RYAN MELZER

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Work Experience

Northrop Grumman | Los Angeles, CA
Principal Software Engineer (TS SAP Clearance)   09/2024 - Present
- Building an end-to-end MLOps pipeline for the machine learning life cycle of a large, legacy signal processing algorithm pipeline, automating data management, model retraining, lineage tracking, and deployment. Integrating technologies including MinIO (AWS S3), PostgreSQL, Prefect, mlflow, lakeFS, Feast, GitLab CI/CD, and GitLab model registry.
- Acting as a key driver in the modernization of a large, legacy C++/CUDA production codebase by introducing C++ Core Guidelines adherence, integrating static/dynamic analysis tools (linters, sanitizers, fuzzers), fixing critical bugs, and refactoring modules for improved performance, maintainability, and platform independence.

Sandia National Laboratories | Albuquerque, NM
Machine Learning Engineer (DOE Q clearance)   01/2021 - 10/2022
Machine Learning Engineering Graduate Intern   05/2019 - 12/2020
- Achieved state-of-the-art results in synthetic aperture radar (SAR) automatic target recognition (ATR) using deep neural networks and neural architecture search (NAS) under strict SWaP constraints. Co-authored two peer-reviewed publications as first author.
- Demonstrated robust domain adaptation between synthetic and real radar imagery. Enhanced model transparency and trust by integrating explainability algorithms. Deployed 8-bit inference models to EdgeTPU devices.
- Built a comprehensive Python library for SAR ATR and pose estimation (PyTorch, TensorFlow, ONNX, OpenCV) that included DNN models, NAS methods, explainability tools, data augmentation routines, training/inference pipelines, and quantization/edge deployment. This library became a foundational resource for internal SAR ATR research.
- Led development of a high-fidelity, GPU-bound hypersonic vehicle simulation in CUDA C++. Implemented control systems, dynamics models, performance optimizations, and DNN inference capabilities; co-authored a related publication. Transitioned the application to JAX, streamlining development while preserving performance.

The University of Arizona | Tucson, AZ
Graduate Research Assistant   08/2018 - 12/2020
- Developed high performance unsupervised learning algorithms in C++ for real-time outlier detection in streaming astronomical data from the Large-aperture Synoptic Survey Telescope (LSST).
- Developed deep reinforcement learning algorithms for hypersonic aircraft control with the Space Systems Engineering Laboratory.
- Built a log-structured file system for macOS in C and C++.
- T.A. for Software Development in C++, Theory of Computation, Data Structures & Algorithms, and Intro. to CS.

Optiver | Chicago, IL
Software Engineer I   06/2017 - 04/2018
Software Engineering Intern   05/2016 - 08/2016
- Launched a real-time post-trade analysis tool in C# to evaluate a novel high-frequency trading strategy, enabling safe deployment at scale.
- Deployed a high-frequency trading application in C++ on a new exchange, significantly boosting daily trading volume.
- Implemented a microsecond-timescale trading strategy in C for identifying profitable trades previously unexploited.
- Implemented a safety mechanism in C enforcing dynamic price limits on fast automated trades, ensuring critical compliance and system safety.
- Developed a C# monitoring server for real-time data throughput analysis, identifying bottlenecks in the market data collection system.

Rincon Research Corporation | Tucson, AZ
Software Engineering Intern   05/2015 - 09/2015
- Designed a distributed geolocation algorithm in Python/C++ for autonomous drone clusters, enabling networked triangulation of targets. Selected and assembled the compute and sensor platform for a prototype drone.

Skills
Programming Languages: C++, C, Python, Bash Shell, C#, Java, SQL
Frameworks/Libraries: CUDA, PyTorch
Machine Learning and AI Subjects: Computer Vision, Deep Learning, Neural Networks, MLOps

Education
The University of Arizona
- *M.S. Computer Science* (machine learning emphasis, 4.0 GPA)   12/2020
- *B.S. Computer Science* (4.0 major GPA)   05/2017
- *B.S. Mathematics*   05/2017