

Pavel Perezhogin

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🌐 pperezhogin.github.io
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Education and Employment

- 2021 – Now 📖 **Postdoctoral Associate** in Mathematics Department. Courant Institute of Mathematical Sciences, New York University, as part of M²LInES project.
Advisor: Dr. Laure Zanna
- 2017 – 2021 📖 **PhD** in Mathematical Modeling, Numerical Methods and Software.
Marchuk Institute of Numerical Mathematics of the Russian Academy of Sciences (INM RAS)
Thesis Title: Stochastic and deterministic subgrid parameterizations for two-dimensional turbulence and their application in ocean circulation models (in Russian).
Advisor: Dr. Andrey Glazunov
- 2011 – 2017 📖 **BSc&MSc** in Applied Mathematics and Physics. Moscow Institute of Physics and Technology (MIPT), Department of Control and Applied Mathematics.

Awards

- 2018 📖 **Medal of the Russian Academy of Sciences** for students for the best scientific work in oceanology, atmospheric physics and geography.

Additional Experience


- Teaching 📖 **Invited** guest lectures "Machine Learning in Geophysics", Russia, Moscow, INM RAS (2023).
- Mentoring 📖 Grad. student Ivan Kobzar (co-advised with Andrey Glazunov, 2021) and Undergrad. Matias Ortiz (co-advised with Laure Zanna, 2023).
- Reviewer 📖 Journal of Advances in Modeling Earth Systems (JAMES) | Ocean Modeling | Geoscientific Model Development (GMD)

Selected Talks



Note: *extended list* of 31 presentations for 2016-2023 years can be found at 🌐 pperezhogin.github.io/talks

- 2023 📖 Courant Atmosphere Ocean Science Colloquium (**invited**) | AGU Fall Meeting | APS Division of Fluid Dynamics | CESM Workshop | CPT Annual Meeting | NEMO Machine Learning WG (**invited**) | CESM Ocean Model WG meeting
- 2022 📖 AGU Fall Meeting | CPT Annual Meeting | NEMO Eddy Closure WG (**invited**)










Publications

Note: *full list* of publications (20), including peer-reviewed in international journals (6) and Russian journals (8); preprints (2), conference papers (3) and open source education/software (1) can be found at  pperezhogin.github.io/publications

Submitted Preprints

- 1 Falasca, F., **Perezhogin, P.**, & Zanna, L. (2023). A data-driven framework for dimensionality reduction and causal inference in climate fields.  doi:<https://doi.org/10.48550/arXiv.2306.14433>
- 2 **Perezhogin, P.**, Zhang, C., Adcroft, A., Fernandez-Granda, C., & Zanna, L. (2023). Implementation of a data-driven equation-discovery mesoscale parameterization into an ocean model.  doi:<https://doi.org/10.48550/arXiv.2311.02517>

Journal Papers

- 1 **Perezhogin, P.**, & Glazunov, A. (2023). Subgrid parameterizations of ocean mesoscale eddies based on germano decomposition. *Journal of Advances in Modeling Earth Systems*, 15(10).  doi:<https://doi.org/10.1029/2023ms003771>
- 2 **Perezhogin, P.**, Zanna, L., & Fernandez-Granda, C. (2023). Generative data-driven approaches for stochastic subgrid parameterizations in an idealized ocean model. *Journal of Advances in Modeling Earth Systems*, 15(10), e2023MS003681.  doi:<https://doi.org/10.1029/2023MS003681>
- 3 Ross, A., Li, Z., **Perezhogin, P.**, Fernandez-Granda, C., & Zanna, L. (2023). Benchmarking of machine learning ocean subgrid parameterizations in an idealized model. *Journal of Advances in Modeling Earth Systems*, 15(1), e2022MS003258.  doi:<https://doi.org/10.1029/2022MS003258>
- 4 Zasko, G. V., Glazunov, A. V., Mortikov, E. V., Nechepurenko, Y. M., & **Perezhogin, P.** (2023). Optimal energy growth in stably stratified turbulent couette flow. *Boundary-Layer Meteorology*, 187(1–2), 395–421.  doi:<https://doi.org/10.1007/s10546-022-00744-3>
- 5 Zhang, C., **Perezhogin, P.**, Gultekin, C., Adcroft, A., Fernandez-Granda, C., & Zanna, L. (2023). Implementation and evaluation of a machine learned mesoscale eddy parameterization into a numerical ocean circulation model. *Journal of Advances in Modeling Earth Systems*, 15(10), e2023MS003697.  doi:<https://doi.org/10.1029/2023MS003697>
- 6 **Perezhogin, P.**, Chernov, I., & Iakovlev, N. (2021). Advanced parallel implementation of the coupled ocean–ice model femao (version 2.0) with load balancing. *Geoscientific Model Development*, 14(2), 843–857.  doi:<https://doi.org/10.5194/gmd-14-843-2021>
- 7 **Perezhogin, P.** (2020a). 2d turbulence closures for the barotropic jet instability simulation. *Russian Journal of Numerical Analysis and Mathematical Modelling*, 35(1), 21–35.  doi:<https://doi.org/10.1515/rnam-2020-0003>
- 8 **Perezhogin, P.** (2020b). Testing of kinetic energy backscatter parameterizations in the nemo ocean model. *Russian Journal of Numerical Analysis and Mathematical Modelling*, 35(2), 69–82.  doi:<https://doi.org/10.1515/rnam-2020-0006>
- 9 **Perezhogin, P.**, Glazunov, A. V., & Gritsun, A. S. (2019). Stochastic and deterministic kinetic energy backscatter parameterizations for simulation of the two-dimensional turbulence. *Russian Journal of Numerical Analysis and Mathematical Modelling*, 34(4), 197–213.  doi:<https://doi.org/10.1515/rnam-2019-0017>

- 10 Dymnikov, V., & **Perezhogin, P.** (2018). Systems of hydrodynamic type that approximate two-dimensional ideal fluid equations. *Izvestiya, Atmospheric and Oceanic Physics*, 54, 232–241. [doi:https://doi.org/10.1134/S0001433818030040](https://doi.org/10.1134/S0001433818030040)
- 11 **Perezhogin, P.**, & Dymnikov, V. (2017). Modeling of quasi-equilibrium states of a two-dimensional ideal fluid. *Doklady Physics*, 62, 248–252. [doi:https://doi.org/10.1134/S1028335817050032](https://doi.org/10.1134/S1028335817050032)
- 12 **Perezhogin, P.**, Glazunov, A. V., Mortikov, E. V., & Dymnikov, V. P. (2017). Comparison of numerical advection schemes in two-dimensional turbulence simulation. *Russian Journal of Numerical Analysis and Mathematical Modelling*, 32(1), 47–60. [doi:https://doi.org/10.1515/rnam-2017-0005](https://doi.org/10.1515/rnam-2017-0005)