

# **Faculty Roles in Managing and Operating the University of California Observatories**

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May 2013

## **Summary**

This document describes the current roles and responsibilities of UCO faculty members in running the University of California Observatories, with particular focus on their functions in UCO management and relationships to UCO staff. Faculty carry out ten different functions in running UCO, many of which also involve staff. Staff relations are of two types: supervisory and collaborative. All research scientists and staff heads of work groups have faculty supervisors. Through their roles in setting strategy and policies and direct supervision of research scientists and staff, UCO faculty provide the basic guidance for steering and managing the Observatories.

## **Introduction**

The first section of this document summarizes the current structure of UCO faculty positions and changes in that structure that are expected going forward. The next section describes how the various work groups in UCO are organized. The third section lists and describes the ten separate functions that UCO faculty currently serve in UCO. Finally, for those functions that also involve staff, we describe the role of staff and the nature of the interaction between staff and faculty in carrying out that function. A table lists current UCO faculty at UCSC and describes the staff relationships of each one.

## **UCO faculty: an overview**

UCO faculty are currently located on two campuses, UCSC and UCLA. UCSC is the headquarters of UCO and carries out a broad array of management, planning, reporting, and interfacing functions. UCSC also operates and repairs the telescopes and facilities at the Lick Observatory and designs and builds instrumentation for both Lick and Keck. Presently, UCSC has 13 affiliated UCO faculty holding 11-month Astronomer appointments.

UCO faculty at UCLA are attached to the UCLA Infrared Laboratory. This lab has three affiliated faculty, whose prime role has been designing and building infrared instruments for Keck. UCLA faculty have regular 9-month professorial appointments but receive summer salary from UCO for their services. The UCLA Director also receives a stipend.

Discussions are converging on a new model for UCO faculty going forward. The new model is a 9-month professorial appointment that is augmented with teaching releases and/or summer salary in order to buy service for UCO. This structure would look much like the current UCLA structure in that the 9-month professorial appointment would be provided by the campus and funds for teaching releases and summer salary would be provided by UCO in return for well defined service. A “full-time equivalent” UCO faculty member under the new model would spend 25% of his/her total effort working for UCO, which is the amount of time available for UCO service in the current 11-month appointments. Current 11-month faculty would be allowed to retire with no change in their appointments, but new faculty would be appointed on the 9-month model. New appointments would have terms of 5 years that are renewable on review. UCO faculty in the new model can be located on any campus.

Although the structure of the UCO faculty positions is expected to change, this change should not substantially affect the nature of the work done by UCO faculty, or the amount of time they spend doing it. That is because the Observatory has a fixed roster of jobs that need to get done in order for it to operate, as has been well described in the white paper “What is an Observatory?”, by UCO faculty member Professor Garth Illingworth. Second, the balance of responsibilities between staff and faculty is not expected to shift as a result of the above change the UCO faculty appointments – faculty will have the same roles and responsibilities that they always have had. Hence, the following content of this report should remain true independent of the proposed change to the UCO faculty positions.

## **The organizational structure at UCSC and UCLA**

Before describing the duties of UCO faculty, we first describe the current organizational structure of UCO at UCSC and UCLA. The larger unit, UCSC, is divided into *five work groups*:

- 1) The **faculty group** consists of thirteen Professors with 11-month Astronomer appointments. Their duties are described in the next section.
- 2) **Research scientists** are non-faculty PhD academics charged with the responsibility to initiate, execute, and provide resources for technical and instrumentation programs that benefit the Observatory. Their UCO-funded work is 100% in service to UCO. Their direction and scope is broadly negotiated with the Director, and each has a *faculty supervisor*. However, once general goals are agreed on, they have considerable freedom of action and are expected to exercise creativity, judgment, and initiative in designing and assembling the resources for their programs and carrying them out. With regard to the expectations of initiative and creativity, research scientists strongly resemble faculty. There are currently four research scientists at UCSC.
- 3) **Engineers and technicians at UCSC** comprise a Chief Engineer, mechanical, electrical, and opto-mechanical engineers, software engineers, opticians, and instrument technicians. These are the primary individuals who design instruments, fabricate parts, assemble and test them in the completed instruments, and deliver and commission the instruments to Keck and Lick. They provide technical assistance to faculty in the design and construction of instrumentation and the preparation of instrumentation grant and gift proposals. They are on call to fix problems at Lick Observatory, and they also provide technical advice to Keck Observatory, especially on instruments that were built by UCSC. These individuals at UCSC currently number 17.0 FTE.
- 4) The **Lick Observatory staff consist** of the Deputy Director for Lick Observatory; technicians who maintain and service telescopes and equipment and who carry out instrument changes on the telescopes; telescope operators who operate the Shane 3-m telescope nightly; Support Astronomers who train visiting observers on the use of the telescopes and who maintain the documentation and calibrations for the instruments; a facilities maintenance staff (paid by UCSC); staff to prepare and maintain the lodging facilities for on-site observers; health and safety experts; staff for the visitors programs (such as the *Music of the Spheres* concerts, Summer Visitors Program, tours, gift shop); staff to prepare the *Lick Newsletter* and Lick Observatory website; staff to support fund-raising and outreach efforts such as the *Friends of Lick* group; and a small administrative staff. Because of the breadth of responsibilities and small staff (only 14 FTE), each individual typically carries out multiple functions.
- 5) **Administration and business office staff** consist of the Assistant Director for Administration, the Director’s Executive Assistant, web designer, and the business office staff. Responsibilities are to

support the Director, support Observatory communications with the external world (including the UCO website and official reports), provide financial and HR services, prepare budgets for instrumentation grant and gift proposals, prepare contracts and MOUs, service contractual relationships with outside entities, and advise the Director on policy and legal matters. This staff numbers 13.0 FTE.

The structure of the UCLA Lab is similar to that of UCSC except that it is smaller and lacks an observatory staff. A core staff of 8 engineers and technicians supports three faculty in technical projects. An administrative assistant supports the Director and carries out some business functions, but most business, accounting, and HR functions are provided by the Department of Physics and Astronomy.

### **UCO faculty responsibilities**

Collectively, the UCO faculty at UCSC and UCLA execute the following functions:

- 1) Set overall goals and policies for UCO: Input from internal UCO groups, advisory committees such as the UCO Advisory Committee and the Strategic Planning Committee, and external groups is synthesized by UCO faculty to develop overall directions and strategies for UCO.
- 2) Represent UC O/IR interests within UC and to external astronomical communities: This involves staffing and managing relations with external groups such as the Keck Science Steering Committee, the Keck CARA Board, the Thirty-Meter Telescope Board and Science Advisory Committee, the Office of Research and Graduate Studies at UCOP, Academic Senate committees such as UCORP, and the newly created UCO Board.
- 3) Provide policies, direction, and high-level oversight for staff at UCSC and UCLA (including tasks for faculty): This entails developing work plans that follow from high-level institutional priorities and providing oversight and high-level management through work group staff leaders. Faculty also confer with group leaders to resolve schedule and staffing issues, write staff leader performance evaluations, and advise the Director on salaries and promotions of staff.
- 4) Oversee and manage policies and procedures for ensuring effective access to Keck and Lick by UC observers: This includes running the time-assignment process for UC nights at Keck and Lick, scheduling the telescopes, making sure (through oversight committees at Keck and by direct management at Lick) that the instrumentation and operation of both observatories meets UC needs, and overseeing the creation of data archives and data-reduction pipelines.
- 5) Initiate and execute the construction of astronomical instrumentation for Keck, TMT, and Lick: This involves having faculty act as Principle Investigators for projects, setting the performance requirements for each project, writing the necessary proposals, leading the conceptual design, assembling the necessary funding and other resources, interfacing with vendors, and leading staff in the detailed design, construction, and installation and commissioning at the telescope. Typical projects have budgets of \$1-15 M and involve teams of 10-25 engineers, scientists, and technicians (who may be located at Caltech and Keck as well as at UCSC and UCLA). Future TMT projects will be two-to-three times as large.
- 6) Develop the astronomical technologies of the future, through research, computation, and laboratory experimentation: This work in detail looks much like item (5) but is a separate activity that is crucial to the long-term strategy of keeping UC O/IR astronomy at the cutting edge.

7) Initiate, oversee, prepare, and participate in education, outreach, and communication activities: This involves communicating the work and achievements of UCO to the public, to UC, and to the state of California. Communication channels include the UCO and Lick websites, the UCO annual report, *Lick Newsletter*, and UC reports such as the Portfolio Review Group report and presentations to the UCO Board. UCO faculty support visitor programs at Lick Observatory and partner with educational institutions to improve student learning, teacher training, and public understanding of science. Much of this work can be done by staff, but faculty are needed to provide scientific oversight, initiate programs, raise resources, and act as scientific ambassadors to the public.

8) Initiate, oversee, and participate in fund-raising and development programs for UC O/IR astronomy: This work is similar to the activities in item (7) above, and, like that item, much of this work can be done by staff. However, faculty are needed to develop overall strategies, provide scientific guidance, represent UCO to prospective donors, and convey the exciting science being done at UCO facilities.

9) Support and promote graduate, undergraduate, and postdoctoral teaching and training. The main duty of providing teaching and training students is carried on by regular UC faculty. However, the Observatory supports these faculty by putting its unique facilities at their disposal. It does this by building facilities that are especially designed for teaching and training, such as the remote observing capability on the Nickel 40-inch telescope (heavily used by undergraduate classes on three campuses) and by facilitating student access to the main research telescopes, such as the policy whereby students and postdocs can create their own programs at Lick. The instrument laboratories at UCSC and UCLA are also used for technical training. UCO teaching and training efforts are led primarily by the UCO faculty but also involve collaboration and participation by staff, particularly in the laboratories, where students work side by side with staff under their guidance.

10) Assist the Director for special needs and special projects, such as the recently created building committee that is setting the requirements for a new Instrument Laboratories building at UCSC.

To summarize, the role of UCO faculty in UCO is analogous to the role of the entrepreneurial leaders of a young startup company. The leaders decide on what the product will be, assemble the team needed to develop the technology and produce the product, and are in charge of finding the needed resources to keep the company going. If the company fails, it is their fault. In the same way, UCO faculty formulate the goals and strategy for UCO and manage the staff to accomplish those goals. They have help and feedback from their “customers”, who are their fellow astronomers in the University of California, but getting the job done is their responsibility.

### **Interactions between UCSC faculty and staff**

The interactions of UCO faculty with staff can broadly be grouped into two classes:

**Supervisory roles** occur most directly through function 3), group and individual supervision, in which faculty provide goals, strategy, high-level oversight and management, and evaluation of staff and group performance. Each work group and each research scientist has a faculty supervisor. However, all following categories, to the extent that they involve work by staff, also entail faculty supervision.

**Collaborative interactions** are most visible in category 5), instrument-building, which involves highly collaborative teams functioning as a group of peers, with each person bringing unique skills and judgment. Categories 6), 7), 8), and 9) also feature high levels of faculty-staff collaboration.

The following table summarizes the staff relationships of current UCO faculty at UCSC

<b>Faculty member</b>	<b>Nature of role</b>	<b>Relation to staff</b>
<b>Rebecca Bernstein</b>	Supervisory	As PI of MOBIE spectrograph, supervises Research Scientist Bruce Bigelow, MOBIE's chief engineer.
	Collaborative	As PI of MOBIE, collaborates with MOBIE design team.
	Collaborative	Co-chair of internal UCO strategic planning committee. Plans collaboratively with staff to define elements of new strategic plan.
	Collaborative	Co-chair of UCO Instrument Laboratory building committee. Plans collaboratively with staff to design new labs building.
<b>Jean Brodie</b>	Collaborative	Faculty co-lead (with Koo) for UCO communications, website, Lick Newsletter, Annual Report. Works with staff to prepare articles, gather facts and data for reports, design and manage UCO websites.
<b>Mike Bolte</b>	Supervisory	Supervises Research Scientist Andrew Phillips (who heads the Advanced Astronomical Coatings Laboratory).
	Collaborative	As Coatings Lab faculty supervisor, works with Coating Lab staff to define directions and write grant proposals.
<b>Harland Epps</b>	Collaborative	PI for camera optics fabrication for Keck KCWI spectrograph. Works with camera optics fabrication team to polish lenses and design and procure lens coatings.
<b>Sandra Faber</b>	Supervisory	As UCO Interim Director, supervises all groups and research scientists.
	Supervisory	Direct supervisor for the Administrative and Business Services group.
	Collaborative	Engages with a broad array of staff to set priorities, solve problems, and keep the place running.
<b>Puragra Guhathakurta</b>	Supervisory	None at present. Next year, will supervise 0.25 FTE development staff member.
	Collaborative	Works with staff to arrange UCO development events.
<b>Garth Illingworth</b>	On sabbatical FY13	
<b>David Koo</b>	Supervisory	Faculty co-chair of NICS computer group oversight committee.
	Collaborative	Faculty co-lead (with Brodie) for UCO communications, website, Lick Newsletter, Annual Report. Works with staff to prepare articles, gather facts and data for reports, design and manage UCO websites.
<b>Claire Max</b>	Supervisory	Supervises Research Scientist Don Gavel (Adaptive Optics specialist).
	Supervisory	Faculty supervisor for Moore Adaptive Optics Laboratory.
	Collaborative	PI for Next-Generation Adaptive Optics at Keck Observatory. Worked with UCO Instrument Laboratory staff to design and cost Next-Generation Adaptive Optics system for Keck telescope.
	Collaborative	Faculty lead for several UCO education and outreach programs. Works with Lick Observatory staff to design K-12 teacher training program, collaborate with with Center for Science Education at UCB, and prepare

<b>Xavier Prochaska</b>	Supervisory	Assoc. Director for Lick Observatory; supervises Lick Observatory staff and Deputy Director for Lick Observatory.
	Supervisory	Supervises Research Scientist Brad Holden (databases and data pipelines)
	Collaborative	As Assoc. Director for Lick Observatory, collaborates with Lick staff and UC astronomers to identify future science uses of Lick.
	Collaborative	PI of Deployable Tertiary Mirror for Keck 1 telescope. This is \$1.5 M proposal to NSF to construct a rotatable tertiary mirror that would permit rapid beam-switching between instruments for fast response. Worked with staff to prepare the MRI proposal to NSF.
	Collaborative	Faculty lead for education and outreach programs. Works with Lick Observatory staff to design exhibits and robotic telescope in collaboration with Tech Museum of San Jose.
<b>Constance Rockosi</b>	Supervisory	Assoc. Director for Optical Instrumentation and Advanced Technology; supervises the on-campus staff of UCO Instrument Laboratories at UCSC.
	Collaborative	PI for camera barrel fabrication and assembly for Keck KCWI spectrograph. Works with camera barrel design and fabrication team to fabricate camera barrel parts, mount lenses, and optically test assembled camera.
	Collaborative	Co-chair of internal UCO strategic planning committee. Plans collaboratively with all staff members to determine elements of new strategic plan.
	Collaborative	Co-chair of UCO Instrument Laboratory building committee. Plans collaboratively with staff to design new labs building.
<b>Graeme Smith</b>	Collaborative	As faculty supervisor of time-assignment process and telescope scheduling for Lick and Keck, works with Lick and Keck staffs to establish instrument capabilities and limitations and schedule telescopes accordingly.
	Collaborative	Faculty liaison for <i>Friends of Lick Observatory</i> fund-raising group. Works with Lick staff to plan Friends events and support fund-raising and visitor programs.
<b>Steve Vogt</b>	Collaborative	PI of Automated Planet Finder telescope and spectrograph at Lick Observatory. Works collaboratively with Instrument Laboratory and Lick staffs to install the telescope and spectrograph, fix problems during commissioning, and initiate normal operations.