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| University   | Peter the Great St. Petersburg Polytechnic University  |
| Level of English proficiency                         | Fluent   |
| Courses and fields of studies offered for applicants | 2.4.7. Turbomachines and reciprocating engines   |
| Projects for potential academic supervision          | <ul style="list-style-type: none"> <li>- R&amp;D "Performing preliminary (calculative) gas-dynamic and strength calculations of compressors and turbines with determination of geometric parameters of flow passage elements and mass-dimensional characteristics of compressors and turbines for experimental, industrial and CO2 utilization power plants" - 2019-2020 - Barskov V.V. responsible performer.</li> <li>- R&amp;D "Study of a 20 kW turbogenerator designed to increase the autonomy of a vehicle" - 2018-2019 - Barskov V.V. responsible performer.</li> <li>- R&amp;D "Development of a pilot model of a waste heat recovery system for electricity generation for own needs of compressor stations", 2011-2018 - Barskov V.V. performer until 2016, responsible performer since 2016.</li> <li>- PNIER "Development and creation of turbogenerator units with electric power of 1 and 30 kW using the energy of compressed natural gas of the gas transportation system of Russia", 2015-2017 - Barskov V.V. responsible performer.</li> <li>- R&amp;D "Conducting research on the selection of parameters and principles for the construction of autonomous local sources of electric power on natural gas based on the use of an expansion turbine of the LP-structure" 2011-2014 - performer Barskov V.V.</li> </ul> |
| Topics offered for prospective researches            | <ul style="list-style-type: none"> <li>- Advanced Computational Fluid Dynamics and Mathematical Modeling for Optimizing Power Plant Efficiency</li> <li>- Design and Optimization of Autonomous Turbine Installations</li> <li>- Principles of Creating Turbine Installations with External Heat Supply</li> <li>- Utilization of Various Types of Fuel in Turbine Systems</li> <li>- Mathematical Modeling and Simulation of Turbine Systems</li> <li>- Development and Verification of Mathematical Models for Turbine Components</li> <li>- Optimization Techniques for Improving Turbine Efficiency</li> <li>- Methods for Calculating Thermal Circuits with External Heat Supply</li> <li>- Numerical Studies for Optimizing Operational Parameters</li> <li>- Analysis and Integration of Energy Sources for Distributed Systems</li> <li>- Criteria for Selecting Energy Sources in Autonomous Turbine Installations</li> <li>- Integration Strategies for Distributed Energy Systems</li> </ul>  |

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|   | <ul style="list-style-type: none"> <li>- Heat and Mass Transfer Processes in Turbomachines</li> <li>- Experimental and Numerical Analysis of Heat Transfer in Turbines</li> <li>- Study of Physical and Chemical Processes in Turbine Systems</li> <li>- Techniques for Monitoring the Technical Condition of Turbine Equipment</li> <li>- Development of Diagnostic Tools for Main and Auxiliary Components</li> <li>- Development of Waste Heat Recovery Systems</li> <li>- Design and Implementation of Waste Heat Recovery Systems for Power Generation</li> <li>- Evaluation of Thermodynamic Efficiency and Practical Applications</li> <li>- Innovative Clean Energy Technologies</li> <li>- Research on CO2 Utilization and Reduction Technologies</li> <li>- Development of Sustainable and Clean Energy Solutions in Turbine Systems</li> </ul>   |
| <div style="text-align: center;">  </div> <p>Research supervisor:<br/>Victor Barskov,<br/>Doctor of Technical Science<br/>(Peter the Great St. Petersburg<br/>Polytechnic University)</p> | <p style="text-align: center;"><i>Energy &amp; fuels</i></p> <p>Supervisor’s research interests<br/>Micro turbine Technology and Design<br/>Autonomous Turbine Installations with External Heat Supply<br/>Mathematical Modeling and Optimization of Turbine Installations<br/>Energy Source Analysis for Distributed Energy Systems<br/>Innovative Methods for Heat and Mass Transfer in Turbomachines<br/>Monitoring and Diagnostics of Turbomachinery<br/>Waste Heat Recovery Systems<br/>Renewable Energy and Clean Technologies</p> <p>Study program highlights<br/>Our program emphasizes rigorous coursework and hands-on research in modern laboratories. Students engage in collaborative projects addressing real-world challenges in energy and mechanical engineering, preparing them for impactful careers.</p> <p>Supervisor’s specific requirements:<br/>Admission requires a robust academic background in engineering, demonstrated research experience or a keen interest in energy systems, proficiency in English and Russian, and potentially GRE scores. We are looking for candidates dedicated to innovation, problem-solving, and advancing sustainable energy solutions.</p> <p>Supervisor’s Publications<br/>In the last 5 years, V. V. Barskov has published more than 30 research papers in journals indexed in Web of Science, Scopus, and RSCI. Below is a list of 5 of the most significant publications:<br/>Pulin, A., Laptev, M., Kortikov, N., <b>Barskov, V.</b>, Roschenko, G., Alisov, K., ... &amp; Novikov, P. (2024). Numerical Investigation of Heat Transfer Intensification Using Lattice Structures in Heat</p> |

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|  | <p>Exchangers. Energies (19961073), 17(13).</p> <p>Vokin, L., Semakina, E., Chernikov, V., Rassokhin, <b>V. V. Barskov</b>, V., Sukhanov, A., &amp; Laptev, M. (2023). Optimal rotor blade swirl law for the last stage of a stationary turbine with an axial diffuser. Natural Gas Industry B, 10(5), 436-444.</p> <p>Automation of Thermal Calculations of Helicopter Turboshift Gas Turbine Engines Using Python Programming Language / T. K. Pham, V. A. Rassokhin, <b>V. V. Barskov</b>, V. C. Chu // Advanced Engineering Technologies: Collection of Articles from the International Scientific and Practical Conference Dedicated to the 125th Anniversary of Peter the Great St. Petersburg Polytechnic University and the 5th Anniversary of the Higher School of Mechanical Engineering, St. Petersburg, May 13–20, 2024. – St. Petersburg: POLYTECH-PRESS, 2024. – pp. 184-188. – EDN RWZYZJ.</p> <p>Effect of Cooling High-Temperature Blade Assemblies on the Efficiency of Gas Turbine Installations Considering the Specific Heat Capacity of the Working Fluid Depending on Temperature / M. Basati Panah, V. A. Rassokhin, <b>V. V. Barskov</b> [et al.] // Izvestiya MGTU MAMI. – 2022. – Vol. 16, No. 2. – pp. 115-124. – DOI 10.17816/2074-0530-106231. – EDN UJFDJY.</p> <p>Improving the Efficiency and Reliability of Gas Turbine Installations Through Additive Technologies / M. Basati Panah, V. A. Rassokhin, <b>V. V. Barskov</b> [et al.] // Reliability and Safety of Energy. – 2022. – Vol. 15, No. 2. – pp. 102-110. – DOI 10.24223/1999-5555-2022-15-2-102-110.</p> <p>On the Choice of Optimal Rotation Frequencies for Microturbine Generator Units / S. N. Besedin, <b>V. V. Barskov</b>, V. A. Rassokhin [et al.] // Gas Industry. – 2024. – No. 3(862). – pp. 98-105. – EDN PVZNLK.</p> <p>Modeling the Probability of Bankruptcy in the Construction Industry / <b>V. V. Barskov</b>, Y. A. Dubolazova, A. A. Maikova, E. A. Konnikov // Soft Measurements and Computations. – 2024. – Vol. 75, No. 2. – pp. 5-15. – DOI 10.36871/2618-9976.2024.02.001. – EDN HRIHRK.EMV.</p> |
|  | <p>Impacts of Supervisor’s Research</p> <p>V. V. Barskov is the author of several patents, including Utility Model Patent No. 132195 U1 for a rotor balancing device.</p> <p>An important outcome of his work is the development of software for the calculation of low-flow turbines (ONE1, TWO2, TURBO 3).</p> <p>He is also actively involved in academic supervision, with several dissertations defended under his guidance and the publication of textbooks on thermal scheme calculations for gas turbine installations and recuperative-type heat exchangers.</p>  |