Aleksei Sholokhov

202 Lewis Hall, Seattle, WA 98105

🌐 aksholokhov.github.io   ✉ aksh@uw.edu   ⌗ aksholokhov   ▯ 505-557-59-81

EDUCATION

University of Washington   **Seattle, WA**
Ph.D. in Applied Mathematics   *Expected Graduation: 07/2023*

Moscow Institute of Physics and Technology   **Moscow, Russia**
B.Sc. in Applied Mathematics and Physics   *07/2018*

EXPERIENCE

Department of Applied Mathematics, University of Washington   **Seattle, WA**
Ph.D. Student   *09/2018 - Now*

- Created a method of distilling interpretable representations from Neural Differential Equation models. It dramatically decreased data requirements for SINDy framework to model noisy dynamical systems.
- Adapted Fletcher-Reeves and Newton-Krylov methods to accelerate training deep neural networks using `tensorflow`, `jax`, and `CUDA`. Achieved state-of-the-art performance in some image recognition applications.
- Developed `gspack`: python-autograder to accelerate creating of coding assignments. This package has been used for 5 scientific computing classes for over 2000 students in Department of Applied Mathematics.

Institute for Health Metrics and Evaluation   **Seattle, WA**
Graduate Research Assistant   *08/2019 - Now*

- Devised a class of model-selection tools for mixed-effect models (`skmixed`) to improve the reliability of Global Burden of Diseases research. Implemented as a Python package integrated with the company's pipelines.
- Developed IHME Projections: a statistical model that projects cases and deaths from COVID-19 globally. Collaborated with a team of 130 researchers while working on it. This tool helped the decision makers, like CDC, to properly allocate scarce resources at the beginning of the pandemic.

Grenoble Informatics Laboratory, University Grenoble-Alps   **Grenoble, France**
Visiting Research Student   *03/2018 - 10/2018*

- Designed an inexact margin approach to enable large-scale SVM classifiers to work with big data. Implemented it as a package `MEMOIR` using SQL, C++, and Python.
- Improved the accuracy and memory management on real-data benchmarks over state-of-the-art approaches.

Center for Nonlinear Studies, Los-Alamos National Laboratory   **Los-Alamos, NM**
Visiting Research Student   *01/2018-02/2018*

- Adapted a reinforcement learning algorithm to dynamically control the energy consumption of electric loads.

Computing Center of Russian Academy of Science   **Moscow, Russia**
Research Student   *02/2016-07/2018*

- Created `rysearch`: an exploratory search engine and recommender system that simplifies knowledge discovery with MongoDB, BigARTM.
- Organized and coordinated research and software development in the team of 3 researchers.
- Developed and published 2 novel metrics for automatic quality assessment of hierarchical topic models.

TEACHING EXPERIENCE

Department of Applied Mathematics, University of Washington   **Seattle, WA**
Teaching Assistant   *01/2019 - Now*

- Held office hours and administered grading for such graduate-level classes as Beginning Scientific Computing, High-Performance Scientific Computing, and Numerical Optimization.
- Taught 3 sections a week of Calculus and Analytic Geometry for 2 quarters.

SELECTED PUBLICATIONS

More at scholar.google.com/citations?user=_2uniNcAAAAJ

- ``Universal Feature Selection for Mixed-Effects Models with Non-convex Penalties"
  Together with Santomauro D., Burke J., Zheng P., and Aravkin A., *in preparation*
- ``Distillation of Neural Differential Equations for Interpretable Model Discovery"
  Together with Kutz, N., and Brunton, S. *in preparation*
- ``pysr3: Python Library for Sparse Relaxed Regularized Regression"
  Together with Zheng, P., and Aravkin, A., *under peer-review*
- ``Modeling COVID-19 scenarios for the United States".
  Together with IHME Covid-19 Forecasting Team. *Nature Medicine*, 2020.
- ``Quality Evaluation and Improvement for Hierarchical Topic Modelling.",
  Together with Belyy A.V., Selezniova, M.S., and Vorontsov, K.,
  24rd International Conference on Computational Linguistics and Intellectual Technologies
- ``MEMOIR: Multi-class Extreme Classification with Inexact Margin."
  Together with Belyy, A.,*arXiv preprint arXiv:1811.09863 (2018).*

SERVICE AND OUTREACH

Department of Applied Mathematics, University of Washington   **Seattle, WA**
Diversity, Equity, and Inclusion (DEI) Committee Member   *09/2020 - Now*
- Developed 10-years Diversity Action Plan for the Department of Applied Mathematics
- Organized and led educational seminars on importance of diversity in academia.
- Interviewed faculty job candidates to assess their DEI action track.