KIRILL ZAKHAROV

AI/ML Researcher, AI/ML Engineer, Applied Mathematician

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ResearchGate GitHub Google Scholar Orcid Habr

EDUCATION

Bachelor of Science in Applied Mathematics and Informatics

SPbSUE

Sept 2018 – June 2022

Master of Science in Financial Technologies of Big Data

ITMO

Sept 2022 – June 2024

PhD in Artificial Intelligence and Machine Learning

ITMO

Sept 2024 – present

EXPERIENCE

- Machine Learning Researcher
  - Conducted research in generative AI for time series and tabular data, and CV.
  - Conducted research in physics-informed neural networks and dynamical systems.
  - Published scientific articles in academic journals in the Q1 rank. Participated in international conferences.

  ITMO University, Russia

  2022 – present

- Machine Learning Researcher
  - Developed a method for the generation of synthetic time series data.
  - Developed a method for the generation of synthetic transactional data with differential privacy.
  - Created an algorithm for the jump diffusion stochastic processes modelling based on neural stochastic differential equations.

  SBER

  2022 – 2025

- Machine Learning Engineer
  - Developed ML algorithm for the deposit duration forecasting.

  Bank Saint Petersburg

  2023 – 2024

SKILLS

- **Classical and Advanced Machine Learning**
- **Deep Learning (CV, NLP)**
- **Generative Models**: GANs, Normalizing Flows, Diffusion Models, VAEs, NeuralSDE Flows
- **Physics-Informed AI**: PINNs, NeuralODEs, NeuralSDEs
- **Probability and Statistics**: classical probability, statistical tests, A/B tests, statistical modelling, stochastic calculus, stochastic integrals, stochastic processes, Itô calculus, measure theory in mathematical finance, SDEs
- **Programming Languages**: Python, C, SQL, Wolfram Mathematica, LaTeX
- **Frameworks/Libraries**: Pytorch, Tensorflow, Keras, MLflow, Airflow, NumPy, Pandas, Scikit-learn, OpenCV, NLTK, SciPy, Docker, Git, Spark
- **Dynamical Systems**: ODEs, PDEs in Finance, complex systems, operator theory

- **Derivative Pricing**: forwards, options pricing, measure change, binomial model, non-parametric methods, computational finance
- **Optimization Methods and Numerical Analysis**: NN training algorithms, numerical derivative pricing, linear programming, portfolio optimization
- **Academic Writing**: Journal Articles, Conference Proceedings

PUBLICATIONS

[1] Kirill Zakharov. “Multivariate Time Series Modelling with Neural SDE Driven by Jump Diffusion”. In: *International Conference on Computational Science*. Springer. 2024, pp. 213–221.

[2] Kirill Zakharov, Anton Kovantsev, and Alexander Boukhanovsky. “Coupling of Lagrangian Mechanics and Physics-Informed Neural Networks for the Identification of Migration Dynamics”. In: *Smart Cities* 8.2 (2025), p. 42.

[3] Kirill Zakharov and Elizaveta Stavinova. “Time-dependent differential privacy for enhanced data protection in synthetic transaction generation”. In: *Proceedings of the 2024 13th International Conference on Software and Computer Applications*. 2024, pp. 112–117.

[4] Kirill Zakharov, Elizaveta Stavinova, and Alexander Boukhanovsky. “Synthetic financial time series generation with regime clustering”. In: *J. Adv. Inf. Technol* 14.6 (2023).

[5] Kirill Zakharov, Elizaveta Stavinova, and Anton Lysenko. “TRGAN: A Time-Dependent Generative Adversarial Network for Synthetic Transactional Data Generation”. In: *Proceedings of the 2023 7th International Conference on Software and e-Business*. 2023, pp. 1–8.

[6] Kirill Zakharov et al. “Forecasting Population Migration in Small Settlements Using Generative Models under Conditions of Data Scarcity”. In: *Smart Cities* 7.5 (2024), pp. 2495–2513.

PREPRINTS AND OTHER MATERIALS

- Mathematical analysis of break-even points and return bounds for option strategies, 2024, doi: 10.13140/RG.2.2.15945.76649
- Optimisation methods. Theorems, 2023, doi: 10.13140/RG.2.2.36071.01440
- Option pricing modelling based on stochastic differential equations, 2022, doi: 10.13140/RG.2.2.13255.37280
- Spherical and Elliptical distributions, 2021, doi: 10.13140/RG.2.2.15639.24484

CONFERENCES

- ICCS, Málaga, Spain, 2024
- ICSCA, Bali, Indonesia, 2024
- ICCSIT, Paris, France, 2023
- ICSeB, Osaka, Japan, 2023
- CMY, Saint Petersburg, Russia, 2025
- CMY, Saint Petersburg, Russia, 2024
- CMY, Saint Petersburg, Russia, 2023

COURSES/CERTIFICATES

- OpenCV Bootcamp, OpenCV University, 2025
- Computer Vision and Image Processing, ITMO, OpenEdu, 2023
- AI Frontiers, ITMO, Saint Petersburg, 2023
- Pricing Options with Mathematical Models, Caltech, Coursera, 2022
- Stochastic Processes, HSE, Coursera, 2022
- Probability Theory, CSC, Stepik, 2022

COMPETITIONS

- 1th place – ITMO HACK FinTech case, 2022
- 5th place – Rosneft Hackathon, 2022
- 3th place – GPN CUP Data Science, 2021