

Mikhail Ivanov

Swedish Meteorological and Hydrological Institute (SMHI)
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WORK EXPERIENCE

Swedish Meteorological and Hydrological Institute (SMHI)

Expert in machine learning for climate applications

Norrköping, Sweden
Mar 2024 – present

- Machine learning-based climate model downscaling for the European region as part of the OptimESM consortium (Optimal High Resolution Earth System Models for Exploring Future Climate Change)
- Ensemble generation using generative adversarial networks for the European Centre for Medium-Range Weather Forecasts (ECMWF)
- Extreme weather event detection using a machine learning algorithm

Stockholm University

PhD position in Physical Chemistry

Stockholm, Sweden
Sep 2018 – Feb 2024

- Developed new molecular models for efficient large-scale simulations for studying the toxicity of inorganic nanoparticles
- Designed and implemented a new machine learning algorithm for molecular interaction predictions
- Written, designed and maintained software (Python, Julia, Rust, Fortran, C) for data analysis and simulations running in parallel at HPC clusters
- Worked in collaboration with other research groups, both domestically and abroad

Stockholm University

Graduate Teaching Assistant

Stockholm, Sweden
Dec 2018 – Jan 2023

- Developed personalized computer lab student projects to improve learning outcomes
- Led chemical lab sessions in the field of soft matter for master students
- Delivered the basis of data analysis and programming to chemistry students in MATLAB and R
- Helped to understand complex physical and mathematical problems during exercise sessions

EDUCATION

- Ph.D. Stockholm University, Department of Materials and Environmental Chemistry (MMK), Sweden, 2018-2024
- M.Sc. St. Petersburg University, Institute of Chemistry, Russia, 2016-2018
- B.Sc. St. Petersburg University, Institute of Chemistry, Russia, 2012-2016

SKILLS

- Python, Julia, Rust, Fortran, C, Matlab, R, Linux, Bash, LaTeX, Git
- Multiscale simulations, Molecular dynamics, Metropolis Monte Carlo, DFT
- Machine learning (PyTorch, Flux), Scientific programming, High-performance computing, Data analysis

PUBLICATIONS

- 2024 **Ivanov, Mikhail** and Alexander P Lyubartsev. "Development of a bottom-up coarse-grained model for interactions of lipids with TiO₂ nanoparticles." *Journal of Computational Chemistry*, DOI: 10.1002/jcc.27310 (2024)
- 2023 **Ivanov, Mikhail**, Maksim Posysoev, and Alexander P Lyubartsev. "Coarse-Grained Modeling Using Neural Networks Trained on Structural Data." *Journal of Chemical Theory and Computation* 19, 19 (2023), pp. 6704–6717
- 2023 Paulo HB Brant Carvalho, **Ivanov, Mikhail**, Ove Andersson, et al. "Neutron scattering study of polyamorphic THF · 17 (H₂O)–toward a generalized picture of amorphous states and structures derived from clathrate hydrates." *Physical Chemistry Chemical Physics* 25, 21 (2023), pp. 14981–14991
- 2021 **Ivanov, Mikhail** and Alexander P Lyubartsev. "Atomistic molecular dynamics simulations of lipids near TiO₂ nanosurfaces." *The Journal of Physical Chemistry B* 125, 29 (2021), pp. 8048–8059
- 2020 Hana Kokot, Boštjan Kokot, Aleksandar Sebastijanović, et al., including **Ivanov, Mikhail**. "Prediction of chronic inflammation for inhaled particles: the impact of material cycling and quarantining in the lung epithelium." *Advanced Materials* 32, 47 (2020), p. 2003913
- 2020 **Ivanov, Mikhail**, V Sizov, and A Kudrev. "Thermal unwinding of Polyadenylic· Polyuridylic acid complex with TMPyP₄ porphyrin in aqueous solutions." *Journal of Molecular Structure* 1202 (2020), p. 127365

RECENT CONFERENCE ACTIVITY

- 2023 GGMM 2023 - Young Modellers Conference, Toulouse, France
- 2021 The International Nanotech & Nanoscience Conference & Exhibition (Nanotech France 2021), Paris, France
- 2021 7th European Joint Theoretical/Experimental Meeting on Membranes (EJTEMM 2021), Graz, Austria

SCHOLARSHIPS

2021-2022	Åke Åkesons foundation scholarship
2021-2022	C.F. Liljevalch travel scholarship

ADMINISTRATIVE DUTIES

2020-2021	PhD council representative
2019-2020	Member of PhD education work group
2019-2020	PhD council chair

LANGUAGES

- English (fluent)
- Swedish (intermediate)
- Russian (native)