UNIVERSITY OF CALIFORNIA

Steven W. Cheung
Chair, Assembly of the Academic Senate
Faculty Representative, UC Board of Regents

Academic Senate

Office of the President
1111 Franklin Street
Oakland, CA 94607

senate.universityofcalifornia.edu

June 9, 2025

Theresa Maldonado
Vice President, Research and Innovation

Re: Five-Year Review of the UC Observatories

Dear Vice President Maldonado,

At its May 28, 2025 meeting, the Academic Council approved the attached five-year review of the UC Observatories (UCO) Multicampus Research Unit (MRU). Following procedures outlined in the Compendium, the review was performed by a joint Senate review committee led by the University Committee on Research Policy (UCORP), with input from the University Committee on Planning and Budget (UCPB) and the Coordinating Committee on Graduate Affairs (CCGA). We request that you forward the attached report to the UCO director.

The review committee found that UCO is a vital systemwide asset that makes major contributions to research, graduate training, and public engagement. It supports cutting-edge instrumentation, fosters innovation and international partnerships, and plays a key role in outreach, helping to bridge science and society. The committee strongly recommends renewing the UCO and emphasizes the importance of continued UC financial support. It also recommends that UCO strengthen disaster preparedness, enhance DEI efforts in leadership and staffing, and address funding challenges, particularly those related to UCSC's structural deficit and evolving federal priorities.

The Academic Council appreciates the significant time and effort the review committee spent preparing this report. In particular, I want to recognize the contributions of UCORP Vice Chair James Weatherall, who led the review.

Thank you for the opportunity to opine. Please do not hesitate to contact me if you have any questions.

Sincerely,

Steven W. Cheung
Chair, Academic Council

Encl.

cc: Academic Council
UCORP
UC Research Initiatives Director Ward
Senate Division Executive Directors
Senate Executive Director Lin

UNIVERSITY OF CALIFORNIA Academic Senate

UC Observatories Five-Year Review

Conducted on behalf of the Academic Senate by the University Committee on Research Policy (UCORP), with input from the Coordinating Committee on Graduate Affairs (CCGA) and University Committee on Planning and Budget (UCPB)

May 20, 2025

OVERALL.IMPRESSION

The University of California has supported large-scale instrumentation and collaboration in astronomy since at least 1888, when the UC-owned and operated Lick Observatory opened at the summit of Mt. Hamilton. Today, the Lick Observatory is administered through the UC Observatories (UCO), a multi-campus research unit (MRU) based at UC Santa Cruz that coordinates research in astronomy across the campuses. In addition to the Lick Observatory, UCO is a managing partner of the W. M Keck Observatory on Maunakea, Hawaii, which is home to the largest optical and infrared telescopes in the world. UCO plays a central role in supporting the work of the more than 650 astronomers within the UC system.

The UCO has contributed to many accomplishments, including a Nobel Prize awarded to Andrea Ghez (UCLA) in 2020 for work performed using UCO instruments, and nearly 1200 papers published by UC researchers using UCO instrument data in the past five years. It engages in public outreach both in California and in Hawaii, including K-12 students. UCO is an integral part of science in California and is essential to the UC system's leadership in astronomy and astrophysics.

MAJOR.ACHIEVEMENTS.AND.SIGNIFICANT.CONTRIBUTIONS

Strengths

- Instrumentation and Technological Innovation: (1) Commissioned new and upgraded instruments at the Keck Observatory. (2) Secured significant external funding for future instrumentation projects across multiple UC campuses. (3) Developed advanced astronomical instruments through core labs at UCLA and UCSC, enabling groundbreaking research.
- Scientific Discoveries: (1) Played a central role in confirming the supermassive black hole at the center of our galaxy, recognized by the 2020 Nobel Prize in Physics. (2) Contributed to the discovery and characterization of extrasolar planets, reshaping our understanding of planetary systems. (3) Conducted pioneering research on dark matter and dark energy, advancing our understanding of the universe. (4) Led to at least 1182 peer-reviewed papers coauthored by UC researchers in the past five years.
- Education and Outreach: (1) Expanded public outreach programs, including K-12 initiatives, undergraduate lab courses, and summer schools. (2) Secured a $5M grant from the Gordon and

Betty Moore Foundation to enhance education and outreach activities. (3) Provided robust graduate and postdoctoral training opportunities using world-class facilities and resources.

Weaknesses

- Public awareness and recognition may be lagging somewhat relative to accomplishments.
- Plan for Natural Disasters: In 2020, the SCU Lightning Complex fire nearly reached the Lick Observatory and damaged several nearby buildings. This event highlighted the importance of developing a comprehensive emergency response plan for all UCO facilities.

MULTI_CAMPUS.OPERATIONS

Strengths

- Broad Multi-Campus Engagement: UCO effectively serves as a central hub for astronomy research across the UC system, with strong engagement from multiple campuses, including key technical hubs at UCLA and UC Santa Cruz (UCSC)
- Collaborative Research Infrastructure: Shared access to world-class facilities like Lick Observatory and Keck Observatory fosters extensive cross-campus research collaborations.
- Inclusive Governance: UCO governance includes representation from all UC campuses, ensuring diverse input and broad participation in decision-making.
- Strategic Partnerships: Collaboration with external entities, such as Lawrence Livermore National Laboratory (LLNL) and other national and international observatories, strengthens UC's astronomy leadership.
- UCO has affiliates (faculty, graduate students, etc.) at all UC campuses except UCSF (which is focused on health sciences and has no astronomy programs).

Weaknesses

No significant weaknesses noted in this area, but the following issues were not addressed in depth during the review process:

- While the report makes clear that UCO plays a vital role in graduate (and to a smaller degree undergraduate) education by providing access to the telescopes and participating in REUs, it is less clear if UCO provides for graduate education beyond the instrumentation and infrastructure.
- The report details a number of important educational programs for undergraduate students outside of UC but has to less to say about programs aimed at UC graduate students.
- While governance includes representatives from all UC campuses, the effectiveness of multi-campus coordination and decision-making processes is not well-articulated.

FUTURE.GOALS

Strengths

- Innovation in Research Infrastructure: Plans to advance instrumentation development, maintain leadership in adaptive optics, and support major projects like the Thirty Meter Telescope (TMT) demonstrate forward-looking scientific priorities.

- Focus on Equity and Inclusion: UCO is committed to fostering diversity, equity, and inclusion (DEI) through increased outreach, training opportunities, and policies aimed at creating an inclusive academic and research environment.
- Sustainability and Funding Strategy: UCO has successfully secured external funding (e.g., $5M from the Gordon and Betty Moore Foundation) and continues to pursue diversified funding streams for research and education programs.
- Workforce Development: The MRU emphasizes training the next generation of scientists through graduate programs, workshops, and undergraduate research opportunities, ensuring a robust talent pipeline for California and beyond.

Weaknesses

- Clarity in Strategic Goals: While strategic planning is underway, clearer articulation of specific milestones and timelines for achieving long-term goals is needed.
- Resource Allocation: Ensuring equitable distribution of resources and opportunities across all campuses, including smaller campuses like UC Merced, remains an ongoing challenge.
- Outreach Expansion: UCO could expand its public outreach programs to maximize impact across a broader range of California communities.
- Funding Uncertainty: changes in federal government operations will expose UCO to challenges in funding its most ambitious goals, including the Thirty Meter Telescope. The report was written for a funding environment that is changing quickly, and a new strategic plan may be needed.

BUDGET

Strengths

- Strong Support from UCOP: UCO gets 55% of its budget from UCOP. A little less than 40% of the budget comes from extramural funding.
- Success in Securing Extramural Funding: The unit has been highly successful in attracting external funding, including significant grants like the $5M Gordon and Betty Moore Foundation award, and consistent support from federal agencies and private donors.
- Strategic Investment in Instrumentation: Resources are effectively allocated to cutting-edge instrumentation projects that enhance UC's leadership in observational astronomy.
- Multi-Campus Resource Sharing: UCO ensures that shared resources, including access to Lick Observatory, Keck Observatory, and the Thirty Meter Telescope, are efficiently utilized across UC campuses.

Weaknesses

- Sustainability of Core Operations and Diversifying Funding Sources: Certain core functions, such as long-term maintenance and operational costs of observatories, may require expanding the diversity of the funding source to ensure stability and competitiveness.
- The report notes that UCOP funding has been flat for years (although the budget pages would seem to suggest that the amount from UCOP has gone up a little from FY20 to FY24).
- During the last review, suggestions were made for increasing UCOP support for educational programs through UCO. This doesn't appear to have materialized, although UCO was successful at getting extramural funds from the Gordon and Betty Moore Foundation.

ADMINISTRATION.AND.GOVERNANCE.

Strengths

- Governance and Strategic Planning: Initiated a large-scale strategic planning process under the leadership of a new Director, Bruce Macintosh.
- Multi-campus oversight: UCO had an advisory committee that reports to the director, has representatives from each campus, and meets four times per year, ensuring collaborative governance.
- Strong leadership is evident from the significant accomplishments of UCO. Initial strategic planning activities have identified clear principles for governance.

Weaknesses

- Leadership could benefit from more proactive initiatives to address future challenges, including natural disaster preparedness, funding challenges, and infrastructure resilience.
- Efforts towards advancing diversity, equity, and inclusion, though mentioned, are not described in detail and could be developed further. The report does detail a variety of educational and outreach programs intended to improve and potentially diversify the STEM pipeline.
- The previous five-year report made several concrete recommendations concerning governance. There is little discussion of how these were directly addressed. Some recommendations were obviated by changes in leadership structure and strategic planning activities, but a more direct response would have been helpful.

CONCLUSIONS.AND.RECOMMENDATIONS

UCO is a vital asset to the UC system, providing unparalleled contributions to research, graduate education, and public service. It supports world-class astronomical research, trains the next generation of scientists, and engages the public through exceptional outreach programs, serving as a bridge between science and society. Its multi-campus collaborations and partnerships with national and international institutions amplify its impact, fostering innovation and discovery. To ensure its continued excellence, UCO needs a strengthened disaster preparedness plan and increased emphasis on diversity, equity, and inclusion to broaden participation in its leadership, faculty, and staff. UCO also faces funding challenges due to changes in federal agency priorities and UCSC's structural deficit. Even so, UCO is well-positioned to further advance its mission and continue to serve the University and the people of California as a leading institution in astronomy and public engagement. UCORP strongly recommends renewing UCO and emphasizes the importance of continued UCOP financial support for this MRU's important activities.