

Researcher profile (portfolio) form for potential research supervisors of postgraduate track participants in the Global Universities Association International Olympiad for graduate and postgraduate applicants.

University	Tomsk Polytechnic University
Level of English proficiency	B2/C1
Educational program and field of the educational program for which the applicant will be accepted	2.6. <i>Chemical technology, materials science, metallurgy</i> 2.6.1. <i>Metallurgy and heat treatment of metals and alloys</i>
List of research projects of the potential supervisor (participation/leadership)	<p>Leadership</p> <ol style="list-style-type: none"> 1. Production of high-strength castings from lead-tin bronzes 2. Increasing the efficiency of energy storage in electric vehicle batteries based on the MXene hybrid nanocomposite 3. Development of technology for printing using the SLM method from stainless steels. 4. Production of gradient centrifugally cast bronze billets by introducing dispersed carbide particles into the crystallizing melt <p>Participation</p> <ol style="list-style-type: none"> 1. Theoretical and experimental modeling of physical and chemical processes during laser sintering of ultrafine metal powders on a substrate 2. Selection of rational design and technological solutions in the production of technological equipment and products from high-tech composite materials 3. Study of the structure and properties of corrosion-resistant coatings of the titanium-tantalum-niobium system, formed by high-energy exposure to an electron beam in a vacuum and air atmosphere
List of the topics offered for the prospective scientific research	<ol style="list-style-type: none"> 1. Subtractive processing of workpieces manufactured by electron beam printing using stainless steel wire 2. Subtractive processing of workpieces manufactured by electron beam printing using titanium alloy wire 3. Subtractive processing of workpieces manufactured by electron-arc 3D printing using stainless steel wire 4. Subtractive processing of workpieces manufactured by electron-arc 3D printing using titanium alloy wire 5. Comparative analysis of the structure and properties of stainless steel parts produced by the EBW and WAAM methods. 6. Comparative analysis of the structure and properties of parts made of titanium alloys produced by the EBW and WAAM methods. 7. Comparative analysis of the structure and properties of parts made of nickel alloys produced by the EBW and WAAM methods. 8. Modification of aluminum alloys (silumins) with ultrafine metal oxide powders. 9. Modification of aluminum alloys (silumins) with ultrafine powders of refractory metals.



Research supervisor:
Nikita V. Martyushev,
Candidate of Science (Tomsk
Polytechnic University)

*Equipment and technology 2.05. Materials technology,
Metallurgy and metal science*

Supervisor's research interests

Additive technologies, powders for additive technologies, 3D printing with metals and alloys. Casting of non-ferrous metal alloys. Computer analysis of microstructures.

Research highlights (*при наличии*)

New area of research, new equipment developed for experimental work

Supervisor's specific requirements:

Good knowledge in the field of materials science of metals and metal alloys.

Total number of publications over the last 5 years: 77

Supervisor's main publications

- 1. Martyushev, N.V.; Kozlov, V.N.; Qi, M.; Tynchenko, V.S.; Kononenko, R.V.; Konyukhov, V.Y.; Valuev, D.V. Production of Workpieces from Martensitic Stainless Steel Using Electron-Beam Surfacing and Investigation of Cutting Forces When Milling Workpieces. Materials 2023, 16, 4529. doi: 10.3390/ma16134529*
- 2. Yelemessov, K.; Baskanbayeva, D.; Martyushev, N.V.; Skeeba, V.Y.; Gozbenko, V.E.; Karlina, A.I. Change in the Properties of Rail Steels during Operation and Reutilization of Rails. Metals 2023, 13, 1043. doi: 10.3390/met13061043*
- 3. Martyushev, N.V.; Bublik, D.A.; Kukartsev, V.V.; Tynchenko, V.S.; Klyuev, R.V.; Tynchenko, Y.A.; Karlina, Y.I. Provision of Rational Parameters for the Turning Mode of Small-Sized Parts Made of the 29 NK Alloy and Beryllium Bronze for Subsequent Thermal Pulse Deburring. Materials 2023, 16, 3490. doi: 10.3390/ma16093490*
- 4. Strateichuk, D.M.; Martyushev, N.V.; Klyuev, R.V.; Gladkikh, V.A.; Kukartsev, V.V.; Tynchenko, Y.A.; Karlina, A.I. Morphological Features of Polycrystalline CdS_{1-x}Se_x Films Obtained by Screen-Printing Method. Crystals 2023, 13, 825. doi: 10.3390/cryst13050825*
- 5. Zykova, A.; Martyushev, N.; Skeeba, V.; Zadkov, D.; Kuzkin, A. Influence of W Addition on Microstructure and Mechanical Properties of Al-12%Si Alloys. Materials 2019, 12, 981. doi: 10.3390/ma12060981*

Results of intellectual activity (*при наличии*)

- 1. Gutarevich, V.O.; Martyushev, N.V.; Klyuev, R.V.; Kukartsev, V.A.; Kukartsev, V.V.; Iushkova, L.V.; Korpacheva, L.N. Reducing Oscillations in Suspension of Mine Monorail Track. Appl. Sci. 2023, 13, 4671. doi: 10.3390/app13084671*
- 2. Martyushev, N.V.; Bublik, D.A.; Kukartsev, V.V.; Tynchenko, V.S.; Klyuev, R.V.; Tynchenko, Y.A.; Karlina, Y.I. Provision of Rational Parameters for the Turning Mode of Small-Sized Parts Made of the 29 NK Alloy and Beryllium Bronze for Subsequent Thermal Pulse Deburring. Materials 2023, 16, 3490. doi: 10.3390/ma16093490*
- 3. Yelemessov, K.; Sabirova, L.B.; Martyushev, N.V.; Malozyomov, B.V.; Bakhmagambetova, G.B.; Atanova, O.V. Modeling and Model Verification of the Stress-Strain State of*

- Reinforced Polymer Concrete. Materials* 2023, 16, 3494. doi: 10.3390/ma16093494
4. Strateichuk, D.M.; Martyushev, N.V.; Klyuev, R.V.; Gladkikh, V.A.; Kukartsev, V.V.; Tynchenko, Y.A.; Karlina, A.I. *Morphological Features of Polycrystalline CdS_{1-x}Se_x Films Obtained by Screen-Printing Method. Crystals* 2023, 13, 825. doi: 10.3390/cryst13050825
5. Kondrakhin, V.P.; Martyushev, N.V.; Klyuev, R.V.; Sorokova, S.N.; Efremenkov, E.A.; Valuev, D.V.; Mengxu, Q. *Mathematical Modeling and Multi-Criteria Optimization of Design Parameters for the Gyrotory Crusher. Mathematics* 2023, 11, 2345. doi: 10.3390/math11102345
6. Malozyomov, B.V.; Martyushev, N.V.; Sorokova, S.N.; Efremenkov, E.A.; Qi, M. *Mathematical Modeling of Mechanical Forces and Power Balance in Electromechanical Energy Converter. Mathematics* 2023, 11, 2394. doi: 10.3390/math11102394
7. Yelemessov, K.; Baskanbayeva, D.; Martyushev, N.V.; Skeeba, V.Y.; Gozbenko, V.E.; Karlina, A.I. *Change in the Properties of Rail Steels during Operation and Reutilization of Rails. Metals* 2023, 13, 1043. doi: 10.3390/met13061043
8. Martyushev, N.V.; Malozyomov, B.V.; Sorokova, S.N.; Efremenkov, E.A.; Qi, M. *Mathematical Modeling the Performance of an Electric Vehicle Considering Various Driving Cycles. Mathematics* 2023, 11, 2586. doi: 10.3390/math11112586