

Stacy Science

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EDUCATION

The University of Chicago

Chicago, IL

B.S. in Physics (honors); B.S. in Mathematics

Honors Thesis: "Primordial Gravitational Wave Signatures in Single-Field Slow-Roll Inflation" (*Advised by J. Herring*)

RESEARCH EXPERIENCE

Herring Theoretical Cosmology Group, University of Chicago

Chicago, IL

Primordial Gravitational Wave Signatures in Single-Field Slow-Roll Inflation

January 2024 – Present

- Investigated modifications to the primordial tensor power spectrum arising from pre-inflationary initial conditions using the in-in formalism
- Derived semi-analytic expressions for the tensor-to-scalar ratio in models with non-standard kinetic terms, implementing numerical cross-checks in Mathematica
- Identified enhanced gravitational wave signals from spectator fields, motivating observational targets for next-generation CMB-S4 polarization experiments

High-Redshift Lensing Survey Group, University of Chicago

Chicago, IL

Spectroscopic Confirmation of Strong Gravitational Lenses at High Redshift

January 2024 – June 2024

- Discovered and characterized strongly lensed galaxy candidates at $z > 1.5$ from public HSC survey imaging data
- Applied neural network lens-finding pipelines and parametric lens modeling to identify and characterize candidate systems
- Conducted follow-up spectroscopic observations using DEIMOS and LRIS at Keck Observatory in Hawaii for redshift confirmation

Galactic Archaeology Group, University of Chicago

Chicago, IL

Star Formation Quenching Timescales in Simulated Milky Way Analogs

September 2023 – Present

- Utilized the EAGLE cosmological simulation suite to examine star formation quenching histories of Milky Way-mass galaxies at low redshift
- Wrote original Python code using the simulation analysis package to isolate quenched stellar populations and compute quenching timescales as a function of environment
- Identified a systematic dependence of quenching timescale on halo concentration not captured by semi-analytic models, informing future zoom-in simulations

High Energy Physics Group, Argonne National Laboratory

Lemont, IL

ATLAS Liquid Argon Calorimeter Upgrade Simulation

June 2023 – September 2023

- Developed C++ and GEANT4 software to simulate energy deposition in the ATLAS liquid argon calorimeter upgrade, enabling realistic modeling of hadronic shower profiles
- Authored and published Argonne technical report documenting simulation software architecture and validation procedures for future ATLAS HL-LHC collaboration members

PUBLICATIONS AND REPORTS

1. Park, S., [...], [Student Name] et al. *Neural network confirmation of strong gravitational lenses in HSC survey data* (2024, Submitted to ApJ)
2. [Student Name] *Primordial Gravitational Wave Signatures in Single-Field Slow-Roll Inflation* (2024, NSF REU Final Report)

TEACHING EXPERIENCE

Society of Science Students, University of Chicago

Chicago, IL

*Instructor for "Computation for Research" Program**September 2023 – Present*

- Independently designed curriculum and problem sets teaching Python, data analysis, and scientific computing to 35+ undergraduates each quarter
- Coordinated graduate student mentorship pairs guiding small groups through original computational research projects culminating in end-of-quarter presentations

Department of Astronomy & Astrophysics, University of Chicago

Chicago, IL

*TA for ASTR 21100: Stars and Stellar Evolution**March 2024 – May 2024*

- Hosted weekly office hours, graded problem sets, and led a night sky observing session at the campus observatory for enrolled students

SERVICE, LEADERSHIP, AND OUTREACH

University Astronomical Society

Chicago, IL

*President (Formerly Vice President)**April 2023 – Present*

- Led monthly public observation nights at the campus dome observatory, open to the general university and neighborhood community
- Organized and funded ~15 undergraduates to visit the Adler Planetarium for a behind-the-scenes tour with research staff

Society of Science Students

Chicago, IL

*President (Formerly Vice President)**February 2023 – Present*

- Moderated weekly Professor Talks and research panels connecting undergraduates with departmental faculty and visiting researchers
- Organized community events including Kavli Prize lecture series, departmental competitions, and end-of-year research showcases

ADDITIONAL INFORMATION

Programming Languages: Python, C++, Bash, Mathematica, Julia, LaTeX**Languages:** English (Native), Mandarin, Korean**Interests:** Fencing (Competitive), Piano (Classical), Cooking