Alibek Kaliyev

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EDUCATION

- **Lehigh University** — Bethlehem, PA, USA
  Bachelor of Science, Computer Science and Business (Minor: Cognitive Science) — *Aug. 2020 - May 2024*
  - **GPA**: 3.83
  - **Activities**: Vice President (2022-2023) & Technical Dev. Chair (2021-2022) at *Computer Science and Business Association*, Secretary at *Lehigh Central Asian Students Association* (2023 - Present), Grader/Course Assistant for *Database Systems & Applications*, *Data Structures and Algorithms* and *Introduction to Programming* (2021-Present)
  - **Honors & Awards**: Beta Gamma Sigma International Business Honors Society Member, Trustees Scholarship (top 1 % of applicant pool), The Most Novel Research Award at Drexel AI Conference, Dean's List (F20, S21, F21, F22, S23), Facebook ABCS Fellow, NHI Fellow, Data For Impact Fellow, STEM-SI Fellow

EXPERIENCE

- **Amazon Web Services (Edge ML Services Team)** — New York City, NY, USA
  Software Development Engineer Intern — *May 2023 - Aug. 2023*
  TypeScript | AWS CDK | AWS Lambda | AWS Step Functions | AWS CloudFormation | CI/CD
  - Designed and implemented an automated CloudFormation stacks updater in the CI/CD production pipeline, which resulted in the team's deployment 15 times faster.
  - Shipped a production-level and ready code 3 times faster than expected, saving the team's time to deliver customer updates. Utilized AWS CDK, Step Functions, Lambda, VPC and Custom Resources.
  - Communicated effectively with senior engineers across 3 teams to discuss and implement the service into their AWS back-end. Worked on unblocking pipelines and handling failure behaviors.

- **GrainBound, LLC** — Bethlehem, PA, USA
  Machine Learning Technical Associate — *Feb. 2022 - May 2023*
  Python | TensorFlow | Scikit-learn | Pandas
  - Implemented machine learning solutions for an international chemicals manufacturer.
  - Enhanced manufacturing efficiency by 40% through data analysis of a 50,000-row dataset using Pandas and predictive modeling with TensorFlow and Scikit-learn.

- **Multifunctional Materials and Machine Learning Group (M3-Learning)** — Bethlehem, PA, USA
  Undergraduate Machine Learning Researcher — *June 2020 - Aug. 2022*
  Python | TensorFlow | PyTorch | Scikit-learn | MatplotLib | Seaborn | NumPy
  - Enhanced quantum material analysis speed by 3.5x using a deep neural network autoencoder.
  - Streamlined neural network in PyTorch, shrinking model size by 3,000x and using Brevitas for quantization-aware training.
  - Processed 1.3 million data samples using Matplotlib, Seaborn, Scikit-learn, and NumPy for visualization and preprocessing.
  - Cut neural network training bits by 54% without loss in MSE, using AutoQKeras for quantization.
  - Readied model deployment on Xilinx K60 FPGA with HLS4ML for real-time inference; benchmarks show 40 $\mu seconds/fit latency$.

PROJECTS

- **Capstone Project for Merck & Co.: Machine-Assisted Contextualization** — Bethlehem, PA, USA
  Python | PyTorch | Pandas | Scikit-learn | FastAPI | AWS — *Jan 2023 - Dec 2023*
  - Expedited development of a machine learning pipeline for label classification using Scikit-learn and Pandas, saving $500k annually.
  - Boosted prediction accuracy from 47% to 92% via feature engineering, enhancing Merck's labeling process efficiency by 10x.
  - Advanced research and development of a semi-supervised GAN-BERT model, achieving 96% accuracy on the test set.
  - Implemented a human-in-the-loop system by deploying the model on AWS with FastAPI and Nginx for retraining capabilities.

PUBLICATIONS

- **A.T. Kaliyev,** R. Forelli, P. Sales, S. Qin, Y. Guo, S.O. Memik, M.W. Mahoney, A. Gholami, R.K. Vasudevan, S. Jesse, N. Tran, P. Harris, M. Takáč, J.C. Agar. Rapid Fitting of Band-Excitation Piezoresponse Force Microscopy Using Physics Constrained Unsupervised Neural Networks. *NeurIPS 2023 AI4Mat Workshop*.
- S. Qin, Y. Guo, **A.T. Kaliyev,** J.C. Agar, 2022. Why it is Unfortunate that Linear Machine Learning Models "Work" so well in Electromechanical Switching of Ferroelectric Thin Films. *Advanced Materials*. 2202814.

SKILLS

- **Programming Languages**: Python, TypeScript, C++, Java, HTML/CSS, JavaScript, SQL
- **DS/ML Tools**: TensorFlow, Keras, PyTorch, Matplotlib, Pandas, NumPy, Scikit-learn, Seaborn
- **SWE Tools**: AWS, JDBC, React, Heroku, Google Cloud, Git, Linux