Aleksei Sholokhov

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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 distill interpretable models of physics laws from neural networks. It decreased the amount of data needed to model noisy dynamical systems by 90%.
- Adapted a reinforcement learning algorithm to dynamically control the energy consumption of electric loads.
- Adapted novel optimization methods to accelerate training of deep learning models with `tensorflow`, `jax`, and `CUDA`. Achieved state-of-the-art performance in selected image recognition applications.

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

- Devised new statistical models to improve the reliability of Global Burden of Diseases research. Implemented as a Python package achieving 30-fold acceleration upon deployment.
- 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.

Software Development in Python, Scala, 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.
- Self-taught `Scala`; succesfully implemented a type-inference system on my free time.
- Enabled SVM classifiers to work with large-scale data. Implemented an open-source package `MEMOIR` using SQL, C++, and Python. Improved the accuracy and memory management by 30% over state-of-the art.

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

- Lead `rysearch` project: an exploratory search engine and recommender system that simplifies knowledge discovery with MongoDB, BigARTM. Written using `python` and `JavaScript`.
- Effectively organized research and software development in the team of 4 researchers to meet tight deadlines. Published 2 novel quality metrics for topic models based on this work.
- Taught graduate-level classes on Scientific Computing and Optimization to classes of 200+ students (UW).

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).*

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.