

Office of the President

TO MEMBERS OF THE COMMITTEE ON EDUCATIONAL POLICY:

DISCUSSION ITEM

For Meeting of November 13, 2013

DOCTORAL EDUCATION

EXECUTIVE SUMMARY

UC's historically excellent ability to attract the best doctoral students from around the world is under great pressure owing to loss of State support and a reduction of national support for research. It has become more difficult for UC departments and faculty to offer competitive financial support for their doctoral students. Current practices also make international students more difficult to support than are domestic students, creating a disincentive to admit some of the best students from the worldwide pool.

The California *Master Plan for Higher Education* (Master Plan) established UC as the one state higher education system responsible for conducting research and awarding doctoral degrees. The education of outstanding Ph.D. students is a vital part of achieving and sustaining world-class status on each UC campus and of fulfilling UC's Master Plan commitments. Doctoral students support and enrich faculty research programs, help recruit and retain outstanding faculty, teach and inspire undergraduates, and become the next generation of inventors, scholars, artists, and self-motivated, independent, thoughtful citizens.

UC's Ph.D. programs are highly ranked, according to a well-respected assessment by the National Research Council (NRC). In all doctoral programs, faculty seek out the best students from around the world and strive to provide, on the basis of merit more than need, financial support that fully covers the costs of obtaining the degree. Appointments as graduate student researchers (GSRs) and teaching assistants (TAs) are crucial both to developing the knowledge, skills, and values expected of a Ph.D. and also to meeting doctoral students' financial needs. Ph.D. programs typically involve three phases: (1) initial course work and other preparatory experiences; (2) advanced coursework and laboratory, field, or other experiences leading to the completion of a proposal for the dissertation; and (3) successful completion of the dissertation. The expected and actual time it takes to complete a Ph.D. vary by field from four to six years for life sciences, physical sciences, engineering and computer science, mathematics, and social sciences, to six to eight years for arts and humanities. The third phase, which largely involves advanced independent work, can be lengthy and account for degree completion well beyond the expected time frame.

In fall 2012, there were 26,155 UC doctoral students. On average across the campuses, they constituted 11 percent of the student body (range of five percent to 16 percent for nine general campuses; 28 percent for UC San Francisco). UC lags behind its Association of American Universities (AAU) public and private university peers in the proportion of graduate students enrolled, including the proportion who are in Ph.D. programs. Despite increases in numbers over more than a decade, the proportion of Ph.D. students has not increased by even one percent because of simultaneous increases in undergraduate enrollment. Moreover, there has been a decrease in recent years in the proportion of doctoral students who are international. The current 25 percent figure is well below the average percentage for UC's peers. In addition, although UC's record of doctoral program participation by students who are from historically underrepresented groups or are women compares favorably with the records of its peer institutions, the record does not yet reflect UC's aspirations.

Recently, two reports, one from a joint faculty/administrator work group and one from a special committee of the systemwide Academic Senate examined UC's competitiveness in recruiting outstanding students to its Ph.D. programs and made several recommendations to address the challenges identified. The two reports agreed that UC was not as competitive as it should be, that UC was not drawing fully on the worldwide pool of highly qualified applicants, and that the handling of nonresident supplemental tuition (NRST) charges was a contributor to the challenges UC faced. The reports also agreed that resources to support doctoral students needed to be increased with new funding and, according to campus priorities, with current funding that is redirected to doctoral education. They disagreed on whether there should be uniform, systemwide practices and policies, or campus- and program-specific approaches to improving UC's competitiveness.

Both reports identified as a particular problem the practice of charging both in-state tuition and NRST to externally funded research grants when faculty appoint GSRs who are not California residents. GSR positions are an effective means of both developing essential research skills and providing the financial support that is expected in doctoral programs. Almost all AAU public and private universities charge some portion of a GSR's tuition to externally funded research grants. UC, however, is unique in charging the full cost of both resident tuition for all GSRs and also nonresident supplemental tuition for students who are not California residents. This practice increases by about a third the cost of appointing a GSR who is a resident of one of the other 49 states or a citizen of another country. The practice is a particular disincentive to admitting international students, who for several years of their doctoral programs are likely to be charged NRST, in contrast to domestic nonresident students who can become California residents after one year. As tuition costs have risen and resources for external research funding have decreased, UC's current practices warrant re-examination.

Campuses are actively and creatively addressing the challenge of recruiting outstanding students to their Ph.D. programs. They are creating new funds for doctoral students, redirecting existing funds to doctoral students, using both new and redirected funds to incentivize faculty and department resource commitments for doctoral student funding, and reducing the burden of NRST costs for faculty who appoint doctoral students for whom both in-state tuition and NRST tuition will be paid from their externally funded research grants. Going forward, the Office of the

President and the systemwide Academic Senate will convene a systemwide meeting of campus leaders in doctoral education to share best practices such as those described at the end of this item and campus goals with respect to doctoral education. A formal report will document the goals and provide a compendium of pathways the different campuses and programs within campuses have found useful.

BACKGROUND

Importance of Doctoral Education

The California *Master Plan for Higher Education* established the University of California as the one state higher education system responsible for conducting research and awarding doctoral degrees. The statutory framework for the implementation of the Master Plan, the Donahoe Higher Education Act, was signed into law by then Governor Edmund “Pat” Brown on April 27, 1960. The education of outstanding Ph.D. students is a vital part of achieving and sustaining world-class status on each UC campus. Among the many contributions Ph.D. students make to achieving UC’s mission are the following:

- The productivity of UC’s research is greatly enhanced by the contributions of doctoral student researchers, a key factor in the high rankings enjoyed by UC. In many instances, doctoral students are the motivating force for UC’s innovative work.
- The ability to attract the best Ph.D. students from a worldwide pool is one of the most important elements in recruiting and retaining faculty members who are themselves outstanding scholars.
- UC’s Ph.D. students become the next generation of the state’s inventors, researchers, artists, and university faculty. In fact, one quarter of all UC and California State University faculty received their Ph.D. from a UC graduate program.
- Ph.D. students are crucial to undergraduate education, serving as teaching assistants for large courses, mentoring undergraduates in research and other creative activity, and acting as role models.
- Ph.D. students and the undergraduates they help to educate leave UC able to carry out self-motivated independent investigations of the sort that are increasingly important as the economy moves to knowledge-based work.

Scope and Organization of Doctoral Education

Size and Scope of Doctoral Education

All ten UC campuses offer Ph.D. degrees. The number and content areas vary across the campuses. As one would expect, a young campus such as UC Merced offers a small number of Ph.D. programs, at last count ten and growing. In general, the older the campus, the more

different Ph.D. degrees it offers. For example, the oldest campus, UC Berkeley, offers about 85 different Ph.D. programs, and a younger campus, UC San Diego, offers about 50. Usually, departments that offer a bachelor’s degree are very likely to offer at least one Ph.D. degree in that field. On the nine general campuses, doctoral programs span from arts and humanities to social sciences to STEM (science, technology, engineering, and mathematics). UC San Francisco’s 16 or so Ph.D. programs are closely related to the intellectual areas relevant to its graduate health sciences focus.

In fall 2012, there were 26,155 academic doctoral students enrolled on the UC campuses. The number of fall 2012 Ph.D. students and the percent they were of all students on each campus varied (Display 1). Note that the average of 11 percent across all campuses is the same as it was in 2000.

Display 1. Total number enrolled students, and number and percent academic doctoral students by campus as of Fall 2012.

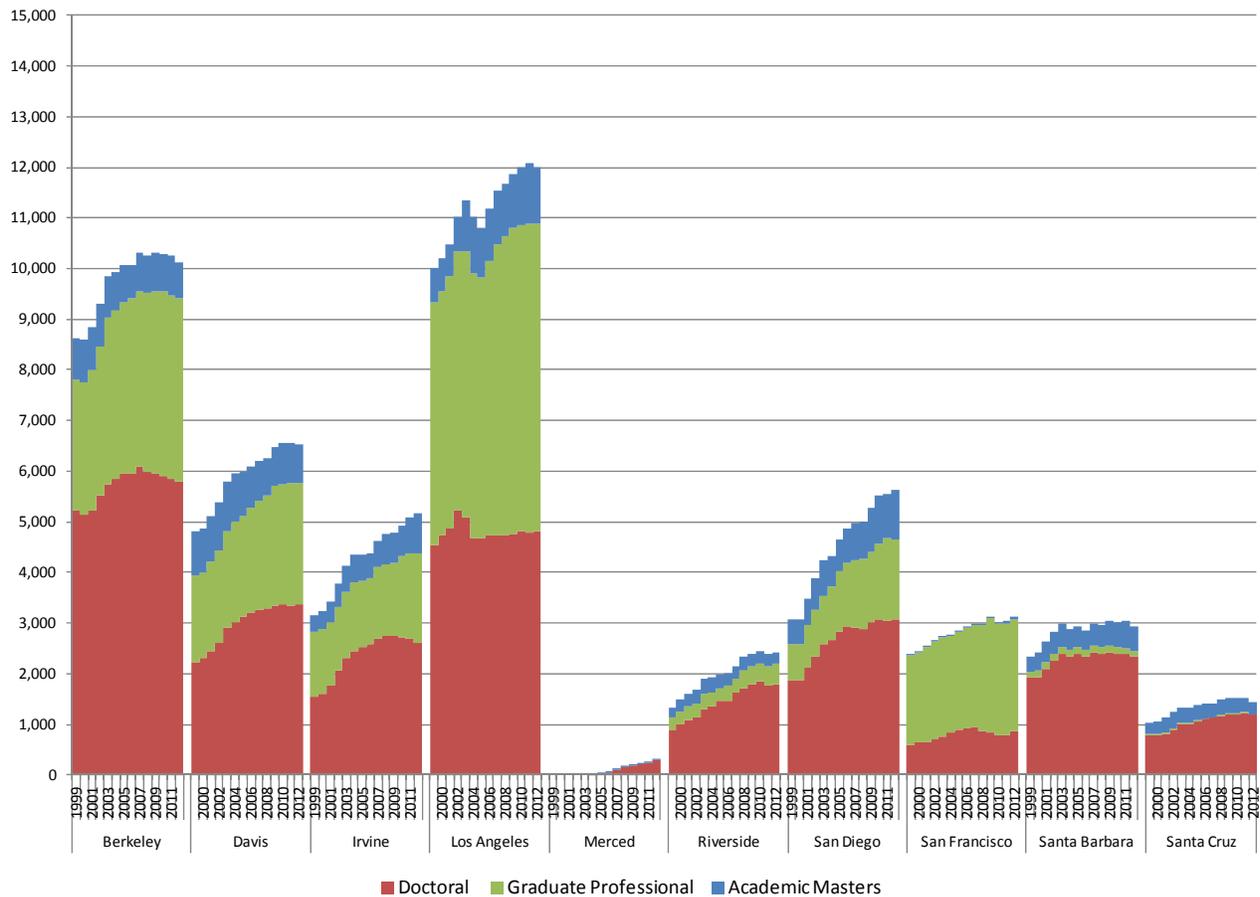
Campus	Total Enrolled Students	Academic Doctoral Students	% Academic Doctoral Students
Berkeley	35,893	5,804	16.2%
Davis	32,354	3,363	10.4%
Irvine	27,479	2,618	9.5%
Los Angeles	39,945	4,826	12.1%
Merced	5,760	288	5.0%
Riverside	21,005	1,787	8.5%
San Diego	28,294	3,060	10.8%
San Francisco	3,137	878	28.0%
Santa Barbara	21,927	2,348	10.7%
Santa Cruz	17,404	1,183	6.8%
UC	233,198	26,155	11.2%

Source: UCOP Corporate Student System
Excludes Health Sciences Residents and includes post-baccs as undergraduates

Graduate students are an essential part of the total student body of elite research universities, and doctoral students are an essential part of the graduate student body. Graduate students are defined as those in doctoral, academic master’s, and professional degree programs. The campuses differ somewhat in the mix of these three types of graduate students (Display 2). On all ten campuses, academic master’s students are a decided minority, and on eight campuses doctoral students are the majority of the graduate students. UC San Francisco with its health sciences mission educates far more graduate professional students than doctoral students, and UC Los Angeles, in contrast to the other general campuses, educates more graduate professional students than Ph.D. students. Although this report focuses on doctoral students and the need to

enhance recruitment of these students, it is worthwhile to use available comparison data to demonstrate that UC needs to increase its proportion of graduate student enrollment overall.

Display 2. UC graduate enrollment by campus and student level, fall 1999 to fall 2012.



For years, UC has lagged behind its AAU public and private peers in graduate enrollment. As of 2010, 21.8 percent of UC’s student body was graduate students, compared to 27.2 percent for the other AAU publics and 52.8 percent for the AAU privates. UC has long sought to increase its number and percentage of graduate students, particularly on the younger campuses. In fact, the recently adopted model for distributing new State funds (known as “rebenching”) includes “incentive funding” to help the younger campuses do so. From fall 2000 through fall 2012, the numbers of UC graduate students have increased from 37,787 to 49,700; however, because of the continuing rise in undergraduate enrollment, graduate students have not increased meaningfully (from 21.1 percent to 21.3 percent) in their representation in the UC student body. Moreover, 21 percent is notably less than the 30 percent figure that characterized the percent of graduate students in UC in the 1960s. UC continues to seek to increase the proportion of graduate students it serves, and it is important to the campuses that doctoral students contribute substantially to the increase.

Characteristics of Ph.D. Students

In world-class research universities doctoral education is an international activity. UC recruits students from throughout California, the nation, and the world. Faculty select applicants for admission to their own Ph.D. program, using a holistic review process that may require work samples, interviews, and/or auditions. Faculty prize applicants who provide evidence of strong intellectual knowledge and skills in relevant areas, lively curiosity, good fit with the strengths and directions of the degree program, and personal characteristics and interests that increase diversity in the student body. Minimum grade point averages must be met and admission must be approved by the graduate division at each campus. Nonetheless, except in rare instances, the faculty of each Ph.D. program make the actual selection of all those to be admitted. Faculty also actively recruit the top candidates and develop financial support packages for them.

Over the last decade, UC Ph.D. enrollment numbers have increased (Display 2). Each year, the majority of Ph.D. students (about 70 percent) have been California residents. Residents of the other 49 states were five to ten percent, and international students were 20-30 percent. Because U.S. residents can become California residents after one year, the 70 percent figure for California residents among all enrolled Ph.D. students includes many students who came from elsewhere in the U.S. in order to attend a UC Ph.D. program. International students cannot become California residents at any point in their Ph.D. program, so the 20-30 percent figure represents all international students.

Enrollment of international Ph.D. students at UC has declined in recent years from a high of about 30 percent to about 25 percent. This fraction is well below the average percentage of international doctoral enrollment for UC's peer institutions. For example, data from the NRC study were used to compare the percentage of international Ph.D. students for each UC campus (except UC Merced) with each of the other 28 AAU public institutions. Among the 37 institutions examined, the percentage of international Ph.D. students ranged from five to 60 percent, and the median was close to 40 percent. Eight of the nine UC campuses fell below the median; the ninth was just above it. There are no benchmarks as to the most desirable international enrollment levels overall or by field. It is possible to be over-enrolled. This is not the case for UC where the percentage is low compared with AAU peers. UC faculty believe they are not enrolling enough international students, largely because of limited capacity to provide adequate financial support packages. This results in UC's not drawing evenly from the very best worldwide pools of students interested in its Ph.D. programs.

The proportions of underrepresented racial/ethnic groups and of women in UC's Ph.D. programs, while less than those in UC's undergraduate programs, are overall about the same as those for other AAU publics and AAU privates (Display 3). Proportions vary considerably by field, with the physical sciences and engineering/computer science preparing the smallest percentages of Ph.D.s who are from underrepresented groups and/or are women. From fall 2001 to fall 2012, the proportion of enrolled Ph.D. students who are underrepresented has increased to some extent and the degree of increase has varied by field and specific racial/ethnic group. Depending on the field, there has been no change or a small decline recently in the proportion of enrolled Ph.D. students who are women. Given California's population and the diversity figures for recent Ph.D.

graduates, UC’s success in diversifying its Ph.D. student body, while comparable to and sometimes better than that of its peers, must improve if the University is to meet its responsibilities to the state and nation.

Display 3. Proportion of underrepresented racial/ethnic groups and of women receiving academic doctoral degrees, 2010-11, at UC, other AAU public institutions, and AAU private institutions. Underrepresented groups include African Americans, American Indians, and Chicanas/os / Latinas/os.

Field	Proportion of Underrepresented Groups			Proportion of Women		
	UC	Other AAU Publics	AAU Privates	UC	Other AAU Publics	AAU Privates
Arts & Humanities	14%	8%	9%	57%	55%	55%
Social Sciences	13%	10%	8%	54%	56%	56%
Life Sciences	8%	6%	8%	54%	59%	56%
Physical Sciences	6%	4%	3%	33%	35%	33%
Engineering & Computer Science	4%	5%	5%	23%	22%	24%

Doctoral Work and Time to Degree

Ph.D. programs involve course work, independent work, and substantial engagement with one or more faculty mentors. Many programs use apprenticeship models to help students acquire the knowledge, skills, and values expected of someone who earns a Ph.D. Programs generally have three phases. In the first year(s) the student takes courses and engages in experiences that develop the research, scholarly, and creative expertise he or she will need to complete the program. In the middle phase, the student demonstrates that he or she has achieved the goals for this first period and is ready to undertake the dissertation through advanced courses, seminars, and/or laboratory or fieldwork experience. She or he will need to pass some combination of written and/or oral examinations and have prepared some preliminary scholarly products. This second period ends when a full proposal for the dissertation has been approved by a campus-approved dissertation committee of three or more ladder faculty. At this point, the student has been “advanced to candidacy” (ATC) for the Ph.D. and entered the third and final phase of a Ph.D. program. The student carries out the research or other creative activity described in the approved proposal, prepares a formal presentation of it (almost always as a written dissertation), and obtains final approval of it from his or her dissertation committee. Completion of the dissertation can be a lengthy process and often accounts for a large portion of time to degree.

The time spent in each of the three phases and the time to degree vary considerably according to the student’s intellectual area. As a generalization, time to the Ph.D. from shortest to longest in different fields is as follows: sciences and engineering, social sciences, arts and humanities. For UC, median years to the doctoral degree for 2007-09 exit cohorts ranged from 5.3 to 5.7 years for physical sciences, mathematics, engineering, and computer science doctorates, and from 6.7

to 7.4 years for arts and humanities doctorates. The longer median time to degree for arts and humanities doctorates is often because of students' need to learn entirely new languages or skills in order to complete the dissertation.

Financing a Doctoral Education

Ph.D. students' educational and living expenses are covered via a combination of resources that may include fellowships, on campus appointments as a graduate student researcher (GSR) or teaching assistant (TA), other opportunities for earnings on or off campus, savings, family contributions, and/or loans. Knowing that full support throughout a doctoral program is the norm for many of UC's competitors and the goal for all of them, departments and the faculty member who serves as a student's mentor take considerable responsibility for ensuring adequate financial support for the doctoral students they admit. Ordinarily this would include fellowships and a GSR and/or TA appointment. These resources are awarded primarily on the basis of merit in contrast to the largely need-based approach to financial aid for UC undergraduates. Ph.D. programs vary considerably in how much GSR and TA support they can provide.

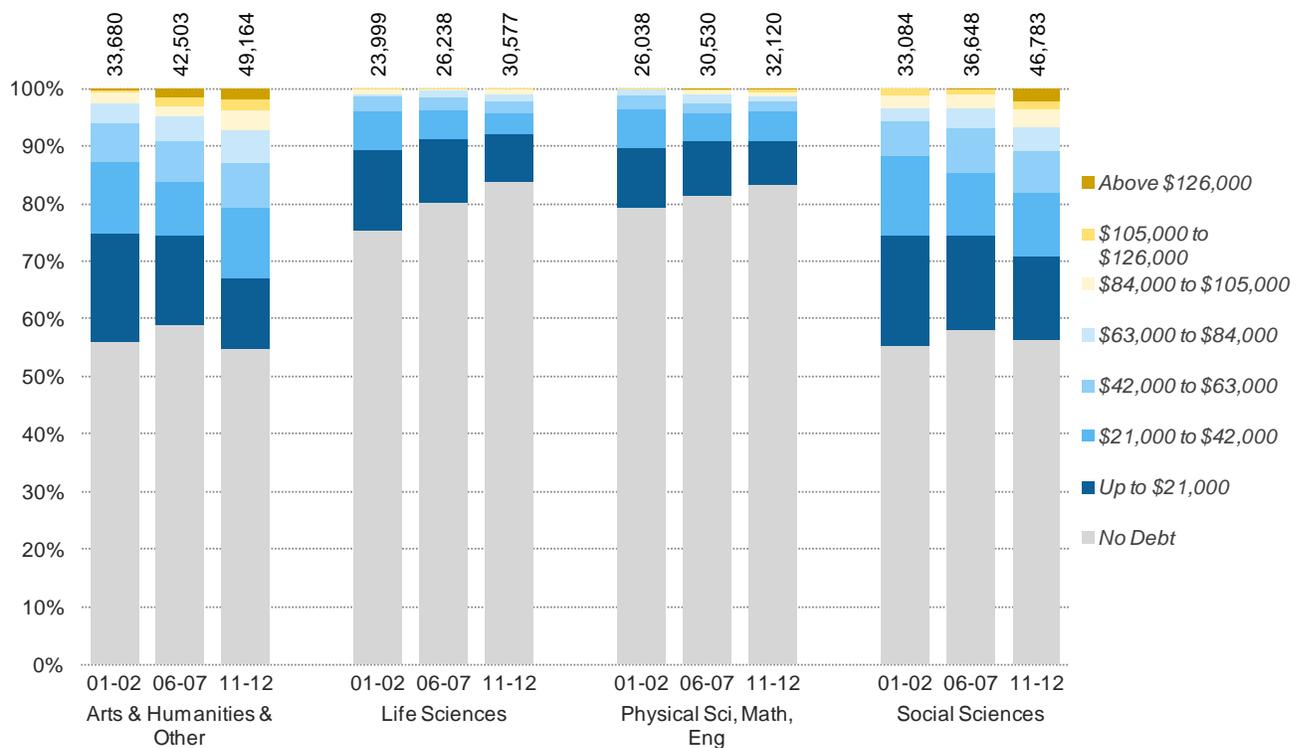
Currently, campuses have a variety of policies and practices governing how Ph.D. student tuition and fees are covered by different fund sources. For fellowships, funds awarded ordinarily must first be used to cover tuition and fees; any remaining funds are used for living expenses. For GSR and TA positions, Ph.D. students are paid a stipend based on their years of experience and percent time of the appointment (25-50 percent is usual). For both TAs and GSRs, it is expected that all tuition and fees will be paid for the term of the appointment. Typically, the TA funds are provided entirely by the campus administration in set amounts for each department and GSR funds come from externally funded faculty research grants.

All Ph.D. students must pay campus-based fees and regular tuition. Those who are not California residents must also pay NRST. All students must cover their living expenses. Currently, the total cost for the first year in a doctoral program would be about \$50,000 to cover tuition and fees for the academic year and living expenses for the calendar year for a California resident without family support obligations; for both a U.S. resident from outside California and a student from outside the U.S. without family support obligations, the total first year cost would be about \$65,000 because of the additional NRST. U.S. residents would be expected to become California residents after one year; they would no longer pay NRST. International students, by Regental policy, pay NRST until they have advanced to candidacy (had their dissertation proposal approved) after which NRST is waived for three years. UC's practice of charging externally funded research grants the full NRST for GSRs who are not California residents is a particular source of consternation for many faculty, especially as the availability of external funding has decreased and tuition costs have risen.

Faculty prefer that every Ph.D. program cover a student's full costs for about four years through a combination of fellowships and appointments as a GSR and/or TA. Virtually all UC doctoral programs meet this aspiration for a few students. At best, a few meet this goal for all their Ph.D. students, and those that do will likely have a very small Ph.D. program and a high volume of external research funding. There are differences across the disciplines in the percentage of

students who complete the Ph.D. in debt, ranging from a high of about 45 percent in humanities and social sciences to a low of less than 20 percent in the STEM fields. Over the last decade, during which UC tuition has dramatically increased, the average amount of indebtedness for those who graduate with debt has risen, but it remains generally within the range that is considered “affordable debt” (Display 4). Over the same time period, there has either been no change in the percent who graduate with debt or the percent has decreased somewhat. This is a remarkable achievement and a testament to the commitment of UC faculty to support Ph.D. students.

Display 4. Graduating doctoral students’ debt burden. Percent graduating with debt, categorical and average debt of those who borrowed, inflation-adjusted dollars, UC systemwide, 2001-02, 2006-07, and 2011-12.



The private universities with which UC competes for the best students are able to promise four or more years of full support to most if not all their students. Clearly, UC is at a competitive disadvantage in this regard. There is great concern in many quarters that UC must address this disadvantage as it seeks to enroll Ph.D. students in the numbers and of the quality essential for a world-class research university. We will return to this topic after a short look at some indicators of UC’s performance in doctoral education.

Accomplishments in Ph.D. Education

UC's Doctoral Programs Are Highly Ranked

There are several ranking systems that are based largely on the quality and impact of a university's research (e.g., Shanghai Academic Ranking of World Universities, Times Higher Education). UC campuses do well in these rankings. The main source of evaluation of U.S. Ph.D. programs themselves is the National Research Council (NRC). NRC is one of four organizations known collectively as the National Academies (the other three are the National Academy of Sciences, National Academy of Engineering, and Institute of Medicine). They produce "groundbreaking reports that have helped shape sound policies, inform public opinion, and advance the pursuit of science, engineering and medicine" (quoted from website).

Over the last decade, the NRC carried out a comprehensive evaluation of 4,838 Ph.D. programs at 212 U.S. universities and ranked each program at each university based on several different measures. The evaluation is a respected source to assess the quality of Ph.D. programs in academia. UC had 325 Ph.D. programs that were ranked. They came from all campuses except UC Merced, with about half of the programs located at UC Berkeley, UC Davis, and UC Los Angeles. Of the 325 UC programs evaluated, 81 (25 percent) were ranked in the top one-to-ten percent and 61 (19 percent) were ranked in the top 11-20 percent in their fields. These high rankings clearly outstrip those of the four public universities in UC's Comparison 8 (Illinois Urbana-Champaign, Michigan Ann Arbor, SUNY Buffalo, Virginia Charlottesville), while the higher rankings of the four privates in the Comparison 8 (Harvard, MIT, Stanford, Yale) clearly outstrip those of UC. The University's Ph.D. programs overall are very good. Many also have plenty of room to improve their status in evaluations such as that conducted by the NRC.

UC Attracts Outstanding Ph.D. Students

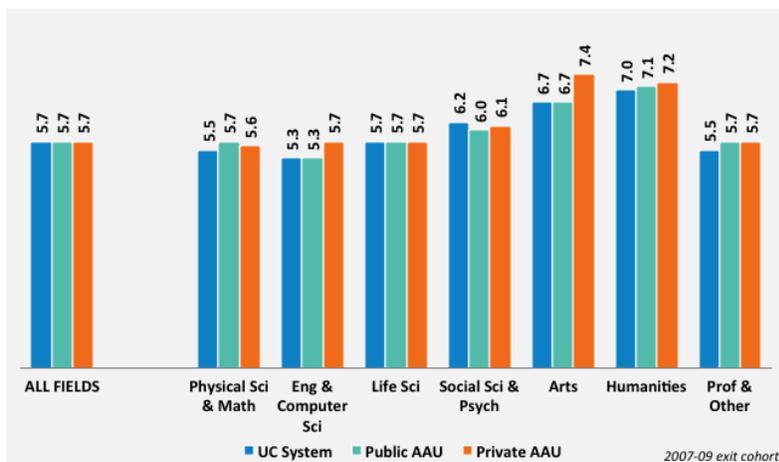
There are several indicators of the quality of the doctoral students whom UC attracts, including the following:

- UC can afford to be highly selective. The systemwide admission rate for academic graduate students was about 20 percent in 2011.
- UC graduate students win a large share of prestigious National Science Foundation (NSF) Fellowships. In 2013, seven UC campuses were among the top 20 institutions attracting NSF Fellows to their doctoral programs. Of the other 13 institutions, eight are elite private universities and five are the flagship campus of the public university systems for Illinois, Michigan, Texas, Washington, and Wisconsin. Among the top 20 institutions, UC Ph.D. students garnered a full 45 percent of all NSF Fellowships in 2013!
- More than twenty UC doctoral students have gone on to win the Nobel Prize

UC's Time to Complete the Ph.D. Compares Favorably to That of AAU Peers

Earlier, differences by field in time to complete the Ph.D. were described. Display 5 below shows those field-based differences and how UC Ph.D.s' median times to degree compare to those of the AAU non-UC publics and the AAU privates. For all seven fields combined, UC, the other AAU publics, and the AAU privates had exactly the same 5.7 median years to the doctorate. UC's median time to the Ph.D. was the same as or shorter than those of the AAU other publics and privates for the six fields of physical sciences and mathematics, engineering and computer and information sciences, life sciences, arts, humanities, and professional and other. For just one field, social sciences and psychology, UC median time was longer than it was for the AAU other publics and AAU privates.

Display 5: The median years it takes to finish a Ph.D. degree in different fields for UC and AAU other public and AAU private institutions.



Standard expectations for completion of the Ph.D. are eight years for arts and humanities fields and six years for the other five fields shown above. The NRC Assessment of Doctorate Programs described earlier shows a wide range in the percentage of students who have completed their Ph.D. by that time. Five fields were examined. Among the UC campuses (excluding Merced) and the eight universities in UC's Comparison 8, the percent of students completing the Ph.D. within the six years expected for their four fields ranged from a low of 20 percent to a high of 67 percent. For arts and humanities, with eight years expected, the range was from 32 percent to 68 percent for the 16 institutions. Considered overall and taking account of the variation among institutions in doctoral enrollment by field, UC students' doctoral completion rates were generally comparable to those of the Comparison 8 publics (Illinois Urbana-Champaign, Michigan Ann Arbor, SUNY Buffalo, Virginia Charlottesville) and lower than those of the Comparison 8 privates (Harvard, MIT, Stanford, Yale). For years, there has been a national conversation among research universities about the length of time it takes many students to complete the Ph.D. and how many may never finish. The Ph.D. is a very demanding degree that should and does require deep and sustained investment from students and their faculty. At the same time, there is wide recognition that Ph.D. programs need to do more to enroll students for

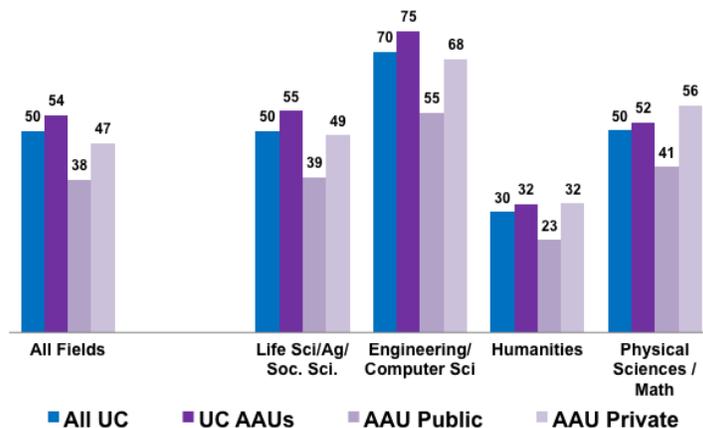
whom the Ph.D. is appropriately matched to their aspirations and abilities, and then to support timely degree completion for these students.

UC's Ph.D. Production Is High

UC awards about 3,600 Ph.D.s a year, or about seven percent of the nation's Ph.D.s. It awards about eight percent of all Ph.D.s that go to students who traditionally are underrepresented in higher education (African Americans, Latinas/os, Native Americans, and Pacific Islanders). True to its Master Plan mission, UC awards 60 percent of all Ph.D.s from California universities and 70 percent of those awarded in science, technology, engineering, and mathematics.

On a per-faculty basis and compared to UC's AAU peers, UC faculty are efficient in educating Ph.D. students. In 2010-11, for example, UC faculty on average each produced 0.5 Ph.D. graduates, the same as did faculty in AAU private universities and 0.1 more (20 percent more) than did faculty in other AAU public universities. By field (because time to degree varies by field) and over five years instead of one (Display 6), UC's Ph.D. productivity per 100 faculty is decidedly greater than that of other AAU publics in each of four different fields. In comparison to AAU privates, UC faculty are more productive in two fields. For the other two fields, in humanities UC faculty at AAU campuses perform the same as AAU privates faculty, with all UC campuses just a little lower; in physical sciences and mathematics, AAU privates faculty are more productive regardless of the AAU status of UC campuses. Overall, UC faculty are more productive in producing Ph.D. graduates than are the faculty at other AAU publics or the AAU privates.

Display 6: UC's production of doctoral degrees per 100 faculty members over the five-year period from 2006-07 to 2010-11 in comparison with AAU other public and AAU private institutions.



Challenges to Maintaining Competitiveness

UC's competitiveness for attracting the top Ph.D. students depends primarily on three factors:

- The world-wide reputation of its faculty and departments
- Funding and a cost structure that together result in UC being able to offer financial support that is competitive with our peer institutions and allows Ph.D. students to complete the degree with minimal financial burdens
- A merit-based admission process that draws from the largest possible talent pool, including both domestic and international students treated equally

Two trends threaten UC's ability to recruit the quality of graduate academic students it wants and needs. The first is that UC's stipend offers are not keeping pace with those of its peers, especially the private peers, and the cost of living in California is generally higher. The second is that UC policies for charging GSR tuition to grants and contracts, and on some campuses for charging TA tuition to departments, make international students far more expensive than are domestic students, providing a strong disincentive to recruit international students. The first of these problems will require additional funds dedicated to stipends both from the University's internal funds, including gifts and endowments, and from externally sponsored research grants. The second problem is primarily internal to UC and can be addressed by changes in how tuition is charged to grants and/or department TA budgets.

UC's lower stipends also result from loss of State support for education and a cutback of federal appropriations for academic research and development. The sequestration of federal funds now in effect worsens this trend: UC's federal funding for the year to date remains nearly \$220 million behind last year's total, a drop of about 12 percent that jeopardizes research advancement and the competitiveness of UC's doctoral education.

UC has always charged supplemental tuition for nonresident students, the Nonresident Supplemental Tuition (NRST) that makes mainly international Ph.D. students more expensive than are domestic Ph.D. students. Charging NRST is common practice among public universities, and the NRST represents a needed source of revenue. However, when it comes to charges on research grants, nearly all UC AAU competitor public universities do not charge more than in-state tuition and some charge less. Nearly all AAU private universities do not charge their full tuition to research grants, and what most privates do charge to research grants is less than what UC campuses charge for a nonresident student. UC's policies are anomalous vis-à-vis its AAU competitors and provide a disincentive to appointing international students as GSRs which in turn decreases the likelihood of their admission into UC's Ph.D. programs.

In comparison with its peers, UC's tuition rates are about average for public universities but much greater than average when NRST applies. Even with NRST, UC's graduate tuition rates are typically lower than those of comparable private universities. However, private universities often use revenue from their endowments and other private funds to support doctoral students

through fellowships and rebates to grants, thus giving them the ability to offer better stipends and reduce the burden on faculty grants or student debt.

Focus on Funding for Ph.D. Students

In the last two years, not one but two reports have examined funding for UC's Ph.D. students and offered recommendations as to how to keep it, or make it, competitive enough that the best students from around the world choose to apply to and enroll in a UC Ph.D. program. This section focuses on the substance of these two reports.

One report was prepared by the joint Senate/Administration Graduate Student Issues Work Group (Joint Report) that was established by the former UC Provost as a follow up to a Regents item (September 2011 meeting). Use of a joint work group is a common approach to tackling shared concerns of UC faculty and administrators. Also typical was the use of Senate/Administration co-chairs, in this case the then Academic Council chair and a campus executive vice chancellor/provost. The other report was prepared by a special Committee on Academic Graduate Student Support (Senate Report) that was established by the same Academic Council chair to carry out its study in parallel and as a complement to that of the joint work group. This committee was led by the chair of the Coordinating Council on Graduate Affairs at that time. It is unusual to have a joint Senate/Administration committee and Senate only committee working on the same topic at the same time. In recognition of the existence of two reports and the shared concerns of faculty and administrators about the competitiveness of UC's Ph.D. programs, this discussion item will be presented to the Regents by both the current UC provost and the current Academic Council chair.

The Joint Report and Senate Report clearly shared the view that high-quality Ph.D. programs and outstanding students in "adequate" numbers are essential for an elite research university such as UC. They generally agreed about the challenges UC faces in funding Ph.D. students at competitive levels and about several of the options for addressing these challenges. There are some differences in assessments of the seriousness of some challenges. There is a significant difference in the recommended course of action, with the Senate Report recommending a small number of actions that would be implemented systemwide and the Joint Report recommending that each campus craft its own best approach drawing from a wide range of possible options.

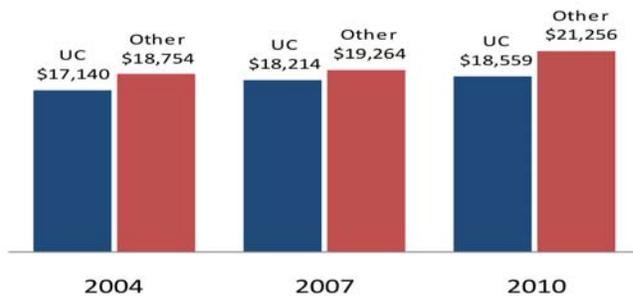
Funding Challenges – Competitive Stipends

The Joint Report and the Senate Report agreed that UC's stipend offers are lower than those of its competitors and that this lessens UC's ability to attract the best Ph.D. students. UC understands that potential Ph.D. students are looking for programs that suit their particular interests, have faculty who are doing outstanding work in those areas, and are in a prestigious university. That said, financial support also matters, particularly as the difference increases between what a UC program and a competitor program each offers.

The 2010 UC Graduate Student Support Survey showed that UC's net stipend offer (the amount available to students for living expenses once tuition and fees are paid) averaged about \$2,700

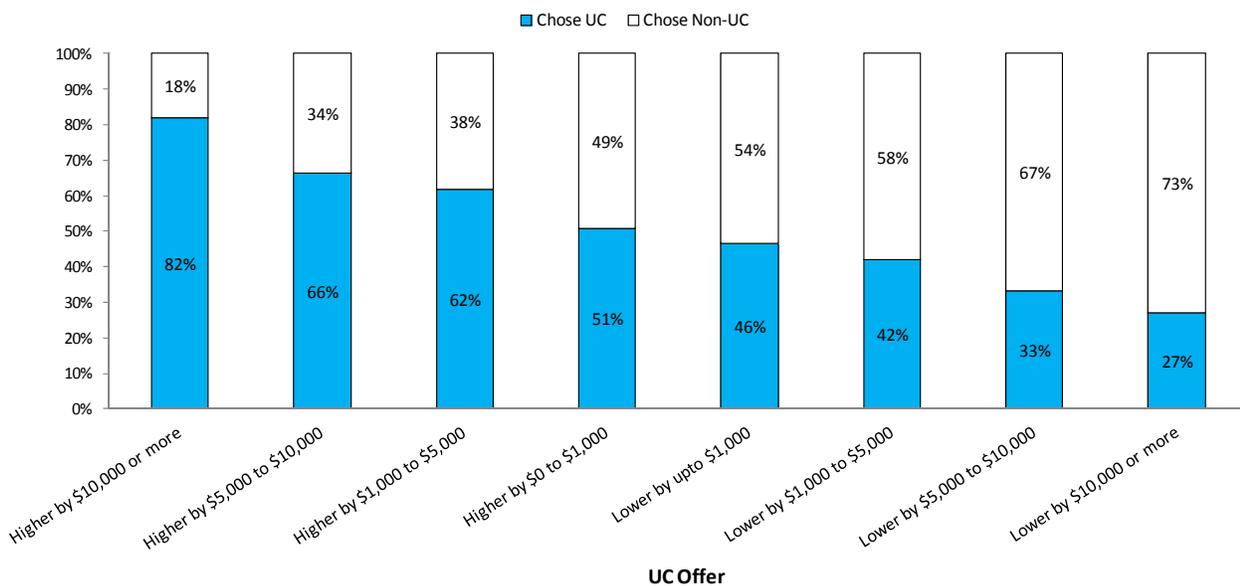
(13 percent) less than the net stipend from students' top non-UC choices (Display 7). Moreover, the gap increased in the six years shown. Preliminary results from the 2013 survey suggest that the gap still exists.

Display 7: Average first-year stipends offered by UC compared to those offered by students' top non-UC choices.



Competitive stipends matter. Analyses of the 2010 UC Graduate Student Support Survey showed that an applicant's acceptance of a UC Ph.D. program offer was clearly related to how much higher or lower UC's stipend offer was compared to that of the offer the student accepted (Display 8). There is a strong linear relation between difference in stipend and the offer that was accepted. At the same time, there is also clear evidence that students take into account characteristics other than, or in addition to, financial support. Even when UC's offer was at least \$10,000 higher, 18 percent of those admitted to a UC Ph.D. program went elsewhere, and even when UC's offer was at least \$10,000 lower, 27 percent came to UC. If UC can do that well in recruiting top choices to its doctoral programs, imagine how well it would do if it were able to make more financial offers that were as high as those offered by its peers.

Display 8: Systemwide acceptance rate vs. stipend offer for doctoral students, 2010.



Funding Challenges – Tuition

UC's tuition charges compare favorably with most of its peers. For public institutions, the tuition for state residents and for residents from other states or countries is reasonably comparable to that for UC. For private institutions, the tuition for all students is somewhat greater than that for non-resident UC students and much greater than that for California resident UC students. Although detailed information is difficult to obtain, it is generally believed that the student support differences between UC campuses and their competitors have more to do with disparities in student funding packages than with disparities in student tuition.

Although UC's tuition is comparable to or less than that of many of its peers, its policy of charging full tuition including NRST to externally funded grants is not comparable. Private institutions typically charge around half of the tuition cost to a grant. Public institutions outside California typically charge only the resident tuition or a flat rate more likely to be lower not higher than the resident tuition. From the time that UC adopted this policy, faculty have chafed at the added costs and frequency of tuition increases that can only be met, given external agency funding limits, by reducing the scope of the research and/or the number of doctoral student GSRs they can appoint.

The rapid increase in tuition and decrease in federal funding for research grants have together placed increasing limitations on the ability of faculty to support apprentice researchers in many fields. Tuition charges are sufficiently high that it is now often less expensive to support a postdoctoral researcher than a graduate student researcher; it is also probably more cost effective in that the postdoc is very likely to be a more sophisticated researcher than is the graduate student. Should a researcher choose to appoint a postdoctoral researcher, funding is shifted away from doctoral student support and the mission to prepare Ph.D.s, and the University decreases its ability to compete effectively for the best Ph.D. students.

In 2010-11 – the latest year for which figures are available – \$70 million in NRST was charged for academic doctoral students. Of this amount, \$41 million (58 percent) was paid from University-funded fellowships and GSR remissions. The remaining \$29 million (42 percent) reflected net revenue from external sources such as external fellowship programs, research grants, and out-of-pocket payments by doctoral students.

Options for Addressing Challenges

Options for addressing UC's challenges in providing competitive funds for Ph.D. students are of three types: those that increase the pool of funds available, those that decrease the costs of doctoral education, and those that change requirements for the costs that different fund sources must cover. Both the Joint Report and the Senate Report offered all three types of options. The Senate Report offered four recommendations. The Joint Report instead chose to recommend that each campus craft the set of measures that best suits its environment. Eight options related to competitive funding were described, there was some discussion of the pros and cons for each one, and none were specifically recommended or rejected.

Increase the Pool of Funds Available to Support Ph.D. Students – Funding for Ph.D. students can be increased via any of the following mechanisms: increase State funding specifically for doctoral student support; redirect existing State funds, general funds, and/or other campus funds from their current uses to doctoral student support; return NRST revenue to the doctoral program that generated it (likely implementation would be NRST from enrollment increases); increase current use and endowment gifts for doctoral student support; increase acquisition of outside doctoral fellowships (e.g., NSF Fellowships) by Ph.D. students, and increase awards of external contracts and grants that include doctoral student support.

One of the Senate Report's four recommendations was to allocate additional resources for doctoral student stipends. Four of the Joint Report's eight options addressed increasing the pool of funds for doctoral student support, although the Joint Report also recognized that particularly in the current time of financial distress any of these options would very likely privilege doctoral student needs over several other high-priority needs on each campus. As the economy improves, however, and as additional systemwide revenue from the State or other sources becomes available, UC should be encouraged to make enhanced doctoral student support a very high priority. Doing so would send a strong signal as to the importance of doctoral education and the need for systemwide action to enhance it.

Decrease the Costs of Education for Ph.D. Students – The costs of a Ph.D. degree can be decreased via any of the following mechanisms: decrease graduate academic student tuition; do not raise graduate academic student tuition when tuition for other students is being raised; do not charge nonresident supplemental tuition (NRST) to Ph.D. students ever or after successfully completing the first year or after advancing to candidacy, and shorten the time required to complete the degree.

Currently, academic year tuition for Ph.D. students who are California residents is, in fact, lower by nearly \$1,500 for graduate than undergraduate students, and nonresident supplemental tuition (NRST) is lower by about \$7,700. One of the Senate Report's four recommendations is to reduce the financial impact of NRST by any of three different strategies, and one of the Joint Report's eight options is to eliminate NRST for Ph.D. students after their first year. The ultimate effect of reducing costs or increasing funding is the same, namely, greater capacity to fund Ph.D. students at the competitive level needed to bring them to UC campuses.

Change Requirements for the Costs Different Fund Sources Must Cover – As described earlier, a GSR receives a monthly stipend, and his or her tuition and fees are covered during the term of the appointment. The costs are lodged against whatever funds are supporting the research, most often an externally funded research grant obtained by UC faculty. Since it was instituted, the practice has been of great concern to many faculty. They are particularly unhappy about charging NRST costs to their grants. As tuition has risen rapidly, concern has increased. Many argue that the costs are sufficiently high that they lead to appointing postdoctoral fellows rather than GSRs, appointing California resident GSRs rather than non-resident GSRs, and appointing fewer GSRs altogether. These choices typically also result in lower Ph.D. enrollments, particularly for international students. All these consequences

undermine efforts to bring the best Ph.D. students to UC campuses in adequate numbers for the faculty.

As noted above, one of the Senate Report's four recommendations was to reduce the financial impact of NRST by any of three different strategies, and one of the Joint Report's eight options was to eliminate NRST for Ph.D. students after their first year. The Senate Report also recommends not charging any NRST to research grants. All these options would reduce the costs that faculty research grants incur when appointing nonresident GSRs and likely increase to some unknown degree the appointing of GSRs. At the same time, as the Joint Report pointed out, these options place the burden of funding NRST on other campus fund sources or else they decrease campus revenues from NRST.

As discussed above, nearly all public AAU institutions (other than UC campuses) generally charge no more than the resident tuition to research grants, regardless of whether the GSR is a resident or nonresident. In contrast, in 2010-11 (the last year for which data are available), an estimated \$13.9 million in NRST revenue was charged to UC research grants. Of this amount, \$4.1 million was charged to UC-funded research grants; the remaining \$9.8 million was charged to external grants. UC could follow the other public AAUs' practice in order both to reduce total costs charged to research grants and also to eliminate the current economic disadvantage associated with enrolling nonresident students, particularly international students, and supporting them as GSRs.

Recent Efforts to Address the Challenges

When the Joint Report and Senate Report were prepared, the University had been struggling for several years with dramatic decreases in State support. Campus adjustments were being made in ways that protected the academic core, with most resource allocation choices directed to sustaining the quality of UC's undergraduate education and to continuing to meet UC's Master Plan commitment to offer enrollment to all eligible California high school graduates who applied. The two reports highlighted both the importance of doctoral education as an essential part of the University's academic core and also the need to improve UC's recruitment of outstanding Ph.D. students by increasing the competitiveness of the funding offered. The campuses have been developing new approaches to doing that.

All campuses are seeking new resources for doctoral student support and innovative ways to use such resources to incentivize funding commitments from faculty and departments and gifts from donors. The following are examples of this work:

- UC Davis and UC San Francisco are developing partnerships with international universities and government agencies to recruit outstanding international doctoral students who come with their own funding.
- UC Los Angeles provides matching funds for externally funded doctoral training grants to encourage faculty to write proposals and boost the impact of funded proposals.

- UC San Diego recently received a gift from a major donor that provides to five incoming Ph.D. students each a \$10,000 annual supplement for each of five years to the funding guaranteed by the department. Also, in its last campaign, in order to incentivize new fellowship gifts, the campus matched the value of current use gifts and the payout of endowment gifts.
- UC San Francisco has a dedicated team of development officers who work with the graduate dean and program directors on fundraising strategies and initiatives.
- UC Merced's development office has worked with the graduate division to create recruiting fellowships that provide \$4,000 annually for four years.
- UC Santa Barbara has endowed close to \$20 million for the direct support of doctoral students in the current phase of its fundraising campaign.
- UC Los Angeles conducts disciplinary and campus-wide workshops and engages faculty mentors to support students' success in garnering extramural fellowships, such as NSF and Fulbright. These activities will be greatly increased this year, with support from the Student Fee Advisory Committee.

Campuses are also redirecting existing resources to provide greater resources for doctoral student support. The following are examples of this work:

- UC Riverside now provides NRST for all incoming U.S. residents outside California for the first year (three quarters) and all incoming international students for the first four quarters.
- UC Irvine has established a Graduate Dean's Recruitment Fellowship of up to \$5,000 to top off an original award offer to prospective doctoral students with competitive offers from other institutions and encourage matching funds from the department.
- UC Santa Barbara offers extensions to doctoral students who receive the prestigious three-year NSF Graduate Research Fellowships and partners with departments to increase award packages for other prestigious external awards.
- UC Davis in fall 2012 committed more than \$2 million for Provost's Fellowships in the Arts, Humanities, and Social Sciences to provide 50 fellowships that provide stipends and cover all tuition and fees for first-year doctoral students.
- UC Berkeley sponsors a campus-wide fellowship competition for prize multi-year fellowships with competitive stipends co-funded with departments and programs.

Finally, campuses are also addressing the negative effects of requiring that externally funded research projects cover the cost of both regular and NRST tuition for doctoral student researchers (GSRs) who are not California residents. The following are examples of this work:

- UC San Diego started this fall to remit funds to departments and programs equivalent to the amount of NRST paid on behalf of entering doctoral students and expects to continue remissions for years two and three. This Chancellor's initiative is intended to remove the current disincentive to recruit Ph.D. students from outside California.
- UC San Francisco recently announced a major gift for the Discovery Fellows Program that includes matching funds from the campus plus \$5 million that must be matched by at least 500 donors to ensure that the campus was always competitive in its Ph.D. recruitments and that faculty research grants are not burdened by the costs of having doctoral students participating in the work.
- UC Santa Cruz covers the first two years of the NRST for select international applicants in all disciplines with the expectation the students will advance to candidacy within that period and therefore have further NRST waived.

The Joint Report emphasized that "different campuses, and different departments within the same campus, face different competitive situations, so flexibility is needed. Additionally, to the extent that several of these recommendations [in the report] cause a net loss of revenue to the campuses, the difficult decisions regarding what might be cut in order to provide enhanced support to academic Ph.D. programs might vary on each campus." Going forward, the Office of the President will collaborate with the systemwide Academic Senate to convene a systemwide meeting on doctoral education to share best practices such as those just described and campus goals with respect to doctoral education. A formal report will document the goals and provide a compendium of pathways the different campuses and programs within campuses have found useful.