

# UNIVERSITY OF MARYLAND

## DEPARTMENT OF ASTRONOMY

College Park, Maryland 20742-2421

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

### General University Information

#### GRE requirements

The GRE is not required.

*President:* Darryll Pines

*Dean of Graduate School:* Dr. Steve Fetter

*University website:* <https://www.umd.edu/>

*School Type:* Public

*Setting:* Suburban

*Total Faculty:* 4,610

*Total Graduate Faculty:* 2,052

*Total number of Students:* 41,000

*Total number of Graduate Students:* 10,611

### Department Information

*Department Chair:* Prof. Andrew Harris, Chair

*Department Contact:* Olivia Dent, Assistant Director

*Total full-time faculty:* 110

*Total number of full-time equivalent positions:* 15

*Full-Time Graduate Students:* 45

*Female Full-Time Graduate Students:* 18

*First-Year Graduate Students:* 9

*Female First-Year Students:* 4

*Total Post Doctorates:* 25

### Department Address

PSC Building, Room 1113

4296 Stadium Drive

College Park, MD 20742-2421

*Phone:* (301) 405-1512

*Fax:* (301) 314-9067

*E-mail:* [astro-grad@astro.umd.edu](mailto:astro-grad@astro.umd.edu)

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

### ADMISSIONS

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#### Admission Contact Information

*Address admission inquiries to:* Graduate Entrance Committee,  
c/o Olivia Dent, PSC Building, Room 1113, University of  
Maryland, College Park, MD 20742-2421

*Phone:* (301) 405-1505

*E-mail:* [astro-grad@astro.umd.edu](mailto:astro-grad@astro.umd.edu)

*Admissions website:* <http://www.astro.umd.edu/graduate/admissions.html>

#### Application deadlines

Fall admission:

*U.S. students:* December 15

*Int'l. students:* December 15

#### Application fee

*U.S. students:* \$75

*Int'l. students:* \$75

Applicants are strongly encouraged to submit all materials by December 15. Applications received after that date may be considered if openings remain. The Department of Astronomy accepts applications for the Ph.D. program only. Information on Application Fee Waivers and waiver eligibility can be found at: <https://gradschool.umd.edu/feewaiverinformation>.

#### Admissions information

For Fall of 2018:

*Number of applicants:* 149

*Number admitted:* 16

*Number enrolled:* 9

### Admission requirements

*Bachelor's degree requirements:* An undergraduate degree in a related field (normally Astronomy or Physics) is required.

*Minimum undergraduate GPA:* 3.0

### GRE requirements

The GRE is not required.

GRE General Test scores and GRE Subject Test scores are an optional component of the application package and will not count against you if not submitted. (University of Maryland institution code is 5814)

### GRE Physics requirements

The GRE Physics is not required.

### TOEFL requirements

The TOEFL exam is required for students from non-English-speaking countries.

Minimum accepted TOEFL scores:

*iBT score:* 96

Students with low scores may be required by the Graduate School to enroll in a language program. For details and the most current information, see <https://gradschool.umd.edu/admissions/english-language-proficiency-requirements>.

### Other admissions information

*Additional requirements:* 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.

Students from non-English speaking countries are required to demonstrate proficiency in English via the TOEFL, PTE, or IELTS exams.

*Undergraduate preparation assumed:* Students who enter the graduate program are normally expected to have strong backgrounds in astronomy, physics, and mathematics. A student with deficiencies in one of these areas may be admitted but will be expected to remedy such deficiencies as soon as possible.

### TUITION AND ASSISTANTSHIPS

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#### Teaching Assistants, Research Assistants, and Fellowships

Number of first-year

*Teaching Assistants:* 8

Average stipend per academic year

*Teaching Assistant:* \$31,000

*Research Assistant:* \$31,000

*Fellowship student:* \$35,000

The listed values are 12-month stipends. TA/RA stipends rise from \$29.9k to \$33.1k as students progress through the program. The stipends also increase when the university receives COLAs raises.

**Tuition year 2019–20:**

Tuition for in-state residents

*Full-time students:* \$731 per credit

Tuition for out-of-state residents

*Full-time students:* \$1,625 per credit

The department provides full funding (with tuition waivers) for up to six years while students maintain adequate progress toward degree. More details can be found at <https://www.astro.umd.edu/graduate/gradprospective.html>.

*Credit hours per semester to be considered full-time:* 8

*Deferred tuition plan:* No

*Health insurance:* Varies; 80% subsidized

*Other academic fees:* Semester fees are listed at <https://billpay.umd.edu/GraduateTuition>.

*Academic term:* Semester

**FINANCIAL AID**

**Loans**

Loans are not available for U.S. students.

Loans are not available for international students.

*GAPSFAS application required:* No

*FAFSA application required:* No

**For further information**

*Address financial aid inquiries to:* Ms. Olivia Dent, PSC Building, Room 1113, 4296 Stadium Drive, University of Maryland, College Park, MD 20742-2421.

*Phone:* (301) 405-1512

*E-mail:* [astro-grad@astro.umd.edu](mailto:astro-grad@astro.umd.edu)

*Financial aid website:* <https://www.financialaid.umd.edu/>

**HOUSING**

**Availability of on-campus housing**

*Single students:* No

*Married students:* No

**For further information**

*Address housing inquiries to:* Off-Campus Housing, 0232 Stamp Student Union, University of Maryland, College Park, MD 20742.

*Phone:* (301) 314-3645

*E-mail:* [och@umd.edu](mailto:och@umd.edu)

*Housing aid website:* <https://och.umd.edu/>

**Table A—Faculty, Enrollments, and Degrees Granted**

Research Specialty	2019–20 Faculty	Enrollment Fall 2020		Number of Degrees Granted 2018–19 (2013–19)		
		Mas-ter's	Doc-torate	Mas-ter's	Terminal Master's	Doc-torate
<b>Astronomy</b>	18	–	45	6(34)	–(3)	3(33)
<b>Total</b>	18	–	45	6(34)	–(3)	3(33)
<b>Full-time Grad. Stud.</b>	–	–	45	–	–	–
<b>First-year Grad. Stud.</b>	–	–	9	–	–	–

**GRADUATE DEGREE REQUIREMENTS**

**Master's:** Students must complete 30 credits (including at least six graduate Astronomy courses) with a minimum GPA of 3.0. A 2nd-year research project with a written report is also required.

**Doctorate:** Students must complete six graduate Astronomy courses and two more graduate courses in Astronomy or supporting areas (normally during the first two years). A minimum GPA of 3.0 is required. Students must also complete a research project (normally in the 2nd year) and pass a thesis proposal defense (normally in the 3rd year) prior to admission to candidacy. After admission to candidacy, students must complete a minimum of 12 credits of doctoral research, a dissertation, and pass a dissertation defense. (Admission to candidacy must occur within four years of admission to the program, and the remaining requirements must be completed no less than one or more than four years after admission to candidacy.)

**SPECIAL EQUIPMENT, FACILITIES, OR PROGRAMS**

Graduate students observe with some of the largest telescopes in the United States and around the world, as well as a wide range of space telescopes covering the electromagnetic spectrum from gamma-rays to the sub-millimeter. The Department has guaranteed access to the 4.3-meter Discovery Channel Telescope through a partnership with Lowell Observatory. We have joined Caltech and other partners in the Zwicky Transient Facility, a time-domain survey at Palomar Observatory for studying rare and exotic transient phenomena. Our planetary science team is heavily involved with space missions visiting solar system bodies, such as NASA's Deep Impact and Rosetta missions to study comets. Complementing its observational program, the Department has a strong theory group, and there is also an important emphasis on the design and building of powerful new instruments.

An extensive department network provides seamless access to software and hardware on a variety of UNIX and LINUX platforms. The computational astrophysics group maintains and upgrades a cluster for computation-intensive science projects. The department also has privileged access to three larger university clusters maintained by the university, including the world-class 'DeepThought2' and 'MARCC/Bluecrab,' which have been invaluable to our students in completing computationally intensive thesis projects. Finally, the department has a new visualization laboratory for state-of-the-art simulations and displays of large data sets.

Many of our students conduct cutting-edge research and instrumentation projects with distinguished scientists at the nearby NASA Goddard Space Flight Center. The university's scientific partnership with Goddard has been further strengthened via the creation of the Joint Space Science Institute (JSI), which supports collaboration between the Departments of Astronomy and Physics and Goddard scientists on topics such as black hole physics, high-energy astrophysics, and cosmology.

The Department has established a partnership with Pontificia Universidad Catolica de Chile (PUC), one of the top two institutions for astronomy in Chile. UMD and PUC signed an agreement 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 department is located in two adjoining buildings, including the new Physical Sciences Complex (PSC). The PSC is an architectural masterpiece, and all 1st and 2nd year graduate students have windowed offices there.

**Table B—Separately Budgeted Research Expenditures by Source of Support**

Source of Support	Departmental Research	Physics-related Research Outside Department
<b>Federal government</b>	\$30,000,000	
<b>State/local government</b>		
<b>Non-profit organizations</b>		
<b>Business and industry</b>		
<b>Other</b>		
<b>Total</b>	\$30,000,000	

**Table C—Separately Budgeted Research Expenditures by Research Specialty**

Research Specialty	No. of Grants	Expenditures (\$)
<b>Astronomy</b>	180	\$30,000,000
<b>Total</b>	180	\$30,000,000

**FACULTY**

**Professor**

- Bolatto**, Alberto D., Ph.D., Boston University, 2000. *Astronomy*. Extragalactic astronomy; IR and radio astronomy.
- Hamilton**, Douglas P., Ph.D., Cornell University, 1994. *Astrophysics, Planetary Science*. Solar system dynamics; solar system origins.
- Harris**, Andrew I., Ph.D., University of California, Berkeley, 1986. Department Chair. *Astronomy*. Extragalactic astrophysics; radio astronomy; instrumentation.
- Miller**, M. Coleman, Ph.D., California Institute of Technology, 1990. Graduate Director. *Astrophysics, Relativity & Gravitation*. Theoretical modeling of neutron stars and black holes; gravitational lensing.
- Mundy**, Lee G., Ph.D., University of Texas, 1984. Director, Laboratory for Millimeter-wave Astronomy; Director, Center for Research and Exploration in Space Science and Technology. *Astronomy*. Millimeter-wave and IR astronomy; star and planet formation; interstellar matter; astrobiology.
- Mushotzky**, Richard, Ph.D., University of California, San Diego, 1976. *Astronomy, High Energy Physics*. High-energy astrophysics; X-ray astronomy; extragalactic astronomy.
- Papadopoulos**, Konstantinos, Ph.D., University of Maryland, 1968. *Atmosphere, Space Physics, Cosmic Rays*. Space plasma physics; Earth’s radiation belts. (ORCID: 0000-0002-5950-6562)
- Richardson**, Derek, Ph.D., University of Cambridge, 1994. *Astrophysics, Computational Physics, Planetary Science*. Asteroid evolution; granular dynamics; computational astrophysics. (ORCID: 0000-0002-0054-6850)
- Ricotti**, Massimo, Ph.D., University of Colorado, 2001. *Astrophysics, Computational Physics, Cosmology & String Theory*.

- Theoretical cosmology; galaxy formation; computational astrophysics. (ORCID: 0000-0003-4223-7324)
- Sunshine**, Jessica, Ph.D., University of California, San Diego, 1993. *Astronomy, Planetary Science*. Comets; asteroids; space missions.
- Veilleux**, Sylvain, Ph.D., University of California, Santa Cruz, 1989. Director, Discovery Channel Telescope Partnership. *Astronomy*. Extragalactic astronomy; AGNs; formation and evolution of galaxies.
- Vogel**, Stuart, Ph.D., University of California, Berkeley, 1983. *Astronomy*. Millimeter-wave astronomy; interstellar medium; extragalactic astronomy.

**Associate Professor**

- Kempton**, Eliza, Ph.D., Harvard University, 2009. *Astrophysics, Planetary Science*. Extrasolar planets.

**Assistant Professor**

- Diemer**, Benedikt, Ph.D., University of Chicago, 2015. *Astronomy, Astrophysics, Computational Physics*. Computational astrophysics.

**Emeritus**

- Earl**, James A., Ph.D., Massachusetts Institute of Technology, 1957. *Atmosphere, Space Physics, Cosmic Rays*. Cosmic rays.
- Harrington**, J. Patrick, Ph.D., Ohio State University, 1967. *Astrophysics*. Planetary nebulae; interstellar matter; stellar atmospheres.
- Leventhal**, Marvin, Ph.D., Brown University, 1964. *Astronomy*. Gamma-ray astronomy.

**DEPARTMENTAL RESEARCH SPECIALTIES AND STAFF**

**Theoretical**

- Atmospheric & Space Physics. Space plasma physics; terrestrial radiation belts. Papadopoulos.
- Computational Astrophysics - Simulations of asteroid evolution. Diemer, Richardson.
- Computational Astrophysics - Simulations of cosmological halo evolution. Ricotti.
- Cosmology and Galaxy Formation. Ricotti.
- High Energy Astrophysics. Black holes; neutron stars; gravitational radiation. Miller.
- Planetary Science. Solar system dynamics: rings, asteroids, collisions; solar system origins (Hamilton, Richardson); extrasolar planets (Kempton). Hamilton, Kempton, Richardson.
- Relativity & Gravitation. Black hole astrophysics. Miller.

**Experimental**

- Extragalactic Astronomy. Optical, infrared, radio, and X-ray observations. Active galactic nuclei; jets; time-domain astronomy; starbursts; star formation; galactic winds; intergalactic medium; galaxy clusters; dark matter; cosmology. Bolatto, Mushotzky, Veilleux.
- Millimeter-Wave Astronomy. Star formation; interstellar medium; galactic structure, dynamics, and evolution; protostellar disks; active galactic nuclei; instrumentation. Bolatto, Harris, Mundy, Vogel.
- Planetary Science. Comets; asteroids; solar system space missions (Sunshine); extrasolar planets (Deming). Sunshine.