


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

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	<p>Alexander Dzh. Breki, D.Sc. in engineering (Peter the Great St. Petersburg Polytechnic University) Professor, Higher School of Mechanical Engineering Lead Researcher of ISTC “BaltTribo-Polytechnic”</p>
<p><b>University</b></p>	<p>Peter the Great St. Petersburg Polytechnic University</p>
<p><b>English proficiency</b></p>	<p>B1</p>
<p><b>Field of study on which the postgraduate student will be enrolled</b></p>	<p>ENGINEERING &amp; TECHNOLOGY 2.5.3. Friction and wear in machinery</p>
<p><b>List of research projects of a potential supervisor (participation / supervision )</b></p>	<p>Grant of the Russian Science Foundation No. 22-19-00178</p>
<p><b>List of possible research topics</b></p>	<p>Friction of steel materials without lubrication, in gas environment and in vacuum. Tribotechnical properties of nanomaterials, nanocoatings and modified surface layers. Tribotechnical properties of lubricating-cooling liquids. Physical and mathematical modeling of friction and wear of nanocomposite materials.</p>
<p><b>Field of study</b></p>	<p>Friction and wear in machines.</p>
<p><b>Supervisor’s research interests</b></p>	<p>Patterns of materials friction in various environment under various thermomechanical conditions, establishment of bifurcation points when changing friction modes. Development of mathematical friction models that describe abrupt changes in the parameters of tribosystems and changes in friction modes. Improving the means of identifying the results of tribological studies.</p>
<p><b>Research highlights</b></p>	<p>Patterns of various types of wear and surface destruction. Friction without lubrication, in gaseous environment and in vacuum. Tribotechnical properties of materials, coatings and modified surface layers. Tribotechnical properties of lubricants. Physical and mathematical modeling of friction and wear.</p>
<p><b>Supervisor’s specific requirements</b></p>	<p>The main requirements to graduate students are as follows: ability to work with scientific sources of information, ability to write articles in journals of various levels and conferences, desire to master experimental research methods, constant self-education, etc.</p>
<p><b>Supervisor’s main publications</b></p>	<p align="center">32</p>

<b>Results of intellectual activity</b>	Development of generalized mathematical models of the laws of friction and wear.
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