

AIDAN SWOPE

aidanswope@gmail.com | aidanswope.com | github.com/maxwells-daemons
(626) 375-6660 | linkedin.com/in/aidan-swope

RESEARCH

Representation Learning for Remote Sensing: An Unsupervised Sensor Fusion Approach

First-author paper on training neural networks unsupervised to understand many-sensor aerial imagery.
Open-source TensorFlow 2 code available at https://github.com/descarteslabs/contrastive_sensor_fusion.

EDUCATION

California Institute of Technology (Caltech)

2016 – 2020

B.S. in Computer Science. GPA: 3.8.

Pasadena, CA

- **Selected Classes (Mathematics and Statistics):** Machine Learning (various classes; Python), Representation Learning (TensorFlow), Numerical & Applied Linear Algebra (MATLAB), Bayesian Statistics, Probability Models
- **Selected Classes (Computer Science):** GPU Programming (CUDA), Algorithms, Operating Systems (C), FPGA Programming (VHDL), Computer-Assisted Theorem Proving (Coq), Introduction to Quantum Computing

EXPERIENCE

NVIDIA

February 2021 - Present

Research Scientist – Applied Deep Learning

Remote

- **RL Automated Theorem Proving:** Designing and building an automated theorem prover using model-based reinforcement learning and natural language processing.

Caltech & NVIDIA

June 2020 - February 2021

Machine Learning Research Intern – Generalization

Remote

- **Generalization Research:** Investigated why Transformers sometimes generalize better than tree- and graph-structured neural networks despite broader inductive bias. Ran experiments and co-authored a paper.

Descartes Labs

Summer 2019

Machine Learning Research Intern – Unsupervised Learning

San Francisco, CA

- **Unsupervised Sensor Fusion Research:** Developed a new algorithm for training convolutional neural networks unsupervised on many sensors at once. Paper described under “Research” above.
- **Transfer Learning Model:** Trained a large sensor-fusion model on 20 TB of data with TPUs. Transfer learning from this model is the basis for Descartes Labs’ current computer vision models, improving performance on multiple vision tasks.

Caltech

Spring 2019 - Spring 2020

Student Lecturer

Pasadena, CA

- **Deep Learning Class:** Designed and led a class on deep learning with TensorFlow and Keras.

Descartes Labs

Summer 2018

Machine Learning Intern – Computer Vision

Santa Fe, NM

- **Tree Segmentation Model:** Developed a convolutional neural network to segment trees in overhead imagery. Deployed this model across California and urban areas worldwide, creating 15 TB of product data.
- **Pointcloud Ingest Pipeline:** Developed and deployed a point cloud data pipeline to preprocess and ingest over 100 TB of LIDAR heightmap data. Data used as ground truth for training multiple models since.

PERSONAL PROJECTS AND TECHNICAL SKILLS

Differentiable Fluid Simulator: A GPU-accelerated fluid simulator supporting backpropagating through simulation.

AlphaZero Othello Bot: A strong game-playing bot trained with model-based reinforcement learning.

Reinforcement Learning with Binary Neural Networks: Applies gradient-free optimization to train binary neural networks with reinforcement learning. Implements fast binary neural networks with Cython on CPU and CUDA on GPU.

Music Accompaniment VAE: Adapts a variational autoencoder to add accompaniment to music.

Selected Technologies: TensorFlow (1 & 2), PyTorch, Jax, NumPy, Python, C, C++, Haskell, CUDA (basics), SQL (basics)