

Daniil Vankov

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Research Summary

I am a final year Ph.D. student at Arizona State University advised by Angelia Nedić and Lalitha Sankar. My research lies at the intersection of optimization, game theory, and machine learning, where I develop efficient and adaptive methods under weaker, more realistic assumptions arising in modern machine learning. My recent works provide new insights into the class of (L_0, L_1) -smooth functions and introduce efficient algorithms achieving the best-known complexity bounds for optimization and equilibrium problems. These results have been published at leading A* venues such as ICLR, ICML, and TMLR.

I am particularly interested in game-theoretic perspectives on multi-agent reinforcement learning and strategic foundation models. Prior to graduate school, I was a winner of the state stage of the Russian Olympiad in Mathematics and participated in the national final round, which sparked my early passion for mathematical problem solving. Alongside my academic research, I work as an Applied Scientist Intern at Amazon, developing efficient machine learning systems for large-scale training and inference, including speculative decoding and pruning.

Education

Arizona State University

Ph.D. in Electrical Engineering | Advisors: [Angelia Nedić](#), [Lalitha Sankar](#)

Tempe, AZ

Expected: April 2026

Skoltech

M.Sc. in Computer Science

Moscow, Russia

June 2020

Selected Coursework: Large Scale Optimization, Deep Learning, Machine Learning.

Higher School of Economics

B.Sc in Computer Science

Moscow, Russia

June 2018

Selected Coursework: Optimization, Game Theory, Machine Learning, Statistical Machine Learning, Operation Research.

Skills

Programming: Python, PyTorch, vLLM, NumPy, triton, transformers

Languages: English, Russian (native)

Work and Academic Experience

Amazon AWS, SageMaker Inference.

May/25 – Dec/25

Applied Scientist II Intern

San Francisco, CA

- Developed adaptive speculative decoding method that increases output tokens per second (OTPS) of Llama models by 5%
- Developed pruning of MoE models such as gpt-oss and DeepSeek, that increases OTPS by 50% without loss in accuracy. The method is being deployed in AWS Bedrock.

CISPA

May/24 – Aug/24

Research Intern

Saarbrücken, Germany

- Conducted research on generalized smoothness optimization and adaptive methods at [Sebastian U. Stich's](#) group, resulting in a publication at **ICLR** and a submitted preprint.
- In these works, we provided new insights into a class of (L_0, L_1) -smooth functions and **significantly improved the best-known complexity bounds**.

Arizona State University

Sep/21 – Present

Graduate Research Assistant

Tempe, AZ

- Developed **novel first-order and adaptive algorithms** for solving **equilibrium and optimization problems** under *generalized smoothness* and *non-convexity*.
- These works published at **ICML**, **TMLR**, **OPT NeurIPS** workshop, established **provable best-known convergence guarantees**, including *almost sure convergence* and *explicit rate results* for stochastic and deterministic settings.
- Assisting in courses, organizing seminars and reading groups of our lab.

Krisp AI

Apr/21 – Dec/21

Senior Machine Learning Engineer,

Yerevan, Armenia

- Trained edge-device deep learning models for video segmentation task. Introduced new losses and trained efficient models using knowledge distillation that improved accuracy of segmentation.

Huawei, Media Algorithm Lab

Senior R&D Engineer,

Feb/20 – Apr/21

Moscow, Russia

- Trained edge-device deep learning models for audio noise reduction problem. Worked on data augmentation, implemented training pipelines and proposed new model architectures.

Skoltech

Research Intern

Apr/18 – May/19

Moscow, Russia

- Proposed and analyzed a new algorithm for nonconvex distributed optimization. Developed clustering method of power-system networks, resulting in a publication at SEST.

Publications ([Google Scholar](#))

1. **Vankov, D.**, Nedić, A. and Sankar, L., “Generalized Smooth Stochastic Variational Inequalities: Almost Sure Convergence and Convergence Rates”, in *Transactions on Machine Learning Research* ([TMLR](#)), 2025. Accepted [with J2C certification](#) (**top-10% contribution**), to be presented at **ICLR/ICML/NeurIPS 2026**.
2. **Vankov, D.**, Rodomanov, A., Nedić A., Sankar, L. and Stich, S.U., “Optimizing (L0, L1)-Smooth Functions by Gradient Methods”, in *International Conference on Learning Representations* ([ICLR](#)), 2025.
3. Moshtaghifar, M., Rodomanov, A., **Vankov, D.** and Stich, S., “DADA: Dual Averaging with Distance Adaptation”, [OPT NeurIPS 2024 Workshop](#). Submitted to ICLR 2026.
4. **Vankov, D.**, Nedić, A. and Sankar, L., “Generalized smooth variational inequalities: Methods with adaptive stepsizes”, in *Forty-first International Conference on Machine Learning* ([ICML](#)) 2024.
5. **Vankov, D.**, Nedich, A. and Sankar, L., “Last iterate convergence of Popov method for non-monotone stochastic variational inequalities”. *Oral Presentation at* [OPT NeurIPS 2023 Workshop](#) (**top-5% contribution**). Submitted to Optimization Methods and Software.
6. **Vankov, D.**, Zorin, I. and Pozo, D., “Clustering time series over electrical networks”, in *International Conference on Smart Energy Systems and Technologies* (**SEST**), IEEE, 2020.

Conferences and Schools

- Multi-Agent Reinforcement Learning Summer School, Lausanne, Switzerland, 2024. *Presented a poster on "Generalized Smooth Variational Inequalities: Methods with Adaptive Stepsizes"*.
- Workshop Future of Computation: Applied Algorithms for Machine Learning, Paris, France, 2024. *Presented a poster on "Generalized Smooth Variational Inequalities: Methods with Adaptive Stepsizes"*.
- Workshop on Nonsmooth Optimization and Applications (NOPTA 2024), Antwerp, Belgium, 2024. *Presented a poster on "First Order Methods for Non-Monotone Non-Lipschitz Stochastic Variational Inequalities"*.
- Information Theory and Applications Workshop, San-Diego, 2023. *Presented a poster on "Last Iterate Convergence of Popov Method for Non-monotone Stochastic Variational Inequalities"*.
- IEEE North American School of Information Theory (NASIT), 2022.

Teaching Experience

- 2025 Fall, Teaching Assistant “Optimization for Engineers”, Arizona State University.
- 2024 Spring, Teaching Assistant: "Convex Optimization", Arizona State University.
- 2023 Fall, Teaching Assistant: "Statistical Machine Learning", Arizona State University.
- 2022 Fall, Teaching Assistant: "Signals and Systems", Arizona State University.
- 2021 Spring, Seminar Instructor: "Machine Learning", Higher School of Economics.