

Ryan David Melzer

|| Tucson, AZ || rdmelzer@email.arizona.edu || (520) 551-8039 || [rdmelzer.github.io](https://github.com/rdmelzer) || linkedin.com/in/ryan-david-melzer ||

Experience

Machine Learning Engineer - Sandia National Laboratories. Albuquerque, NM **Feb 2021 - Present**

- Leading and conducting research and development of novel neural network methods for automatic target recognition.
- Implementing new controllers and dynamics models in CUDA for a rapid trajectory generation tool.
- Contributing features to a currently unreleased multi-agent reinforcement learning Python library.
- Skills and technologies used: Python, C++, PyTorch, CUDA, computer vision, deep learning, deep reinforcement learning.

Machine Learning Research Intern - Sandia National Laboratories. Albuquerque, NM **May 2019 - Feb 2021**

- Implemented a suite of deep neural network models for automatic target recognition and pose estimation in synthetic aperture radar imagery to run on autonomous aircraft, several of which exceeded current state-of-the-art accuracy.
- Implemented explainability algorithms for these models and discovered that many of them make classification decisions based on unexpected features.
- Developed deep neural network models and neural architecture search techniques for achieving accurate domain adaptation between synthetic and real radar imagery.
- Skills and technologies used: Python, PyTorch, computer vision, deep learning.

Research Assistant - University of Arizona Department of Computer Science. Tucson, AZ **Jan 2019 - Jan 2021**

- Implemented and successfully trained deep reinforcement learning algorithms for control of a hypersonic aircraft.
- Developed and implemented an unsupervised learning algorithm for real-time outlier detection in streaming astronomical data from a large, high throughput telescope.
- Skills and technologies used: Python, PyTorch, machine learning, deep reinforcement learning.

Software Engineer I - Optiver. Chicago, IL **Jun 2017 - Apr 2018**

- Built and launched a real-time post-trade analysis tool to analyze the behavior of a new automated trading strategy. This tool allowed the company to test and deploy the strategy at scale safely.
- Implemented and deployed an ultra-fast high-frequency trading application on an unsupported exchange. Extended an in-house end-to-end testing framework to cover both the new application and the exchange.
- Discovered a use-case for a new microsecond time-scale trading strategy through examining packets sent over an exchanges' UDP broadcast. Implemented, tested, and deployed this strategy in an existing trading application.
- Implemented, tested, and deployed a safety mechanism across the entire trading system to prevent automated trades outside of algorithmically predetermined price limits.
- Skills and technologies used: C, C++, C#, Unix, Python, Java.

Software Engineering Intern - Optiver. Chicago, IL **Summer 2016**

- Built a server to simulate changes in option prices using forecasted market fluctuations and changes in pricing model parameters. This server computed large matrix operations in parallel for thousands of options and broadcasted the results on a local UDP network.
- Developed and deployed server that collected real-time monitoring statistics of work queues in the data collection system. The server was able to easily identify bottlenecks across each component of the system in real-time.
- Skills and technologies used: C#, Python.

Software Engineering Intern - Rincon Research Corporation. Tucson, AZ **Summer 2015**

- Developed and deployed a geolocation algorithm to be used onboard autonomous drone clusters.
- Skills and technologies used: C++, Python, Unix.

Teaching Assistant - University of Arizona Department of Computer Science. Tucson, AZ **2015, 2016, 2018**

Publications

- **Ryan Melzer**, William Severa, Mark Plagge, and Craig Vineyard - "Exploring Characteristics of Neural Network Architecture Computation for Enabling SAR ATR". *SPIE Defense + Commercial Sensing*, 2021

Education

The University of Arizona, Tucson AZ

- **M.S. Computer Science** (emphasis in Machine Learning), December 2020 (4.0/4.0 GPA)
- **B.S. Computer Science**, May 2017 (4.0/4.0 major GPA)
- **B.S. Mathematics**, May 2017