

# ASTRONOMY AND SPACE SCIENCES (GRADUATE FIELD)

Program Website (<http://astro.cornell.edu/>)

## Field Description

Members of the staff are particularly interested in directing graduate research in the following subjects:

1. **Astronomy** - The general field of natural science concerned with celestial objects including Solar System, Galactic and Extragalactic objects. Most of the enrolled students in the field work in this overarching area.
2. **Astrobiology** - The subfield concerned with the origin, evolution, distribution and future of life in the Universe. It comprises both observational and theoretical studies of the possibilities for life in the Universe.
3. **Astrophysics** - The application of physics and related sciences to explain natural phenomena in the general field of Astronomy. Students that engage in substantial quantitative research in Astronomy generally work in this area.
4. **Astrostatistics** - The subfield concerned with the analysis of data (relevant to Astronomy and Space Sciences) by the methods of statistics, data mining and machine learning.
5. **Cosmology** - The description of the Universe on large scales. Students that study the history and development of large scale features of the Universe like groups and clusters of galaxies and the cosmic microwave background are engaged in this area. The field also probes questions of fundamental physics via astronomical/astrophysical studies.
6. **Data Science** - The subfield concerned with the development of algorithms, computing methods, statistical techniques for the purpose of exploring data sets (relevant to Astronomy and Space Sciences).
7. **Exoplanets** - Study of planetary systems outside the Solar System. Students study the origin, evolution and observational properties of planets and host stars beyond the Solar System. The notion of planet includes not only the solid part but also the atmosphere.
8. **Instrumentation** - The design and construction of instruments to measure and record physical properties (in Astronomy and Space Sciences). It includes laboratory studies to develop ground, air-borne and space-based instruments.
9. **Planetary Sciences** - Quantitative science of Solar System and bodies in orbit about other stars including moons, rings, asteroids and comets. Students that analyze data from space missions are engaged in this area.
10. **Space Sciences (General)** - Scientific disciplines involving space exploration and phenomena taking place in space. Students involved with space missions and the exploration of the Solar system work in this area. Many enrolled students in the field are engaged in this area.
11. **Theoretical Astrophysics** - The mathematical modeling of natural phenomena in Astronomy and Astrophysics. Students that calculate model outcomes by simulating or solving the relevant physical laws are engaged in this area.

## Data and Statistics

- Doctoral Program Statistics (<https://gradschool.cornell.edu/about/program-metrics-assessments-and-outcomes/doctoral-program-statistics/?SelectGradField=24>)

## Field Manual

- Manual (<https://astro.cornell.edu/graduate-student-handbook-0/>)

## Subject and Degrees

### Astronomy and Space Sciences

- Astronomy and Space Sciences (PhD) (<https://catalog.cornell.edu/programs/astronomy-space-sciences-phd/>)

## Concentrations by Subject

### Astronomy and Space Sciences

- astrobiology
- astronomy
- astrophysics
- astrostatistics
- cosmology
- data science
- exoplanets
- instrumentation
- planetary sciences
- space sciences [general]
- theoretical astrophysics

## Faculty

Nicholas Battaglia (<http://astro.cornell.edu/nicholas-battaglia/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astrophysics; astrostatistics; cosmology; data science; theoretical astrophysics
- **Research Interests:** astrophysics and cosmology

Rachel Bean (<http://astro.cornell.edu/rachel-bean/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astronomy; astrophysics; astrostatistics; cosmology; data science; space sciences [general]; theoretical astrophysics
- **Research Interests:** theoretical astrophysics; cosmology

James F Bell (<http://astro.cornell.edu/james-f-bell/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astronomy; space sciences [general]
- **Research Interests:** Mars exploration; asteroids; comets; surface mineralogy; data reduction and calibration

Shami Chatterjee (<http://astro.cornell.edu/shami-chatterjee/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astronomy; astrophysics

- **Research Interests:** nanohertz gravitational waves and pulsar timing arrays, radio transients, first radio bursts, compact objects, neutron stars

David Fisher Chernoff (<http://astro.cornell.edu/david-chernoff/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astronomy; astrophysics; astrostatistics; cosmology; space sciences [general]; theoretical astrophysics
- **Research Interests:** theoretical astrophysics; interstellar medium; stellar dynamics

Dongwoo Chung (<http://astro.cornell.edu/dongwoo-chung/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* cosmology
- **Research Interests:** astronomy, astrophysics, cosmology, data science, theoretical astrophysics

James Martin Cordes (<http://astro.cornell.edu/james-m-cordes/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astrobiology; astronomy; astrophysics; astrostatistics; data science; exoplanets; instrumentation; theoretical astrophysics
- **Research Interests:** observational astronomy; neutron stars; SETI; instrumentation and signal processing; pulsars; exoplanets

Abigail T. Crites (<http://astro.cornell.edu/abigail-crites/>)

- **Campus:** Cornell ILR NYC
- **Concentrations:** *Astronomy and Space Sciences:* astronomy; astrophysics; cosmology; instrumentation
- **Research Interests:** mm-wavelength instrumentation, observational cosmology, line intensity mapping, and cosmic microwave background

Nils Deppe (<http://physics.cornell.edu/nils-deppe/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astrophysics; theoretical astrophysics
- **Research Interests:** Binary black hole and binary neutron mergers; core collapse supernovae; accretion flows onto compact objects; numerical and computational methods for astrophysics

Drummond Buschman Fielding (<http://astro.cornell.edu/drummond-fielding/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* theoretical astrophysics
- **Research Interests:** Theoretical Astrophysics Astrophysics Astronomy

Eanna E Flanagan (<http://physics.cornell.edu/eanna-flanagan/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astronomy; astrophysics; cosmology; theoretical astrophysics

- **Research Interests:** general relativity; gravitational wave astronomy; theoretical astrophysics

Alexander Hayes (<http://astro.cornell.edu/alexander-hayes/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astrobiology; data science; instrumentation; planetary sciences; space sciences [general]
- **Research Interests:** planetary sciences

Martha Patricia Haynes (<http://astro.cornell.edu/martha-p-haynes/>)

- **Campus:** Ithaca - (Graduate School Professor)
- **Concentrations:** *Astronomy and Space Sciences:* astronomy; astrophysics; cosmology; data science
- **Research Interests:** internal kinematics of galaxies; star formation; thresholds; galaxy evolution

Leslie Hebb (<http://astro.cornell.edu/leslie-hebb/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astronomy; exoplanets
- **Research Interests:** Astronomy and exoplanets

Terry Lee Herter (<http://astro.cornell.edu/terry-herter/>)

- **Campus:** Ithaca - (Graduate School Professor)
- **Concentrations:** *Astronomy and Space Sciences:* astrophysics; cosmology; exoplanets; instrumentation
- **Research Interests:** infrared astronomy; interstellar gas and dust; galaxy evolution

Anna Yen Qin Ho (<http://astro.cornell.edu/anna-yq-ho/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astronomy; astrophysics; data science
- **Research Interests:** time-domain astronomy, high-energy phenomena (supernovae, gamma-ray bursts), transients, radio and submillimeter observations, large surveys

Natasha Grace Holmes (<http://physics.cornell.edu/natasha-holmes/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astronomy; astrostatistics
- **Research Interests:** Physics Education Research, CDER, Physics. <https://physics.cornell.edu/natasha-holmes>

David Lee Hysell (<http://www.engineering.cornell.edu/faculty-directory/david-lee-hysell/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* space sciences [general]
- **Research Interests:** geophysics; ionospheric physics; remote sensing

Lisa Kaltenecker (<http://astro.cornell.edu/lisa-kaltenecker/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astrobiology; astronomy; astrophysics; exoplanets; planetary sciences; space sciences [general]; theoretical astrophysics
- **Research Interests:** Astronomy

Larry Kidder (<http://astro.cornell.edu/lawrence-kidder/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astrophysics; theoretical astrophysics
- **Research Interests:** computational astrophysics, modeling gravitational wave sources

Dong Lai (<http://astro.cornell.edu/dong-lai/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astronomy; astrophysics; exoplanets; space sciences [general]; theoretical astrophysics
- **Research Interests:** theoretical astrophysics

Nikole K. Lewis (<http://astro.cornell.edu/nikole-lewis/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astronomy; data science; exoplanets; planetary sciences
- **Research Interests:** exoplanets atmospheres - observations

James Lloyd (<http://astro.cornell.edu/james-p-lloyd/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astrobiology; astronomy; astrophysics; astrostatistics; data science; exoplanets; instrumentation; planetary sciences; space sciences [general]
- **Research Interests:** adaptive optics, astronomical instrumentation, and extrasolar planets

Jonathan Lunine (<http://astro.cornell.edu/jonathan-lunine/>)

- **Campus:** Ithaca - (Graduate School Professor)
- **Concentrations:** *Astronomy and Space Sciences:* astrobiology; astronomy; astrophysics; exoplanets; planetary sciences; space sciences [general]
- **Research Interests:** evolution of giant planet and brown dwarf stars, the formation of planets, atmospheric and surface processes on planets (including exoplanets) and their moons, chemistry leading to the origin of life

Philip David Nicholson (<http://astro.cornell.edu/philip-d-nicholson/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astronomy; astrophysics; planetary sciences; space sciences [general]
- **Research Interests:** planetary observational astronomy; planetary rings; celestial mechanics

Michael Niemack (<http://physics.cornell.edu/michael-niemack/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* cosmology
- **Research Interests:** cosmology; astrophysics; fundamental physics

Matthew E. Pritchard (<http://www.eas.cornell.edu/faculty-directory/matthew-pritchard/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* planetary sciences
- **Research Interests:** planetary geophysics, geodesy, tectonics and volcanology; glaciology; optical and radar satellite remote sensing

Julie Rathbun (<http://astro.cornell.edu/julie-rathbun/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astronomy; planetary sciences
- **Research Interests:** Infrared observations of Io (Astronomy Concentration). Areas of research for (Planetary Sciences) surface properties of outer solar system moons, volcanism, thermal properties

Dmitry Savransky (<http://www.mae.cornell.edu/faculty-directory/dmitry-savransky/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astrostatistics; exoplanets; instrumentation

Britney E. Schmidt (<http://schmidt.eas.gatech.edu/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astrobiology; astronomy; planetary sciences; space sciences [general]
- **Research Interests:** Astronomy, Space and Planetary Sciences, Earth & Atmospheric Sciences, Geophysics, Oceanography & Climate, Astrobiology

Gordon John Stacey (<http://astro.cornell.edu/gordon-j-stacey/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astrophysics; instrumentation
- **Research Interests:** infrared astronomy; galaxies; interstellar gas and dust

Saul A Teukolsky (<http://physics.cornell.edu/saul-teukolsky/>)

- **Campus:** Ithaca - (Graduate School Professor)
- **Concentrations:** *Astronomy and Space Sciences:* astrophysics; theoretical astrophysics
- **Research Interests:** general relativity; relativistic astrophysics

Ira M Wasserman (<http://astro.cornell.edu/ira-wasserman/>)

- **Campus:** Ithaca
- **Concentrations:** *Astronomy and Space Sciences:* astrophysics; cosmology; theoretical astrophysics
- **Research Interests:** theoretical astrophysics