Дмитрий Ковалев

Личные данные

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Опыт работы

2023-н.в. Ведущий исследователь
Яндекс, Москва, Россия

2022-2023 Постдокторантура
Католический университет Лувена, Лувен-ла-Нёв, Бельгия

2021-2023 Стажер-исследователь
Исследовательский центр доверенного искусственного интеллекта
Институт системного программирования им. В.П. Иванникова РАН Москва, Россия

2022 Исследователь
Лаборатория продвинутой комбинаторики и сетевых приложений
Московский физико-технический институт, Долгопрудный, Россия

Образование

2019-2022 Доктор философии (PhD) по компьютерным наукам
Научно-технологический университет имени короля Абдаллы, Тувал, Саудовская Аравия
Руководитель: Peter Richtárik
Диссертация: "Optimal Algorithms for Affinely Constrained, Distributed, Decentralized, Minimax, and High-Order Optimization Problems"
Диссертационный совет: – Внешний: Юрий Нестеров, Аркадий Немировский
– Внутренний: David E. Keyes, Di Wang, Matteo Parsani

2018-2021 Магистр прикладных математики и физики
Московский физико-технический институт, Долгопрудный, Россия
Руководитель: Александр Гасников

2018-2019 Магистр компьютерных наук
Научно-технологический университет имени короля Абдаллы, Тувал, Саудовская Аравия
Руководитель: Peter Richtárik

2014-2018 Бакалавр прикладных математики и физики
Московский физико-технический институт, Долгопрудный, Россия
Руководитель: Александр Гасников

Научные интересы

Оптимизация, Федеративное и распределенное обучение
Машинное обучение, Глубокое обучение

Навыки

Программирование	C/C++, Python, JAX, PyTorch, Алгоритмы и структуры данных (Мастер Codeforces)
Математика	Математический анализ, Линейная алгебра, Теория вероятностей и статистика, Выпуклый Анализ
Компьютер	macOS, LaTeX, Git
Языки	Русский, Английский

Награды

1. **Национальная премия “Лидеры ИИ” 2025**, Конференция “AI Journey”
2. **Премия имени Б.Т. Поляка для молодых учёных 2025**, Университет Иннополис
3. **Студенческая премия за отличные успехи в науке**, Научно-технологический университет имени короля Абдаллы, 2021
4. **Лучшая студенческая работа воркшопа FL-ICML 2021**
5. **Научная премия Яндекса 2021**, Яндекс
6. **Научная премия Яндекса 2020**, Яндекс
7. **Стипендия Абрамова за отличные успехи в учебе**, Московский физико-технический институт, 2015-2017
8. **Азиатская физическая олимпиада (APhO) 2014, похвальная грамота**, Сингапур
9. **Призер заключительного этапа Всероссийской олимпиады школьников по физике**, Санкт-Петербург, 2014
10. **Победитель регионального этапа Всероссийской олимпиады школьников по информатике**, Москва, 2014
11. **Победитель регионального этапа Всероссийской олимпиады школьников по математике**, Москва, 2014
12. **Победитель заключительного этапа Всероссийской олимпиады школьников по физике**, Владивосток, 2013
13. **Призер заключительного этапа Всероссийской олимпиады школьников по физике**, Саранск, 2012

Публикации

1. **Decentralized Optimization with Coupled Constraints** (Demyan Yarmoshik, Alexander Rogozin, Nikita Kiselev, Daniil Dorin, Alexander Gasnikov, Dmitry Kovalev). *International Conference on Learning Representations*, 2025.
2. **On Linear Convergence in Smooth Convex-Concave Bilinearly-Coupled Saddle-Point Optimization: Lower Bounds and Optimal Algorithms** (Ekaterina Borodich, Dmitry Kovalev). *International Conference on Machine Learning*, 2025.
3. **An Optimal Algorithm for Strongly Convex Min-Min Optimization** (Dmitry Kovalev, Alexander Gasnikov, Grigory Malinovsky). *Uncertainty in Artificial Intelligence*, 2025.
4. **Lower Bounds and Optimal Algorithms for Non-Smooth Convex Decentralized Optimization over Time-Varying Networks** (Dmitry Kovalev, Ekaterina Borodich, Alexander Gasnikov, Dmitrii Feoktistov). *Advances in Neural Information Processing Systems*, 2024.
5. **Decentralized convex optimization on time-varying networks with application to Wasserstein barycenters** (Olga Yufereva, Michael Persiianov, Pavel Dvurechensky, Alexander Gasnikov, Dmitry Kovalev). *Computational Management Science*, 2024.
6. **Decentralized saddle-point problems with different constants of strong convexity and strong concavity** (Dmitry Metelev, Alexander Rogozin, Alexander Gasnikov, Dmitry Kovalev). *Computational Management Science*, 2024.
7. **Decentralized saddle point problems via non-Euclidean mirror prox** (Alexander Rogozin, Aleksandr Beznosikov, Darina Dvinskikh, Dmitry Kovalev, Pavel Dvurechensky, Alexander Gasnikov). *Optimization Methods and Software*, 2024.

8. **Convex-Concave Interpolation and Application of PEP to the Bilinear-Coupled Saddle Point Problem** (Valery Krivchenko, Alexander Gasnikov, Dmitry Kovalev). *Russian Journal of Nonlinear Dynamics*, 2024.
9. **Non-smooth setting of stochastic decentralized convex optimization problem over time-varying graphs** (Aleksandr Lobanov, Andrew Veprikov, Georgiy Konin, Aleksandr Beznosikov, Alexander Gasnikov, Dmitry Kovalev). *Computational Management Science*, 2023.
10. **Decentralized Convex Optimization over Time-Varying Graphs** (Alexander Rogozin, Alexander Gasnikov, Aleksander Beznosikov, Dmitry Kovalev). *Encyclopedia of Optimization*, 2023.
11. **Smooth monotone stochastic variational inequalities and saddle point problems: A survey** (Aleksandr Beznosikov, Boris Polyak, Eduard Gorbunov, Dmitry Kovalev, Alexander Gasnikov). *European Mathematical Society Magazine*, 2023.
12. **Is consensus acceleration possible in decentralized optimization over slowly time-varying networks?** (Dmitry Metelev, Alexander Rogozin, Dmitry Kovalev, Alexander Gasnikov). *International Conference on Machine Learning*, 2023.
13. **Stochastic distributed learning with gradient quantization and double-variance reduction** (Samuel Horvath, Dmitry Kovalev, Konstantin Mishchenko, Peter Richtarik, Sebastian Stich). *Optimization Methods and Software*, 2023.
14. **Accelerated primal-dual gradient method for smooth and convex-concave saddle-point problems with bilinear coupling** (Dmitry Kovalev, Alexander Gasnikov, Peter Richtarik). *Advances in Neural Information Processing Systems*, 2022.
15. **Communication acceleration of local gradient methods via an accelerated primal-dual algorithm with an inexact prox** (Abdurakhmon Sadiev, Dmitry Kovalev, Peter Richtarik). *Advances in Neural Information Processing Systems*, 2022.
16. **Optimal algorithms for decentralized stochastic variational inequalities** (Dmitry Kovalev, Aleksandr Beznosikov, Abdurakhmon Sadiev, Michael Persiianov, Peter Richtarik, Alexander Gasnikov). *Advances in Neural Information Processing Systems*, 2022.
17. **Optimal gradient sliding and its application to optimal distributed optimization under similarity** (Dmitry Kovalev, Aleksandr Beznosikov, Ekaterina Borodich, Alexander Gasnikov, Gesualdo Scutari). *Advances in Neural Information Processing Systems*, 2022.
18. **The first optimal acceleration of high-order methods in smooth convex optimization** (Dmitry Kovalev, Alexander Gasnikov). *Advances in Neural Information Processing Systems*, 2022.
19. **The first optimal algorithm for smooth and strongly-convex-strongly-concave minimax optimization** (Dmitry Kovalev, Alexander Gasnikov). *Advances in Neural Information Processing Systems*, 2022.
20. **Accelerated variance-reduced methods for saddle-point problems** (Ekaterina Borodich, Vladislav Tominin, Yaroslav Tominin, Dmitry Kovalev, Alexander Gasnikov, Pavel Dvurechensky). *EURO Journal on Computational Optimization*, 2022.
21. **An optimal algorithm for strongly convex minimization under affine constraints** (Adil Salim, Laurent Condat, Dmitry Kovalev, Peter Richtarik). *International Conference on Artificial Intelligence and Statistics*, 2022.
22. **IntSGD: Adaptive floatless compression of stochastic gradients** (Konstantin Mishchenko, Bokun Wang, Dmitry Kovalev, Peter Richtarik). *International Conference on Learning Representations*, 2022.
23. **Lower bounds and optimal algorithms for smooth and strongly convex decentralized optimization over time-varying networks** (Dmitry Kovalev, Elnur Gasanov, Alexander

Gasnikov, Peter Richtarik). *Advances in Neural Information Processing Systems*, 2021.

24. **A linearly convergent algorithm for decentralized optimization: Sending less bits for free!** (Dmitry Kovalev, Anastasia Koloskova, Martin Jaggi, Peter Richtarik, Sebastian Stich). *International Conference on Artificial Intelligence and Statistics*, 2021.

25. **ADOM: accelerated decentralized optimization method for time-varying networks** (Dmitry Kovalev, Egor Shulgin, Peter Richtarik, Alexander V Rogozin, Alexander Gasnikov). *International Conference on Machine Learning*, 2021.

26. **Near-optimal decentralized algorithms for saddle point problems over time-varying networks** (Aleksandr Beznosikov, Alexander Rogozin, Dmitry Kovalev, Alexander Gasnikov). *Optimization and Applications: 12th International Conference, OPTIMA 2021, Petrovac, Montenegro, September 27–October 1, 2021, Proceedings 12*, 2021.

27. **Towards accelerated rates for distributed optimization over time-varying networks** (Alexander Rogozin, Vladislav Lukoshkin, Alexander Gasnikov, Dmitry Kovalev, Egor Shulgin). *Optimization and Applications: 12th International Conference, OPTIMA 2021, Petrovac, Montenegro, September 27–October 1, 2021, Proceedings 12*, 2021.

28. **Linearly converging error compensated SGD** (Eduard Gorbunov, Dmitry Kovalev, Dmitry Makarenko, Peter Richtarik). *Advances in Neural Information Processing Systems*, 2020.

29. **Optimal and practical algorithms for smooth and strongly convex decentralized optimization** (Dmitry Kovalev, Adil Salim, Peter Richtarik). *Advances in Neural Information Processing Systems*, 2020.

30. **Don't jump through hoops and remove those loops: SVRG and Katyusha are better without the outer loop** (Dmitry Kovalev, Samuel Horvath, Peter Richtarik). *Algorithmic Learning Theory*, 2020.

31. **Accelerated methods for saddle-point problem** (Mohammad S Alkousa, Alexander Vladimirovich Gasnikov, Darina Mikhailovna Dvinskikh, Dmitry A Kovalev, Fedor Sergeevich Stonyakin). *Computational Mathematics and Mathematical Physics*, 2020.

32. **Revisiting stochastic extragradient** (Konstantin Mishchenko, Dmitry Kovalev, Egor Shulgin, Peter Richtarik, Yura Malitsky). *International Conference on Artificial Intelligence and Statistics*, 2020.

33. **Acceleration for compressed gradient descent in distributed and federated optimization** (Zhize Li, Dmitry Kovalev, Xun Qian, Peter Richtarik). *International Conference on Machine Learning*, 2020.

34. **From local SGD to local fixed-point methods for federated learning** (Grigory Malinovskiy, Dmitry Kovalev, Elnur Gasanov, Laurent Condat, Peter Richtarik). *International Conference on Machine Learning*, 2020.

35. **Variance reduced coordinate descent with acceleration: New method with a surprising application to finite-sum problems** (Filip Hanzely, Dmitry Kovalev, Peter Richtarik). *International Conference on Machine Learning*, 2020.

36. **RSN: randomized subspace Newton** (Robert Gower, Dmitry Kovalev, Felix Lieder, Peter Richtarik). *Advances in Neural Information Processing Systems*, 2019.

37. **Stochastic proximal Langevin algorithm: Potential splitting and nonasymptotic rates** (Adil Salim, Dmitry Kovalev, Peter Richtarik). *Advances in Neural Information Processing Systems*, 2019.

38. **Stochastic spectral and conjugate descent methods** (Dmitry Kovalev, Peter Richtarik, Eduard Gorbunov, Elnur Gasanov). *Advances in Neural Information Processing Systems*, 2018.

39. **A hypothesis about the rate of global convergence for optimal methods (Newton's type) in smooth convex optimization** (Alexander Gasnikov, Dmitry Kovalev). *Computer research and modeling*, 2018.

Препринты

1. **SGD with Adaptive Preconditioning: Unified Analysis and Momentum Acceleration** (Dmitry Kovalev). *arXiv preprint arXiv:2506.23803*, 2025.
2. **Understanding gradient orthogonalization for deep learning via non-euclidean trust-region optimization** (Dmitry Kovalev). *arXiv preprint arXiv:2503.12645*, 2025.
3. **On Solving Minimization and Min-Max Problems by First-Order Methods with Relative Error in Gradients** (Artem Vasin, Valery Krivchenko, Dmitry Kovalev, Fedyor Stonyakin, Nazari Tupitsa, Pavel Dvurechensky, Mohammad Alkousa, Nikita Kornilov, Alexander Gasnikov). *arXiv preprint arXiv:2503.06628*, 2025.
4. **Decentralized finite-sum optimization over time-varying networks** (Dmitry Metelev, Savelii Chezhegov, Alexander Rogozin, Aleksandr Beznosikov, Alexander Sholokhov, Alexander Gasnikov, Dmitry Kovalev). *arXiv preprint arXiv:2402.02490*, 2024.
5. **Optimal algorithm with complexity separation for strongly convex-strongly concave composite saddle point problems** (Ekaterina Borodich, Georgiy Kormakov, Dmitry Kovalev, Aleksandr Beznosikov, Alexander Gasnikov). *arXiv preprint arXiv:2307.12946*, 2023.
6. **On scaled methods for saddle point problems** (Aleksandr Beznosikov, Aibek Alanov, Dmitry Kovalev, Martin Takac, Alexander Gasnikov). *arXiv preprint arXiv:2206.08303*, 2022.
7. **Decentralized distributed optimization for saddle point problems** (Alexander Rogozin, Aleksandr Beznosikov, Darina Dvinskikh, Dmitry Kovalev, Pavel Dvurechensky, Alexander Gasnikov). *arXiv preprint arXiv:2102.07758*, 2021.
8. **Fast linear convergence of randomized BFGS** (Dmitry Kovalev, Robert M Gower, Peter Richtarik, Alexander Rogozin). *arXiv preprint arXiv:2002.11337*, 2020.
9. **Distributed fixed point methods with compressed iterates** (Selim Chraibi, Ahmed Khaled, Dmitry Kovalev, Peter Richtarik, Adil Salim, Martin Takac). *arXiv preprint arXiv:1912.09925*, 2019.
10. **Stochastic Newton and cubic Newton methods with simple local linear-quadratic rates** (Dmitry Kovalev, Konstantin Mishchenko, Peter Richtarik). *arXiv preprint arXiv:1912.01597*, 2019.