


Researcher profile (portfolio) form for potential research supervisors of postgraduate track participants in the Global Universities Association International Olympiad for graduate and postgraduate applicants 2023-2024.

University	Tomsk Polytechnic University
English language proficiency	C1
Applicant's postgraduate program	1.3.8. Condensed matter physics 2.2.12. Devices, systems and medical products 2.6.6. Nanotechnology and nanomaterials
List of research projects of a potential research supervisor (participation/leadership)	<ul style="list-style-type: none"> • Dual sensing for highly specific and quantitative chemical analysis in pesticides detection • Electronic components based on laser integration for the biocompatible/biodegradable flexible electronic devices • Flexible and durable multi-functional sensors without cross talk • Processes of laser-matter interaction during the formation of nanostructured composite materials
List of possible research topics	<ul style="list-style-type: none"> • Development and analysis of graphene-polymer hybrid materials for biocompatible electronics • Nanoscale analysis of two-dimensional materials by tip-enhanced Raman spectroscopy • Study of the laser radiation effect on the electrochemical properties of functionalized graphene
 <p>Research supervisor: Evgeniya Sheremet, Ph.D. (Chemnitz University of Technology, Germany)</p>	<p style="text-align: center;">Title</p> <p style="text-align: center;">Interaction of laser radiation with matter, including in super-strong fields</p>
	<p>Supervisor's research interests:</p> <p><i>The work of Prof. Sheremet focuses on nanomaterials. The study of laser treatment processes on nanomaterials and their composites are the basis for the fabrication of graphene-based composites for biomedical applications. Plasmonic nanomaterials have a special benefit of working as nano-antennas focusing light at the nanoscale and enhancing optical spectroscopy signals. It is used for nanospectroscopy applications.</i></p>
	<p>Research highlights:</p> <p><i>Specify the key highlights of the program that make it stand out from others. (Use of unique equipment, collaboration with foreign scientists and research centers, financial support for graduate students, etc.)</i></p> <p><i>We have a unique setup for nanoanalysis based on tip-enhanced Raman spectroscopy and other advanced atomic force microscopy methods. The approach for laser-induced composite formation for flexible electronics is a scalable approach with the prospects of advanced application in various fields. Students who show their abilities can receive funding as by joining research projects.</i></p>

	<p>Supervisor's specific requirements: Self-discipline, ability to self-educate</p>
	<p>Supervisor's main publications:</p> <p>54 publications in the last 5 years</p> <ul style="list-style-type: none"> • <u>Cover: Rodriguez et al., 2021. Ultra-Robust Flexible Electronics by Laser-Driven Polymer-Nanomaterials Integration. Advanced functional materials, 31, 2008818. (IF 18.808)</u> • <u>Cover: Rodriguez et al., 2020. Beyond graphene oxide: Laser engineering functionalized graphene for flexible electronics. Materials Horizons, 7(4), 1030-1041. (IF 12.319)</u> • <u>Cover: Lipovka et al., 2022. Photoinduced flexible graphene/polymer nanocomposites: Design, formation mechanism, and properties engineering. Carbon., 194 (154-161). (IF 9.594)</u>
	<p>Results of intellectual activity <i>Patent for invention № 2785547 "METHOD FOR PRODUCING COMPOSITE FILMS BASED ON ASPHALTENES"</i></p>