

UW Department of Astronomy

Academic Program Review 2022-2023

Review Committee Report

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Committee Members:

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OVERVIEW

Process: The review committee received its charge during a Zoom meeting on May 1, 2022. Prior to the zoom meeting, the review committee was provided with the 10-yr report and other relevant documents. The committee was given the opportunity to ask questions about the 10-year report, and the Department of Astronomy provided written responses to these questions. The in-person review occurred October 10 and 11, 2022. The review committee met with the Astronomy 10-yr review committee; tenured and tenure track professors; research scientists, postdoctoral researchers, and research faculty; teaching faculty; graduate students; undergraduates; and staff. We also met with the leads of interdisciplinary research groups and with Advancement. The review committee additionally requested to meet separately with non-tenured faculty and with students of color. Both requests were accommodated. We also received a brief tour of lab and teaching space, including the planetarium. During the course of the in-person reviews, we requested additional written information, which was readily provided to the committee.

Departmental strengths: The Department of Astronomy is one of the top Astronomy departments in the country, with significant leadership roles in Astrobiology, Data Science, and the Vera Rubin Observatory, all of which align well with the current directions laid out in the Astronomy Decadal Survey. The department is uniquely positioned to take advantage of the Vera Rubin Observatory and the Legacy Survey of Space and Time (LSST). The undergraduate program has tripled the number of majors in the past ten years, and these students are well-positioned to enter graduate programs and data-science oriented career trajectories. The PhD program is remarkably exclusive, accepting about 5 students each year from the 350 applicants. These students become top leaders within Astronomy and other careers of their choosing. The faculty includes an outstanding cohort of early career scientists, including two Sloan Fellows. The research faculty and staff play key roles in creating strong and exciting research within the department and the teaching faculty are essential to enhancing learning within the undergraduate community. The administrative staff are clearly dedicated to supporting the educational and research missions of the department.

Current challenges: And yet, the department faces a critical transition that requires development of a new strategic plan to guide the next 10 years. The department recognizes that reaping the benefits of the Vera Rubin Observatory and attracting new faculty hires requires access to 6-10-meter class telescopes, which in turn requires significant private funding, as federal funding is not available.

The department struggles to cover faculty service roles, in good measure because the senior faculty are heavily involved in high-profile research activities at the national level. This has led to junior faculty taking on significant administrative roles. Furthermore, the current chair is serving a short two-year service, and there is no clear succession plan. Long-term leadership and the lack of administrative know-how is a serious, but eminently addressable, challenge.

The department has also struggled to attain its long-established goal of increasing the diversity of the faculty. They have made substantial progress in increasing the number of female faculty but have only recently made incremental progress in BIPOC representation, with the hiring of Assistant Teaching Professor Sophia Cisneros. More generally, the department faces several climate issues that require prompt attention. Faculty feel overwhelmed, which likely contributes to the lack of willingness to take on service roles in the department. Furthermore, the relationship between faculty and PhD students is strained. This seemed more pronounced among senior and BIPOC PhD students. Indeed, while the department has made significant progress in recruiting PhD students from underrepresented backgrounds, more work is required to develop the tools to support and retain these students.

The undergraduate program has tripled in size to 120 majors, with ~90% of these students as double majors with physics. Despite this increase in student numbers, the department has retained the explicit goal of ensuring that each student has the opportunity to conduct in-depth research with a faculty advisor. The success of the major adds to the overwhelmed feeling of the faculty who are dedicated to student success and yet are becoming more and more thinly stretched.

Finally, while the committee felt that the staff is deeply committed to the mission of the department and to making an impact on diversity, equity and inclusion, it was also apparent that the current dynamics make the management of the department challenging. The department lacked a stable and engaged department manager for many years. The coping mechanisms developed by the rest of the staff (and faculty) have led to blurred roles, an idiosyncratic organizational chart, and some level of tribalism that have made organizational change and the integration of new staff difficult.

Recommendation: The review committee's recommendation to the Graduate School is that the Department of Astronomy maintain its status and undergo a subsequent review in 10 years. We also recommend that the department provide an interim report to the graduate school in 5 years. This interim report should be guided by the review committee's specific recommendations, provided below. These recommendations have been formulated to provide a general road map that can be followed over the next 5 years to help enhance communication, transparency, and departmental cohesion.

SPECIFIC RECOMMENDATIONS

Creation of Written Policies, Job Descriptions, Review Criteria

The Department of Astronomy is experiencing “growing pains” associated with their successes over the last 10 years. In the past, new policy implementations were commonly communicated to others verbally, a process that does not scale well with the increased size and complexity of the department. We recommend the following policy statements, job descriptions, and review criteria be developed and formalized by the department and provided to departmental members via readily accessible department resources, including departmental web pages. We also recommend that the department prioritize the order that these recommendations are followed with the goal that all are completed within 3 years. We highlight with an asterisk those activities that the committee recommends should begin as quickly as possible. Addition of a social event on at least a quarterly basis is an easy (and enjoyable) step towards enhancing departmental culture. Accomplishing these activities will enhance communication and transparency and create shared departmental and university knowledge.

Graduate education

- *Incorporate standard procedures into a written Graduate Student Handbook (available over the web). The Handbook should include a timeline of milestones and specific requirements associated with each milestone, including TA requirements. The Handbook should also include information about who students should contact with grievance issues. Creation of the Handbook should be viewed as a top priority for immediate implementation. Examples of such handbooks at UW include [Chemical Engineering](#), [Statistics](#), [Education](#), and [Computer Science and Engineering](#).
- Provide yearly written feedback to each student on their progress, including items such as a description of accomplishments, areas for improvement, and plans for funding the student. This yearly feedback would become part of the student file, which would be available to students for review. Ideally, each student would provide the faculty with a self-assessment that includes, among other things, a statement of their accomplishments over the past year and their plans for the next year. Examples of self-assessments include [Gender, Women and Sexuality Studies](#) and [Statistics](#). The guidelines for the yearly review process should be incorporated into the Grad Handbook.
- Increase transparency of how the so-called “10% positions” are assigned by advertising these positions to all PhD students. The job requirements and evaluation criteria for each position should be formalized and made available to all students.
- Replace the variable FTE pay rate with a variable rate system (with standard 50% appointments) with a higher base salary. We recognize that implementing this change requires lead time to allow the new rates to be incorporated into research grants.

Undergraduate education

- *Formalize how undergraduates are paired with faculty for research projects so the load is distributed across faculty.
- Formalize the process for peer review of faculty classroom instruction.

Administrative structure

- *The current staff organizational chart, with multiple staff members reporting directly to the Chair of the department, is highly unusual. The committee felt that this is a legacy that needs to

be revisited, and that a more hierarchical structure with a Department Manager at the top might facilitate the job of the Department Chair and improve departmental operations.

- Staff job description should be clarified and updated to reflect the tasks that staff are currently engaged on. Among other issues, the committee noted that many of the administrative staff are deeply involved in outreach activities, which should be included within the job descriptions as appropriate. When these outreach activities exceed the responsibilities of a particular position, the department should consider providing additional compensation to the staff, possibly using funds designated for Broader Impacts in extramural grants.

Early Career Faculty

- Formalize mentoring policies for junior faculty.

Research Faculty, Postdocs, and Research Scientists

- The policy around career tracks between and within research positions should be formalized and made available to all researchers. There appeared to be some confusion from different members of this community about opportunities to move between tracks.
- Formalize a clear policy regarding potential funding gaps for the Research Faculty.

Faculty workloads

- Identify key committees, consistent with the strategic plan (see below), required for departmental function and eliminate redundant and/or little utilized committees.
- *Formalize process for assigning committee membership by addressing issues such as a maximum or minimum number of committees per faculty member.

DEI plans

- Develop a department-wide Code of Conduct and make it available over the web.
- *Revise the composition of the current Inclusion and Access committee to better balance representation from different components of the department. Include, for example, a postdoc representative, staff representative, undergraduate and graduate representatives.

Departmental culture

- Prioritize attendance (beginning with faculty) at the department-wide seminar series to foster synergy between research groups.
- *Consider hosting regular department-wide social events where drinks and light food are provided to enhance collegiality.

Strategic Planning

The review committee notes that the greatest challenge faced by the department is development of a new strategic vision that builds from department-wide discussions of shared goals. The 10-yr report provided to the review committee included multiple questions that the department is grappling with, which indicates to the committee that the department has begun the process but still has further to go. The strategic plan must incorporate the goals of enhancing transparency, creating synergies amongst the different interdisciplinary components of the department, and increasing communication.

Leadership:

The current chair is in the first year of a 2-year appointment, with no indication yet of who will serve as the next chair. Many of the obvious senior faculty who could assume this leadership role are already leading big programs that require their full attention. The review committee suggests that the department consider an external hire to become departmental chair and that this recruitment begin within the next two years. Until this new chair is recruited, an interim chair would lead implementation of the policies and procedures outlined in the first recommendation.

Strategic diversity, equity and inclusion plan:

The review committee recommends development of a more focused strategic diversity, equity and inclusion plan to help the Department create an inclusive, equitable and sustainable culture and work environment. Workplace diversity is the collective mixture of differences and similarities that include individual and departmental characteristics, values, beliefs, experiences, culture and behaviors. While diversity creates the potential for greater innovation and productivity, inclusion is what will enable the Department to realize the benefits of this potential. When developing the strategic plan, the essential components should be aligned to work with the Department's overall scientific strategy and hiring plan, which are currently absent.

The committee notes that faculty searches must include candidate statements of their contributions to diversity, equity, and inclusion. We recommend that the Department agree on how to incorporate these statements into their hiring decisions, and that they elevate their commitment to diversity, equity and inclusion throughout the hiring process, from job inception to the interview process to support of new hires. Hiring efforts must be shaped with equity as a central design principle and accompanied by thoughtful efforts around retention and culture building.

Workloads:

Perceptions of increased (and sometimes unrealistic) workloads were heard from across the department, although the stressors differed depending on the group. We hope that the formalization of policies suggested above will reduce some stressors. We note that the number of tenured and tenure-track faculty has been effectively at 12, because of the long-term leave of two full professors (Ivezic and Dalcanton). The two tenure-track hires approved for this year will help with reducing the workload and yet, these new faculty cannot realistically fulfill the roles of full professors. Additional approaches to alleviate stress are provided below.

- The development of a strategic plan will create department-wide priorities, which in turn, will help all members identify their highest priorities. The goal is to reduce or eliminate activities that may be inconsistent with top priorities.
- Increase budgetary transparency. The department raises significant RCR (research cost recovery) that support different aspects of departmental functions.
 - Share broadly the strategic plan that prioritizes how these funds are utilized. Developing this plan will help build trust.
 - Balance teaching requirements with departmental resources. As it currently stands, current teaching loads for some faculty appear high for an R-1 Astronomy department, particularly for those that serve as undergraduate or graduate coordinators. The fact that

these positions do not currently appear to receive any teaching relief makes the department an outlier in the College.

- Determine realistic targets for optimum student credit hours for both undergraduate lower division courses and majors based on departmental educational goals. These targets require discussions with the Divisional Dean.
- The review committee supports the Astronomy request for state support of a teaching faculty if current or increased student credit hours are the agreed upon target.
- Prioritize financial support for a person to organize/support DEI activities such as outreach, speaker invitations, etc. Current DEI activities appear to be carried out primarily by administrative staff, which are the most diverse group within the department, and by the graduate students through their work within the Graduate Students of Color in Astronomy and Physics (GCAP). A financially supported, trusted ally of the BIPOC community, would alleviate the administrative burden of these important activities.
- The Department leadership can utilize the powerful levers at their disposal (awards, grants, promotion, raises, administrative support) to recognize the existing, but currently invisible, labor of early career faculty, graduate students, and staff to diversify the institution.
- Create clear incentives for faculty to get directly involved in DEI activities. For example, clear expectations on DEI contributions could be included as part of promotion and tenure as well as annual merit reviews. Appropriate service or course release for substantial participation in this kind of activity could be another incentive.
- Develop clear metrics for achieving agreed upon DEI goals and ways to document which goals are met and why others have not (yet) been met.

Undergraduate education:

A stated goal of the undergraduate program in Astronomy is to prepare students for graduate school, technical jobs, or teaching. Over 90% of the Astronomy majors are double majors in Physics, and all majors have the opportunity to conduct research in different research groups as this is correctly viewed as an essential prerequisite for admission to graduate school. A cap of 120 majors has been implemented to ensure each student can be provided with in-depth research opportunities.

- The department should evaluate whether continuing individual research projects for all undergraduate majors is a top priority of the department. If the department decides that this is a top priority, the associated teaching load should be carefully considered to ensure that all are involved in the teaching mission. The department should consider implementing one (or more) of the following options.
 - A maximum and minimum number of students per faculty should be agreed upon.
 - If certain faculty supervise a disproportionate number of students, then this should be considered as fulfilling an aspect of their teaching obligation.
 - Alternative means of providing research opportunities within a class structure should be considered.
- The number of students in Pre-MAP is currently limited by the number of available mentors.
 - The department should evaluate the appropriate balance between Pre-MAP mentoring vs research project mentoring and incorporate this balance into the strategic plan.

- Work closely with the physics department to replace the gatekeeper instructional style which are tantamount to an unethical, discriminatory practice that disproportionately impacts historically underrepresented groups of students.
- The committee encourages the Department to continue creating partnerships at non-R1 Undergraduate Institutions, Minority Serving Institutions, and Women’s Colleges to join large, long-lasting scientific collaborations to gain access to computational resources, leverage contributions of affiliates (faculty and students) and pan-STEM networks between these institutions. The committee also suggests increasing funding/scholarships to offset financial hardships for undergraduate students and their families. The committee suggests increasing opportunities for more students to participate in REU programs and through partnerships with local industry, develop paid internships and other national undergraduate research programs.

Graduate education:

The graduate program is world class and creates future leaders. At the same time, the program is surprisingly small with a steady state population of only about 25 students. The rationale for this number of students appears to reflect funding constraints of individual PIs combined with concerns amongst some faculty about potential job opportunities for graduates of the program. The limited number of graduate students has repercussions for the undergraduate program as there are few graduate students in any given year that can serve as a TA and so the department relies on post-bacs to serve as TAs. Moreover, graduate students are an exciting source of innovation and creativity. They are also often catalysts for change.

- The department should evaluate pluses and minuses of a small graduate program and then decide whether to continue to accept only 5 new graduate students per year into the future.
- Enhance transparency in the communication with graduate students. We expect that establishing the procedures outlined in the first recommendation will help address the current perceived lack of transparency.
- The department should work to provide graduate students with information on the diversity of career options available to them. This will help avoid the perceived “failure” of those who decide to pursue careers outside of academia.
- Currently the graduate students appear to have multiple overlapping committee requirements - a mentorship committee, a research qual committee, and a thesis committee. It was not always clear who is expected to serve on these committees and the specific goals of the committees. For example, there appeared to be confusion as to whether a student’s advisor should or should not be on the mentoring committee. Development of the Graduate Handbook that explicitly describes the role of committees and membership of the committees is essential to defining student responsibilities.
- Over 40 percent of Astronomy PhD recipients in 2015-16 did not take postdoctoral positions. Two-thirds of these PhD recipients went to work in the private sector.¹ The Department must respond to this trend and ensure innovation at an emergent level; technical training programs in

¹ Mulvey & Pold 2019, AIP Statistical Research Center Report. Accessed 21-Aug-2020
<https://www.aip.org/sites/default/files/bach1yrafterdeg-a-16.1.pdf>

computational methods and instrumentation are available for Astronomers throughout their careers.

Private funding:

Country-wide, the field of Astronomy relies on private funding to gain access to optical facilities, and top-20 departments in the US commonly have proprietary access to large telescopes. The Astronomy department has identified access to a large optical telescope as a critical research need. Three main options available to the department are to 1) apply for time on the Gemini North and Gemini South Observatories, twin 8-meter telescopes where the US astronomical community has a share; 2) buy nights that other institutions are selling on their large telescopes; or 3) join in a partnership with other universities to run a large telescope. The committee suggests that the department should not rely solely on option 1 because of the limited number of available nights, the controlled science and restricted instrumentation. The latter two options should be considered, and a plan developed to achieve them. The department estimates a fund-raising target of around 20 million for access to large telescopes. The UW Advancement team should make a concerted effort to help the Astronomy department achieve this goal.

The department has also identified as a top priority the establishment of an endowed postdoctoral fellowship program that supports research in all areas of Astronomy. Currently, the department has the DiRAC and grant- and program-based postdoctoral scholars. The success of the DiRAC Postdoctoral Fellowship Program in recruiting and placement shows that such a program would attract top talent and would place alumni in prestigious positions. The department estimates a fund-raising target of around 6 million dollars for an endowed postdoctoral fellowship.

It appears to the review committee that the greatest interactions with UW Advancement is centered around DiRAC. Development of department-wide fundraising strategy that builds upon DiRAC would enhance their ability to garner private support.

- The department should create a fully developed scientific rationale and cost structure for access to a large telescope of choice. This document will ultimately benefit from iterations with the Advancement team.
- The department should ensure there is a “plan B” for how they will support access to needed optical facilities until sufficient private funds are available.
- The department should create a document that describes the benefits of an endowed postdoctoral fellowship that would build upon the successes of the DiRAC fellowship but be open to all areas of Astronomy.