# Rudenko Varvara

Data Scientist/ RL Researcher

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 github.com/Rudenshtok

▶ scopus.com

## Interests

- Reinforcement learning
- Stochastic optimization
- MCMC

## Education

**2019 - 2023**

**MIPT Bachelor's degree Department of Control and Applied Mathematics**

**2023 - today**

**MIPT Master's degree Department of Control and Applied Mathematics**

| English | C1 |
|---|---|

| French | B1 |
|---|---|

# Publications

| **Algorithm for Constrained Markov Decision Process with Linear Convergence** | AISTATS 2023 |
|---|---|
| ▶ Arxiv.org | |

| **Markov Decision processes and convex optimization** | CRM 2023 |
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| ▶ CRM.org | |

| **Parallel Stochastic Cubic Newton with Dual Momentum in Multi-agent Optimization setup** | preprint |
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| **Multi-Agent Normilized Policy Gradient algorithm in the stochastic optimization setting for Reinforcement Learning** | preprint |
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| **Robust Submodular Multi-Agent Reinforcement Learning Algorithms** | preprint |
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# Conferences

▶ 65th All-Russian Scientific Conference of MIPT 2023 "Markov Decision processes and convex optimization"

▶ Fall into ML 2023 "ALGORITHM FOR CONSTRAINED MARKOV DECISION PROCESS WITH LINEAR CONVERGENCE"

# Work experience

| **Researcher** | 2024 - today |
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| Artificial Intelligence Research Institute (AIRI) | |
| ▶ Airi.net | |

| **Lecturer** | 2023 - today |
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| Reinforcement Learning course MIPT University | |

| **The seminarian/Teacher** | 2023 - today |
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| Math statistics course Hight School Economics University/ MIPT Olympiad school | |

| **Researcher** | 2021 - 2024 |
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| Laboratory of mathematical methods of optimization | |
| ▶ LabMMO.ru | |

| **Researcher** | 2020 - 2024 |
|---|---|
| International Laboratory of Stochastic Algorithms and Multidimensional Data Analysis | |
| ▶ HDIlab.ru | |

# Additional Education

**2020**

**Sampling, management and optimization**

Sirius University of Science and Technology in the program "Modern methods of information theory, optimization and management"

**2021**

**Fundamentals of Reinforcement Learning**

The Alberta Institute & Alberta Machine Intelligence Institute

**2021**

**Stochastic algorithms and machine learning**

Sirius University of Science and Technology in the program "Modern methods of information theory, optimization and management"

**2022**

**Modern methods of optimization**

Sirius University of Science and Technology in the program "Modern methods of information theory and optimization"

**2024**

**Artificial intelligence in climate sciences**

Sirius University of Science and Technology

# Charitable activity

**10/2022 - today**

**Teaching mathematics at a charity school for cancer-stricken children**

Charity Fund "Gift of life"

# Grants

- ▶ High Professional Potential Group (High School Economics University Personnel Reserve) Category "New researchers"
- ▶ Laureate of the scholarship for achievements in the field of numerical optimization methods MIPT
- ▶ Optimization, training and control methods in the tasks of synthesizing the motion of complex robotic systems with many degrees of freedom in a dynamic environment Sber Allab

# Projects

**Importance Sampling and control variates**
Improving estimates by adding control variates with zero variance

**2020 HDI, Sirius**

**UVIP: Model-Free Approach to Evaluate Reinforcement Learning Algorithms**
Work with KBRL, KBSF methods, testing algorithm for two Gaussians

**2021 HDI, Sirius**

**Langevin Monte Carlo: random coordinate descent and variance reduction**
The idea was to improve the ULA algorithm using a randomized coordinate vector

**2022 HDI**

**Regret Minimization for Discounted MDPs by Variance-Reduced Q-learning**
New adaptation of classical Q-learning algorithm and introduce Q-learning with Hoeffding bonuses and Bernstein Bonuses

**2023 HDI, MIPT**

**Determination of garbage pollution from satellite photos**
Work is underway to refine the method for detecting debris in satellite photographs in a small dataset

**2024 Sirius**

**Multi-agent Reinforcement Learning system in double auction setting**
Creation of a MARL user environment in which several agents trade with each other in a continuous double auction

**2025 MIPT**