

## SUMMARY

Astrophysicist specialized in developing efficient machine learning and statistical techniques for large and complex telescope datasets.

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## EDUCATION

Stanford University	Ph.D. Physics	GPA: 4.00/4.00	2019–2024
Lehigh University	B.S. Physics & Minor in Applied Mathematics Thesis: "Machine Learning Applications for Relativistic Heavy-Ion Collisions"	GPA: 3.97/4.00	2015–2019

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## SKILLS

Proficient	Python • SQL • MATLAB
Familiar	C++ • HTML • Tableau
Python Packages	PyTorch • PyTorch Lightning • Scikit-learn • Pandas • Hugging Face transformers • NumPy • Statsmodels • SciPy • Seaborn • Xgboost • Shap • Matplotlib • Pytest • TensorFlow/Keras • WandB
Machine Learning	Computer Vision • Generative Modeling • Natural Language Processing • MLOps
Other Topics	Causal Inference • Bayesian Inference • A/B Testing • Time Series/Signal Processing

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## EXPERIENCE

**Data Scientist Intern** | Alife Health, Inc., San Francisco, CA | 2023

### Causal Inference and Machine Learning for IVF Intracycle Dose Adjustments

- Developed techniques for analyzing the impact of dose adjustment patterns throughout IVF cycles on pregnancy outcomes.
- Employed statistical tests to alert clinics when a doctor's performance deviates from average on key performance indicators (KPIs).

**Graduate Student Researcher** | Stanford University, Stanford, CA | 2019–2024

### Transformer-Based Super-Resolution for Dust Polarization Images

- Built a multi-image encoder, a transformer-based fusion module, and a decoder to increase the image resolutions by 4x.

### Causal Inference for Modeling the Effects of the Nearby Dust Geometry on Magnetic Fields | [Paper Link](#)

### Spherical Harmonic Convolutional Hough Transform | [GitHub Link](#) | [Paper Link](#) | [Invited Talk Link](#)

- Developed a computer vision algorithm to model the structure of interstellar gas.
- Achieved 3000x runtime speedup and 5x memory reduction over the previous state-of-the-art.

### Modeling the Foreground Obscuring Radiation from the Early Universe | [Paper Link](#) | [Award Link](#) | Invited Talks: [Harvard](#), [Spain](#), [S4](#)

- Used computer vision, hypothesis testing, and Bayesian inference for quantifying this foreground signal, setting new limits.

### Deep Learning for Stochastic Generation of Observed Galaxy Properties | [GitHub Link](#)

- Developed a conditional Wasserstein generative adversarial neural network with gradient penalty (cWGAN-GP) to generate observed galaxy properties in wide-field surveys.

### Deep Learning for Modeling the Transfer Function of Galaxy Detection | [GitHub Link](#)

- Developed a probabilistic model for predicting the transfer function of galaxy detection in wide-field surveys, achieving an ROC-AUC score of 0.95.

### Deep Learning for Searching for 2- $\nu$ Double- $\beta$ Decay of $^{136}\text{Xe}$ | [Poster Link](#)

- Developed a Long Short-Term Memory (LSTM) based model to search for this decay to the excited state of  $^{136}\text{Ba}$  in EXO-200 data, achieving an ROC-AUC score of 0.98.

**Undergraduate Student Researcher** | Yale University and Lehigh University | 2018–2019

### Deep Learning for Heavy-Flavor Jet Classification at RHIC | [Report Link](#) | [Talk Link](#)

- Developed a Python-based Long Short-Term Memory (LSTM) model to classify bottom, charm, and light jets, attaining misclassification rates of 2.1%, 10.9%, and  $4 \times 10^{-3}\%$ , respectively, leveraging C++ for efficient data preprocessing.

**Undergraduate Student Researcher** | The Ohio State University and Lehigh University | 2016–2018

### Deep Learning for Collision Geometry Determination

- Developed a model to identify the collision geometry of nuclei based on the activation pattern of STAR-EPD detector tiles in Python, leveraging C++ for efficient data preprocessing.
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**PUBLICATIONS** | [15+ including 3 first/corresponding-author in top astrophysics journal](#)