Department of Astronomy Educational Overview

By Chris Impey, Tom Fleming, John Bieging, and Ann Zabludoff

The University of Arizona's (UA) Astronomy Department currently has 43 Ph.D. students, making it the largest astronomy graduate program in the country. The program is of extremely high quality, with admission of about 8-10 students per year from among 150-180 applicants. Incoming astronomy graduate students have the highest mean Graduate Record Exam scores among over 100 graduate programs on campus. We compete against Caltech, Harvard, UC Santa Cruz, UC Berkeley, and Chicago for the best students in the country and from abroad. The graduate program is diverse, boasting a student body of 35% female (compared to the national average of 30%) and 26% international students.

About two-thirds of the graduating Ph.D. students move into permanent astronomy jobs in academia, government, or other research institutes. Graduates also do well in the competitive astronomical community. One of these graduates, Jennifer Scott, was recently awarded the top honor in the country - the Trumpler Award - for a Ph.D. thesis in Astronomy. She is now an assistant professor at Towson University in Maryland. Recent graduates have also been awarded prestigious post-doctoral fellowships, including the Hubble, Spitzer, NSF, Harvard-Smithsonian, and Carnegie Fellowships.

While pursuing their studies, UA astronomy students have immediate access to our world-class observational facilities, such as the two 6.5-m Magellan telescopes, the 6.5-m MMT telescope, the 2x8.4-m Large Binocular Telescope (which is the largest telescope on a single mounting in the world), and the Arizona Radio Observatory's 10-m sub-millimeter and the 12-m mm wave radio telescopes. In fact, some students are the Principal Investigators of successful proposals to use these and space-based telescopes in their first year. Other students are involved in Steward's strong instrumentation program, including the forefront work conducted at the Steward Observatory Mirror Laboratory and the Center for Astronomical Adaptive Optics. Students also participate in space missions, including the design and building of instruments for the Hubble Space Telescope, the James Webb Space Telescope, and the Spitzer Space Telescope. Students are encouraged to conduct interdisciplinary research between the astronomy, chemistry, optical sciences, planetary sciences, and biology departments through the Life and Planets Astrobiology Center (LAPLACE) and the Steward Observatory Astrochemistry Laboratory. Students conducting theoretical research have access to the unique, interdisciplinary Theoretical Astrophysics Program, which involves the Astronomy, Physics, and Planetary Sciences Departments.

The Astronomy Department also runs one of the largest undergraduate majors program in the country, according to statistics from the American Institute of Physics. In 2008, 10 students graduated with a degree in astronomy, and the best of our recent graduates were accepted in the Ph.D. programs at Caltech, UC Berkeley, Harvard, and Chicago, which are in the top echelon of astronomy departments nationwide. Many of our students have double majors in physics and astronomy, and over two-thirds of the majors receive a formal research experience during their time as undergraduates, drawing on the full expertise of 37 astronomy faculty members in theory, observation, and instrumentation. Additionally, with 45% female enrollment, the program has achieved near gender equity, significantly greater than the national average for astronomy and far surpassing the national average in physics.

Perhaps the most important attraction for these students is the broad range of research opportunities here, in which undergraduates are encouraged to participate. Together with the reputation of the faculty, these opportunities continue to attract high quality students from around the country and internationally to our program. For the 2008/2009 academic year, we have 74 returning majors. During the summer of 2008 some 30 new students registered as incoming astronomy majors or transfer students. About 2/3 of our students come from outside of Arizona, in contrast to the University-wide average of 1 in 3.

The Raymond E. White, Jr. 21-inch telescope, housed in the historic Steward Observatory dome on campus, is being used for undergraduate research. Astronomy major Mary Anne Peters worked on a novel concept for a coronagraph under the direction of Prof. Laird Close. The device called BESSEL was successfully tested on the 8-inch refractor finder scope in an attempt to prototype a new technique to observe stellar and planetary companions to bright stars. This work earned Mary Anne the "2007 Outstanding Research Award" the highest award the College of Science awards to a graduating student for research. The first light of an Optical Vortex Coronagraph with BESSEL was highlighted as one of the top two breakthroughs in Beam Engineering in 2008. Mary Anne is now a graduate student in astronomy at UC Berkeley.

The department also has an excellent general education program for non-majors. One in four UA students takes a Department of Astronomy General Education course, and this substantial teaching load is carried out by faculty who raise more money in sponsored research in most years than any other unit on campus. This semester, UA astronomers are teaching 1,530 Tier One and Tier Two General Education students (the largest number of students taught by any department in the UA College of Science). Faculty members in the department have been innovative in the use of preceptors, classroom response devices and instructional technology.

The department also houses the Center for Astronomy Education (CAE), which is the largest college-level astronomy education research group in the nation, as well as continuing education and public outreach programs. These programs include the nationally renowned Astronomy Camp, Steward Observatory Public Evening Lectures, and Mt. Lemmon Sky Center.

http://www.as.arizona.edu/department