MINUTES OF THE UCOAC MEETING
UC Santa Cruz, 17 July 2012

Attending: Mike Bolte (UCO Director; UCSC), Alex Filippenko (UCOAC Chair; UCB), Bob Becker (UCD, via telephone), Gary Chanan (UCI), Geoff Marcy (UCB), Claire Max (UCSC), Ben Mazin (UCSB), Ian McLean (UCLA), Brian Siana (UCR), David Tytler (UCSD). Others (not UCOAC members) attending: Sandy Faber (UCSC, via telephone), Andrea Ghez (UCLA, via telephone), Maureen McLean (UCSC), Paula Towle (UCSC), John Wareham (Lick Observatory), various other UCSC researchers for parts of the meeting (e.g., Rebecca Bernstein, Bruce Bigelow, David Cowley, Raja Guhathakurta, Bob Kibrick).

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 Sandy Faber, the Interim Director of the University of California Observatories (UCO). Executive Sessions will occupy a significant fraction of time today.

Changing of the Guard: Mike Bolte

Directorship: Mike Bolte is stepping down on July 31 2012. Starting August 1, Sandy Faber will become the Interim Director of UCO. Bolte will stay on as UC member of the TMT Board (along with Henry Yang and Nathan Brostrom). The intention is for a search for a new Director to start in the Fall. The process will be the same as last time. Filippenko requested that the names of the short-list candidates be given to the UCOAC.

There will be a celebration (by invitation) in Mike's honor on October 2, 4−6 pm, at the UCSC Chancellor's house.

UC Observatories Advisory Board: Both the UC Astronomy Task Force (UC-ATF) and the External Review Committee (ERC) recommended that a UCO Advisory Board be formed. This was discussed at the last UCOAC meeting. The draft from the UCOP Office of Research and Graduate Studies (ORGS) did not follow the advice or spirit of the review recommendations. Input from UCO to make the charge more consistent with that of similar boards that oversee STScI, Gemini, and NOAO was not incorporated by the ORGS.

UCOAC: This will be the last meeting of the current UCOAC. A new UCOAC charter was discussed at our March meeting. A draft has been circulated and will be the basis of the new UCOAC. Bolte thanks everyone for their assistance over the years.

UCO Strategic Planning: Mike Bolte

Here are some thoughts on strategic planning for UCO. This should be considered a draft; nothing has been set in stone yet.

Priorities: The broad UC astronomy priorities were established in 2011 by the UC-ATF and endorsed by the ERC. Equally ranked at the top were maintaining UC leadership in TMT, maintaining UC access to Keck and keeping that facility at the forefront, followed by instrumentation (closely tied to keeping Keck at the forefront), and then Lick Observatory on Mt. Hamilton.

The ERC had quite clear recommendations on strategic planning for UCO; excerpts from their report include the following. (1) It is prudent for UCO and UC to consider carefully the long-term obligations that entry into the TMT project will entail, and the likely impacts it will have on infrastructure and staffing of UCO. (2) The long-term future of Lick should be critically examined as part of a strategic planning exercise. (3) They did not fully examine the rationale for maintaining the current number (12) of "80/20" positions, but are concerned that eventually the cost of maintaining this level of staffing will compete with other UCO priorities; this issue should be addressed as part of their recommended strategic planning process, in the context of future needs in the TMT+Keck era.

Objectives: (1) UC systemwide astronomy and UCO need to develop a strategic plan to ensure that they focus on the future and retain their world-wide leadership. (2) The Strategic Planning Committee (SPC) should provide a realistic and achievable resource-based long-term plan. (3) The emphasis will be on optimal uses for "shared" resources (facilities operated for UC astronomers systemwide). (4) We need to get the best "bang for the buck" – identify areas where UC astronomy can leverage advances in the field consistent with UC's strengths and investments in facilities. (5) The strategic plan should be consistent with UC-ATF/ERC priorities, but should also be receptive to consideration of other opportunities for enhancing the leading role of UC astronomy. (6) In times of budget pressure it is particularly important to have a real vision for what UCO will become in 5 to 10 years. (7) Budget issues require that this task be done expeditiously. (8) The main plan should be for 5 years, but also with consideration of capabilities needed in the TMT era (10-year horizon). (9) The plan should establish a set of goals and desired outcomes, with appropriate actions and timescales for action. (10) The plan should be realistic regarding resources – the needed personnel, facilities, and support. (11) The plan should utilize realistic cost estimates, with considerable contingency, since detailed cost estimates are impractical to obtain on short timescales for conceptual instruments, facilities, and software. (12) The plan should consider the scientific and technical staff skills/experience needed to carry out its objectives.

Process: (1) Establish an ad-hoc SPC of UC astronomers from all campuses and UCO to develop the strategic plan for UCO. (2) Develop the charge and membership, and iterate in discussions with the UCOAC. (3) The SPC should consult widely within the UC astronomy community. (4) There should be regional meetings (north and south) and

topical workshops (Mt Hamilton, Keck, TMT). (5) The SPC should consult with the Keck SSC and the TMT SAC co-chairs. (6) The SPC should consult with administrators at UCOP with interest in and experience with UC astronomy program. (7) The SPC should be provided with support through the UCO Director's office to enable it to carry out its task and to be provided with timely information about UCO.

Committee Membership: (1) About 12 members from UC astronomy – at least one from each campus and one from the two national labs (LLNL, LBNL). (2) Representation from scientists with experience with major projects, and where possible, management and organization/operation of facilities. (3) Members from UCO to provide knowledge and experience of current operating facilities and laboratories. (4) Members appointed by the UCO Director in consultation with the UCOAC. (5) Chair and vice-chair structure. (6) Chair to be selected by the UCO Director in consultation with the UCOAC.

Preparatory Work: (1) The SPC will move forward efficiently and expeditiously if it is provided with input from UCO regarding current plans, tasks, and typical effort required for facility support and for instrumentation projects. (2) To assist the SPC a group within UCO (the UCO SPC-Planning group) should prepare such material, including the likely effort needed on future capabilities. (3) The UCO SPC-Planning group should also develop certain scenarios with broad estimates of effort required. (4) Some members of the UCO SPC-Planning group should be part of the SPC to enable a close working relationship between the SPC and its UCO support group. (5) The UCO SPC-Planning group will provide the SPC information about the resources and timescales needed for different options to help the SPC provide a realistic and achievable resource-based long-term plan.

Committee Timescale, Reporting, and Implementation: (1) The report is expected to take about 6 months to develop. (2) The report is to be submitted to the UCO Director by February 15, 2013. (3) The report is to be transmitted to the UCOAC and to the UCO Board for review and advice. (4) Detailed resource and manpower-loaded implementation plans based on the SPC's recommendations will be developed at UCO and discussed with the UCOAC and with the UCO Board, and, for areas with overlap with Keck and TMT, with the SSC and SAC and their respective Boards.

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. Formal acceptance testing will start in September. Everything is in place and tested. The MEMS lost one actuator (4096) and new Lyot masks were required. Have reached the contrast goal of $>10^6$ in the lab. The current schedule has the pre-ship review in mid-March 2013.

Shane Adaptive Optics (AO): Upgrades to the Shane 3-m AO system, funded with a $2M NSF MRI grant; PIs Constance Rockosi, Claire Max, and Don Gavel. There is good

progress on all design fronts, and the first drawings are being released to the shops. There was a good external review on April 26. A Moore Foundation grant of $385k was awarded to implement the Livermore fiber laser. Detector and mechanism upgrades to IRCAL are proceeding.

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. The tank refurbishment has been completed, for enhanced (extending reflectivity to <350 nm), protected, silver-based coatings. They have produced the highest performance, most durable silver-based coatings in the world. There is little damage apparent in a 4-year fully exposed test used in the photovoltaic industry.

Retirements: Terry Mast, Bob Kibrick, and Jeff Lewis all retired on June 28, 2012. We thank them for their many years of devoted service.

Systemwide Astronomy & Astrophysics Awards: Andrea Ghez received the Crafoord Prize; David Jewitt was honored with both the Shaw Prize and the Kavli Prize; Sandy Faber received both the AAS Russell Prize and the ASP Bruce Medal; and Jerry Nelson was awarded the Franklin Medal in Electrical Engineering.

Lick Observatory News: Mike Bolte

Lick Observing Policies and Web Updates (Filippenko): Filippenko brought up three issues. (1) Several years ago, the UCOAC decided that well-trained undergraduate students are allowed to observe with the Shane 3-m telescope, with the approval of their faculty supervisor. Currently, there is a statement to the contrary on the observing policy web page (http://www.ucolick.org/lickobs/undergrad.html); this should be updated. (2) UC researchers with job titles such as "specialist" should be allowed to observe with the 3-m Shane telescope, if properly trained and with faculty approval. They should also be allowed to apply as PIs for Nickel proposals. Prochaska said that Filippenko should draft a proposed policy, and it will be discussed at a future UCOAC meeting. (3) Postdocs who will be starting their UC appointments during an upcoming observing semester should be allowed to apply for time in that semester, unless their arrival date is likely to be near the end of the semester. The UCOAC agreed, and a note to this effect will be posted on the observing policy web page.

Recent Education and Public Outreach (E/PO) at Lick Observatory: Lick Observatory has recently had several successful public-outreach events. There were good crowds for the partial solar eclipse on May 20 and for the transit of Venus on June 5. The Music of the Spheres and Summer Visitor Program evenings were sold out this summer.

The third issue of the Lick Observatory Observer newsletter has been completed; see http://etc.ucolick.org/web_s2n/kast online. Jean Brodie is the new editor.

E/PO Planning at Lick Observatory: X. Prochaska provided a report to Bolte on

education and public outreach (E/PO) at Lick Observatory. There is a new partnership with the Center for Science Education (CSE). It was initiated with a full-day, in-person strategic planning workshop, with a staff of about 13 persons at the UC Berkeley Space Sciences Lab (SSL). There is a formal Memorandum of Understanding (MOU) designating terms of the partnership.

The Mission and Vision Statements were distributed to the UCOAC last week, and the UCOAC gave the Associate Director its blessing. Filippenko suggested that "Mysteries" should be used instead of "Secrets" in both cases, and that either lower case or upper case be used consistently.

There is a NASA/HST E/PO Solicitation that connects Hubble Space Telescope science (gas and galaxies) with Lick activities. We will aim for $60k directed toward Teacher Workshops at Lick Observatory. The proposal will be directed and developed by CSE in coordination with UCO.

An MOU is being developed to formalize a partnership with the Tech Museum of San Jose. Regarding other non-UC participation: a "letter of support" has been signed for an NSF/CAREER grant out of Cal Poly. There are other parties interested in developing E/PO projects at Lick (e.g., SJSU). The UCOAC decided that a few of these would be explored on a trial basis before committing to more.

Friends of Lick Observatory: A new group of supporters, Friends of Lick Observatory (FoLO), has been formed. Its primary goals are to raise money through public donations, build a political base for Lick Observatory (LO), and do a better job of public outreach. A Board of Directors has been established; Alex Filippenko is its President. Membership structure has been determined, with several different levels of support and corresponding benefits. A website has been developed (http://www.ucolick.org/public/friends/), and contributions and memberships have started coming in; as of July 10, there are 63 members and a total of $8000 in contributions (which is approaching the break-even point). There will be a BBQ picnic at Lick Observatory on September 15, with several prominent speakers (Filippenko, Geoff Marcy, Sandy Faber, and Tim Ferris), music, and viewing through telescopes. UCOAC members are encouraged to join FoLO, and they should spread the word to their colleagues.

APF (Automatic Planet Finder) Status: Various problems with the telescope and dome continue to hamper progress: there are telescope oscillations at some locations in the sky, an inability to home has recently developed, and the dome does not keep up with the telescope at full slow during cold weather.

However, with spectrometer adjustments, the slit images now look good, and the point-spread function (PSF) is under 3 pixels FWHM. The PSF looks excellent across the entire format. With a 0.5" slit, the average sigma of the Gaussian PSF in the iodine region is about 0.9 pixels (resolution $R \approx 116{,}000$). Unfinished issues involve implementation and tuning of the temperature control of the enclosure; we are in the process of obtaining

good focus vs. temperature calibrations. In June/July, data were being obtained to establish the precision limits, but then the latest telescope problems halted observations.

Getting the APF to work properly should be a top priority for Mt. Hamilton. EOST has gone out of the telescope business, transferred warranty responsibility to EOS Australia. A request has been made for a "tiger" team for servo tuning, and access to proprietary software and board schematics. Also we need to establish some agreements about operations, and some operations funding must be identified.

Upcoming Lick Observatory Activities: An LO Workshop will occur on Sep. 13 and 14, at the SETI Institute in Mountain View, CA. All UC astronomers interested in LO are encouraged to attend. One major goal is to find ways to run the telescopes on Mt. Hamilton in a more cost-effective manner. For example, should we charge UC users for specialized services? Should we consider straight sales of telescope time? If so, at what rates, and what should be the maximum fraction of the available time?

The FoLO "Picnic with the Stars" will be on Saturday evening, Sep. 15. Any and all astronomers are invited to attend, as is the general public. Tickets are $60 per person.

There will be a workshop for graduate students November 1−5; the sign-up deadline is October 7. These have been quite successful in the past.

An on-line exposure-time calculator (ETC) for the Kast spectrograph is now available (http://etc.ucolick.org/web_s2n/kast), and we expect modules for the imagers soon.

The Lick Archive goes public on August 1, following the UCOAC approved policies. This archive should be mentioned in new NSF proposals and in annual progress reports.

Keck Observatory Report: Mike Bolte

Keck Usage Statistics: Over the time period 2008–2012 UCSC has been the single biggest user, followed closely by UCB and UCLA. When normalized by department size, all of the UC campuses are roughly comparable, though there are wide variations among semesters.

Status of Federal Proposals, 2012−2013: (a) ATI PSF reconstruction was funded at $650k. (b) KCWI-B TSIP was funded at $2.9M. (c) K1DM3 MRI (UCSC) was not funded. (d) ATI Polarimeter NIRC2 was not funded.

Keck Cosmic Web Imager (KCWI): KCWI (PI: Chris Martin, Caltech) is an integral field spectrograph for Keck-2. UCSC is responsible for the cameras (PI: Connie Rockosi) and optical design (Harland Epps). The project has received $2.4M from TSIP so far. A 2012 TSIP proposal for $2.9M to build the blue side was successful; however, there is still a $1.1M shortfall for the blue-side-only option. A 2012 MRI proposal for KCWI-Red submitted through the W. M. Keck Observatory (WMKO) was not funded.

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; unfortunately, it was not funded, despite very positive reviews.

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

Keck Segment Microfractures: The axial pads and the radial pads show microfractures at the insert coupling to the zerodur glass. A solution for the axial pad (but not for the radial pad) problem has been developed. The choice between an in-house vs. external fix has not yet been made; either one is expensive.

Telescope Control System (TCS): The Keck TCS is 20 years old, so there are substantial maintenance and performance issues. There has been an under-resourced effort to design and prototype a new system. With the laser and MOSFIRE projects ramping down, this effort will now have a higher priority. There are discussions with Hilton Lewis about how to involve UCO in this and other pressing infrastructure needs.

Keck Lasers: The Keck-1 laser is working, but not yet fully optimized (beam quality). The OSIRIS move from Keck-2 to Keck-1 has been completed. May 29 was the first scheduled night with the laser, and 8 shared-risk nights in June went well. WMKO received a $2M gift from the Moore Foundation for a new Keck-2 laser (TOPTICA), along with a $1.5M match from the Keck Foundation. A total of $4M is needed for the new laser plus full installation, so we are still short $0.5M.

Keck Laser Guide Star Adaptive Optics (LGSAO): We need to have a thoughtful discussion about the future of Keck AO. Should we have two LGSAO systems? The costs are high, and easy to quantify and highlight. We should better understand the benefits in the context of the astronomical landscape of the next ten years.

Keck has long been the clear leader in AO and LGSAO science. But Next Generation AO (NGAO) is expensive and difficult to fund. Thus, piecewise improvements are the current path forward: wavefront sensor (Keck Foundation), center-launch laser, higher power laser, infrared tip-tilt, PSF reconstruction, the Keck-1 laser, and better algorithms.

Where are we headed? 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. Others who want to get involved should contact Ghez and X. Prochaska.

Keck Science Meetings: The 2012 Keck Science meeting will be Sep. 20−21 at UC San Diego; registration is open (http://ksm2012.ucsd.edu/). We thank Adam Burgasser and Alison Coil for taking the UC lead in organizing this year's meeting.

The 2013 Keck Science meeting will be special, because 2013 is the 20th anniversary of the commencement of Keck-1 science operations. This will be a big event with many activities: the science meeting, an open house at Keck, a Keck gala, guest speakers, tours, and stargazing. It is an opportunity to celebrate the great success of WMKO in advancing world science. Details still need to be planned, and we should coordinate the effort between UC, Caltech, and Keck. The science meeting itself is being organized by Andrea Ghez and David Koo (UC), Judy Cohen and John Johnson (Caltech), Chas Beichman (NASA), Taft Armandroff and Debbie Goodwin (WMKO), and Guenther Hasinger (UH). Ex-officio members are the Directors of UCO and the Caltech Optical Observatories.

UCOAC members expressed some reservations about holding the event in mid-March, as currently scheduled, because many faculty will be unable to attend due to teaching duties. Bolte will inquire whether the event could be postponed to summer 2013.

Keck Observatory Advancement (Development): The Evenings with Astronomers series attendance now exceeds 700 per year. The advancement effort continues to be a net funding generator, and it continues to make many friends for Keck in CA and HI.

NSF Portfolio Review: Setting up an extensive "portfolio review" was NSF's response (http://www.nsf.gov/mps/ast/ast_portfolio_review.jsp#link3) to projected budgets and Astro2010 decadal report aspirations. WMKO submitted a white paper, as did ACCORD and UCO. The report has been delayed from June to August 2012.

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 and to define a potential role for the NSF. TMT submitted a proposal, but the Giant Magellan Telescope collaboration

chose not to. If selected, the TMT becomes the US federal government GSMT partner; NSF and other federal entities would then be able to talk to the TMT partners. A decision is required by July 31, 2012.

The TMT proposal was entitled "Planning a U.S. Partnership in the Thirty-Meter Telescope"; it was submitted on April 16, 2012, and a copy was provided to all partners. The NSF review panel, organized by Don Terndrup (NSF), met May 29–31; questions were submitted to TMT with responses prepared within 24 hours. On May 30 there was a discussion of partnership, governance, data-products quality, programmatic risks, and observing shares. Questions and responses were discussed with the Proposal Development Team (PDT) in a telecon.

The TMT NSF Reverse Site Visit was on June 19; questions were received a week before, and the PDT was consulted on June 14. Mike Bolte, Gary Sanders, Tom Soifer, Ed Stone, and Henry Yang traveled to NSF for the meeting, while Nathan Brostrom and Dave Goodman were on the phone. There was good NSF participation, including AST Division Director Jim Ulvestad, Assistant General Counsel Blanco, and Tony Gibson from Legislative Affairs. Many details of the proposal and project were clarified.

The meeting was quite positive. (1) NSF/AST would like to be part of an extremely large telescope (ELT) project. How to best accomplish this will be developed during the award period. (2) External reviewers and NSF AST program officers were optimistic about the technical and management readiness to proceed. (3) NSF was positive about fostering the start of construction by the current partnership; but was clear that entering into a collaborative agreement with TMT did not commit the NSF to construction of operations funding in the future. (4) NSF representatives would serve as members of the Collaborative Board. (5) The principle of a "premium" factor for early contributions was acceptable to NSF.

What happens next? We expect a very quiet period from now until the decision is released. Terndrup's committee will write a recommendation to either accept or decline our proposal; it will include detailed advice that may lead to a Cooperative Agreement. Ulvestad (Source Selection Official) will consider the committee report and make a decision. Internal consultation will take place within NSF, and discussions with the Executive Branch and relevant Congressional staff are likely by July 31. TMT will be informed of the decision after internal consultation, and we will be given the report of the External Review Panel. A final decision will probably occur in the July 31 – August 19 timeframe (Terndrup returns to Ohio State University on August 19).

If TMT is selected, a cooperative agreement will be developed with discussion between NSF and TMT. The normal timetable would have the agreement completed by January 1, 2013. If this can be advanced to October 1, NSF participation in the October 2012 Board meeting might be possible.

Hawaii Permit Status: The "Contested case" hearing report for the Hawaii permit is still pending. The Governor, Senators, and various state officials regularly express public

support for the TMT by name. There has been a definite improvement in the public perception of astronomy at Mauna Kea.

Partnership Building Activities: In the next year there will be Science Advisory Committee (SAC) meetings in China and India, and Board meetings in Japan, India, China, and Canada. All partner countries are now engaged with funding agencies and ministries. An Indian joint announcement with Secretary Hillary Clinton about joint trade and science-project collaborations, including a paragraph about TMT, is quite important.

Major Activities for the Next 9 Months: (1) Finish the partnership Memorandum of Understanding (MOU) and prepare legal agreements. (2) Support partner funding proposal processes. (3) Continue to qualify work around the world. (4) Establish the *value* of every in-kind contribution to the project. (5) The "world market" cost will be established via additional contracts and an extensive review process. (6) Each partner will need to sign up to a work-package value defined in the next TMT cost review. The current cost estimate (NSF Baseline Plan) is $1,187M; it has been slowly creeping up.

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

These minutes were provided by UCOAC Chair Alex Filippenko.