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

	**Valentina V. Zhurikhina**, Doctor of Science, Peter the Great St. Petersburg Polytechnic University, Russia Professor of Higher School of Basic Physical Research Director of SEC "Physics and Technology of Heterogeneous Materials and Nanoheterostructures" Head of "Multifunctional Glass Materials" Lab
University	Peter the Great St. Petersburg Polytechnic University, Russia
English proficiency	Advanced (C1)
Field of study on which the postgraduate student will be enrolled	PHYSICAL SCIENCE 1.3.8. Condensed matter physics
List of research projects of a potential supervisor (participation / supervision)	Supervision: 1. Multifunctional glassy materials of new generation for micro-optics and nanoplasmonics, Russian Ministry of Education and Science, World-class Research Center program: Advanced Digital Technologies, 2020 – 2025 Participation: 1. Nanostructured optical waveguides for microlasers, RFBR, 20-02-00334 A, 2020 - 2022 2. Precision spectroscopy of quantum systems and nanoobjects in a wide range of energies, Russian Ministry of Education and Science, FSEG-2020-0024, 2020-2022 3. Investigation of structures of micro- and nanophotonics formed in amorphous dielectrics under the action of strong local fields, Russian Ministry of Education and Science, FSRM-2020-001,2020-2022 4. Highly sensitive biosensors based on self-assembled metal nanoparticles, Russian Ministry of Education and Science, 2017 – 2019

	5. Nanostructuring by ultra-high electric field, RSF, 16-12-10044, 2016 – 2020
List of possible research topics	Electron beam treatment for the formation of local optical nonlinearity of glasses Charge lithography for photonics devices
Field of study	Glass structure, glass poling and nanostructuring, optics, nonlinear optics, second harmonic generation, optical structures
Supervisor's research interests	Glasses, nanostructures, optics, plasmonics, photonics
Research highlights	Modeling and experimental study of the characteristics of a polarized region and the space charge distribution during glass polarization Theoretical study and numerical simulation of the nonlinear properties of glasses and structures Studies of micro- and nanostructuring of glasses during their polarization and heat treatment Studies of structural transformations in polarized glasses and glass-ceramics under the action of temperature Analytical and numerical modeling of the growth and optical properties of metal nanoparticles in the bulk and nanoislands on the surface of dielectrics for applications of photonics and sensors
Supervisor's specific requirements	Good knowledge of condensed matter physics, electrodynamics MATLAB and COMSOL skills are highly welcome English or Russian, level B2 and above
Supervisor's main publications	1. Skvortsov A., Babich E., Redkov A., Lipovskii A., Zhurikhina V. Stable in biocompatible buffers silver nanoisland films for SERS // Biosensors. – 2021. – V.11. – P.448. https://doi.org/10.3390/bios11110448 2. Babich E., Lubyankina E., Kaasik V., Mozharov A., Mukhin I., Zhurikhina V., Lipovskii A. Visualization of spatial charge in thermally poled glasses via nanoparticles formation // Nanomaterials. – 2021. – V.11. – P.2973. https://doi.org/10.3390/nano11112973 3. Reduto I., Babich E., Zolotovskaya S., Abdolvand A., Lipovskii A., Zhurikhina V., Controlled metallization of ion-exchanged glasses by thermal poling, Journal of Physics: Condensed Matter. – 2021. – V. 33. – P. 505001 (7pp) DOI 10.1088/1361-648X/ac276c 4. Scherbak S.A., Kaasik V.P., Zhurikhina V.V., Lipovskii A.A. SEM-visualization of a spatial charge and a giant potassium peak in a corona-poled glass // Journal of Physics: Condensed Matter. – 2021. – V.33. – P.235702 (7pp) DOI 10.1088/1361-648X/abf383 5. Fetisova M., Kryzhanovskaya N., Reduto I., Zhurikhina V., Morozova O., Raskhodchikov A., Roussey M., Pélisset S., Kulagina M., Guseva Yu., Lipovskii A., Maximov M., Zhukov A. Strip-loaded horizontal slot wave-guide for routing microdisk laser emission // Journal of the Optical Society of

	America B: Optical Physics. – 2020. – V. 37. – N.6 – P.1878-188 DOI: 10.1364/JOSAB.391993 6. Reduto I., Kamenskii A., Brunkov P., Zhurikhina V., Svirko Yu., Lipovskii A. Relief micro- and nanostructures by the reactive ion and chemical etching of poled glasses. // Opt. Mater. Express. 2019. V.9. N.7. P. 3059-3068. DOI: 10.1364/OME.9.003059 7. Lipovskii A.A., Redkov A.V., Rtischeva A.A., Tagantsev D.K., Zhurikhina V.V. Kinetics of ion-exchange-induced vitrification of glass-ceramics // J.Am.Ceram.Soc., 2019. V.102, P.3426-3431, DOI: 10.1111/jace.16253 8. Redkov A.V., Melehin V.G., Raskhodchikov D.V., Reshetov I.V., Tagantsev D.K., Zhurikhina V.V., Lipovskii A.A. Modifications of poled silicate glasses under heat treatment // Journal of Non-Crystalline Solids. 2019. V. 503–504, P. 279-283, https://doi.org/10.1016/j.jnoncrysol.2018.10.011 9. Kryzhanovskaya N., Polubavkina Yu., Moiseev E., Maximov M., Zhurikhina V., Scherbak S., Lipovskii A., Kulagina M., Zadiranov Y., Mukhin I., Komissarenko F., Bogdanov A., Krasnok A., and Zhukov A., Enhanced light outcoupling in microdisk lasers via Si spherical nanoantennas // Journal of Applied Physics. 2018. V. 124, P.163102; https://doi.org/10.1063/1.5046823 10. Lipovskii A., Zhurikhina V., Tagantsev D., 2D-structuring of glasses via thermal poling: A short review // International Journal of Applied Glass Science. 2018. V.9. PP.24-28, DOI: 10.1111/ijag.12273.
Results of intellectual activity	The computer program NANORES, designed to calculate the spectral position of the plasmon resonance and the local amplification of the electric field in metal nanoparticles depending on the environment, including biological media. Registered 22.03.2021, certificate N 2021613301. The computer program DECRYSTALLIZATION, designed to calculate the dynamics of changes in the volume fraction of the crystalline phase in glass ceramics during crystallization/decrystallization of glass ceramics in the process of ion exchange. Registered 08.10.2021, certificate N 2021666127.