


**Portfolio of the academic advisor of the participants of the International Olympiad of the Global Universities Association
on the track of postgraduate studies in 2022-2023**

	<p>Oleg V. Tolochko, Doctor of Science, Peter the Great St. Petersburg Polytechnic University</p>
<p>University</p>	<p>Peter the Great St. Petersburg Polytechnic University</p>
<p>English proficiency</p>	<p>Advanced (C1)</p>
<p>Field of study on which the postgraduate student will be enrolled</p>	<p><u>CHEMISTRY & MATERIAL SCIENCE</u> 1.4.1. Inorganic chemistry 2.6.1. Metal science and heat treatment of metals and alloys 2.6.5. Powder metallurgy and composite materials 2.6.6. Nanotechnology and nanomaterials 2.6.17. Material science</p>
<p>List of research projects of a potential supervisor (participation /supervision)</p>	<p>Supervisor of more than 15 research project for the last 5 years.</p> <ul style="list-style-type: none"> • Development of an elementary base of photoelectronics based on new quantum materials / supervision / SkolTech. Moscow / 2015-2017 • Development of a technology for producing flux-cored welding wires reinforced with oxide nanoparticles to improve the properties of the weld / supervision / joint research project with Brabdenburg Technical University (B-TU) / 2017-2019 • Implementation of work on the development of domestic materials for the manufacture of tantalum oxide - semiconductor chip - capacitors / supervision / JSC “GiriCond” / 2020-2021 • Effect of alloying on structure formation in the synthesis of composite materials based on aluminum and copper with carbon nanoparticles / supervision / Inner Mongolia carbon Valley Technology, China // 2017-2019 • Regularities of the processes of friction and wear of multilevel composite materials based on thermoplastic polymers filled with carbon fibers and nanoparticles / supervision / Russian foundation of basic research (RFBR) / 2019-2021
<p>List of possible research topics</p>	<p>Metal matrix composites, strengthened by carbon nanostructures. High entropy alloys Nanopowders Synthesis and applications Thermoplastics based multilevel composite materials</p>

Field of study	Materials Science: composite materials, including carbon nanomaterials; metallic glasses; high entropy alloys; metal and polymer-matrix composite materials; tribology
Supervisor's research interests	Nanoparticles synthesis and applications; Metallic glasses; Synthesis and applications of nanocarbon materials; Phase transformation in solids; Multilevel thermoplastic polymer-based composite materials
Research highlights	<ul style="list-style-type: none"> • Research work in laboratory; modern equipment; • Financial support for student is possible; • Close collaboration with Russian and foreign Research organizations and Universities (mainly PR China, Germany, S.Korea)
Supervisor's specific requirements	<ul style="list-style-type: none"> • Basic level of Physical Chemistry, Chemistry, Metal Physics • Basic principles of the most common methods: XRD, SEM, XPS, thermal analysis
Supervisor's main publications	<p>More than 130 research papers.</p> <ul style="list-style-type: none"> • Preparation of lightweight glass microsphere/Al sandwich composites with high compressive properties (2022) Materials Letters, 308, статья № 131220. DOI: 10.1016/j.matlet.2021.131220 • Microstructure evolution of fencicocr1.3 mo0.5 high entropy alloy during powder preparation, laser powder bed fusion, and microplasma spraying (2021) Materials, 14 (24), статья № 7870. DOI: 10.3390/ma14247870 • Modification of the CVD-graphene resistivity by post-processing sample annealing (2021) Chinese Journal of Physics, 74, pp. 256-261. DOI: 10.1016/j.cjph.2021.09.010 • A novel copper-matrix composite with fullerene soot nanoparticles produced by molecular level mixing (2021) Materials Letters, 304, статья № 130514, . DOI: 10.1016/j.matlet.2021.130514 • Tribological properties of al-based composites reinforced with fullerene soot (2021) Materials, 14 (21), статья № 6438, . DOI: 10.3390/ma14216438 • Effect of al content on phase compositions of fencicocrmo0.5alx high entropy alloy (2021) Metals, 11 (11), статья № 1734. DOI: 10.3390/met11111734 • The Mechanical Properties Improvement Of Thermoplastics-Based Fibermetal Laminates (2021) Materials Physics and Mechanics, 47 (4), pp. 592-599. DOI: 10.18149/MPM.4742021_6

	<ul style="list-style-type: none"> • Regularities of Friction of Multiscale Composite Materials Containing Highly Dispersed Particles of Fullerene Soot (2021) Technical Physics Letters. DOI: 10.1134/S1063785021030111 • Friction and Wear of Polyetheretherketone Samples With Different Melt Flow Indices (2022) J. Tribol. 144 (6): 061705 DOI: 10.1115/1.4053092
<p>Results of intellectual activity</p>	<ul style="list-style-type: none"> • Method for obtaining nanocomposite material based on aluminum; Patent on invention RU 2676117 C2, 26.12.2018. • Method of producing nanocomposite material based on copper, hardened by carbon nanofibres; Patent on invention RU 2696113 C1, 31.07.2019. • Method of carbon-based nanoparticles distribution during production of nanocomposite one-way thermoplastic tapes; Patent on invention RU 2741945 C1, 29.01.2021.