



125 Years of Excellence, Traditions, and Innovations



St. Petersburg Electrotechnical University "LETI"

Since 1886

St. Petersburg Electrotechnical University "LETI"

5, Prof. Popov Str., 197376 St. Petersburg, RUSSIA

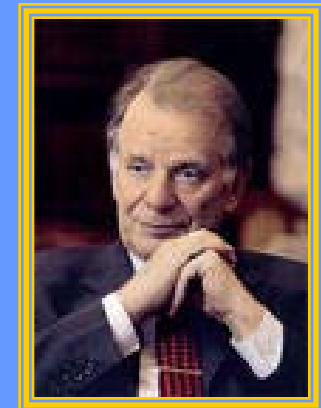


• The Oldest Higher Educational Institution of Electrical Engineering in Europe

- 1886 – The Engineering College of the Russian Post and Telegraph Department was founded in St. Petersburg under the edict of the Russian Emperor Alexander III
- 1891 – The Engineering College was reorganized into the Imperial Institute of Electrical Engineering
- 1924 – The Institute was renamed as Leningrad Electrotechnical Institute (LETI)
- 1992 – The Institute was granted the University status. The name was consequently changed to St. Petersburg Electrotechnical University (ETU) "LETI"



Inventor of Radio Communication
Prof. Alexander S. Popov
(1859-1906)



Nobel Prize Laureate in Physics (2000)
Prof. Zhores I. Alferov



• Milestones (XIX – XX)



Genrikh O. Graftio



Imant G. Freiman



Alexander A. Smurov

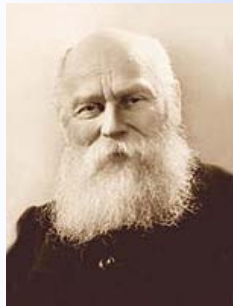
- 1886 – *The Engineering College of the Russian Post and Telegraph Department was founded in St. Petersburg under the edict of the Russian Emperor Alexander III*
- 1891 – *The Engineering College was transformed into the Institute of Electrical Engineering. It was the first in Europe higher education institution for training engineers and researchers in the field of Electrical Engineering*
- 1895 – *On May, 7th Prof. Alexander S. Popov demonstrated a possibility of transmitting and receiving short, continuous signals over a distance up to 64 meters by means of electromagnetic waves with the help of a special portable device responding to electrical oscillation*
- 1905 – *Prof. Alexander S. Popov became the first elected Director of the Institute*
- 1910 – *The project of the first in Russia hydroelectric power plant 'Volkhov' was worked out at the Institute under the supervision of Prof. Genrikh O. Graftio*
- 1914 – *The first Russian aluminium was manufactured and an industrial method of its production was developed at the Institute*
- 1917 – *The first in Russia chair of Radio Engineering was established at the Institute by the graduate Prof. Imant G. Freiman. It appeared to be the basis for development of the Russian Scientific School in the area*
- 1920s – *Prof. Alexander A. Smurov's laboratory of High-voltage Technology and Electric Power Transmission was the largest in Europe*



• Milestones (XX)



Sergey A. Rinkevich



Valentin P. Vologdin

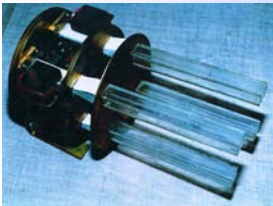


Nikolai P. Bogoroditsky

- 1922 – *The first in the world chair of Electric Drive was established at the Institute by Prof. Sergey A. Rinkevich*
- 1924 – *The Institute was renamed as Leningrad Electrotechnical Institute (LETI)*
- 1931 – *Prof. Sergey Ya. Sokolov established at the Institute the first in the world chair of Electroacoustics and Ultrasonic Testing. His works in the field of ultrasonic (supersonic) vision research gained the worldwide priority*
- 1935 – *The first in the world chair of High-frequency Electrothermy was established at the Institute by Prof. Valentin P. Vologdin*
- 1937 – *Prof. Sergey Ya. Sokolov patented in the USA the 'Sokolov tube' used for underwater imaging, where an acoustical image of an object comes into view as a result of object "illumination" by two ultrasonic transducers. The device was also known as the Acoustic Electron-Ray Converter (AERC)*
- 1938 – *Prof. Valentin P. Vologodin developed methods of inductive metal tempering and high-frequency electrothermy*
- 1940s – *The pioneer works in the area of electrotechnical materials investigation were carried out under the supervision of Prof. Nikolai P. Bogoroditsky*
- 1946 – *The department of Electrotechnical Materials was established by Prof. Nikolai P. Bogoroditsky*



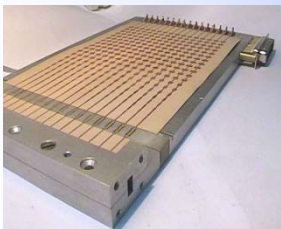
• Milestones (XX – XXI)



The first phase array antenna (1955)



The Nobel Prize Award Ceremony (2000)



DRWiN electrically scanned antenna (R&D 100 Award, 2001)

- 1955 – *A prototype of the phase array antenna was elaborated at LETI by the team of Prof. Yury Ya. Yurov for the first time in the world*
- 1960s – *The foundations of the Nuclear Spectrometry were developed at LETI*
- 1960s – *The devices for space investigations and a unique test complex for spacemen to work in the state of weightlessness were designed by the staff of the Institute*
- 1976 – *A method of sublimation growth, which is widely used all over the world for sublimation growth of the SiC boules and known as the LETI method, was elaborated by the team of Prof. Yury M. Tairov*
- 1991 – *The first in the former USSR Center for Innovations Commercialization 'Technopark' was established at LETI*
- 1992 – *The Institute was granted the University status. The name was consequently changed to St. Petersburg Electrotechnical University (ETU) "LETI"*
- 2000 – *Prof. Zhores I. Alferov, a graduate and the Chair of Optoelectronics Department of ETU, was awarded the Nobel Prize in Physics*
- 2001 – *Ferroelectrics based DRWiN electrically scanned antenna developed by the team of Prof. Andrey B. Kozyrev together with the American National Renewable Energy Laboratory (NREL) and Paratek Microwave Inc. was selected by the R&D Magazine as one of the 100 Most Technologically Significant New Products of the Year*



• Milestones (XXI)



IEEE Milestone Plaque



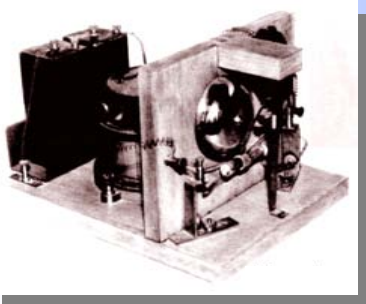
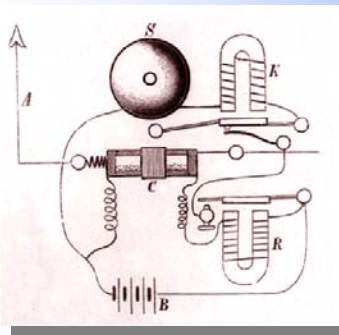
Portable digital X-ray diagnostic complex



- 2005 – *IEEE Milestone Plaque was mounted at ETU as recognition of Popov's contribution to the development of wireless communication in 1895*
- 2007 – *ETU became on the 57 best Russian universities (24 universities of technology) which won the national bid in the scope of the National Project on Innovations in Education*
- 2007 – *ETU was one of the first Russian Universities which moved to BSc/MSc/Ph.D. programs according to the Bologna principles*
- 2009 – *ETU was included in the Register of Innovative Organizations and Projects of St. Petersburg*
- 2010 – *ETU was awarded the Grand Prix of St. Petersburg Technical Fair for the development of the first national portable digital X-ray diagnostic complex, which was recognized as 'The Best Innovation Project and the Best Research Development of the Year'*
- 2010 – *The portable digital X-ray diagnostic complex developed at ETU won the gold medal at the IV Civilization Forum 'Development Prospects and Civilizations Partnership Strategy' held in Shanghai in the frames of World Exhibition 'EXPO-2010'*
- 2011 – *ETU celebrated its 125-th Anniversary*



• IEEE Milestone Plaque at ETU "LETI"



IEEE MILESTONE IN ELECTRICAL ENGINEERING AND COMPUTING

POPOV'S CONTRIBUTION TO THE DEVELOPMENT OF WIRELESS COMMUNICATION, 1895

On 7 May 1895, A. S. Popov demonstrated the possibility of transmitting and receiving short, continuous signals over a distance up to 64 meters by means of electromagnetic waves with the help of a special portable device responding to electrical oscillation which was a significant contribution to the development of wireless communication.

May 2005



INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS



• Outstanding Scientists of ETU "LETI"

"Almost all inventions, having laid the foundation stone for major applications of electricity, were made in Russia by Russian scientists and engineers".

From report of Prof. M.A. Chatelaine, 1896.



Ivan I. Borgman
(1849 – 1914)



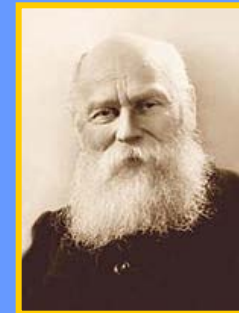
Alexander S. Popov
(1859 – 1906)



Mikhail A. Chatelaine
(1866 – 1957)



Genrikh O. Graftio
(1869 – 1949)



Valentin P. Vologdin
(1881 – 1953)



Alexander A. Smurov
(1884 – 1937)



Sergey A. Rinkevich
(1886 – 1955)



Imant G. Freiman
(1890 – 1929)



Aksel I. Berg
(1893 – 1979)



Alexander A. Pistol'kors
(1896 – 1996)



Nikolai P. Bogoroditsky
(1902 – 1967)



Zhores I. Alferov
(born in 1930)



- ✓ *A leading educational and research center with 125 years of excellence, traditions, and innovations*
- ✓ *One of 4 top Russian universities of technology with the highest citation index (SIR World Report 2010)*
- ✓ *One of 14 top Russian institutions of the highest research significance (SIR World Report 2010)*
- ✓ *Over 150 monographs within the last 5 years*
- ✓ *Around 90 textbooks and over 500 guidelines within the last 5 years*
- ✓ *About 20 winners of national and international prizes working for ETU*
- ✓ *More than 30 members of national and international Academies of Science among ETU lecturers*
- ✓ *International cooperation with more than 40 universities from all over the world*



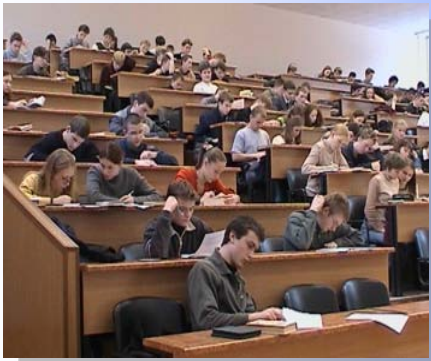
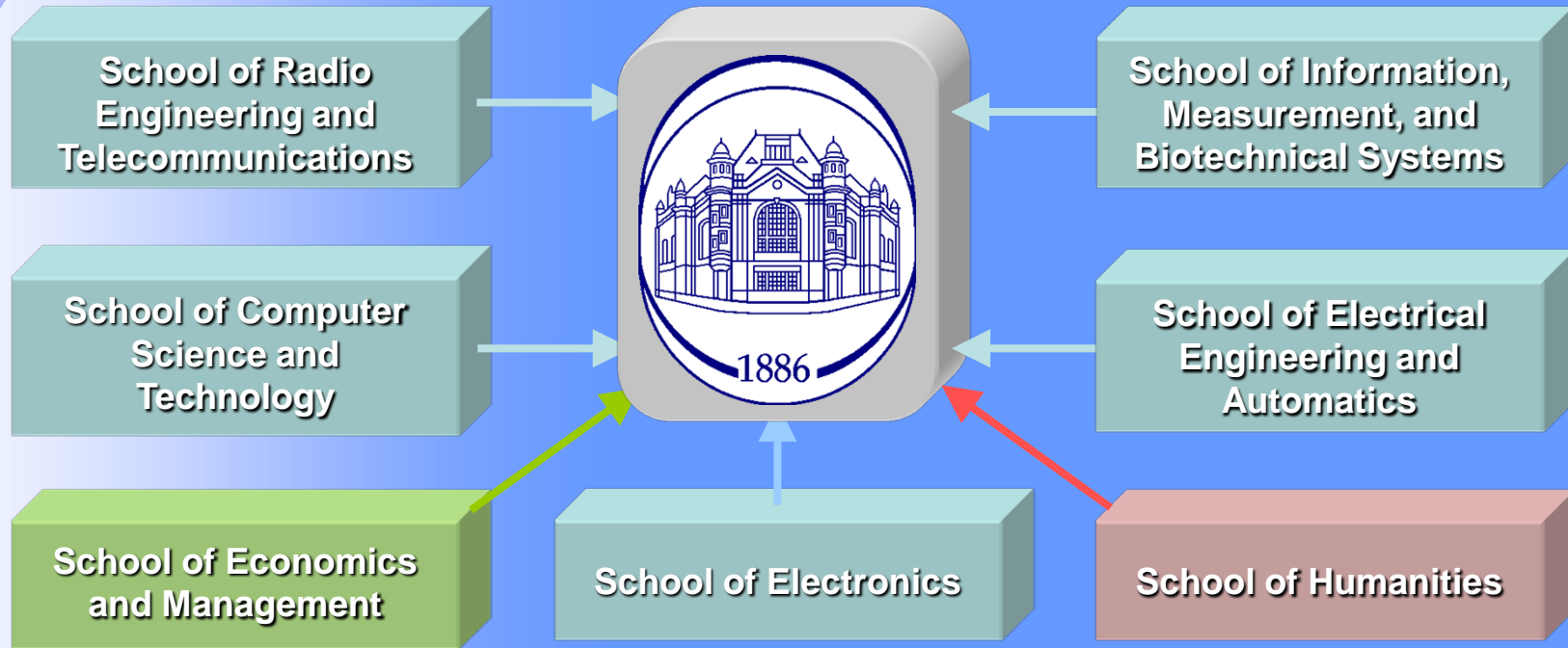
• The University Mission

The mission of St. Petersburg Electrotechnical University "LETI" is to contribute to society through the pursuit of education, learning, and research at the highest international levels of excellence





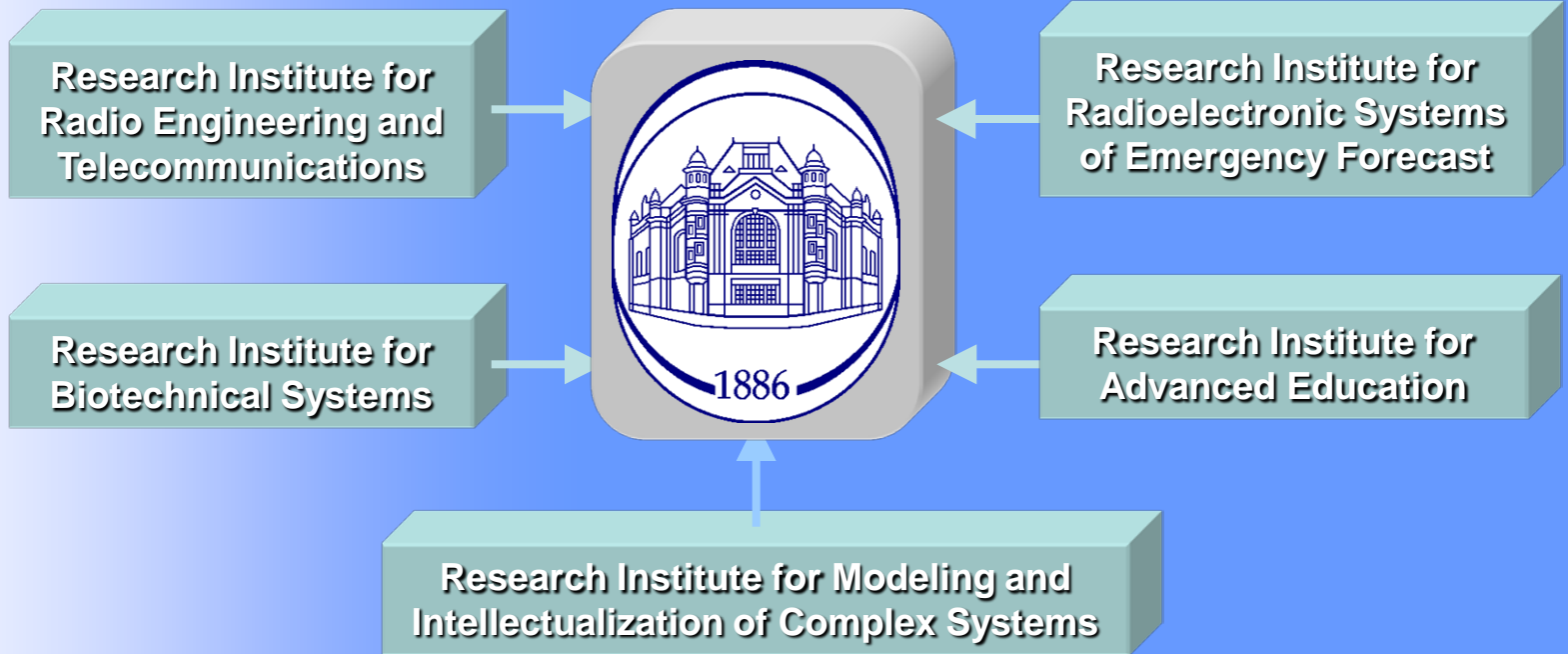
• Education at ETU "LETI" •



- ✓ *About 10 000 students including 400 international students from almost 40 countries*
- ✓ *Near 1200 academics including 130 Professors, 200 Doctors of Science, and more than 700 Ph.D.s*
- ✓ *About 100 major educational programs and over 40 Ph.D. courses*
- ✓ *40% of academic curricula are devoted to fundamental disciplines*
- ✓ *Over 1600 BSc, MSc, and Integrated Degree Diplomas every year*



• Research at ETU "LETI"



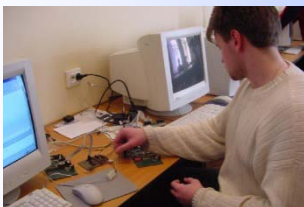
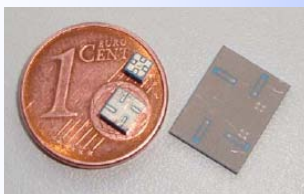
- ✓ *Fundamental and applied research*
- ✓ *5 research institutes*
- ✓ *Over 50 research teams and labs*
- ✓ *Laboratories of world-wide companies*
- ✓ *State-of-the-art facilities and equipment*
- ✓ *Over 24 million US\$ R&D budget (2010)*



• Fundamental Research



- *Macroscopic Electrodynamics*
- *Solid State Physics*
- *Phase Transitions, Fluctuations, and Renormalization Group*
- *Plasma Physics*
- *Charged Particles Acceleration*
- *Non-linear Wave Dynamics and Chaos*
- *Physical Chemistry*
- *Mathematical Physics*
- *Functional Analysis*
- *Differential Equations*
- *Numerical Methods*
- *Mathematical Methods of Statistics*
- *Artificial Neural Networks*



- *Nanotechnology*
- *Semiconductor Materials, Structures, and Devices*
- *Acoustoelectronics*
- *Acoustoptics*
- *Optoelectronics*
- *Micromechanics*
- *Microwave Microelectronics*
- *Sensors*
- *Radiolocation and Navigation*
- *Environmental Remote Sensing*
- *Geoinformation Systems*
- *Electromagnetic Compatibility*
- *Laser Measurement and Navigation Systems*
- *Biotechnical Systems*
- *Enzyme Immunoassay*
- *Digital Signal Processing*
- *Computer Simulation*
- *Distributed Intelligent Technology and Systems*
- *Parallel Computing*
- *Data Acquisition*
- *Data Protection and Information Security*
- *Pattern Recognition and Image Analysis*
- *Machine Vision*
- *Television*
- *X-ray Devices*
- *Ultrasonics and Nondestructive Testing*
- *Spectroscopy*
- *High Frequency Induction Heating*
- *Adaptive Control Systems*
- *Robotics*
- *Electric Drives*
- *Electric Machines*
- *Quality Management*



• FP6 Network of Excellence "METAMORPHOSE"



- ✓ Title: *Metamaterials Organized for Radio Frequency and Photonics Superlattice Engineering – "METAMORPHOSE"*
- ✓ Duration: *01.05.2004 – 30.04.2008 (Now VI Metamorphose AISBL)*
- ✓ ETU Project Leader: *Prof. Irina Vendik*
- ✓ Goal: *Creating a common European research platform and new organizational structure – Virtual Institute, to plan and organize joint research and use and disseminate knowledge in targeted area.*
- ✓ URL: *<http://www.metamorphose-vi.org>*



UK

- Loughborough University
- The Queens University of Belfast
- University of Glasgow
- University of Southampton



Italy

- Univesità degli Studi di Siena
- University of Roma Tre



Greece

- The Foundation for Research and Technology (FORTH)



Switzerland

- École Polytechnique Fédérale de Lausanne



Finland

- [Helsinki University of Technology](#)
(Now [Aalto University](#), Coordinator)



Sweden

- Chalmers University of Technology



Russia

- St. Petersburg Electrotechnical University



Spain

- Universidad Publica de Navarra
- Universitat Autònoma de Barcelona
- Universitat Politècnica de Catalunya
- University of the Basque Country



Germany

- University of Siegen



Turkey

- Bilkent University



Belgium

- Université Catholique de Louvain



Poland

- Institute of Electronic Materials Technology
- University of Warsaw



France

- Thales
- University of Lille
- University Paris-Sud

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5, Prof. Popov Str., 197376 St. Petersburg, RUSSIA • Tel.: +7 (812) 234 38 57 • E-mail: OMP@mail.eltech.ru



• FP6 Research Project "NANOSTAR"



- ✓ Title: Nano-Structured Ferroelectric Films for Tuneable Acoustic Resonators and Devices – "NANOSTAR"
- ✓ Duration: 01.09.2005 – 31.08.2008 (Completed)
- ✓ ETU Project Leader: Prof. Irina Vendik
- ✓ Goal: Development of the theory, fabrication processes and device demonstrators for functional validation of nanostructured multifunctional ferroelectrics films and components integrated with silicon substrate. Tuneable Thin Film Bulk Acoustic Resonators (TFBAR), varactors, and delay lines are typical components.
- ✓ URL: <http://www.nanostar-eu.com>
- ✓ Partners:



Sweden

- Chalmers University of Technology (Coordinator)
- Ericsson



Switzerland

- École Polytechnique Fédérale de Lausanne



France

- Temex



The Netherlands

- Philips Applied Technologies



Russia

- St. Petersburg Electrotechnical University

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5, Prof. Popov Str., 197376 St. Petersburg, RUSSIA • Tel.: +7 (812) 234 38 57 • E-mail: OMP@mail.eltech.ru



• FP7 Research Project "Nanointerface"

- ✓ Title: Knowledge-based multi-scale modelling of metal-oxide-polymer interface behaviour for micro- and nanoelectronics – "Nanointerface"
- ✓ Duration: 01.09.2008 – 31.08.2011 (Completed)
- ✓ ETU Project Leader: Prof. Irina Vendik
- ✓ Goal: Development of a unique experimentally validated general multi-scale and multi-physics engineering software tool to predict the behaviour of metal-oxide-polymer interfaces in which models at atomic level will be explicitly coupled to models at macroscopic scale.

✓ URL: <http://www.nanointerface.eu>

✓ Partners:



The Netherlands

- Delft University of Technology
- NXP Semiconductors
- Philips Applied Technologies (Coordinator)

Germany

- AMIC GmbH
- Fraunhofer IZM
- Infineon Technologies AG

USA

- Honeywell International Inc.

UK

- Accelrys Ltd.

Russia

- St. Petersburg Electrotechnical University

France

- Centre National de la Recherche Scientifique
- Georgia Institute of Technology Lorraine

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• FP7 Project "ICPC NANONET"



- ✓ Title: *A Web-Based Repository of Nanoscience and Nanotechnology Publications, Database of Researchers and Online Forum, to Inform and Facilitate Networking between EU and ICPC RTD – "ICPC NANONET"*
- ✓ Duration: *01.06.2008 – 31.05.2012 (In Progress)*
- ✓ ETU Project Leader: *Assc. Prof. Alexey Ivanov*
- ✓ Goal: *To provide wider access to published nanoscience research, and opportunities for collaboration between scientists in the EU and International Cooperation Partner Countries (ICPC). This is being achieved through an open access electronic archive of nanoscience publications (Nano Archive) and tools to facilitate networking between scientists in different world regions.*
- ✓ URL: *<http://www.icpc-nanonet.org>*
- ✓ Partners:



UK

- Institute of Nanotechnology (Coordinator)



The Netherlands

- Malsch TechnoValuation
- Universiteit Maastricht



Portugal

- Sociedade Portuguesa de Inovação



India

- Jawaharlal Nehru Centre for Advanced Scientific Research



Russia

- St. Petersburg Electrotechnical University



China

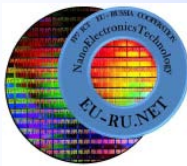
- Chinese Society of Micro-Nano Technology

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• FP7 Project "EU-RU.NET"



- ✓ Title: *Linking R&D Strategies, Foresight, and Stimulation of EU-Russia Cooperation in Nanoelectronics Technology – "EU-RU.NET"*
- ✓ Duration: *01.05.2010 – 30.04.2012 (In Progress)*
- ✓ ETU Project Leader: *Assc. Prof. Alexey Ivanov*
- ✓ Goal: *Identification of the most urgent and promising fields for cooperation, and setting up working groups of experts to support the participation of EU and Russian scientists at workshops and brokerage events to encourage the setting up of new collaborations, including joint EU or bilateral project proposals. Help to participants to identify the bottlenecks of cooperation and propose improvements. A foresight study for the future of EU-Russia cooperation in Nanoelectronics Technology.*
- ✓ URL: *<http://www.eu-ru.net>*
- ✓ Partners:
 -  **Germany**
 - Fraunhofer Society
 -  **Belgium**
 - European Centre for Knowledge and Technology Transfer (Coordinator)
 - Interuniversity Microelectronics Centre
 -  **Russia**
 - Moscow Lomonosov University
 - Russian Academy of Sciences
 - Scientific Research Center for Molecular Electronics and Mikron Factory
 - State University – Higher School of Economics
 - St. Petersburg Electrotechnical University
 -  **Italy**
 - Italian Research Council
 -  **France**
 - French Commission for Atomic Energy and Alternative Energies



• FP7 – Marie Curie IRSES Project "MultiWaveS"



- ✓ Title: *Multiband Electronically Reconfigurable Microwave Devices and Antennas for a New Generation of Wireless Systems – "MultiWaveS"*
- ✓ Duration: *01.04.2010 – 31.03.2014 (In Progress)*
- ✓ ETU Project Leader: *Prof. Irina Vendik*
- ✓ Goal: *Establishing new partnerships and reinforcing already existing ones between two European and three non-European research institutions, through a structured programme of exchange of researchers and coordinated multiannual joint research programme in the field of multiband electronically reconfigurable microwave devices and antennas. The main technical goal of the joint research programme is to encourage the application of emerging technologies and result in the development of low-cost miniature tunable and reconfigurable microwave devices and antennas for future multifunctional wireless systems.*
- ✓ URL: *<http://cordis.europa.eu>*
- ✓ Partners:



Serbia

- University of Novi Sad
(Coordinator)



USA

- *University of Pennsylvania*



South Africa

- *Stellenbosch University*



UK

- *Heriot-Watt University*



Russia

- *St. Petersburg Electrotechnical University*



• ETU "LETI" Center for Innovations Commercialization "Technopark"



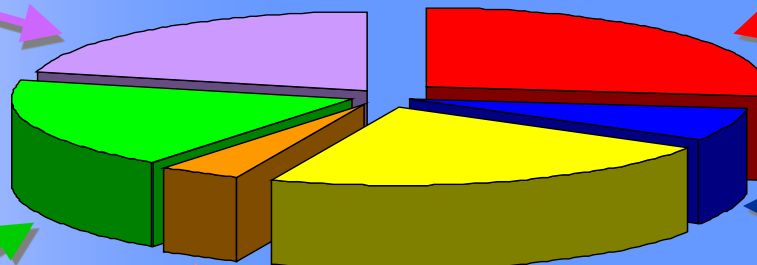
Electronics: 21%

- ✓ The first in the former USSR university's technopark (1991)
- ✓ 26 small innovative enterprises
- ✓ 3100 square meters
- ✓ 11 million US\$ turnout (2010)
- ✓ Annual growth of 15-20%

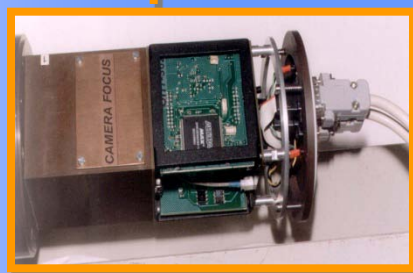


Information technologies: 27%

Technology transfer: 7%



Medical devices: 19%



Telecommunication systems: 4%

Automation & hardware complex: 22%





- ✓ *Government Regulation of 14.02.2006, No. 89 "On state support for educational institutions implementing innovation educational programs"*
- ✓ *Government Regulation of 02.08.2007, No. 498 "On targeted federal program "Nanoindustry infrastructure development in the Russian Federation"*
- ✓ *Federal Law of 03.08.2009, No. 217 "On the establishment of small promotional enterprises at the higher educational institutions and research organizations"*
- ✓ *Government Regulation of 09.04.2010, No. 218 "On state support for the cooperation development between Russian higher educational institutions and organizations performing integrated projects on high-tech production"*
- ✓ *Government Regulation of 09.04.2010, No. 219 "On state support for the innovation infrastructure development at the federal educational institutions for higher vocational education"*
- ✓ *Government Regulation of 09.04.2010, No. 220 "On measures for recruitment of leading scientists at Russian educational institutions for higher vocational education"*



Industrial Partners of ETU "LETI" World-Wide





St. Petersburg Electrotechnical University "LETI"
5, Prof. Popov Str., 197376 St. Petersburg, RUSSIA



Prof. Vladimir M. Kutuzov
Rector of ETU "LETI"



Dr. Mikhail Yu. Shestopalov
Vice-Rector for Research

Director of International Projects Office – Dmitry V. Kholodnyak
Tel.: +7 (812) 234 38 57, Fax: +7 (812) 346 08 67, E-mail: DVKholodnyak@mail.eltech.ru