

Demyan Yarmoshik

Contacts

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Research Interests

Optimization on graphs: decentralized and distributed gradient methods, transportation modelling and multicommodity flows, power systems, communication networks, graph algorithms.

Work Experience

Apr 2024 – Now	Research Scientist <i>DisCO Lab (head Andrey Kupavskii), MIPT</i> Cooperation projects: • Team Member: T-Bank, implementation of a solver for a generalized vehicle routing problem • Team Member: Hua***, research project on robust routing in communication networks
2025–Now	
2025	
Aug 2021 – Now (Senior from 2025)	Research Scientist <i>LabMMO (head Alexander Gasnikov), MIPT</i> Cooperation projects: • Team Lead: Sirius University, development of static equilibrium transportation model of Sirius • Team Member: Hua***, research project on communication networks optimization • Key Contributor, Project Lead: RUT MIIT, development of software system for equilibria modelling in traffic networks
2025	
2023–2024	
2022–2024	
Oct 2021 – Feb 2022	RnD Software Engineer <i>RTT Lab, Moscow Research Center, Huawei</i> • Applying global optimization techniques in search of optimal error-correction codes under PAC framework
Mar 2020 – Mar 2023 (part-time from Aug 2021)	Engineer-Programmer <i>Scientific and Technical Center of Autonomous Energy, MIPT</i> • Mathematical analysis and program development of high-level (economic dispatch / optimal power flow) multi-agent control system for microgrids with renewable energy sources
Oct 2018 - Mar 2020	Intern/Junior Developer (C++, Java) <i>Rutoken</i> • Support of C++ cryptography (PKCS11) library • Development of Android demo app with automated on-device testing

Education

Sep 2021 – Jul 2025	PhD in Computer Science Moscow Institute of Physics and Technology Thesis: Decentralized Optimization with Affine Constraints Advisor: Alexander Gasnikov Formal information: link
Sep 2019 – Jul 2021	MSc in Renewable Energy Systems Moscow Institute of Physics and Technology Thesis: Mathematical Tools for Distributed Control of Isolated Microgrids Advisor: Igor Leonidovich Ozernykh
Sep 2015 – Jul 2019	BSc in Applied Mathematics and Physics Moscow Institute of Physics and Technology Thesis: Spectra of First-Order Sentences with Limited Number of Variables Advisor: Maksim Zhukovskii

Teaching

2024 – Now	Project mentoring, Mathematical Practicum, 2nd year BSc, PSAMCS MIPT
2024 – Now	Lectures, project mentoring and course organization, Mathematical Modelling of Transportation Flows, 1st year MSc, PSAMCS MIPT
2022 – 2024	Seminars, Numerical Methods in Optimization, 3rd year BSc (and 1st year MSc in 2024), PSAMCS MIPT. Webpage
2022, 2024	Lectures and seminars, Numerical Methods in Optimization, 1st year MSc, FCS HSE
July 2023	Project mentoring, Big Challenges, high school students, Educational Centre “Sirius” . Project landing

Awards

2022, 2023, 2024, 2025	A. M. Raigorodskii Scholarship for Contribution to the Development of Numerical Optimization Methods
2024	International conference “Mathematical Optimization Theory and Operations Research” (MOTOR 2024) Best Paper Award, Sponsored by BIA Technologies

Academic Supervision at MIPT

MSc students: Igor Ignashin (2024–2026), Pavel Pishchev (2025–2026), Yaroslav Bodrov (2024–2025), Yana Davydova (2023–2024)

BSc students: Lev Bazarov (2025–2026), Igor Ignashin (2023–2024)

Reviewing

[ICLR](#) (2026), [ICML](#) (2026), [Simulation](#) (2026), [Journal of Mathematical Sciences](#) (2025), [JOTA](#) (2025), [ICOMP](#) (2024, 2025), [Automation and Remote Control](#) (2025), [WAIT](#) (2023, 2024), [Computer Research and Modelling](#) (2023)

Publications

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|----------------|---|
| In Preparation | <p>Gribanov, D., N. Kuzmin, A. Tereshin, A. Urazgulov, and D. Yarmoshik. “Spectral Diameter Upper Bounds for Special Classes of Polyhedra”. In: <i>In Preparation</i>.</p> <p>Ignashin, I. and D. Yarmoshik. “Decentralized Block-Coordinate Frank–Wolfe”. In: <i>In Preparation</i>.</p> <p>Yarmoshik, D. and M. Klimenko. “A lower bound on time-varying decentralized communication complexity via global objective parameters”. In: <i>In Preparation</i>.</p> |
| Under Review | <p>Klimenko, M., F. Ozhegov, D. Yarmoshik, M. Peskin, I. Samoylenko, A. Kupavskii, and S. Moiseev. “Dominating DomRank on Dominating Set”. In: <i>Submitted to VLDB26, A*</i>.</p> <p>Pishchev, P. and D. Yarmoshik. “GPU-parallel alternatives for traffic assignment”. In: <i>Submitted to MOTOR26</i>.</p> <p>Yarmoshik, D., N. T. Nguyen, A. Rogozin, and A. Gasnikov. “Decentralized Optimization with Mixed Affine Constraints”. In: <i>arXiv preprint arXiv:2602.04479, submitted to ICML26, A*</i>.</p> |
| 2026 | <p>Yarmoshik, D., I. Ignashin, E. Sikacheva, and A. Gasnikov. “Modeling skiers flows via Wardrobe equilibrium in closed capacitated networks”. In: <i>Journal of Mathematical Sciences</i>, pp. 1–13.</p> |
| 2025 | <p>Ignashin, I., D. Yarmoshik, and A. Raigorodskii. “Stochastic Origin Frank–Wolfe Method for Traffic Assignment”. In: <i>Journal of Mathematical Sciences</i> 295.2, pp. 170–184.</p> <p>Kovalev, D. A., A. B. Kupavskii, A. V. Rogozin, and D. Yarmoshik. “On the complexity of decentralized optimization by the global function parameters”. Russian. In: <i>Uspekhi Matematicheskikh Nauk</i>, <i>Accepted for publication</i>. mathnet: https://www.mathnet.ru/rus/rm10278.</p> <p>Yarmoshik, D., A. Rogozin, N. Kiselev, D. Dorin, A. Gasnikov, and D. Kovalev. “Decentralized Optimization with Coupled Constraints”. In: <i>The Thirteenth International Conference on Learning Representations (ICLR 25, A*)</i>.</p> |
| 2024 | <p>Guseva, V., I. Sklonin, I. Podlipnova, D. Yarmoshik, and A. Gasnikov. “An Equilibrium Dynamic Traffic Assignment Model with Linear Programming Formulation”. In: <i>International Conference on Optimization and Applications</i>. Springer, pp. 17–30.</p> <p>Ignashin, I., D. Yarmoshik, et al. “Modifications of the Frank–Wolfe algorithm in the problem of finding the equilibrium distribution of traffic flows”. In: <i>Computer research and modeling</i> 16.1, pp. 53–68.</p> <p>Kubentayeva, M., D. Yarmoshik, M. Persiiarov, A. Kroshnin, E. Kotliarova, N. Tupitsa, D. Pasechnyuk, A. Gasnikov, V. Shvetsov, L. Baryshev, et al. “Primal-dual gradient methods for searching network equilibria in combined models with nested choice structure and capacity constraints”. In: <i>Computational Management Science</i> 21.1, p. 15.</p> <p>Yarmoshik, D. and A. Gasnikov. “An Equilibrium Dynamic Traffic Assignment Model with Linear Programming Formulation”. In: <i>Optimization and Applications: 15th International Conference, OPTIMA 2024, Petrovac, Montenegro, September 16–20, 2024, Revised Selected Papers</i>. Vol. 15218. Springer Nature, p. 17.</p> <p>Yarmoshik, D. and M. Persiiarov. “On the Application of Saddle-Point Methods for Combined Equilibrium Transportation Models”. In: <i>International Conference on Mathematical Optimization Theory and Operations Research</i>. Springer, pp. 432–448.</p> <p>Yarmoshik, D., A. Rogozin, and A. Gasnikov. “Decentralized optimization with affine constraints over time-varying networks”. In: <i>Computational Management Science</i> 21.1, p. 10.</p> |
| 2023 | <p>Gasnikova, E., A. Gasnikov, D. Yarmoshik, M. Kubentaeva, M. Persiiarov, I. Podlipnova, E. Kotlyarova, I. Sklonin, E. Podobnaya, and V. Matyukhin. “Sufficient conditions for multi-stages traffic assignment model to be the convex optimization problem”. In: <i>Matematicheskaya teoriya igr i ee prilozheniya</i> 15.2, pp. 3–17.</p> <p>Il'tyakov, N., M. Obozov, I. Dyshlevski, D. Yarmoshik, M. Kubentaeva, A. Gasnikov, and E. Gasnikova. “On accelerated coordinate descent methods for searching equilibria in two-stage transportation equilibrium traffic flow distribution model”. In: <i>Programming and Computer Software</i> 49.6, pp. 513–524.</p> |

- 2022 | Rogozin, A., **D. Yarmoshik**, K. Kopylova, and A. Gasnikov. “Decentralized Strongly-Convex Optimization with Affine Constraints: Primal and Dual Approaches”. In: *International Conference on Optimization and Applications*. Springer, pp. 93–105.
- Yarmoshik, D.**, A. Rogozin, O. O. Khamisov, P. Dvurechensky, and A. Gasnikov. “Decentralized convex optimization under affine constraints for power systems control”. In: *International Conference on Mathematical Optimization Theory and Operations Research*. Springer, pp. 62–75.
- 2021 | Kotliarova, E. V., A. V. Gasnikov, E. V. Gasnikova, and **D. Yarmoshik**. “Finding equilibrium in two-stage traffic assignment model”. Russian. In: *Computer Research and Modeling* 13.2, pp. 365–379.

Interests

Bikepacking, transgressive art