

# Stephen Jarrell

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## PERSONAL SUMMARY

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I am a driven life-long learner of machine learning with recent experience developing and deploying computer vision models for early wildfire detection in California and maritime domain awareness for the US Navy. I am a Computer Science and Engineering Graduate Student and I enjoy prototyping and reading research papers to stay informed on the exciting state-of-the-art of machine learning.

## EDUCATION

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### University of California, San Diego (UCSD)

*MS in Computer Science and Engineering specializing in Artificial Intelligence*

**Sept. 2021 – March 2023**

*San Diego, CA*

### University of California, San Diego (UCSD)

*BS in Cognitive Science specializing in Machine Learning & Neural Computation*

**Sept. 2017 – June 2021**

*San Diego, CA*

## WORK EXPERIENCE

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### Project Tidal - X, the Moonshot Factory

*Software Engineer – Computer Vision Intern*

**September 2022 – December 2022**

*Mountain View, CA*

- Trained a new production object detector, Foreign Fish V2, a consolidated model for both the disease and biomass pipelines
- Formulated and executed a strategy for high-quality data collection of benthic cover images in Indonesia to generate 3D structure-from-motion meshes of seagrass for quantifying biomass and carbon sequestration.
- Developed a quantitative basis for selecting the optimal score threshold of production object detection models by revamping TF-Vision metrics and expanding support for custom metrics plotting in TensorBoard
- Employed state-of-the-art pose estimation research to quantitatively direct the replacement of the pre-existing pose model and accelerate the new CenterNet pose architecture for real-time deployment

### Cerebras Systems Inc.

*Applied Machine Learning Intern*

**June 2022 – September 2022**

*San Diego, CA*

- Built V-Net in PyTorch, a volumetric segmentation model, to predict knee tissue pathologies from 3D MRI scans, advancing the efficiency and accuracy of modern MRI analysis and diagnosis
- Collaborated with the SKM-TEA Stanford researcher team to deploy their novel research on Cerebras hardware.

### University of California, San Diego (UCSD)

*Graduate Teaching Assistant*

**Jan. 2022 – June 2022**

*San Diego, CA*

- Courses taught: CS 108: Data Science in Practice and CS 118A: Supervised Machine Learning Algorithms
- Authored new machine learning curriculum, developed auto-grading infrastructure, and led weekly discussion classes and office hours for project-oriented course sizes of 350 to 480 junior and senior undergraduate students

### Saildrone Inc.

*Machine Learning Engineer Intern*

**June 2021 – Aug. 2021**

*Alameda, CA*

- Developed and deployed deep neural networks in a two-person team for object detection on the Saildrone Fleet of unmanned, solar, ocean drones: currently used for maritime security & surveillance by the US Navy and developed using PyTorch
- Modified ResNet Block skip connections to facilitate 50% pruning of the model without sacrificing classification accuracy across classes: F1-score (Recall @ Precision 80 = 91.84)
- Accelerated the detection inference on drones by quantizing and pruning 350 GFLOPs of excess computations in the ResNet conv layers and FPN, achieving real-time detection capabilities for deployed drones
- Expanded the data augmentation pipeline to include “bag of tricks” from YOLOv4 and YOLOv5 to further improve our RetinaNet

### San Diego Supercomputer Center

*Machine Learning Software Engineer Intern*

**Nov. 2020 – June 2021**

*San Diego, CA*

- Developed Deep Learning models on a supercomputer cluster for object detection and segmentation, such as Faster R-CNN and Mask R-CNN, using PyTorch and Python.
- Engineered these Wildfire Smoke Detection models for deployment at high-altitude weather stations across California
- Automated image preprocessing for training and performance evaluation of the model, frame-by-frame, for hundreds of videos
- Coordinated amongst a global team of Deep Learning Researchers to program state of the art methods for proprietary image data

### Computational Neural Data & Dynamics Lab

*Undergraduate Researcher*

**Dec. 2019 – Mar. 2020**

*San Diego, CA*

- Facilitated Neuroscience Researchers, as part of President Obama’s BRAIN Initiative, in creating the first taxonomy of every cell in the mammalian brain, by deploying Unsupervised Machine Learning methods to a web portal using Python
- Built pipelines in a Linux environment to efficiently process RNA-seq, methylation and chromatin acc data for neural cell clustering

## SKILLS

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- **Programming Languages:** Mastery of Python, C, C++
- **Mathematics of Machine Learning:** Convex Optimization, Numerical Optimization, Vector Calculus, Linear Algebra, Probability
- **Machine Learning Domains:** Deep Learning, Supervised Learning, Unsupervised Learning, Reinforcement Learning
- **Relevant Python Libraries/Frameworks:** PyTorch, TensorFlow, NumPy, Pandas, Scikit-learn

## PROJECTS (Website for more projects @ <http://stephenjarrell19.github.io/>)

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- Deep Reinforcement Learning with TensorFlow and DDPG to optimize a continuous control policy for a Bipedal Walker (OpenAI)
- Deep Dream with TensorFlow to visualize the “black-box” of SOTA image recognition models (ResNet101, VGG16, InceptionV3)