Dominic LeDuc

CONTACT

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EDUCATION

B.A. Astrophysics | GPA 3.70
UC Berkeley (2016-2020)

SKILLS

- Python
- Java
- Arduino
- C/C++
- MATLAB
- Unix/Linux
- LaTeX
- Image Processing
- Machine Learning
- Data Analysis
- Tensorflow/Pytorch
- Matplotlib
- Bokeh
- Plotly

Signal/Image Processing Engineer (TS Clearance) | Lockheed Martin
Sunnyvale, CA | August 2020—present

- Leading team of software engineers building object-level change detection (OLCD) database of multiple intelligence sources for mission analysts
- Catapulted team to provisional 5th place out of 300 registrants in building segmentation challenge SpaceNet 7 with U-Net solution
- Researching and developing neural network models for single-image damage assessment and pre and post-damage assessment from satellite imagery
- Implemented Cook-Torrance BRDF model and fit to measured reflectance data
- Accelerated model training/testing pipeline from 22 hours to 8 hours with custom data generator
- Built cloud detector ML model in rapid 4-day timescale for customer demo as proof of concept of OPCoE's capabilities
- Designed optical distortion correction algorithms in MATLAB for Hawkeye sensor

Breakthrough Listen Research Intern | Berkeley SETI Research Center
Berkeley, CA | January 2019—August 2020

- Achieved 98.7% testing accuracy with convolutional neural networks in classifying fast radio bursts (FRBs) signals vs. radio frequency interference (RFI)
- Accelerated narrowband signal search program *turboSETI* from 9 hours to 30 minutes using a CNN-based approach to detection while maintaining accuracy of classical methods
- Developed simulation code to generate 200,000 synthetic fast radio bursts (FRBs) modeled off telescope observations
- Integrated ML models into transient signal search pipeline SPANDAK, currently still in use to flag broadband signals of interest

Optical Payloads Intern | Lockheed Martin
Sunnyvale, CA | May 2019—August 2019

- Designed calibration software for the Optical Payload Center of Excellence
- Simulated image and power on focal plane array from a given geometric arrangement of light sources
- Created MATLAB GUI for image segmentation training and implemented morphological operations

TAGCAMS Image Analysis Intern | NASA Goddard Space Flight Center
Greenbelt, MD | June 2018—August 2018

- Refined navigational accuracy to the asteroid Bennu by characterizing point spread function (PSF) data from OSIRIS-REx images
- Cleaned noise due to dark current and channel-wide offset by implementing dark correction script
- Sharpened images by modeling spatially-variant PSF for image deconvolution
- Overcame pixel alignment issues with image cross-correlation algorithm
- Visualized PSF data for TAGCAMS in-flight camera calibration paper, presenting findings to NASA Goddard and Lockheed Martin (https://link.springer.com/article/10.1007%2Fs11214-020-00682-x)