

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
Level of English proficiency	Fluency
Educational program and field of the educational program for which the applicant will be accepted	1.3. Physical sciences (educational program) Chemical physics, combustion and explosion, physics of extreme states of matter (field of the educational program)
List of research projects of the potential supervisor (participation/leadership)	1. “Development of physical and mathematical models ignition of gel fuels under conditions characteristic of space, the Arctic and Antarctic”, RSF grant No. 18-13-00031. 2. Physical and chemical transformations that contribute to the multiple growth of the chemical reaction area of promising solid fuels due to intensive dispersion during heating”, TPU Competitiveness Improvement Program.
List of the topics offered for the prospective scientific research	Development of a mathematical model of physical and chemical processes during the ignition of dispersant fuel droplets. Substantiation of the efficiency of conversion of coal-fired thermal power plants to composite fuel. Experimental study of regularities of physical and chemical processes in self-igniting systems with gel components. Development of a strategy for the disposal of industrial and municipal waste at industrial thermal power facilities.
	Natural and exact sciences 1.03. Physics and Astronomy, Physics - Interdisciplinary
	Research interests: condensed matter, fuel, energy source, heat and mass transfer, chemical reaction, experimental study, mathematical modeling, gel fuel
	Peculiarities: Use of unique equipment for research, interaction with foreign scientists and universities, financial support for a graduate student



Research supervisor:

Dmitrii O. Glushkov,

Doctor of Science (All-Russian
Research Institute of Fire
Defense)

Main publications (more than 50 publications in journals indexed by Scopus over the past 5 years):

- *Feoktistov D.V., Glushkov D.O., Kuznetsov G.V., Orlova E.G. Gel fuels based on oil-filled cryogels: Corrosion of tank material and spontaneous ignition // Chemical Engineering Journal. 2021, Vol. 421. Article No. 127765. Doi: 10.1016/j.ccej.2020.127765*
- *Glushkov D.O., Egorov R.I., Klepikov D.M. High-speed contactless measurements of temperature evolution during ignition and combustion of coal-based fuel pellets. International Journal of Heat and Mass Transfer. 2021, Vol. 175. Article No. 121359. Doi: 10.1016/j.ijheatmasstransfer.2021.121359*
- *Glushkov D.O., Kosintsev A.G., Kuznetsov G.V., Vysokomorny V.S. Experimental research and numerical simulation of gel fuel ignition by a hot particle. Fuel. 2021, Vol. 291. Article No. 120172. Doi: 10.1016/j.fuel.2021.120172*
- *Glushkov D.O., Kosintsev A.G., Kuznetsov G.V., Vysokomorny V.S. Numerical simulation of ignition of a typical gel fuel particle, based on organic polymer thickener, in a high-temperature air medium. Acta Astronautica. 2021, Vol. 178. P. 272–284. Doi: 10.1016/j.actaastro.2020.09.004*
- *Glushkov D.O., Kuznetsov G.V., Nigay A.G., Yanovsky V.A., Yashutina O.S. Ignition mechanism and characteristics of gel fuels based on oil-free and oil-filled cryogels with fine coal particles. Powder Technology. 2020, Vol. 360. P. 65–79. Doi: 10.1016/j.powtec.2019.09.081*

Results of intellectual activity (more than 20 certificates of state registration of computer programs and 1 patent for an invention over the past 5 years)

- *Volkov R.S., Glushkov D.O., Strizhak P.A. Testing facility for studying the process of ignition and combustion of a drop of water-coal fuel with petrochemical substances // RF Patent No. 2596797.*