

Achievements of SPbPU scientists in 2024

The ongoing decade of science and technology in 2024 is marked by many bright events in the scientific activities of universities. Peter the Great St. Petersburg Polytechnic University has made a great contribution to the overall achievements.

The year was marked by high publication activity of SPbPU scientists: **1735** scientific articles were published in HAC journals as of mid-December, and the **Hirsch** index of RINC publications today is **164**; **13** highly cited scientists of Polytechnic University are included by Elsevier in the list of the most influential scientific experts in the world.

Among the inventions of Polytechnic scientists there are many import-substituting and import-replacing technologies, including technologies for solving knowledge-intensive tasks in the interests of leading enterprises of machine-building, aviation, space and fuel and energy industries.



SPbPU scientists demonstrated outstanding results.

Researchers from the [Advanced Engineering School of SPbPU](#) developed a pilot technology for manufacturing filaments from continuous carbon fiber based

on thermoplastics; [developed a digital twin](#), designed and manufactured a fairing for a motor glider for the flight [to the North Pole of the famous traveler Fyodor Konyukhov](#); scientists from the Institute of Machinery, Materials and Transport (IMM&T) have developed a mobile laser cladding complex «Nomad», created by the specialists of the Research Laboratory «LiAT» of IMM&T SPbPU.

Many scientific projects were implemented with the support of the Priority-2030 strategic academic leadership program.

IMM&T has developed a technology for the production of first stage guide vanes for GT-750-6 GPA using domestic materials.

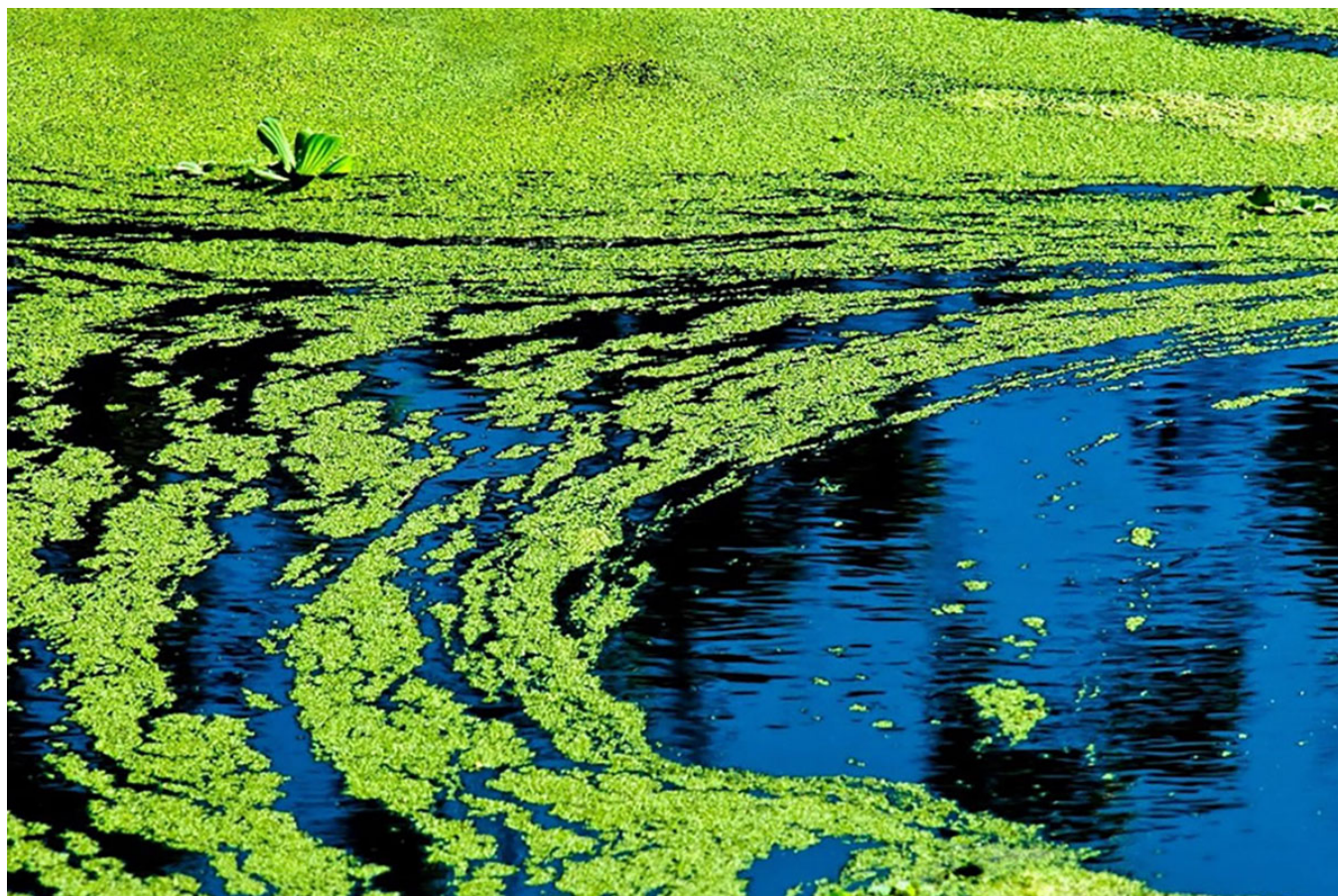
The Laboratory of Optical Materials Science equipped robots with vision systems and combined a minispectral analyzer with artificial intelligence.

Students, graduate students and scientists from IMM&T, ICCS and the [Industrial Systems of Stream Data Processing](#) laboratory have created an [unmanned truck](#).

Researchers of the [Institute of Power Engineering of SPbPU](#) have proved that changing the operating mode of combined cycle gas turbine units will increase the marginal income of HPPs without significant changes in the thermal scheme.

Scientists of the Graduate School of Applied Physics and Space Technologies of SPbPU created an improved digital model of a quantum optical magnetometer. In cooperation with leading enterprises of the Russian military-industrial complex, two ultra-small spacecraft Polytech Universe-4 and Polytech Universe-5 were successfully launched into Earth orbit.

The Institute of Biomedical Systems and Biotechnologies has created «containers» *for the delivery of therapeutic* [miRNA molecules to intestinal cells](#) affected by infection, as well as a diagnostic kit and a device for laboratory and mobile rapid diagnostics of infectious diseases.



ISI scientists have developed a method of [cleaning water bodies from blue-green algae using green microalgae Chlorella](#).

The CEI's Industrial Ecology Research Laboratory [created a cascade-type photobioreactor for indoor air purification](#).

[The Gazprom Neft-Polytech Research and Development Center](#) implemented the projects «Forecasting Well Performance in Heterogeneous Reservoirs», «Automated Selection of Optimal Targets for Drilling Horizontal Wells to Involve Unexploited Areas in Mature Fields», «Development of Tools for Probabilistic Calculations of Launching Well Flow Rate», «Gas Foamed Fluid Fracturing», «Optical Sensor for the Presence and Level of Contamination by Oil Products and Heavy Particles in Fluids».

Last year, scientists of the Higher School of Theoretical Mechanics and Mathematical Physics improved their navigation system for surgery based on augmented reality technologies, as well as developed models of heat transfer and fluid removal in gas wells and a technique for proxy-modeling of the energy state of the deposit.

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