

Alexander Bukharin

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Education

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| Aug 2021 – Present | Georgia Institute of Technology
<i>Ph.D. in Machine Learning</i> |
| Aug 2017 – May 2021 | Georgia Institute of Technology
<i>B.S. in Industrial and Systems Engineering, Concentration in Advanced Studies in Operations Research and Statistics, GPA: 4.0</i> |

Publications

- Machine Learning Force Fields with Data Cost Aware Training
Alexander Bukharin, Tianyi Liu, Shengjie Wang, Simiao Zuo, Weihao Gao, Wen Yan, Tuo Zhao
In submission, 2022
- Adaptive Budget Allocation for Parameter-Efficient Fine-Tuning
Qingru Zhang, Minshuo Chen, **Alexander Bukharin**, Pengcheng He, Yu Cheng, Weizhu Chen, Tuo Zhao
In submission, 2022
- Robust Multi-Agent Reinforcement Learning using Stackelberg Adversarial Training
Alexander Bukharin, Yue Yu, Qingru Zhang, Zhehui Chen, Simiao Zuo, Yan Li, Chao Zhang, Tuo Zhao
In submission, 2022
- Ambient Noise based Weakly Supervised Manhole Localization Methods over Deployed Fiber Networks
Alexander Bukharin, Shaobo Han, Yuheng Chen, Ming-Fang Huang, Yue-Kai Huang, Yao Xie, Ting Wang
In submission, 2022
- PLATON: Pruning Large Transformer Models with Upper Confidence Bound of Weight Importance
Qingru Zhang, Simiao Zuo, Chen Liang, **Alexander Bukharin**, Pengcheng He, Weizhu Chen, Tuo Zhao
International Conference of Machine Learning (ICML), 2022
- Early Detection of COVID-19 Hotspots Using Spatio-Temporal Data.
Shixiang Zhu, **Alexander Bukharin**, Liyan Xie, Shihao Yang, Pinar Keskinocak, Yao Xie
Accepted to IEEE Journal of Selected Topics in Signal Processing
*Best Paper Award (Honorable Mention) at ICML Time Series Workshop 2021
*A short version is accepted for oral presentation and highlighted as a contributed talk by ICML Time Series Workshop 2021
*Finalist of Best Applied Paper Competition at 2021 INFORMS Workshop on Data Mining and Decision Analytics
*Excellent Poster Award at Georgia Statistics Day 2021
- High-resolution Spatio-temporal Model for County-level COVID-19 Activity in the US.
Shixiang Zhu, **Alexander Bukharin**, Liyan Xie, Mauricio Santillana, Shihao Yang, Yao Xie
ACM Transactions on Management Information Systems, July 2021
- Five-Year Project-Level Statewide Pavement Performance Forecasting Using a Two-Stage Machine Learning Approach Based on Long Short-Term Memory.
Alexander Bukharin, Zhongyu Yang, and Yichang Tsai.
Transportation Research Record, May 2021
- Data-Driven Optimization for Police Beat Design in South Fulton, Georgia
Shixiang Zhu, **Alexander W Bukharin**, Le Lu, He Wang, Yao Xie
KDD Workshop on Data Science for Social Good 2021

Research Experience

May 2022 - Present	Pre-Training Graph Neural Networks: Work on improving the pre-training of large graph neural networks for molecular science applications.
Nov 2021 - Feb 2022	Efficient Transformer Models: Investigate performance of large Transformer models when a significant amount of parameters are removed via various pruning algorithms. Also work on efficient fine-tuning with Low-Rank Adaptation. Conduct experiments on pre-trained Vision Transformer models and large language models (i.e. BLOOM).
Jan 2021 - May 2022	Robust Multi-Agent Reinforcement Learning: Study the effect of adversarial training on the robustness of MARL algorithms to observation noise and different environment changes with applications to traffic light control, autonomous driving, and robotics.
Aug 2019 - May 2021	Spatio-Temporal Data Mining: Develop methods for spatio-temporal modelling and decision making by combining machine learning, statistics, and operations research. This work was motivated by high-impact problems from police operations and epidemiology.

Work Experience

May 2022 - Aug 2022	Applied Machine Learning Research Intern, Bytedance: Work on improving the performance of large graph neural networks for molecular dynamics modeling.
Jun 2021 - Aug 2021	Research Intern, NEC Labs America: Developed novel methods for distribution-based multiple instance learning with applications to pothole detection and fiber optic cable mapping.
Jul 2020 - Aug 2020	Quantitative Research Intern, Truist: Compared the performance of the Black-Scholes and Bachelier models for derivatives trading.

Teaching Experience

Teaching Assistant:

- Stochastic Manufacturing and Service Systems (ISyE 3232), Fall 2021, Spring 2022
- Engineering Economy (ISyE 3025), Spring 2020
- Probability with Applications (ISyE 2027), Fall 2019

Honors

- Presidents Fellowship at Georgia Tech, 2021
- College of Engineering Undergraduate Research Award, 2020
- Presidents Undergraduate Research Award at Georgia Tech, 2018, 2020

Skills

Programming: Python, PyTorch, R, Java, C, SQL