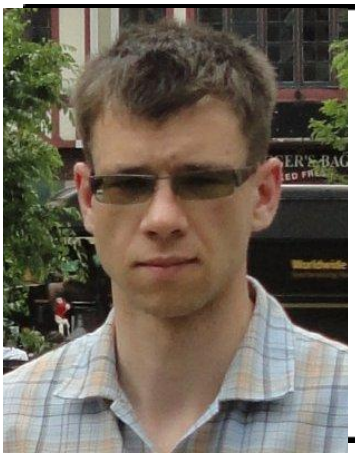
Scientific profile structure (portfolio) of potential research supervisor as participant of the International Olympiad in the Association "Global universities" on the postgraduate studies track in 2021-2022.

University	Samara National Research University
English proficiency	Upper-intermediate
The direction of training for which the graduate student will be accepted	Mechanical Engineering
The code of the field of study for which the graduate student will be accepted	2.5
List of research projects of a potential supervisor	Grant of the regional competition of integrated projects, Samara Region, 7/2-IPP / 2014, 2014, Development of advanced technologies for manufacturing materials from aluminum-lithium alloys with high operating parameters and conducting qualification tests for light and heavy class launch vehicles (responsible executor) RFBR 16-38-00495 mol_a, 2016-2017, Development of a plasticity criterion based on the energy approach for modeling the processes of deformation of orthotropic materials (head) RFBR 16-48-630828 p_a, 2017-2019, Investigation of the influence of texture on the formation of the phase composition during the aging of cold-rolled sheets from an Al-Cu-Li system alloy (head) RFBR 16-58-52051 MNT_a, 2016-2018, Development of methods for optimizing occupancy of a stamp engraving for metal forming: from the macro level to the micro level (performer) RFBR 17-58-540007 Viet_a, 2017-2018, The effect of elastic and plastic anisotropy on the analysis and design of beams and disks (performer) Grant of the regional competition of integrated projects, Samara Region, 3/34-IPP / 2017, 2017, Development of technologies for the manufacture of hot rolled semi-finished products with a guaranteed level of mechanical characteristics of aluminum alloys of the Al-Mg-Sc system for welded structures of promising samples of aerospace engineering (responsible executor) RFBR 18-58-53061 GFEN_a, 2018-2019, Investigation of the Formation of Metal-Polymer Composite Materials under Different Types of Loading (performer) Grant of the regional competition of integrated projects, Samara Region, 2/2-IPP / 2018, 2018, Development of technologies for manufacturing cold-rolled semi-finished products in the heated and heat-treated condition with the required level of mechanical characteristics of aluminum alloy of the Al-Mg-Sc system for welded structures of promising samples of aerospace engineering (responsible executor) Grant of the regional competition of integrated projects, Samara Region, 1/6-IPP / 2019, 2019, Development of technologies and creation of a pilot site for incremental forming of structural elements of aerospace engineering from advanced aluminum alloys (head) RSF 20-69-46070, 2020-2022, Development of the method for production and optimization of the properties of high-gradient bimetallic materials for aerospace application (responsible executor).

	RSF 20-79-10340, 2020-2023, Functionally graded materials due to plastic anisotropy: design and application (head).
List of possible research topics	• *Modeling the evolution of crystallographic texture in metal forming processes* • *Development of a plasticity criterion for anisotropic materials based on the approximation of the yield surface by splines* • *Study of the process of incremental forming of layered metal-polymer composite materials* • *Study of the mechanism of formation of a layer of severe plastic deformation between the tool and the workpiece and its effect on fracture in subsequent sheet metal forming processes* • *Numerical and experimental studies of limit strains during incremental forming of sheets*
 Research supervisor: Yaroslav A. Erisov, Doctor of Science (Samara University)	Заголовок (область исследования научного руководителя одной фразой) Mechanics of materials and technological processes of metal forming
	Supervisor's research interests (более детальное описание научных интересов): 1. The constitutive equations of plasticity theory of orthotropic, including transtropic, media, which explicitly take into account such structural parameters of the material as the elastic constants of the crystal lattice and the crystallographic texture, as well as special cases for plane stress and strain states and simplified linearized form are developed. 2. Mathematical models for constructing theoretical forming limit curves of sheet metal during forming, taking into account the crystallographic orientation of the blank structure. 3. Equations and ratios that allow, in a theoretical analysis of the processes of drawing, bending and stretch-wrap forming, to determine the optimal crystallographic orientation of the structure of the blanks. The results of the analysis of the influence of typical crystallographic orientations of aluminum alloys on the anisotropy, yield strength, as well as on the behavior and limit strains of sheet blanks during plastic forming. 4. Mathematical and computer models for calculating the influence of the crystallographic orientation of the structure of the metal base on the operational characteristics of metal-matrix and metal-polymer composite materials. Results of the analysis of the influence of typical crystallographic orientations of an aluminum alloy matrix on the tensile strength of a fibrous composite material, fracture toughness and ultimate load bearing capacity of a metal-polymer composite material of the GLARE type. 5. Evolution of the crystallographic orientation of the structure and its relationship with mechanical and technological properties in the manufacture of sheet semi-finished products from advanced aluminum alloys of the Al-Li (1424 and V-1461) and Al-Mg-Sc (V-1579) systems.
	Research highlights (при наличии): *Необходимо указать отличительные особенности данной программы, которые бы выделяли её перед остальными. (Использование уникального оборудования, взаимодействие с зарубежными учеными и исследовательскими центрами, финансовая поддержка аспиранта и т.д.)* An essential distinguishing feature of ongoing research and developing metal forming technologies is taking into account the influence of

	anisotropy of properties and its physical foundation - crystallographic texture, which makes it possible to intensify the deformation process and improve the quality of parts. Investigation of changes in the structure during deformation makes it possible to create a rational crystallographic texture that provides an increase in the performance characteristics of products in certain directions. For research, in addition to standard analytical equipment and testing machines, the following specialized equipment will be used: 1. Experimental installation for incremental forming based on the industrial robot KUKA KR160 R1570 nano with SprutCAM 11 software for creating control programs and the VIC-3D non-contact strain state analysis system. 2. Combined rolling mill DUO D240-300, KVARTO K220 / 75-300.
	Supervisor's specific requirements: Раздел заполняется при наличии требований, предъявляемых к аспиранту (обязательный бэкграунд кандидата/дисциплины, которые он обязательно должен был освоить/ методы, которыми он должен владеть/ уметь пользоваться каким-то определённым ПО и др.) ● *Plasticity Theory* ● *Theory and technology of metal forming* ● *Continuum mechanics* ● *Design of Experiment* ● *Modeling of metal forming processes (LS-Dyna, Abaqus, etc.)*
	Supervisor's main publications (указать общее количество публикаций в журналах, индексируемых Web of Science или Scopus за последние 5 лет, написать до 5 наиболее значимых публикаций с указанием выходных данных): *36* ● *Chernikov D., Erisov Y., Petrov I., Alexandrov S., Lang L. Research of Different Processes for Forming Fiber Metal Laminates // International Journal of Automotive Technology. 2019. Vol. 20, pp. 89-93. DOI: 10.1007/s12239-019-0131-7 (IF=0.71, Q1)* ● *Alexandrov S., Dinh Kien N., Erisov Y., Grechnikov F. Evolution of internal variables in an expanding hollow cylinder at large plastic strains // SpringerPlus. 2016. Vol. 5 (1), pp. 378. DOI: 10.1186/s40064-016-2027-6 (IF=0.43, Q1)* ● *Erisov Y.A., Grechnikov F.V., Surudin S.V. Yield function of the orthotropic material considering the crystallographic texture // Structural Engineering and Mechanics. 2016. Vol. 58 (4), pp. 677-687. DOI: 10.12989/sem.2016.58.4.677 (IF=0.71, Q2)* ● *Grechnikov F.V., Erisov Y.A., Alexandrov S.E. Effect of the Anisotropic Yield Condition on the Predicted Distribution of Residual Stresses in a Thin Disk // Doklady Physics. 2019. Vol. 64 (5), pp. 233-237. DOI: 10.1134/S1028335819050100 (IF=0.39, Q2)* ● *Alexandrov S., Erisov Y., Grechnikov F. Effect of the yield criterion of matrix on the brittle fracture of fibres in uniaxial tension of composites // Advances in Materials Science and Engineering. 2016. Vol. 2016, pp. 3746161. DOI: 10.1155/2016/3746161 (IF=0.34, Q2)*
	Results of intellectual activity (при наличии) (Наиболее значимые результаты интеллектуальной деятельности) ● *Grechnikov F.V., Maslov V.D., Chertkov G.V., Erisov Y.A. A method of manufacturing thin strips from low-formability aluminum-lithium alloys. Pat. 2602583 RU, decl. 04/20/2015, publ. 11/20/2016, Bull. No. 32.*

	● *Grechnikov F.V., Erisov Y.A., Surudin S.V., Dorogov R.P. FLStress+ – program for calculating the flow stress of a material when modeling hot forming in the DEFORM system. Certificate of state registration of computer programs No. 2017662109, decl. 09/08/2017, publ. 10/27/2017, Bull. No. 11.* ● *Erisov Y.A., Grechnikov F.V., Surudin S.V. Fibositer – program for calculating the strength of a metal-matrix composite material. Certificate of state registration of a computer program No. 2018617460, decl. 05/07/2018, publ. 06/25/2018, Bull. No. 7.* ● *Khaimovich A.I., Erisov Y.A., Grechnikov F.V., Surudin S.V., Petrov I.N. Comfrilaw – program for calculating friction coefficients in metal forming processes. Certificate of state registration of computer programs No. 20169617247, decl. 05/27/2019, publ. 06/05/2019, Bull. No. 6.* ● *Glushchenkov V.A., Chernikov D.G., Tiabashvili A.T., Erisov Y.A. The method of dynamic testing of sheet material and a device for its implementation (options). Pat. 2695945 RU, decl. 02/06/2018, publ. 07/29/2019, Bull. No. 22.* ● *Ilyukhin V.N., Doladov M.Yu., Erisov Y.A., Surudin S.V., Degtyarev S.V., Razzhivin V.A. Servo control program for incremental forming auxiliary mechanism. Certificate of state registration of a computer program No. 2019666931, decl. 10.16.2019, publ. 12/17/2019, Bull. No. 6.*