

# ASTRONOMY (ASTR)

Graduate Degree Program  
College: Computer, Mathematical, and Natural Sciences

## ABSTRACT

The Department of Astronomy offers a program of study leading to a Doctor of Philosophy degree. Students typically earn a Master of Science after completing the program's second year. A full schedule of courses covering most fields of astronomy is offered. Some areas in which the faculty focus their research efforts are comets, interplanetary dust, planetary dynamics, extrasolar planets, star and planet formation, mm wavelength astronomy, the interstellar medium, black holes, active galaxies, time-domain astronomy, galaxy formation and evolution, plasma astrophysics, high energy astrophysics, theoretical and computational astrophysics, and cosmology.

## FINANCIAL ASSISTANCE

The Department of Astronomy offers both teaching and research assistantships. Students making adequate progress toward degree completion will receive up to six years of funding through teaching and/or research assistantships. Research assistantships are either with faculty in the Department or with staff members at the NASA/Goddard Space Flight Center or other local astronomical research centers.

## Contact

**Graduate Entrance Committee**  
**Department of Astronomy**  
1113 Physical Sciences Complex  
4296 Stadium Drive  
University of Maryland  
College Park, MD 20742  
**Telephone:** 301.405.3001  
**Fax:** 301.314.9067  
**Email:** astro-grad@astro.umd.edu

**Website:** <http://www.astro.umd.edu>

**Courses:** ASTR ([https://academiccatalog.umd.edu/graduate/courses/](https://academiccatalog.umd.edu/graduate/courses/astr/)astr/)

**Relationships:** Physics (PHYS) (<https://academiccatalog.umd.edu/graduate/programs/physics-physics/>)

## Admissions

### General Requirements

- Statement of Purpose
- Transcript(s)
- TOEFL/IELTS/PTE (international graduate students (<https://gradschool.umd.edu/admissions/english-language-proficiency-requirements/>))

### Program-Specific Requirements

- Letters of Recommendation (3)
- Supplementary Application (<https://gradschool.umd.edu/sites/gradschool.umd.edu/files/uploads/admissionsforms/umdsupplementaryapplicationastr.pdf>)

- **Description of Research:** 1-2 page description of research and relevant work experience. It should include the topic of research, where it took place and who supervised it, the description of the actual activity (for example, "data reduction for a ground-based optical FTS instrument, wrote reduction software in Python"), whether there were resulting publications, what you learned from pursuing this activity, and what motivated you to pursue it. Note: Please do not upload documents for the Writing Samples. (The admissions committee will not read these.)
- **Publications/Presentations**
- **Faculty of Interest:** applicants are asked to select a minimum of 3 tenured/tenure-track faculty members (<http://www.astro.umd.edu/people/directory.html#Tenured/Tenure-Track%20Faculty>).
- **CV/Resume**
- **Optional: Graduate Record Examination (GRE)**
- **Optional: Physics GRE**

Because of the large number of qualified applicants, the Department of Astronomy has had to restrict formal admission to the Graduate School to those who have shown particularly outstanding work in their undergraduate records. Students who enter the graduate program are normally expected to have strong backgrounds in astronomy, physics, and mathematics (equivalent to a B.S. in Astronomy or Physics). A student with deficiencies in one of these areas may be admitted but will be expected to remedy such deficiencies as soon as possible.

- In our admission process, we are looking for students who will thrive and succeed in our program, and who will be productive and active members of our graduate student community. To evaluate this we take into account all of the information you include in the application. Good academic preparation is needed for success in any graduate program; this can be demonstrated in a number of ways, such as good grades especially in appropriate-level physics and math classes, or with the Physics GRE test (which is an optional component of the application package and will not count against you if not submitted). As you work on your application materials, consider that we are very interested in understanding not only what you have done, but also what you have learned as part of your classes and research experience.

Note that the Department of Astronomy accepts applications for the Ph.D. program only. (Admitted students typically receive an M.S. degree after their second year in the program.) For full details, see <http://www.astro.umd.edu/graduate/admissions.html>

For more admissions information or to apply to the program, please visit our Graduate School website (<https://gradschool.umd.edu/admissions/application-process/step-step-guide-applying/>).

## Application Deadlines

Type of Applicant	Fall Deadline
<b>Domestic Applicants</b>	
US Citizens and Permanent Residents	15 Dec
<b>International Applicants</b>	
F (student) or J (exchange visitor) visas; A,E,G,H,I and L visas and immigrants	15 Dec

**Other Deadlines:** Please visit the program website at <http://www.astro.umd.edu>

## Requirements

- Astronomy, Doctor of Philosophy (Ph.D.) (<https://academiccatalog.umd.edu/graduate/programs/astronomy-astr/astronomy-phd/>)
- Astronomy, Master of Science (M.S.) (<https://academiccatalog.umd.edu/graduate/programs/astronomy-astr/astronomy-ms/>)

## Facilities and Special Resources

The Department has guaranteed observing time on the 4.3-meter Discovery Channel Telescope through a partnership with Lowell Observatory. We have strong interactions with other major observatories, where many students and faculty maintain observing programs, and with neighboring scientific institutes, including the Naval Observatory, the Naval Research Lab, and other government agencies. We have joined with Caltech and other partners in the Zwicky Transient Facility, a time-domain survey for studying rare and exotic transient phenomena which will see first light at Palomar Observatory in 2017. Our planetary science team is heavily involved with space missions visiting solar system bodies, such as NASA's Deep Impact, EPOXI, and Rosetta missions to study comets.

The Center for Research and Exploration in Space Science & Technology II (CRESST II) is the most visible of our many interactions with NASA's Goddard Space Flight Center, located only 5 miles away. UMD researchers work together with Goddard scientists on many topics, ranging from the study of neutron stars, black holes, and extremely hot gas throughout the universe to the study of planets in our Solar System. This partnership offers an exciting array of opportunities for graduate students to work with Goddard scientists and facilities on their Ph.D. theses.

U. Maryland and NASA's Goddard Space Flight Center formed the Joint Space-Science Institute (JSI), a close collaboration between the Departments of Astronomy and Physics and NASA/Goddard. JSI's areas of investigation include black hole physics, high-energy astrophysics, and cosmology.

The Department has also established a partnership with Pontificia Universidad Catolica de Chile (PUC). PUC, one of the top two institutions for astronomy in Chile, signed an agreement with UMD in 2010 that enables astronomy graduate students at both institutions to participate in a joint Ph.D. program starting in their third year. These students split their time between both locations and conduct their thesis research under the supervision of UMD and PUC co-advisors. UMD students gain improved access to Chilean observatories, which include many of the best telescopes in the world.

The Center for Theory and Computation (CTC), a strong group of theoretical astrophysicists within the department, built and maintains a Beowulf cluster to perform computational analyses and simulations across a range of research areas. We also have access to three larger university clusters, including the world-class 'DeepThought2' and 'MARCC/Bluecrab', which have been invaluable to our students in completing computationally-intensive thesis projects.

In 2014, much of the Department moved to the new Physical Sciences Complex (PSC). Highlights of the building include beautiful architecture, windowed office space for grad students, a grad student lounge, and

a state-of-the-art visualization lab for state-of-the-art simulations and displays of large datasets.

This Department is associated with the following research units and facilities:

- Center for Research and Exploration in Space Science and Technology II (CRESST II) (<http://cresst.umd.edu/>): Partnership between UMCP, UMBC, USRA, and NASA/Goddard, with an emphasis on high-energy astrophysics.
- Joint Space Science Institute (JSI) (<https://jsi.astro.umd.edu/>): Partnership between Astronomy, Physics, and NASA/Goddard, with an initial emphasis on high energy astrophysics, especially black holes. Established 2010.
- Laboratory for Millimeter Wave Astronomy (LMA) (<http://www.astro.umd.edu/rareas/lma/>)
- Center for Theory and Computation (CTC) (<http://www.astro.umd.edu/rareas/ctc/>): Astronomy Dept. center for theory- and computation-related research programs.
- Discovery Channel Telescope (DCT) (<http://www.astro.umd.edu/facilities/dct.html>)
- Zwicky Transient Facility (ZTF) (<https://www.ptf.caltech.edu/ztf/>)
- PDS Small Bodies Node (<https://pds-smallbodies.astro.umd.edu/>) (<https://www.ptf.caltech.edu/ztf/>)