# Trey (George) Driskell

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## Education

**University of Southern California** — **Los Angeles, CA**
PhD in Physics, GPA 3.7 — 08/2020 – 08/2025

**Cornell University** — **Ithaca, NY**
BA in Physics, GPA 3.7 — 08/2016 – 05/2020

## Skills

**Languages:** Python (expert), C++20 (intermediate), SQL (intermediate)
**Tools & Frameworks:** PyTorch, Keras, TensorFlow, Scikit-learn, Pandas, NumPy, SciPy, Matplotlib, Unreal Engine
**Applications:** Machine learning, Deep Learning, Computer Vision, Bayesian Inference, Data Visualization, Statistical Modeling, Gaussian Process, Reinforcement Learning, CI/CD

## Experience

**University of Southern California** — Los Angeles, CA
Graduate Researcher — 08/2020 – 08/2025

- Built the first Bayesian likelihood pipeline for comparing JWST galaxy observations to simulated data
- Trained a custom Gaussian Process regression model using GPflow and TensorFlow Probability to fit a more accurate distribution to simulated data than traditional methods
- Built a simulation pipeline integrating multiple codebases to predict novel cosmological signals with automated testing through Github Actions
- Led collaborations across multiple institutions and mentored junior graduate students and undergraduate researchers as part of the Simons-NSBP Scholars Program, resulting in 9 total publications

**California Institute of Technology and NASA Jet Propulsion Lab (JPL)** — Pasadena, CA
Undergraduate Researcher — 05/2019 – 01/2021

- Trained a custom deep convolutional (ResUNet) model in PyTorch for image-to-image transformations
- Implemented a continuous integration pipeline in CircleCI leveraging Docker containers to automate dependency installation and run unit tests
- Used Weights & Biases to monitor model training and performance across multiple custom loss metrics
- Improved accuracy of predictions by a factor of 2 relative to traditional methods on intermediate scales

**Cornell University** — Ithaca, NY
Undergraduate Researcher — 01/2019 – 08/2020

- Designed a neural network in Keras with TensorFlow backend to classify phase transitions from Quantum Monte Carlo simulation data
- Implemented novel data pre-processing method to augment training data based on electron transport in materials, resulting in significantly faster training than with raw data
- Identified phase transition orders of magnitude faster than traditional methods with similar accuracy

## Projects

**Reinforcement Learning in Unreal Engine (In-progress)**

- Trained a Transformer model to drive a car in Unreal Engine using reinforcement learning
- Currently implementing a vision-based observation model for handling obstacles

**GPU Particle System in Custom Game Engine**

- Implemented animation and physics systems in custom game engine in C++
- Added compute shader support to the engine and implemented a GPU-based particle system in D3D11/Vulkan