

Maria Pudoka, PhD

+1 330-958-1775 | pudokam17@gmail.com

[pudokam](#) | [maria-pudoka](#)

PROFESSIONAL OVERVIEW

Doctoral astrophysicist with experience building end-to-end Python pipelines and domain-informed machine learning systems to answer complex technical questions using noisy, high-dimensional datasets. Seeking roles focused on advanced data analysis, ML/AI, and research-driven impact.

TECHNICAL SKILLS

Tools: Python (conda), Linux, Git/Github, Jupyter, VS Code, HPC/cluster computing (SLURM)

Analysis: machine learning, Bayesian inference & MCMC, statistical modeling, uncertainty quantification

Packages: PyTorch, TensorFlow, tkinter, Django, astropy, Pandas, scikit-learn, numpy, matplotlib

Project Management: Agile/Scrum, international collaborative research

EXPERIENCE

Doctoral Researcher – *University of Arizona, Tucson AZ*

Aug 2021 — Present

- **Doctorate anticipated May 2027.** Co-authored 23 peer-reviewed publications (two as first author).
 - Regularly presented technical and scientific results to internal and external audiences including international conferences.
- Awarded **\$177,000** as Principal Investigator of a James Webb Space Telescope Proposal (11% acceptance rate).
 - Collaborating with researchers at external institutions to obtain complementary datasets and characterize galaxy properties in quasar-associated overdensities — work anticipated to yield a first-author publication.
- Secured 4 nights of telescope time at the MMT Observatory as Principal Investigator of two proposals to extend ongoing quasar environment research.
- Engineered a machine learning pipeline in Python to automate faint signal detection, from synthetic dataset generation to model training and evaluation.
 - Trained and optimized a Faster R-CNN model to identify emission line doublets from galaxies in 2D spectroscopic data; achieved significant reductions in the computational and manual effort of traditional pipelines.
- Developed end-to-end photometric selection pipelines to identify and characterize faint galaxies around high-redshift quasars across two large imaging surveys.
 - Produced multi-filter catalogs from JWST and ground-based imaging; derived photometric redshifts using three independent SED-fitting packages; and quantified spatial clustering with completeness simulations and angular autocorrelation analysis.

Undergraduate Researcher – *Ohio State University, Columbus OH*

June 2018 — May 2021

- Produced an undergraduate thesis synthesizing heterogeneous multi-sourced spectroscopic datasets with Gaia satellite astrometry to characterize stellar populations.
 - Developed a probabilistic Bayesian framework to assign age upper limits to stars; quantified systematic uncertainties from binary contamination and observational noise.
- Authored an undergraduate Python programming textbook as a Course Development Assistant and designed curriculum in collaboration with the course instructor.

EDUCATION

Doctor of Philosophy (PhD), Astronomy & Astrophysics — *University of Arizona* *anticipated 2027*

Master of Science (MS), Astronomy & Astrophysics — *University of Arizona* 2024

Bachelor of Science (BS), Astronomy & Astrophysics — *Ohio State University* 2021