Dominic LeDuc

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Education

B.A. Astrophysics | UC Berkeley May 2020 | GPA: 3.70

Experience

Signal/Image Processing Engineer | Lockheed Martin Space, Sunnyvale, CA

August 2020 — present

- Catapulted team to provisional 5th place out of 300 registrants in building segmentation challenge SpaceNet 7 with neural network detector solution
- Accelerated model training/testing pipeline from 22 hours to 8 hours with custom data generator
- Built cloud detector model in rapid 4-day timescale as proof of concept for customer demo
- 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 99.7% 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 synthetic fast radio bursts (FRBs)
- Integrated models into Breakthrough Listen transient signal search pipeline SPANDAK

Optical Payloads Intern | Lockheed Martin Space, Sunnyvale, CA

May 2019 — August 2019

- Designed optical calibration software, saving engineering teams thousands of dollars in physical design and manufacturing costs
- Simulated image and power on focal plane array given the geometric arrangement of light sources
- Created MATLAB GUI for image segmentation 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 constructing spatially-variant PSF model used in image deconvolution
- Overcame pixel alignment issues writing an 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)
- Simulated extreme environments using one-dimensional stellar evolution code MESA

Skills

- **Programming Languages:** Python, Java, MATLAB, Unix/Linux, LaTeX
- **Data:** Machine/Deep Learning, Image Processing, Keras, TensorFlow, Data Analytics
- **Visualization**: Matplotlib, Bokeh, Plotly