

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	
Educational program and field of the educational program for which the applicant will be accepted	31.06.01 Clinical medicine (educational program) 3.1.13 Urology and andrology (field of the educational program)
List of research projects of the potential supervisor (participation/leadership)	<ol style="list-style-type: none"> 1. Contract with a firm PowerScan (China), No.5-162/15K, "Algorithm dual power at a low dose". 2. Contract with a firm PowerScan (China), No.5-551/2016K, "Adaptive Method for Betatron Performance of Dual Energy Material Recognition". 3. Contract with a firm PowerScan (China), No.5-612/16, "Expansion Recognizable Thickness Range of Dual Energy Material Recognition Algorithm". 4. Contract with a firm PowerScan (China), No.16.02.04-66/2019, "Development of Method of Weakening Barrier Effect for Enhancement of Dual Energy Material Recognition". 5. Contract with OAO Gasprom Transgas Tomsk No.01/0527/16 «Development of a domestic set of equipment for radioscopic (filmless) inspection of pipeline welds», (participation). 6. Contract with UEC Saturn No 5-640/2017y «Development of a radiographic control system for rotors of gas turbine engines. RGK-700», (participation). 7. FSP No.14.578.21.0251 «Development of technology for the intellectual production of critical spatially complex fittings», (participation). 8. Contract with Russian Federal Nuclear Center (VNIITF), No.5-607/16, "Investigation of the capabilities of a tomograph based on a small-sized betatron with energy of 9 MeV". 9. Contract with Eltech Spb AO № 16.02.04-60/2018y «Supply of equipment for X-ray introscope RIN-400». 10. Contract with FKP Kombinat Kamensky» No.16.02.04-520/2019y «Supply of X-ray introscope RIN-400». 11. Contract with OOO «Diagnostics-M», Moscow No.16.02.04-109/2019y «Development of software for controlling an X-ray microscope based on the Prodis Mark detector and microfocus X-ray apparatus». 12. Contract with UEC Saturn PAO No 16.07-7/2021y «Modernization of X-ray control installation of welded seams», (participation). 13. Contract with OOO «Diagnostics-M», Moscow No.16.02.04-118/2021y «Development of software of a microfosome x -ray introscope for three -dimensional control of microelectronics and composite materials».
List of the topics offered for the prospective scientific research	<p>X -ray tomography and inspection systems. Obtaining x -rays and their digital processing. Software to operate x-ray inspection systems.</p>



Research supervisor:

Sergey V. Chakhlov,

Candidate of Physic-
Mathematic Science
(degree awarded in Tomsk
State University)

Заголовок (указывается направление международной карты науки, соответствующее области исследования, карта науки доступна по [ССЫЛКЕ](#))

Supervisor's research interests

Development of software for processing and analyzing images and equipment management for their capture in X-ray and ultrasound non-destructive testing, as well as computed tomography (including betatron tomography)

Research highlights:

X-ray Tomograph "Orel", X-ray inspection-system of TPU ("IDK").

Supervisor's specific requirements:

- Experience in C++ programming in Qt environment
- Numerical methods and algorithms of computational mathematics.

Total number of publications in journals indexed by Scopus for the last 5 years: 22.

Most significant publications:

- Osipov S., Chakhlov S., Batranin A., Osipov O., Van Bak Trinh, Kytmanov Ju. Theoretical study of a simplified implementation model of a dual-energy technique for computed tomography // NDT & E International, V.98, pp. 63–69 (2018). DOI: 10.1016/j.ndteint.2018.04.010
- Osipov S., Zhang G., Chakhlov S., Shtein M., Shtein A., Trinh V. B., Sirot'yan E. Estimation of Parameters of Digital Radiography Systems // IEEE Transactions on Nuclear Science, V.65, No.10, pp. 2732-2742 (2018) DOI: 10.1109/TNS.2018.2870162
- Vorobeychikov S.E., Chakhlov S.V., Udod V.A. A Cumulative Sums Algorithm for Segmentation of Digital X-ray Images // Journal of Nondestructive Evaluation, 2019, v.38, Issue 3, no.78, DOI: 10.1007/s10921-019-0616-3
- Osipov S., Chakhlov S., Udod V., Usachev E., Schetinkin S., Kamysheva E. Estimation of the effective mass thickness and effective atomic number of the test object material by the dual energy method // Radiation Physics and Chemistry March 2020, Vol. 168, DOI: 10.1016/j.radphyschem.2019.108543

Inspection of bulk cargoes and liquids by the dual energy method Osipov, S.P., Usachev, E.J., Chakhlov, S.V., Schetinkin, S.A., Osipov, O.S. Radiation Physics and Chemistry, 2020, 177, DOI: 10.1016/j.radphyschem.2020.109133

Results of intellectual activity (при наличии)

1. Chakhlov S.V. Control of the X-ray Tomography System for Large Scale Objects (INKCT). // Software for PC RU № 2015615108, published 20.06.2015.
2. Chakhlov S.V., Batranin A.V. Control of X-ray Micro-tomograph TOLMI-150-10 (uCT). // Software for PC RU № 2015615768, published 20.06.2015.
3. Filippov G.A., Zhvyrblya V.Ju., Dolmatov D.O., Sednev D.A., Chakhlov S.V., Ozdiev A.Kh. Software to control system of X-ray tomography TolmiCTControl. // Software for PC RU no.2019667740, published 26.12.2019.