

DEPARTMENT OF PHYSICS  
COLLEGE OF ARTS AND SCIENCES

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE WOMEN

APPLICATION DEADLINE: 03/01/2020

PROJECT TITLE: Zooming In On the Distant Universe with Gravitational Lensing

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**Project Description**

Gravitational lensing is a phenomenon in which large concentrations of matter distort the geometry of the universe in their immediate surroundings, causing light traveling through these regions to have its trajectory changed and deflected. The result of this process is that regions of the universe that contain large quantities of matter can act as "natural" gravitational lenses that distort and magnify the light from distant background sources. Gravitational lensing is a powerful tool for addressing a wide range of topics in observational astrophysics and cosmology.

The WISE student will work on a project related to one of two broad family of problems as a member of Prof. Bayliss' group at Cincinnati: 1) directly constraining the distribution of matter within the foreground lensing objects, and 2) measuring the properties of the magnified background sources. This project will involve a significant amount of data analysis and/or data mining, as well as data visualization. Prior experience with computer programming and unix/linux systems is helpful but not required. There will be the option to continue the project beyond the summer in hopes of the student completing a publishable result which the student will be able to present at a conference (travel funding available).