Graduate Astronomy Program

The Astronomy Department offers graduate work leading to the degree of master of arts. The small size of the department permits individualized instruction and a close working relationship between students and faculty. Students are expected to become involved in the research programs of the department early in their graduate careers. They also are expected to select courses offered in the areas of observational and theoretical astronomy and astrophysics; a graduate student normally takes at least one 500-level astronomy course each semester. Additional courses in physics and mathematics are recommended according to individual student needs. Two years are usually necessary to complete requirements for the MA degree. However, the department also offers a five-year combined BA plus MA program for Wesleyan students. Eligible astronomy majors who complete their undergraduate requirements in four years can enroll for a fifth year and obtain a master’s degree upon successful completion of one year of graduate coursework and a thesis. Primary research activities in the department include mapping the local interstellar medium, probing the atmospheres of extrasolar planets, observations of young stars and protoplanetary disks, investigations of x-ray binary star systems, and studies of the massive black holes that reside at the centers of galaxies.

Courses

The student will normally enroll in at least one 500-level course in astronomy each semester. Depending on the year, the courses are ASTR521, ASTR522, ASTR524, ASTR531, ASTR532, or ASTR555. These courses are similar in content to the 200-level courses of the same name but with some supplementary materials and special assignments. These supplements are designed especially for graduate students. A minimum of 10 non-seminar credits, with grades of B- or better, is required for the MA degree. These include two credits for research leading to the thesis, which is also required. The student may expect to take four to six courses in physics, mathematics, or other sciences after consultation with the faculty of the department. In addition, students are required to participate in the department’s seminars on research and pedagogy in astronomy, which are offered each semester.

Progress and Qualifying Exams

To be admitted to candidacy, a student must take a written and oral qualifying examination demonstrating satisfactory understanding of several areas of astronomy, fundamental physics, and mathematics. This examination should be taken after the first year of study. If performance in this examination is not satisfactory, the student will either be asked not to continue or to repeat the examination.

Teaching

The emphasis in the program is on research and scholarly achievement, but graduate students are expected to improve communication skills by classroom teaching, formal interaction with undergraduate students, and presenting talks to the observatory staff and to the community.

Research

The research interests of the current faculty are:

- Dr. William Herbst—star and planet formation
- Dr. Ed Moran—extragalactic X-ray sources and supermassive black holes
- Dr. Seth Redfield—exoplanets and the interstellar medium
- Dr. Roy Kilgard—high-mass X-ray binary populations and statistical challenges in high energy astrophysics
- Dr. Meredith Hughes—planet formation

The department is well-equipped for instruction and research. Facilities include a network of MacOS X workstations, a CCD attached to a 24-inch reflector, a 20-inch refractor equipped for observational work, and the substantial astronomical library of the Van Vleck Observatory. Members of our faculty are frequently awarded observing time on world-class telescopes, including the Hubble Space Telescope, Chandra X-ray Observatory, and dozens of ground-based telescopes.

Thesis / Dissertation / Defense

Each candidate is required to write a thesis on a piece of original and publishable research carried out under the supervision of a faculty member. A thesis plan, stating the purpose and goals of the research, observational and other materials required, and uncertainties and difficulties that may be encountered, must be submitted to the department for approval after admission to candidacy. The thesis, in near-final form, must be submitted to the faculty at least one week prior to the scheduled oral examination. In this examination, the student must demonstrate a high level of understanding in the research area. The oral examination may touch on any aspect of the student’s preparation. It is expected that the student will submit the results of his or her work to a research journal for publication.

Concentrations

Planetary science is an emerging interdisciplinary field at the intersection of geology and astronomy with substantial contributions from physics, chemistry, and biology. The subject matter is planets, including those around other stars (exo-solar systems). The science questions include the most important of our times: How do planets (including Earth) form? How common are they in the universe? What is their range of properties and how do they evolve? Is there or was there ever life on other planets? The discovery of even microbial life beyond Earth would rank as one of the greatest human achievements of all time, and this quest lies squarely within the purview of planetary science.

Additional Information

For additional information, please visit wesleyan.edu/astro/grad-program (http://wesleyan.edu/astro/grad-program).