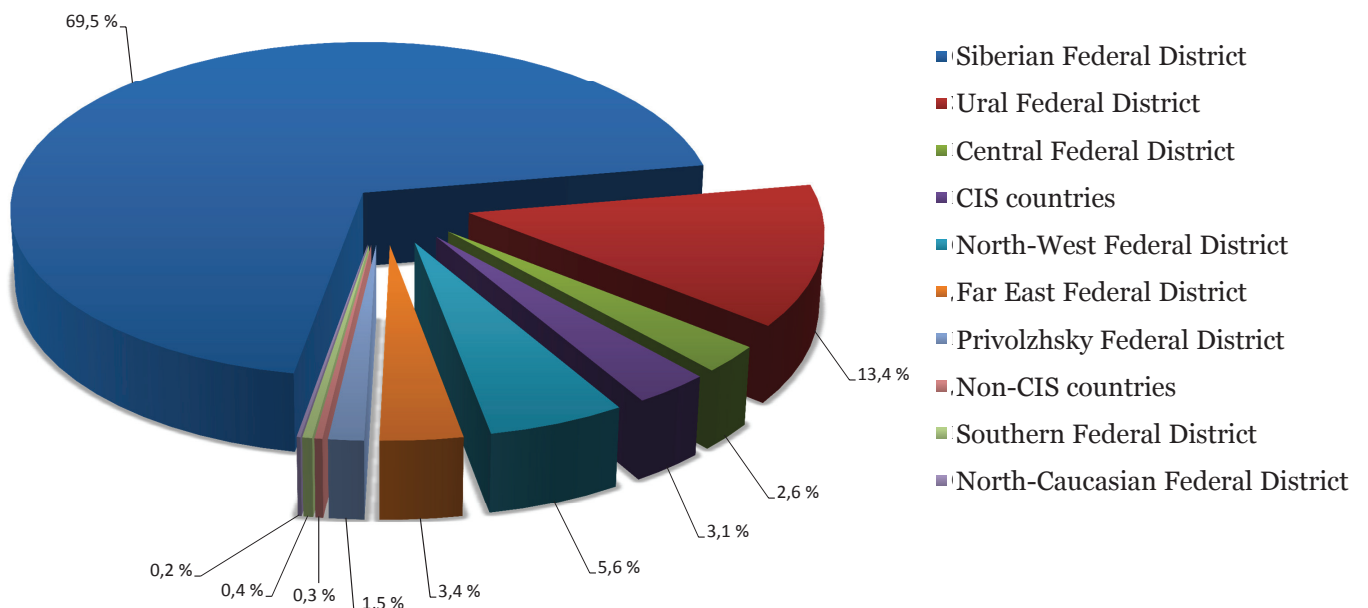


## 11 Double Degree Programmes

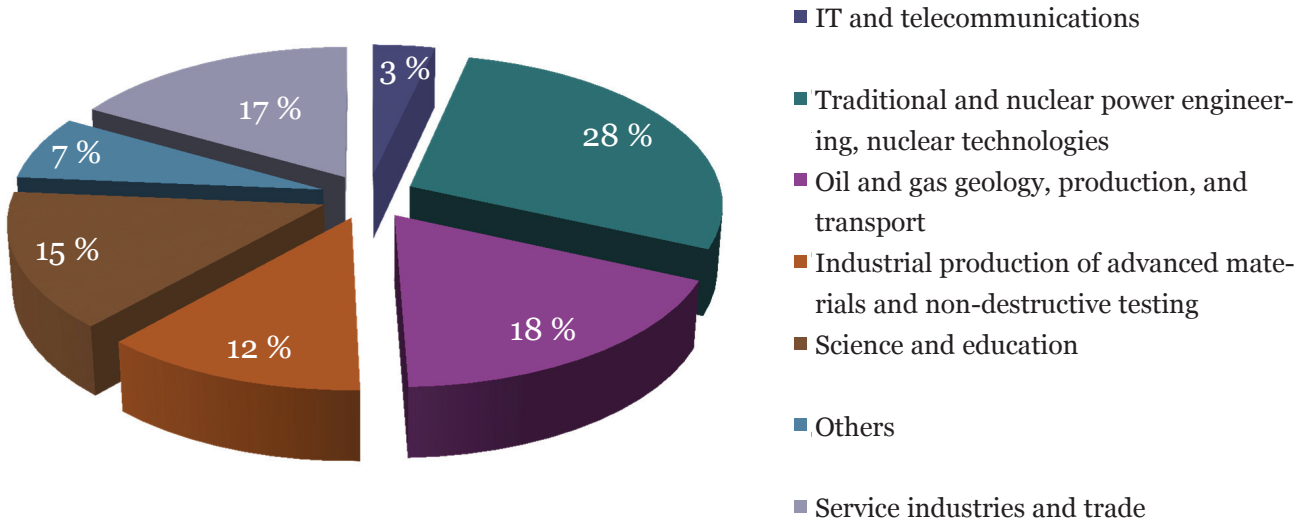
The European universities-partners on the implementation of the Double Degree programmes:

- Technical University of Berlin (Germany)
- Aachen University of Applied Science (Germany)
- Technical University of Munich (Germany)
- Czech Technical University in Prague (Czech)
- University Paris SUD 11 (France)
- Heriot-Watt University (Great Britain)

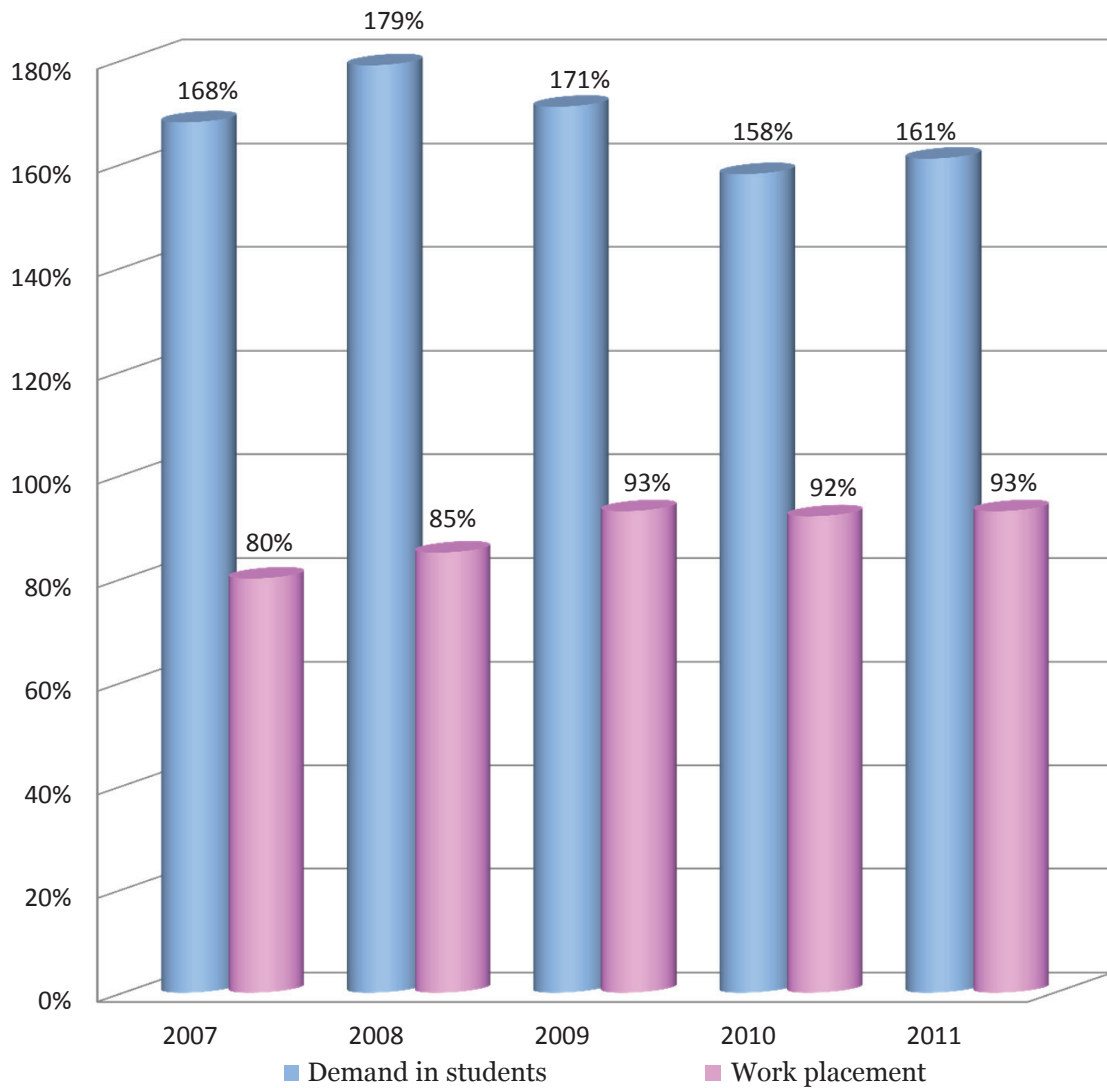
## Work placement geography



## Assignment of students by industries



## Student demand and assignment



### Skolkovo project residents

- OOO R&D Centre 'Smart Grids' (between TPU and Melentiev Power Engineering Institute, Irkusk). Projects:
  - Hybrid simulator all-speed real time complex of distribution network
  - Decentralized power supply systems with the involvement of renewable energy, storage systems, and active consumers
  - Hardware and software platforms for embedded digital control power converters
- OOO 'Nanokor' (between TPU and Research Institute of Cardiology). Project:
  - Development of therapy technology of vein atherosclerosis using chemically modified nanoparticles
- OOO 'Centre for Petroleum Technologies'. Power efficiency cluster. Project:
  - On-line web development for monitoring and control for separation and utilization of casing-head gas
- OOO 'NIC RSK'. Project:
  - Software for the advanced navigation and telecommunication systems using GLONASS and pilotless aircrafts for mobile team control

### Innovative infrastructure

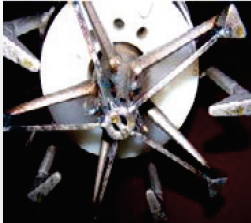
- Centre of excellence 'Raduga'
- OOO Technological Incubator of TPU
- 12 core facility centres and 10 research and education centres of excellence
- 70 small innovative enterprises
  - 24 are financed by the Foundation for Assistance to Small Innovative Enterprises in Science and Technology within the Program START
  - 3 are residents of Tomsk special technology development economic area
  - 28 are established by Federal Law 217
- Exhibition centre 'Science and education at TPU: traditions and novations'

### TPU balance sheet

- 43 ground areas of 154 ha;
- 21 buildings;
- TPU Library (2,7 million books);
- Centre of excellence 'Raduga';
- International Culture Centre;
- Food Production Facility;
- 2 kindergartens;
- Health Centre;
- Recreation Camp;
- Children's Camp;
- Sporting Facilities;
- Work experience centre for geology;
- 14 student hostels (5528 accommodations)

## World-class products

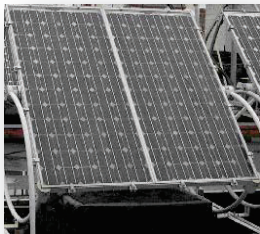
### Electric discharge technologies



Electric discharge drilling

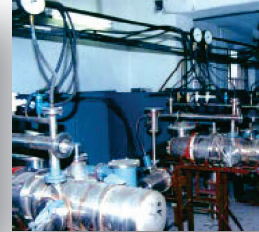


Water treatment

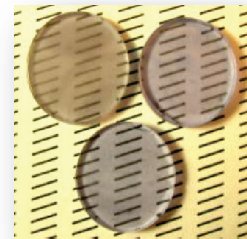


- ❑ Nanopowder pilot production using plasma chemical synthesis
- ❑ Solar silicon production and silicon-based products for solar energy

### Nanotechnologies



Unique production technology of nanodispersed powders and production of tailor-made products



- ❑ Production of heat insulating foam glassceramic materials
- ❑ Production technique of optically transparent nanoceramics

TPU is the only one designer and producer in the world of small size



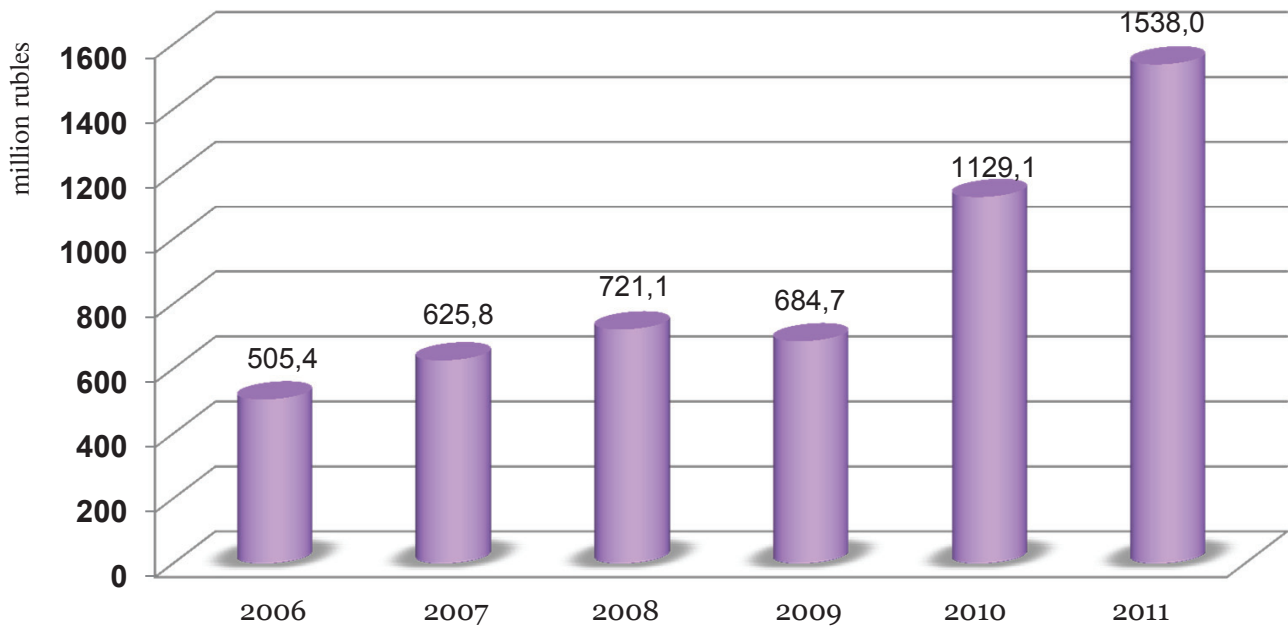
Inspection systems and medical applications

Technologies and set-ups for application of plasma thermal regulated and modified coating

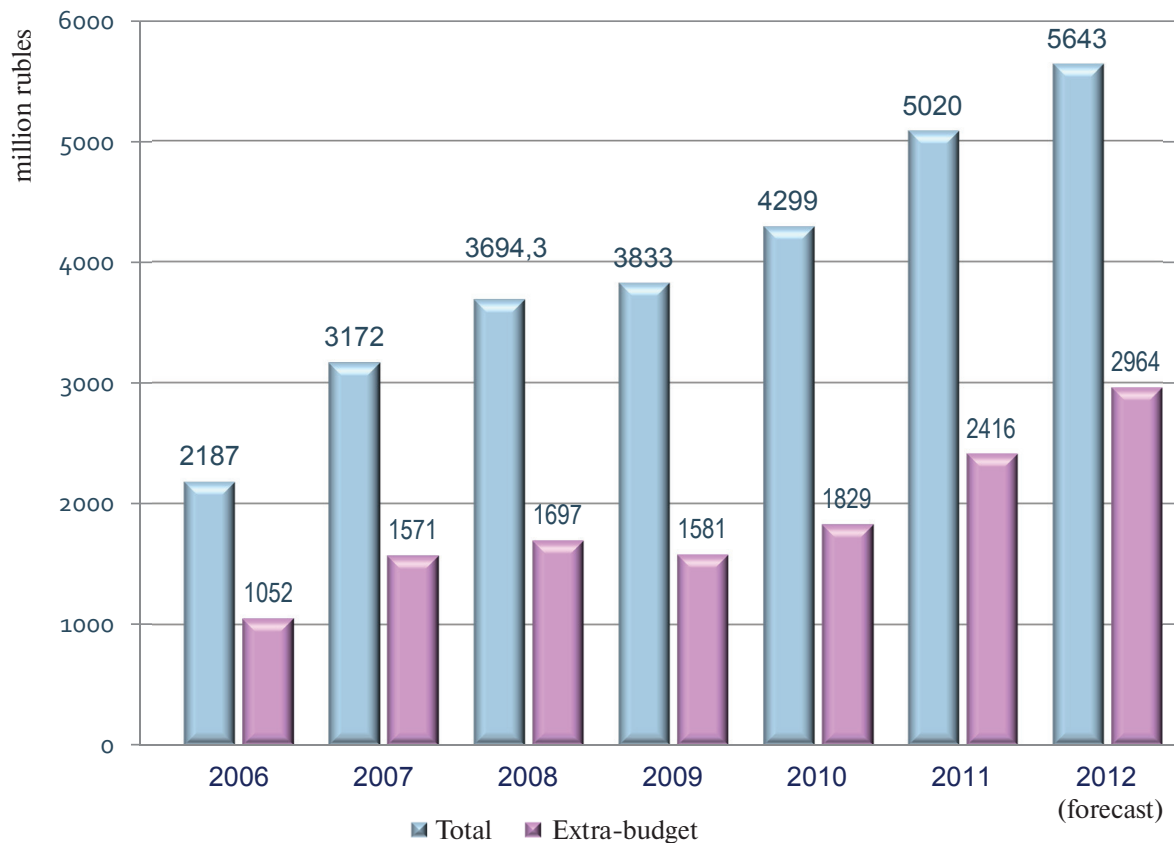


GLONASS applications

## R&amp;D dynamics



## Consolidated Budget



## Cooperation

### International cooperation

TPU is strongly involved in cooperation with many countries of the world. There are 39 countries-partners with which TPU has concluded over 200 agreements and 37 contracts.

762 employees have improved their qualifications and worked on probations.

TPU includes 20 international laboratories and three research centres. In 2011 there were opened 2 international laboratories:



- Thermosetting Polymers (in tandem with SIBUR Holding; Head D. Verwake, Belgium)
- X-Ray Optics (in tandem with the National Academy of Sciences, Head A. Mkrtchan, Armenia)

### The main universities-partners of TPU:

Universität Karlsruhe (KIT), Technische Universität München, Sheffield University, Saarland University, Université Paris-Sud 11, Vienna University of Technology, Hiroshima University, Shenyang Institute of Technology, University of New Orleans, Université Louis Pasteur Strasburg (ULP), National Polytechnic

Institute of Grenoble, Czech Technical University), University of Trondheim (Norway), Ulsan University (Korea), etc.

### Major industrial partners

GT Semiconductor Materials Co Ltd (Китай), Smiths Heimann GmbH (Germany), Adensis GmbH Company (Germany), Beijing Co Ltd (China), DSO CO 09085 (Singapore), Unodrill AS (Uno) (Norway), UNID Co Ltd. (Korea).

### Centers

«Microsoft», «Danfoss», «Lapp Group», «Hughes», «Woodward» and other companies.





## TPU membership in international associations and initiatives

- International Association of University Presidents, IAU


- International Network for Engineering Education and Research iNEER


- European Society for Engineering Education, SEFI


- Conference of European Schools for Advanced Engineering Education and Research CESAER


- Consortium Linking Universities of Science and Technology for Education and Research is a network of leading European Universities of Technology


- European University Association, EUA


- Top Industrial Managers for Europe, T.I.M.E.


- CDIO Initiative


- European Association of Research & Administrators, EARMA


- European Network for Quality of Higher Engineering Education for Industry, ENQHEEI


- International Society for Engineering Education, IGIP


- European Association for International Education, EAIE



### Strategic partnership

TPU has concluded 315 agreements of strategic partnership:

- 186 with the industrial enterprises, organisations, and institutions of the Siberian Federal District including 99 agreements with the Tomsk region;
- 81 with other subjects of the Russian Federation;
- 41 with CIS countries;
- 5 with non-CIS countries (Great Britain, Germany, Japan, Italy, France)

### Tomsk region

- OOO 'Gasprom transgas Tomsk'
- OAO 'Siberian Chemical Combine'
- OOO 'Tomskneftehim'
- OAO 'Centersibnefteprovod'
- OAO 'Tomsk Vakhrushev Electromechanical Plant'
- OAO 'NPC Polus'
- OAO 'Manotom'
- ZAO 'Siberian Agrarian Group'
- ZAO 'Tomskkabel', and others

### Russia

- OOO 'Gasprom'
- OAO 'Reshetnev Information Satellite Systems'
- ZAO 'NK Rosneft'
- OAO 'Alrosa'
- AK 'Basic Element'
- GUP 'Mining and Chemical Combine'
- OAO 'Concern Energoatom'
- TNK-BP
- Shell
- Schlumberger
- SB RAS, and others



## Institutes



- Institute of Natural Resources
- Institute of Power Engineering
- Institute of High Technology Physics
- Institute of Cybernetics
- Institute of Non-Destructive Testing
- Institute of Physics and Technology
- Institute of Social and Humanitarian Technologies



- Institute of International Education and Language Communication
- Institute of Distance Learning
- Institute of Lifelong Learning
- Yurga Institute of Technology, TPU affiliate



## *Institute of Natural Resources*

**A/Prof. Andrey Yu. Dmitriev, PhD**

*Vice-Rector, Director*

*Tel./Fax: +7 (3822) 426-173*

*E-mail: ipr@tpu.ru*

The Institute offers training in the following academic programmes:

Bachelor's programmes – 8

Specialist programmes – 2

Master's programmes – 7 including 2 DD programmes

Postgraduate programmes – 17

### **Oil-and-gas subject area**

#### **Department of Geology and Oil Field Development**

Degree Programmes offered:

- Bachelors
  - 131000 Petroleum Engineering
- Masters
  - Oil and Gas Field Development and Operation
- Postgraduates
  - 25.00.09 Geochemistry, Geochemical Methods of Exploration
  - 25.00.12 Geology and Exploration of Fuels
  - 25.00.17 Oil and Gas Field Development and Operation

#### **Department of Oil and Gas Storage and Transportation**

Degree Programmes offered:

- Bachelors
  - 131000 Petroleum Engineering
- Masters
  - Oil-and-Gas Pipeline and Storage Reliability

#### **Department of Well Drilling**

Degree Programmes offered:

- Bachelors
  - 131000 Petroleum Engineering
  - 130102 Geological Exploration Technology
- Masters
  - Long-Hole Construction Complicated by Geological Factor
- Postgraduates
  - 25.00.14 Exploration Engineering and Technology
  - 25.00.15 Drilling Technology and Well Completion

#### **Department of Oil-and-Gas Complex Engineering Design**

Degree Programmes offered:

- Masters
  - Programs of Heriot-Watt University (one year of study) and DD (two years of study)
  - Geological-Geophysical Problems of Oil-and-Gas Fields Exploration

### **Mining and geology subject area**

#### **Department of Hydrogeology, Engineering Geology and Hydrogeocology**

Degree Programmes offered:

- Bachelors
  - 280100 Environmental Engineering and Water Resources Management
- Qualified specialists
  - 130101 Applied Geology
- Masters
  - Environmental Engineering Survey
- Postgraduates and Doctoral Students
  - 25.00.07 Groundwater Hydrology
  - 25.00.08 Engineering Geology, Geocryology, Pedology
  - 25.00.09 Geochemistry, Geochemical Methods of Exploration
  - 25.00.36 Environmental Geology

## Department of Geophysics

Degree Programmes offered:

- Bachelors
  - 130102 Geological Exploration Technology
- Postgraduates
  - 25.00.10 Geophysics, Geophysical Methods of Exploration

## Department of Geology and Minerals Prospecting

Degree Programmes offered:

- Qualified specialists
  - 130101 Applied Geology
- Masters
  - Geology and Mineral Deposits
- Postgraduates and Doctoral Students
  - 25.00.09 Geochemistry, Geochemical Methods of Exploration
  - 25.00.11 Geology and Exploration of Solid Minerals, Minerageny

## Department of Geoecology and Geochemistry

Degree Programmes offered:

- Bachelors
  - 022000 Ecology and Wildlife Management
  - 020700 Geology
- Masters
  - Geology of Radioactive Raw Materials
  - Environmental Geology
- Postgraduates and Doctoral Students
  - 25.00.09 Geochemistry, Geochemical Methods of Exploration
  - 25.00.11 Geology and Exploration of Solid Minerals, Minerageny
  - 25.00.36 Environmental Geology

## Department of Natural Resources Economics

Degree Programmes offered:

- Bachelors

- 080200 Management
- Masters
  - Logistics
  - Enterprise Economics and Management
- Postgraduates
  - Economics and National Economics Management (including economics, industrial engineering and management, regional economy, management, innovation management, wildlife management economics, land management)

## Department of Geology and Land Management

Degree Programmes offered:

- Bachelors
  - 120700 Land Management and Inventory
- Postgraduates
  - 25.00.01 General and Regional Geology
  - 25.00.11 Geology and Exploration of Solid Minerals, Minerageny
  - 25.00.26 Land Management, Cadastre and Monitoring

## Chemical engineering subject area

### Department of Chemical Engineering of Fuels and Chemical Cybernetics

Degree Programmes offered:

- Bachelors
  - 240100 Chemical Engineering
  - 241000 Energy-Efficient and Resource-Saving Processes in Chemical Engineering, Petrochemistry and Bioengineering
- Masters
  - Chemical Engineering of Fuel and Gas
  - Processes and Devices of Industrial Chemistry
- Postgraduates
  - 05.17.07 Engineering of Chemical Fuels and High-Energy Materials
  - 05.17.08 Processes and Devices of Chemical Engineering

- Doctoral Students
  - 05.17.08 Processes and Devices of Chemical Engineering

### Department of Technology of Organic Substances and Polymer Materials

Degree Programmes offered:

- Bachelors
  - 240100 Chemical Engineering
- Masters
  - Chemical Engineering of Organic and Petrochemical Synthesis
  - Chemical Engineering of High-Molecular Compounds
- Postgraduates
  - 05.17.04 Organic Matter Technology

### Department of Chemical Engineering

Degree Programmes offered:

- Bachelors
  - 240100 Chemical Engineering
  - 241000 Energy-Efficient and Resource-Saving Processes in Chemical Engineering, Petrochemistry and Bioengineering
- Masters
  - Chemical Engineering of Inorganic Matters and Materials
- Postgraduates and Doctoral Students
  - 05.17.08 Processes and Devices of Chemical Engineering

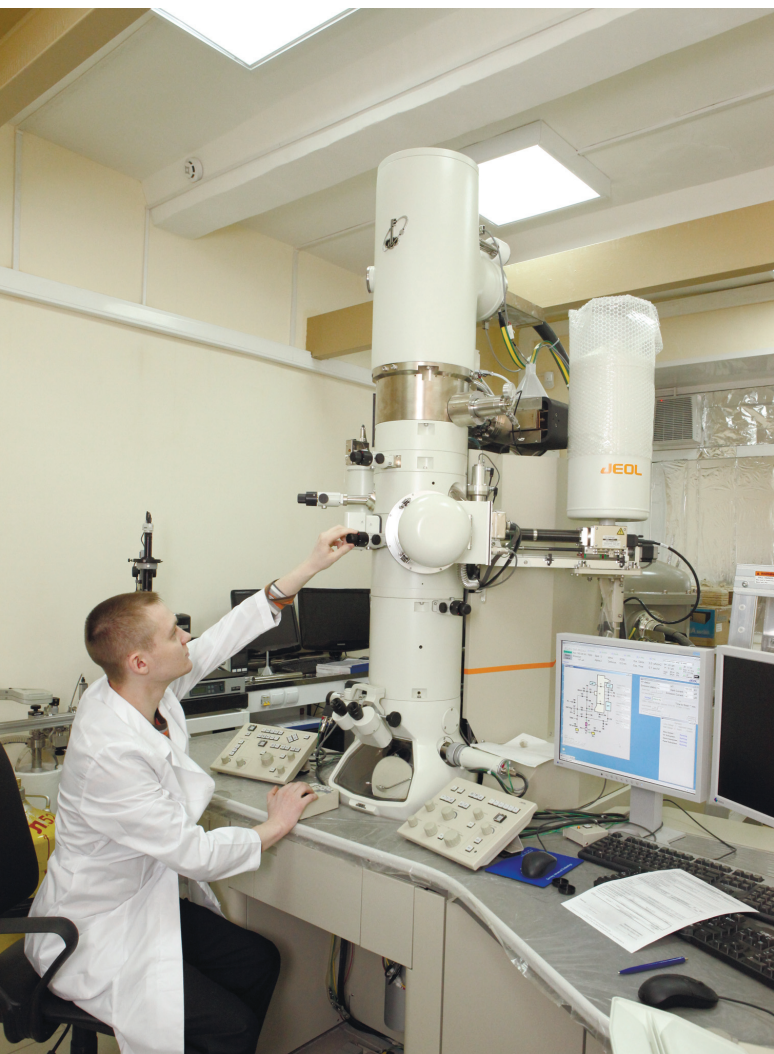
### Department of Physical and Analytical Chemistry

Degree Programmes offered:

- Bachelors
  - 240100 Chemical Engineering
- Masters
  - Analytical Control for Built Environment
- Postgraduates
  - 02.00.02 Analytical Chemistry
  - 02.00.04 Physical Chemistry

### Department of Foreign Languages for Specialists in Natural Resources

The faculty members teach 1–5 year students and graduate students Basic Level English and Foreign Language for Specific Purposes (English, German).



## *Institute of Power Engineering*

**A/Prof. Yuri S. Borovikov, PhD**

*Vice-Rector, Director*

*Tel./Fax: 8 (3822) 563-787*

*E-mail: borovikov@tpu.ru*

The Institute offers training in the following academic programmes:

- Bachelor's programmes – 3
- Specialist programme – 1
- Master's programme – 3 including 1 DD programme
- Postgraduate programmes – 6

### **Department of Electric Grids and Systems**

Degree Programmes offered:

- Bachelors
  - 140400 Electric Power Engineering and Electrical Engineering
- Masters
  - Power Systems Automation
  - High-Voltage Engineering of Electric Power Systems
  - Control Modes of Electric Power Systems

### **Department of Electromechanical Plants and Materials**

Degree Programmes offered:

- Bachelors
  - 140400 Electric Power Engineering and Electrical Engineering
- Masters
  - Material Studies in Electrical Engineering and Radio Electronics
  - Design and Production Technology for Electromechanical Converters

### **Department of Electric Drives and Equipment**

Degree Programmes offered:

- Bachelors
  - 140400 Electric Power Engineering and Electrical Engineering
- Masters
  - Energy Saving Modes of Electrical Power Supplies, Complexes, and Systems
  - Electric Drives and Control Systems
- Postgraduates
  - 05.09.01 Electromechanics and Electric Devices
  - 05.09.03 Electrical Engineering Systems
- Doctoral Students
  - 05.09.01 Electromechanics and Electric Devices

### **Department of Industrial Electric Power Supply**

Degree Programmes offered:

- Bachelors
  - 140400 Electric Power Engineering and Electrical Engineering
- Masters
  - Renewable Energy Sources
  - Optimization of Modern Power Supply Systems
- Postgraduates
  - 05.09.01 Electromechanics and Electric Devices
  - 05.14.02 Electric Power Plants and Electric Systems

### **Department of Power Grids and Electrical Engineering**

Educational disciplines offered:

Electrical Engineering; Electrical Engineering and Electronics; Electrical Engineering Theory; Theoretical Electrical Engineering; Selected Chapters of Electrical Engineering; Basics of Electrical Engineering; Electrical Engineering,

Electronics and Simulation; Electrical Engineering, Electric Drive

- Masters
  - Electric Power Systems, Power Grids and Transmission: Modes, Stability and Reliability
  - Energy Saving and Energy Efficiency

### **Department of Nuclear and Thermal Power Plants**

Degree Programmes offered:

- Bachelors
  - 140400 Electric Power Engineering and Electrical Engineering
- Qualified Specialists
  - 141403 Nuclear Power Plants: Design, Operation and Engineering
- Masters
  - Heat and Electric Power Generation Technology
- Postgraduates
  - 05.14.14 Thermal Power Plants, Grids and Generating Units

### **Department of Steam Generating Machinery Engineering**

Degree Programmes offered:

- Bachelors
  - 141100 Power Machinery Engineering
- Masters
  - Water and Fuel Engineering
- Postgraduates
  - 01.04.14 Thermal Physics and Theoretical Combustion Engineering
  - 05.14.14 Thermal Power Plants, Grids and Generating Units

### **Department of Theoretical and Industrial Heat Systems Engineering**

Degree Programmes offered:

- Bachelors
  - 140100 Heat and Power Engineering and Heat Engineering
- Masters
  - Heat and Mass Transfer Processes and Installations
  - Thermal Physics in Heat-and-Power Engineering
  - Low Temperature Physics and Engineering
- Postgraduates
  - 01.04.14 Thermal Physics and Theoretical Combustion Engineering
  - 05.14.04 Industrial Heat and Power Engineering

### **Department of Heat and Power Process Automation**

Degree Programmes offered:

- Bachelors
  - 140100 Heat and Power Engineering and Heat Engineering
- Postgraduates
  - 05.13.06 Engineering and Production Automation and Control

### **Department of Foreign Languages**

The Department offers foreign language training for senior students, retraining of faculty members in advanced technologies in education.



## *Institute of High-Technology Physics*

**A/Prof. Alexey N. Yakovlev, PhD**

*Vice-Rector, Director*

*Tel.: +7 (3822) 417-899*

*E-mail: jakovlev\_an@tpu.ru*

The Institute offers training in the following academic programmes:

- Bachelor's programmes – 7
- Master's programmes – 6 including 3 DD programmes
- Postgraduate programmes – 10

### **Beam-Plasma Technologies subject area**

#### **Department of High-Current Electronics**

Degree Programmes offered:

- Masters
  - Physical Electronics

#### **Department of Lasers and Lighting Engineering**

Degree Programmes offered:

- Bachelors
  - 200400 Optical Engineering
- Masters
  - Methods and Technology of Pulsed Optical and Physical Research
  - Lighting Engineering and Light Sources
- Postgraduates
  - 01.04.07 Physics of Condensed Matter
  - 05.09.07 Lighting Engineering and Light Sources
- Doctoral Students
  - 01.04.01 Tools and Methods of Experimental Physics
  - 01.04.07 Physics of Condensed Matter
  - 05.09.07 Lighting Engineering and Light Sources

#### **Department of High Technology Physics in Mechanical Engineering**

Degree Programmes offered:

- Bachelors
  - 150700 Mechanical Engineering
- Masters
  - High Technology Physics in Mechanical Engineering

### **Electric Discharge Technologies subject area**

#### **Department of High Voltage Engineering and Electrophysics**

Degree Programmes offered:

- Bachelors
  - 140600 Hi-Tech Plasma and Energy Equipment
- Masters
  - High-Voltage Physics and Engineering
- Postgraduates and Doctoral Students
  - 05.14.12 High Voltage Engineering

### **Chemical Engineering in Medicine subject area**

#### **Department of Bioengineering and Organic Chemistry**

Degree Programmes offered:

- Bachelors
  - 240700 Bioengineering
- Masters
  - Chemical Engineering of Bioactive Substances

### **Nanotechnologies and Nanomaterials subject area**

#### **Department of Nanomaterials and Nanotechnologies**

Degree Programmes offered:

- Bachelors
  - 150100 Materials Science and Technology

- Masters
  - Nanostructured Materials Tool Production

### Department of General and Inorganic Chemistry

Degree Programmes offered:

- Masters
    - Nanomaterial Production Techniques, Structure and Properties
  - Postgraduates and Doctoral Students
    - 02.00.04 Physical Chemistry
    - 05.17.08 Processes and Devices of Chemical Engineering
- Majors:** Inorganic Chemistry; General and Inorganic Chemistry, Chemistry

### Department of Material Science in Mechanical Engineering

Degree Programmes offered:

- Bachelors
  - 150100 Materials Science and Technology
- Masters
  - Computer Simulation of Material Production, Processing and Treatment
  - Materials Science and Technology of Nanomaterials and Coatings
- Postgraduates
  - 05.16.01 Physical Metallurgy and Heat Treatment of Metals
  - 05.16.06 Powder Metallurgy and Composites
- Doctoral Students
  - 05.16.01 Physical Metallurgy and Heat Treatment of Metals
  - 01.04.07 Physics of Condensed Matter

### Department of Material Science and Process Metallurgy

Degree Programmes offered:

- Postgraduates

- 05.16.01 Physical Metallurgy and Heat Treatment of Metals

**Majors:** Material Science; Materials Science and Engineering Materials; Principles of Metal Forming; Machine-Building Processes; Artistic Forging Technology; Artistic Casting Technology

### Department of Silicate and Nanomaterials Technology

Degree Programmes offered:

- Bachelors
  - 240100 Chemical Engineering
- Masters
  - Chemical Engineering of Refractory Nonmetals and Silicates
- Postgraduates and Doctoral Students
  - 05.17.11 Silicate and Refractory Non-Metal Materials Technology

### Department of Theoretical and Applied Mechanics

Degree Programmes offered:

- Bachelors
  - 151000 Production Machines and Equipment
- Postgraduates and Doctoral Students
  - 01.02.06 Dynamics and Durability of Machinery
  - 05.02.08 Theory of Mechanisms and Machines

### Department of Foreign Languages

The Department offers foreign language training for senior students, retraining of faculty members in advanced technologies in education.

## *Institute of Cybernetics*

**A/Prof. Mikhail A. Sonkin, PhD**

*Vice-Rector, Director*

*Tel./Fax: +7 (3822) 420-001*

*E-mail: sonkin@tpu.ru*

The Institute offers training in the following academic programmes:

- Bachelor's programmes – 11
- Master's programmes – 8 including 3 DD programmes
- Postgraduate programmes – 9

### **Department of Computer-Aided Design Systems**

Degree Programmes offered:

- Bachelors
  - 230100 Computer Science and Technology
- Masters
  - Software Development
  - Distributed Automated Systems
- Postgraduates
  - 05.13.01 Systems Analysis, Data Management and Processing
  - 05.13.11 Mathematical Software for Computing Machines, Computer Systems and Networks
- Doctoral Students
  - 05.13.11 Mathematical Software for Computing Machines, Computer Systems and Networks

### **Department of Automatics and Computer Systems**

Degree Programmes offered:

- Bachelors
  - 220400 Control in Computer Systems
  - 230100 Computer Science and Technology
  - 230400 Information Systems and Technologies

- Masters
  - Software Development
  - Control System Theory
- Postgraduates
  - 05.13.01 Systems Analysis, Data Management and Processing

### **Department of Computer Engineering**

Degree Programmes offered:

- Bachelors
  - 230100 Computer Science and Technology
  - 230400 Information Systems and Technologies
- Masters
  - Microprocessors
  - Computer Analysis and Data Interpretation
  - Geographic Information Systems
- Postgraduates
  - 05.13.11 Mathematical Software for Computing Machines, Computer Systems and Networks

### **Department of Applied Mathematics**

Degree Programmes offered:

- Bachelors
  - 010400 Applied Mathematics and Informatics
- Masters
  - Mathematical Physics
  - Mathematical Modeling
- Postgraduates and Doctoral Students
  - 01.04.20 Physics of Charged Particle Beams and Accelerating Equipment
  - 05.13.01 Systems Analysis, Data Management and Processing
  - 05.13.11 Mathematical Software for Computing Machines, Computer Systems and Networks
  - 05.13.18 Mathematical Simulation, Numerical Computing and Software Systems

## Department of Integrated Computer Control Systems

Degree Programmes offered:

- Bachelors
  - 220700 Workflow and Production Automation
  - 221000 Mechatronics and Robotics
- Masters
  - Mechatronic Control Systems
- Postgraduates
  - 05.13.01 Systems Analysis, Data Management and Processing
  - 05.13.06 Engineering and Production Automation and Control

## Department of Control System Optimization

Degree Programmes offered:

- Bachelors
  - 230100 Computer Science and Technology
  - 230700 Applied Computing
- Masters
  - Software Systems Design
  - Computer Networks and Telecommunications
- Postgraduates and Doctoral Students
  - 05.13.01 Systems Analysis, Data Management and Processing



- 05.13.11 Mathematical Software for Computing Machines, Computer Systems and Networks

## Department of Descriptive Geometry and Graphics

Degree Programmes offered:

- Bachelors
  - 072500 Design

**Majors for students:** Descriptive Geometry; Engineering Graphics; Engineering and Computer Graphics; Descriptive Geometry and Graphics; Computer Design; Theory of Shadows and Perspective Views; Computer Graphics Technology in Social Work; Basics of Computer Graphics; Engineering Composition; Design

**Majors for Professional Advancement Centre:** Descriptive Geometry and Teaching Methods; Applied Geometry of Surfaces; Main Kinds of Transformation; Engineering Graphics and Teaching Methods; Computer-Aided Graphics Problem Solving; Problems of Design Using PAutoCAD; 3D Modeling; Advanced IT.

## Department of Automation and Robotics in Mechanical Engineering

Degree Programmes offered:

- Bachelors
  - 151900 Design-Engineering Supply for Mechanical Engineering
  - 261400 Arts and Treatment of Materials
- Masters
  - Dynamics and Acoustics of Machine Tool Systems
- Postgraduates

- 01.02.06 Dynamics and Durability of Machinery

## Department of Automated Engineering Technology

Degree Programmes offered:

- Bachelors
  - 150700 Mechanical Engineering
- Masters
  - Workflow and Production Automation in Mechanical Engineering
- Postgraduates and Doctoral Students
  - 01.02.06 Dynamics and Durability of Machinery
  - 05.02.18 Theory of Machines and Mechanisms
  - 05.03.01 Technology and Equipment of Mechanical and Physicotechnical Treatment

## Department of Computer-Aided Measurement Systems and Metrology

Degree Programmes offered:

- Bachelors
  - 221700 Standardization and Metrology
- Masters
  - Computer-Aided Measurement and Control (CAMAC)
- Postgraduates
  - 05.11.01 Measuring Devices and Methods

## Department of Foreign Languages

Bachelors, engineers and masters of the Institute of Cybernetics are trained in foreign language for specific purposes.

## *Institute of Non-Destructive Testing*

**Prof. Vasily A. Klimenov, DSc**

*Vice-Rector, Director*

*Tel.: 8 (3822) 418-697*

*E-mail: klimenov@tpu.ru*

The Institute offers training in the following academic programmes:

- Bachelor's programmes – 5
- Master's programmes – 5 including 1 DD programme
- Postgraduate programmes – 9

### **Department of Welding Engineering**

Degree Programmes offered:

- Bachelors
  - 150700 Mechanical Engineering
- Masters
  - Welding Engineering
- Postgraduates
  - 05.03.06 Welding Technology and Equipment
  - 05.09.03 Electrical Engineering Systems

### **Department of Physical Methods of Non-Destructive Testing**

Degree Programmes offered:

- Bachelors
  - 200100 Instrument Engineering
  - 221400 Quality Management
- Masters
  - Non-Destructive Testing Devices and Techniques
  - Quality Management in Manufacturing and Technological Systems
- Postgraduates
  - 05.02.11 Methods of Control and Diagnostics in Mechanical Engineering
  - 05.11.13 Testing Devices and Methods of Natural Environment, Substances, Materials and Products

- Doctoral Students
  - 05.11.13 Testing Devices and Methods of Natural Environment, Substances, Materials and Products

### **Department of Precision Instrument Making**

Degree Programmes offered:

- Bachelors
  - 200100 Instrument Engineering
- Masters
  - Geophysical Instrumentation
  - Attitude Control and Navigation Systems
  - CAD Systems in Instrument Engineering
- Postgraduates
  - 01.02.06 Dynamics and Durability of Machinery
- Doctoral Students
  - 01.02.06 Dynamics and Durability of Machinery
  - 05.11.03 Gyroscopic Devices and Systems

### **Department of Information-Measuring Engineering**

Degree Programmes offered:

- Bachelors
  - 200100 Instrument Engineering
- Masters
  - Measuring IT
  - Information and Measurement Equipment and Technology of Non-Destructive Testing
- Postgraduates
  - 05.11.01 Measuring Devices and Methods (measuring of electric and magnetic quantities)
  - 05.11.13 Testing Devices and Methods of Natural Environment, Substances, Materials and Products
  - 05.11.17 Medical Devices, Systems and Products

## Department of Industrial and Medical Electronics

Degree Programmes offered:

- Bachelors
  - 201000 Bioengineering Systems and Technology
  - 210100 Electronics and Nanoelectronics
- Masters
  - Electronic Devices and Facilities
  - Medical and Biological Devices and Systems
  - Electronic Control and Diagnostic Systems in Engineering and Medicine
- Postgraduates
  - 05.09.12 Power Electronics
  - 05.11.13 Testing Devices and Methods of Natural Environment, Substances, Materials and Products
  - 05.11.17 Medical Devices, Systems and Products
- Doctoral Students
  - 05.11.13 Testing Devices and Methods of Natural Environment, Substances, Materials and Products

## Department of Ecology and Basic Safety

Degree Programmes offered:

- Bachelors
  - 280700 Safety in Technosphere
- Masters
  - Industrial Ecology and Sustainable Use of Natural Resources
- Postgraduates
  - 03.00.16 Ecology
  - 05.26.03 Fire and Industrial Safety
  - 05.11.13 Testing Devices and Methods of Natural Environment, Substances, Materials and Products
  - 02.00.02 Analytical Chemistry

## Department of Foreign Languages

Bachelors, engineers and masters of the Institute of Non-Destructive Testing are trained in foreign language for specific purposes.



## *Institute of Physics and Technology*

**A/Prof. Oleg Yu. Dolmatov, PhD**

*Vice-Rector, Director*

*Tel.: 8 (3822) 417-954, 563-792*

*E-mail: dolmatov@tpu.ru*

The Institute offers training in the following academic programmes:

- Bachelor's programmes – 4
- Specialist programmes – 2
- Master's programmes – 3 including 1 DD programme
- Postgraduate programmes – 12

### **Nuclear Physics subject area**

#### **Department of Theoretical and Experimental Physics**

Degree Programmes offered:

- Masters
  - Advanced Materials and Technologies in Medicine, Medical Devices and Dentistry
- Postgraduates
  - 01.04.04 Physical Electronics
  - 01.04.07 Physics of Condensed Matter
  - 01.04.16 Nuclear and Elementary Particle Physics

#### **Department of Higher Mathematics and Mathematical Physics**

Degree Programmes offered:

- Bachelors
  - 010400 Applied Mathematics and Informatics
  - 231300 Applied Mathematics
- Postgraduates and Doctoral Students
  - 01.04.02 Theoretical Physics
  - 01.04.16 Nuclear and Elementary Particle Physics

#### **Department of Higher Mathematics**

Degree Programmes offered:

- Postgraduates
  - 01.01.04 Geometry and Topology
  - 01.04.07 Physics of Condensed Matter
- Doctoral Students
  - 05.11.13 Testing Devices and Methods of Natural Environment, Substances, Materials and Products

#### **Department of Applied Physics**

Degree Programmes offered:

- Bachelors
  - 140800 Nuclear Physics and Technologies
- Masters
  - Physics of Kinetic Phenomena
  - Medical Physics
- Postgraduates
  - 01.04.01 Tools and Methods of Experimental Physics
  - 01.04.16 Nuclear and Elementary Particle Physics
  - 01.04.20 Physics of Charged Particle Beams and Accelerating Equipment

### **Nuclear Technologies subject area**

#### **Department of Nuclear Power Plants**

Degree Programmes offered:

- Bachelors
  - 140800 Nuclear Physics and Technologies
- Masters
  - Nuclear Power Plant Systems
  - Nuclear and Technical Inspection and Control
- Postgraduates
  - 01.04.01 Tools and Methods of Experimental Physics
  - 01.04.08 Plasma Physics
  - 01.04.14 Thermal Physics and Theoretical Combustion Engineering
  - 05.14.03 Design, Operation and Decommissioning of Nuclear Power Plants



## Department of Electronics and Automation of Nuclear Plants

Degree Programmes offered:

- Qualified Specialists
  - 140801 Electronics and Automation of Nuclear Plants
- Postgraduates
  - 05.13.06 Engineering and Production Automation and Control

## Department of Applied Physics Engineering

Degree Programmes offered:

- Bachelors
  - 140800 Nuclear Physics and Technologies
- Masters
  - Medical Physics
- Postgraduates and Doctoral Students
  - 01.04.01 Tools and Methods of Experimental Physics
  - 01.04.08 Plasma Physics
  - 01.04.14 Thermal Physics and Theoretical Combustion Engineering

## Department of Rare, Scattered and Radioactive Element Technology

Degree Programmes offered:

- Qualified Specialists
  - 240601 Chemical Engineering of Materials in Modern Power Engineering
- Postgraduates
  - 05.17.02 Rare, Scattered and Radioactive Elements Technology

## Technical Physics subject area

### Department of General Physics

Degree Programmes offered:

- Bachelors
  - 011200 Physics
- Masters
  - Condensed Matter Physics
- Postgraduates
  - 01.04.01 Tools and Methods of Experimental Physics
  - 01.04.02 Theoretical Physics
  - 01.04.07 Physics of Condensed Matter
  - 01.04.16 Nuclear and Elementary Particle Physics
- Doctoral Students
  - 01.04.07 Physics of Condensed Matter

### Department of Hydrogen Energy and Plasma Engineering

Degree Programmes offered:

- Bachelors
  - 011200 Physics
- Masters
  - Plasma Physics
- Postgraduates
  - 01.04.01 Tools and Methods of Experimental Physics
  - 01.04.07 Physics of Condensed Matter
  - 01.04.08 Plasma Physics
  - 01.04.20 Physics of Charged Particle Beams and Accelerating Equipment

### Department of Foreign Languages for Specialists in Physics and Technology

The Department trains students of the 3–5 years of study and masters in foreign languages for specific purposes.

## *Institute of Social and Humanitarian Technologies*

**A/Prof. Denis V. Chaikovsky, PhD**

*Director*

*Tel.: +7 (3822) 705-002*

*E-mail: dnvit@tpu.ru*

The Institute offers training in the following academic programmes:

- Bachelor's programmes – 11
- Specialist programmes – 1
- Master's programmes – 15
- Postgraduate programmes – 6

### **Department of Engineering Entrepreneurship**

Degree Programmes offered:

- Bachelors
  - 220600 Innovation Management
  - 080200 Management
  - 100700 Business Studies
- Masters
  - Innovation Management
  - Project Management
  - Media Business Management
  - International Management
  - Innovative Entrepreneurship
- Postgraduates
  - 08.00.01 Economics
  - 09.00.11 Social Philosophy

### **Department of Management**

Degree Programmes offered:

- Bachelors
  - 080200 Management
- Masters
  - Marketing
  - Financial Management
  - Enterprise Economics and Management
- Postgraduates

- 08.00.10 Public Finance and Monetary Accommodation
- 08.00.05 Economics and National Economics Management: Regional Economy; Labour Economics; Innovations and Investments

### **Department of Economics**

Degree Programmes offered:

- Bachelors
  - 080100 Economics
- Masters
  - Corporate Economics and Planning
  - Accounting, Analysis, and Audit
  - Innovative Economics
- Postgraduates
  - 08.00.01 Economics

### **Department of Sociology, Psychology and Law**

Degree Programmes offered:

- Bachelors
  - 034700 Records Management and Archival Science
  - 080200 Management

### **Department of History and Regional Studies**

Degree Programmes offered:

- Bachelors
  - 032000 Foreign Regional Studies
- Qualified Specialists
  - 036401 Customs

### **Department of Philosophy**

Degree Programmes offered:

- Bachelors
  - 040400 Social Work
  - 080400 Human Resources Management
- Masters
  - Human Resources Management
- Postgraduates
  - 09.00.01 Ontology and Epistemology
  - 09.00.11 Social Philosophy

## Department of Cultural Studies and Social Communication

Degree Programmes offered:

- Bachelors
  - 100400 Tourism
- Masters
  - Tourism: Evolution, Structure, Management and Marketing
  - Tourist and Hospitality Management
- Postgraduates
  - 09.00.01 Ontology and Epistemology
  - 09.00.11 Social Philosophy

## Department of Management and Technology in Higher Professional Education

Degree Programmes offered:

- Masters
  - Research and Education Management

## Department of Foreign Languages

Offers English for bachelors, specialists, masters and postgraduate students.

## Department of Physical Training

Offers two cooperating activities: compulsory academic classes during three years plus examination in the sixth term and non-academic and sporting work.

## Department of Sports Disciplines

Degree Programmes offered:

- Bachelors
  - Physical Training



## *Institute of International Education and Language Communication*

A/Prof. Vladimir M. Zamyatin, PhD

*Director*

*Tel.: +7 (3822) 564–500*

*E-mail: zvm@tpu.ru*

### **Department of Russian as a Foreign Language**

Offers Russian as a foreign language. Conducts public testing on the Russian language as a foreign one. Courses for international undergraduates-philologists.

### **Department of the Russian Language and Literature**

Degree Programmes offered:

- Postgraduates
  - 10.01.01 Russian Literature
  - 10.02.01 Russian Language

- Additional education (for international students)
  - Interpreter for Professional Communication (Russian)
- Qualified specialists
  - Translation and Translation Studies

### **Department of Linguistics and Translation Studies**

Degree Programmes offered:

- Bachelors
  - 035700 Linguistics
- Qualified Specialists
  - 035701 Translation and Translation Studies

### **Department of Oriental Languages**

Offers the following language courses: Chinese for students of the Institute of International Education and Language Communication; the second foreign language: Chinese, Korean, and Japanese

### **Department of the German Language**

Offers the following disciplines and courses of study: Foreign Language (for junior students of all faculties and institutes of TPU); Foreign Language for Specific Purposes (3–5 year students, undergraduates).

### **Department of Methods of Teaching Foreign Languages**

Design and implementation of qualification improvement programs for the university employees.

Postgraduate courses offer:

- 13.00.02 Theory and Methodology of Teaching and Training
- 13.00.08 Theory and Methodology of Professional Education

### **Interdisciplinary Department**

International students are offered general academic disciplines both in Russian and English.



## *Institute of Lifelong Learning*

**Larisa A. Barinova**

*Acting Director*

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*E-mail: barinova@tpu.ru*

The Institute of Lifelong Learning offers the following activities:

- Professional advancement of teachers and researchers in the priority research fields
- Professional retraining with awarding additional qualification
- Professional retraining with the aim to conduct new kind of professional activity
- Professional advancement for specialists from industrial enterprises and organizations
- Professional training in blue-collar occupations
- Special training and attestation
- Training in additional academic programmes

## *Yurga Institute of Technology, TPU affiliate*

**A/Prof. Andrey B. Efremkov, PhD**

*Director*

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The Institute offers training in the following academic programmes:

- Bachelor's programmes – 7
- Specialist programmes – 1
- Master's programmes – 1

The Institute includes the following Faculties and Departments:

- Mechanical Engineering Faculty

- Department of Welding Production
- Department of Mechanical Engineering
- Department of Ferrous Metals Metallurgy
- Department of Agricultural Engineering
- Department of Mining Equipment
- Department of Mechanics and Engineering Graphics
- Economics and Management Faculty
  - Department of Economics and Automated Control Systems
  - Department of Information Systems
  - Department of Natural Sciences
  - Department of Humanities
  - Department of Foreign Languages
  - Department of Life Safety, Ecology and Physical Training
- Part-Time and Correspondence Education Faculty
- Pre-Tertiary Education Faculty

## *Institute of Distance Learning*

**Prof. Sergey I. Kachin, DSc**

*Director*

*Tel./fax: +7 (3822) 564–100*

*E-mail: ksi@ido.tpu.ru*

Degree Programmes offered:

- Bachelors
  - 031600 Advertising and Public Relations
  - 040400 Social Work
  - 080100 Economics
  - 080200 Management
  - 080400 Human Resources Management
  - 100400 Tourism
  - 100700 Business Studies
  - 140100 Heat and Power Engineering and Heat Engineering
  - 140400 Electric Power Engineering and Electrical Engineering

- 150700 Mechanical Engineering
- 200100 Instrument Engineering
- 220400 Control in Computer Systems
- 220700 Workflow and Production Automation
- 230100 Computer Science and Technology
- 230700 Applied Computing
- 240100 Chemical Engineering
- 241000 Energy-Efficient and Resource-Saving Processes in Chemical Engineering, Petrochemistry and Bioengineering
- 280700 Safety in Technosphere
- Masters
  - 100400 Tourism
  - 200100 Instrument Engineering
  - 220400 Control in Computer Systems
  - 241000 Energy-Efficient and Resource-Saving Processes in Chemical Engineering, Petrochemistry and Bioengineering

## *Department of Engineering Pedagogy*

**Prof. Mikhail G. Minin, DSc**

*Head of Department*

*Tel.: +7 (3822) 563–302*

*E-mail: minin@tpu.ru*

- Degree programmes offered:
- Masters, postgraduates and teachers
    - Additional education programme *University Teacher*;
  - Postgraduates
    - 13.00.08 Theory and Methodology of Professional Education

## *Reserve-Officer Training Department*

**Vasily D. Gorev, Colonel**

*Head of Department*

*Tel.: +7 (3822) 419–610*

The Department trains reserve officers for army air defense.

## Education

Tomsk Polytechnic University is the first Russian university which has accessed to the CDIO™ INITIATIVE (Conceive– Design– Implement– Operate), an innovative educational framework for producing the next generation of engineers. The CDIO concept was originally conceived at the Massachusetts Institute of Technology in the late 1990's.

TPU has designed and implemented the Standards and Guidelines for the quality assurance in academic programmes of bachelor's, master's, and specialist degrees in priority research fields the National research Tomsk Polytechnic University is being involved in.

During 2011, 83 concentration programmes have been updated in conformity with the TPU Standard: general regulations, curricula, work programs of academic disciplines and practices. These programmes are available at <http://portal.tpu.ru/departments/head/education/resource/fornd>.

Designs:

- Teaching and methodological resources for academic programmes on priority research fields in English designed for international students:
  - teaching and learning materials on 70 academic disciplines (including work programs, teaching aids, work-books, laboratory courses, lectures, monitoring materials, etc.)
  - booklets describing master's degree and bachelor's degree programmes
- teaching and learning courses of disciplines on engineering enterprise

- teaching and learning courses of optional and unified disciplines of concentration programmes
  - Introduction to Tolerance Theory and Practice
  - Business Communication
  - Methodological Problems of Modern Science
  - Philosophical Issues of Science and Engineering

These courses are offered students of engineering programmes, residents of the Student Business Incubator heads of industrial entrepreneurial organizations:

- The procedure of coordination of the graduates' expertise and employers. All concentration programmes have been coordinated in this way
- Regulations for Internal Accreditation of Concentration Programmes and Regulations for Accreditation of Modular-Based Programmes of TPU. In 2010/11 academic year 26 study disciplines was accredited.
- Professional development program for engineering skills of Russia

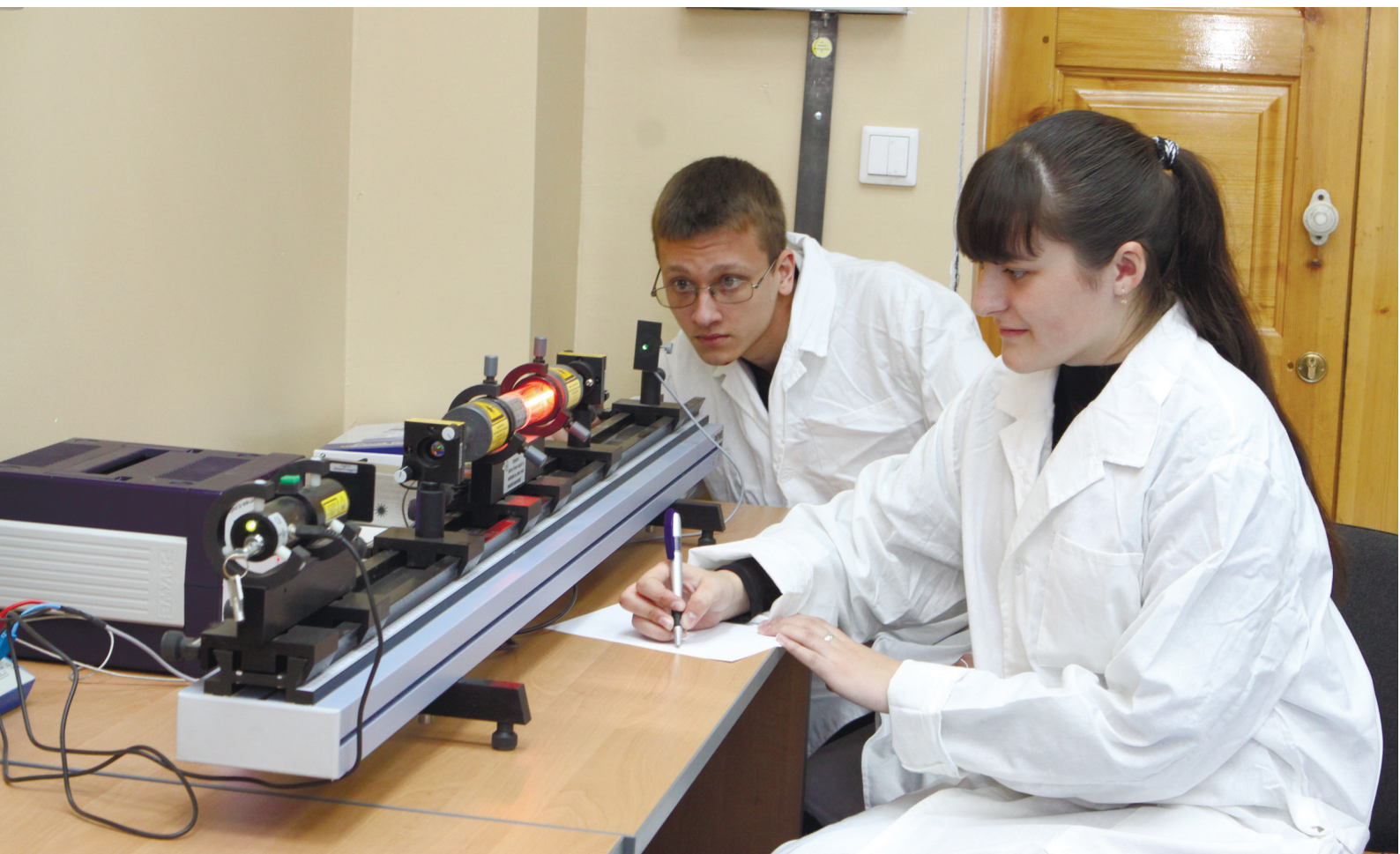
A system of development of teachers' expertise in the area of design and implementation of concentration programmes of new generation:

- A list of teachers' expertise necessary for the educational activity was approved (Regulations for the expertise evaluation of teachers and researchers featured in the educational activity);

- A modular-based program was designed to improve teachers' qualifications (214-hour curricular containing of 19 modules, divided into main and variable parts) a pilot implementation of which has been launched: 19 teachers successfully completed the study course;
- 73 electronic teaching complexes were designed to provide/support different types of e-learning (LMS) at TPU. Education was organized for two teachers' groups – course designers of additional academic programme 'Instruments and technologies for e-learning design and implementation: e-LMS and e-LLT'. The pilot operation of LMS was carried out in the fall term in all courses developed.

TPU teachers published 537 text-books and teaching aids, including 145 with the EMA label.

In 2011, TPU put into operation information bundled software to administer the educational process:
- Bundled software subsystem 'Electron Deanery' (<http://dekanat.tpu.ru>) which allows:
  - Compiling the reports on the student population
  - Compiling order drafts on the student population changes
- Bundled software for accounting students' progress, actual and sessional
  - Electron teacher's journal (<http://app.tpu.ru>)
  - actual and sessional accounting of student progress
- Bundled software 'Filling in departmental announcements on teaching duties' (<http://app.tpu.ru/ork>) intended for computer-aided work of departments and academic and methodological department in solving problems of the workload
- Bundled software subsystem 'academic programme foundation' (<http://portal.tpu.ru/fond>) intended for:





- Academic programme assessment
- Publication of documents of academic programmes (<http://portal.tpu.ru/departments/head/education/resource>)
- Full-text search for learning materials on the foundation
- Subsystem of choice of optional and variable disciplines for bundled software ‘Individual student syllabus’
- Bundled software ‘Enrollment target figures’ intended for planning student enrollment in academic disciplines and subject areas
- Bundled software ‘Personal cabinet of employee/student designed for the access to personal data (<http://portal.tpu.ru/desktop>)
- Bundled software ‘academic exchange’ (<http://portal.tpu.ru/cmop>)

In order to provide teachers and students with the appropriate research and education information about the priority research fields at the cost of the governmental grant, the access to the academic programmes databases of the world is provided:

- Journals of *Elsevier Publisher* on ‘ScienceDirect’ platform
- Journals ‘All – Society Periodicals Package Online’ (IEEE)
- ProQuest Dissertations and Theses
- Bundled software ‘Codex’
- Russian state online library of dissertations
- Safari Books Online

Online resources are available in the corporate network of TPU. During the past year the number of accesses to these resources came to 42 thousand. Over 20 thousand articles from



journals and over 50 thousand patents were saved; 6,5 thousand theses were looked through that considerably exceeds the information volume access in 2010.

104 workshops and lectures were conducted by the Russian and foreign scientists and workers from the real economy enterprises, among them:

- Professor George Baracos, Liverpool University, Engineering Faculty, England
- Vardanian Mkrtchan, representative of the Internet University of Control and Information Communication Technologies, Australia
- Professor Philipp Pale, Joseph Fourier University, France
- Professor Alexey Vinogradov, Osaka University, Japan

The fundamentals of the implementation a person-oriented academic setting were designed in TPU. Teaching in this setting allows bachelors and specialists forming individual syllabus with the help of advisors in terms of educational loci corresponding maximally to the quality of their pre-university training and abilities to master university academic programmes. As a result, the quality of education is raised as well as preparation of graduates for their professional performance.

The TPU Academic Board approved the concept of the person-oriented academic setting:

- The main locus of the concentration programme training according to the basic curriculum (for students with the high pre-university training and skills)
- The locus of the concentration programme training according to the curriculum corresponding to the system of elite engineering education (for gifted students with high-quality pre-university training in the sciences and skills at a high level)
- The locus of the concentration programme training according to the adapted curriculum providing the achievement of results meeting the federal state standards (for stu-

dents with the insufficient quality of pre-university training in the sciences)

This concept defines the academic liberties in mastering concentration programmes in TPU which suppose the right to choose a university by students:

- Concentration programme profiles in the corresponding subject area of bachelor's programme or in master's programme
  - Discipline Foreign Language for Specific Purposes or a set of humanities, namely: Russian Language and Speech Standards, Cultural Studies, Psychology, Political Science, etc. stipulated by the basic curriculum
  - A specific set of disciplines in terms of variable parts of the sciences, general scientific and professional cycles of basic curriculum
  - Disciplines form the general university catalogue which substitute disciplines form the variable parts of the sciences and professional cycles of basic curriculum (not over 10 credits)
  - Military training or a set of optional disciplines, namely: Business Communication, Foreign Language, Principles of Resource Efficiency, Engineering Entrepreneurship, and others
  - Disciplines from the catalogue of another Russian or foreign university-partner of TPU which substitute disciplines of variable parts of the sciences, general scientific and professional cycles of basic curriculum (including DD programmes)
- The Program of Academic and Social Adaption was implemented for the 1-year students. The Program was designed to provide students with the instrument to successfully orient in and quickly adapt to the university setting. To achieve the goal of the Program in the 2011/12 academic year we created:
- The information web-resource <http://student.tpu.ru> (information interesting to students, useful contacts, templates and forms to carry out term papers and abstracts)
  - A guide for the 1-year students

To enhance adaption of students the following topics were discussed at different workshops: 'Virtual Polytech', 'Computer is your assistant', 'Basics of information culture', 'Working from information' 'Speech in public', 'Know yourself', 'Know others', 'Arrange your time'.

In August 2011, the Program was approved; good opinions were given by the students.

Within the academic mobility programs, 440 students, undergraduates, and postgraduates of TPU completed education, research experience or internship in universities of Austria, Belgium, Germany, Spain, Italy, Kazakhstan, China, Korea, Finland, France, Czech, Sweden, and other countries. 91 students from foreign universities completed education at TPU.

Agreements on the implementation of the academic exchange programs were signed with

Czech Technical University, Jilin University College (China), Norway University of Science and Technology, Alexander Dubchek University (Slovakia), Gutenberg University of Applied Sciences (Germany), Lisbon Institute of Technology (Portugal).

Summer school was organized for international universities-partners which includes intensive courses of Russian and cultural familiarization measures.

The development of interacademic relations and strengthening of the university liaisons on implementation of the academic mobility programs of students and postgraduates assists not only in the quantitative increase of the program participants, but also significantly increases feasibility of attracting financial resources of each university. Cooperation between TPU and such universities as Czech Technical University in Prague, University of Applied Sciences



(Germany), Institute of Science and Technology (Finland) is the most fruitful.

Students and postgraduates of TPU were trained in European universities under the academic exchange programs and scholarship in terms of Erasmus Mundus Action 2 MULTIC. In December 2011 34 our students became the future participants in this Project in 2012.

The Project ECDEAST is one more example of the interacademic cooperation in the quality assurance. This Project has been approved and financed since October 2010. It is oriented towards designing by the Russian universities new master's degree programmes in the engineering education field.

Much has been done for the development of the teachers' academic exchange. Thus, in Paris the international workshop was conducted under the theme 'Planning, organizing, and evaluating the results of training in implement-

ing academic programmes in the field of engineering and technology'. This workshop was conducted in tandem with European Network for Quality of Higher Engineering Education for Industry, ENQHEEI and Moscow State University of Steels & Alloys. 20 delegates from TPU took part in the workshop and familiarized themselves with the mail trends in the European education network. 18 TPU employees participated in seminar 'Education and mobility: developing engineering academics' (Portugal). The workshop 'The advanced experience in engineering training in European universities in partnership with industry' was conducted together with Czech Technical University in Prague. About 40 representatives from Russia and EC universities from such countries as Czech, Austria, Spain, France, Sweden, Belgium, Portugal took part in this workshop.



## Research and Innovations

In 2011 Tomsk Polytechnic University achieved the following results in research activity. The total R&D revenue was 1521 million rubles, including the budget (189 million rubles and extra-budget 1332 million rubles).

Owing to strengthening of material and technical basis the efficiency of research conducted by TPU, was increased.

TPU employees published the following:

- 136 monographs including 40 in foreign publishers, namely: Saarbrücken, Deutschland: LAP LAMBERT Academic Publishing GmbH & Co. KG; VDM Publishing House Ltd., New York: Nova Science Publishers, Rijeka, Croatia: InTech, Berlin: LAP LAMBERT Academic Publishing GmbH & Co., Toronto: LEGAS; Walnut Creek, California: Left Coast Press, and others.
- 2258 articles in scientific periodicals indexed by Russian and international organizations (Web of Science, Scopus, Russian index of scientific citation). Of them 1872 articles on priority research fields including 141 in journals with high impact factor: Nature – 36,101 and nature Nanotechnology – 30,306, and some others.

Employees, postgraduates, and doctoral students defended 32 DSc theses and 120 PhD theses. The postgraduate courses and doctorate efficiency was 50,3 % of the intake.

154 patents were obtained; 9 licensed agreements were registered; applications were submitted to obtain three foreign patents.

On the university basis 77 scientific conferences and other events were carried out, including 30 international.

TPU developments were presented at 70 exhibitions, including 25 international ones. 40 medals and 46 certificates were granted to our researchers.

In 2011, some 250 applications were submitted to different competitions of the Federal Target Program; 50 new projects are already supported. In all, over 100 projects are being fulfilled at TPU within the Federal Target Program funded with 167,5 million rubles in 2011. Five new grants from the Russian Humanitarian Foundation were obtained; over 30 grants were from the Russian Foundation for Basic Research including 2 grants for the development of research facilities (9 million rubles).

TPU has entered the cofounder membership of 14 technological platforms out 28 ones. The most promising for the university are the following platforms: medicine of the future; intelligent power grids of Russia; deep conversion of hydrocarbon resources.

TPU features in 11 innovative programs, in six of which it is a home base, namely: OAO 'Gasprom'; GK 'Rosatom'; OAO 'ISS'; FGUP NPO 'Mocrogen'; OAO 'System Operator EES'; OAO RAO 'Eastern Power Grids'.

In 2011 the first number of online journal 'Herald of Science of Siberia' was issued. The journal is made up of 12 series including such as 'Earth sciences'; 'Physics. Mathematics';

'Chemistry'; 'Power engineering'; 'Engineering sciences', and others. Chief editors of the series are academicians and correspondent members of the Russian Academy of Sciences.

The most significant research findings obtained in 2011 are as follows:

- For the first time it was carried out the assessment of the levels of accumulation, distribution laws, and occurrence forms of radioactive elements in coals of the Asian part of Russia, Mongolia, and Kazakhstan. Petrography and geochemical research was conducted into structural conditions of uranium-ore fields that will lead to a serious growth of fuel-energy resources.
- An automated voltammetric analyser was created for thiols compounds in blood serum of a human and animals for diagnostics of treatment success of oxidative stress, epilepsy, and diseases connected with thiolis insufficiency in an organism.
- An assessment of oil and gas presence in Ust-Tymskaya megabasin.
- A theory of firing of condensed matters was elaborated under a local heating so as to detect microscopic laws of physical and chemical processes which take place under burning of liquid, solid, jellous, and paste-like condensed matters initiated by the organic energy capacity sources. A new method of detecting the quality of hydrocarbon fuels was suggested.
- Unique technologies of production of new nanocolloid agents marked by technecium-99 for diagnostics of cancer. Two principal approaches were suggested for formation of nanoparticles marked by technecium-99 based on organic and inorganic matrix, and new production methods were developed for synthesis of three nanocolloid preparations.
- A state of electron was experimentally registered on a microscopic scale with a partial loss of its Coulomb field, and a dynamics of the field recovery to a stable condition was investigated.
- Shown was a fallibility of the traditional interpretation of the nature of transient Vavilov-Cherenkov diffraction emission in the direction of relativistic electrons.
- Developed was a theory of surface erosion of a solid body under the influence of powerful beams of charged particles. It is used to describe mechanisms and laws of atom emission from the surface of a solid body under the influence of powerful beams of charged particles and plasma.
- A model range of circuit modules was created for electric drive control.
- Hi-tech systems of pilot-plant equipment were designed to solve the problems of space industry in the field of magnetron modifying coverings and radiation resistance testing of electronic components of such systems as 'GLONASS', 'YAMAL', 'AMOS'.
- A new method of synthesis of nanodispersed silicon and titanium oxides under the influence of a pulsed electron beam upon the mixture of oxygen and hydrogen and silicon or titanium tetrachloride. Shown was the availability of plasma-chemical synthesis of nanoscale oxides and carbides due to low consumption, a possibility of the implementation of large-tonnage production and the variety of nanoparticle sizes.
- A production technology for functional and constructional nanostructures ceramics was developed for hi-tech industries. This development was awarded the gold medal and the certificate '100 best organizations of Russia. Science. Innovations. Developments'.
- An electrophysical decontamination and purification technology was created for sewage.
- Tough armour ceramics technology was developed from boron carbide. The optimal composition of B<sub>4</sub>C powder mixture and submicron fractions were detected as well as technological modes of synthesis of high density ceramics by sintering in plasma sparking which provide anomalously high impact viscosity of 15 MPa m<sup>1/2</sup> and microhardness of 47 HPa.

- A single information area for design and test of unified electron modules of control systems and electric supply of the aircraft based on life cycle technology of hi-tech products.
- Navigation telecommunication systems of new generation were created using navigation system GLONASS and pilotless vehicles for mobile groups and control centres. The main function is to monitor a territory using pilotless vehicle and accompany mobile groups of different purposes including life saving groups, data processing.
- Mathematical software was designed for intelligent systems of aerospace monitoring intended for raising the efficiency and data processing accuracy of Earth's remote sensing. The head of the project was awarded the medal from the Russian Academy of Sciences in category 'Young scientist'.
- A domestic radiometric inspection system was designed to control large-scale vehicles and freights in which methods and principles of obtaining three perspectives of shadow images were applied for the first time and also identifying the groups of elements with close atomic numbers within the real time mode.
- A mobile flow detecting system was created to automated, digital, and X-ray control for pipelines.



## Social Initiatives

### **Endowment Fund of Tomsk Polytechnic University**

In 2011 a unique campaign has been started at TPU. The action group of students brought a proposal to make contribution to the Endowment Fund, and form a basis for the scholarship established for previous generations. The scholarship will be paid annually from the revenues obtained from investments to securities (by the example of the Nobel Foundation).

This scholarship will be granted to the best students and teachers of each institute which will be assigned by the student voting.

The names of all donors will be listed on a special page of the Endowment Fund web site. Thereby, for future students this is the scholarship of the previous generations while for the students of today it is the scholarship of themselves.

To add the name to the future of the university one can by several ways. It can be a simultaneous donation, one-day salary transfer, or monthly transfer of the certain percentage from the salary.

In April 2011, the student local trade proposed a campaign 'Scholarship of Ourselves'. During the year 400 donations have been transferred. Owing to the revenues from beneficial ownership some our students will get 10 thousand rubles each, and one teacher will get 15 thousand rubles.

### **Centre for Volunteer Services and Social Activity**

TPU won the competition of the academic institutions of the Russian Federation, and got the right to become a centre for attracting volunteers to take part in the organization and conducting the 22<sup>th</sup> Olympic Games and the 9<sup>th</sup> Paralympic Winter Games in Sochi.

Volunteers in the field of communication and IT technologies will be trained at TPU, who will present the Siberian federal District in the Olympic Games.

Measures taken to improve the quality of living that are one more example of the social initiative.



## University Rankings

With the purpose to position TPU in the international education community and raising competitiveness on the intellectual labor market, to create a positive image of the university and also conduct a comparative analysis of its activities, TPU actively participates in different national and international rankings.

### National rankings

The ranking of the Ministry of Education and Science: TPU ranks 2<sup>nd</sup> of 148 technical and technological institutions of Russia.

A complex ranking of the leading Russian universities compiled according to the Federal scholarship program of 2010/11 academic year: TPU ranks 8<sup>th</sup> of 60 institutions of Russia.

TPU ranks 1<sup>st</sup> of 217 Russian universities by the results of monitoring of activities performed by the graduate employability centres of the higher vocational education establishments.

### International rankings

For the first time TPU was registered in QS World University Rankings at the 567<sup>th</sup> place. Among the Russian universities it ranks 10<sup>th</sup> and it ranks 2<sup>nd</sup> of 2000 technical universities.

The Ranking Web of World Universities: TPU' place is 892; in regional ranking – top-100; Central and Eastern Europe – 57; among Russian institutions – 9 (general quantity is 20,300).



## Events

- TPU was included in QS World University Rankings
- TPU (the first in Russia) was accreted to CDIO (Conceive-Design-Implement-Operate)
- TPU was accessed to the CESAER Board of Directors at its 22<sup>nd</sup> General Assembly
- TPU designed and approved the Complex Development Plan for the years of 2011–2015
- The Association ‘Tomsk Consortium of Research and academic Organizations’ was founded, the Chairman is TPU Rector
- Tomsk-city Administration and GK ‘Rosatom’ signed the agreement on the establishment of the International Centre for Training Specialists on the TPU basis
- TPU signed the agreement on training specialists for ‘R-Pharm’, one of the largest Russian producers and distributors of pharmaceuticals
- The ‘Hughes-TPU’ Centre for professional retraining of users of Hughes systems in Russia and CIS countries
- International laboratories of Thermosetting Polymers and of X-Ray Optics were opened
- The Association of small entrepreneurial enterprises was set up
- Pavel Strizhak, a researcher of TPU became the DSc holder at 26



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Information edition

# TPU YEAR-BOOK

## 2012

Number 17

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Passed for printing 02.07.2012. Format 60x84/8. Paper «Classic».

Printing XEROX. Printed sheets 6,98. Published sheets 6,31.

Order 845-12. Circulation 100 numbers.



National Research Tomsk Polytechnic University  
The Quality Management System of TPU Publishing House  
was certified by the National Quality Assurance to meet BS EN ISO 9001:2008

