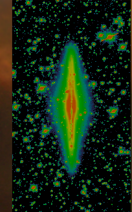


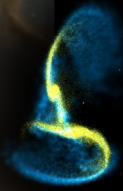
# CWRU Astronomers

Warner Professor Earle Luck's research concentrates on determinations of stellar elemental content primarily in the context of either stellar or galactic evolution. Two major programs are currently underway: 1) a large scale study of galactic Cepheids to determine stellar properties as well as the galactic metallicity gradient, and 2) a large scale survey of the stars of the local neighborhood which seeks to determine the elemental abundance characteristics of the stars out to 100 pc from the solar system.



Professor Heather Morrison is an observational astronomer whose main research interest is the formation of galaxies. She uses observations of old stars in our own and nearby galaxies to reconstruct their history. A major project is the "Spaghetti" survey for stars in the outer halo of the Milky Way, which detects streams of stars which have been pulled off by tidal forces as small satellites are captured by the Milky Way. She is also interested in gender studies and the history and philosophy of science, and is co-founder of WISER, CWRU's community of women in science and engineering.

Professor Chris Mihos uses both computer models and observational data to study the formation and evolution of galaxies. Computational projects include simulations of colliding galaxies, galaxy clusters, and elliptical galaxies with supermassive black holes. Observational studies have focused on the kinematics of merging and starburst galaxies using ground based telescopes and the Hubble Space Telescope, as well as deep imaging of galaxy clusters using CWRU's wide field Burrell Schmidt telescope. Professor Mihos is also active in developing Java and WWW-based materials for astronomy education.



Paul Harding combines an interest in observations which constrain galaxy formation via the stellar "fossil record" with a broad background in telescope, instrument, and detector design. Students can gain hands-on experience in projects as diverse as the recent optimization of the Burrell Schmidt telescope's optical assembly (shown here, as a 3' hole was cut into the side of the telescope), or working on the controller electronics for the Schmidt's wide field camera.



## Academics

The department offers BS and BA programs for students majoring in Astronomy, as well as a minor program. Of course, any interested students are welcome to take courses in the astronomy department; we offer a variety of general and technical courses, aimed at students of all walks of life.



### General Courses include:

- ☐☐☐☐ The Sun and its Planets
- ☐☐☐☐ Stars, Galaxies, and the Universe
- ☐☐☐☐ Archaeoastronomy
- ☐☐☐☐ Einstein's Universe

### Technical Courses include:

- ☐☐☐☐ Stars and Planets
- ☐☐☐☐ Galaxies and Cosmology
- ☐☐☐☐ Astronomical Techniques
- ☐☐☐☐ Stellar Physics
- ☐☐☐☐ The Local Universe
- ☐☐☐☐ Cosmology and the Structure of the Universe

## Student Research

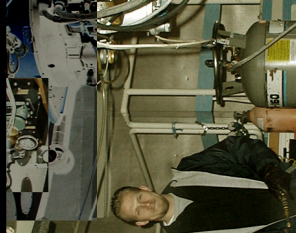
Many of our students are active in research projects within the department.



Bonnie Stayer worked with Professor Morrison on determining the ages of globular clusters in the disk of M31, the Andromeda galaxy. Globular clusters are some of the oldest known objects in the Milky Way, and we use them to reconstruct the early history of Andromeda. She is shown above on an observing trip to the Canary Islands.

Steve Rodney worked with Professors Mihos and Morrison studying intracluster light in clusters of galaxies using deep imaging from telescopes at the Kitt Peak National Observatory. He is now in a graduate school at the University of Hawaii with a prestigious NSF Graduate Fellowship.

Cameron McBride developed simulations of the formation and evolution of galaxy clusters using the Astronomy Department's Beowulf supercomputer. He has also been involved in observational searches for diffuse light in galaxy clusters. Shown here using the KPNO 2m telescope, Cameron is now a graduate student at the University of Pittsburgh.



Amanda Kepley worked with Professor Morrison on the Spaghetti project, investigating a stream of stars which runs through the solar neighborhood. Professor Morrison collaborates with faculty in CWRU's Statistics department, which gave Amanda the opportunity to learn cutting-edge statistics in her research. She is now doing graduate work (with an NSF Graduate Fellowship) at the University of Wisconsin, Madison.