

Yura Malitsky

Curriculum Vitae

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Job experience

- 01.03.2023–current **Assistant professor in Computational Optimization**, University of Vienna, Faculty of Mathematics
- 2020–2023 **Assistant professor**, Linköping University, Department of Mathematics
- 2019–2020 **Postdoc researcher**, EPFL, Laboratory for Information and Inference Systems, Group of Prof. Volkan Cevher
- 2017–2019 **Postdoc researcher**, University of Göttingen, Institute for Numerical and Applied Mathematics, Group of Prof. Russell D. Luke
- 2015–2016 **Postdoc researcher**, Graz University of Technology, Institute for Computer Graphics and Vision, Group of Prof. Thomas Pock

Education

- 2012–2015 **PhD student**, Taras Shevchenko University of Kyiv, Faculty of Cybernetics, Applied Mathematics
- 2010–2012 **MSc**, Taras Shevchenko University of Kyiv, Faculty of Cybernetics, Applied Mathematics
- 2006–2010 **BSc**, Taras Shevchenko University of Kyiv, Faculty of Cybernetics, Applied Mathematics

PhD thesis

- title *Efficient projection methods for variational inequalities and composite optimization problems.*
- supervisor Prof. Volodymyr V. Semenov
- description The dissertation was dedicated to the development of new algorithms for monotone variational inequalities and composite minimization problems.

Fields of interests

- Mathematical optimization
- Nonlinear analysis
- Machine learning
- Algorithms

Awards

- 2015 SIAM Student Paper Award for “Projected reflected gradient method for monotone variational inequalities” (SIAM J. Optimization 25, 2015)

Scholarships and grants

- 2024 FWF START Award, Total: €1.2 mln
- 2022 Knut and Alice Wallenberg Foundation Prize, co-PI. Together with Erik G. Larsson (PI), Carlo Fischione (co-PI), and Mikael Johansson (co-PI). Total: SEK 30 mln
- 2020-2023 Wallenberg AI, Autonomous Systems and Software Program Faculty
- 2006-2015 Ukrainian government scholarship

Publication

- [1] A. Alacaoglu, A. Böhm, and Y. Malitsky. Beyond the golden ratio for variational inequality algorithms. *J. Mach. Learn. Res.*, 24:1–33, 2023. arXiv: 2212.13955. URL: <http://jmlr.org/papers/v24/22-1488.html>.
- [2] Z. Chen, E. G. Larsson, C. Fischione, M. Johansson, and Y. Malitsky. Over-the-air computation for distributed systems: something old and something new. *IEEE Network*, 2023. DOI: 10.1109/MNET.126.2200205. arXiv: 2211.00767.
- [3] Z. Chen and Y. Malitsky. Over-the-air computation with multiple receivers: a space-time approach. *IEEE Wireless Communications Letters*, 12(8):1399–1403, 2023. DOI: 10.1109/LWC.2023.3275760.
- [4] Y. Malitsky and K. Mishchenko. Adaptive proximal gradient method for convex optimization. 2023. arXiv: 2308.02261.
- [5] Y. Malitsky and M. K. Tam. A first-order algorithm for decentralised min-max problems. 2023. arXiv: 2308.11876.
- [6] Y. Malitsky and M. K. Tam. Resolvent splitting for sums of monotone operators with minimal lifting. *Math. Program.*, 201(1):231–262, 2023. DOI: 10.1007/s10107-022-01906-4. arXiv: 2108.02897.
- [7] A. Alacaoglu and Y. Malitsky. Stochastic variance reduction for variational inequality methods. In *Proceedings of Thirty Fifth Conference on Learning Theory*, volume 178, pages 778–816. PMLR, 2022. arXiv: 2102.08352. URL: <https://proceedings.mlr.press/v178/alacaoglu22a.html>.
- [8] F. J. Aragón-Artacho, Y. Malitsky, M. K. Tam, and D. Torregrosa-Belén. Distributed forward-backward methods for ring networks. *Computational optimization and applications*, 2022. DOI: 10.1007/s10589-022-00400-z. arXiv: 2112.00274.
- [9] A. Alacaoglu, Y. Malitsky, and V. Cevher. Convergence of adaptive algorithms for weakly convex constrained optimization. In *NeurIPS*, volume 34, pages 14214–14225, 2021. arXiv: 2006.06650. URL: <https://papers.nips.cc/paper/2021/hash/76c073d8a82d9ddaf993300be03ac70f-Abstract.html>.
- [10] A. Alacaoglu, Y. Malitsky, and V. Cevher. Forward-reflected-backward method with variance reduction. *Computational optimization and applications*, 80(2):321–346, 2021. DOI: 10.1007/s10589-021-00305-3.
- [11] M.-L. Vladarean, Y. Malitsky, and V. Cevher. A first-order primal-dual method with adaptivity to local smoothness. In *NeurIPS*, volume 34, pages 6171–6182, 2021. arXiv: 2110.15148. URL: <https://papers.nips.cc/paper/2021/hash/310b60949d2b6096903d7e8a539b20f5-Abstract.html>.
- [12] A. Alacaoglu, Y. Malitsky, P. Mertikopoulos, and V. Cevher. A new regret analysis for adam-type algorithms. In *Proceedings of the 37th International Conference on Machine Learning*, volume 119, pages 202–210. PMLR, 2020. arXiv: 2003.09729. URL: <http://proceedings.mlr.press/v119/alacaoglu20b.html>.
- [13] Y. Malitsky. Golden ratio algorithms for variational inequalities. *Mathematical Programming*, 184:383–410, 2020. DOI: 10.1007/s10107-019-01416-w. arXiv: 1803.08832.
- [14] Y. Malitsky and K. Mishchenko. Adaptive gradient descent without descent. In *Proceedings of the 37th International Conference on Machine Learning*, volume 119, pages 6702–6712. PMLR, 2020. arXiv: 1910.09529. URL: <http://proceedings.mlr.press/v119/malitsky20a.html>.
- [15] Y. Malitsky and M. K. Tam. A forward-backward splitting method for monotone inclusions without cocoercivity. *SIAM Journal on Optimization*, 30(2):1451–1472, 2020. DOI: 10.1137/18M1207260. arXiv: 1808.04162.
- [16] K. Mishchenko, D. Kovalev, E. Shulgin, P. Richtárik, and Y. Malitsky. Revisiting stochastic extragradient. In *International Conference on Artificial Intelligence and Statistics*, 2020. arXiv: 1905.11373. URL: <http://proceedings.mlr.press/v108/mishchenko20a.html>.

- [17] E. R. Csetnek, Y. Malitsky, and M. K. Tam. Shadow Douglas-Rachford splitting for monotone inclusions. *Applied Mathematics & Optimization*, 80(3):665–678, 2019. DOI: [10.1007/s00245-019-09597-8](https://doi.org/10.1007/s00245-019-09597-8). arXiv: [1903.03393](https://arxiv.org/abs/1903.03393).
- [18] Y. Malitsky and P. Ochs. Model function based conditional gradient method with Armijo-like line search. In *Proceedings of the 36th International Conference on Machine Learning*, pages 4891–4900, 2019. arXiv: [1901.08087](https://arxiv.org/abs/1901.08087). URL: <http://proceedings.mlr.press/v97/ochs19a/ochs19a.pdf>.
- [19] D. R. Luke and Y. Malitsky. Block-coordinate primal-dual method for nonsmooth minimization over linear constraints. In *Large-Scale and Distributed Optimization*, pages 121–147. Springer, Cham, 2018. DOI: [10.1007/978-3-319-97478-1_6](https://doi.org/10.1007/978-3-319-97478-1_6). arXiv: [1801.04782](https://arxiv.org/abs/1801.04782).
- [20] Y. Malitsky. Proximal extrapolated gradient methods for variational inequalities. *Optimization Methods and Software*, 33(1):140–164, 2018. DOI: [10.1080/10556788.2017.1300899](https://doi.org/10.1080/10556788.2017.1300899). arXiv: [1601.04001](https://arxiv.org/abs/1601.04001).
- [21] Y. Malitsky and T. Pock. A first-order primal-dual algorithm with linesearch. *SIAM Journal on Optimization*, 28(1):411–432, 2018. DOI: [10.1137/16M1092015](https://doi.org/10.1137/16M1092015). arXiv: [1608.08883](https://arxiv.org/abs/1608.08883).
- [22] Y. Malitsky. The primal-dual hybrid gradient method reduces to a primal method for linearly constrained optimization problems. 2017. arXiv: [1706.02602](https://arxiv.org/abs/1706.02602).
- [23] Y. Malitsky. Projected reflected gradient methods for monotone variational inequalities. *SIAM Journal on Optimization*, 25(1):502–520, 2015. DOI: [10.1137/14097238X](https://doi.org/10.1137/14097238X). arXiv: [1502.04968](https://arxiv.org/abs/1502.04968).
- [24] Y. V. Malitsky and V. Semenov. A hybrid method without extrapolation step for solving variational inequality problems. *Journal of Global Optimization*, 61(1):193–202, 2015. DOI: [10.1007/s10898-014-0150-x](https://doi.org/10.1007/s10898-014-0150-x). arXiv: [1501.07298](https://arxiv.org/abs/1501.07298).
- [25] Y. V. Malitsky and V. Semenov. An extragradient algorithm for monotone variational inequalities. *Cybernetics and Systems Analysis*, 50(2):271–277, 2014. DOI: [10.1007/s10559-014-9614-8](https://doi.org/10.1007/s10559-014-9614-8).

Conferences and Workshops

- Vienna, June 2024 Erwin Schrödinger Institute workshop “One World Optimization Seminar in Vienna” (organizer)
- Antwerp, April 2024 Workshop on Nonsmooth Optimization and Applications
- Shanghai, February 2024 Fudan workshop “Applied Mathematics and Data Science”
- Graz, September 2023 Abstract “*Distributed algorithms for saddle point problems*”, ÖMG Tagung
- Budapest, August 2023 EUROPT-2023 (a stream chair)
- Paris, June 2023 Abstract “*Adaptive first-order methods in convex optimization*”, Foundations of Computational Mathematics
- Seattle, June 2023 Abstract “*Adaptive proximal gradient method*”, SIAM conference on Optimization
- Stockholm, June, 2022 Abstract “*Adaptive gradient descent without descent*”, Mathematics of Complex Data
- Online, December, 2021 NeurIPS
- Online, October, 2021 Abstract “*A Forward-Backward Splitting Method for Monotone Inclusions Without Cocircuity*”, 2021 INFORMS Annual Meeting
- Online, July, 2020 ICML
- Vienna, February, 2020 Abstract “*Adaptive gradient descent without descent*”, Workshop of the Research Group on “Applied Mathematics with Emphasis on Optimization
- Cluj-Napoca, April, 2019 Abstract “*Golden ratio algorithm for variational inequalities*”, Games, Dynamics, Optimization–2019

- Vienna, February, 2019 Abstract *"On a new method for monotone inclusions"*, ESI workshop: Numerical Algorithms in Nonsmooth Optimization
- Vienna, December, 2018 Abstract: *"Bilevel composite minimization problems"*, Vienna Workshop on Computational Optimization
- Marburg, November, 2018 Abstract: *"Primal-dual algorithm for linearly constrained optimization problem"*, 4th Central European Set-Valued and Variational Analysis Meeting
- Bordeaux, July, 2018 Abstract: *"Primal-dual algorithm for linearly constrained optimization problem"*, 23rd International Symposium on Mathematical Programming
- Malta, May, 2018 Abstract: *"Primal-dual algorithm for linearly constrained optimization problem"*, 9th International Conference on Inverse Problems: Modeling and Simulation
- Chemnitz, November, 2017 Abstract: *"Golden ratio algorithms for variational inequalities"*, 3rd Central European Set-Valued and Variational Analysis Meeting
- Oaxaca, Mexico, September, 2017 Abstract: *"Golden ratio algorithms for variational inequalities"*, Splitting Algorithms, Modern Operator Theory, and Applications
- Vancouver, May, 2017 Abstract: *"Novel methods for saddle point problems"*, SIAM Conference on Optimization
- Münster, February, 2017 Abstract: *"A first-order primal-dual algorithm with linesearch"*, with T. Pock, Workshop: Shape, Images and Optimization.
- Graz, September, 2016 Abstract: *"A first-order primal-dual algorithm with linesearch"*, with T. Pock, SFB Workshop: Imaging with Modulated/Incomplete Data 2016
- Tokyo, August, 2016 Abstract: *"New Projection Methods for Monotone Variational Inequalities"*, The Fifth International Conference on Continuous Optimization (ICCOPT-2016).
- Poznan, July, 2016 Abstract: *"Proximal extrapolated gradient methods for variational inequalities"*, 28th European Conference on Operational Research.
- Kyiv, October, 2014 Abstract: *"A Douglas-Rachford method for best approximation pair for two disjoint intersections of closed convex sets"*, VI International Conference 'Computational and Applied Mathematics' dedicated to Ivan Lyashko.
- Heidelberg, September, 2013 1 Heidelberg Laureate Forum.
- Kyiv, September, 2013 Abstract: *"A Variant of Tseng's Splitting Method for Monotone Inclusion Problem"*, V International Conference 'Computational and Applied Mathematics'
- Kyiv, September, 2012 Abstract: *"The approximation of a common fixed point of a finite number of Fejér mappings in Hilbert space"*, V International Conference 'Computational and Applied Mathematics'

Referee service

- Mathematical Programming
- SIAM J. Optimization
- Mathematical Methods of Operations Research
- Computational Optimization and Application
- Journal on Optimization Theory and Application
- Journal of Mathematical Imaging and Vision
- Journal of Global Optimization
- Journal of Scientific Computing
- Set-Valued and Variational Analysis
- Operations Research Letters
- Numerical Algorithms
- Inverse Problems
- Optimization
- Optimization Letters
- NeurIPS
- ICML
- ICLR
- COLT

Teaching

- 2024 Master course: Stochastic Algorithms
- 2023 Master course: Optimization methods for data science
- 2022 Master course: Mathematical Optimization
- 2022 WASP PhD course: WASP Artificial Intelligence and Machine Learning
- 2022 WASP PhD course: Mathematics for Machine Learning
- 2022 PhD course: Nonlinear Optimization
- 2021 Vienna Graduate School on Computational Optimization: “Continuous Optimization: between Mathematics and Computation”
- 2018-2019 Numerical methods I — Teaching assistant
- 2014-2015 Analysis I — Teaching assistant
- 2013-2014 Analysis II — Teaching assistant
- 2013-2014 Functional analysis — Teaching assistant
- 2006-2014 Olympiad mathematics for high school students

Languages

- Ukrainian native
- Russian fluent
- English fluent
- German beginner (B1)

Awards in the national and international competitions in mathematics

- 2008, 2009 **Silver Medal**, *4th, 5th Internet Mathematical Olympiads for Students*, Ariel University Center, Israel
- 2008 **3rd Prize**, *69th William Lowell Putnam Mathematics Competition*, Faculty of Mechanics and Mathematics, Taras Shevchenko National University of Kyiv
- 2005, 2006 **3rd Prize**, *45th and 46th Ukrainian National Mathematics Competition for high school students*

Participation at schools

- Austria, 2014 Gene Golub SIAM Summer School 2014. “Simulation, Optimization, and Identification in Solid Mechanics”, Linz.
- Czech, 2012 Spring School on Analysis 2012. “Variational Analysis and its Applications”, Paseky nad Jizerou.
- Czech, 2011 Spring School on Analysis 2011. “Functional Spaces, Approximation, Inequalities”, Paseky nad Jizerou.

Social activities

- 2023 Lecturer at Kharkiv-Vienna International Science School
- 2009-2015 Member of jury of the Ukrainian Mathematical Olympiad (high-school level)
Training sessions for regional, Ukrainian and International mathematics competitions (high-school level)
Member of the creating and selection problem committee for Ukrainian mathematical competitions (high-school level)
- 2009-2014 Teacher at Summer Math Schools