

FURLETOV YURY MIKHAILOVITCH

Research profile (portfolio) of potential research supervisor of post-graduate track participants in the Open Doors: Russian Scholarship Project

UNIVERSITY	MOSCOW POLYTECHNIC UNIVERSITY (Moscow Polytech)
Level of English proficiency	Advanced
Educational program and field of the educational program for which the applicant will be accepted	2.9.5 Exploitation of transportation vehicles (Vehicle Operation Engineering) 2.5.11 Land transport and technological means and complexes (Land Vehicles)
List of research projects of the potential supervisor	• R&D project “Open automobile platform for research and testing of autonomous vehicles technologies”, MADI, Ministry of Science and Education of the Russian Federation, 2015-2017. • R&D project “Development of autonomous driving system for S-Class Mercedes Benz” (aDDa Project), TU Darmstadt, Daimler AG, 2017-2022. • R&D project “Development of sound processing system for autonomous driving”, 2017-2022. • Research into implementation of technologies based on import phase-out in “Transport Engineering”, “MADI” center for road engineering, “OOO `MSK` CSA (A)” certification authority, 2022. • R&D project “Independent suspension of a prospective passenger platform”, Moscow Polytechnic University, KAMAZ research center, 2023. • R&D project “Development of driving quality and safety monitoring system (scoring system) based on the onboard systems data, GNSS and accelerometer”, “ITMO” advanced engineering school, PAO “Tatneft”, 2023-2024. • R&D project “Development of floor-mounted clamp-truck autonomous driving system for tires factory”, “ITMO” advanced engineering school, PAO “Nizhnekamskmashina”, 2023-2024. • R&D project "Developing a mathematical model of chassis operation (transmission, running gear, controlling mechanisms) in static and dynamic condition based on the digital twin of the passenger car platform", Moscow Polytechnic University, Ministry of Science and Higher Education of the Russian Federation, 2023-2025. • R&D project "Development of a control system for the motion of the Dontech unmanned tractor along a fixed trajectory", Moscow Polytechnic University, DSTU, 2024. • R&D project "Development of a scientific and methodological framework for synthesizing optimal solutions for the energy-efficient operation of semi-trailer trucks on federal roads of the Russian Federation, taking into account remote monitoring and forecasting of performance characteristics in relation to the road network," MADI, Ministry of Education and Science of the Russian Federation, 2024-2025. • R&D project "Development of a methodological apparatus for the development of advanced power steering systems for

trajectory control of highly automated vehicles and transport and technological complexes", Moscow Polytechnic University and PJSC KAMAZ, Russian Science Foundation (RSF), 2026-2027.

List of the topics offered for prospective research

- Development of methods and algorithms for noisy sound signal filtering.
- Development of requirements, virtual and field test methods for sensor equipment and software for the autonomous vehicles in connection to the intellectual transportation environment.
- Development of methods and algorithms for acoustic data fusion in connection to the intellectual transportation system.
- Development of an improved sensor setup for autonomous vehicle perception systems.
- Development of vehicle predictive diagnostics and technical condition monitoring based on audio data.
- Application of acoustic signal processing algorithms to smart city systems (V2X).
- Development of a road surface detection system based on audio data.



Research supervisor:
Furlotov Yury Mikhailovitch,
Dr.-Ing. (equivalent to a PhD), The
Technical University of Darmstadt
(Germany)

Field of research

2.02.01 **Automation & control systems**

1.03.01 **Acoustics**

Supervisor's research interests

- Autonomous driving systems;
- Advanced driver assistance systems (ADAS);
- Audio signal processing systems;
- Vehicle remote diagnostics and technical condition monitoring systems.

Supervisor's specific requirements

Preferably: Python, C++, ML, Matlab, driver's license.

Supervisor's main publications

The total number of publications in journals indexed by Web of Science, Scopus, and RSCI over the past five years – 28.

Most significant publications over the past five years:

1. Y. Furlotov, V. Willert and J. Adamy, "Auditory Scene Understanding for Autonomous Driving," 2021 IEEE Intelligent Vehicles Symposium (IV), Nagoya, Japan, 2021, pp. 697-702, doi: 10.1109/IV48863.2021.9575964.
2. Y. M. Furlotov, A. M. Ivanov, S. S. Shadrin and M. A. Toporkov, "Sound Source Direction of Arrival Estimation for Autonomous Driving Applications," 2022 Intelligent Technologies and Electronic Devices in Vehicle and Road Transport Complex (TIRVED), Moscow, Russian Federation, 2022, pp. 1-5, doi: 10.1109/TIRVED56496.2022.9965523.

3. V.-T. Tran, W.-H. Tsai, Y. Furletov, and M. Gorodnichev, "End-to-End Train Horn Detection for Railway Transit Safety," *Sensors*, vol. 22, no. 12, p. 4453, Jun. 2022, doi: 10.3390/s22124453. (Q1)
4. Zavatsky, A.M.; Keller, A.V.; Shadrin, S.S.; Makarova, D.A.; Furletov, Y.M. Development of an Electric All-Wheel-Drive Simulation Model Used to Test Torque Distribution Algorithms. *Energies* 2023, 16, 7144. <https://doi.org/10.3390/en16207144> (Q1)
5. Klimov, A.V.; Ospanbekov, B.K.; Keller, A.V.; Shadrin, S.S.; Makarova, D.A.; Furletov, Y.M. Research into the Peculiarities of the Individual Traction Drive Nonlinear System Oscillatory Processes. *World Electr. Veh. J.* 2023, 14, 316. <https://doi.org/10.3390/wevj14110316>
6. "Equalizing Leaf Spring Vehicle Suspension Synthesis Technologies Based on Modern Mathematical Simulation Modeling", / Roman O. Maksimov, Mikhail M. Zhileykin, Andrey V. Keller, Sergey S. Shadrin, Daria A. Makarova, Yuri M. Furletov // *Rep Mech Eng* , vol. 6, no. 1, pp. 91–101, Jun. 2025, doi: 10.31181/rme454
Q1 (Mechanical Engineering)
7. Zavatsky, A. M., Keller, A. V., Shadrin, S. S., Makarova, D. A., & Furletov, Y. M. (2024). Automatic determination of directional stability parameters of an electric vehicle with a two-motor scheme as part of the torque distribution controller. *Vehicle System Dynamics*, 1–21. <https://doi.org/10.1080/00423114.2024.2415076>
Q1 (Automotive Engineering)
8. Klimov, A.V.; Ospanbekov, B.K.; Keller, A.V.; Shadrin, S.S.; Makarova, D.A.; Furletov, Y.M. Research into the Peculiarities of the Individual Traction Drive Nonlinear System Oscillatory Processes. *World Electr. Veh. J.* 2023, 14, 316. <https://doi.org/10.3390/wevj14110316>
Q2 (Automotive Engineering)
9. Petin, V.V.; Keller, A.V.; Shadrin, S.S.; Makarova, D.A.; Furletov, Y.M. Development of a Methodology Used to Predict the Wheel–Surface Friction Coefficient in Challenging Climatic Conditions. *Future Transp.* 2025, 5, 129. <https://doi.org/10.3390/futuretransp5040129>
Q2 (Engineering)
10. Petin, V., Keller, A., Shadrin, S., Makarova, D., et al., "Development of an Adaptive Algorithm for the Automatic Emergency Braking System," *SAE Int. J. Veh. Dyn., Stab., and NVH* 10(1):153-175, 2026, <https://doi.org/10.4271/10-10-01-0008>.

Results of intellectual activity

The most significant over the past 5 years is as follows:

Shadrin S.S., Furletov Yu.M., Keller A.V., Makarova D.A. Program for generating scenarios and conducting virtual tests of highly automated and unmanned vehicles: Certificate of state registration for the database No. 2025610693, Russian Federation; declared 11.12.2024; published 13.01.2025.