

MASTER OF ARTS IN ASTRONOMY

The Astronomy program blends coursework with research opportunities, providing students access to state-of-the-art instrumentation and computers to investigate areas of current astronomical interest. Primary research activities in the Astronomy department include mapping the local interstellar medium, probing the atmospheres of extrasolar planets, observations of young stars and circumstellar disks, investigations of x-ray binary star systems, and studies of the massive black holes that reside at the centers of galaxies. 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. Faculty members are frequently awarded observing time on world-class telescopes, including the Hubble Space Telescope, Chandra X-ray Observatory, and dozens of ground-based telescopes.

The Astronomy Department offers graduate work leading to the degree of Master of Arts. Two years are usually necessary to complete the requirements for the MA degree. Alternatively, the department offers the 5-year combined BA/MA program for Wesleyan students. Wesleyan also offers an MA Concentration in Planetary Science, an emerging interdisciplinary field at the intersection of geology and astronomy with substantial contributions from physics, chemistry, and biology.

Six to ten non-seminar credits—including two credits for research leading to the thesis—are required for the MA degree. Master's candidates are expected to become involved in the department's research programs early in their graduate careers and to select courses offered in observational and theoretical astronomy and astrophysics. Additional courses in physics, mathematics, computer science, or planetary science are recommended according to individual student needs. The small size of the department permits individualized instruction and a close working relationship between students and faculty.

BA/MA students are not required to be teaching assistants; however, graduate students are expected to improve their communication skills through classroom teaching, formal interaction with undergraduate students, and presentations to the observatory staff and the community. MA students work as teaching assistants for one class each semester.

Each MA candidate must write a thesis on a piece of original research. Many thesis projects are ultimately submitted to a journal for publication.

COURSES

All degree-seeking graduate students are required to register for at least one credit in each semester that they are enrolled in the university. Students 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. In order to show proficiency in astronomy, physics, and mathematics, a minimum of 6-10 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 two to four courses in physics, mathematics, or other sciences after consultation with the faculty of the department. In each semester of the first year of a 2-year MA program, students typically take three courses: one 500-level astronomy course and two courses in physics or math to match the level of proficiency expected in the Department's

BA in astronomy. In each semester of the final year of the MA program, students typically take one 500-level astronomy course and one credit of thesis research. 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, an MA 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 prior to the last 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. BA/MA students do not take a written or oral qualifying examination if ASTR155 has been successfully completed.

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. BA/MA students are not required to be teaching assistants.

RESEARCH

The research interests of the current faculty are:

- 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
- Dr. Sarah Wellons—galaxy formation theory

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 AND 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 defend his or her work and 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

Wesleyan offers an MA Concentration in Planetary Science. 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. For more information and course requirements see <https://www.wesleyan.edu/planetary/Graduate.html>.

ADDITIONAL INFORMATION

For additional information about the Master of Arts program at Wesleyan, please visit

<https://www.wesleyan.edu/grad/graduate-programs/masters.html>.