Scientific profile structure (portfolio) of potential research supervisor as participant of the International Olympiad in the Association "Global universities" on the postgraduate studies track in 2021-2022.

University	Samara National Research University
English proficiency	Fluent
The direction of training for which the graduate student will be accepted	Inorganic Chemistry
The code of the field of study for which the graduate student will be accepted	1.4.1.
List of research projects of a potential supervisor	Performer of the RFBR project 19-03-00048 in 2019–2021 'Coordination polyhedra AX_n (A - lanthanide or actinide, X - sulfur, selenium or tellurium) in crystal structures'
List of possible research topics	 Synthesis, study of the structure and properties of new coordination compounds. Analysis of the coordination features of various ligands. Application of Voronoi–Dirichlet polyhedra to study the structure of crystals. Search for relationships between composition, structure and properties within the framework of the stereoatomic model of crystal structures.
	Study of the relationship between the composition, structure and properties of substances Supervisor's research interests: Synthesis and study of the structure and properties of new coordination compounds. Study of the relationship between the composition/structure/properties of solids. Use and development of the stereoatomic model of crystal structures and Voronoi–Dirichlet polyhedra for the analysis of the structure of crystals. Study of noncovalent interactions, the phenomenon of polymorphism, actinide contraction, the electron-donating ability of ligands, the stereo effect of a lone electron pair, etc. Study of the fundamental principles of the formation of solids and universal approaches to the description of chemical bonds, determination of the oxidation states of elements, coordination numbers of atoms, geometric characteristics of molecules, etc.
Research supervisor:	Research highlights:
Denis V. Pushkin, Doctor of Science at Samara University	 Professional, responsive and collaborative research team. The unique advanced software for the analysis of crystalline substances, which has no analogues in the world, is used. The research team constantly participates in the implementation of work on grants that receive financial support. Interaction with leading Russian and foreign scientists working in the field of interests of the scientific group. Experimental work is carried out on high-tech equipment from the centers of collective use

• The results of scientific work are constantly published in highly aited acientific iournals and reported at leading specialized
international conferences.
None
 Supervisor's main publications: 20 articles indexed in Web of Science or Scopus during last 5 years 1. Uhanov A.S., Sokolova M.N., Fedoseev A.M., Bessonov A.A., Nechaeva O.N., Savchenkov A.V., Pushkin D.V. New Complexes of Actinides with Monobromoacetate Ions: Synthesis and Structures. (2021) ACS Omega, 6, pp. 21485–21490. DOI: 10.1021/acsomega.1c02296 2. Uhanov A. S., Klepov V.V., Vologzhanina A. V., Zubavichus Y.V., Savchenkov A.V. Pushkin D.V. Serezhkina I. B. Serezhkin V.N.
 Savchenkov A.V., Pushkin D.V., Serezhkina L.B., Serezhkin V.N. New itaconate-containing uranyl complex unit and coordination modes of itaconate ions. (2020) Comptes Rendus Chimie, 23, pp. 117–126. DOI: 10.5802/crchim.8 Serezhkin, V.N., Rogaleva, E.F., Savchenkov, A.V., Pushkin, D.V., Serezhkina, L.B. Aspects of the topology of actinide atom substructures in crystal structures and the concept of antiliquid. (2019) Acta Crystallographica Section A: Foundations and Advances, 75, pp. 370-378. DOI: 10.1107/S2053273318018326 Savchenkov, A.V., Vologzhanina, A.V., Pushkin, D.V., Serezhkina, L.B. Unusual heteronuclear uranyl clusters with aliphatic monocarboxylate ligands and coordination modes of crotonate, butyrate, and valerate ions. (2018) European Journal of Inorganic Chemistry, 2018 (18), pp. 1869-1876. DOI: 10.1002/ejic.201701318 Savchenkov, A.V., Vologzhanina, A.V., Dmitrienko, A.O., Zubavichus, Y.V., Pushkin, D.V., Serezhkina, L.B., Serezhkin, V.N. Crystal structures of uranyl complexes with isobutyrate and isovalerate anions. (2018) Dalton Transactions, 47 (6), pp. 1849-1856. DOI: 10.1039/c7dt04042c
Results of intellectual activity For the first time, more than fifty new uranyl carboxylates were obtained, the structure of their crystals was determined and it was proved that more than twenty of them possess nonlinear optical activity. The use Voronoi-Dirichlet polyhedra for the first time allowed to explain some features of thermal polymorphism of actinides, as well as to justify the crystal-chemical criteria for the presence of 5f-binding interactions between actinide atoms. The presence of a quantitative relationship between the nonlinear optical activity of U(VI) triscarboxylates and the value of a vector characterizing the displacement of the nucleus of a uranium atom from the center of gravity of its Voronoi-Dirichlet polyhedron in a cationic sublattice of uranium atoms and external sphere single or doubly charged cations was shown. The principle of maximum space filling was validated in sublattices containing actinide atoms (from Th to Es) in the structures of all studied to date crystalline substances. It was found that in U-sublattices of substances having 20 or more crystallographically nonequivalent U atoms in the unit cell, the short-range (or crystal-chemical) order in the mutual arrangement of atoms is absent and only the long-range order is preserved (translational

symmetry). The analysis of coordination polyhedra MCn (M - s-metal, B or Al) in the structures of organoelement compounds was conducted. It was established that the volume of Voronoi-Dirichlet polyhedra of M atoms is almost independent of their coordination numbers.
Patent # RU 2 570 236 C1 Date of publication: 10.12.2015 Bull. № 34 Method of obtaining calibration mixtures by photochemical reaction of potassium carboxylatouranylates and device for its realisation Savchenkov A.V., Pushkin D.V., Serezhkina L.B., Arutjunov J.I., Serezhkin V.N.