

## Department of Physics Graduate Program (PhD and MS)

### *Five Year Plan*

June 15, 2012

#### Executive Summary

We are grateful to the review committee for their comments and suggestions, which we have tried to take into account in the following 5 year plan. As mentioned in our self-study, the Physics graduate program is already undergoing substantial revision based upon faculty and student feedback and input from the Regents Review of a few years ago. Many of these revisions are reflected in the items below. Of course, the recent graduate program self-study gave us several additional new ideas on improving our program.

Our overall goals over the next five years are to (1) increase the quality of PhD students in our program; (2) improve the financial support for our students, (3) maximize efficiency in the delivery of our coursework, both from the students' point of view and from the point of view of utilization of faculty resources; (4) restructure our RA/TA funding model to account for the new tuition fellowship environment.

The following plan is organized into two sections. The first section is a list of concrete actions we will take over the next five years to improve our program. After each item we identify which of the core areas (Recruitment, Mentoring, Management, Funding) the item is intended to address. The second section is a list of metrics which we will use to assess our progress.

#### Action Items

- Each research group has made a high quality brochure which can be distributed to potential students and also appears electronically on our website. These brochures will be reviewed and updated as needed. (Impact: Recruitment)
- The department is working with graduate students to enable them to put a (research-based) profile both on our department website and in Digital Commons. Students have informed us that this is a very important method for catching a prospective student's interest. For an example, see:

<http://physics.usu.edu/htm/people/graduate-students/memberID=6669>

(Impact: Recruitment)

- The Physics Department website has been totally overhauled and will continue to be fine tuned with the principal goal of enhancing its recruitment impact.

(Impact: Recruitment)

- We have begun bringing our most promising graduate student applicants for visits to the department. We feel such visits improve our graduate recruiting efforts on two fronts. First, while we regularly get applications from students who seem of high quality and a good match for our programs, often we find we simply cannot compete with comparable schools if only because of our relatively low TA stipends. So we feel we must do something extra for these kinds of students. Second, we find our most successful students are those who come here with their research interests already well-matched with those of our faculty. Visits to USU help us align the students' interests with those of the faculty. Such visits also provide a good way to filter out the students who are not a good match with our program.

(Impact: Recruitment, Mentoring, Management)

- Using departmental F&A money we have initiated an effective 25% increase in the TA stipend for incoming students. This enhanced stipend lasts for 2 years. This increase should take us from nearly the bottom of our peer group and put us somewhere near the lower middle in TA funding, at least for incoming students. The stipend increase is advertised to the students as a Research Stipend and is given in conjunction with new research-related curricular requirements for our incoming students (see below). This research stipend lasts for the first two years of a student's time here, after which the stipend reduces to its current, lower value. The idea is that, in light of our new curriculum structure, a student should be moving into an RA after 2 years and/or supplementing his/her support with fellowships and scholarships.

(Impact: Recruitment, Management)

- The new graduate course curriculum (currently being implemented) consists of a rigorous 2 year sequence of courses which all students must take. At the end, all Physics Department course requirements will be satisfied. With a universal two year coursework program we maintain adequate class sizes, we provide an efficient means to evaluate a student's abilities to complete our program, and we better prepare our students for research. This also relieves a perennial headache of finding the best match of faculty resources to the (previously) fluctuating student demand for various

courses. Besides the usual core courses needed to give depth and breadth to potential PhDs, the new physics graduate curriculum includes two new, less traditional types of courses. These courses are meant to facilitate the student's movement into PhD research and to provide valuable skills needed by our students to be competitive for funding before and after they graduate. The first course, entitled "Graduate Research in Physics", requires a student to collaborate with one or more faculty mentors on a relatively low-level, introductory research experience. The second course, entitled "The Profession of Physics", will be a one-credit course that addresses a number of timely topics for the graduate students. It shall be taught each fall semester. These topics will include (i) departmental areas of research, (ii) writing of proposals and fellowship applications, and (iii) research ethics (which is intended to satisfy federal mandates), and (iv) career paths in physics. As this course requires each student to write a proposal for, e.g., NSF fellowship funding, it is hoped that this course will lead to enhanced financial support for our students.

(Impact: Mentoring, Management, Funding)

- Graduate students now elect a student representative to the faculty. This student attends faculty meetings (where appropriate) and is a principal contact for formal faculty student interactions.

(Impact: Mentoring, Management)

- We have initiated a regular series of graduate student-faculty meetings. These monthly meetings, administered by the Department Head and Assistant Head, are open to all faculty and graduate students. The agenda of the meeting is worked out in advance via faculty interaction with the student representative.

(Impact: Mentoring, Management)

- We will continue to employ our Graduate Student Tracking committee. This committee, which consists of a representative from each of the department's principal research areas, meets annually with all graduate students to assess their progress through our system and give help or guidance as needed. In addition, this committee now meets with all incoming graduate students to make sure they understand our system and to give them timely advice on how best to proceed.

(Impact: Mentoring, Management)

- Our current RA pool supports 10-12 students. We will be working with faculty researchers to increase this pool to a target of 15.

(Impact: Funding)

- We will try to identify a faculty member who can investigate (if not apply for and oversee) training grants such as IGERT. While we feel successfully acquiring and administering such grants is something of a long shot, if an enthusiastic faculty overseer can be identified, this would be a significant enhancement to our graduate program.

(Impact: Mentoring, Funding)

- We will implement exit interviews with all graduate students as they finish their degrees. We will begin following up these with annual emails to our previous graduate students. This allows us to collect valuable assessment data on student attitudes toward the program, on any specific problems which arise, and on placement of our students in the job market.

(Impact: Recruitment, Mentoring, Management)

- We are asking all researchers whose grant proposal requests a full-time (half-time) graduate student to also request 12 credits of in-state tuition for two semesters. Part-time graduate students would have the tuition support request pro-rated accordingly.

(Impact: Funding)

- We are exploring the possibility of offering large, general education classes online via RCDE. The relevance to the graduate program is threefold. First, such classes provide unique teaching opportunities for graduate students. Second, such classes provide excellent opportunities for employing TAs. Third, such classes generate revenue for the department which can be used for TA stipends. Thus these classes generate much-needed revenue to support our graduate students when they are not engaged by an RA. Our first test class (PHYS 3030, The Universe) is being offered this summer and looks to be successful.

(Impact: Funding, Mentoring)

### Assessment Metrics:

Some of the following items are principally for informational purposes, others represent concrete goals we are trying to achieve through the initiatives listed above.

- We will begin systematic statistical monitoring of GRE scores and GPAs of incoming graduate students.

- We will systematize tracking of all our graduates with regard to their subsequent career. Currently this has been done in a somewhat informal, ad hoc fashion.
- Increase RA pool to 15.
- We will track the diversity of our graduate population and compare with the national average.
- With our new curriculum in place, we would like to verify that we are averaging a minimum of 5 students per class.
- We will formally track time for transition from TA to RA; the goal being 2 years on average.
- We will formally track graduate average stipends as a function of time to confirm that the slope is positive and approaching national mean values.
- \* Tuition fellowship support from the department administration and from research grants should adequately complement support from the university.
- \* Many of the above items involve collection and assessment of various graduate student demographics. We plan to set aside a week at the end of each year for processing and analysis of these data by the department's administrative team (faculty and staff). This will serve as an annual evaluation of our program, the results of which will feature in each year's faculty retreat.