Aleksei Sholokhov

202 Lewis Hall, Seattle, WA 98105

linkedin.com/in/aksholokhov | aksh@uw.edu | aksholokhov | 505-557-59-81

EDUCATION

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

University of Washington — **Seattle, WA**
M.Sc. in Applied Mathematics — *07/2021*

SKILLS

Research in Machine Learning Algorithms and Deep Learning — **Seattle, WA**
As Research Assistant at University of Washington — *09/2018-now*

- Created an algorithm to extract interpretable models and learned physics laws from trained neural networks. Decreased the amount of data needed to model noisy dynamical systems by 90%.
- Accelerated training of deep neural networks using higher-order methods, and implemented image recognition libraries using `TensorFlow` and `jax` that achieved state-of-the-art performance for selected image recognition tasks.

Data Science and Statistical Analysis — **Seattle, WA**
As Research Assistant at the Institute for Health Metrics and Evaluation (IHME) — *09/2018-now*

- Invented new statistical modeling tools that extract meaningful features for machine learning models. Implemented it as a `python` package `skmixed` that is fully compartibe to `scikit-learn`. Achieved 30-fold speed-up upon deployment to the company's pipelines.
- Developed IHME Projections: a statistical model that projects cases and deaths from COVID-19 globally; in cross-functional collaboration with a team of 130 researchers. This tool helped the decision makers (including national, state, and local governments) to manage resources and plan ahead during the pandemic.

Software Development in Python, MATLAB, and C++ — **Seattle, WA**
As Research Assistant at University of Washington and IHME — *09/2018-now*

- Developed `gspack`: python-autograder to accelerate grading of coding assignments. This package is successfully used for 5 scientific computing classes for over 3000 students in Department of Applied Mathematics.
- Enabled SVM classifiers to work with large-scale data using stochastic optimization. Implemented it as an open-source package MEMOIR using `SQL`, `C++`, and `Python`. Improved the accuracy and memory management by 30% over state-of-the art approaches.
- Learned `OpenMP`, `MPI`, and `CUDA` by working as a teacher assistant for graduate-level High-Performance Scientific Computing classes for two years. Learned `MATLAB` by teaching Scientific Computing for 1 year.

Project Management, Communication, and Leadership skills — **Moscow, Russia**
As Research Student at Computing Center of Russian Academy of Science — *02/2016-07/2018*

- Developed strong analytical, communication, and quantitative problem-solving skills by teaching graduate-level classes on Scientific Computing, HPC, and Optimization to classes of 200+ students (UW).
- Lead `rysearch` project: an exploratory data analysis and recommender system that simplifies knowledge discovery with NLP techniques such as topic-modeling. Implemented using `python`, `JavaScript`, and `MongoDB`.
- Effectively organized research and software development in the team of 4 researchers and successfully met tight deadlines. Published 2 novel quality metrics for topic models based on this work.

Negotiation Skills, Cross-Functional Collaboration, and Cross-Cultural Dialog — **Seattle, WA**
As a Diversity, Equity, and Inclusion (DEI) Committee Member at UW — *09/2020 - Now*

- Developed 10-years Diversity Action Plan for the Department of Applied Mathematics.
- Collaborated with the committee introducing Early Scholars Program to the department leadership. Secured $20k of financial commitment to the program as a result of tense negotiations.
- Organized and led educational seminars on importance of diversity and inclusion in academia.

SELECTED PUBLICATIONS

- **``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).*