





# OLYTECH INTERNATIONAL OUTLOOK



## Dear partners and colleagues! Dear friends!

We are very pleased to welcome you at the POLYTECH DAYS IN BERLIN 2020. This landmark event is devoted to the 120 years anniversary since the foundation of Peter the Great St. Petersburg Polytechnic University, and is organized within the Russian-German Year of Scientific and Educational Partnerships 2018–2020. Within this event SPbPU in cooperation with European partners will present promising research and innovation projects and opportunities for bilateral investment, based on successful cases of many years of cooperation.

Europe is a strategic region for SPbPU. Our university has been developing cooperation with European countries for over 100 years. Today we have partnerships with over 500 educational, research and industrial organizations, leading global companies and top world universities.

We are focused on creating a new type of university – university of the 21st century driven by innovation and complex cooperation between academic foundation, advanced research and industry. Being committed to international activities, every year we hold global forums, conferences and workshops and create special platforms for sharing knowledge and experience for our esteemed international partners in the field of education, technologies, science and business.

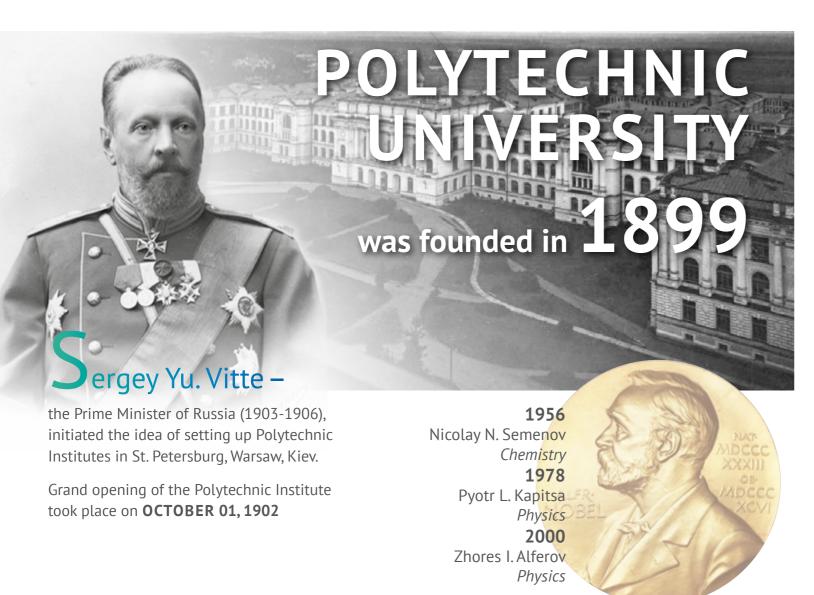
We hope that POLYTECH DAYS IN BERLIN 2020 will give all of us new prospects, brilliant ideas and new innovative ways for fruitful cooperation.

Welcome to the POLYTECH DAYS IN BERLIN 2020!

Andrei Rudskoi SPbPU Rector



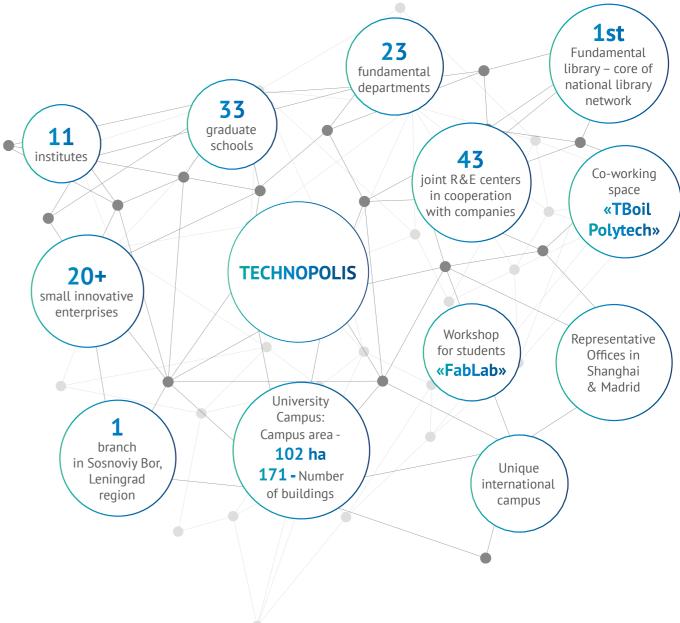
## ABOUT UNIVERSITY | |





in Shanghai, PRC

### STRUCTURAL UNITS



### **RANKINGS**













**TOP 250 Engineering & Technology** 



**Education** 



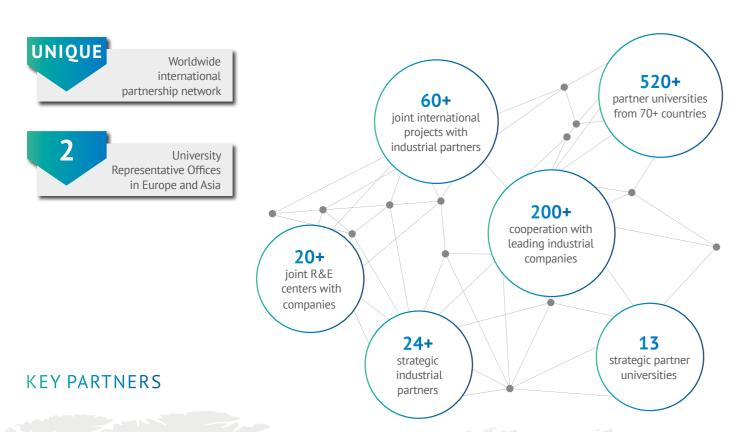


**TOP 500** 2020



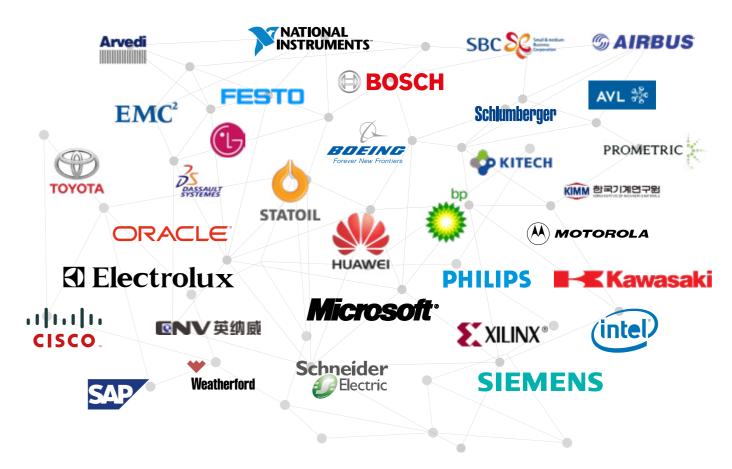


# JUNIVERSITYS I GGLOBAL PARTNERS TINERS





### COOPERATION WITH FOREIGN COMPANIES



## COOPERATION WITH RUSSIAN COMPANIES



PARTNER UNIVERSITIES

# NTERNATIONALISATION ALSATION

### INTERNATIONAL FACTS & FIGURES TOP-3 40+ among Russian Joint & double universities by number degree of international students programs 153 position 23 International MSc 85+ programs **OF INTERNATIONAL** International in English **STUDENTS** educational programs **15** Joint PhD programs 2019 16 45+ Modules Modules of Winter School of Summer School 2000+ faculty JOINT INTERNATIONAL **EDUCATIONAL STRUSTURES** 250+ 12% international of teaching staff faculty are international annually faculty Joint internship center 32000+ U Xian-Polytech" total number in cooperation of students ith Xi'an University 8500+ of Technology total number of international Engineering students from 120 Institute in countries cooperation 18% vith Jiangsu Normal of full-time Center University of Russian Language equivalent Russian and Culture at Binh student are Language Centers **Duong University** international in China provinces: Henan, Shandong, 65% international students from non-CIS Testing center countries in cooperation with ParisTech

### INTERNATIONAL STRATEGIC PRIORITIES

- Aiming to be one of the world leading technical Universities
- Worldwide unique international partnership network with leading universities, research institutions and companies
- Targeted promotion strategy on the European, Asian and Ibero-American market through the network of representative offices and joint structures
- Comprehensive internationalization: educational programs, number of international faculty, foreign students, international-friendly campus
- Organization of unique international events in collaboration with world academic & industrial leaders









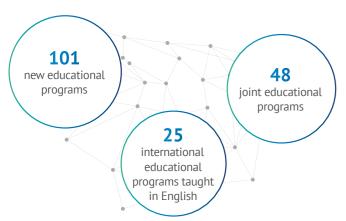


## KEY INTERNATIONAL ASSOCIATIONS

- AU: International Association of Universities
- Association of Sino-Russian Technical Universities
- Belt & Road Science and Innovation Network
- World Class World Cities University Network
- T.I.M.E. Association
- Association of Russian-Indian Universities
- BRICS Network University
- Hewlett-Packard OpenView University Association

## BEST PRACTICES IN EDUCATION

## ANNUAL MONITORING AND UPDATING OF EDUCATIONAL PROGRAMS PORTFOLIO



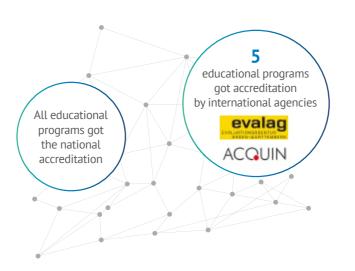
### STRATEGY FOR ATTRACTING PROSPECTIVE STUDENTS:

- Cooperation with centers for gifted children
- Cooperation with leading high schools of Russia
- Olympiads & contests
- Early career guidance
- Project activities & online courses
- Expert activities
- Exhibitions & social platform
- System of Engineering Schools for high school students of grades 9 and 10 (engineering leagues, Summer Schools, Polytechnic Challenge Festival)









Winners of major Russian Olympiads for Russian and foreign citizens study at SPbPU.







SPbPU, Rosatom State Corporation and Akkuyu Nuclear JSC are working together on a large-scale Russian-Turkish project of Akkuyu NPP. Students from Turkey study nuclear energy at SPbPU and take practical training at the Leningrad Nuclear Power Plant.









### ONLINE EDUCATION



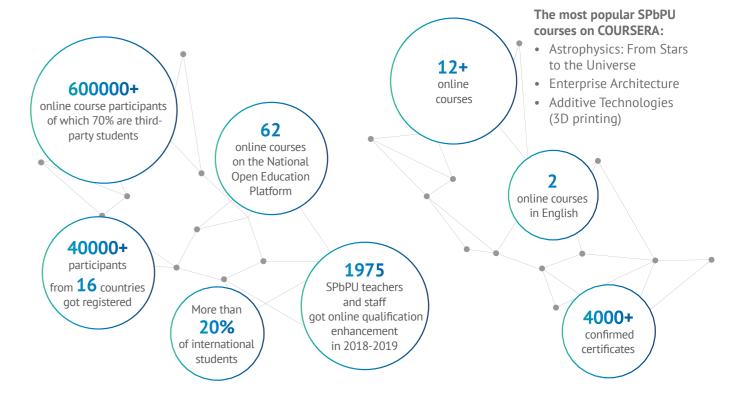
open.spbstu.ru





○ткрытое образование





# SPbPU educational programs curriculum include online courses

## MOBILITY MODULE: INDIVIDUAL LEARNING PATHS

## KEY EDUCATIONAL TECHNOLOGIES INTRODUCTION:

- Project activities: blended learning metodology course "Basics of project activities"
- Online education: open online courses are included in the curriculum of all SPbPU educational programs
- Individual learning paths
- · Joint educational programs

tracks of Individual learning paths

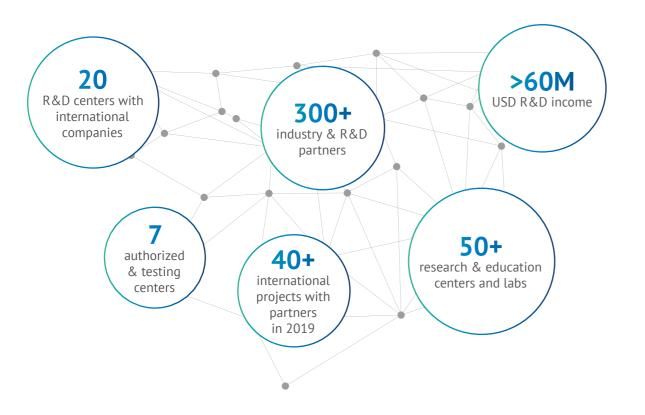
13000+
students completed mobility module training in 2018-2019

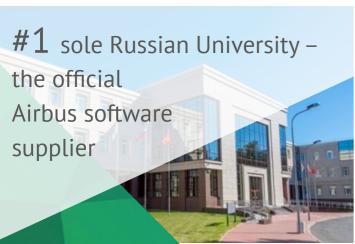
The students completed mobility module training in 2018-2019

The students completed mobility module courses are available in the framework of mobility moduletraining at: opened.ru, Coursera, Lectorium, SPbPU internal portals

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# RESEARCH







### KEY RESEARCH ASSOCIATIONS AND SCIENTIFIC NETWORKS:

- · International network for professional education and research in process & project management (PMUni)
- European Consortium for Mathematics in Industry
- · European Science and Education Fellowship (ESEF)
- International Association of Universities and Colleges of Art, Design and Media (CUMULUS)
- The European Fusion Education Network (FuseNet)
- Russian-Speaking Academic Science Association
- Institute of Electrical and Electronics Engineers (IEEE)

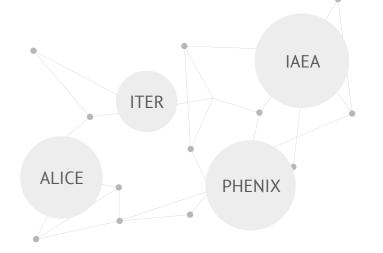






### MEGA SCIENCE. **GLOBAL RESEARCH PROJECTS**

SPbPU scientists are involved with the major experiments



### SCIENCE. WORLD-CLASS TECHNOLOGIES

full employment of resources and increase in performance of oil and gas extraction

design processes acceleration due to creation of digital models of civil engineering objects

CIVIL ENGINEERING

use of thermonuclear energy on an industrial scale

to develop the

domestic component glasses, to replace the expensive analogues, to create a series of final devices and devices for tasks in the field of biosensorics, micro-gas sensors, optical tomographs for the diamond processing industry

4-fold increase

base of special purpose

**OPTICS & OPTICAL** DEVELOPMENT

### MECHANICAL **ENGINEERING**

of the Arctic sledge load-carrying capacity transportation of large-size cargo weighing up to 60 tons for the distance of 1500 km

providing a complete cycle from design to manufacture of engine parts

**ENGINE** CONSTRUCTION

### **AUTOMOBILE INDUSTRY**

development of environmentally friendly public transport in the Russian Federation

cost reduction via friction stir welding technology and lighter structures

ensuring the speed of material connection while maintaining quality

**NEW MATERIALS** AND TECHNOLOGIES

### **SHIPBUILDING**

a carbon plastic catamaran design and manufacture with high speed and seaworthiness and operational efficiency for passenger, tourist and cargo

> high accuracy and uninterrupted positioning of objects in the absence of navigation systems

transportation























# DEVELOPMENT PMENT TECHNOPOLIS OPOLIS

### JOINT R&D STRUCTURES



International R&D Center Siemens-Polytech «Industrial Artificial Intelligence»



Joint Education and R&D Center of Industrial Robotics Kawasaki-Polytech



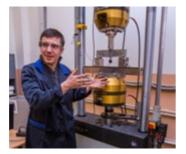


Laboratory of Aerospace and Electronic Engineering with Tsinghua University, China





Laboratory of Basic and Translational Neuroscience with Shanghai Jiao Tong University, China



International Research and Education Center «Weatherford -Polytechnic»

Gazpromneft -Polytech Scientific and Research Center



International Academic Center of Excellence «Polytechnic - SAP»



### NATIONAL TECHNOLOGY INITIATIVE CENTER FOR ADVANCED MANUFACTURING TECHNOLOGIES





Russia's leading center of competence and largest consortium in the field of advanced manufacturing technologies



leader in the development of original technologies, structures, equipment and products based on advanced manufacturing technologies

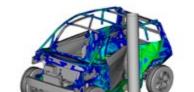
FOR AMT PROJECTS

NTI CENTER

### **TECHNOLOGIES** OF NTI CENTER FOR AMT



- Digital design and simulation (DT)
- Computer-Aided Engineering (CAE)
- High Performance Computing (HPC) • Computer-Aided Optimization (CAO)
- Computer-Aided Manufacturing (CAM)
- · Computer-Aided Additive Manufacturing (CAAM)
- Product Data Management (PDM)
- Product Lifecycle Management (PLM)
- New materials (NM)
- Additive technologies (AT)
- Smart Manufacturing



Smart Digital Twin of a Compact Urban



Level 1 Digital Twin of an Aircraft



Building Information Modeling (BIM) Technologies for Cultural Heritage



Novel Materials for Oilfield Equipment







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# INTERNATIONAL PROJECTS WITH UNIVERSITY PARTNERS with University partners



- "Development and implementation of innovative aquatic-based bio-refinery for microalgae Chlorella sorokiniana and duckweed Lemna minor (ABiRe)" with TUHH, Hamburg, Germany;
- "Development and characterization of novel materials for capacitor-based storage devices" with IIT Madras, India
- "Technologies and Toolset for Reliable Control of Production Areas of Internet of Things" with IIT Bombay, India
- Joint project of SPbPU and Leibniz University of Hanover on the production of ultrapure alloys



- "Energy-efficient systems based on renewable energy for Arctic conditions (EFREA)" with LUT University, Finland and Prometey Company, Russia
- "Lightweight hybrid wooden composite materials for sustainable construction technology (SUSTECH)" with LUT University
- "One Drop new technologies for water cleaning" with LUT University
- "POETA Practice-oriented children education in the areas of Industry 4.0 based on a unified open educational harware platform" with LUT University

### BRICS FRAMEWORK RESEARCH PROGRAM

- "Research and development of algorithms and experimental samples of hardwaresoftware system for increased accuracy seamless indoor\outdoor positioning" with IIT Rourkee, India and East China Normal University, China
- "Natural and artificial porous materials filled with liquid and solid dielectrics" with IIT Madras, India and University of Venda, South Africa

### INTERREG PROGRAM FOR BALTIC SEA REGION

- "AREA21 Baltic Smart City Areas for the 21st Century" with HafenCity University, Hamburg, Germany and consortium
- "CAMS Platform for audit in energy" with Tartu Regional Energy Agency
- German Academic Exchange Service (DAAD) Program
- "Strategic partnership joint project of SPbPU and Leibniz Universität Hannover"















## INTERNATIONAL I O N A L ACTIVITIEST | E S

# SPbPU INTERNATIONAL EVENTS:

SPbPU International Polytechnic week

1st Russian-Spanish Week of Language and Culture in cooperation with University of Cádiz

International Forum Student Project Marathon in cooperation with Graz University of Technology

POLYTECH DAYS in Europe and Asia

St. Petersburg German Week

Falling Walls Lab competition of young scholars in cooperation with the German Academic Exchange Service (DAAD) and the German Centre for Research and Innovation in Moscow (DWIH)

# PARTICIPATION IN WORLD LEADING B2B EVENTS:

NAFSA (National Association for Foreign Student Affairs)

APAIE Annual Conference & Exhibition

Annual EAIE
Conference and Exhibition

CEE (China Education Expo)









# INTERNATIONAL CONFERENCES









Nature International Conference "Achievements and Applications of Plasma Physics"

International Conference Cyber-Physical Systems and Control (CPS&C'2019)

Scientific and Practical Conference with International Participation "SPbPU Science Week"

International Conference "Corrosion in the Oil and Gas Industry"

International Conference on Digital Technologies in Logistics and Infrastructure

> Fifth International Scientific Conference "Technological Transformation: a New Role of People"

International Scientific Conference "Modern materials and advanced manufacturing technology"

International Scientific Conference "Mathematical Methods in Engineering and Technology – 32"

> International Symposium "Compressors and compressor equipment «named after K.P. Seleznev"

International
Summer School-Conference –
"Advanced Problems in Mechanics"

## STUDENTS RESEARCH & ACTIVITIES

### FORMULA STUDENT

(Formula SAE) – race car for Formula Student racing



The first Russian customized conceptual electric car

CML CAR



## SATELLITE POLYTECH

development of the first student satellite of Polytechnic University



### BRAILLE SIMULATOR

for use by students of typhoid departments, educators who study braille, and late-onset blind people



### SOLAR CAR -

first Russian solar unique solar-powered car



### SOLAR PANEL BOAT

Unmanned control solar-powered boat



### **FABLAB**

Center for scientific and technical creativity



### SOLARDRONE

Solar powered catamaran



### TEDXSPBPU CONFERENCE

Provides a unique opportunity to bring out a unique idea to a wide audience



### ARDUINO WATCH -

for teaching robotics and programming



### SCIENCE SLAM POLYTECH

International project to popularize science



### RECTOR CUP ENGINEERING COMPETITIONS

For developing students' technical abilities, creative thinking, unleash potential, acquire teamwork skills and broaden their horizons



### POLYTECH RİSE WEEKEND'19 FORUM

A platform for acquaintance of students, inventors, investors and large companies



### «UMNIK» SCHOOL

For anyone who wants to prepare their project for participation in the UMNIK scientific and technical grant and "UMNIK-NTI"



# FABPRO DIGITAL PRODUCTION EDUCATIONAL COURSE

To teach university students how to work with modern machines and other technological equipment



## BIONIC HAND PROSTHETIS

Bionic prosthesis of the hand developed by SPbPU Students



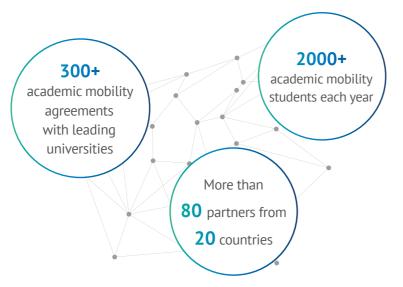
## STUDENT TOURNAMENT OF THREE SCIENCES

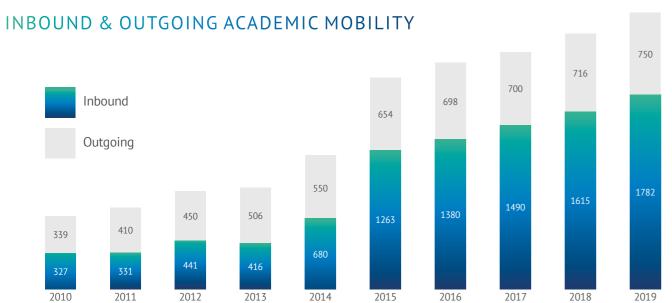
Platform for the interaction of students, the business community and government authorities with the subsequent employment of talented participantsowered car



# ACADEMIC MOBILITY



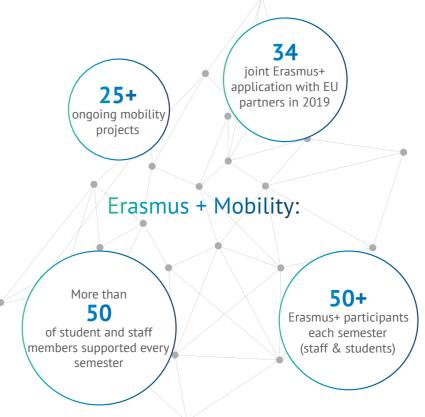


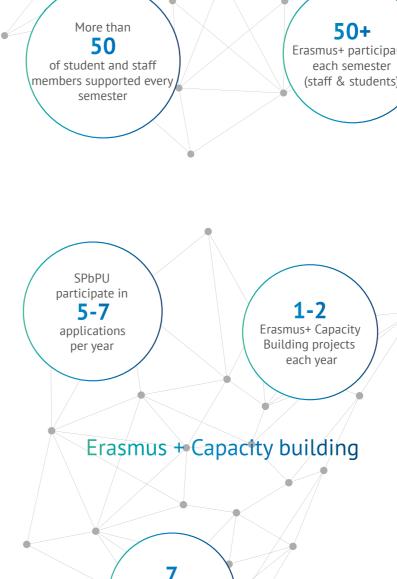












ongoing projects Erasmus+ Capacity Building











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## INTERNATIONAL POLYTECHNIC SUMMER SCHOOL OL

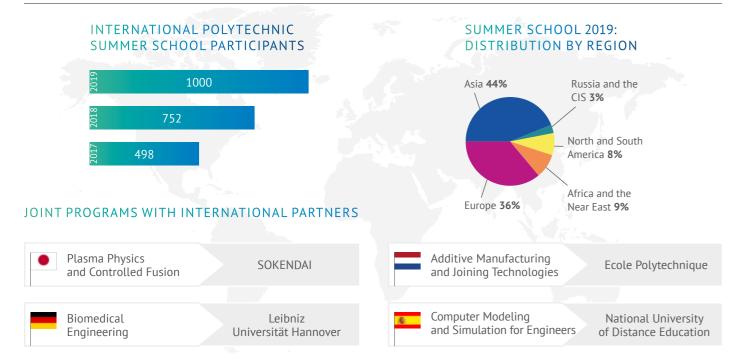


WHO1000 international students from60 countries

**WHAT**45+ programs
with ECTS credits

WHEN

June – September







































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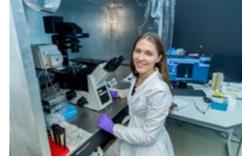














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