

## Office of the President

### TO MEMBERS OF THE COMMITTEES ON LONG RANGE PLANNING AND EDUCATIONAL POLICY:

#### DISCUSSION ITEM

*For Meeting of September 15, 2010*

### BIENNIAL ACCOUNTABILITY SUB-REPORT ON GRADUATE ACADEMIC AND PROFESSIONAL DEGREE STUDENTS

This first **Biennial Accountability Sub-Report on Graduate Academic and Professional Degree Students** contributes to the series of reports that has been established in order to:

- review key areas of the accountability framework in more detail;
- discuss strategic choices that need to be made by UC in those areas;
- inform the Board's deliberations about important policy and budget questions; and
- achieve a richer understanding of UC as a system and of campus distinctiveness.

#### **The University of California's Doctoral Education Mission**

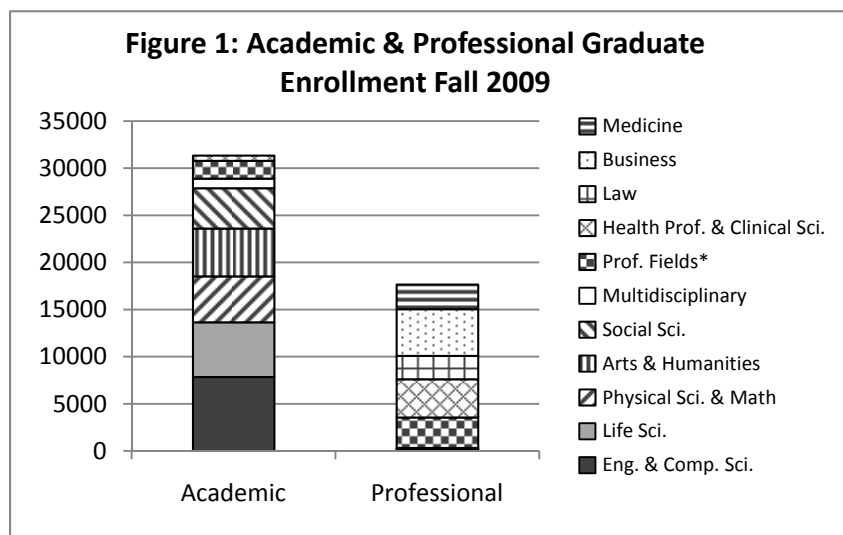
The 1960, California Master Plan for Higher Education provided that the University of California "has the sole authority in public higher education to award the doctor's degree in all fields of learning."<sup>1</sup> Forty-eight years later, during the academic year 2007-8, UC awarded 63 percent of all academic doctoral degrees in California and California led the nation awarding 5,923 academic doctorates<sup>2</sup>. This report explores the condition of UC's graduate studies and compares UC's performance to national trends.

Graduate Studies can be divided into two broad categories: Professional Degrees (e.g. Business, Law and Medicine) and Academic Degrees (e.g. Science Technology, Engineering and Math: commonly referred to as **STEM** Fields; and Humanities, Arts, Behavioral and Social Sciences: for simplicity, referred to as **HABSS** Fields). Professional and Academic Degree programs differ in their requirements and in the time students devote to classroom learning, teaching and research. While professional degree students spend the majority of their time enrolled in coursework, academic degree students spend much more of their time engaged in teaching and research. In so doing, academic degree students simultaneously receive training and contribute to UC's teaching and research missions, and generally remain enrolled for longer periods of time. In the fall of 2009, UC enrolled 31,337 academic degree students and 17,337 professional

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<sup>1</sup> A Master Plan for Higher Education in California 1960-1975

<sup>2</sup> Survey of Earned Doctorates, 2007-08



\*Professional Fields include Architecture, Public Administration, and Academic Doctorates in Business, Law and Education.

degree students (**Figure 1**). This biennial sub-report will focus primarily on academic graduate students with some indicators of professional degree students presented as well.

### Graduate Applications, Admission and Enrollment

Applications to UC academic graduate programs climbed between 2000 and 2009 while acceptances and enrollments remained flat (**Figure 2**). Put in a national context, applications to UC academic graduate programs rose by 5 percent on average, annually from 2000-2009, while Carnegie Very High Research Universities<sup>3</sup> enrollment increased by only 3.5 percent during the same period. By contrast, UC enrollment only increased by 1 percent, on average, each year, while Carnegie Very High Research Universities' enrollment increased by 2.2 percent each year between 2000-2009. This trend in increasing applications and flat acceptances and enrollments suggests that UC academic graduate programs are becoming more selective over time.

Analyses of individual campus admit rates (defined as the number of admissions divided by the number of applications) also shows that UC campuses are highly selective. UCSF and Berkeley are the most selective campuses, and UCSF has a much higher enrollment yield rate than any other campus (defined as the number of enrollments divided by the number of admissions). This is likely due to the homogeneity of academic graduate programs at UCSF and the prevalence of guaranteed stipend funding through NIH training grants. Berkeley, by contrast, offers academic graduate programs in the STEM fields, where graduate funding from extramural research grants is common, as well as in the HABSS fields where less extramural funding is available.

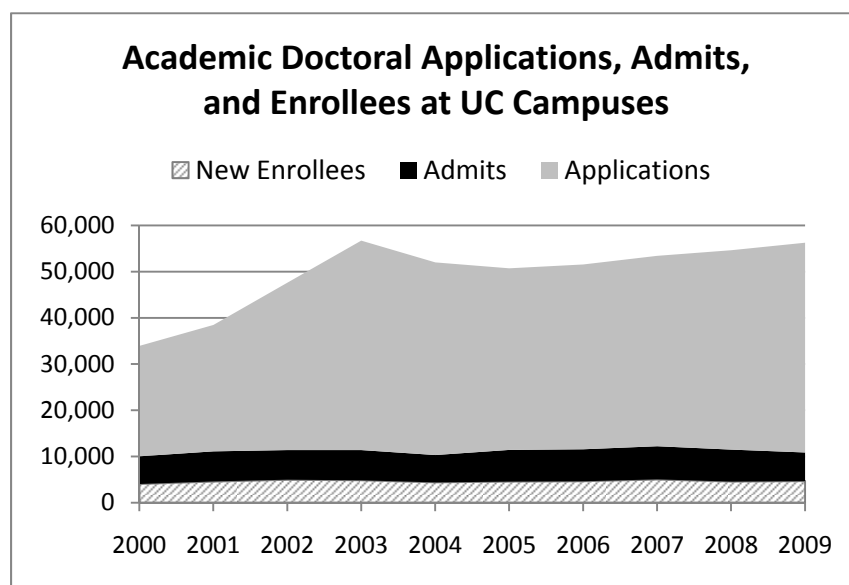
The average admit rate for UC, 19 percent, is lower than the average for Carnegie Very High Research Universities of 32 percent. This again underscores UC's selectivity in comparison to other research universities. In contrast, UC's average yield rate, 43 percent, lags behind the

<sup>3</sup> Defined in the Carnegie Classification as universities with very high research activity that award at least 20 doctorates per year. This list includes all AAU universities except McGill, University of Oregon, University of Toronto and Syracuse University.

57 percent yield rate of Carnegie Very High Research Universities. Analyses presented subsequently in this sub-report suggest that this may be due to lagging graduate student stipend support at UC coupled with a higher cost of living at many of the UC campuses.

### Graduate Student Quality

To determine whether high selectivity at UC campuses results in higher quality academic graduate students, students' competitiveness for national graduate fellowships was analyzed. National Science Foundation Graduate Fellowships, Javits Fellowships, and Ford Foundation Fellowships are competitively awarded, annually, to support graduate students pursuing doctoral degrees in STEM fields, HABSS fields, and to promote diversity in all fields, respectively. UC graduate students are highly competitive for these awards and in 2009 UC won nearly 21 percent of all NSF fellowships, a third of Javits fellowships, and a quarter of all Ford Foundation fellowships. UC Berkeley graduate students, in particular, outperformed MIT, Harvard, and Stanford students winning more NSF, Javits and Ford Foundation Fellowships than any other



Source: UCOP Graduate Admissions Database. Note: The application decline in 2004 is possibly due to a combination of (1) post-911 international student application effects and (2) changes in data reported to UCOP.

university. In addition to supporting graduate students' research, the large share of these prestigious national fellowships won by UC also demonstrates the high quality of graduate students UC continues to attract.

### Graduate Student Diversity

Maintaining gender and ethnic diversity among UC graduate students is critical to academic excellence and UC's continued ability to compete for the best and brightest students and faculty

while sustaining a workforce pipeline that reflects the diversity of California and the nation. On average, academic graduate programs are divided equally among men and women at UC and AAU universities. In specific disciplines, however, the gender balance differs. For instance, UC Education programs enroll 73 percent women and 27 percent men while UC Engineering programs enroll 24 percent women and 76 percent men; AAU universities' enrollment averages mirror those of UC in these disciplines. While national data were not available for Humanities and Social Sciences, at UC, men and women are enrolled evenly in these disciplines.

Ethnic diversity among UC academic graduate students has increased by 2.3 percent over the past seven years and enrollment of underrepresented minorities (URM) is, on average, higher at UC than at AAU Privates or other AAU Publics. Chicano/Latino enrollment of 7 percent systemwide and African American enrollment of 3 percent systemwide still lags behind California's total Chicano/Latino population share of 37 percent, and California's African American population share of 7 percent<sup>4</sup>. Similarly, UC enrollment of American Indians of less than one percent does not reflect California's American Indian population share of 1.2 percent.

Both in aggregate and at individual campuses, UC lags behind AAUs and select comparators in enrolling African American academic graduate students. Taken together with the overall lag in enrollment of Chicano/Latino students and American Indian students by AAU universities, these enrollment trends suggest that elite research universities are not preparing a workforce that reflects the diversity of the nation.

Ethnic diversity among UC professional practice graduate students has held steady over the past seven years. Systemwide, 7 percent of professional students were African American, five percent Chicano/Latino and less than one percent American Indian. Compared to other AAU Publics, UC is doing a better job of enrolling underrepresented minorities in professional degree programs. Compared to AAU Privates, UC enrolls fewer Chicano/Latino students but more African American Students.

### **Doctoral Degrees Awarded**

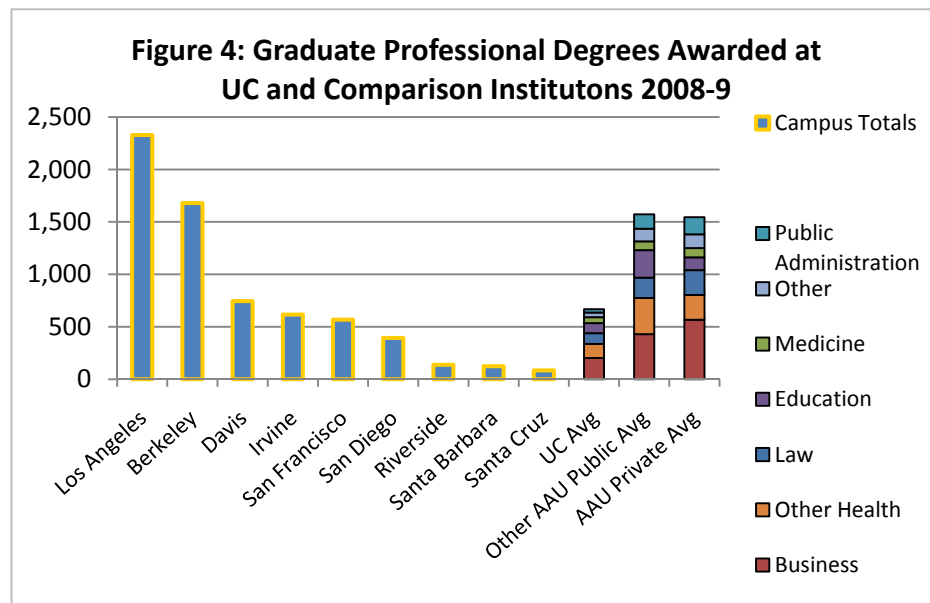
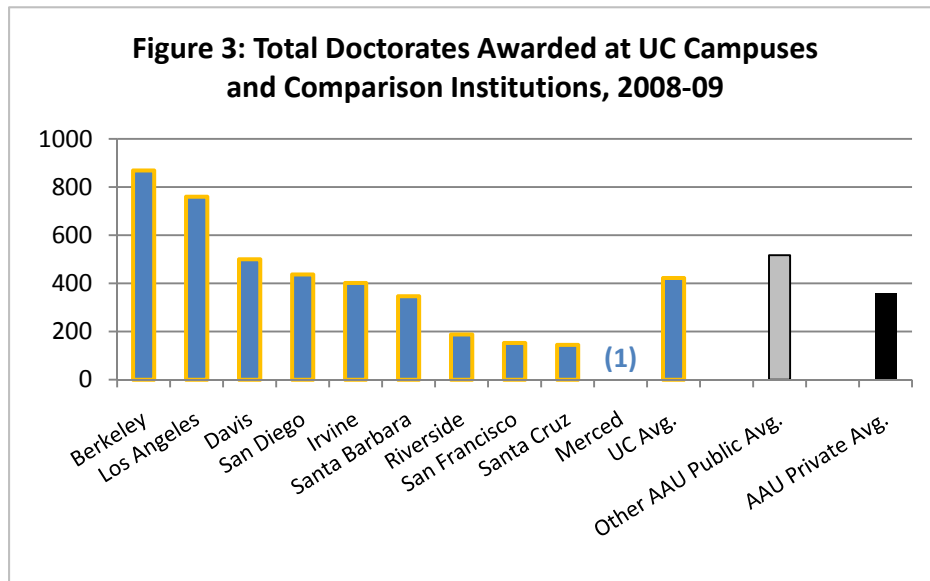
As the institution with the primary responsibility for granting doctoral degrees in California, it is appropriate that UC grant two thirds of all doctoral degrees in the state. In STEM fields, UC grants more doctoral degrees than private California universities by two to one. Twice as many doctoral degrees in the humanities are also awarded by UC than by private California universities. Social Science doctorates are equally granted by UC and private California universities; this is primarily due to the large number of Psychology doctoral degrees granted by private California universities.

Among UC campuses, Berkeley and UCLA awarded the most academic doctoral degrees in 2008-9 (**Figure 3**). In fact, Berkeley awarded the most doctoral degrees in the United States during the 2007-8 academic year and California led the nation in awarding doctoral degrees<sup>5</sup>. This underscores the critical role that UC plays in training not only California's doctoral workforce but also in training the doctoral workforce of the United States.

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<sup>4</sup> Source: U.S. Census Bureau: State and County QuickFacts

<sup>5</sup> Source: 2007-8 Survey of Earned Doctorates



By discipline, UC has trained an increasing number of doctorates in the STEM fields over the past seven years, and trains more doctorates in the STEM fields than its AAU comparators. UC mirrors the trend among AAU Universities of training fewer HABSS doctorates during the same time period.

Nine of the ten UC campuses awarded professional degrees in 2008-9 (**Figure 4**). On average, however, UC awarded fewer professional degrees than other AAU institutions

### Doctoral Student Experience

Time to degree for doctoral students is measured from the time students enter their doctoral programs until the time they complete their Ph.D. degrees; and is based upon a rolling average over a three-year period. On average, doctoral students at UC take about the same amount of time to complete their degrees as students at other AAU universities. By discipline, HABSS students take longer to complete their degrees than students in STEM fields. This may be due to the additional time arts and humanities students spend as teaching assistants and the fact that they more often interrupt their studies for financial or other reasons. While STEM doctoral recipients complete their degrees faster, they also more likely to continue postdoctoral study upon completing their Ph.D.s than Arts and Humanities doctorates.

Of students who began doctoral studies between the fall of 1992 and the fall of 1994, 57 percent had completed their Ph.D.s 10 years later. This is comparable to the national average documented by the Council of Graduate schools' Completion and Attrition Program. In Life and Physical Sciences, UC led the national average in 10 year completion rates. In Engineering and Computer Science, UC lagged behind the national average. This lag could be due students leaving graduate programs early influenced by the strong market for engineers and computer scientists in California, regardless of degree, during the dot-com bubble of the late 1990s.

Limited data exists to track the outcomes of graduate studies either at UC or nationally. Based on the Survey of Earned Doctorates, at graduation, more UC doctoral recipients have jobs in hand or other definite plans than do nationally. More UC doctorates are employed than nationally as well. Long term tracking of doctoral recipients is needed both within UC and nationally to determine the long-term impact these individuals have to society and to the economy.

### **Graduate Student Financial Support**

Academic graduate students simultaneously receive training and contribute to the instructional and research missions of UC, and they receive financial support in the form of stipends to compensate them for their work in instruction and research. To assess the competitiveness of UC's stipends, the Graduate Student Support Survey<sup>6</sup> was administered in 2004, 2007 and 2010. Analysis of the 2010 survey data will not be complete until the fall of 2010, so analysis was confined to the 2004 and 2007 surveys.

Survey respondents were asked to identify both their top-choice UC and non-UC institution among the schools to which they had been admitted, identify their enrollment decision, and to report both the amount and composition of the offers they received from each institution. A net stipend was then calculated for each offer based on the amount of tuition and/or fees, if any, the respondent expected to pay from their offer. The result is a net stipend that shows, on average,

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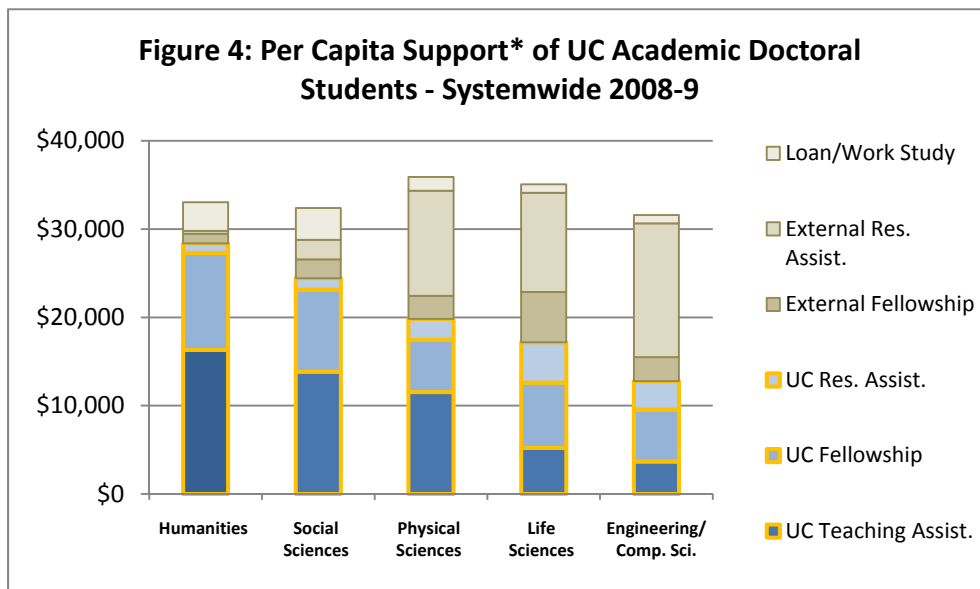
<sup>6</sup> The 2007 Graduate Student Support Survey was conducted on-line and included the full population of students admitted to UC academic doctoral programs in all fields and majors for fall 2007. The population consisted of students admitted to the University on or before April 24th, 2007, when the survey was launched. Only students who had made their enrollment decisions at the time of the survey were asked to participate. Findings from the 2007 survey can be compared with findings from the 2004 Graduate Student Support Survey.

the amount of the award available for students’ other expenses – books and supplies, living expenses, personal use, etc.

Systemwide, 50 percent of survey respondents decided to enroll at UC in 2004 and 52 percent in 2007. On individual campuses, between 47 percent-55 percent of survey respondents in 2004 and between 48 percent-63 percent of survey respondents in 2007 decided to enroll at UC.

Systemwide, admitted students reported a \$1,526 gap between the net stipend offered by UC and that offered by their top-choice non-UC campus in 2004. In 2007, that gap narrowed to \$1,001. Stipend offers differed by campus and by discipline with the largest three-year increases at UC Santa Cruz (+15 percent), Santa Barbara (+14 percent), Berkeley (+12 percent) and UCLA (+12 percent) and in Social Sciences (+17 percent) and Humanities (+18 percent).

When asked to rate their top-choice UC and their top-choice non-UC schools on certain factors they used in making their decision as to where to enroll, survey respondents rated their UC and non-UC top-choice schools equivalently on reputation, research interest and caring environment.



Respondents rated UC’s location and diversity more favorably than their top-choice non-UC campus. Respondents rated UC less favorably on the amount, type and duration of financial support as well as on the availability of affordable housing compared their top-choice non-UC. Responses to this survey suggest that admitted students feel that the financial support for UC is not sufficient given the high cost of living at many campuses.

Source: UC Graduate Support Tables; \*Includes Tuition, Fees and Stipend.

The analyses of the 2004 and 2007 Graduate Student Support Surveys, as well as anecdotal evidence from faculty and students, suggest that additional funding will be required to continue

to attract the highest quality graduate students to UC academic doctoral programs. The amount of funding varies among disciplines, as seen in **Figure 4**. The bars show the per capita support for academic doctoral students in 5 disciplines at UC. In contrast to the Graduate Student Support Survey, *this includes tuition and fees as well as stipend support*. Both the amount of support and the sources of support vary greatly by discipline. The blue sections of the bars represent funding that must be provided from internal UC funds (e.g. teaching assistantships, research assistantships and fellowships). These amounts are highest in the humanities and social sciences. By contrast, the beige sections show the funding provided by external sources of funding (e.g. extramural research grants, fellowships and loans/work study). Grants and Fellowships are highest in the Physical and Life Sciences as well as Engineering and Computer Sciences where extramural funding sources are more numerous. Graduate Students in the Humanities and Social Sciences have the highest loan burden.

This analysis shows that increasing the type, amount, and duration of financial support for doctoral students will require different approaches in different fields. While increases in external research funding from the federal government may increase available funds for STEM fields, sources of internal UC funds must be identified to support doctoral students in the humanities and social sciences.

### **Conclusions and Future Challenges**

UC leads the nation in attracting high-quality graduate students, an essential condition to recruit and retain the best faculty at UC. UC trains a high percentage of URM doctoral students and a high percentage of STEM doctorates compared to other AAU universities.

UC has not met its aspirational goals to diversity and student financial support and continues to strive for improved quality of academic graduate students.

We currently do not possess a way to measure the impact of financial support on graduate student quality on a systemwide basis. Individual graduate programs may track how many of their top-choice admitted students decide to enroll, but this practice is neither consistent nor comparable across campuses. Given the important role that academic doctoral students play in fulfilling both the research and doctoral missions of UC, it will be important to monitor the quality of students recruited and to act swiftly to correct a downward trend.

A challenge related to both the Biennial Accountability Sub-report on Graduate Academic and Professional Degree Students and to the Sub-report on the Research Enterprise is measuring how UC's lagging graduate net stipends impact the entire Research Enterprise. Given the importance of graduate students in conducting research at UC, if the best quality students are not recruited, faculty research programs may suffer as a consequence. In addition, recruitment of high quality graduate students may influence faculty recruitment as well. Leading indicators of graduate studies' impact on the research enterprise must be identified to prevent any deterioration in the research enterprise.



A final challenge, as mentioned earlier, is that limited data exists to track the long-term career outcomes of doctoral recipients either at UC or nationally. While anecdotal evidence shows that some UC doctoral recipients have gone on to start companies, industries and to win prestigious academic awards, more rigorous analysis and tracking is required to empirically measure the impact doctoral recipients have on education, society and the economy.

**(Attachment)**