

**Graduate Council  
Statement on Graduate Growth**

To: Academic Senate, Santa Cruz Division

Graduate Council strongly supports the longstanding UCSC goal of strengthening and growing UCSC graduate programs to achieve a proportion of graduate enrollments commensurate with an aspiring AAU research university and our comparative sister campuses in the UC system. To this end, Graduate Council established in 2015-16 a subcommittee on graduate growth, with goals to 1) make recommendations to catalyze campus strategic planning and action for growing and strengthening graduate programs, and 2) make more widely visible the progress the campus has made towards graduate growth. Council recognizes that there are substantive challenges to growing the proportion of graduate enrollments, including increasing the number and capacity of graduate programs, growing capacity for financial support of graduate students, and incentivizing faculty participation in graduate mentoring, to name a few. But, strengthening and growing graduate programs is justified by the fact that strong graduate programs bring important broad benefits to the campus and its undergraduate and graduate educational mission by enhancing UCSC's public research university reputation, attracting top faculty, and providing the most stimulating graduate and undergraduate educational experience. The enclosed Graduate Council report presents analysis of enrollment data for UCSC and our sister campuses along with recommendations for setting realistic goals for growth in proportional graduate enrollments.

Respectfully submitted;  
GRADUATE COUNCIL

Lissa Caldwell

Ben Crow

Gerald Casel

Michael Dine

Judith Habicht-Mauche

Athanasios Kottas

Roberto Manduchi

Paul Roth

Fitnat Yildiz

Tyrus Miller, *ex officio*

Don Smith, Chair

Katharin Peter, Library Representative

Gordon Keller, Graduate Student Representative

Melanie Dickinson, Graduate Student Representative

March 8, 2017

**Graduate Council  
Subcommittee on Graduate Growth Report, May 2017**

**I. Summary of goals and recommendations endorsed by Graduate Council:**

Graduate Council strongly supports the goal of strengthening and growing graduate programs on the UCSC campus to achieve a proportion of graduate enrollments commensurate with an aspiring AAU research university and our comparative sister campuses in the UC system. In this report, we provide an overview of the Council's perspective on graduate growth and make recommendations to support the Council's statement on strengthening and growing graduate programs at UCSC.<sup>1</sup>

Historical UC undergraduate and graduate enrollment data suggest that the proportion of graduate students (academic Master's and doctoral) increase with undergraduate enrollments. There is a central logic to this, since enrollment growth is a major determinant of faculty FTE growth, and growing ladder faculty numbers is a key determinant for growing graduate programs. However, when historical enrollment data for UCSC are compared with our closest comparative UC campuses (UCR, UCSB; see below), it indicates that while UCSC undergraduate enrollments have increased substantially over the past several decades (and have overlapped with undergraduate enrollments at UCR), the proportion of graduate enrollments at UCSC has not increased as one might expect. *This reflects that growing undergraduate enrollments is not in itself sufficient to support increasing the proportion of graduate enrollments. Instead, it suggests a need for **both** enrollment growth and a strategic effort to prioritize investment of campus resources that come with enrollment growth into strengthening and growing graduate programs.* Council's perspective is entirely consistent with the analysis and recommendations of recent Joint Senate/Administrative Task Forces.<sup>2</sup>

Goals:

- Continue emphasizing graduate education as a central campus priority, and further incentivize faculty participation in graduate mentoring and support.
- Strengthen and grow existing graduate programs.
- Establish new graduate programs, with an emphasis on doctoral programs, but recognize that academic and professional Master's programs can also add value and contribute to graduate growth.
- Investments in graduate growth should include efforts to broadly enhance graduate student diversity, welfare and success, including 1) development/expansion of professional development opportunities for graduate students to support awareness and development of professional competency skills beyond academia, and 2) invest in programs that support graduate student diversity and welfare, including a safe and supportive educational environment, mental health, and affordable housing.

- 1) Recommendations: Graduate Council believes that meaningful growth in the proportion of graduate enrollments (as a percent of undergraduate enrollments) can best be achieved by the

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<sup>1</sup> Graduate Council Statement on Strengthening and Growing Graduate Programs at UCSC, April 27, 2017.

<sup>2</sup> Joint Senate/Administrative Task Force on Academic Structures and Academic Planning (TFASAP): Report and Recommendations, May 2013; Joint Senate/Administrative Task Force on Graduate Growth (TFGG): Report and Recommendations, June 2015.

UCSC central administration working in partnership with the academic senate to develop a comprehensive and forward-looking strategic plan for strengthening and growing doctoral and Master's programs at UCSC. The plan should:

- a. Establish achievable proportional and absolute growth targets for doctoral and Master's enrollments, with mechanisms and timelines for achieving this goal that are clear and agreed upon by the administration and Senate. The 12% doctoral enrollment relative to undergraduate enrollment goal established through the UCOP 'rebenching' report is not a realistic aspirational goal for UCSC in the near-term. Instead, more realistic and achievable growth goals should be established based on a strategic academic plan that incorporates analyses of resource availability and the impact of new and emerging policies for strengthening and growing graduate programs at UCSC.

Preliminary estimates (see below) may suggest a target range of 1449 - 1485 doctoral, and 483 - 495 Master's enrollments at our LRDP cap of 19,500 total enrollment, or ~8.4% doctoral to undergraduates, and 11.2% academic graduate to undergraduates. These modest growth targets are below UCOP's budget enrollment allocations to UCSC for academic doctoral enrollments (1337 + 441 aspirational doctoral growth enrollments, 1778 total budgeted enrollments), and higher than the budget enrollment allocations for Master's (348 academic Master's enrollments, 49 graduate professional enrollments). If UCSC targeted a higher ratio of PhD to Master's students in graduate growth (e.g., 4 to 1, rather than the 3 to 1 ratio used here), we would achieve proportionately greater doctoral growth (e.g., ~1540 to 1580 doctoral enrollments, or a proportion of ~9% doctoral to undergraduates) by the time UCSC reaches its LRDP cap.

- b. Articulate goals and timelines to achieve an appropriate balance between doctoral and Master's enrollments, which may differ by discipline. This should include a realistic economic model for the extent that fee-paying Master's students generate resources for doctoral growth, and how this differs by discipline. Council recognizes that there are good programmatic reasons to grow Master's programs, but has concern that supporting large Master's programs with a goal of generating resources for doctoral students may come with trade-offs, such as increased faculty workload and impacts on doctoral programs.
- c. Articulate a transparent process, with appropriate accountability measures, for prioritizing allocation of campus resources and the trade-offs for supporting one campus goal over another. Difficult decisions leading to internal reallocation of campus resources will undoubtedly be required. For example, the plan should articulate the goal of prioritizing strategic deployment of newly authorized faculty FTE in departments and programs with demonstrated potential to advise and support graduate (primarily doctoral) students.
- d. Propose measures to grow/enhance UCSC's research enterprise to increase extramural resources that can be used to support graduate growth. This should include institutional efforts to support faculty, program, and department efforts to increase extramural funding to support graduate students.
- e. Include accountability metrics that can be used to track progress towards established

goal(s) of graduate growth that can be reviewed annually.

- f. Include recognition that investments in graduate growth should include resources which will improve student recruitment, such as increased targeted scholarships, improved outreach and marketing (possibly through use of outside consultants, and developing techniques to share "best practices"). Also critical are efforts to enhance graduate student welfare and success more broadly, including: 1) development/expansion of professional development opportunities for graduate students to support awareness and development of professional competency skills beyond academia, and 2) invest in programs that support graduate student welfare more broadly, such as a safe and supportive training environment, mental health, and affordable housing. Without an infrastructure to support graduate students, the ability to recruit and retain them will remain severely compromised.

## **II. Principles and historical perspective:**

1. Principles and broader benefits of strengthening and growing graduate enrollments to the campus and its undergraduate and graduate educational mission.
  - In order to maintain and enhance its standing as a renowned public research university and continue delivering on its commitment to excellence in undergraduate and graduate education, UCSC must strengthen and grow graduate, and especially doctoral/terminal degree programs.
  - Enhancing UCSC's public research university reputation, attracting top faculty, and providing the most stimulating undergraduate educational experience all depend upon strong and vibrant graduate programs.
  - UC's doctoral student training and doctoral degree granting programs provide education and training for the next generation of California's innovators, leaders, and academicians. Doctoral students contribute to an enhanced undergraduate educational environment; they are an important feature distinguishing UC from the California State Universities (CSU's), and in part justify the higher marginal cost of instruction at UC compared to CSU's.
  - Similarly, Master's students and programs help fulfill UC's mission to provide an expert workforce to public and private sectors of the State. They contribute to the undergraduate environment, and help enrich the doctoral training environment both directly and indirectly.
2. Historical overview informing Council's perspective on graduate growth.

UCSC has a history of graduate growth proportionate to undergraduate growth, so in essence, the campus has funded graduate growth through undergraduate enrollment growth. As a result, UCSC looks different from UC norms on instructional support/non-instruction support funds for our graduate students. Beginning in 2012 -13, UC embarked on a 'rebenching' effort to address, in part, the considerable disparities among UC campuses in per-student funding. One of the four core principles driving the rebenching effort recommendations was graduate education: "Graduate education is such an integral part of UC's mission and excellence that it needs to be recognized in any allocation model."<sup>3</sup>

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<sup>3</sup> University of California Rebenching Budget Committee Report and Recommendations, June 25, 2012.

The rebenching report established a 12% doctoral enrollment of undergraduate enrollment goal, to be achieved over a six year rebenching transition period (starting 2012-13), with the goal that campuses with academic doctoral student proportions below 12% will be provided funding to increase the numbers of such students up to the 12% level [UCSC currently receives the largest proportion of budgeted enrollments to support ‘aspirational doctoral growth’ (441 enrollments) compared to the other UC’s]. Notably, the recommendations also stated that funding will be withdrawn for any shortfalls in achieving these numbers at the end of an appropriate phase in period.

The Joint Senate/Administrative Task Force for Graduate Growth (June 2015) performed an analysis of the state of graduate programs on the UCSC campus compared to our sister UC campuses, and provided a list of prioritized recommendations to help UCSC strengthen and grow graduate enrollments on campus.<sup>4</sup> Graduate Council strongly supports the Task Force report and its recommendations.

Analyses presented in the Joint Senate/Administrative Task Force for Graduate Growth report shows that UCSC possess the lowest academic doctoral or total graduate student enrollments as a proportion of undergraduate (or total) enrollments of any UC campus (UCSF and UC Merced excluded). The reasons for this disparity are undoubtedly complex, and likely include historic per-student funding disparities, limited economy of scale opportunities due to the relatively small size of UCSC, and campus decision-making that may not have sufficiently prioritized growing and strengthening graduate programs over the past several decades.

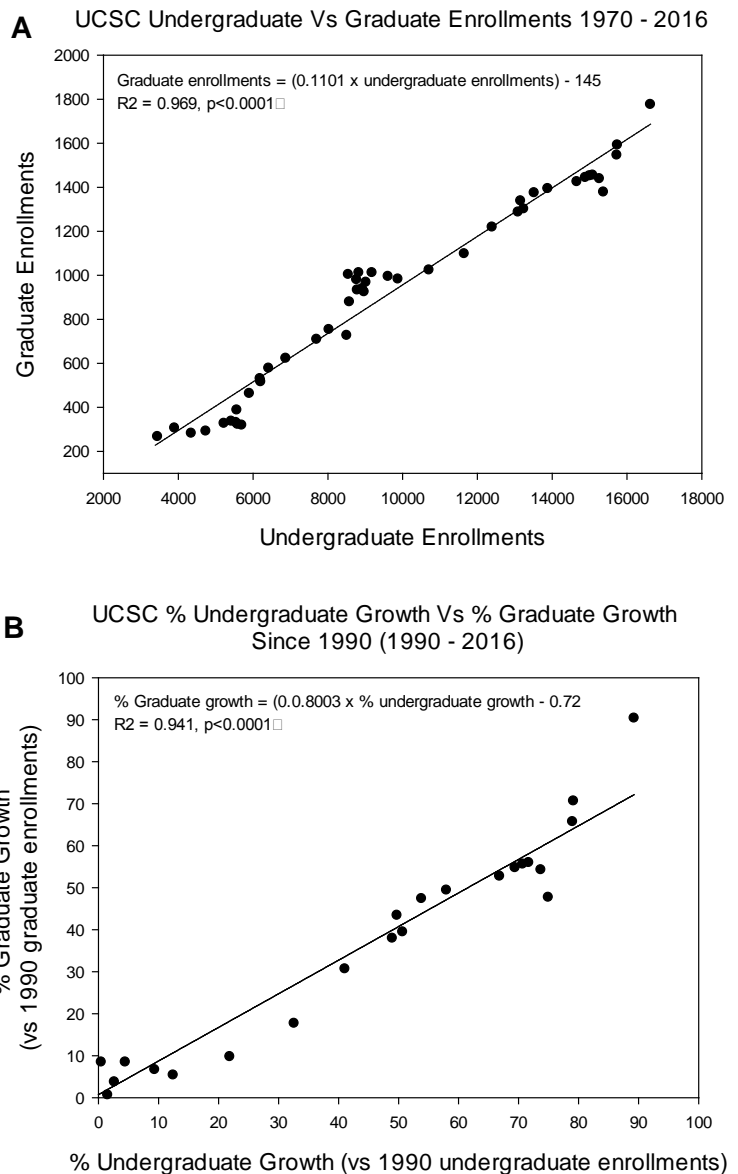
Graduate Council’s independent analyses, using data available from UCSC planning and budget and UCOP, substantiates:

- A) Graduate enrollment growth at UCSC is closely associated with undergraduate enrollments over UCSC’s history (1970 – 2016, Figure 1A).
- B) Over the period 1990 to present, the relative percent increase in graduate enrollments has been ~80% of the relative increase in undergraduate enrollments (i.e., 0.8003 slope of % graduate growth versus % undergraduate growth, Figure 1B; percent enrollment growth calculated separately for undergraduates and graduates relative to 1990 levels).

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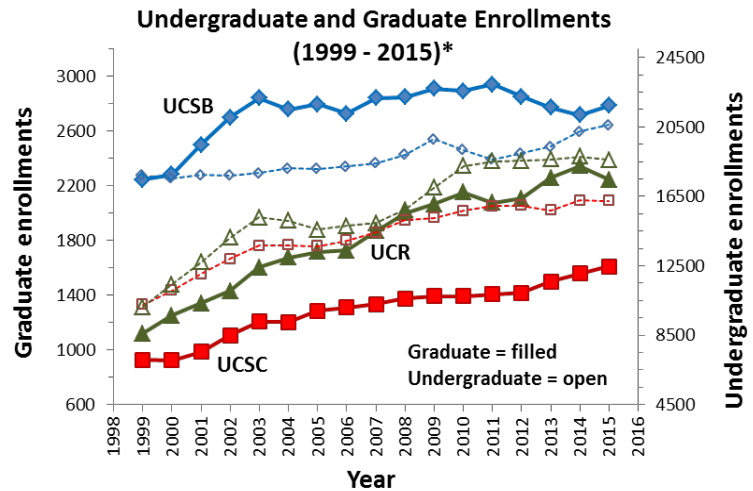
<sup>4</sup> Joint Senate/Administrative Task Force on Graduate Growth (TFGG): Report and Recommendations, June 2015.

Figure 1. (A) UCSC historical 3 quarter graduate versus undergraduate enrollments (1970 – 2016) shows a highly significant association between the two. (B) Over the period 1990 – 2016, relative growth in graduate enrollments has been ~80% of relative growth in undergraduate enrollments, based on the slope of 0.8003 for the linear function for % graduate growth versus % undergraduate growth. Note 2016-17 academic year data are fall and winter quarter average only; data source: <http://planning.ucsc.edu/irps/historicalData/Historical3QtrAverage.pdf>.



C) Graduate enrollments generally track with undergraduate enrollments at our closest comparator sister campuses (UCR, UCSB) over the period 1999 – 2015, with notable periods of disassociation where relative graduate growth outpaced undergraduate growth (e.g., UCSB 2000 – 2003, UCR 2006-2008) (Figure 2).

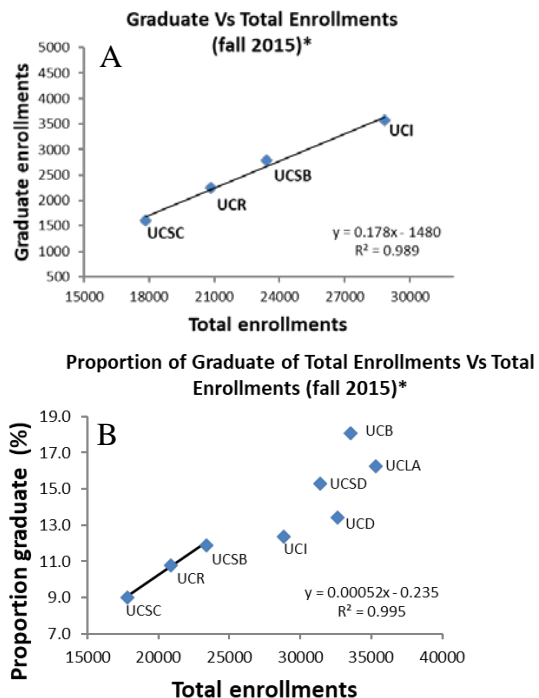
Figure 2. UCSC, UCR, and UCSB graduate and undergraduate fall enrollments (1999 – 2015) show that graduate enrollments generally track with undergraduate enrollments, with notable periods of disassociation (e.g., UCSB 2000 – 2003, UCR 2006-2008). Note that the relative y-axis scales for graduate and undergraduate enrollments are similar (~5.4-fold increase from minimum to maximum) to facilitate comparison of the relative changes in enrollments over time.



\*Academic doctoral and masters only  
 Source: <http://universityofcalifornia.edu/infocenter/fall-enrollment-glance>

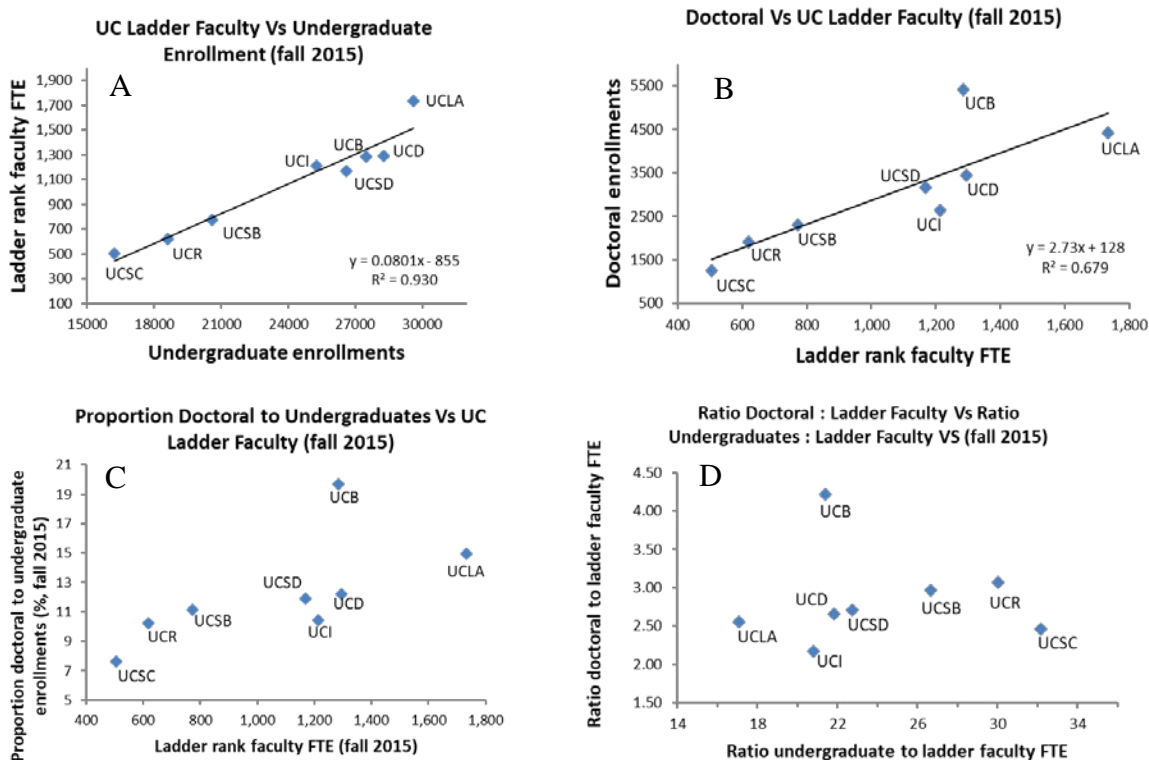
D) Graduate enrollments, and the proportion (%) of graduate to total (undergraduate and graduate) enrollments are closely associated at UCSC and our closest comparative UC campuses (fall 2015, Figure 3A, B), suggesting that graduate growth and the proportion of graduate to total campus enrollments at UCSC can be achieved with increased campus enrollments.

Figure 3. (A) Fall 2015 enrollment data from the four UC campuses with the lowest total enrollments (UCM and UCSF excluded). The data suggest an increasing linear relationship between graduate and total enrollments. (B) The proportion of graduate to total enrollments (%) versus total enrollments across the UC campuses for fall 2015 shows an increasing linear relationship for the three campuses with the lowest total enrollments (UCM and UCSF excluded), suggesting that the proportion of graduate enrollments scale with total campus enrollments for these three campuses. Total undergraduate enrollments are undergraduate + academic doctoral and Master's, while graduate enrollments are academic doctoral and Master's.



\*Academic doctoral and Master's only  
 Source: <http://universityofcalifornia.edu/infocenter/fall-enrollment-glance>

- E) The number of regular teaching ladder rank faculty FTE is strongly aligned with undergraduate enrollments across all UC campuses, reflecting the role of undergraduate enrollment growth as a major driver of campus FTE growth (UCM and UCSF excluded) (fall 2015, Figure 4A).
- F) Doctoral enrollments (academic doctoral) are highly associated with the number of regular teaching ladder rank faculty FTE across the UC campuses, reflecting the role of ladder rank faculty FTE as a driver of doctoral enrollments (UCM and UCSF excluded) (fall 2015, Figure 4B). Similarly, the proportion of doctoral to undergraduate enrollments (%) is associated with the number of ladder faculty FTE, particularly at the three UC campuses with the lowest number of faculty FTE (UCSC, UCR, UCSB) (fall 2015, Figure 4C). This further supports the potential to increase the proportion of doctoral enrollments at UCSC with (strategic) growth in faculty FTE.
- G) Notably, UCSC shows the highest undergraduate to faculty FTE ratio within the UC system (UCM and UCSF excluded), and a doctoral student to faculty ratio slightly lower than our closest comparative campuses (UCR, UCSB) (fall 2015, Figure 4D).



\*Regular teaching ladder rank faculty; Academic doctoral only  
 Source: <http://universityofcalifornia.edu/infocenter/fall-enrollment-glance>  
 Source: [http://legacy-its.ucop.edu/uwnews/stat/headcount\\_fte/oct2015/welcome.html](http://legacy-its.ucop.edu/uwnews/stat/headcount_fte/oct2015/welcome.html)

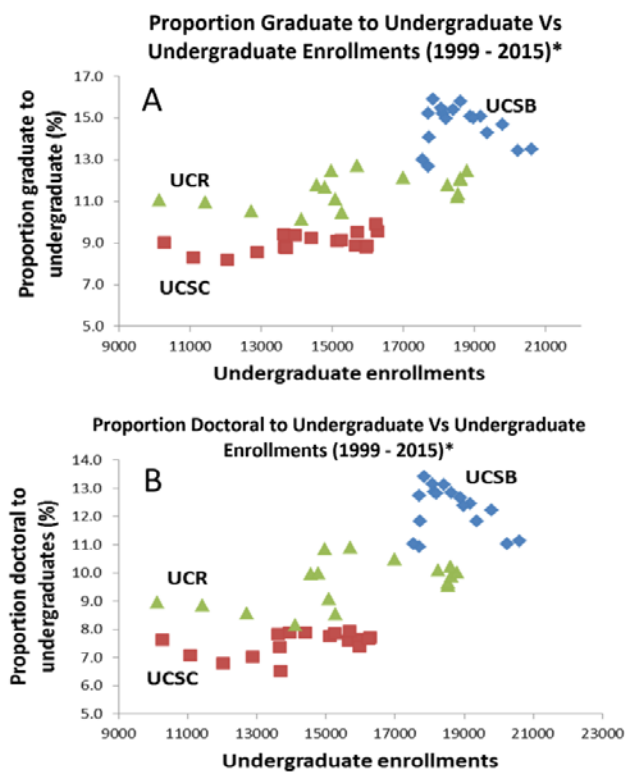
Figure 4. (A) Number of regular ladder rank faculty FTE versus undergraduate enrollments across the UC campuses (excluding UCM and UCSF) shows a strong association between the two as expected, especially among UCSC, UCR, and UCSB. (B) A similar association exists between academic doctoral enrollments and faculty FTE, again especially with UCSC, UCR, and UCSB. (C) The proportion of academic doctoral to undergraduate enrollments (%) is associated with the number of ladder faculty FTE across the UC campuses, suggesting that the proportion of doctoral



students to undergraduate enrollments will increase with increasing ladder faculty FTE, especially at the campuses with the fewest ladder faculty (UCSC, UCR, and UCSB). (D) The ratio of doctoral student enrollments to faculty FTE versus the ratio of undergraduate enrollments to ladder rank faculty FTE shows a relatively narrow range in the former and a wide range in the latter, with UCSC having the highest undergraduate to ladder faculty FTE ratio of the campuses shown.

H) While the data in figures 3 and 4 above suggest that the proportion of graduate and doctoral enrollments should increase with undergraduate (or total) enrollments and growth in ladder faculty FTE, these associations should not be taken to suggest causal relationships between those variables. For example, data for UCSC shows that the proportion of graduate to undergraduate enrollments (% academic doctoral and Master's only) over 1999 – 2015 has remained relatively unchanged at ~9% (9% in fall 1999 and 9.9% in fall 2015), even though undergraduate enrollments increased by ~6000 students and ladder faculty FTE increased by ~125 over this same period. UCR experienced a similar ~1% increase in the proportion of graduate students to undergraduates over this period (i.e., 11 to 12%), and a net increase of ~8500 undergraduate enrollments and 236 ladder faculty FTE, though UCR achieved much greater increases in the proportion of doctoral students during periods of rapid growth over the period 2003 – 2009 (up to ~ 13% graduate enrollments and 11% doctoral enrollments, both vs undergraduate enrollments, Figure 5A, B). UCSB experienced a similar net increase of ~0.8 % in the proportion of graduate to undergraduate enrollments from fall 1999 – 2015 (from 12.7% to 13.5%), with net increases of 2908 undergraduate enrollments and 110 ladder faculty FTE of over this period, though over 2000 – 2007 it achieved even greater growth in the proportion of graduates and doctoral students (up to ~16% and ~13%, respectively) (Figure 5A, B). This suggests that the growth in undergraduate enrollments and ladder faculty FTE is not sufficient for graduate growth without strategic investment in graduate growth.

Figure 5. (A) The proportion of graduate to undergraduate enrollments (% academic doctoral and Master's only) versus undergraduate enrollments over 1999 – 2015 shows that at UCSC the proportion of graduate students has remained relatively unchanged, while at UCR and UCSB there have been periods of marked growth in the proportion of graduate to undergraduate enrollments. (B) The proportion of academic doctoral enrollments (%) versus undergraduate enrollments shows a similar pattern as in 5A above.



\*Academic doctoral and masters only  
 Source: <http://universityofcalifornia.edu/infocenter/fall-enrollment-glance>

### III. Setting a realistic target for PhD and Master's enrollment growth

The UC goal of 12% doctoral enrollments as a proportion of undergraduate enrollments set through the rebenching process, is not a realistic aspirational goal for UCSC to achieve by the current LRDP end date of 2020. That said, the benefits of growing the proportion of graduate enrollments at UCSC are substantial, and support establishing achievable graduate growth goals. Near-term graduate growth goals can be established within the current LRDP enrollment cap of 19,500 students, with higher goals to be established through a new LRDP process.

Several possible approaches could be used to establish appropriate graduate enrollment goals. For context, graduate enrollments (fall and winter qtr average) for the 2016-17 UCSC academic year were 1306 academic doctoral (7.9 % of undergraduate enrollments) and 430 Master's. Total graduate enrollments were 1736 (10.4 % of undergraduate enrollments).

Approach #1: Estimate a graduate enrollment target to be achieved when UCSC reaches its current LRDP cap (19,500 total enrollments), using the relationship between total (undergraduate plus academic doctoral and Master's) enrollments at UCSC, UCR, UCSB, and UCI [Figure 3A; graduate enrollments = (0.178 x total enrollments) – 1480]. This yields a target of 1979 graduate student enrollments by the time UCSC reaches its LRDP enrollment cap (i.e., by 2020).

- Assuming a ratio of doctoral to Master's students of 3:1 (i.e., slightly higher than the current three year average), we can set **target goals of 1485 doctoral and 495 Master's enrollments, or 1980 total graduate enrollments**; *these equate to proportional graduate enrollment goals of 8.5% doctoral to undergraduate enrollments, and 11.3% total graduate to undergraduate enrollments by the time UCSC reaches its current LRDP cap.*

Approach #2: Alternatively, graduate growth goals may be set by using the highly significant linear relationship between total enrollments and the *proportion* of graduate enrollments (%) for UCSC, UCR, and UCSB [Figure 3B; proportion of graduate enrollments (%) = (0.00052 x total enrollments) – 0.235].

- This approach yields a target proportion of graduate enrollments of 9.9% of total enrollments (or 7.4% doctoral to total enrollments) by the time UCSC reaches its current 19,500 LRDP enrollment cap. This equates to a total of **1932 graduate enrollments (1449 doctoral and 483 Master's enrollments)**, and a proportion of doctoral to undergraduate enrollments of ~8.2%, and a proportion of total graduate to undergraduate enrollments of ~11%.

Approach #3: Establish graduate growth targets based on budgeted graduate enrollments allocated by UCOP.

- With advent of the rebenching process, UCOP has allocated to UCSC **budgeted enrollments for 1337 academic doctoral enrollments, 441 aspirational doctoral growth enrollments, 348 academic Master's enrollments, and 49 graduate professional enrollments, totaling 1778 academic doctoral enrollments and 2175 total graduate enrollments.** These budgeted enrollments substantially exceed targeted doctoral enrollments based on approaches 1 and 2 above, but are less than the targeted Master's enrollments.

Empirical graduate enrollment estimates from approaches #1 and 2 suggest a target range of 1449 to 1485 doctoral, and 483 to 495 Master's at our LRDP cap of 19,500 total enrollment, or ~8.4% doctoral to undergraduates, and 11.2% graduate to undergraduates. If UCSC targeted a higher ratio of PhD to Master's students in graduate growth (e.g., 4 to 1, rather than the 3 to 1 ratio used above), we would achieve proportionately greater doctoral growth (e.g., ~1540 to 1580 doctoral enrollments, or a proportion of ~9% doctoral to undergraduates) by the time UCSC reaches its LRDP cap.

Note that if graduate growth targets were set relative to undergraduate enrollments at the start of rebenching (2012-13 three qtr average of 15,374 undergraduates), achieving these levels of graduate growth under the current LRDP enrollment cap would result in graduate and doctoral enrollments that are ~9.5% doctoral to undergraduates, and ~12.7% total graduate to undergraduate.

**In summary**, while progress has been made over the past decade towards growing and strengthening doctoral and Master's programs to reach aspirational goals, it is not enough. The data provided here support the potential to increase the proportion of doctoral enrollments at UCSC with (strategic) growth in faculty FTE, in tandem with other measures to increase doctoral student support. Graduate Council strongly encourages and supports the need to develop a central administration-driven, campus-wide strategic plan to strengthen and grow graduate, and especially doctoral programs on our campus, alongside a commitment to graduate student welfare.