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

	**Roman Yu. Dobretsov** Doctor of Technical Sciences (diploma of the Higher Attestation Commission, dissertation defended at Petrozavodsk University) Professor of Higher School of Transport
University	Peter the Great St. Petersburg Polytechnic University
English proficiency	–
Field of study on which the postgraduate student will be enrolled	ENGINEERING & TECHNOLOGY 2.5.2. Engineering machinery 2.5.6. Engineering technology 2.5.11. Ground transportation and technological complexes
List of research projects of a potential supervisor (participation/supervision)	Participation: 1. "Design development of a new model lineup of automated gearboxes for agricultural and road construction equipment in the range of 140-440 kW, adapted for use in the complex of unmanned tractor systems" (unique project identifier RFMEFI57816X0213), 2018 (successfully completed) 2. "Development of methods and algorithms for adaptive motion control of multi-agent spherical robots of increased maneuverability under conditions of uncertainty and significant external disturbances" (unique project identifier RFMEFI61315X0047), 2016 (successfully completed) Scientific Supervisor: 1. “Development of a draft design, design documentation, manufacturing, testing and completion according to the test results of a prototype of an independent tracked module with 4x2 and 4x4 formulas with a track width of 190-250 mm", 2018 (successfully completed) 2. “Development, manufacture, testing and refinement of a prototype ICM with improved performance characteristics for passenger cars with a wheel width of 200-30 mm", 2019 (successfully completed) 3. Project No. 65571, application C1-85694 within the framework of the implementation of the innovative project “Prototype of a light all-terrain vehicle of the low-price segment", 2021 (completed, interim report submitted)

	4. Three prize-winning projects of the KNSH competition of the Government of St. Petersburg (one-time grants-awards), 2019, 2020
List of possible research topics	1. Pulse control of highly loaded mechatronics objects in the transmissions of unmanned transport-traction and transport vehicles. 2. Theoretical foundations of designing hybrid transmissions and evaluating the energy efficiency of the chassis of transport and technological machines and mobile energy platforms adapted to work in autonomous mode. 3. Digital power distribution control technologies in mobile chassis transmissions adapted to offline operation. 4. Electromechanical shaft synchronization when shifting gears.
Field of study	Transport engineering – chassis systems (transmission, wheeled and tracked propulsion, suspension)
Supervisor's research interests	Transport engineering (wheeled, tracked, walking machines, including planetary rovers) – chassis systems (transmission, chassis): design, testing, operation
Research highlights	1. Energy efficiency of the chassis of vehicles. 2. Interaction of the mover with the ground. 3. The use of digital twin technology in scientific research. 4. Control of the transmission units and the running system of the vehicle.
Supervisor's specific requirements	in addition to the basic requirements for a postgraduate student, – knowledge of the Russian language at a level that allows you to work with literary sources in the specialty.
Supervisor's main publications	1. Energy Expenditure Forecasting at Path Generation of Spherical Robots within Multi-Agent System. Indian Journal of Science and Technology, Vol. 9(44), 2016. – PP. 1-9. DOI: 10.17485/ijst/2016/v9i44/104704 2. Evaluation of the performance of the hydraulic drive system of the power distribution devise (rus). Vestnik AAI. – 2016. – №5(100). – C. 30-32. 3. Hi mobility locomotion systems and board manipulators for nuclear robots application. Proceedings of Astra 2017. ESA, 20-22 June 2017. Leiden. Netherlands. 4. Ways to improve the controllability of forest and transport tracked vehicles (rus). Vestnik BGAU. 2017. № 3 (43). C. 97-106. 5. Multi-shaft gearbox (rus patent). № 2017113579. 6. On the way to driverless road-train: Digital technologies in modeling of movement, calculation and design of a road-train with hybrid propulsion unit. IV International Scientific Conference "The Convergence of Digital and Physical Worlds: Technological, Economic and Social Challenges" (CC-TESC 2018). 2018. Pp. 1-9. 7. Hybrid power distribution device in the power train of a vehicle. №2658486.

	8. Stability of movement of the two-section tracked vehicle (rus). Vestnik mashinosroenia. – 2019. – №3. – C. 53-56. 9. Friction steering devices in two-stream transmissions of tracked vehicles (rus). Traktory i sel'hosmashiny. – 2019 – № 1. – C. 60-69. Kinematic and power analysis of the power distribution device of the ZF Vector Drive lineup. Izvestia MGTU MAMI. – 2019 – № 3(41). – C. 97-103.
Results of intellectual activity	1. The concept of an objective comprehensive assessment of the chassis of transport and transport-technological machines (PhD thesis defended, research continued by graduate students). 2. Controlled inter-wheel and inter-axis power distribution mechanisms (head of the protected dissertation, PhD, research is continued by graduate students). 3. "Diagonal" turn control system of a tracked vehicle (articles, including Scopus, have been published, 2 patents of the Russian Federation have been obtained). 4. The concept of a parallel-sequential hybrid for the transmissions of tracked vehicles and a two-flow electromechanical MRM for wheeled vehicles (a number of articles, including Scopus, have been published, patents of the Russian Federation have been obtained). 5. "Multi-shaft" gearboxes, transmission and rotation mechanisms on their basis (a number of articles, including, Scopus, patents of the Russian Federation are obtained). (received more than 15 patents of the Russian Federation in the listed areas)