UC San Diego Astronomy Ph.D.
Graduate Admission Information Session

Applications now open!

Submission deadline December 4, 2024

Start your application at
https://connect.grad.ucsd.edu/apply

Learn more at http://astro.ucsd.edu

Questions? astrophd-inquiry@physics.ucsd.edu

Keck photograph © Laurie Hatch

UCSD Astronomy PhD Information Session

Welcome & introductions

A&A Department at a Glance

Astronomy PhD Program

Graduate Life

Guidance on Applications

Q&A

Grad Admissions Chair
Prof. Adam Burgasser

Graduate Student Affairs Advisor
Dani Magat

Asst. Prof.
Chris Theissen

UCSD Astronomy & Astrophysics Department at a Glance

Introducing the **NEW** Department of Astronomy & Astrophysics!

Department Chair
Alison Coil

VC Grad Ed
Pat Diamond

Grad Admissions Chair
Adam Burgasser

2022 Inaugural Class of UCSD Astronomy PhD program

- UCSD's Astronomy PhD program was established in 2022
- Department of Astronomy & Astrophysics was established in 2023
- Department stats:
  - 19 faculty & affiliate faculty
  - 20 postdoctoral scholars & research scientists
  - 20 graduate students
  - ≈150 undergraduate majors

Introducing the **NEW** Department of Astronomy & Astrophysics!

Student Affairs Department Staff

Student Affairs Advisor & Coordinator
Mikah Al-Arfaj

Graduate Student Affairs Advisor
Dani Magat

For general application questions, please email:
astrophd-inquiry@ucsd.edu

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New faculty 2024 & 2025

Floor Broekgaarden
Gravitational-Wave data science

Griffin Hosseinzadeh
Observational transients

Kyle Kremer
Theoretical dynamics & grav. waves

Eve J. Lee
Star & planet formation theory

Ethan Nadler
Computational galaxy formation

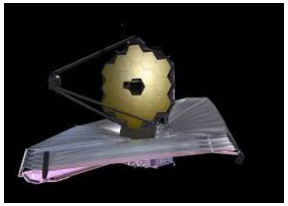
Samantha Trumbo
Observational planetary science

Areas of Research - Observational Astronomy

UCSD's astronomers observe the Universe on all scales, including the **Solar System**, the nearest **stars & exoplanets**, the **Milky Way** system, **extragalactic systems** at low and high redshifts, the **dust and gas within and between galaxies**, and the **earliest epochs of the Universe**. We use premiere facilities on and off the world, including the **Lick & Keck Observatories**, the *Hubble Space Telescope*, the *James Webb Space Telescope* and the future Thirty Meter Telescope, among others

Lick Observatory

Keck Observatory



JWST

Burgasser

Coil

Hosseinzadeh

Konopacky

Sandstrom

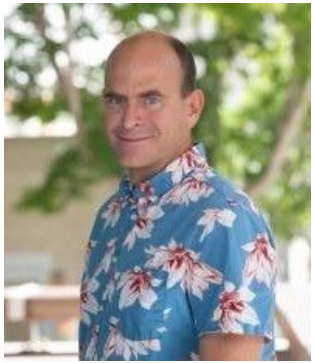
Theissen

Trumbo

Tytler

Wright

Areas of Research - Astronomical Instrumentation



Arnold

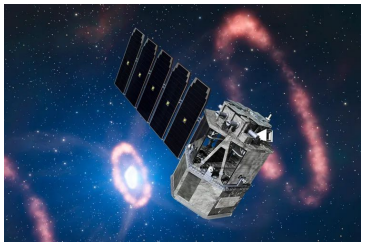
Boggs

Konopacky

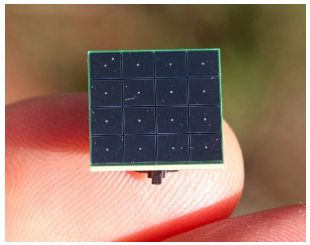
Wright

UCSD is a leader in astronomical instrumentation that spans microwave to gamma-ray wavelengths and incorporates novel technologies. **The Cosmology Lab** (Arnold) builds instruments to study the cosmic microwave background. **The High-energy group** (Boggs) builds instruments for gamma-ray and X-ray observatories. **The OIR lab** (Wright & Konopacky) builds instruments for Keck, Gemini, TMT, and SETI.

Simons Observatory



COSI spacecraft



SETI ns detector

Areas of Research - Theory & Computational Astrophysics


Diamond


Kremer


Keres


Lee


Nadler


Norman

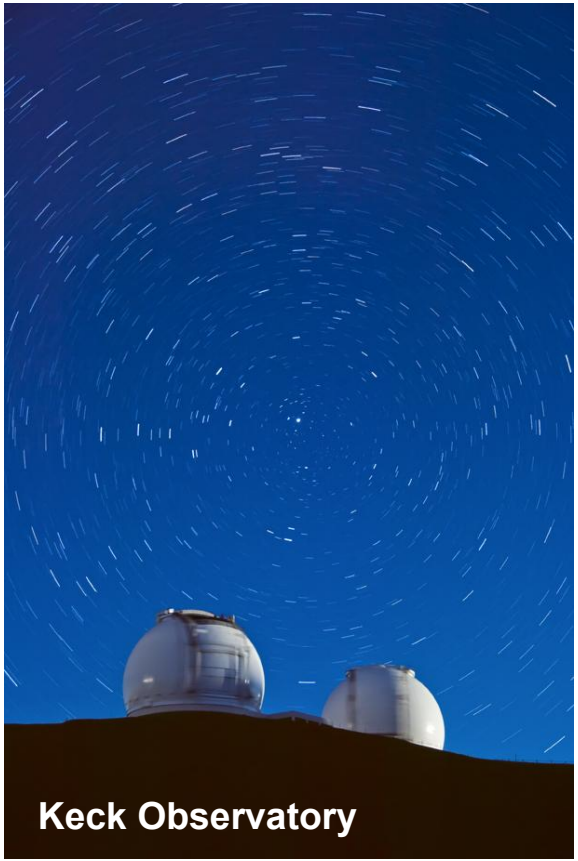
UCSD theorists investigate the physics that underlie **plasma phenomena and magnetic dynamos** (Diamond) and **star & planet formation** (Lee)

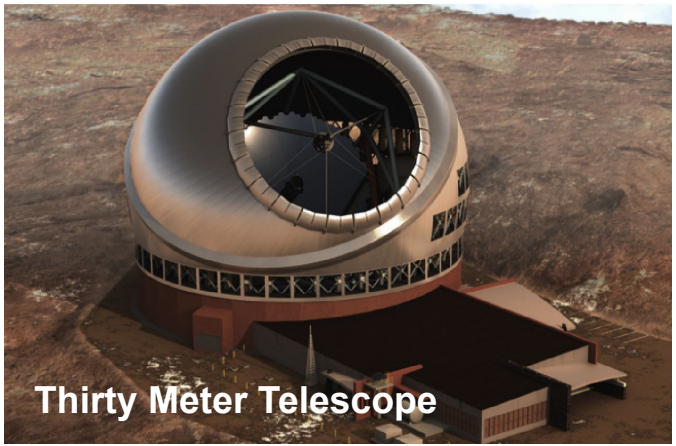
UCSD computationalists use advanced computing hardware at the **San Diego Supercomputer Center** to simulate **galaxy formation** (Keres), **dark matter structure** (Nadler), **dynamics of compact objects and gravitational waves** (Kremer) and the **early evolution of the Universe** (Norman).

Areas of Research - Data Science

UCSD astronomical data scientists are harnessing and creating new algorithms to explore massive datasets from surveys such as **Euclid & LSST,** and large simulations, with foci **star/planet characterization** (Burgasser, Konopacky, Theissen), **transient detection** (Hosseinzadeh), **gravitational wave detection** (Broekgaarden), and **cluster & galaxy simulations** (Kremer, Keres, Nadler), in partnership with the **Halıcıoğlu Data Science Institute**.

World-renowned Research Facilities



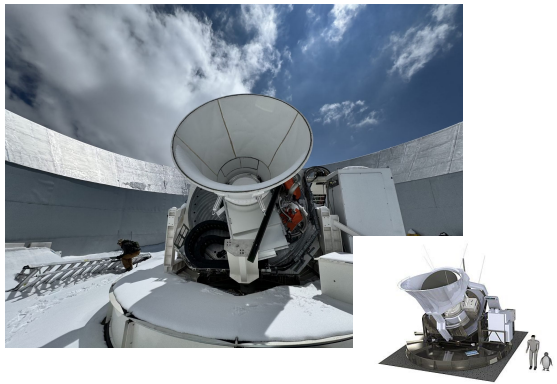


World-renowned Research Facilities

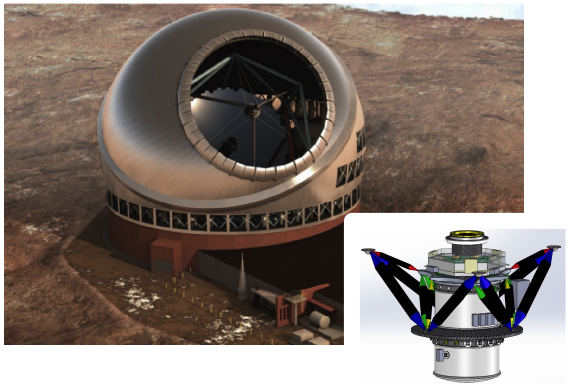
San Diego Supercomputer Center

Halıcıoğlu Data Science Institute

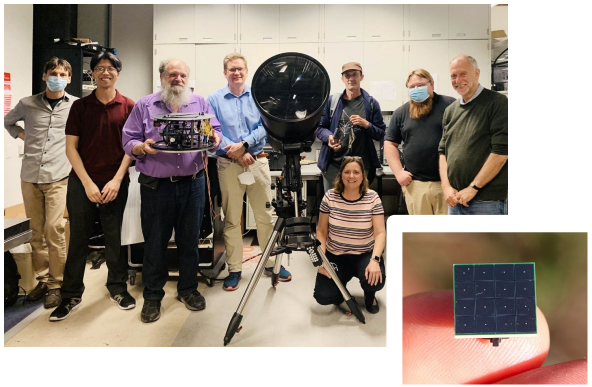
Major initiatives - science and technology development



Simons Observatory began operations in June 2024 to search for traces of cosmic inflation

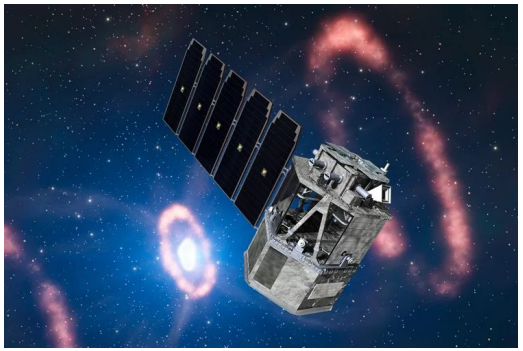


The OIR Lab develops new instrumentation for the Thirty Meter Telescope (TMT), including IRIS & MODHIS



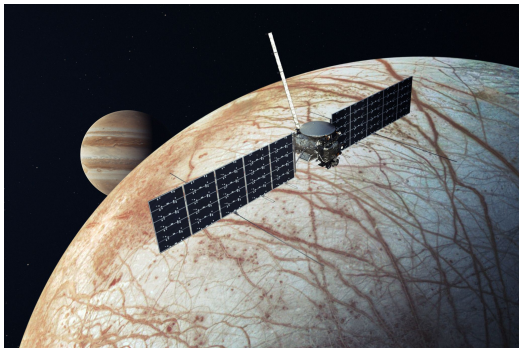
PANOSETI instrument under development for wide-field SETI and rapid transient science

Current major initiatives - science and technology



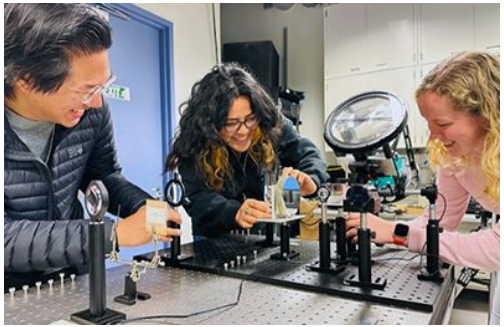
The **Compton Spectrometer and Imager** (COSI), led by PI Steve Boggs, is under development in HE Lab

The data science group is preparing for first survey data from **Large Survey of Space and Time** (LSST) in August 2025



Preparing for NASA's **Europa Clipper mission** and the European Space Agency's **Jupiter Icy Moons Explorer**

Major initiatives - education & professional development



UCSD partners with professional development programs such as the **AstroTech Summer School** to prepare for careers beyond academia

STARTastro program supports community college transfers into A&A and related majors through research and professional training

CU*IP 2025 Site!

Equity, Diversity, Inclusion and Belonging are central to department's mission to educate, inspire, and engage the broad community

UCSD Astronomy PhD Program

Key Features of the Astronomy PhD Program: Requirements

Coursework (years 1-2): Students complete 10 graduate courses encompassing fundamentals of astrophysics, key topical areas in astronomy, and focused electives

Qualifying exam (end of year 2): Research-based presentation and written report, and oral exam based on research and coursework, as part of a second-year project under faculty mentorship

Candidacy exam (end of year 3): Presentation of thesis plan, including context, proposed work, and timeline

Dissertation defense: Presentation of dissertation, leading to formal approval of PhD degree

Key Features of the Astronomy PhD Program: Courses

Students are required to **complete 10 graduate courses in Astronomy**, and complete two (2) quarters of Independent Research by the end of their second year

Core A: (4 courses, 10 units)

- ASTR 200: Survey of Astronomy (4 units)
- ASTR 201: Radiative Processes in Astrophysics (4 units)
- ASTR 202: Astrophysical Fluid Dynamics (4 units)
- ASTR 500: Astronomical Teaching Training (2 units)

Core B: (3 of 5 courses, 12 units)

- ASTR 210: Planets and Exoplanets (4 units)
- ASTR 211: Stellar Structure and Evolution (4 units)
- ASTR 212: Physics of the Interstellar Medium (4 units)
- ASTR 213: Galaxies (4 units)
- ASTR 214: Physical Cosmology (4 units)

Electives: (3 courses, 12 units): options in Physics, Astronomy, Math, Computer Science, SIO, Chemistry, Data Science, etc.

1st year Seminar: attached to colloquium and journal club, discussion of presented research and reading/presentation skills

Key Features of the Astronomy PhD Program: Timeline

Sample Course Schedule for Astronomy Ph.D. Student (Extragalactic Focus)		
Fall Quarter	**Winter Quarter**	**Spring Quarter**
YEAR 1		
*ASTR 200: Survey *ASTR 201: Radiation *ASTR 500: Teaching ASTR 250: Colloquium ASTR 251: Journal Club	*ASTR 202: Fluids **ASTR 211: Stellar Astro. §ASTR 220: Observational Techniques ASTR 250:Colloquium ASTR 251: Journal Club	**ASTR 213: Galaxies §ASTR 214: Cosmology ASTR 250: Colloquium ASTR 251: Journal Club
Year 2		
§ASTR 223: Astrostatistics ASTR 298: Directed Studies ASTR 250: Colloquium ASTR 251: Journal Club	**ASTR 212: Interstellar Medium ASTR 298: Directed Studies ASTR 250: Colloquium ASTR 251: Journal Club	**ASTR 224: Astrophysical Dynamics ASTR 298: Directed Studies ASTR 250: Colloquium ASTR 251: Journal Club

This is *only* an example course timelines. Elective graduate courses are typically offered every 2 years at differing quarters. Core A classes are taught regularly. *Core A **Core B §Elective

Graduate and Campus Life

Graduate Funding

All UCSD graduate students are **guaranteed five (5) years of funding and tuition** through the following roles:

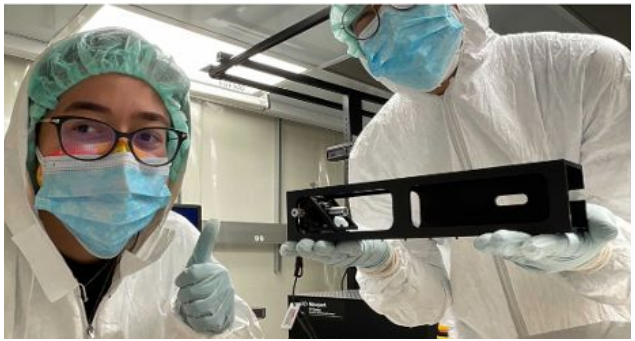
Teaching Assistant (TA): 20 hr/week/quarter; all Astronomy PhD students must TA at least one (1) quarter

Graduate Student Researcher (GSR): 20-40 hr/week/quarter, funded by faculty PI

Fellowships: both internal and external competitive graduate fellowships can fully or partially fund salary and tuition (e.g., NSF GRFP, Sally Ride Fellowship)

Additional roles: part time positions mays be also available to manage outreach program, tutoring, etc.

Note: All UC graduate TAs and GSRs are unionized under UAW 2865



Graduate Fellowships

All admitted students are **guaranteed 5 years funding** for tuition & stipend through TA/GSR appointment. Additional fellowships are available for support

San Diego & Cota Robles
"Start-up" funding in the first year

Sally Ride Fellowship
Supports women in the physical sciences

Katzin Prize
Awarded to graduate students who demonstrate outstanding talent and promise for graduate study

CalBridge Fellowship
For participants in CalBridge program, up to 2 years of graduate support

Tribal Membership Initiative
Native Americans and Alaska Natives from federally recognized tribes

J. Yang Scholarship
Supports graduates students from Taiwan, offsets tuition and stipend

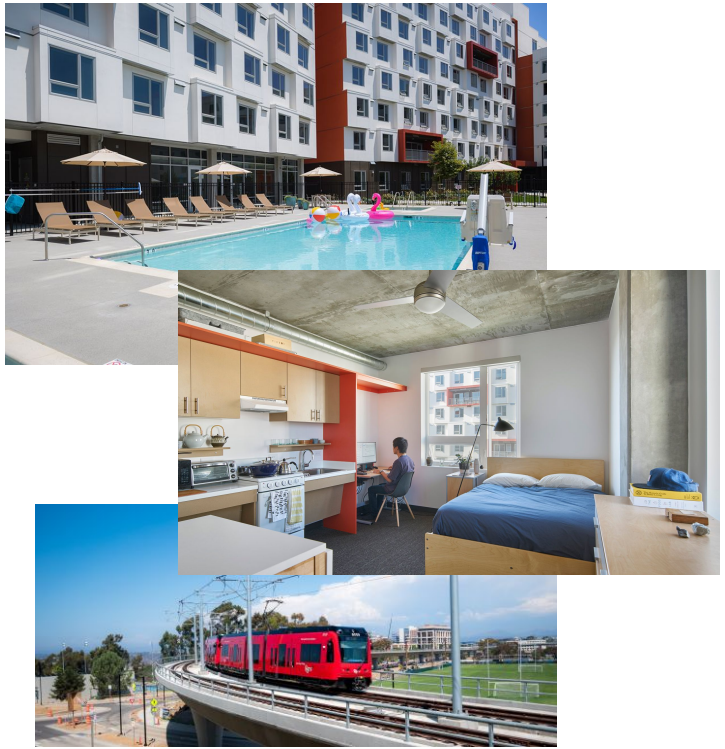
Other requirements apply; for more information see
https://grad.ucsd.edu/financial/fellowships/index.html

Graduate Housing & Commuting

UCSD has extensive **on-campus graduate & family housing** at competitive rates relative to the local market.

Graduate students typically live on-campus years 1-2, then off-campus in communities across San Diego county

All registered students receive **free public transit through U-Pass program**, with plenty of bus, train, and trolley options from across San Diego county



Learn more at
https://bit.ly/3AWgy7A

Graduate Community

UCSD GWIP group with Dr. Jill Tarter, pioneer in SETI

Astronomy graduate students participate in department governance through the **Astronomy Graduate Council** (AGC), and meet in groups such as the **Graduate Women in Physics** (GWIP) and **Graduate Student Diversity Initiative** (GSDI) groups.

There are also **affinity groups** for community members who identify as people of color, international members, early-career astronomers, etc.

Campus organizations such as the **Graduate and Professional Student Association (GPSA)** broaden connections across campus

Outreach & Public Education

Graduate students manage the **Cosmic Tours** portable planetarium show, organize local events such as **Astronomy on Tap**, attend large science festivals such as the San Diego Science and Engineering Festival, and coordinate with community groups such as **Native Like Water** and **BeWISE** to share the excitement of studying the Universe

Application Details

Apply at https://connect.grad.ucsd.edu/apply/
Deadline: December 4

Application elements:

- Academic transcripts
- GRE/PGRE are NOT required
- CV/Resume
- Statement of Purpose
- Additional educational experience ← *fellowship opportunity!*
- 3-5 Letters of Recommendation
- International Applicants: English language tests
- **Application fee waivers are available (must submit by Nov 27)**

Suggestions for providing your BEST application

CV/Resume (1-2 pages)

- Include relevant upper division/graduate courses
- Include relevant skills & experience (observing, SolidWorks, python,...)

Statement of Purpose: (2 pages ideal)

- Describe the science/big questions you're interested in
- Highlight individual/lead contributions to research (e.g., data analysis)
- Connect your interests to specific research conducted by UCSD faculty

Letters:

- Send regular reminders to your writers!
- Try to have at least one letter writer who can speak to your academic preparation & strengths

Additional experience essays:

- Please complete these! They will make you eligible for UCSD fellowships
- A single paragraph for up to 3 questions is sufficient

IMPORTANT: make sure to submit all materials by the deadline!

Frequently Asked Questions

Fee waiver info:
https://bit.ly/3OpEXWd

Fee Waivers

- Fee waivers are available for US citizens, permanent residents, and Undocumented students
- Fee waivers are provided based on financial hardship (provide FAFSA and/or tax information), US military service, participation in specific graduate preparation programs (e.g., CalBridge, STARS, UC LEAD)
- You must submit your application **at least 1 week in advance** (by November 27) to be considered for a fee waiver

Sending Test Scores (GRE/TOEFL)

- **Physics GRE is NOT required**; can only help application (low scores ignored)
- Self-reported, unofficial scores are okay now, official scores required later
- Submit electronically to UCSD (Institution code: **4836**)
- TOEFL not required for English-speaking international universities on IAU World Higher Education Database (https://www.whed.net)

What are your questions?

http://astro.ucsd.edu

astrophd-inquiry@ucsd.edu