

**Joint Senate-Administration Working Group on
Graduate Education
Final Report: March 2021**

Executive Summary

Strengthening the graduate enterprise, cultivating research excellence and professional development, advancing diversity, and providing an environment for student success and welfare are key drivers to maintaining and enhancing UCSC's status as an outstanding public research university. The Joint-Senate Administration Working Group on Graduate Education (JWG) was created following consultation between Graduate Council and the Chancellor and CP/EVC, and launched in spring 2020. The work of the JWG focused on: 1) developing a comprehensive revenue analysis of the graduate enterprise¹ at UCSC, including the recently enacted 5 year funding guarantee for doctoral students (2 years for MFA); 2) exploration of alternative graduate student funding models, including close examination of the "cohort model" implemented at UC Riverside; 3) the development and analysis of the Faculty Graduate Education Survey (FGES), intended to elicit the perspectives of faculty on graduate education and funding at UCSC, and particularly views on the carrying capacity of different programs; and 4) analysis of Graduate Division staffing levels at UC campuses.

The JWG's revenue analysis brought clarity, even to working group members, regarding the budget allocation "rebenching" process and its on-going fiscal benefits to UCSC and the graduate enterprise. The budget allocation rebenching process modified how state enrollment-based revenues flowed to UC campuses. It resulted in the allocation of \$24.3M in one-time funding to UCSC distributed over the 5 year transition period beginning in 2012-13, and ongoing doctoral student enrollment-based funding for 1,778 doctoral enrollments, which was equivalent to a 12% doctoral:undergraduate student enrollment ratio established at the start of the rebenching process. Notably, because of extensions of the rebenching process, UCSC continues to receive state enrollment-based funding for 1,778 doctoral students, even though actual doctoral enrollments have not reached this goal (doctoral enrollments were 1,420 as of end fall quarter 2020). The difference between the dollars UCSC receives for the 1,778 doctoral enrollments versus the dollars it would receive for actual doctoral enrollments constitute upfront "aspirational" dollars to support doctoral enrollment growth. In 2018-19 (a focus year for the JWG's revenue analysis), the amount of state enrollment-based funding UCSC received for these 441 "aspirational" doctoral enrollments (i.e., 1,778 - 1,337 actual) was \$8.4M. One implication of continuing to receive state funding for more doctoral students than UCSC actually has is that increases in doctoral enrollments will not lead to additional state enrollment-based revenue until UCSC surpasses 1,778 doctoral enrollments. It is also possible that UCSC may lose those aspirational growth dollars if doctoral enrollments do not grow. Given this, the campus should develop concrete strategic plans with UCOP for the stabilization of these aspirational doctoral enrollment dollars, and articulate specific plans and resources to support doctoral enrollment growth that are sensitive to disciplinary desires for growth. Indeed, the Faculty Graduate Education Survey (FGES) revealed important differences across disciplines in the desire and ability to sustainably grow doctoral enrollments.

The JWG's revenue analysis also revealed that Academic Student Employee appointments (ASEs, which includes Teaching Assistants [TAs] and Graduate Student Instructors [GSIs]) play an outsized role as a means of support for graduate students at UCSC. A relatively large proportion (65%) of core state enrollment + tuition-based revenues spent supporting graduate students in 2018-19 were spent on graduate student ASEs (TAs, GSIs), the majority of which were TAships. The question of whether this is appropriate

¹ Here, the term "graduate enterprise" is used to encompass the totality of revenues generated by graduate student enrollments, how those funds are spent supporting graduate students, the instructional roles played by graduate students, and the faculty advising and co-curricular aspects of graduate education.

depends on whether we as a campus view the primary role of ASE appointments as supporting undergraduate or graduate education, or a mix of both. The former (i.e., ASEs primarily supporting undergraduate education) implies that only 28% of the core state + tuition revenue generated by the graduate student enrollments was spent supporting graduate students (with the majority of this funding supporting the undergraduate enterprise). However, if ASE appointments are considered as the primary mechanism to support graduate students, then 78% was spent supporting graduate students (i.e., \$48.5M of the \$62M core revenues generated by graduate student enrollments + tuition). Regardless, this analysis shows that UCSC relies very heavily on ASE appointments (especially TAs) to support doctoral/MFA students, especially in the Arts, Humanities, and Social Sciences Divisions, where there are fewer opportunities for other forms of student support (fellowships, extramurally-funded GSRs, etc.). This not only makes graduate students highly dependent upon TAs over the course of their graduate careers, with implications of prolonged time to degree, but it also makes programs and academic divisions (some much more than others) highly reliant on TA/GSI allocations that are not currently predictable over the 5 year guaranteed graduate student support window, creating unnecessary funding uncertainties for both students and programs. This sentiment is underscored by a majority of faculty respondents to the FGES across all divisions, who stated that students are serving as ASEs too often at the cost of prolonging their time to degree.

It is noteworthy, however, that many faculty respondents also indicated that they do not receive sufficient TA support for their courses. This conundrum between faculty thinking that graduate students TA too much over their careers versus many faculty thinking they do not receive sufficient TA support for their courses suggests a possible opportunity to strengthen both graduate and undergraduate education by creating a mix of alternative modes of instructional assistance that does not rely so heavily on graduate student ASEs. The JWG recommends that programs and the broader campus explore creative modes of instructional assistance to complement graduate student ASE appointments, with the goal of reducing the number of ASE quarters a graduate student would serve over their career in favor of additional fellowship quarters, while at the same time maintaining or increasing the level of instructional assistance to qualifying undergraduate courses.

The JWG revenue analyses also revealed that a relatively modest amount of extramural funding is directed to supporting graduate students (\$20.4M in 2018-19), which is 29% of the total amount spent supporting graduate students in 2018-19, and 12% of total extramural funds brought to campus that year. Similarly, a relatively low proportion of gifts and endowment-based extramural funding (15% of total extramural) was spent to support graduate students in 2018-19. Together, these findings suggest that there is capacity to grow support for funding graduate students through growth in extramural funding and associated Indirect Cost Recovery (ICR), and by growing gifts and endowments overall by increasing fund-raising efforts for graduate student support at all levels of the institution, including University Relations, Graduate Division, and the academic divisions. Supporting this suggestion, respondents to the FGES stated that more graduate student support could be worked into extramural funding proposals, but also noted that there are barriers to doing so, chief among them being the high cost of supporting graduate students, which is nearly on par with the cost of supporting postdocs. This issue should raise significant concerns for the campus, i.e., there is the potential that increasing costs of graduate student support could lead to proportional reductions in the number of graduate students included in extramural proposals. In light of this, the JWG believes it is imperative that faculty-identified challenges/barriers for increasing both the number of extramural proposals submitted, and the proportion of proposals with significant graduate student support, including levels of institutional support, workload recognition and accommodation, etc., be addressed. In addition, we recommend that the campus develop a cost-sharing program for faculty supporting graduate students as GSRs on extramural funding in order to reduce the costs of supporting graduate students on extramural funds, and to incentivize including more graduate student support in extramural proposals.

The Faculty Graduate Education Survey (FGES) was conducted during Phase III of the JWG, with 293 responses (a 47% response rate) from all academic divisions (Arts n = 40, BSOE 44, Humanities 55,

PBSci 75, Social Sciences 79). The findings of the survey are incorporated throughout the report, and in this summary, we call out a few key findings and resulting recommendations.

- Access to doctoral/MFA students is important to faculty. However, the degree to which having access to doctoral/MFA students advances, versus takes time away from faculty's research, and hence the extent that advising/mentoring doctoral/MFA students may directly contribute to faculty advancement, varies by academic division and faculty race/ethnicity and gender. In general, faculty in BSOE, PBSci and, to a lesser extent, SocSci, are much more likely to view advising doctoral/MFA students as an important factor in advancing their research. Faculty in the Arts & Humanities are, conversely, much more likely to state that while advising doctoral/MFA students is important to them, mentoring/advising doctoral/MFA students does not advance their research, and even takes time away from it. These trends are even more pronounced with underrepresented minority (URM) faculty, and especially URM women.
- Many faculty do not feel that their efforts mentoring/advising doctoral/MFA students are adequately valued or recognized in the personnel merit review process, especially faculty in Arts, Humanities, and SocSci divisions. There were also notable race/ethnicity and gender based differences, with women being ~20% less likely than men to state their work advising doctoral/MFA students has been adequately recognized and valued in their personnel reviews by their home department. Further, URM faculty are more likely to disagree/strongly disagree that their work advising/mentoring graduate students is adequately recognized and valued as part of their department/program teaching workload.
- Less than a quarter of all respondents stated their doctoral students can finish within 5 years. However, when faculty survey respondents were asked to consider whether their doctoral students could finish within 5 years under "ideal" conditions (with guaranteed and increased financial student support), a substantially increased majority of ~60% stated their doctoral students could finish within 5 years, with notable increases across all academic divisions.
- The vast majority of faculty stated that the campus should provide higher levels of financial support to doctoral/MFA students, as the current amount of funding is not sufficient to meet costs in the Santa Cruz market. Importantly, the gap between salary/stipends and cost of attendance disproportionately and negatively impacts underrepresented graduate students and therefore impedes the campus' efforts to increase graduate student diversity. Most faculty respondents state UCSC should provide most of a doctoral/MFA student's cost-of-attendance, and at least some support for MA/MS students, though many also stated that graduate students, including doctoral/MFA students, should be partly obligated to meet some of their cost-of-attendance needs as an opportunity cost to the student for the training they receive in earning a higher degree.

Based on these key findings, the JWG recommends that all departments/programs and academic divisions update and/or develop clear and comprehensive faculty workload policies that appropriately quantify, recognize and value the workload associated with graduate student mentoring and advising, and graduate education more broadly, on par with undergraduate education, formal classroom teaching, etc., that is appropriate for the discipline². The disciplinary, gender, and race/ethnicity differences in whether advising/mentoring doctoral/MFA students actually advances the faculty mentor/advisor's research, and whether the workload associated with advising/mentoring graduate students is adequately recognized in personnel actions, should be carefully considered in establishing mentoring/advising expectations and workload. Second, given that time-to-degree varies by discipline and that even under ideal circumstances, a substantial number of doctoral students will take more than 5 years to earn their degree, the JWG

² The Joint Senate Administrative Task Force on Graduate Growth's 2015 report also recommended that divisions and programs produce and implement comprehensive faculty workload policies, which was taken up by the VPAA. The FGES findings indicate that those efforts remain incomplete, and that workload policies should be further examined for recognition of differences across discipline, race/ethnicity, and gender.

concludes that the 5 year guarantee should not foreclose flexibility for departments to pursue additional funding (i.e., from ASE and/or extramural fellowship opportunities) for students beyond their 5 year guarantee.

The 5/2 year funding guarantee for doctoral/MFA students was announced in winter 2020, and became effective fall 2020³. JWG's revenue analysis of the 5/2 year funding guarantee shows that it is readily feasible at current funding levels, so long as supporting doctoral/MFA students is prioritized over master's students. However, current practices for funding graduate students, which operate on annual or semi-annual timeframes at the divisional and program level, do not provide sufficient stability and predictability for planning graduate student support over the 5/2 year guarantee window, nor do they factor in possible graduate enrollment growth.

One important aspect of the 5/2 year support guarantee is that it suggests, in concept, a potential framework to plan for and parameterize the cost of supporting doctoral/MFA students through the majority of their careers, and may provide the foundation for developing alternative graduate student funding models to achieve greater funding stability and predictability. To optimize divisional and programmatic planning in conjunction with the 5 year guarantee, we recommend that the central funding (ASEs and Block) for doctoral/MFA students be stabilized and rendered more predictable over the 5 year period over which groups of students are covered by the guarantee. To this end, the JWG recommends that the Graduate Division, in conjunction with Planning and Budget, develop a plan to implement a cohort funding model at UCSC. The cohort model (as practiced at UCR) guarantees the amount of central funding over a 5 year span for an entering graduate class, ensuring a 5-year fiscal planning window for programs. Optimally, such cohort funding would define both central fellowship funding and a minimum level of ASE funding for a cadre of entering doctoral/MFA students. The principal challenges for implementing a cohort funding model are: (1) developing 5 year central funding commitments, and (2) establishing baseline long-term ASE/fellowship commitments to programs that allow planning for a 5 year guaranteed period of support for entering cohorts of doctoral students (2 years for MFAs). This plan would allot a designated amount of fellowship support over a 5/2 year duration of a doctoral/MFA student cohort, and guarantee a base level of ASE support per doctoral/MFA student each year. In this plan, support of doctoral/MFA students would be a primary driver of baseline ASE funding allocations to divisions and programs, with undergraduate and large master's course enrollments being secondary drivers.

Lastly, our findings indicate that the Graduate Division is significantly under-resourced, with likely significant negative impacts on the graduate enterprise. The level of staffing within the Graduate Division, which may be an indicator of graduate student programming and support capabilities, is the lowest in the UC system and well below what is expected based on graduate student enrollment numbers. Comparison with our sister campuses suggests that the number of graduate enrollments at UCSC (1,908 doctoral + MFA + master's in 2018-19) could justify ~23 graduate division staff and administrators, ~35% more than the current number of staff and administrators (14.5 as of 2 years ago; fewer now). The JWG recommends increased investment in the Graduate Division to provide much needed support for students and the graduate enterprise more broadly, including staffing and programming to support significantly increased efforts to recruit, retain, and graduate demographically diverse students, enhanced professional development

³ On January 27th, 2020, UCSC Chancellor Larive announced two programs to enhance support for doctoral and MFA students: the 5/2 year support guarantee program for doctoral/MFA students, which provides a minimum level of support equivalent to that of a 50% teaching assistantship; and an annual \$2,500 housing supplement fellowship program.

<https://news.ucsc.edu/2020/01/chancellor-new-graduate-student-programs.html#:~:text=First%2C%20beginning%20in%20fall%202020,a%2050%20percent%20teaching%20assistantship>

opportunities for students across all disciplines, and improved student success. Supporting this need, a majority of FGES respondents believe their students are more likely to get professional (versus tenure track academic) jobs post-degree, underscoring the importance and likely impact of enhanced professional development programming across all institutional levels (departments, divisions, etc.). These findings reflect and align with national trends in graduate education.

Recommendations

Priority	Recommendation	Responsibility
Highest	Develop a 5/2 year doctoral/MFA student Cohort Funding Model for implementation at UCSC. The model should provide stability and predictability in graduate student support over a 5/2 year timeframe, and address specific plans and resources to support doctoral enrollments in conjunction with department/program goals and aspirations, given that there are important differences across disciplines in the desire and ability to sustainably grow doctoral enrollments.	CP/EVC, P&B in conjunction with Grad Div, academic divisions, CPB and GC
Highest	Build the graduate funding model into the proposed Academic Resource Model (if adopted), in which support of doctoral/MFA students is a driver of baseline ASE funding allocations to divisions and programs, with undergraduate and large master's program enrollments as secondary drivers.	CP/EVC, P&B, Grad Div, academic divisions, in consultation with CPB and GC
Highest	Utilize the JWG framework of Graduate Division data to conduct a cost-benefit analysis to determine whether increased fellowship support for doctoral/MFA students would reduce time to degree and offset the increased costs of support.	P&B, Grad Div, in consultation with CPB and GC
Highest	Continue analysis of graduate student support needs, and ways the campus can better meet these, including possibly through enhanced fellowship support. This should be reassessed regularly.	P&B, Grad Div, CPB, GC
Highest	Increase Graduate Division staffing resources to provide much needed support for students and the graduate enterprise more broadly, including programming to support significantly increased efforts to recruit, retain, and graduate demographically diverse students, enhance professional development opportunities for students across all disciplines, and improve student success.	CP/EVC

High	Institute clear and comprehensive faculty workload policies for all departments and divisions, appropriate for the discipline, that appropriately recognize and value efforts associated with mentoring and advising graduate students.	VPAA/APO, academic divisions, departments, and Senate committees
High	Establish a committee to investigate whether demographic and disciplinary inequities exist in faculty workload associated with graduate advising and its recognition in personnel actions.	VPAA/APO, in consultation with academic divisions, departments, and Senate committees
High	Provide incentives for including more graduate student support in extramural funding proposals, and from philanthropic sources. These may include enhanced institutional support for grant/proposal writing; development of a cost-sharing program for faculty supporting graduate students as GSRs on extramural funding, enhanced prioritization of graduate support by University Relations, etc.	Chancellor/ CPEVC/OR/U R/P&B
High	Evaluate the effectiveness of the Master's Incentive Program (MIP) in strengthening graduate education, including its role in supporting or growing doctoral and/or master's programs. More broadly, evaluate the role that master's programs should play in the graduate education ecosystem, including whether and how to grow master's programs and where interest and capacity exists.	CPB, GC, Grad Div, academic divisions, P&B
High	Institutionalize and regularize updating the data framework annually on: revenues generated by and spent in support of graduate students; graduate student level data on time to degree and funding support, so as to inform strategic and tactical decisions to strengthen graduate education.	P&B and Grad Div, in consultation with CPB and GC
Medium	Develop enhanced professionalization programming within the Graduate Division, academic divisions, and departments to better serve professional development needs of graduate students.	Grad Div, in conjunction with academic divisions, departments, and Career Center
Medium	Develop policies that better integrate and recognize LSOEs and Research Faculty as graduate student mentors/advisors and valued contributors to graduate education.	VPAA/APO in conjunction with divisions, departments and Senate committees

1. Introduction

Maintaining and enhancing UCSC's status as an outstanding public research university, and its ability to attract top faculty and provide the most stimulating undergraduate educational experience all depend upon strong and vibrant graduate programs. The Joint-Senate Administration Working Group on Graduate Education (JWG) was created following consultation between Graduate Council and the Chancellor and CP/EVC, and broadly charged with conducting a revenue analysis of graduate funding in order to assess the totality of revenues generated by and spent on graduate students and the ways in which these are currently used. These analyses were to inform JWG recommendations to stabilize and strengthen the graduate enterprise in the near and long term, centering on diversity, broadly defined (see the full charge at the end of the report, Appendix A). The JWG addressed the charge by conducting a comprehensive analysis of revenues generated by graduate student enrollments and funds spent supporting graduate students, conducting a faculty graduate education survey, performing analysis of the 5/2 year doctoral/MFA support guarantee, assessing alternative models for supporting graduate students, and comparing Graduate Division staffing across the UC campuses. Here, the term "graduate enterprise" is used to encompass the totality of revenues generated by graduate student enrollments, how those funds are spent supporting graduate students, the instructional roles played by graduate students, and the faculty advising and co-curricular aspects of graduate education.

The JWG conducted its work in three phases. In Phase I, the JWG developed principles, listed below, to guide the JWG's efforts, constructed a comprehensive dataset framework capturing the totality of revenues and expenditures related to graduate student support, broken down by academic division for 2018-2019, and identified key challenges that the campus and graduate enterprise will need to face moving forward in order to meet the 5 year funding guarantee. In Phase II, the revenue analysis was expanded to encompass 3 years (2016-17, 2017-18, 2018-19), and a Faculty Graduate Education Survey (FGES) was developed (see Appendix B) to assess faculty's perspectives on i) the importance of advising/mentoring graduate students in their profession and the workload associated with those efforts, ii) the roles of Academic Student Employee (ASE) appointments to support graduate students and their cost of attendance, and iii) the importance of demographic and disciplinary diversity in the graduate enterprise. The JWG's work concluded in Phase III in fall 2020 and early winter 2021 with further expansion of the revenue analysis of graduate student funding to the department/program level, the administration of the Faculty Graduate Education Survey, collection/analysis of Graduate Division data on graduate student support practices over the past decade, financial modeling of the 5/2 year doctoral/MFA student funding guarantee, analysis of graduate division staffing across the UC, and development of an alternative graduate student cohort funding model. Some aspects of the JWG's work remains incomplete, such as a comprehensive analysis of the Master's Incentive Fund Program (MIP) and the role of master's enrollments in the graduate education ecosystem, as well as a comprehensive analyses of Graduate Division student enrollment and support data, with a recommendation that those efforts continue through appropriate Senate and Administration collaboration.

It was apparent at the onset of JWG's work that there existed varying degrees of knowledge among group members about how the campus supports graduate education at UCSC, including: the recent history and context shaping the graduate growth initiative; how state and tuition revenues are generated; how the rebenching funding model affects graduate enrollment revenues; what UCSC is obliged to regarding rebenching and graduate growth enrollment numbers; and how revenues flow to UCSC and are used to support graduate students.

2. Guiding Principles and Approach

The JWG reviewed previous reports (Senate and Administrative) related to graduate education, including two systemwide statements and reports, which set out principles and goals related to the graduate

enterprise⁴. The JWG developed a set of principles to guide current efforts. These are to:

- **Strengthen the Graduate Enterprise:** UCSC's graduate enterprise is integral to our teaching, research, and service mission and a vital component of our R1 and AAU statuses. We are thus committed to strong graduate programs and the overall strengthening of graduate education at UCSC.
- **Cultivate Research Excellence and Professional Development:** We favor an enhanced educational environment that supports the development of outstanding scholars and practitioners by creating outstanding research environments coupled with strong career-relevant professional development opportunities.
- **Advance Disciplinary, Faculty and Student Diversity:** We are committed to disciplinary and student diversity, knowing that human and planetary well-being, now and in the future, requires critical and creative knowledge from diverse sources. To this end, we are committed to ensuring that our graduate programs attract, support, retain, and graduate a diverse body of students.
- **Provide an Environment for Student Success & Welfare:** A climate that engenders belonging and dignity is central to the mission of UC and is critical to student success and welfare. We are committed to a strong and healthy graduate education institution that provides students the time, financial support, and creative environment they need to execute their studies and research successfully.

3. Revenue Analysis Process and Overview

A significant proportion of the JWG's effort was spent on conducting a comprehensive revenue analysis of how UCSC supports graduate students. One key finding is that prior to JWG's efforts there were reporting mechanisms for analyzing graduate student financial support expenses, but no means to readily assemble necessary data for a comprehensive revenue analysis of graduate support practices. This circumstance has likely affected, if not precluded, the comprehensive analysis of graduate support that should serve as a basis for major decision making. As each of these pools of data were obtained in disaggregated form (i.e., multiple spreadsheets, and multiple worksheets per spreadsheet), the JWG developed a data management and analyses framework that integrated the revenues generated by (via enrollment and tuition) and spent supporting graduate students (including ASE employment, fellowships, and extramural sources). This data framework allowed for analysis across datasets that previously had been difficult if not impossible to achieve. JWG worked with the Office of Planning and Budget (P&B) to develop a programmed workflow to automate the generation of integrated datasets for subsequent years moving forward so as to facilitate the reporting process of this information.

3.1 Revenue and expense analysis of graduate student support

Revenue analysis of graduate student support was performed for three fiscal years (2016-17, 2017-18, 2018-19) using data acquired through Planning and Budget to determine and summarize: 1) revenue generated by graduate student enrollments through core state enrollment and tuition; and 2) money spent supporting graduate students through ASEs, GSRs, and fellowships, etc. The major revenue sources that are spent to support graduate students are: 1) core state enrollment and tuition revenues, which includes tuition and state enrollment-based revenue; 2) extramural revenues, which includes contracts, grants, gifts and endowments; and 3) other funding sources, which include sales and service, indirect cost recovery, and student fees.

⁴ Documents reviewed included: Joint Senate Administrative Task Force Report on Academic Structures (2013); Senate Executive Committee Guiding Principles for Graduate Growth (October 2014); Joint Senate Administrative Task Force on Graduate Growth Report and Recommendations (June 2015); Graduate Council Statement and Report on Strengthening and Growing Graduate Programs at UCSC (May 2017); Graduate Council Report on Growing and Sustaining Graduate Student Research (May 2019); Academic Council Re: UCPB Letter on Graduate Student Funding (April 2020); Report of the Joint Advisory Committee on Graduate Student Support (Attiyeh Report) (January 1991).

Notably, the revenue data from P&B are based on graduate student FTE, and not individual students per se, and thus were not readily aligned with support of specific students. Therefore, the JWG also conducted analysis of data from the Graduate Division⁵ on how students were actually supported over the course of their graduate career to determine: 1) what proportion of students have gone without any form of institutional support (i.e., self-funded or funded by external entities) during some portion of their graduate career; 2) what percentage of graduate students received full, partial, or no funding, by degree type (doctoral and master's), academic division and department; 3) actual time-to-degree by degree type, division and department; and 4) correlational analysis of the relationship between funding, funding-type and time-to-degree. This project revealed some important gaps in UCSC's data, such as funding external to UCSC that some graduate students are supported by, and grants such as Fulbright, SSRC, or support of international students from a student's country of origin, etc. Those analyses are ongoing and will be reported separately.

Core state enrollment-based revenue arises from state dollars that come to campus based on graduate student enrollments. State enrollment dollars are based on a per student amount (\$7,623 in 2018-19), and a weighting factor based on student status (i.e., undergraduate, graduate, or professional). Undergraduates and master's students are weighted 1.0 (i.e., campus received \$7,623 per enrollment in 2018-19), while doctoral students are weighted 2.5 (\$19,058 per enrollment in 2018-19). These state-based revenues for student enrollments arose out of a budget allocation "rebenching" process implemented by the University of California Office of the President (UCOP) in 2012-13 that affected how state enrollment-based revenues flowed to UC campuses. The UCOP budget allocation rebenching process resulted in the allocation of \$24.3M in one time funding to UCSC distributed over the 5 year transition period beginning in 2012-13, and ongoing doctoral student enrollment-based funding for 1,778 doctoral enrollments, which was equivalent to a 12% doctoral:undergraduate student enrollment ratio established at the start of the rebenching process. Notably, because of extensions of the rebenching process, UCSC continues to receive state enrollment-based funding for 1,778 doctoral students, even though actual doctoral enrollments have not reached this goal (doctoral enrollments were 1,420 as of end fall quarter 2020). The difference between the dollars UCSC receives for the 1,778 doctoral enrollments versus the dollars it would receive for actual doctoral enrollments constitute upfront "aspirational" dollars to support doctoral enrollment growth. In 2018-19, the amount of state enrollment-based funding UCSC received for the 441 "aspirational" doctoral enrollments (i.e., 1,778 - 1,337 actual) was \$8.4M. One implication of continuing to receive state funding for more doctoral students than UCSC actually has is that increases in doctoral enrollments will not lead to additional state enrollment-based revenue until UCSC surpasses 1,778 doctoral enrollments. It is also possible that UCSC may lose future aspirational growth dollars if doctoral enrollments do not grow.

In 2018-19, **core state revenue** from doctoral enrollments (including aspirational) was \$33.9M, based on 1,778 doctoral enrollments, a 2.5 weighting factor, and a per student FTE funding level of \$7,623. State revenue from master's enrollment (397 student FTE) created \$3M in revenue. Though state dollars from graduate enrollment has increased by 8% from 2014-15 (\$31.3M) to 2018-19 (\$36.9M), this increase did not occur because of doctoral enrollment growth, but rather because of increases in the state budget, which provided \$7,038 per student FTE in 2014-15 and increased to \$7,948 in 2019-20. By comparison, state revenue from undergraduate enrollment in 2018-19 (16,441 student FTE) resulted in \$125M to UCSC. As a percentage of total state revenue from total student enrollments (\$162M), state dollars generated from undergraduate enrollments was 77% of UCSC's total student enrollment-based revenue, doctoral

⁵ Data obtained from the Graduate Division included: a 10 year longitudinal dataset (from 2010-2019) with data per student including anonymized ID, division, department, and degree type (PhD, DMA, MFA, MA, MS), year and quarter enrolled, enrollment status (full time, part time, in absentia, on leave), support level (full, partial, none), and type of support (TA, GSI, GSR, fellowship). The JWG worked with P&B to restructure these data into a single analyzable dataset, and to create a programmed workflow to make analysis semi-automated for the Graduate Division moving forward.

enrollments (1,778) generated 20.9%, and master's enrollments generated 1.8% of total student enrollment-based revenue.

4. Key Accomplishments, Findings and Implications

4.1 Bird's eye view summary of revenue analysis

Revenue analysis was performed for three fiscal years (2016-17, 2017-18, 2018-19), which showed similar trends in revenues generated by graduate enrollments and spent on graduate students. In light of this similarity, and to simplify the presentation of findings, only data from the 2018-19 fiscal year are summarized here.

The primary total revenues generated through core state and tuition enrollments of UCSC graduate students in 2018-19 was \$62M. For the same year the total amount spent supporting graduate students at UCSC was \$71M. Of this \$71M, \$48.5M (68%) came from core state + tuition revenues, and \$20.4M (29%) from extramural revenues, which included grants, contracts, endowments and gifts. The remaining \$2.1M (3%) came from "other" funding sources such as sales & service, indirect cost recovery (ICR) and student fees. Notably, the costs associated with educating graduate students (e.g., costs of faculty, program and administrative staff, facilities, services, etc.) were not considered in this analysis.

Most of the graduate student support coming from **core state** funds was through ASE appointments (65% of core state/43% of total (core state + extramural + other) expenses), the majority of which were TAs (98% of ASE assignments). Other significant forms of core support came in the form of fellowships from the Graduate Division (19% of core state/13% of total) and core state-funded GSRs (13% of core/9% of total).

The majority of graduate student support from **extramural funds** (grants and gifts) came as GSRships (70% of extramural/20% of total), with the remainder through fellowships from academic divisions (16% of extramural/4.5% of total) or the Graduate Division (13% of extramural/3.7% of total).

The majority of graduate student support from **other** sources (indirect cost recovery, student fees, sales and service) came as GSRships (40% of "other"/ 1.2% of total), Graduate Division fellowships (26% of "other"/0.8% of total), and other fellowships (25% of "other"/0.8% of total).

Implications. A bird's eye view of the revenue analysis shows that UCSC spends more supporting graduate students than is generated from their core state and tuition-based enrollment revenues, underscoring the importance of extramural revenues in supporting graduate students. It also highlights the need for continued advocacy for a state / higher education compact that values graduate education and the unique role of the UC in California's tripartite higher education system. Moreover, since graduate students appointed as ASEs generate no net tuition revenue (as the institution pays itself for their tuition), the difference between the cost of supporting/educating graduate students versus the revenue their enrollments generate is further exacerbated. Of course, one vitally important factor is that ASE appointments, which are a primary mechanism for supporting graduate students, are also critical for supporting the undergraduate teaching mission of the campus (see below), and hence play a major role in the campus' undergraduate revenue generation.

4.2 UCSC relies heavily on ASE appointments (especially TAs) to support doctoral/MFA students, especially in the Arts, Hum and SocSci divisions, where there are fewer opportunities for other forms of student support (fellowships, extramurally-funded GSRs, etc.).

A relatively large proportion (65%) of core state enrollment + tuition-based revenues spent supporting graduate students in 2018-19 were spent on graduate student ASEs (TAs, GSIs), the majority of which were TAs. The question of whether this is appropriate depends on whether we as a campus view the primary role of ASE appointments as supporting undergraduate or graduate education, or a mix of both. The former (i.e., ASEs primarily supporting undergraduate education) implies that only 28% of the core state + tuition revenue generated by the graduate student enrollments was spent supporting graduate students (with the majority of this funding supporting the undergraduate enterprise). However, if ASE appointments are considered as the primary mechanism to support graduate students, then 78% was spent supporting graduate students (i.e., 48.5M of the \$62M core revenues generated by graduate student enrollments + tuition) (see Figure 1). This reliance on TAs as a critical in support of undergraduate education *and* as the primary mechanism for supporting graduate students has several important implications. First, in some divisions it makes graduate students overly dependent upon TAs over the course of their graduate studies, and quite likely extends their time-to-degree. And second, it makes departments and divisions (some much more than others) unduly reliant on TA/GSI allocations that are not currently predictable over the 5 year guaranteed doctoral student support window.

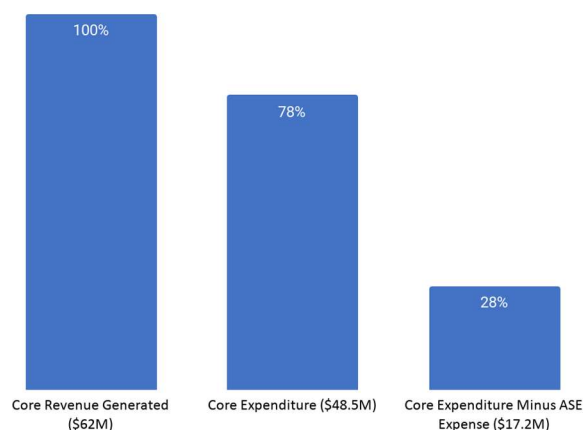


Figure 1. Percentage of total core state + tuition-based revenue generated by graduate student enrollments (\$62M) that was spent supporting graduate students if ASE appointments are included (\$48.5M, 78% of total core revenue), and if ASE appointments are excluded (\$17.2M, 28%) for 2018-19.

Results from the Faculty Graduate Education Survey (FGES) suggest that if the two support cases represented above (78% vs 28%) represent philosophical extremes of the role of ASEs in university education, then UCSC has leaned too much towards treating ASEs as the primary mechanism to financially support graduate students. For example, while nearly two-thirds of all faculty respondents (63%) report that they typically advise students who serve as ASEs for two or three quarters/year, a majority (54%) of faculty stated that students should serve as an ASE for no more than one to two quarters/year, and a clear majority (73%) indicated that serving as an ASE for two or more quarters/year prolongs a student's time to degree.

The majority (67%) of all respondents stated that the typical time to degree for their doctoral students was 6 years or more, while only a quarter (23%) stated that the typical time to degree is 5 years or less⁶. BSOE was an exception to this, with a majority (55%) of BSOE respondents stating that the typical time to degree

⁶ Appendix D of the UCSC Academic Senate Manual lists normative (i.e., maximum) time to degree for doctoral students as 6 years for most doctoral programs, while four programs have an approved 7 year normative time to degree.

for their doctoral students was 5 years or less. This is corroborated by longitudinal analysis of data from that Graduate Division, which shows that from 2010-2019, only 37% of doctoral students finished in 5 years or less (see Table 1).

Table 1. Percent of doctoral students enrolled between 2010-2019 who earned their degree in less than 5 years, 5 years, or more than 5 years, by academic division.

Time to Degree (doctorates)	Arts (n=39)	BSOE (n=147)	Hum (n=56)	PBSci (n=292)	SocSci (n=151)	Grand Total (n=685)
< 5 years	15%	22%	11%	12%	9%	14%
5 years	18%	21%	21%	27%	17%	23%
> 5 years	67%	56%	68%	60%	75%	64%
Total	100%	100%	100%	100%	100%	100%
7 years or more	23%	14%	36%	7%	28%	16%

It is noteworthy that less than a quarter (23%) of all faculty respondents stated their doctoral students can finish within 5 years (ranging from 4% in Humanities to 55% in BSOE). But when asked to consider this same question under “ideal” conditions (i.e., fewer quarters spent as ASE, higher salary/stipends to meet cost of attendance needs), this increased substantially to a majority (59%) of all respondents stating that their doctoral students could finish within 5 years, with notable increases across all academic divisions (up to 40% in Arts and 84% in BSOE). Moreover, in a follow up open-ended question where respondents were asked to elaborate on the differences between their perceived ideal and current state conditions favoring 5 years or less time to degree, 79% of respondents providing relevant answers defined their ideal state as providing greater financial support for graduate students with commensurate reduced need to serve as an ASE as frequently. However, when respondents were asked about the overall level of TA support for courses that they teach, over half (58%) indicated that they receive insufficient TA support for courses they teach.

Implications. There are multiple factors that contribute to doctoral student time to degree, including program curricula and research needs, availability of research support (fellowships, GSRships, etc.), and the frequency that students serve as ASEs over their career - all of which vary across programs and disciplines. Since actual time to degree has significant implications for graduate student support that should be considered within the context of the 5 year doctoral student funding guarantee, the JWG recommends analyzing the cost of lowering barriers to degree completion relative to the benefit of graduating more doctoral students earlier and with an enhanced educational experience. This should be done in combination with expanded efforts to enhance extramural and fellowship funding to augment ASE sources of student support.

The FGES responses also raised somewhat of a conundrum between the heavy reliance on ASEs to support doctoral/MFA students, and the sentiment from a majority of faculty respondents across all divisions that students are serving as ASEs too often at the cost of prolonged time to degree, versus many faculty indicating that they do not receive sufficient TA support for their courses. This conundrum suggests a possible opportunity to strengthen both graduate and undergraduate education by creating a mix of alternative modes of instructional assistance that does not rely so heavily on doctoral/MFA student ASEs (e.g., doctoral student TAs, along with other forms of instructional support such as non-student tutors, readers, lecturers, as appropriate for the discipline), with the goal of reducing the number of ASE quarters a graduate student would serve over their career while at the same time increasing (or at least not

diminishing) the level of instructional assistance to qualifying undergraduate courses. Possible strategies for achieving this goal are presented in the Alternative Funding Models section below.

4.3 A relatively modest amount of extramural funding is directed to supporting graduate students, suggesting there is capacity to grow support for graduate students through growth in extramural funding and associated Indirect Cost Recovery (ICR).

The JWG revenue analyses revealed that a relatively modest amount of extramural funding is directed to supporting graduate students (\$20.4M in 2018-19), which is 29% of the total amount spent supporting graduate students, and 12% of total extramural funds brought to campus that year. Similarly, a seemingly low proportion of gifts and endowment-based extramural funding (15% of total extramural) was raised to support graduate students in 2018-19. Overall, nearly three quarters (70%) of extramural funding supporting graduate students was through GSRships, with the remainder through other divisional fellowships (16%), Graduate Division fellowships (13%), etc. Finally, of the extramural funding-based revenue spent supporting graduate students, 86% came from contracts and grants, while 15% came from gifts and endowments.

The amount of extramural funds spent supporting graduate students varied greatly across divisions, with PBSci and BSOE spending \$11.2M and \$5.8M respectively, and SocSci (\$1.7M), Hum (\$334K), and Arts (\$160K) generating and spending considerably less. Even within PBSci and BSOE departments, there are large differences in extramural support for graduate students. Six departments supported their graduate students with approximately half of total funding (core state + extramural + other) coming from extramural sources: Molecular, Cell, and Developmental Biology (58%); Ecological & Evolutionary Biology (52%); Earth and Planetary Sciences (51%); Astronomy and Astrophysics (51%); Biomolecular Engineering (47%); and Electrical and Computer Engineering (43%). Three departments supported graduate students with at least 30% of funding coming from extramural sources: Microbiology and Environmental Toxicology (40%); Ocean Sciences (38%); and Chemistry & Biochemistry (31%). Six departments supported graduate students with at least 20% of funding coming from extramural sources: Environmental Studies (27%); Education (22%); Applied Math (21%); Computer Science and Engineering (21%); Computational Media (20%); and Sociology (20%).

According to the FGES, a majority of faculty stated they have and/or are interested in pursuing extramural funding, but there are barriers that require division specific solutions. Nearly all respondents in BSOE and PBSci have pursued federal or state grants, while a lower but still majority of respondents (>55%) in Arts/Hum/SocSci disciplines have done so. Approximately three quarters or more of Arts/Hum/SocSci respondents have pursued grants from foundations/non-profits. In general, a relatively small proportion of respondents across all divisions (<15%) have pursued endowments or gifts (excepting BSOE respondents, where nearly 60% have pursued corporate gifts). In combination with responses to the open ended question about what could be done to support increased efforts to pursue extramural funding (e.g., course relief, increased institutional assistance and support), these data suggest that greater institutional investments should be made to support the pursuit of more gifts and endowments, and increased extramural funding in general. Moreover, a majority of respondents across all divisions said they would increase their efforts to secure extramural funding that directly supports graduate students if they received what they considered appropriate campus support, such as matching funds from the campus for extramural funding raised for graduate student support, or availability of seed funds for developing early-stage ideas and/or writing proposals. Respondents also made clear that the high cost of supporting doctoral/MFA students was the predominant barrier to adding more graduate student support into their extramural funding efforts.

Only one third of respondents (31%) stated that campus support/recognition was adequate for their extramural funding efforts, and that providing teaching relief and greater divisional support would be most helpful in their efforts to secure more extramural funding. That said, whether deploying ~12% of

extramural award dollars to support graduate students is reasonable as an institution-wide average represents a separate, difficult-to-address question. From the survey, faculty stated that more graduate support could be worked into proposals, but that there are barriers to doing this, chief among them being the high cost of graduate students. This suggests that future increases in the cost of graduate student support could lead to proportional reductions in the number of students included in extramural proposals.

Implications. Together, these data suggest that there is capacity to grow support for graduate students through growth in extramural funding and associated Indirect Cost Recoveries (ICR), and by focusing on growing gifts and endowments overall by increasing fundraising efforts for graduate student support at all levels of the institution, including University Relations, Graduate Division, and the academic divisions. This capacity can be assessed and analyzed at both the divisional and department levels, as there is much variation in extramural funds raised between and within divisions. Despite those differences, there are opportunities for growth across divisions by addressing barriers associated with overall support for grant/proposal writing, and for graduate support within grants/proposals more specifically. Similarly, the relatively low proportion of gifts and endowment-based extramural funding (15% of total extramural) that supports graduate students suggests that there is an opportunity to more strategically focus on growing gifts and endowments overall by increasing fundraising efforts for graduate student support across the institution.

Within BSOE, PBSci, and SocSci divisions, there are notable differences between departments in the extent to which they rely upon core state vs extramural funding sources to support graduate students. These differences suggest that follow up analyses at the division/department level should explore the underlying reasons for this as a means to normalize these sources of graduate support across departments to the extent possible - such as possibly targeting institutional and divisional resources and support to increase extramural funds for graduate students in the departments with the greatest potential to derive benefits. The relatively low use of extramural funding sources to support graduate students in the Arts and Humanities suggests that those departments might benefit from greater institutional support, enhanced fund-raising efforts, and recognition of faculty workload associated with mentoring/advising graduate students.

4.4 Graduate students are integral to the success of faculty, UCSC as a public R1 research institution, and to providing the next generation of California's innovators, leaders, and academicians, but faculty perspectives differ on the extent that advising/mentoring graduate students is adequately recognized in their workload expectations.

The vast majority of faculty across academic divisions felt that being able to work with doctoral/MFA students is important to them (in total, 89% agree/strongly agree). However, the extent that faculty's research is seen as advanced by having access to doctoral/MFA students notably varied across academic divisions. For example, in BSOE, PBSci, and SocSci 100%, 85%, 67% of faculty, respectively, agree/strongly agree that advising doctoral/MFA students is an important factor in advancing their research, whereas in Arts & Humanities only 40% agree/strongly agree. Conversely, faculty in the Arts and Humanities divisions were more likely to respond that advising/mentoring doctoral/MFA students takes time away from their research (e.g., for Humanities and Arts respondents, 53 - 63% agreed/strongly agreed, whereas 12, 19, and 38% agreed/strongly agreed in BSOE, PBSci and SocSci, respectively). Moreover, underrepresented minority (URM) faculty in Hum/SocSci/Arts are less likely to agree/strongly agree than Caucasian and "all other" demographics that having access to doctoral/MFA students is an important factor in advancing their research (i.e., 36% compared to 57% and 50%, respectively)⁷. Similarly, female URM

⁷ The FGES allowed respondents to self-identify race/ethnicity and gender via open-ended questions. There were a variety of responses that reflected the diversity of respondents' racial/ethnic self-understandings. In order to create categories that would allow analysis of patterns, if any existed, the JWG interpreted the responses and reported the following categories: Caucasian, URM, and "all others" (See Appendix E for details). For gender, the majority of responses were female, male and no answer.

faculty in the Hum/SocSci/Arts are least likely of all groups to agree/strongly agree (only 29%) that having access to doctoral/MFA students is an important factor in advancing their research. In general, these percentages are higher and the differences between demographic groups are smaller in BSOE/PBSci.

Conversely, faculty in the Arts, Humanities, and Social Sciences divisions were more likely to respond that advising/mentoring doctoral/MFA students takes time away from their research (e.g., for Humanities and Arts respondents, 53 - 63% agreed/strongly agreed, in Social Sciences 38% agreed/strongly agreed, whereas only 12 - 19% agreed/strongly agreed in BSOE and PBSci). When looking at the percent of faculty who strongly agree (as opposed to agree/strongly agree), important demographic differences emerge: URM in Hum/SocSci/Arts are more likely to strongly agree that advising/mentoring doctoral/MFA students takes time away from their research (32%, compared to a campus total of 17%). Female URM in Hum/SocSci/Arts are also most likely of all groups to strongly agree on this question (43%, compared to a campus average of 17%).

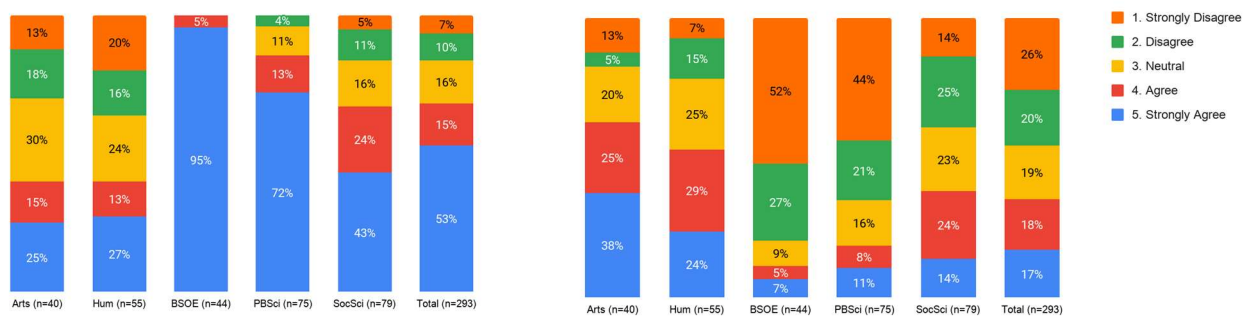


Figure 2. Left panel, proportion of faculty responses to the question “Having access to doctoral/MFA students is an important factor in my research”. Right panel, responses to question “At present, advising/mentoring doctoral/MFA students takes time AWAY from my research”.

Moreover, many faculty do not think that their efforts mentoring/advising graduate students are adequately valued or recognized in the personnel merit review process, especially for faculty in the Arts, Humanities, and SocSci divisions. While nearly 60% of respondents agreed/strongly agreed that their work advising graduate students is adequately recognized by their department/program in their personnel reviews, this dropped off sharply with the stages of review beyond the department (38% at the divisional review stage, 29% at the CAP review stage). There were also notable divisional/disciplinary and gender-based differences. For example, 53 - 68% of respondents in BSOE, Humanities, PBSci, and SocSci, but only 35% of respondents in Arts agreed/strongly agreed that their graduate student mentoring efforts were adequately recognized by their home department. Moreover, female faculty respondents are ~20% less likely than their male counterparts to state their work advising graduate students has been adequately recognized and valued in their personnel reviews by their home department (i.e., 49% of female versus 67% of male respondents), a disparity that was slightly greater in Arts, Humanities, and SocSci versus BSOE and PBSci. URM faculty are more likely to disagree/strongly disagree that their work advising/mentoring graduate students is adequately recognized and valued as part of their department/program teaching workload (48% URM compared to 37% total). Lastly, there are perceived disparities with unrecognized mentoring. For example, female and male URM faculty are more likely to state they do professional development mentoring (94% and 90% respectively, compared to a 75% campus total). Female faculty are more likely to state they do “other kinds” of mentoring (e.g., personal mentoring), with female URM faculty being the most likely of all groups (82% vs 72% campus total). These responses illustrate a continuing perception among faculty that the workload advising graduate students, the institutional expectation that faculty should be engaged

with and contribute to graduate education, and the perception of institutional reward structures are not sufficiently aligned.

Implications. The FGES suggests that the extent to which mentoring/advising students actually advances or hinders a faculty's research might be affected by a faculty's discipline, gender, and race/ethnicity. This interplay of discipline, gender, and race/ethnicity with faculty workload should be carefully considered when establishing mentor/advisor workload expectations. Further, the perception of faculty that their graduate advising efforts are not sufficiently recognized in their personnel reviews - a perception that is heightened among female and female URM faculty, needs to be addressed at all levels of the institution. If they do not already exist, all departments/programs and academic divisions should be mandated to develop clear and comprehensive faculty workload policies that appropriately recognize and value workload associated with graduate student mentoring and advising, and graduate education more broadly, on a par with undergraduate education, formal classroom teaching, etc., as appropriate for the discipline. In addition, the JWG recommends a study that examines the interplay of discipline, gender and race/ethnicity on workload and faculty advancement.

4.5 The 5/2 year doctoral/MFA student guarantee is feasible and fits within our current funding envelope, so long as supporting doctoral/MFA students is prioritized over master's. However, current practices for funding graduate students are not sufficiently predictable to support planning for the 5 year guaranteed support horizon - thus, an alternative graduate student funding model is needed.

In winter 2020, the campus announced a 5 year funding guarantee for doctoral students (2 years for MFA), effective fall 2020. The FGES shows that this recently enacted initiative is an important step in the right direction that will help strengthen the graduate enterprise. It was also clear that most faculty respondents (75%) believe UCSC should provide all of a doctoral/MFA student's cost-of-attendance. Most faculty (65%) also believe UCSC should provide at least some support for MA/MS students (13% stated full support, 15% most, and 37% partial support). However, many faculty (42%) also believe that doctoral/MFA students are partly obligated to meet some of their cost-of-attendance needs as an opportunity cost for the training they receive in earning a higher degree, ranging from 29% in Hum to 54% in SocSci (see Figure 3 below).

For 2020-21 the projected total cost of supporting the 1,202 doctoral/MFA students eligible for guaranteed funding (including the new \$2,500 housing fellowship supplement) is \$51.5M, or \$42.8K per eligible student.⁸ To put that number in context, \$51.5M is \$19.5M less than the \$71M spent supporting all graduate students (doctoral, MFA, and master's) in 2018-19, but \$3M more than total core state + tuition-based revenues (\$48.5M) spent supporting graduate students in that same year, indicating that core state + tuition graduate enrollment-based revenues alone will not be sufficient to meet the 5/2 year funding guarantee for doctoral/MFA students. However, if all sources of revenues used to support doctoral/MFA students are considered at their proportional contribution based on analysis of 2018-19 data (i.e., 68% from core, 29% from extramural, etc.), then \$35.5M of the needed \$51.5M (68% of \$51.5M) would come from core state revenue funds, and \$14.5M from extramural funding (29% of \$51.5M).

This shows that the amount of core state + tuition enrollment-based funds needed to meet the 5/2 year funding obligation for doctoral/MFA students is less than what was actually spent supporting all graduate students, and that current practices for supporting doctoral/MFA students are able to meet the 5/2 year funding obligation moving forward, if supporting doctoral/MFA students remains prioritized over supporting master's students. This is, in part, because extramural funding sources play an important role in supporting doctoral students, and because undergraduate instructional needs require more TAs/GSIs than

⁸ Based on 3 quarters of TAs/ship plus tuition and fees. In 2020-21, the baseline salary for ASEs is \$22,569; the tuition/benefits/GSHIP for CA residents is \$17,808.

needed to meet the 5 year guarantee. In some cases master's students, or undergraduate or non-student course assistants, have filled this need. For example in 2018-19, 28% of full time master's students were fully funded, in many cases by serving as ASEs (see Table 3).

Table 2. Percentage of doctoral students fully or partially funded by year from UCSC funds.

Doctoral Student Support	2016-17	2017-18	2018-19	2019-20
# Doc students enrolled (3 quarter average)	1282	1333	1382	1429
Fully funded	874	914	1001	1075
% total enrolled fully funded	68%	69%	72%	75%
# Full time enrolled (excludes in absentia)	1198	1251	1286	1336
Full time enrolled fully funded	851	883	971	1036
% of full time enrolled who are fully funded	71%	71%	75%	78%
Part time enrolled	46	38	39	40
Part time fully funded	4	5	5	7
% part time, fully funded	8%	14%	14%	17%

Table 3. Percentage of master's students fully or partially funded by year from UCSC funds.

Master's Student Support	2016-17	2017-18	2018-19	2019-20
Total master's Student bodies enrolled	444	470	441	454
Fully funded	86	97	115	120
% total enrolled fully funded	19%	21%	26%	26%
# Full time enrolled (excludes in absentia)	421	440	415	426
Full time enrolled fully funded	85	96	115	112
% of full time enrolled who are fully funded	20%	22%	28%	26%

Nevertheless, current graduate student support practices, which operate on annual or semi-annual timeframes at the divisional and program level, do not provide sufficient predictability for planning graduate student support over the 5 year guarantee window, nor do they factor in possible graduate enrollment growth. Also, the normative (i.e., maximum) time to degree for the vast majority of doctoral

programs is 6 years (four programs have normative times of 7 years)⁹ - something that should also be taken into account in doctoral student funding models. It is also noteworthy that our current system for allocating ASE FTE to divisions, and disbursement of ASEs to programs by divisional deans, is based solely on numbers of undergraduate enrollments within divisions/programs. Hence, undergraduate enrollment fluctuations within divisions and programs can directly impact the amount of ASE-based graduate support available to a program, and jeopardize the ability of programs to fulfill the 5 year guarantee with sufficient predictability.

For comparison, the Graduate Division block fellowship allocations to programs, which are used to make first year funding offers to new doctoral/MFA students and support continuing students, are based primarily on a program's 3 year average doctoral student enrollments. Recently, the block fellowship amount across the campus equated to about \$4,800 per doctoral student per year. Support of graduate students through GSR appointments can, of course, not only depend on faculty extramural funding success, but also hinge on variable federal and state research support opportunities. In order for programs to plan their funding packages for doctoral students over the 5 year guaranteed support window with reasonable confidence, a greater degree of stability of both ASE and fellowship allocations to programs is needed. Such multi-year central funding guarantees to programs were instituted almost two decades ago at UC Riverside with their "cohort" funding system. In this system, the institution guarantees a total amount of funding over the 5 (or 6) year career of a student (discussed more fully in section 4.6). If UCSC adopted a similar graduate student funding model to meet the 5 year funding guarantee, as we propose, our current level of Graduate Division block fellowship funding would require \$24,000/student over 5 years (i.e., 5 years x \$4,800/year). A more straightforward but modestly more expensive approach might be to increase this amount to two quarters of in-state fellowship support over the duration of an average student's career which, if equivalent to a TAsip, would be ~\$27,000 over 5-6 years. We believe that such a system, with both guaranteed levels of fellowship funding, and long-term floors on ASE funding to programs, would allow campus programs to not only plan their financial support to match the 5 year guarantee, but also to tailor their support packages so that a subset of students could, for example, receive fellowship support later in their graduate careers to support timely degree completion.

One possible vision of such a cohort system might:

- 1) Require that support of doctoral/MFA students be a driver of baseline ASE funding allocations to divisions and programs. For example, graduate programs could be allocated a minimum of 1 TAsip per year per eligible doctoral/MFA student. Remaining centrally-funded TAsips could continue to be allocated based on undergraduate and large master's program enrollments to meet curricular needs (or, be allocated by whatever method is determined for undergraduate courses should we adopt a new Academic Resource Model).
- 2) Include within the cohort funding model for the 5 year guarantee duration at least two fellowship quarters from the block allocation per eligible doctoral student (support equivalent to a TAsip with stipend and fees), that could be deployed to support the student beyond their first year as they progress towards their qualifying exam and dissertation. This would serve to both strengthen graduate education overall, and would likely also reduce time to degree in many programs. We recognize, from a financial perspective, that the campus might need to phase in such a program over several years.
- 3) For some programs/divisions, additional non-ASE-based support could be garnered for doctoral students through either return funds from master's enrollments (as with the current MIP program), or for those with large undergraduate teaching loads, non-student employees/lecturers could be deployed to meet some instructional assistance needs, thus freeing up support that would have been

⁹ UCSC Academic Senate Manual, Appendix D.

expended on tuition/fees. Deployment of this type of revenue-generating mechanisms would be enabled by enhanced stability of ASE allocations.

Implications. The funding needed to meet the campus' 5/2 year doctoral/MFA funding guarantee is within the envelope of resources that the campus already spends supporting graduate students, and thus is readily achievable in the current fiscal environment. Several qualifiers to this statement are that 1) many graduate students, especially in BSOE and PBSci, are supported as GSRs at a higher dollar level than would be provided by a TA appointment, and 2) the number of graduate students currently eligible for the 5 year guarantee (1,202 in 2020-21) is less than the actual number of graduate students that are actually receiving support.

One important aspect of the 5 year guarantee is that it suggests, in concept, a potential framework to plan for and parameterize the cost of supporting doctoral/MFA students through the majority of their careers, and may provide the foundation for developing alternative graduate student funding models to achieve greater funding stability and predictability. To optimize divisional and programmatic planning in conjunction with the 5 year guarantee, we recommend that the central funding (ASEs and Graduate Division block) for doctoral/MFA students be stabilized and rendered more predictable over the 5 year period over which groups of students are covered by the guarantee. A modified version of UCR's Cohort Funding System, allotting a designated amount of fellowship support over the entire duration of a student cohort, and guaranteeing a base level of ASE support per doctoral/MFA student each year appears the most straightforward way of achieving a funding model that matches the 5 year guarantee commitment. This possibility is discussed further in Section 4.6.

4.6 Alternative Funding Models: The Cohort Doctoral/MFA Funding Model as a Possibility for UCSC

A Brief Description of the Cohort Model. There is one alternate model to the standard block/TA allocation algorithm that has been deployed within the University of California system, and whose intent/logistics match well with our new 5 year guarantee. UC Riverside has, since 2001-02, deployed the Cohort Graduate Funding Model. This involves funding sources being tied to an entering cohort (class) of doctoral students – these funding sources include central funds, ASEs, GSRs, and fellowships. The central administration allocates a designated amount of central funds to an enrolled class (cohort) of students, with the amount allocated per cohort being determined by the number of entering doctoral students in the cohort in a given year. The Graduate Dean works closely with each doctoral program to 1) establish the number of incoming students that will make up the cohort, and 2) map out funding sources (central funds, ASE, GSRs, etc.) to support the incoming cohort over its 6 year normative time to degree. The central funding can, in concept, be expended by the program on students within the cohort at any time over the course of the cohort's existence (up to 6 years, for most programs at UCR). In practice, however, much of the expenditures of central funding by programs occurs in the first 2 years, and the program is responsible for meeting the cohort's funding needs thereafter (e.g., through ASEs, GSRs, and fellowships). As part of the Cohort Model, the Graduate Division works interactively with each program to determine admissions offers and targets, and has oversight over cohort funding expenditures. Another key feature of the Cohort Funding Model is that longer term commitments of other major sources of doctoral student support (ASEs, GSRs) are planned and made at the program and institutional level to provide predictable funding for a cohort over its 6 year normative time to degree.

Comparison with the Block Allocation Funding Model. In comparison, the Block Allocation Funding Model at UCSC has, since the early 2000's, allocated an annual budget to each program via a formula that is currently based on two factors, 1) the 3 year average of their doctoral enrollments (weighted at ~80%), and 2) the program's 3 year average of doctoral degrees awarded (weighted ~20%). At UCSC, each program

declares how much of their block they plan to spend on incoming students versus how much they will reserve for their continuing students. The incoming student allocation is deployed in conjunction with an admissions multiplier (the over-offer ratio) to construct admissions offers. When programs experience lower than expected acceptances (i.e., shortfalls in acceptances), their unexpended block allocation for incoming students is, in concept at least, swept back to the Graduate Division to fund (i.e., back-fill) programs that exceeded their admissions targets and that had, based on their larger-than-expected class, an over-commitment of their block. At UCSC, the Block Allocation Model does allow some unused funding to be retained by the program between years, since 10% of the block (more by request) is allowed to be carried forward by the program between years (this carryforward capability is only occasionally deployed by programs). Expenditures of the Block Allocation are approved by the Graduate Division, and the boundaries of what the block can be spent on are frequently an area of discussion, and at times contention, between the Graduate Division and programs.

Notably, other sources of doctoral student support (ASEs, GSRs, etc.) are managed and allocated via entirely separate and uncoordinated annual (and, in some cases, quarter by quarter) processes to the Block Allocation Model.

To summarize, relative features of the Cohort and Block Models include:

- The Cohort Model has long-term predictability; programs know precisely what the center will provide for the normative-time-to-degree of an incoming doctoral class, and what the program commitments need to be associated with other sources of funding support (ASEs, GSRs, etc.).
- The Cohort Model provides programs with the flexibility to pursue multi-year planning for each class, with central funds prospectively being deployed at any stage during the cohort's normative time. For example, centrally funded quarters designed to assist with thesis completion could be planned years in advance.
- Both the Block and Cohort Models, in tandem with the 5 year guarantee, require a level of commitment to (or at least confidence in) funding levels from other sources (ASE, GSRs, external fellowships) in the out-years.
- The Block Allocation can be expended by programs in ways other than *sensu stricto* fellowships and tuition/fees (e.g., *ad hoc* fellowships that might support research or travel expenses), though whether this practice should continue is a point of discussion.
- The Block Model has greater administrative flexibility, in that it can be toggled upwards or downwards on an annual basis, whereas the Cohort Model delivers a commitment that the central funding complement for a cohort will be delivered at the discretion of the program.

What Changes Would Facilitate Adoption of the Cohort Model in Tandem with the 5/2 Year Guarantee? UCSC doctoral/MFA students are highly dependent on ASE employment and, as internally-derived funding, this means of support could be committed over a multi-year timeframe (research funds/GSRs are, by their nature, somewhat predictable but not guarantee-able). Indeed, 65% of the core funding supporting doctoral students is derived from ASE (TA/GSI) employment. The bulk of these resources are currently allocated to academic divisions based on undergraduate enrollments, and in turn allocated from divisions to programs. Thus, ASE employment opportunities are the primary component of graduate student support funding within the 5 year guarantee, and these are currently subject to both annual fluctuations and long-term trends in undergraduate enrollments. Hence, the long-term ability of programs to engage in realistic long-term financial planning for their cohort hinges on being confident in at least a minimum level of support from ASE/teaching support allocations over time-frames that approach normative times to degree. A possibility for UCSC, driven by the recognition that the teaching support allocation has a tandem role in both instruction and in graduate student support, and that some proportion of funds supporting ASEs comes from graduate student enrollment-based revenues, is that a minimum base level of teaching support (e.g., ASE funding) for a program could be defined based on doctoral student

enrollments in the program, with the balance of the ASE allocation being determined by undergraduate (and possibly master's) enrollments.

Such a guaranteed minimum level of teaching support would generate a mechanism for programs to enhance their level of graduate support through internal prioritizations. Specifically, if teaching support represents an allocated budget for the program to flexibly support its teaching mission, a program could prioritize other creative means to provide instructional support for some classes. Graduate programs that are not affiliated with undergraduate programs or have limited undergraduate course offerings may require alternate funding allocation mechanisms to ensure that their base-level of resources is sufficient for their long-term graduate support needs. Currently, such programs rely on semi-formal understandings with other programs on TA availability, and/or on their students proactively seeking out other ASE opportunities for which they are qualified. If a Cohort Model is adopted, stable base-level funding for such programs might be leveraged by memoranda of understanding with programs or divisions to guarantee a base-level teaching support budget for their graduate students.

Implications: A plan should be developed to implement a cohort funding model at UCSC. The principal challenges for such a plan are: (1) developing 5 year central funding commitments, and (2) establishing baseline long-term ASE commitments to programs that allow planning for a 5 year cohort.

4.7 Graduate Student Support and Cost of Attendance

Issues surrounding graduate student support, both in absolute levels of support per quarter and number of quarters of support over a student's graduate career, have received substantial attention across the campus (and in fact UC system-wide) over the past several years. An important point of consideration is "what is UCSC's obligation to meet the cost of attendance needs of graduate students?" While this question is partly addressed with the implementation of the 5/2 year doctoral/MFA student guaranteed funding policy, the level of guaranteed support does not fully meet the cost of attendance needs of students. The FGES responses show that the vast majority of faculty (87%) stated that the campus should provide higher levels of financial support to our doctoral/MFA students. Further, most faculty felt that what students receive is not sufficient in the Santa Cruz housing market, disproportionately and negatively impacting underrepresented students and the campus' efforts to increase graduate student diversity. In particular, when asked in principle what level of support UCSC is obligated to provide doctoral students (i.e., full, partial, etc.), three quarters (75%) of all respondents stated UCSC should, in principle, provide full support of a doctoral student's cost of attendance. However, when asked a follow-up question about the doctoral student's obligation to financially support their own cost of attendance, with the stated assumption that earning a graduate degree provides opportunity to the student, a little more than half (57%) of all respondents stated "none", 34% stated "partial," and 8% said "most" or "full."

When asked about trade-offs between supporting doctoral students at a higher level and admitting fewer, the same, or more students, only 28% of respondents would trade off higher levels of support with admitting fewer students. In other words, respondents favored admitting the same number or more students, while also supporting them at a higher level. In both cases, there are significant financial implications to the campus and faculty supporting students as GSRs.

If UCSC were to increase its annual housing fellowship supplement, say to \$4,500, \$6,750, \$9,000 or to \$11,250, it would cost an additional \$2.4M, \$5.1M, \$7.8M and \$10.5M, respectively, given our current student cadre. In lieu of a simple enhancement of the housing fellowship supplement, making summer support more widely available for graduate students would also generate a more fiscally viable annual fellowship for students. While summer support via GSRs is relatively common in the STEM fields that generate significant extramural funding to support graduate students, it is more challenging to access such support in other divisions. In this regard, the recent growth of summer session (for which predicting the

build-out enrollments is beyond the scope of this report) has provided additional support for a subset of our students.

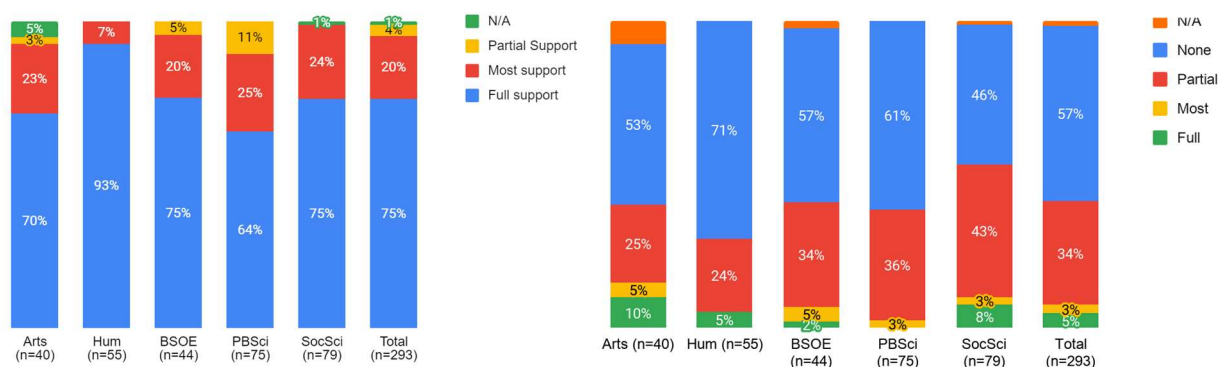


Figure 3. Left panel, proportion of faculty responses to the question “In principle, what do you think are UCSC’s obligations to financially supporting doctoral students’ cost-of-attendance in your discipline?” Right panel, faculty responses to question “Assuming that earning a doctoral degree provides opportunity to the student, what do you think students’ obligations are to financially support their own cost-of-attendance needs in your discipline?”

Implications. Most faculty (87%) believe that UCSC should be providing higher levels of financial support per doctoral student than we do at present, and most faculty (75%) also believe that UCSC is in principle obliged to provide full financial support for doctoral/MFA students in their discipline. However, these responses also display important divisional differences in how respondents view the trade-offs between the number of student admits and the levels of student support, suggesting that approaches for balancing these trade-offs should emerge, at least in part, out of programs and academic divisions.

Collectively the survey shows that the recently enacted policy to provide 5/2 years of guaranteed support to doctoral/MFA students is an important step in the right direction that will help strengthen the graduate enterprise. While most faculty respondents feel UCSC should provide much of a doctoral/MFA student’s cost-of-attendance, and at least some support for MA/MS students, there is not a consensus on whether the support levels should necessarily match the cost-of-attendance needs. It may also be considered that the training and opportunity benefits associated with earning a graduate degree are likely of long-term financial benefit to the student, partly justifying the student’s cost-of-attendance as an opportunity cost. In addition, there is a clear majority sentiment among faculty respondents that doctoral/MFA students should be provided higher levels of support than they currently receive, though only 28% of respondents would trade off higher levels of support with fewer admitted students. In other words, respondents favored admitting the same or larger numbers of students, while also supporting them at a higher level.

4.8 Faculty perspectives on graduate student training, professional development, and career competitiveness

A series of questions were asked to gain perspective on how faculty respondents felt about whether graduate students in their programs were receiving appropriate training to be competitive for various career paths post-graduation. The vast majority of respondents indicated that their graduates are competitive for academic or professional jobs. Faculty in the Arts (60%) and PBSci (61%) were somewhat more likely to state that doctoral graduates are competitive for tenure track jobs in academia, compared to respondents in the other divisions (Hum 40%, BSOE 50%, SocSci 56%). Faculty respondents in BSOE (98%) and PBSci (93%) were most likely to state that graduates were competitive for applied/professional jobs in their field of discipline, compared to the other divisions (Arts 60%, Hum 64%, and SocSci 77%).

Complementing the above responses, one quarter of all faculty respondents (27%) agree/strongly agree that their department/program has an ethical obligation to train their doctoral/MFA students to be competitive for tenure-track academic jobs over other types of career paths, with faculty in the Arts (43%) and Humanities (34%) being more likely to agree/strongly agree. However, a slightly larger proportion of respondents (36%), especially faculty in BSOE and PBSci (52% each), disagree/strongly disagree with that statement. Regarding MA/MS graduates, BSOE (especially) and PBSci respondents are much more likely to claim that MA/MS graduates from their programs have competitive opportunities in professional jobs outside of academia, including applied/professional jobs in their disciplinary field (BSOE 93%, PBSci 59%), and professional jobs more broadly (BSOE 77%, PBSci 59%), compared to the other academic divisions (<40%).

Implications. Collectively, these responses suggest that a majority of faculty believe their students are more likely to be hired for professional versus tenure track academic jobs, underscoring the need and importance of professional development programming across institutional levels (departments, divisions, etc.).

4.9 The UCSC Graduate Division is Under-Staffed Compared to Other UCs

The level of staffing within the Graduate Division at UCSC, which may be an indicator of graduate student programming and support capabilities, is the lowest in the UC system and well below what it should be compared to graduate student enrollment numbers and staffing at other UC's. Given that graduate student populations may differ somewhat across the UC's, an assessment of the service levels at our campus relative to other UC's should be conducted. Nevertheless, the relationship between total number of Graduate Division staff and total graduate student enrollments (academic and professional) across UCs shows that Graduate Division staffing levels at UCSC are notably below other UCs, including UC Merced with significantly fewer graduate students. A simple best-fit regression to those data suggest that the number of graduate enrollments at UCSC (1,908 in 2018-19) could justify ~23 graduate division staff and administrators (~25 graduate division staff and administrators if only academic master's and PhD enrollments are considered), ~35% more than the number of staff and administrators as of this year (14.5: this number has slightly declined since 2019). Supporting this need, a majority of FGES respondents believe their students are most competitive for professional (versus tenure track academic) jobs post-degree, underscoring the importance and likely impact of enhanced professional development programming across all institutional levels (departments, divisions, etc.).

Implications. These findings suggest greater investment in the Graduate Division is critical to provide much needed co-curricular and service support for students and the graduate enterprise more broadly, including staffing and programming to support significantly increased efforts to recruit, retain, and graduate demographically diverse students, enhanced professional development opportunities for students across all disciplines, and improved student success.

**Appendix A:
Joint Senate Administration Working Group on Education:
Charge and Membership**

At the February 2020 Academic Senate meeting Chancellor Cynthia Larive announced the establishment of a working group to develop a comprehensive, realistic and actionable plan for strengthening graduate education. The idea of this working group came from conversations with Graduate Council and acting Vice Provost and Dean of Graduate Studies Quentin Williams. We provide the announcement below:

I am pleased to share today the charge and membership for that working group.

As part of our campus efforts to develop a strategic, realistic and actionable plan to enhance graduate student welfare and strengthen graduate programs, the Joint Working Group on Support for Graduate Education is charged with assessing the totality of the revenues related to the graduate enterprise and the ways those revenues are currently used. Specifically, this analysis should include:

A revenue analysis of the graduate enterprise relative to the various expenditures on the enterprise focusing on:

- Current Graduate Division fellowships and block funding allocations and the ways they are used by programs, including for the recruitment of students who enhance the excellence of our research enterprise, contribute to the diversity of our graduate programs, and improve our teaching mission
- Number and distribution of teaching assistantships and graduate student instructors, particularly in relationship to the undergraduate and graduate student enrollments of the program
- Number and distribution of research assistants and external fellowships (e.g. T32, NSF GRFP, GAANN, philanthropy)
- Assessment of the short-term impacts of the 5-year funding guarantees for doctoral students (2-year for MFAs) on graduate programs and the institution, and possible strategies for navigating the transition period as programs adapt
- Goals and the carrying capacity of Divisions and individual PhD and MFA graduate programs
- Potential of alternative funding streams including cross-subsidies from MS/MA programs, including professional, self-supporting and 4+1 programs, and the role of research development and prospective Center- or graduate block grant funding.

In addition, we ask that the working group build on the information and insights gained from this analysis to provide recommendations about near and longer-term ways to stabilize and/or enhance the graduate enterprise across disciplines on campus. Throughout this group's work, we ask for explicit consideration of student diversity, broadly defined.

We ask the working group to submit a report by July 1, 2020.

Membership

Co-Chairs:

Donald Smith, Microbiology & Environmental Toxicology, Chair, Graduate Council
Quentin Williams, Acting Vice Provost/Dean Graduate Studies

Senate:

David Brundage, History, Senate Vice Chair
Gina Dent, Feminist Studies, Graduate Council
Debbie Gould, Sociology, Committee on Planning & Budget

Longzhi Lin, Mathematics, Graduate Council
Dard Neuman, Music, Committee on Planning & Budget

Administration:

Scott Brandt, Vice Chancellor of Research
Katharyne Mitchell, Dean of Social Sciences (Phase I & II)
Jim Moore, Assistant Dean, Graduate Studies (Phase I)
Kimberly Register, Planning & Budget
Alexander Wolf, Dean, Baskin School of Engineering

Staff Support to the Joint Working Group:

Esthela Bañuelos, Academic Senate
Zack Myers, Music Department (Phase III)
Barbara Smee, Graduate Division
Oliver Spires, Office of Planning and Budget (Phase II & III)

Appendix B:

Faculty Graduate Education Survey (FGES): This appendix presents the complete FGES instrument as administered to UCSC faculty in October, 2020.

<https://drive.google.com/file/d/1ONab--KuT4Sf3NlsK9hg1UigWgyXhNz/view?usp=sharing>

Appendix C:

Narrative Appendix: This appendix contains an expanded presentation of the data and their analyses, as well as discussion of the major findings that are summarized in the JWG report. As such, this appendix serves as an important linkage between the final report and the complete revenue analysis and Faculty Graduate Education Survey (FGES) data appendices (i.e., Appendices D and E).

<https://drive.google.com/file/d/1W6r3yBJ2oJ3zulpsMu8ldISgvKAKkD0j/view?usp=sharing>

Appendix D:

Revenue Analysis Slides: This appendix presents a comprehensive report of the revenue data collected and analyzed by the JWG, including: revenue generated by graduate enrollments; revenue spent supporting graduate students; 5/2 year guaranteed support projections; cost of attendance adjustment projections; master's incentive fund program (MIP) information; longitudinal data on graduate support and time-to-degree using Graduate Division student-level data. This appendix also contains a three-year overview of revenue expenditures and then detailed data by division and department.

https://drive.google.com/file/d/1JGhmXPJtg3IYG2Nndax_E_Atqp916H8J/view?usp=sharing

Appendix E:

Faculty Graduate Education Survey Data Slides: This appendix contains responses to all questions in the Faculty Graduate Education Survey, broken down by division and in some cases by demographics.

<https://drive.google.com/file/d/1QmFPuAyrDvqCH9tGoRtTWBx0UQ11r5lj/view?usp=sharing>

Please make sure you are logged in to your UCSC account to link to appendices