

Response to the Program Review Team Report

Department of Physics

Weber State University

April 26, 2008

Introduction:

The Department of Physics is grateful to the Program Review Team for their careful, thorough, and thoughtful work in reviewing the Program Review Self-Study, and in interviewing faculty, staff, students, the Chair of the Department, and the Dean of the College of Science in preparation for submitting their report. The review team was comprised of:

- Dr. Dan Bedford (Department of Geography, Weber State University)
- Dr. H. Laine Berghout (Department of Chemistry (Weber State University))
- Dr. D. Mark Riffe (Department of Physics, Utah State University)
- Dr. Paula Szkody (Astronomy Department, University of Washington)

Listed below are major strengths and challenges of the Department that have been identified by the review team in various portions of their report. After each item, the Department has provided a response.

Strengths:

The review team noted several strengths of the department. The department also takes pride in, and would like to point out, its long history of service to the profession of teaching physics. Examples of this service include textbook writing, creation of open-source software, a recently completed physics demonstration video project, and a long history of participation in the American Association of Physics Teachers at the regional and national levels.

The strengths identified by the review team include:

- ▶ "...the major strength of the department is the excellent faculty that are dedicated to providing the best physics education possible for undergraduates."
 - Response: The Department makes every effort to prepare its majors (Physics, Applied Physics, and Physics Teaching) for successful careers in any area they choose to pursue upon completion of their studies at Weber State University.
- ▶ "The Physics curriculum is a second major strength. While most of the teaching and student credit hours are spent in service courses, strong preparation for the future is provided for Physics majors as well. Physics students feel well-prepared for graduate school and industry through both Physics and the Applied Physics majors."
 - Response: The Department strives to provide an exciting, stimulating, and rigorous program of study for all of our major programs, thus preparing students to compete favorably with students graduating from any program in the United States. The Department also strives to provide an effective, engaging, and rigorous introduction to physics for all students that we serve, including service courses for other major and minor programs, and for those students taking courses that satisfy the Physical Science component of their general education curriculum.
- ▶ "A third major strength is the emphasis the department places on undergraduate research. This involvement of students (both inside and outside of the Physics Department) allows

them to experience science in a way that encourages problem solving and creativity far beyond what textbook and lecture alone can accomplish.”

- Response: Undergraduate research is a major focus of the Department. Providing opportunities for undergraduate research is an important component of a strong undergraduate education in physics at most institutions. Moreover, developing a departmental culture that values undergraduate research has made a significant impact on our recruitment and retention efforts. As such, recent faculty hires in the Physics Department have intentionally focused on recruiting faculty who could significantly advance our undergraduate research program. We have also been very fortunate to have private sponsorship to support a summer undergraduate research fellowship.
- ▶ “The Physics Department is very active in community outreach with ongoing efforts associated with the Ott Planetarium and museum.”
 - Response: Physics faculty members have always been active in performing community outreach. These individuals routinely visit high schools and grade schools on their own time. The Physics faculty have also played an important role in creating and revitalizing exhibits in the Museum. One faculty member has a Ph.D. in physics education, and his responsibilities include these types of outreach activities. In recent years the Ott Planetarium has taken a leadership role in outreach. This outreach includes 1) students coming to the planetarium to see shows tailored to the Utah K-12 Core Curriculum, 2) the Ott Planetarium producing content for small planetariums nationwide that is tailored to their core curricula, and 3) “Ottreach: Science in the Parks.” Ottreach is a summer program, in conjunction with Ogden’s free lunch program for children in the city’s parks, that brings hands-on science to disadvantaged students.
- ▶ “The Physics Department has a comprehensive program of assessment that goes beyond that of most Physics departments.”
 - Response: The Physics Department's program of assessment of faculty offers ample opportunity for young faculty to receive feedback on their performance. In addition to annual review by the Chair, in which every faculty member participates, young faculty undergo an informal 2-year review with the Chair, and a full 3-year interim review, including a review of teaching by their peers. This program not only ensures that there are no surprises in the tenure process, but it also provides an opportunity to mentor young faculty as they develop their teaching methodologies. This process plays a role in creating and sustaining the outstanding teaching ethic of the Department.

Challenges and Recommendations:

- ▶ “Adequately reducing the teaching credit hour requirements for faculty that are involved in significant undergraduate research projects. Justification for this change might be found through a survey of teaching loads at comparable 4 year universities. With research becoming expected of undergrads, and with larger Physics courses and labs, more time is required for mentoring, grading, etc. The department Chair should be encouraged to provide as much comp time as possible.”
 - Response: This challenge has grown more severe as the number of students involved in undergraduate research has risen. Indeed, involvement in undergraduate research is now the norm, and students both expect and desire a research experience. Although the Chair has some flexibility to manage teaching

loads, its effectiveness is limited by the expectation that faculty members teach (on average) 12 credit hours per semester. Twenty years ago, the average faculty load was 12 credit hours, and almost no majors were involved in research. Today, the average faculty load is 12 credit hours, and almost every major is involved in research. The Physics Department just lost its newest faculty member to USU, where his teaching load will be 3 credit hours per semester. A preliminary review of WSU's peer institutions indicates that at least 4 of our 10 peers have 9-hour teaching loads (Indiana U-Ft. Wayne, U North Florida, U of Northern Iowa, Western Washington U.) and most have research release time policies in place or in preparation. All of them recognize the importance of research to teaching. Ultimately, this problem of balancing teaching with research must be addressed at the highest levels.

- ▶ “Ensuring that the Office of Sponsored Programs provides better service for grant support. A clear policy for indirect cost return to the department needs to be created. A knowledgeable person at the college level to help with all science grants is urgently needed.”
 - Response: The Physics Department completely concurs with this recommendation. Problems with the Office of Sponsored Projects have negatively impacted both faculty productivity and morale. A knowledgeable person to provide support for College of Science grants is critically needed, College-wide. The Physics Department has just completed a survey of both similar and Utah institutions to determine the commonly accepted indirect cost return policies at other institutions. We will use this data as a springboard for discussions College-wide to develop an effective policy that will provide incentives for faculty to seek external funds, and allow Departments some autonomy in solving their problems.
- ▶ “Providing a full time technical person at the college level to provide support for the computer labs in all science departments. This individual must be able to deal with the customized hardware and software configurations that are common in the College of Science, which will require creation of a permanent position with that responsibility. Faculty do not have time to constantly deal with security and maintenance issues such as managing user accounts and updating computer hardware and software on top of their teaching loads.”
 - Response: The Physics Department completely concurs with this recommendation. As the level of technology of all kinds has increased, an increasing burden has been placed on the faculty for maintenance and support within the Department. This requires a coordinated response at the College level. Starting in Fall of 2008, the department, in cooperation with other technology-dependent departments, will draft a job description and workload estimate of such a technical support person, and prepare documents to help initiate the hiring process when funds become available. We will also identify sources of funding from existing external grants that could be used to defray the cost of this position, and work to negotiate recapture of indirect funds to help the department meet this need.
- ▶ “Providing sufficient student lab space so there are not more than 2 students per lab station and there are separate labs for calculus based physics courses and trigonometry based physics courses.”
 - Response: The department agrees that it would be desirable to put a stricter limit on the number of students per lab section, and to separate the labs for calculus-based and trigonometry-based introductory physics. Moving toward those goals

would require more equipment and more space. The equipment issue could be addressed through funds from lab fees and funds returned to the department from indirect costs (addressed elsewhere in this response). As enrollments grow, more lab space could be acquired by reclaiming the space currently occupied by the science testing/learning center (if that center were able to relocate to a new location nearby on campus). Reducing lab group size would also require more faculty time and could be addressed with the addition of a full-time laboratory instructor (perhaps at the master's degree level) to the faculty. By Spring 2009, the Physics Department will prepare a detailed analysis of our current space usage and make recommendations on how existing space could be used more efficiently. The Physics Department will also coordinate with other departments in the college to address the overall space needs and suggest potential solutions to the space shortage in the near-, mid-, and long-term. In the short term, the department will increase the number of available lab sections at the expense of sections of PHYS 1040 (Elementary Astronomy), to maintain the current lab group size or reduce it.

- ▶ “Adding a Mathematical Physics course for majors.”
 - The Physics Department's Curriculum Committee will study the perceived need for such a course, interviewing students and faculty to better understand what problems such a course might be able to solve and what resources it would require. The committee will also gather data on Mathematical Physics courses taught at other institutions, and discuss this issue with the Department of Mathematics. By Spring 2009 the committee will bring its findings and recommendations to the department, and the department will make a decision on any proposed curricular changes. Any proposed changes would then be forwarded to the College and University levels for further discussion and approval.
- ▶ “Several faculty mentioned possibilities of an astrophysics major or a master's program, while others thought this could not be done without further resources and less attention to current programs. While the committee heard both sides of the issue, it was not clear that the entire faculty were aware of the possibilities so there is a need for a further discussion of these issues.”
 - Response: The Physics Department's Curriculum Committee has studied the feasibility of expanding the department's offerings in astronomy and astrophysics, and has presented a detailed set of proposals to the department. After an initial discussion, the department has tabled this issue for the time being. The possibility of offering a master's program has not been systematically studied or discussed at the departmental level. Before committing additional resources to any area of the curriculum, the department needs to discuss the full range of possibilities and determine its priorities. These long-term issues will be discussed further during 2008-09.

Conclusions:

As documented in the Review Team Report, the Department of Physics was commended for

- ▶ having an excellent faculty.
- ▶ providing a strong physics curriculum to its students, both in major and service courses.
- ▶ having a strong program in undergraduate research.
- ▶ being very active in community outreach.
- ▶ having a comprehensive program of assessment.

On the other hand, the Department of Physics faces significant challenges in

- ▶ providing adequate reassigned time to faculty involved in undergraduate research.
- ▶ obtaining adequate support from the Office of Sponsored projects and a equitable distribution of indirect costs.
- ▶ obtaining adequate technical support and maintenance for its facilities.
- ▶ providing adequate student lab space for its lower-division labs.
- ▶ reviewing its curriculum to study the possibility of adding a course in Mathematical Physics.
- ▶ determining whether and how further astronomy courses will be added to its curriculum.

Some of these challenges can be addressed in future departmental planning, while others require coordination with the College of Science and Weber State University. The review team identified a potential issue of faculty retention related to a number of the challenges listed in the report. While the department does not fear the immediate loss of additional faculty, it should be noted that promptly addressing the issues raised by the review team would help the department retain its faculty "without burnout or loss to other institutions."