Aleksei Sholokhov

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EDUCATION

University of Washington **Seattle, WA**
Ph.D. in Applied Mathematics *Expected Graduation: 06/2023*

SKILLS

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

- Integrated `Neural ODE` techniques into model discovery library `SINDy`, under the supervision of J. Nathan Kutz and Steve Brunton. Decreased the amount of data needed to model noisy dynamical systems by a factor of 10.
- Accelerated training of deep neural networks using higher-order optimization methods. Implemented it as `TensorFlow` and `jax` modules. 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) *09/2019-12/2021*

- Invented new statistical modeling tool `pysr3` which does feature selection using non-convex optimization techniques. Implemented it as a `scikit-learn`-compatible `python` package. Achieved 30-fold speed-up relative to the competitors.
- Developed a statistical model that projects cases and deaths from COVID-19 in collaboration with a team of 130 researchers. It helped governmental decision makers 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 thousands of homeworks in Department of Applied Mathematics.
- Enabled SVM classifiers to work with large-scale data using approximate nearest neighbor search. Implemented it using `SQL`, `C++`, and `Python`. Improved accuracy and memory costs by 30% over competitors.
- Learned `OpenMP`, `MPI`, `CUDA`, and `MATLAB` by working as a teaching assistant for graduate-level High-Performance Computing and Scientific Computing classes for 6 quarters.

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

- Led `RySearch` project: an exploratory data analysis and recommender system that simplifies knowledge discovery with NLP techniques such as topic modeling. Implemented it using `python`, `JavaScript`, and `MongoDB`.
- Effectively organized research and software development in a team of 4 researchers. 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-year Diversity Action Plan for the Department of Applied Mathematics.
- Negotiated $20k financial commitment from the department of Applied Mathematics to Early Scholars Program.
- Organized and led climate orientations and educational seminars on importance of diversity and inclusion in academia.

SELECTED PUBLICATIONS

- Sholokhov A., Santomauro D., Burke J., Zheng P., and Aravkin A., "Universal Feature Selection for Mixed--Effects Models with Non-Convex Penalties", *in preparation*
- Sholokhov, A., Zheng, P., and Aravkin, A., "pysr3: Python Library for Sparse Relaxed Regularized Regression", *under peer-review*
- IHME Covid-19 Forecasting Team, "Modeling COVID-19 scenarios for the United States". *Nature Medicine, 2020*
- Belyy A.V., Selezniova, M.S., Sholokhov, A., and Vorontsov, K., "Quality Evaluation and Improvement for Hierarchical Topic Modelling", *24rd International Conference on Computational Linguistics*