UCSC Astronomy & Astrophysics Prospective Graduate Student FAQ

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with the Dept.

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Contents

1 Is this it?

This document is not exhaustive, and it's not meant to be. If you're really interested in coming to Santa Cruz to pursue a PhD in astronomy & astrophysics, you should explore *all* the information that's available at `http://www.astro.ucsc.edu`, as well as the main University site at `http://www.ucsc.edu`. Since you're probably considering several grad programs, this document is supposed to be a succinct guide through all that available information.

This document lives on the web at `http://www.ucolick.org/~board/grad/faq/faq.html`, so check there for updates (or just start at `http://www.astro.ucsc.edu/grads.xml`).

Table 1: **Current Astronomy & Astrophysics graduate students** as of January 2002.

Name	*Email*[a]	*Year*[b]	*Previous Education*	*Current Advisor(s)*
Phil Choi	`pchoi`	AC	Wesleyan	Guhathakurta
Ian Dobbs-Dixon	`iandd`	1	UC-Santa Cruz	...
Shawfeng Dong	`dong`	AC	U. of Science & Tech. (China)	Lin
Marla Geha	`mgeha`	AC	Cornell, NMSU	Guhathakurta
Justin Harker	`jharker`	1	U. of Wisconsin-Madison	...
Justin Howell	`jhhowell`	$\sim$4	Caltech, Columbia	Guhathakurta
Patrik Jonsson	`patrik`	AC	Uppsala (Sweden)	Primack, Faber
Michael Kuhlen	`mqk`	2	Caltech	Woosley, Madau
David Lai	`david`	1	Reed	...
Laura Langland-Shula	`laura`	1	...	...
Sarah Martell	`martell`	1	U. of Washington	...
Alex McDaniel	`alexm`	2	Princeton	Laughlin
Jason Melbourne	`jmel`	1	Wesleyan	...
Anne Metevier	`anne`	AC	Northwestern	Koo
Greg Novak	`novak`	1	Harvard	Lin
Lynne Raschke	`lynne`	4	Haverford	Faber
Tami Rogers	`tami`	3	U. of Arizona	Woosley
Linda Schroder	`linda`	AC	Arizona State	Brodie
Scott Seagroves	`scott`	3	UNC-Chapel Hill	Thorsett
Andrew Sheinis	`sheinis`	AC	UMass-Amherst, Worcester	Miller
Kim-Vy Tran	`vy`	AC	U. of Arizona	Illingworth
Kurtis Williams	`williams`	5	Penn State	Bolte
Weiqun Zhang	`zhang`	AC	U. of Science & Tech. (China)	Woosley

[a] all emails are @ucolick.org

[b] Once a student has successfully proposed a thesis topic (passed his or her "Qualifying Exam"), that student has Advanced to Candidacy (AC). At that point it becomes very easy to lose track of how long s/he's been here ...

2 Can I talk to some current grads?

Table 1 has some information on the current graduate students. If you're interested in hearing about the experience of people from your background, or who work with an advisor you're interested in, try getting in touch with the right student.

3 What is the graduate curriculum?

In roughly chronological order, here's how you get from where you are now to a PhD:

Classes

Table 2 lists the classes usually taught in our curriculum. In approximately your first two years (that's 6 quarters, not 4 semesters), you will take 12 "real" classes, plus 2 others. Let me get the "others" out of the way first: one (Intro. to Research) is simply a course where each faculty member comes by to chat with your class of first-years about his or her research; the other is Independent Study, which you must take in connection with your Research Project. Read more about that below.

Table 2: **Astronomy & Astrophysics courses.**
(**Boldface** indicates a required class; 14 total required.)

Physics (3)[a]	*Stars* (3)	*Galaxies* (3)	*Other* (2)
E&M/Plasmas	**Stellar Structure**	**Galaxies A**	**Intro. to Research**
General Relativity	Star Formation	Galaxies B	**Ind. Study**
Physics of Astrophysics A	Star Death	Galaxies C	Observation Techniques
Physics of Astrophysics B	Accretion	Cosmology	Radio/Sub-mm
Gas Dynamics	Compact Objects	Low-Density	Instrumentation
QM sequence[b]	Atmospheres	Stellar Dynamics	Planetary Science
Classical Mechanics[b]			Numerical Techniques
Magnetohydrodynamics[b]			

[a]The minimum number of classes you must take from each column is listed.
[b]These courses are taught in other departments.

As for the 12 "real" classes: You will be required to take 3 classes in particular. One is an E&M class on radiation and plasma physics; one is a standard course in stellar structure & evolution; one is a standard course on galaxies. After that, you must take at least 2 more classes from the "physics" column, 2 more from the "stars" column, 2 more from the "galaxies" column, and then take whatever you like until you have 12.

TA

At least one quarter you must be a Teaching Assistant. Typically students do this early, when they don't necessarily have a regular research advisor for financial support anyway.

Research Project

Ideally during the summer between your 1st and 2nd year, you will work on a roughly Master's-thesis-size project. A good thing to do is to use the Independent Study course in the spring before or the fall after that summer, either to prepare for your project or to finish it up. When you're done, if you can get a publication out of it, that's great; if not you must submit a journal-style writeup to the Dept. to help fulfill this requirement. You must also give a talk (in the form of a FLASH, see below) on your Research Project.

FLASH

FLASH (the Friday Lunch Astronomy Seminar Hour) is a weekly talk given by visitors, faculty, postdocs, or grads. In connection with the Research Project, you must give a FLASH by the end of your 2$^{\text{nd}}$ year to finish the completion of this requirement.

Prelims

The prelims are two 3-hour written examinations: one is on basic physics and the other is on graduate-level astronomy & astrophysics. The department offers the prelims every June. You may pass either or both exams in your first attempt. You really should pass both sections by the summer after your 2$^{\text{nd}}$ year, i.e., after your second attempt. However, see the Dept. Review.

Dept. Review

Typically just before your 3$^{\text{rd}}$ year the faculty review your progress. By the time of the Dept. Review, you should have completed your classes, your Research Project and its FLASH, and passed the prelims. “Passing” the Dept. Review typically means being granted a Master’s and being encouraged toward thesis work. In other instances you may be provisionally passed with the opportunity to re-take the prelims or an extension on your FLASH. In principle, the faculty could choose not to pass you.

Qual

After completing classes, prelims, and all Research Project requirements, it’s time to start thinking about a thesis. The Qualifying Exam is the place to propose and defend a thesis topic; that means you don’t necessarily have to complete lots of the thesis work before this exam. The Qual is a defense-style exam: you give some presentation but also face comments, objections, and suggestions from your committee. Students are encouraged to complete their Qual by the end of their 3$^{\text{rd}}$ year, and are required to do so before the end of their 4$^{\text{th}}$.

More FLASHes

You need to give a couple more FLASHes as you progress on your dissertation work; this is good practice for your thesis defense and all the talks you’ll have to give as you apply for postdocs.

Defense

Finally, of course, you must write a thesis and defend it in front of your committee. Hopefully your thesis is composed of several publications you’ve written while you worked; that will help with your postdoc applications. Then you’re done!

4 Will I get a job?

The department has an extraordinary record of placing its graduates into postdoctoral positions. Those who wish to continue in the field almost universally do so, proceeding through postdocs and on to permanent positions. Recently students’ first positions have increasingly been prestigious

Table 3: **Recent Astronomy & Astrophysics graduates.**

Name	*PhD Year*	*First Position*	*Current Position (if different)*
Caryl Gronwall	96	Wesleyan postdoc	Researcher, Johns Hopkins
Rob Hoffman	96	LLNL postdoc	LLNL researcher
Kathryn Johnston	96	Inst. for Adv. Study	Wesleyan faculty
André Martel	96	STScI postdoc	Researcher, Johns Hopkins
Eric Sandquist	96	Northwestern postdoc	San Diego St. faculty
Matt Shetrone	96	ESO postdoc	HET astronomer
Greg Wirth	96	U. Victoria postdoc	Keck instrument scientist
Chris Churchill	97	Penn St. postdoc	Researcher, Penn St.
Jarita Holbrook	97	UCLA postdoc	faculty, UCLA archaeoastronomy
Kim Sepulver	97	NASA Ames postdoc	Malin Space Sciences, Inc.
Rachel Somerville[a]	97	Hebrew U. postdoc	U. Michigan faculty
Natalie Stout-Batalha	97	Brasil postdoc	Researcher, NASA-Ames
Scott Trager	97	Carnegie fellow	Hubble fellow (Carnegie Obs.)
Debra Fischer	98	UC Berkeley postdoc	Researcher, UC Berkeley
Jeremy Heyl	98	Caltech Prize fellow	Chandra fellow (Harvard)
Dan Kelson	98	Carnegie fellow	Researcher, Carnegie Obs.
Ian Walker	98	Hebrew U. postdoc	(finance?)
James Bullock[a]	99	Ohio St. postdoc	
Romeel Davé	99	Spitzer fellow	Hubble fellow (Steward/Arizona)
Jon Fulbright	99	DAO postdoc	
Ari Maller[a]	99	Hebrew U. postdoc	
Neal Turner	99	U. Maryland postdoc	
Geoffrey Bryden	00	JPL postdoc	
Anthony Gonzalez	00	CfA fellow	
Jason Harris	00	STScI postdoc	
Jennifer Johnson	00	Carnegie fellow	
Andrew MacFadyen	00	Caltech Prize fellow	
Dave Reitzel	00	UC Irvine postdoc	
Katherine Wu	00	U. Florida postdoc	
Kathleen Flint	01	Carnegie fellow	
Amy Nelson	01	UCSC (teaching)	
Risa Wechsler[a]	01	U. Michigan postdoc	
Anouk Shambrook	01	UCSC (teaching)	

[a]Physics Dept. graduates who worked with Joel Primack in theoretical cosmology are included.

fellowships, indicating the quality of the PhD program here. Not only are our grads getting jobs, they are getting some of the best jobs available.

Table 3 gives the basic information on recent UCSC PhDs. In the past five years or so, out of 31 graduates, 29 are still in astronomy. One chose to leave research before her first postdoc, and the other chose to leave after his first postdoc. Neither left astronomy against their will.

5 Who can I work with, and what can I work on?

Astrophysicists at UCSC are among the world's experts in the field. Their studies range from theoretical cosmology to observations of planets, and everything in between. The theorists work both analytically and numerically; the observers work in a broad range of wavelengths. The research is probably the main reason you'd want to come here.

Faculty

Without further ado, then, what follows is a concise, *definitely non-exhaustive* summary of each faculty member's interests. Listed in the "Notes" field are current major projects or collaborations that person is affiliated with; see §6 for descriptions of these projects.

GEORGE BLUMENTHAL
Office: 439B Kerr *Phone:* 459-2005 *Email:* george@ucolick.org
Notes:
Issues in theoretical cosmology, including: the role of dark matter; the origin of structure in the universe; galaxy evolution; voids; inflation; perturbations in the CMB. Also: AGNs; accretion disks; GRBs.

PETER BODENHEIMER
Office: 415F Kerr *Phone:* 459-2064 *Email:* peter@ucolick.org
Notes: CODEP
Theoretical studies of star and planet formation, including: calculation of protostellar collapse; multiple-star system formation; evolution of protostellar disks and the formation of planets within them; giant planets; solar system formation.

MICHAEL BOLTE
Office: 401 Kerr *Phone:* 459-3896 *Email:* bolte@ucolick.org
Notes: CELT
Primarily observational studies of globular clusters as tests of theories about stellar structure & evolution, star formation, and for constraining the age of the universe. Also: stellar populations; dwarf galaxies; effects of environment on galaxies; instrumentation.

JEAN BRODIE
Office: 141B Kerr *Phone:* 459-2987 *Email:* brodie@ucolick.org
Notes:
Observational studies of Galactic and extragalactic globular clusters; galactic dynamics and chemical evolution; instrumentation.

HARLAND EPPS
Office: 133A Kerr *Phone:* 459-3454 *Email:* epps@ucolick.org
Notes: HST NICMOS
Astronomical instrumentation: optical design, fabrication, and testing.

SANDY FABER
Office: 470 Kerr *Phone:* 459-2944 *Email:* faber@ucolick.org
Notes: DEEP, DEIMOS, CfAO, HST WFC
Observational and theoretical studies of the formation and evolution of galaxies, including: stellar populations; black holes in galactic nuclei; dark matter; velocity fields; high-z galaxies. Also: adaptive optics and astronomical instrumentation.

John Faulkner
Office: 403 Kerr *Phone:* 459-2815 *Email:* johnf@ucolick.org
Notes:
Theory of stellar evolution, including: red giants and horizontal branch stars; solar models; dwarf novae; nucleosynthesis. Also: cosmology; mathematics; history of science.

Raja Guhathakurta
Office: 481 Kerr *Phone:* 459-5169 *Email:* raja@ucolick.org
Notes: DEEP, CfAO, CELT
Observational studies of globular clusters, galaxies, and galaxy evolution, including: interacting galaxies; dwarf galaxies; faint blue galaxies; Tully-Fisher relation; dust and reddening; stellar populations; gravitational lensing; dark matter. Also: adaptive optics.

Garth Illingworth
Office: 467 Kerr *Phone:* 459-2843 *Email:* gdi@ucolick.org
Notes: DEEP, HST ACS, NGST
Observational studies of high-z galaxies; galaxy formation and evolution, including: structure; kinematics; stellar populations. Also: space telescopes.

Burt Jones
Office: 473A Kerr *Phone:* 459-2384 *Email:* jones@ucolick.org
Notes:
Observational studies of stellar dynamics and stellar evolution, including: astrometry and proper motion studies; spectroscopy of young and low-mass stars; the rotation, lithium abundance, age, and chromospheric activity of solar-type stars.

David Koo
Office: 435 Kerr *Phone:* 459-2130 *Email:* koo@ucolick.org
Notes: DEEP, DEIMOS, CfAO
Observational cosmology: angular and redshift distributions of galaxies, quasars, and gas; clustering; stellar populations; galaxy evolution. Also: adaptive optics and astronomical instrumentation.

Greg Laughlin
Office: 464 Kerr *Phone:* 459-3208 *Email:* laugh@ucolick.org
Notes: CODEP
Theoretical astrophysics, including topics in planet formation and evolution; extrasolar planet searches; multiple-planet systems; dynamical interactions; evolution of the universe into the distant future.

Doug Lin
Office: 461 Kerr *Phone:* 459-2732 *Email:* lin@ucolick.org
Notes: CODEP
Theoretical astrophysics: star and planet formation; dynamical evolution of planetary, stellar, and galactic systems; galaxy formation; galactic structure; globular clusters and dwarf galaxies; interacting galaxies; astrophysical fluid dynamics; AGNs; accretion.

Piero Madau
Office: 473 Kerr *Phone:* 459-3839 *Email:* pmadau@ucolick.org
Notes:
Theoretical astrophysics, including: early structure formation; reionization; the intergalactic medium; universe at high-z; radiative transfer; high-energy astrophysics.

Bill Mathews
Office: 421 Kerr *Phone:* 459-2074 *Email:* mathews@ucolick.org
Notes:
Theoretical studies of astrophysical gas dynamics, including: galactic winds; cooling flows; elliptical galaxies; instabilities and dynamics in cores of quasars and AGNs.

Claire Max
Office: 14 Kerr *Phone:* 459-2049 *Email:* max@ucolick.org
Notes: CfAO
Adaptive optics instrumentation; science with adaptive optics; solar system science.

Joseph Miller
Office: Nat. Sci. II Annex *Phone:* 459-2991 *Email:* miller@ucolick.org
Notes: Director of UC Observatories, CELT
Observational studies of AGNs. Also: astronomical instrumentation and telescopes.

Jerry Nelson
Office: 463 Kerr *Phone:* 459-5132 *Email:* jnelson@ucolick.org
Notes: CfAO (Director), CELT
Design of giant telescopes; astronomical instrumentation; adaptive optics.

Joel Primack
Office: 209 Kerr *Phone:* 459-2580 *Email:* joel@ucolick.org
Notes: UCSC Physics Dept., SCIPP, DEEP
Theoretical cosmology, including: nature and composition of dark matter; galaxy formation and evolution by analytic and semi-analytic methods; N-body and hydrodynamical simulations of structure formation and galaxy interactions.

Jason X. Prochaska *New faculty member, arriving summer 2002*
Office: *Phone:* *Email:* @ucolick.org
Notes:
Observational cosmology and galaxy formation, including: quasar absorption line systems, chemical abundances at high-z and in the Galaxy, missing baryons, high-z galaxy dynamics, star formation. Also: ISM, cosmological simulations, metal-poor stars.

Graeme Smith
Office: 149 Kerr *Phone:* 459-2907 *Email:* graeme@ucolick.org
Notes:
Observational studies of old stellar populations; stellar evolution; Galactic chemical evolution; red giants; comets.

Steve Thorsett
Office: 439A Kerr *Phone:* 459-5170 *Email:* thorsett@ucolick.org
Notes: HETE, GLAST
Observational studies of compact objects, including: pulsar timing, dynamics, & ages; neutron stars; GRBs & GRB afterglows. Also: radio observations & instrumentation; high-precision VLBI; GRB host galaxy observations; high-energy astrophysics.

Steve Vogt
Office: 129 Kerr *Phone:* 459-2151 *Email:* vogt@ucolick.org
Notes: CODEP, CELT
Design and use of high-resolution spectrometers; extrasolar planets; quasar spectra.

Stan Woosley
Office: 433A Kerr *Phone:* 459-2976 *Email:* woosley@ucolick.org
Notes: Department Chair, CODEP, HETE
Theoretical high-energy astrophysics, including supernovae and gamma-ray bursts. Also: stellar evolution, particularly of high-mass stars; hydrodynamics; nucleosynthesis; nuclear astrophysics.

Other researchers

There are other researchers affiliated with the Dept., in positions with various titles, who are valuable resources you should know about. They include:

Julian Christou
Office: 59 Kerr *Phone:* 459-5775 *Email:* christou@ucolick.org
Notes: CfAO
Adaptive optics, especially characterization of PSFs and deconvolution; science with AO.

Rachel Dewey
Office: 415G Kerr *Phone:* 459-3081 *Email:* dewey@ucolick.org
Notes:
Radio pulsars; astronomy education and outreach.

Terry Mast
Office: 229 Kerr *Phone:* 459-3807 *Email:* mast@ucolick.org
Notes: CfAO, CELT
Design of giant telescopes; astronomical instrumentation; adaptive optics and its applications.

Ruth Peterson
Office: 17 Kerr *Phone:* 459-3559 *Email:* peterson@ucolick.org
Notes:
Spectroscopy of stellar populations.

Drew Phillips
Office: 499 Kerr *Phone:* 459-3841 *Email:* phillips@ucolick.org
Notes: CfAO, DEEP, DEIMOS
High-z galaxies and galaxy evolution; instrumentation; adaptive optics.

Scott Severson
Office: 241 Nat. Sci. II *Phone:* 459-5149 *Email:* severson@ucolick.org
Notes:
IR instrumentation, adaptive optics, science with AO.

And of course, like any healthy department we have a large turnover of top-notch postdocs and visitors. There are many, and sometimes graduate students work closely with them; however they're a transient population so it's difficult to list them here.

Astronomers vs. professors?

This is a confusing aspect you shouldn't worry about: Some of our faculty are entirely affiliated with the Astronomy & Astrophysics Department; others are only 20% with the department, and 80% with the U. of California Observatories/Lick Observatory (UCO/Lick). This does affect who teaches more classes (the ones with entirely Dept. appointments), but otherwise this is not a concern for graduate students. In all respects all faculty members are well-integrated in the department, and students may work with whomever they wish.

6 What are all those acronyms?

Members of UCSC Astronomy & Astrophysics are affiliated with large collaborations and other major projects. Here is a brief summary of some of them, along with a few other acronyms you've seen floating around:

• **CfAO**: `http://www.ucolick.org/~cfao/`
Astronomical images taken from ground-based observatories suffer blurring from turbulence in the atmosphere. 'Adaptive optics' is a set of technologies and techniques for correcting these aberrations in real-time, resulting in images as sharp as those taken from space.

The Center for Adaptive Optics is a major NSF-funded center based in Santa Cruz, but with member institutions from other campuses of UC and from across the nation. Jerry Nelson is director of the CfAO; other Center faculty include Sandy Faber, David Koo, and Raja Guhathakurta. In addition, further researchers (Julian Christou, Drew Phillips), a great host of postdocs, and several grad students are affiliated with the Center.

• **CELT**: `http://www.ucolick.org/~celt/`
The University of California and Caltech are exploring the idea of a 30-meter telescope, and have dubbed this project the California Extremely Large Telescope. (If this seems giant to you, note that the Europeans have begun planning OWL — the Overwhelmingly Large telescope — which will have a 100-meter primary!) CELT and the CfAO are somewhat related, because CELT is being designed for AO from the start.

Jerry Nelson and Terry Mast (who were 'instrumental' in the design and construction of the Keck telescopes) are working on this project. Other faculty affiliates include Mike Bolte, Raja Guhathakurta, Joe Miller, and Steve Vogt.

• **CODEP**: `http://natsci.ucsc.edu/codep/`
CODEP is the Center for the Origin, Dynamics, and Evolution of Planets, and that pretty well explains what they're about. Over the next four years, CODEP will coordinate the hiring of seven new faculty members, some in Astronomy & Astrophysics, some in other departments.

CODEP affiliates in the Dept. include Peter Bodenheimer, Doug Lin, Steve Vogt, and Stan Woosley. Astrophysics grads also enjoy the valuable resources of some other CODEP faculty, including Gary Glatzmaier of the Earth Sciences Dept. (who is an expert on magnetohydrodynamics and dynamos) and Erik Asphaug of the Institute of Techtonics (who is an expert on impacts within the solar system and other aspects of planetary science).

• **DEEP**: `http://www.ucolick.org/~deep/`
The Deep Extragalactic Evolutionary Probe, composed of researchers at UCSC in collaboration with researchers at Berkeley, Caltech, U. of Chicago, Hawaii, and Johns Hopkins, is a long-term Keck and HST project. The broad goals of this large-scale survey of distant, faint field galaxies include studying galaxy formation and evolution, the origin of large-scale structure, the nature and role of dark matter, and the overall geometry of the universe. Phase I of DEEP, already under way, involves Keck observations with the current suite of instruments, and HST observations. The next phase of DEEP will employ DEIMOS, a new spectrograph for Keck being constructed at Santa Cruz, and SIRTF, NASA's next great space telescope.

Members of the DEEP team at Santa Cruz include Sandy Faber, Raja Guhathakurta, Garth Illingworth, David Koo, and several postdocs.

• **DEIMOS**: `http://www.ucolick.org/~loen/Deimos/deimos.html`
The Deep Extragalactic Imaging Multi-Object Spectrograph is an impressive Keck instrument being built at Santa Cruz. Sandy Faber is the PI of the project; other Santa Cruz researchers affiliated with DEIMOS include Terry Mast, Garth Illingworth, Drew Phillips, and other DEEP team members.

• **GLAST**: `http://glast.gsfc.nasa.gov`
The Gamma-ray Large Area Space Telescope is a future NASA mission that may launch as early as 2005. It will study high-energy astrophysical phenomena, including but not limited to neutron stars and GRBs.

Steve Thorsett is an interdisciplinary scientist on the GLAST team.

• **HETE**: `http://space.mit.edu/HETE/`
The High Energy Transient Explorer mission recently launched, and the commissioning of its instruments is under way. HETE's goal is to provide precise localizatons of gamma-ray bursts. This will facilitate follow-up observations of the afterglows, and further our understanding of GRBs a great deal.

Stan Woosley and Steve Thorsett are affiliated with the project.

• **HST**: `http://www.stsci.edu/`
Of course, one of the premier instruments of astronomy today is the Hubble Space Telescope. Harland Epps was involved in the optical design of the NICMOS instrument; Sandy Faber is on the WFC team. Garth Illingworth is affiliated with the Advanced Camera, an instrument slated to be installed on HST as a testbed for NGST technologies. Many (if not most) researchers at UCSC work with HST data regularly.

• **NGST**: `http://ngst.gsfc.nasa.gov/`
A high priority in major astronomy funding over the next decade, the proposed Next Generation Space Telescope will be an orbiting 8-meter class telescope. It is intended to pick up where HST leaves off ...

Garth Illingworth has some affiliations with the project.

• **SCIPP**: `http://scipp.ucsc.edu`
The Santa Cruz Institute for Particle Physics, primarily concerned with accerator experiments at SLAC and CERN, is also involved in particle and high-energy astrophysics. Current interests include the Milagro cosmic ray airshower detector and the GLAST mission. In addition, SCIPP supports the work of theoretical cosmology.

Joel Primack, George Blumenthal, and several members of the Physics Dept. faculty are affiliated with SCIPP.

• **UCO/Lick**: `http://www.ucolick.org`
The University of California Observatories/Lick Observatory is an organized research unit of the UC system. Lick Observatory, located atop Mt. Hamilton near San Jose, harbors 3-m and 1-m 'workhorse' telescopes that are extensively used by faculty and graduate students. In addition, UCO/Lick administers the UC portion of access to Keck Observatory atop Mauna Kea, which is shared with CalTech. The twin Keck telescopes (10-m) are the largest in the world, and UCSC researchers make extensive use of this facility.

7 Will I have money?

The Dept. guarantees financial support to its graduate students. Support comes in the form of Teaching Assistantships and the occasional department fellowship, or support for research from an advisor's grant money. (Note that what is called an 'RA' at most institutions is a 'GSR' — Graduate Student Researcher — here.) Of course, you should still apply for your own funding in the form of fellowships and grants (these give you more freedom).

8 OK, that's great, what else do people do?

Q: "What do people do around here?" A: "Everything. This is Santa Cruz."

Like nature? How do surfing, tidepooling, biking, hiking, camping, caving, stargazing, climbing, etc., sound? How about just enjoying a morning or evening walk by the ocean? Several redwood parks and state beaches are right here in Santa Cruz County; the Monterey Bay aquarium is about 45 minutes away; Big Sur is just a half-hour or so beyond that. The UCSC campus has redwood forests, biking and hiking trails, and a breathtaking view of the Monterey Bay, sometimes obstructed by grazing deer.

Like sports? Play basketball with your fellow astronomers a couple times a week. Or join one of the dozen or so local Ultimate Frisbee teams. Work out at the UCSC gym facilities — they face out over the Monterey Bay!

Like *both* nature and sports? Skiing and snowboarding at Lake Tahoe and environs is an easy weekend trip (4-5 hours' drive).

Need assurance that Santa Cruz has the standard amenities? It does. A multiplex theater and several smaller ones. A smaller, art-film house. Several great bookstores within spitting distance of one another, and a Borders, too. Coffeehouses and taquerias around every corner. Street musicians. Teenagers on skateboards.

Like nightlife? Start small. There are bars, dancing, and impressively good live music right here in Santa Cruz. I can easily think of about 20 bars in town that I'm familiar with. (Perhaps I'm bragging, or perhaps I'm ashamed...)

But if your tastes are more ultra-urban, most spots in San Francisco, Berkeley, etc., are easily within 2 hours' drive. (Sometimes quite a lot less — the biggest variable is traffic.) 'Over the hill' the cities of the south Bay (like San Jose) are within 45 minutes.

9 Where will I live?

There is on-campus graduate student housing available. Most astro grads live off campus, in houses relatively downtown. Some of us share housing with each other; others share with grads and real-world people our age.

The campus is easily accessible by bus from virtually anywhere in the Santa Cruz metro area; bus rides are free to students during academic quarters. Biking to campus is entirely possible (several do it), but be warned that the hill is longer than it looks. Parking passes are not prohibitively expensive if you carpool.

Housing in Santa Cruz is very expensive. (If you're thinking the on-campus option is probably cheaper, it isn't.) It's unlikely you'll get to live alone in a spacious apartment. However, it is possible to live alone in a cozy studio, or to find fairly spacious housing shared among a couple/few people. Should you decide to come to Santa Cruz, ask around for advice, because patience and a strategy are the key to success in our housing market.