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Chair of the Assembly of the Academic Senate
Faculty Representative to the Regents
University of California
1111 Franklin Street, 12th Floor
Oakland, California 94607-5200

July 27, 2023

**KATHERINE S. NEWMAN
PROVOST AND EXECUTIVE VICE PRESIDENT
UNIVERSITY OF CALIFORNIA**

Re: Approval of Master of Biotechnology (MBT) at UC Berkeley

Dear Katherine:

In accordance with the *Universitywide Review Processes For Academic Programs, Units, and Research Units* (the "Compendium"), and on the recommendation of CCGA, the Academic Council has approved UC Berkeley's proposal to establish a Master of Biotechnology (MBT) self-supporting graduate and professional degree program (SSGPDP).

Because this is a new degree title, and the Assembly of the Academic Senate is not meeting within 30 days of CCGA's approval, Council must approve the program per Senate Bylaw 125.B.7.

I am enclosing CCGA's report on its review of the new program, and respectfully request that your office complete the process of obtaining the President's approval.

Sincerely,

A handwritten signature in black ink, appearing to read "Susan Cochran".

Susan Cochran, Chair
Academic Council

Cc: Academic Council
IRAP Analyst Procello
UCB Senate Director Banaria
Executive Director Lin

**COORDINATING COMMITTEE ON GRADUATE AFFAIRS (CCGA)**

Erith Jaffe-Berg, Chair
erithj@ucr.edu

ACADEMIC SENATE

University of California
1111 Franklin Street, 12th Floor
Oakland, California 94607-5200

July 17, 2023

SUSAN COCHRAN, ACADEMIC COUNCIL CHAIR

Dear Chair Cochran,

On July 5, CCGA met and reviewed the proposal from the Berkeley campus for a self-supporting Master of Biotechnology. After discussion, the proposal was approved 10-0-1.

The proposed Master of Biotechnology responds to the current boom in the biotechnology industry and capitalizes on new genomic technology, big data, CRISPR/Cas9, and stem cell biology. It is clear that companies urgently need employees who have two essential qualifications: 1) experience with state-of-the-art technologies and hands-on bench research experience in an industrial setting to significantly shorten ramp-up time; 2) fundamental knowledge in both biology and biotech business (drug development, entrepreneurship, regulatory processes) and strong communications skills.

The Master in Biotechnology will meet these needs by emphasizing entrepreneurship, technology innovation and interdisciplinary work. It will provide hands-on research and an internship experience in addition to multidisciplinary course work that covers molecular biology, business practices and drug development processes. It will be a one-year, in-residence program with a 30-unit graduation requirement and a capstone project (Plan II). The target program enrollment at steady state is 60 students after 4-5 years but the initial cohort will be limited to 12-15 with an additional 10-15 students each subsequent year.

Four reviewers were identified to provide detailed comments on the MBT proposal (2 UC-internal and 2 external). The reviewers identified several areas of strength, including that the program is targeted to those with biology degrees, and gives them “marketable” laboratory skills in a rather short time. Moreover, the reviewers appreciated the program’s engagement with the biotech industry that surrounds the Bay Area. The reviewers agree that a large pool of potential students could be recruited to the program to sustain it. The reviewers also pinpointed a few areas of concern, which mirrored concerns of CCGA members. These are detailed in the Lead Reviewer’s report, which is attached. These concerns were shared with the Biotechnology proposal team, who submitted point-by-point responses to each concern that was raised. CCGA discussed the campus response and found it satisfactory.

UCPB also reviewed the proposal and found it financially sound and well-grounded. UCPB and The Lead Reviewer did note that a similar two-year program at UCI, which is state-supported program exists but was overlooked by the program proposers. UCPB’s report offers important comparisons between what the two programs would offer. A copy of the UCPB report is attached.

As you know, CCGA's approval is the last stop of the Academic Senate side of the Systemwide review and approval process except when the new degree title must be approved by the Academic Council. I submit this for your review; please do not hesitate to contact me if you have further questions regarding the proposal.

Sincerely,



Erith Jaffe-Berg
CCGA Chair

cc: James Steintrager, Academic Council Vice Chair
CCGA Members
Monica Lin, Academic Senate Executive Director
Michael LaBriola, Academic Senate Assistant Director
Chris Procello, Academic Planning and Research Analyst
Lisa García Bedolla, UCB Dean of the Graduate Division
Jocelyn Surla Banaria, UCB Senate Executive Director
Sumei Quiggle, UCB Senate Associate Director



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July 17, 2023

Dear Chair Jaffe-Berg,

The following letter details my report on CCGA review of the proposed Master of Biotechnology (MBT) on the Berkeley campus. The graduate degree proposal was submitted by and will be managed by the Department of Molecular & Cell Biology at UC-Berkeley. It was approved by the Berkeley campus Graduate Council (after iteration and revisions) as well as the Divisional Council of the Academic Senate and the MBT proposal was forwarded to CCGA on March 29, 2023 for review. The MBT program is a self-sustaining graduate program (SSGP), and a separate evaluation was submitted by the UC Council on Planning and Budget (UCPB) that deemed the program to be financially sound.

As described in the proposal documentation, the MBT is proposed as a one-year program that will train students with skills needed in the biotechnology industry, both the hands-on-experience with state-of-the-art technologies useful on the bench and the fundamentals of biotech business that are useful in a boardroom. The proposed program is very timely given the need for professionals in the biotechnology field, as has been clearly articulated by the industry leaders interviewed by the proposers. The program also builds on the university's tremendous strength in the area. The initial size of the program would be ~12-15 students with a steady state of about 60 students. Students would pay a \$70k tuition with 25% return to aid, and complete the 1 year in residence program that consist of 30 units and a capstone course. Some issues were identified on the Berkeley campus associated with intellectual property (IP) as part of a student internship opportunity that would be presented as part of a capstone class. Overall, the MBT program targets students with degrees in biology, and focuses on development of hands-on skills of use in the biotech industry.

Review by Systemwide Campus Planning & Budget (CPB) noted a similar two-year program at UC Irvine, a Master of Science in Biotechnology Management (MSBTM), that was overlooked by the proposal. The MSBTM, a state- supported professional degree program, offers a more robust educational experience, particularly a more robust business education, for the same overall cost as the MBT. Graduates of this program easily find employment in the field, and it was noted that a similar employment landscape awaits graduates of the proposed MBT Berkeley program. The one-year MBT is likely to yield a positive employment outlook despite a less-robust educational experience and so provide students wanting less time out of the job market an option for advancement in this field. CPB review projects that the MBT program will break even by year 4 of the program, and notes that the MBT program appears financially positive for Berkeley (although it does not consider the new graduate student contract costs and probably understaffs the program).

Four reviewers were identified in winter/spring 2023 to provide detailed comments on the MBT proposal (2 UC-internal and 2 external). The reviewers identified several areas of strength, including that that the program is targeted to those with biology degrees, and gives them "marketable" laboratory skills in a rather short time. Moreover, the reviewers appreciated the program's engagement with the biotech industry that surrounds the Bay Area. The reviewers agree that a large pool of potential students could be

recruited to the program to sustain it. The reviewers also pinpointed a few areas of concern, which mirrored concerns of CCGA members during our review. Overall, the reviewers & CCGA members delineated 3 key areas of concern with the new MBT program, which was conveyed to the MBT proposers in June, 2023. First, the Council asked for an update and clarification of the ongoing potential issues with intellectual property ownership associated with the intersection of the student internship experience and program coursework. Second, the Council conveyed concerns with the rigor of the proposed laboratories, especially the practical skills that the students would actually gain in the time allotted. Specifically, it does not seem possible to culture mammalian cells or develop animal handling skills in such a short period. The Council asked the MBT proposers whether the students be developing these skills, or will they simply be observing? Third, it was unclear to the Council whether an internship would be required of the students. While they all may be encouraged to apply for internships, what happens if they do not secure one? What provisions are there in the program for these students? How will they complete their degree requirements?

The MBT proposal team prepared a thoughtful response to the 3 key issues raised above. They assured CCGA that IP discussions had been worked out, and that any ongoing issues would be proactively addressed as they emerge. The proposers also clarified the curricula associated with the laboratory classes, which would give the MBT students some hands-on skills that would be attainable in the few months that they would enroll in the course. Finally, the MBT proposers clarified that students would be able to take internships as part of academic laboratories and/or core facilities, ensuring that all students would be able to be matched to an internship experience as part of the program. Overall, CCGA was satisfied with these responses, and voted to approve of the program during the 7/5/23 meeting.

In summary, CCGA commends the Berkeley campus and the MBT proposers on developing this new degree program. We look forward to its success, and recommend its approval.

Sincerely,

A handwritten signature in black ink that reads "Michelle A. O'Malley". The signature is written in a cursive, flowing style.

Michelle A. O'Malley
Professor, Department of Chemical Engineering
Vice Chair, Department of Bioengineering
University of California, Santa Barbara
Chair, UCSB Graduate Council
Member, CCGA



UNIVERSITY COMMITTEE ON PLANNING AND BUDGET (UCPB)
Donald Senear, Chair
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May 18, 2023

**ERITH JAFFE-BERG, CHAIR,
COORDINATING COMMITTEE ON GRADUATE AFFAIRS**

RE: UC BERKELEY MASTER OF BIOTECHNOLOGY

Dear Erith,

UCPB appreciates the opportunity to comment on the proposed UC Berkeley Master of Biotechnology (MBT) self-supporting degree program. This one-year program, targeted to students with a science background, asserts that it will prepare students for labs as well as “boardrooms.” Students begin with a six-week intensive laboratory course in the July Summer Session, followed by two semesters of twelve units each. Graduates are expected to be employed as “research assistants, program managers (coordinating different groups within and outside the company), in clinical operations (interfacing with hospitals, patients and nurses, coordinating clinical trials), and in regulatory affairs (FDA and tax agencies).”

The committee noted a similar two-year program at UC Irvine, a Master of Science in Biotechnology Management (MSBTM), that was overlooked by the proposal. The MSBTM, a state-supported professional degree program, offers a more robust educational experience, particularly a more robust business education, for the same overall cost as the MBT. Graduates of this program easily find employment in the field, and it was noted that a similar employment landscape awaits graduates of the proposed Berkeley program. The one-year MBT is likely to yield a positive employment outlook despite a less-robust educational experience and so provide students wanting less time out of the job market an option for advancement in this field.

MBT courses will be taught largely by Senate faculty. It appears that this will be on buyout during the regular academic year and as overload during the summer. The program suggests a desire to minimize the number of MBT specific courses to address concerns that Senate faculty will be taken from state-supported programs. It does so by relying on existing elective courses for which the MBT will pay the state-supported program for the elective units taken by MBT students. With the additional students it provides, the MBT program aspires to increase the number of elective offerings available to students in state-supported graduate programs. While the program does not address the teaching effort for these additional courses, we infer that it might plan to deploy its eventual profit to hire additional faculty.

UCPB noted with approval plans for a full-time career and internship manager providing staff support for students, but questions whether one staff member is sufficient to support sixty students at full program capacity. It also notes that the program does not seem to have considered higher GSR salaries in the pay for students on internship. UC Berkeley should be aware of higher salaries following the labor negotiation and calculate that effect on the proposed program. Nevertheless, the program appears to be a financial positive for the Berkeley campus.

With philanthropic funds to support its development, albeit only partially in hand, the MBT is projected to break even in year 4 and be self-supporting in following years. This is a year later than specified by policy for self-supporting programs. However, in part this is due to a 25 percent return to aid, which is high compared to other self-supporting degree programs. UCPB noted with approval plans to use this generous aid as need-based funding to encourage URM California students. Additionally, the committee appreciates the inclusion of a member of the Department Equity Committee on the admissions committee, and that the MCB Equity Committee will supervise the admission process.

Despite concerns that the program has some thinness in the business educational offerings, UCPB recommends approval of this degree program. A vigorous three-year review conducted by the campus is necessary, with a particular emphasis on the financial performance and projections thereof, since the program is not expected to have achieved self-sufficiency by then.

Sincerely,

A handwritten signature in cursive script that reads "Donald Felt Senear".

Donald Senear, Chair
UCPB

Attachment
cc: UCPB

UCPB Proposed Self-Supporting Professional Degree Program Review -- May 2023

Transmittal Package: <https://ucop.app.box.com/v/UCBMasterofBiotechnology/file/1177148628507>

Excel File: <https://ucop.app.box.com/v/UCBMasterofBiotechnology/file/1192773454795>

Note: The appendix file in the box folder repeats the appendices in the main transmittal package.

Name and Location of Program: Master of Biotechnology (MBT) at UC Berkeley. Proposed by The Department of Molecular & Cell Biology (MCB).

Lead reviewer(s): Heather Rose

Academic justification:

This program targets students who already have degrees in the biological sciences. It trains students in skills relevant for the lab (“bench” experience) and for the boardroom. The program capitalizes on “new genomic technology, big data, CRISPR/Cas9 (gene editing tool) and stem cell biology.” Interviews with industry leaders suggest they need students with “hands-on bench experience,” the business side of the industry, and communication skills. It also “follows the call of the 2018 Berkeley Strategic plan to establish new Masters degree programs and is designed to increase our efforts to serve a wider spectrum of students, to enhance our existing Bachelor’s and Ph.D program and to provide trained and skilled workforce to the growing life science industry in California and beyond.” The proposal does a good job justifying the importance of a degree like this for society. The program will be a bridge between the new undergraduate biology and business (BioBus) program in partnership with the Haas School of Business (started with donations from MCB alum) and the traditional Ph.D. training program.

Program description:

The program is a one-year (11 month), in-residence program with a 30-unit graduation requirement with capstone project (plan II). Students start with a 6 week intensive lab course in July Summer Session. The lab is 6 units, and then students take 12 units each semester. Candidates will be required to have completed a Bachelor’s degree in Biological Sciences or a related field. All other admissions requirements are identical to those in the Ph.D. program. “Our program graduates are likely to serve as research assistants, program managers (coordinating different groups within and outside the company), in clinical operations (interfacing with hospitals, patients and nurses, coordinating clinical trials), and in regulatory affairs (FDA and tax agencies).”

Planning and Budget overview:

1. Proposed initial tuition and any rate of increase:

\$70,000 USD with annual 3% increase starting in Year 3. (See note on 90 of proposal/111 of document) and Excel file (Tab 3. Revenue).

2. Target enrollments for years 1-3:

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Pg 4 Descriptions	12-15	22-30	32-45	42-60	52-60	60
Fig 1, pg 7	12	18	26	36	48	60

ProForma Tab in Excel*	12	18	28	38	48	60
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* Budget based on these enrollment figures.

The target enrollment is 60 students, but the proposal provides a couple different descriptions of how the enrollment will grow to that size.

- “The target program enrollment at steady state is 60 students after 4-5 years but the initial cohort will be limited to 12-15 with an additional 10-15 students each subsequent year” (page 4 of proposal, 11 of document). See row 1 of table above.
- Page 15 of the proposal (21 of the document) suggests the plan is to have “cohort sizes smaller than 18 for the first two years.” Figure 1 (proposal page 7/document page 13) is consistent with this explanation. See row 2 in table above.
- The Excel File (Tab 1 Pro Forma) is similar to Figure 1 but with 2 students more in years 3 and 4. Budget estimates are based on these enrollment assumptions. See Row 3 above.

Target enrollment growth of 25 in year 3 seems critical in order to offer an expanded set of electives (proposal page 19, document page 25). The expanded elective offerings are viewed as one of the big benefits for state supported students.

3. Projected net revenues for years 1-3:

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Program Net Revenue	\$ (560,375)	\$ (429,573)	\$ (259,896)	\$ (181,346)	\$ 214,648	\$ 596,622	\$ 1,072,988
Cumulative Program Net Revenue	\$ (560,375)	\$ (989,948)	\$ (1,249,844)	\$ (1,431,190)	\$ (1,216,542)	\$ (619,920)	\$ 453,068
Cumulative Campus Assessment	\$ -	\$ 121,604	\$ 304,011	\$ 596,267	\$ 1,004,799	\$ 1,536,321	\$ 2,220,655
Cumulative Total University Net Revenue	\$ (560,375)	\$ (868,344)	\$ (945,833)	\$ (834,923)	\$ (211,743)	\$ 916,400	\$ 2,673,722

Source: Excel Tab 1. Pro Forma

Review by Financial Planning and Analysis states “the pro forma statement represents a reasonable estimate of the program's expected revenues and expense,” (page 89 of proposal, 110 of document).

Major concern for UCPB to discuss:

- **“the program does not currently achieve self-supporting status within the three-year period expected by policy.”**
- “The program is not projected to generate positive net revenue until enrollment Year 4, and will not repay the total investment of ~\$1.4M (including deficit clearing costs in Years 1-3) until Year 6, assuming enrollment targets are met.”
- Note that the MBT would be considered self-supporting based on in-year net revenue surpluses with as few as 35 enrollments at steady-state; however at this enrollment level, the total cumulative investment of \$1.4M is never repaid within the ten-year pro forma period.

Given these concerns, UCPB should consider the impact of the following cost pressures:

- Tuition is increasing only 3% a year, but the salary increases of faculty and staff may exceed that. This type of issues has led to the structural deficits seen at the campus level across the system.
- Pg 111 says “GSR rates are based on 21-22 rates.” However, these rates have substantially increased with the new collective bargaining agreement. What impact on self-sufficiency will the new rates have?

On the plus side, the proposal states:

- The Department has secured philanthropic seed funding of \$1.2 million to cover initial expenses related to launching the program, while ramping up enrollment. Excess expenses will be covered by department reserves. (Page 37 of proposal/43 of document). ***Issue: I do not see this seed funding in the excel file.***
- After Year 3, program net revenue is expected to increase to a steady state of ~\$1.1M annually in Year 6.

4. Proposed indirect cost rate (IDC):

Campus assessment is 15% of Program Gross Revenue (see Excel Tab 1. Pro Forma, line 54).

Detailed areas of review:

5. How was the proposed IDC rate determined? Does the proposed rate appear to cover all indirect costs (facilities, IT, etc.)? What are the space needs of the program?

There is not much narrative in the proposal about what this rate covers. The main proposal did not mention the indirect cost rate at all. It is in the excel file. The Budget Pro Forma Review states, “campus fees (e.g., Campus Fee, Class Pass Fee, Document Management Fee, and Instructional Resilience and Enhancement Fee) but not including health insurance”. I’m assuming this indirect rate does not cover classroom and program space, lab consumables, and physical space for admin given those are line items on the Excel file.

6. What are the proposed uses of net revenues? How will they supplement [enhance] state-funded programs? Are there other ways that the program, if successful, will benefit the UC mission (e.g., filling a need not covered by state-supported programs)?

“The Department wholeheartedly believes that the proposed Masters in Biotechnology program can bring benefits to state-funded degree program students by allowing a development of new courses that can benefit them directly.” (Proposal page 7; document page 14). I don’t see specific information about how revenue will be used more generally.

7. How are any potential negative impacts on state-funded programs and the research mission of the UC mitigated?

“Students can select from six existing graduate level classes that will enable students to specialize in an area of molecular biology.” The MBT students will be taking these courses with state-supported students. The program will reimburse the department at a rate of \$750 per unit for state funded courses that students enroll into. (See MOU in Appendix 7, page 53 of proposal, 74 of document). State-supported students will maintain priority enrollment and therefore MBT students will only be able to enroll in courses if space is available. The rate of \$750 seems to be the rate that UC Extension Concurrent enrollment is charged.

Some prior reviews raised the question of whether this could put an undue burden on faculty teaching a high-demand course. There is also the question of what happens to state-supported students in those courses as class sizes increase.

8. Describe disposition and compensation of faculty serving the program. What is the proposed ratio of UC Senate faculty to non-UC adjunct faculty? For the former category, differentiate between ladder rank and P/LSOE. How will UC Senate faculty be compensated? On-load (i.e., course buyout), overload, or some combination thereof?

There does seem to be substantial senate level involvement. “*The majority* of courses that are taken by students enrolled in the program will be taught by Senate Faculty.” In the proposal, it was difficult to track who was teaching what, but I found the Excel file easier to follow. Tab “4. Instructional Expenses” was especially useful. I have tried to provide a summary here with key bullet points below the table.

Class Name		Units	Faculty	Questions
MCB 201LA STEM Cell & CRISPR Gene Editing Techniques Lab <i>Lecture style; co-taught; required</i>	New/ Req	6	1 faculty 1 lecturer	Faculty costs are half as much as 201LB, even though 201LB has fewer units. Is faculty count correct?
MCB 201LB STEM Cell & CRISPR Gene Editing Techniques Lab <i>Lecture style; co-taught by two faculty</i>	New/ Req	4	1 faculty 1 lecturer	
MCB 275 Biotechnology: Finance, Regulation & Culture <i>Seminar style and guest speakers</i>	New	2	Ladder Faculty	This says class size of 20 in Excel, but costs don't rise as enrollment does.
MCB 227 Science Writing and Science Career Professional Development	New	2	Lecturer	
MCB 288 Data Science for Molecular and Cell Biology	Core	3	1 faculty	
MCB 292: Research Units <i>Research units for internship</i>		4	\$1,000 faculty stipend per intern	
MCB 289: Capstone Project		5	Ladder Faculty	w/ Support by Staff Program Director
<i>New Elective Courses To Be Developed</i>	New	12	4x lecturers	Begins in year 3.

Notes:

- “All mandatory courses except the MCB 227 Writing and Professional Development will be taught by senate faculty members.” The electives can be taught by lecturers.
- “The majority of existing courses that students will enroll into are already taught by Senate Faculty as MCB employs very few lecturers to teach upper division and graduate level courses.”
- “The program has been developed to leverage existing courses, while developing one new course per semester of the program that will be taught by Senate Faculty.”
- The existing elective courses will be taught by senate faculty who would normally teach these courses to undergraduate and Ph.D. students.
- ***Issue for UCPB to discuss: There is little discussion of ladder rank versus LPSOE. The proposal primarily distinguishes between Senate and Lecturer.***

Compensation

Page 50/51 of proposal (71/72 of document): “Faculty that teach self-supporting graduate program courses will be bought out of their teaching commitment or receive an overload payment if the teaching takes place during the summer session. The maximum buy-out in any academic year will be 50% of their normal expected teaching load.”

The proposal does acknowledge that the program is trying to minimize buyouts because of the potential impact to state supported students.

“Four senior faculty have agreed to provide capstone mentoring to students. This number will grow as the program enrollment increases. These senior faculty have reduced Ph.D. advising roles because of their seniority and will instead advise Masters students as part of their service. (See page 30 of proposal/36 of document).

Issue for UCPB to discuss: This does take up time that could be used to support state-supported programs though other service, but there is no compensation provided to the state-supported program. What happens when these faculty retire? It doesn't seem like junior faculty will take up this role. Or, perhaps this is just a good use of excess capacity.

As the UCB Committee on Budget and Interdepartmental Relations pointed out “Still, there will be some impacts on faculty workload, particularly for those who are covering for MBT faculty. Also, for those faculty teaching graduate electives, there will be an increase in student numbers.” (Page 48 of document.)

- 9. Describe how the program will ensure accessibility and encourage diversity. Note: these concerns may be addressed through return-to-aid used for need-based fellowships, although programs may address accessibility and diversity in a variety of ways and UCPB does not set a standard return-to-aid percentage.**

The proposal highlights the importance of diversity efforts. It describes a series of robust outreach policies and a holistic admissions reviews that take contributions to diversity into account. The admissions committee will include a member of the Department Equity Committee, and the MCB Equity Committee will supervise the admission process. The proposal also describes the orientation and belonging-focused activities for entering students (although like most of these efforts, there is little data about actual effectiveness). The proposal also highlights the success of hiring a more diverse group of junior faculty due to new diversity-focused hiring policies and DEIB-focused cluster hires.

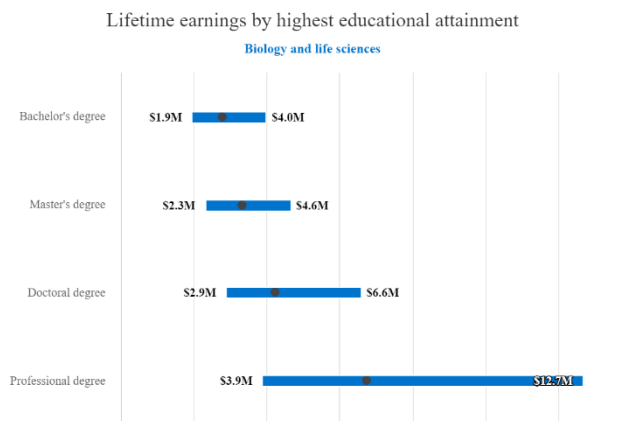
The return to aid policy seems generous and much higher than proposals we typically review: 25% of the revenue (20% in years 1 and 2, see pg 110 of document) will be returned to aid to help support students from underrepresented backgrounds, especially those that hold California residency. (Although there was some question in prior iterations about how this would be achieved given quotas are not allowed). Also, given the limitations of Prop 209, it wasn't clear how their return to aid plans would identify recipients. Elsewhere, the proposal states that the scholarships from the return-to-aid will be need based (pg 39 of proposal).

- 10. Describe the market analysis used to justify demand and price point for the proposed program. Will the program compete with others in the system? What are projected**

percentages of California resident, domestic non-resident, and international students in the program?

Nav-B provides a recommendation of tuition based on a survey of 129 students from the GRE search service. The response rate is not provided. Given the small sample, it would be helpful to provide margins of error around their estimates. Also, I'm curious about whether this national sample is a good sample to extrapolate from if the program is trying to draw California residents. Lastly, I am a little confused about the distinction the analysis makes between the MA and the MS degrees. It seems like the program being proposed is an MA, not an MS. I did not find the Nav-B straightforward or compelling.

The general information the proposal provided about the expected salary benefits for students with a master's in biology as opposed to just a bachelor's degree seemed high (they suggest getting a MA will provide salaries that are twice as high). However, even more reasonable estimates make the investment seem worthwhile. I'm including a figure I from the [Georgetown Center on Education and the Workforce](#). This shows median lifetime earnings for those with a BA in biology and life sciences is \$2.8 million, but those with an MA have median earnings of \$3.3 million. The graphs also highlights the interquartile range with the bars.



There are three existing masters programs on the Berkeley campus that are related but differentiated:

- Department of Bioengineering has masters in Translational Medicine joint with UCSF. The program partners students with practicing physicians to develop medical devices that can lead to medical and therapeutic innovation in healthcare.
- Department of Bioengineering has a MEng in Bioengineering in partnership with the Fung Institute. Focused on applying problem solving approaches to prepare students to be business professionals in the Biotech sector.
- The Department of Chemical and Biomolecular Engineering has a Master of Bioprocessing Engineering focused on training students to enter careers in commercial manufacturing processes

The proposal says they have discussed the program plan with the other two departments and they are supportive - please see appendix 8 for letters of support. There is a letter of support from the chair of the Department of Chemical & Biomedical Engineering (Pg 85 of proposal/106 of packet), ***however there is not a letter from the Department of Bioengineering.***

The proposal also discusses:

- UC Davis has a designated emphasis at Ph.D. level in Biotechnology that provides students with coursework and academic research related to Biotechnology but not with experiential experience of the Biotech sector. The proposers don't see any interrelationships with their program.
- UC Irvine offers a MS in Biotechnology with an emphasis in Biochemistry. "The program shares some of the characteristics of our proposed program in terms of subject but the research experience is only with faculty labs and not in biotech companies." It seems like this is a two-year state-supported program, so would cost about \$37,000 in tuition and fees in total.

The proposal does not mention the following:

- UCI offers a Masters in Biotech Management. It is a state supported program that charges professional fees. The cost of the two-year program is about \$70,000. Don explained that this program "merges one year of science with wet lab experience offered by my dept (Mol Biol & Biochem) with one year of MBA training offered by the business school." This could be quite comparable to the proposed program, and it would have been helpful for the proposers to talk with the UCI program director.

11. Describe relevant consultation and assessment from lower levels of review, external assessments of the proposal, and the like.

- MCB faculty unanimously supported the proposal (May 2019; attended by 73 of 78 MCB faculty. Proposal page 13.)
- There are letters of industry support from Vicinitas Therapeutics, Eikon Therapeutics, Neurona Therapeutics.

Been through two rounds of feedback at the Divisional level. Endorsed by:

- UCB Divisional Council of the Academic Senate
- UCB Graduate Council
- UCB Committee on Budget and Interdepartmental Relations (Berkeley's version of CAP)
- The Divisional Council consulted with the Division's Committee on Academic Planning and Resource Allocation.
- Committees on Academic Planning and Resource Allocation (CAPRA)
- Budget and Interdepartmental Relations (BIR).
- DIVCO endorses the proposal.

The concern about student intellectual property developed during internships is being addressed by the proposers with the campus's Intellectual Property and Research Alliances office.

For UCPB to discuss: "GC's three graduate student members, who had said that they would vote against any new SSGPDP proposals, were not in attendance due to the labor strike."

12. Any other planning and budget concerns?

The budget narrative is absent from the proposal. The excel sheet is helpful, but it seems like the main proposal should contain more of this information. The excel file still raises some questions about costs in the teaching expense tab. That said, the Excel file is a great template for all programs to use.

Outstanding Concerns from Prior reviews: Graduate Council raised concerns about "Intellectual property conflicts that may arise between students' internships in the private sector and the expectation that they present their research as part of a capstone project at Berkeley." It sounds like this is currently being addressed with the campus's Intellectual Property and Research Alliances office."

The proposal says the plan is to start in summer 2024, which does not seem realistic at this point.

What additional costs does the graduate student collective bargaining settlement raise?

13. Any academic-quality or related concerns to flag for CCGA?

14. Are there specific areas of concern that the mandated review after the third year of operation ought to capture?

Close monitoring of budget, giving net positive revenue is not expected until year 6.

What are the benefits (or costs) to state-supported students.

What are enrollment projections? It seems like faster enrollment growth could really help the bottom line?

Conclusions and recommendation:

It is important for UC to be nimble and responsive to industry needs. We need to recognize there is not enough state funding to fulfill the educational demand of Californians and those in the rest of the U.S. SSGPDP's provide a real opportunity to further the educational mission of the university and to provide additional resources for state-supported students.

Here are points I think UCPB's discussion should focus our discussion on:

- The program does not have net positive until year 6. As the Pro Forma budget review highlights, "this point should not disqualify the proposal but should be balanced against strong academic justification." Do you feel like there is strong academic justification? It does seem like there is grant funding to cover \$1.2 of startup losses.
- The Graduate Student Members of CG said would vote against any new SSGPDP proposals. (They were not at the meeting due to the strike).
- The proposal is missing a budget narrative and is weak on a clear accounting of the faculty who will teach in the program. There is no distinction between ladder and LPSOE. I think this is a broader issue we have been seeing across multiple proposals.
- There are a few budget questions that would be helpful to clarify. See Appendix on next page.

Appendix: Budget Questions

Here are some questions that should be clarified, but I don't think they likely impact the bottom line of the review.

- The program will invest in bespoke information web systems to help students navigate the program and provide dashboard metrics for faculty teaching the student. Investment in information systems will be covered by Department funds committed to launching the program and part of the dedicated students support services.
- Question from prior review: With respect to the budget, we are confused by the figures showing increases over time for faculty and GSI teaching costs. Those figures seem to account for salary growth, but not for the projected growth of the program from serving 12 students per year at the outset to 60 students per year at maturity. Pg 50 of document.
- MCB275 shows a course size of 20. However, ladder faculty costs do not seem to increase as program size rises to 40 and 60. I would expect new sections to be added then, thus increasing the number of faculty required.
- Faculty costs are half as much as 201LB, even though 201LB has fewer units. Is faculty count correct? Why is faculty buyout counted twice in MCB 201LB? (If it is a mistake the costs would actually be lower.)
- Why are GSI costs so different for MCB 201LA and MCB201LB?
- The minimum payment for students on an internship will be set at the same rate as a GSR step 6 salary. We cannot control what individual company policy provides for anyone interning with them, but we are committed to ensuring a base level salary equivalent to a GSR step 6 pay rate, which is currently \$5,284.33 per month for a full-time (100%) appointment. ***UCPB Question: Has this been adjusted since strike settlement, and what is the impact on the budget?***