

MINUTES OF THE UCOAC MEETING
UC Santa Cruz, 19 March 2012

Attending: Mike Bolte (UCO Director; UCSC), Alex Filippenko (UCOAC Chair; UCB), Gabriela Canalizo (UCR), Gary Chanan (UCI), Garth Illingworth (UCSC, via telephone), David Lai (UCSD, via polycom), Lori Lubin (UCD, via polycom), Jerry Nelson (UCSC, via telephone), Xavier Prochaska (UCSC), Mike Rich (UCLA, via polycom), Tommaso Treu (UCSB). Others (not UCOAC members) attending: Alison Coil (UCSD, via polycom), Andrea Ghez (UCLA, via telephone), Maureen McLean (UCSC), Alice Shapley (UCLA, via polycom), Brian Siana (UCR), Paula Towle (UCSC), John Wareham (Lick Observatory, via telephone), various other UCSC researchers for parts of the meeting (e.g., Rebecca Bernstein, Bruce Bigelow, David Cowley, Sandy Faber, David Koo, Mark Krumholz, Connie Rockosi).

Introduction: Alex Filippenko

Alex thanked the UCSC staff for making the meeting arrangements and everyone for attending. UCOAC members should provide updates to their campus colleagues, discuss issues with them, and see if there are any new matters to bring to the attention of Alex and Mike.

UC Santa Cruz Campus Report: Mike Bolte

Gemini Planet Imager (GPI): GPI is the \$20M high-contrast extreme AO imager destined for the Gemini-S telescope. The PI is Bruce Macintosh and the Project Scientist is James Graham. Assembly and integration in the “Highbay” at UCSC have encountered some delays, but are proceeding.

Shane Adaptive Optics (AO): Upgrades to the Shane 3-m AO system, funded with a \$2M NSF MRI grant, are progressing reasonably well. A proposal for additional funds to deploy the new LNL laser will be submitted to the Moore Foundation.

Coatings Lab: Drew Phillips is leading the effort on this project: NSF-funded major upgrades to the coating tank in the UC Santa Cruz labs. Focus has been on completing the tank upgrades and enhanced (extending reflectivity to <350 nm), protected silver-based coatings. They have produced the highest performance, most durable silver-based coatings in the world.

MOBIE: Thanks to a supplemental grant from the Moore Foundation, the MOBIE design has proceeded to the second phase, with anticipated completion of the conceptual design in the second quarter of 2013.

Super-LOTIS: Since 2008, UC astronomers have been making use of Super-LOTIS, the 0.6-m Livermore Optical Transient Imaging System (<http://slotis.kpno.noao.edu/LOTIS>), for both science and classroom projects. We have renewed our participation for another year, at a cost of \$13k. However, there are significant issues with this telescope (no guider, often poor image quality, etc.), and it is substantially smaller than the 1-m Nickel reflector at Lick Observatory, so it is not a viable long-term substitute for the latter.

Jerry Nelson: Jerry is recovering at a good pace after his stroke in late-November, 2011. He has been removed from Intensive Care and is now undergoing rehabilitation. In fact, he felt sufficiently well to join part of the UCOAC meeting via telephone. Go, Jerry – we wish you a full and speedy recovery!

UC-ATF and UCO External Review Committee Reports: Mike Bolte

The UC Astronomy Task Force (ATF), chaired by Geoff Marcy, completed its work in June 2011. Its Prioritized Investment Recommendations for the UCO multi-campus research unit (MRU) are as follows.

(1) ***Ensure the long-term success of UC leadership within the TMT project.*** UC should continue to play a leadership role in the development of TMT's telescope design and instrument suite by investing in the technical expertise and UC laboratories. UC should commit to shifting \$6.5 M/year in 2018 from Keck operations to TMT operations when Caltech is contractually obliged to pick up that portion of Keck operations. This represents UC's contribution to TMT operations for a 15–18% share, leaving UC's share in Keck unchanged.

(2) ***Keep the Keck Observatory at the cutting edge of 10-m class telescopes and maintain UC's current share of the telescopes.*** UC should continue the contractually obliged funding of Keck operations. It should design and construct new instruments and new adaptive optics systems for the Keck Observatory. This requires UC to keep its instrumentation labs strong (at UCSC and UCLA) and to pursue, with its Keck partners, sources of additional funding.

(3) ***Strengthen support for development and construction of instrumentation and adaptive optics.*** UC facilities, instruments, and personnel are vital to UC's leadership in both Keck and TMT and to the success of these observatories. UC should focus system-wide funding on labs capable of building next-generation AO and instrumentation. It should also identify ways to mitigate risk for TMT and advance science at Keck.

(4) ***Continue funding Lick Observatory at current levels, while exploring other funding models.***

A separate recommendation is the creation of a **UC Astronomy and Astrophysics Council**. This new body will improve the UC astronomy and astrophysics (A&A) community's ability to examine, optimize, and advocate for the system-wide investments

that UC makes in this field.

The ATF Report provided useful information to the UCO External Review Committee. It also sets our priorities for UC facilities and activities, to be used in the case of budget reductions and for UCO/A&A strategic planning. However, it's not a simple process, in part because of the "scale problem" (e.g., spending \$50k can have a large impact at Mt. Hamilton and very little impact for the TMT) and the "minority problem" (certain efforts, such as some of those at Mt. Hamilton, are of great interest to a few UC astronomers, and UCO should strive to address their needs).

The report of the UCO External Review Committee was exceptionally positive, highlighting the prominence of UC A&A research on the world scene and UCO's role in enabling UC A&A research. It identified access to Lick and Keck as a key part of the UC A&A success, and it generally endorsed the UC-ATF future vision. While recognizing the challenging budget climate, the report did not recommend any large course corrections. Its main recommendations are as follows.

(1) *The costs of operating Mt. Hamilton need to be carefully evaluated and models for reducing the UC-based costs developed (consistent with the UC-ATF).* Accordingly, as part of the FY13/14 budget exercise UCO explored various options: (a) close the CAT and/or Nickel telescopes; (b) reduce the number of operations days; (c) reduce instrument changes and/or available instruments; and (d) raise non-UC funding. Regarding this last point, there could be more public outreach, a "Friends of Lick Observatory" group has been formed, and we might consider selling telescope time. The action item is to get many stakeholders together in a workshop to make sure we understand the options, costs, benefits, and role of Mt. Hamilton in UC A&A programs and aspirations.

(2) *Form a new governance committee whose members would serve as "trustees and advocates for the UCO program."* It would be appointed by, and report to, the UC Office of the President (UCOP). It would consist of a mixture of senior astronomers, Deans and/or Vice Chancellors of Research, members of the Academic Senate, and outsiders for perspective. The committee would meet once per year, with the main agenda items being discussions of the UCO annual report (which would be submitted to the UCOP) as well as the one-year and five-year plans. It would submit an independent report to the UCOP. The action item is to establish the *process* for chartering and populating this committee, and then to form the committee.

(3) *Strengthen and enhance the UCOAC.* Steps to take include the following: (a) clarify the charter, (b) formalize the membership (define campus representation, 3-year appointment terms, Chair and vice-Chair with rotation), (c) improve coupling to the Keck Science Steering Committee (SSC) and the TMT Science Advisory Committee (SAC), (d) better align meeting content to UC A&A priorities, and (e) establish standing subcommittees for the important areas chaired by UCOAC members (Lick, Keck, TMT). Input from the UCOAC is critical here. There was considerable discussion, and Director Bolte was charged with developing and circulating a draft UCOAC Charter in which the discussion would be captured.

(4) *Undertake a system-wide strategic planning process.* The UC-ATF provides an excellent basis and emphasis: facilities. Also, we must be cognizant of Keck and TMT Strategic Plan activities: the Keck Strategic Plan is developed and maintained by the Keck SSC with strong input from UC, and the TMT Strategic Plan is developed and maintained by the TMT SAC with strong input from UC. UCO should utilize this vision for detailed planning and evolution. The action item here is to define a scope, process, and structure (e.g., ad hoc committee, timetable, role of the UCOAC).

The UC A&A strategic plan will establish a detailed path forward for UC A&A that meets the broad objectives of the ATF report and provides a framework for evolving UCO to meet those objectives. What are the capabilities most needed to achieve the UC astronomy goals? How do we develop those capabilities? What are the capabilities needed to ensure efficient and effective operations and interfaces for UC astronomy? What technical personnel are needed to carry out these plans? What is the role and scale of the UCO faculty? What are the interfaces between the various campuses? What activities can UCO undertake to maximize the effectiveness of the “Power of 10”?

What happens next? There is a standard process following an MRU review: (a) the University Committee on Research Policy (UCORP, a system-wide Academic Senate committee) submits a written response to the Academic Council (AC), as does a system-wide Committee on Budget and Planning; (b) additional input is requested from the Executive Vice Chancellors and from UCO; and (c) the Academic Council submits a written response to Provost Larry Pitts. This particular case has been the subject of much more discussion and “back and forth” than seems required for such a positive review. There have been many discussions with UCORP/AC representatives, and a large effort was required to address numerous misrepresentations in the UCORP written response.

There was substantial discussion of all the above issues by the UCOAC members.

Lick Observatory Report: Mike Bolte

APF (Automatic Planet Finder) Update: The initial radial velocity precision (with no optimization or temperature stabilization) was 8 m/s. Various problems with the telescope and dome continue to hamper progress, but there has been a steady string of additional tests and adjustments. This is a significant effort from the Santa Cruz campus with Steve Vogt fully engaged, and regular contributions from the engineering and technical staff at UC Santa Cruz. We need to establish some agreements about operations, and some operations funding must be identified.

Friends of Lick Observatory: Bob and Michelle Kibrick have done much of the work to get a “Friends of Lick Observatory” (FoLO) program underway. The goals would be to help raise money, build a political base, and do a better job of public outreach. There are structures and rules for Friends organizations in UC; a Charter for FoLO was approved in February. These are to be stand-alone organizations, but UCO will provide some staffing

and accounting support as the programs takes off. This is a good opportunity to engage other campuses.

Lick Observatory Future Planning: As already noted above, stakeholders should meet to discuss the options, costs, benefits, and role of Mt. Hamilton in UC A&A programs and aspirations. A workshop will be held this summer. There will be discussions with potential partners, and partnership parameters will be established.

Keck Observatory Report: Mike Bolte

MOSFIRE: This is a 0.97–2.45 micron camera and multi-object spectrograph for the Keck Observatory (PI: Ian McLean, UCLA). First light will be on April 4, 2012 (and post-meeting reports indicate it was a smashing success). There are 10 commissioning nights in Semester 2012A, and shared-risk scheduling in 2012B (with backup HIRES or AO programs on the schedule).

Keck Cosmic Web Imager (KCWI): KCWI (PI: Chris Martin, Caltech) is an integral field spectrograph for Keck II at the Nasmyth mount, covering 0.35 to 1.0 μm and having considerable flexibility (field of view from 8" to 30" \times 20"; selectable gratings $R \approx 1,000$ to 20,000). It is optimized for very low surface brightness targets and faint emission features, with high sensitivity (throughput $> 25\%$) and precise sky subtraction. UCSC is responsible for the cameras (PI: Connie Rockosi). The project has received \$2.4M from TSIP so far. The decision on a 2012 TSIP proposal for \$2.9M has been delayed. Even if successful, it will come up about \$1M short for the blue-side only option. KCWI is an excellent target for potential private funding.

Keck I Deployable Tertiary: One clever idea for enabling Target of Opportunity (ToO) or cadence observing is to replace the Keck I tertiary with a deployable system. Seed money was requested and granted by the Keck Observatory for working out more detailed feasibility and cost estimates (PI: Xavier Prochaska, UCSC); as a result, a 2012 UCSC NSF MRI slot was allocated to this project. It is a big job to prepare these (and other) proposals, necessitating input from the PI, engineers, the UCO business office, and the Keck Observatory staff. The UCSC Vice Chancellor for Research added matching funds. Leading and preparing proposals for Keck instruments are very important roles for UCO and UCO faculty.

Other Keck Projects at the Feasibility Stage: DEIMOS focal plane upgrade (PI: Connie Rockosi, UCSC), SHREK, NIRSPEC detector upgrade (PI: Ian McLean, UCLA).

Keck Segment Microfractures: The axial pads (which were part of the warping harness system) and the radial pads show microfractures at the insert coupling to the zerodur glass. The problem is understood, and solutions are nearly developed but expensive to implement (\$6–11M over the next 5 years).

Keck Lasers: The Keck-1 laser is working, but not yet always up to specifications. The OSIRIS move from Keck-2 has been completed. May 29 is the first scheduled night with the laser. The W. M. Keck Observatory (WMKO) received a \$2M gift from the Moore Foundation for a new Keck-2 laser (TOPTICA), and an invitation from the Keck Foundation to submit a \$1.5M proposal. A total of \$4M is needed for the new laser plus full installation.

NSF Portfolio Review: Of probable relevance to Keck (and the TMT), the NSF response to projected budgets and Astro2010 decadal report aspirations was to set up a “portfolio review”: http://www.nsf.gov/mps/ast/ast_portfolio_review.jsp#link3. Daniel Eisenstein (Harvard) and Joseph Miller (UCSC) are the Chair and Vice Chair (respectively) of the Portfolio Review Committee. Committee activities began in late September 2011, and a report will be completed by the end of June 2012. The time frame is planned so the Review recommendations may be considered in the budget process for FY2014.

The committee was asked to construct its recommendations in a two-stage process: (1) determine the critical capabilities needed to make progress on the science program articulated in Chapter 2 of Astro2010; and (2) determine what combination of new facilities and programs plus existing (but evolved) facilities and programs will best deliver those capabilities within strict budgetary constraints.

Recommendations will be made in the context of the full domestic and international astronomical landscape, taking into account the effects on current and potential partnerships and on the status of the profession. The review will *not* reopen the debate on the content or the relative prioritization of the Astro2010 recommendations.

WMKO submitted a white paper, as did ACCORD and UCO.

The Future of the Telescope System Instrumentation Program (TSIP): The President’s FY12 budget had zero dollars for TSIP. Bolte, Keck Director Taft Armandroff, and Caltech Optical Observatories Director Shri Kulkarni have been in conversation with the NSF about a possible successor program. This will be folded into the NSF AST Portfolio Review.

Keck Observatory Time Exchanges: For many years, UC and Caltech have been exchanging a total of 24 nights/year through a combination of TSIP and NASA. This, combined with NSF MRI/ATI and philanthropy, is the source of new capabilities at Keck starting with OSIRIS. UC astronomers are eligible to use TSIP and NASA exchange time.

If TSIP is discontinued, we will need to find another way to obtain funding. NSF is the preferred partner, as long as we have the opportunity to compete for time. Other options include TMT partners and various universities (Caltech has been selling time to Yale and Swinburne University, for example). Funds are badly needed to maintain even a modest development program and to fix the segment microfractures described above.

Keck Laser Guide Star Adaptive Optics: Keck has long been the clear leader in adaptive optics (AO) and laser guide star AO (LGSAO) science. But Next Generation AO (NGAO) is expensive and has been difficult to fund. Thus, piecewise improvements are the current path forward: wavefront sensor (Keck Foundation), center-launch laser, higher power laser, infrared tip-tilt, point-spread function reconstruction, the Keck-1 laser, and better algorithms.

Where are we headed? To some people, the mantra had been “All AO, all the time,” but this will probably not be the case. We have been demand limited at about 45 nights per semester. However, we need to consider the unknown effects on time demand when we have better AO performance, improved OSIRIS sensitivity, and the eventual loss of the Hubble Space Telescope. On the other hand, AO is expensive compared to other instrumentation. NGAO is estimated to cost \$50M, and attempts to secure private funding have not yet gone far. An NSF mid-scale proposal combined with private support remains a reasonable path, but this has probably been stretched out to 2013/14 for a possible NSF start. The Gordon and Betty Moore Foundation and the Keck Foundation have each expressed an interest in supporting AO at the Keck Observatory. An alliance of these two foundations in this area may provide a key addition to our funding model for major future AO upgrades and innovation at the Keck Observatory.

Is there a clear UC consensus on how much time and money should be spent on improvements to Keck AO? It was agreed that we need a UC subcommittee on AO; Andrea Ghez will be the Chair, and Claire Max will be the UCOAC representative.

Keck Instrumentation Updates: There is an annual report on Keck instruments (performance, known problems, ongoing tasks) from the WMKO instrument scientists. This information is of wide interest, but how do we distribute it better? Perhaps all Keck PIs should get an email message alerting them to the relevant web pages. Bolte will suggest this to the Keck SSC.

January Keck Summit Visit: Senior Vice President Nathan Brostrom, UCSC Chancellor George Blumenthal, and UCI Chancellor Michael Drake visited the Keck telescopes in January and were very impressed. VP Brostrom is now a member of the CARA Board and has been on the TMT Board for the past year.

UCOAC Input to the Keck SSC: As far as possible, UCOAC meetings should precede Keck SSC meetings, and the UCOAC input should be given to the Keck SSC members. The UCO Director could summarize the input verbally, or (better) through a brief written summary. The latter could be drafted by the UCOAC Chair and edited by the UCO Director ahead of each Keck SSC meeting.

TMT Update: Mike Bolte

NSF Call for Proposals: A Giant Segmented Mirror Telescope (GSMT) federal partner evaluation was required by law in 2011, and the NSF Call for Proposals came out on

December 30, 2011. The scope was limited: \$1.25M over five years with the goal of engaging the broad US A&A community in TMT planning. Part 1 is 15 pages describing this engagement; Part 2 is a description of the project (about 250 pages, including the science case about which Garth Illingworth contacted UCOAC members). Proposals are due on April 15. There will be an unusually quick decision process, with the result announced by the end of June 2012. Perhaps surprisingly, the Giant Magellan Telescope collaboration decided not to submit a proposal.

TMT Activities: Additional funding was secured from the Moore Foundation (against the overall pledge), to be used to keep the instrumentation programs going. The international partner Memorandum of Understanding discussions are making good progress, and the workshare matrix is in pretty good shape. The project is on increasingly firm ground everywhere, although NSF may still be a key.

Technical Progress: Technical progress continues: (a) a China Export license was granted; (b) the telescope structure design completion and construction is being evaluated by Mitsubishi; (c) the sensors/actuators will be built in India; (d) there is good progress on segments at Tinsley and Canon; (e) the M2 redesign is underway; and (f) China will develop the laser guide star facility for AO.

TMT Operations: A year-long effort to develop an operations model and cost it led to a review in June 2011. There was an excellent panel during a 3-day meeting that led to a few small changes, and additions to staffing. The resulting plan and costs were adopted by the TMT Board at their November 2011 meeting. Operations will cost \$27M/year in 2010 dollars. An additional \$12M/year for new instrumentation will be part of the partner commitments.

Hawaii Permit Status: There was a Board of Land and Natural Resources (BLNR) hearing on February 25, 2011, and the TMT permit was granted. However, a “Contested case” was also granted and was held over six long days in September. On May 11, 2012, the BLNR will consider the outcome of the Contested Case Hearings. The Asian Pacific Economic Cooperation 2011 meeting was held in Honolulu. This was a high-profile event for Pacific Rim endeavors like the TMT. TMT had a booth at the exhibit hall. UC President Mark Yudof attended the meeting and the Governor of Hawaii hosted a well-received event for the TMT.

UCOAC Input to the TMT SAC: UCOAC input on TMT science issues should be given to the TMT SAC members. The UCO Director could summarize the input verbally, or (better) through a brief written summary. The latter could be drafted by the UCOAC Chair and edited by the UCO Director before each TMT SAC meeting.

The open meeting was adjourned at 4:30 pm, and an Executive Session was held.

These minutes were provided by UCOAC Chair Alex Filippenko.