

# Bradley Peterson

[www.bradleypeterson.dev](http://www.bradleypeterson.dev) | [contact@bradleypeterson.dev](mailto:contact@bradleypeterson.dev) | (480) 340-3299

## SUMMARY

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Accelerated Computer Science graduate student with a portfolio in ML and LLM-based projects involving nuanced datasets. Extensive experience in collaborative projects, with skill at communicating complex concepts.

## EDUCATION

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### Bachelor of Science in Computer Science

Arizona State University, Tempe, AZ

May 2024

GPA: 3.63

Relevant Coursework: Applied Linear Algebra, Introduction to Artificial Intelligence, Data Structures and Algorithms, Database Management, Found. of Machine Learning, Engineering Probability and Statistics, Multimedia Info. Systems

### Master of Science in Computer Science

Arizona State University, Tempe, AZ

May 2025

## PROJECT EXPERIENCE

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### CS Capstone: Toxic Sentiment Mitigation Research Project

August 2023 – Present

- Fine-tuned 2 large language models (LLMs) via progressive distillation to detect and mitigate toxic sentiment in scientific paper reviews, in collaboration with 4 students and researchers from Mayo Clinic and ASU.
- Developed an automated annotation technique to efficiently build a value-aligned dataset for our models.
- Implemented DeBERTa-based feature extraction and Random Forest classification to categorize sentences into 9 semantic classes and accelerate data collection. Visually verified success via PCA and k-means clustering.

### Light Pollution Research & ML Data Analysis

November 2021 - Present

- Fused astrophotography and comprehensive image data analysis of 5,500+ sky-brightness samples to research the spatiotemporal character of artificial light across central AZ.
- Extracting key trends and features from a massive set of multidimensional data, employed machine learning techniques such as DBSCAN, random forests, and neural-net classification with Keras to derive new insights.
- Presented actionable findings to city councils, directly influencing city lighting objectives.

### Conversational Travel-Assistant Web App

April 2023 - July 2023

- Collaborated with business graduates in an extracurricular project, blending technical and communication skills to develop a full-stack, conversational interface for end-to-end travel planning and booking, powered by GPT-4.
- Integrated several travel-related REST APIs to power the Python backend. Created an interactive frontend using React/JavaScript, and HTML/CSS. Streamed responses live via Redis.

### Optimized Radiance Modeling Project

December 2023 - Present

- Developed a Python-based geospatial analysis tool to simulate the radiant impacts of a complex road network, applying techniques such as raster data manipulation, NumPy vectorization, and efficient memory management.
- Optimized performance to achieve over a 99% reduction in runtime, utilizing techniques such as Voronoi-density weighted sampling, lookup trees, and parallel processing, significantly improving the simulation's scalability.

## ADDITIONAL EXPERIENCE

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### Data Validator | OFW | Phoenix, AZ

June 2023 - November 2023

- Acted as a liaison between technical and non-technical departments at OFW, translating complex concepts into actionable solutions.

### Delegate - East Valley (Volunteer) | DarkSky International

August 2020 - Present

- Present regularly on dark-sky topics to a variety of audiences: conferences, clubs, and city councils.

## TECHNICAL SKILLS

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- **Programming:** Python, JavaScript, Java, C++, SQL, HTML
- **ML/Data:** PyTorch, TensorFlow, scikit-learn, Keras, DBSCAN, LLMs, NLP, Pandas, NumPy
- **Tools, Databases, OS:** Git, GitHub, PostgreSQL, Windows, MacOS, Linux