



**ADVANCING DIVERSITY, EQUITY, INCLUSION &  
BELONGING IN THE LIFE SCIENCES:**

**AN INTERNAL REPORT FROM  
THE FUTURE OF BIOLOGY 2 COMMITTEE  
MARCH 4, 2022**

**Berkeley**  
UNIVERSITY OF CALIFORNIA



## SECTION 1: INTRODUCTION

### THE CALL TO ACTION

As an academic community, we must make interventions to remedy systemic racism and inequality and to foster the expansion of diversity, belonging and inclusion. This call to action is codified at the system-wide level by UC Policy 4400,<sup>1</sup> which mandates the populations of UC reflect the diversity of the state. On the Berkeley Campus, we see the call to action in our Principles of Community which affirm “the intrinsic relationship between diversity and excellence in all our endeavors”; our embrace of “open and equitable access to opportunities for learning and development as our obligation and goal” and “the dignity of all individuals and strive to uphold a just community in which discrimination and hate are not tolerated.”<sup>2</sup>

In the life sciences, we see slow but promising improvement to reflect the diversity of the population of the State in our student and faculty populations. These trends are discussed in detail in the report sections on undergraduate students, graduate students, and faculty. Here we present Figures 1.a & 1.b to provide a snapshot of underrepresented minoritized groups, or URM (identifying as African American, Chicanx/Latinx<sup>3</sup>, Native American/Alaska Native and Pacific Islander), and gender representation in our current faculty and student populations. These charts display a significant gap in faculty in by both URM and gender representation, and while gender representation is positive in the student populations, URM representation continues to be far behind State levels. Furthermore, the recent My Experience climate results demonstrate that there is much work to be done to foster belonging and inclusivity on our campus<sup>4</sup>.

Fig 1.a. %URM by Population, Life Science Depts\* (20-21)

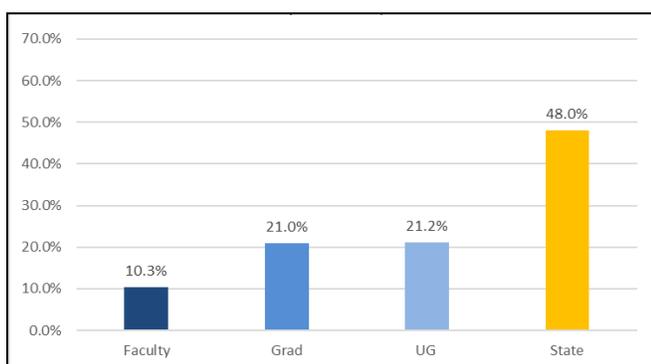
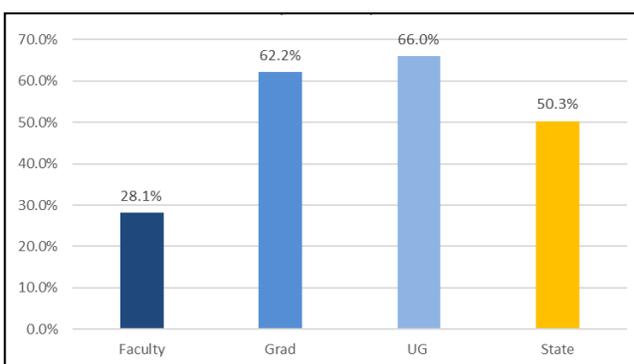


Fig 1.b. % Women by Population, Life Science Depts\* (20-21)



\* Departments: Bioengineering , Chem & Biomolecular Eng , Env Sci, Policy, & Mgmt , Integrative Biology , L&S Public Health , Molecular & Cell Biology , Nutritional Sciences & Tox , Other Bio Sciences Pgms , Plant & Microbial Biology , Ag & Env Chem Grad Grp , Bioengineering-UCSF Grad Grp , Biophysics Grad Grp , Biostatistics Grad Grp , Comparative Biochem Grad Grp , Computational Biology Grad Grp , Epidemiology Grad Grp , Health & Medical Sci Grad Grp , Infectious Diseases & Immun GG , Metabolic Biology Grad Grp , Microbiology Grad Grp , Molecular Toxicology Grad Grp , Neuroscience Graduate Program , Public Health. Source: Student Data, Cal Answers Census by Multi Field Report, Fall 2021; Faculty Data, OFEW 2021 Faculty Benchmarks reports for BioSci, CoC, CoE, RCNR, SPH. State data,

But why, readers may ask, is a cross-campus effort to advance DEIB in the life sciences necessary? Our campus has seen a burst of activity in this area in the last decade. Each academic department includes a strategic plan for DEIB in the academic review process. At the decanal level, most colleges have appointed an associate dean for DEIB and launched equity and inclusion initiatives, the College of Engineering being a notable example.<sup>5</sup> At

<sup>1</sup> <https://regents.universityofcalifornia.edu/governance/policies/4400.html>

<sup>2</sup> <https://diversity.berkeley.edu/principles-community>

<sup>3</sup> Note, while we recognize that the term “Latinx” has some controversy, we will follow the Campus Hispanic Serving Institution Initiative and use it in this report. <https://hsi.berkeley.edu/> unless specifically used otherwise as in census data

<sup>4</sup> <https://news.berkeley.edu/2021/02/25/berkeley-survey-campus-climate-overall-is-positive-but-marginalized-still-feel-excluded/>

<sup>5</sup> <https://engineering.berkeley.edu/about/equity-and-inclusion/>

the campus level, the Office for Faculty Equity and Welfare continues to be a strong force for advancing diversity, equity and inclusion for faculty<sup>6</sup>. In the student arena, the Division of Equity and Inclusion sponsors several programs and initiatives,<sup>7</sup> and both the Graduate and Undergraduate Divisions are engaged in work to benefit all of campus. In our investigations as a committee, however, it has become clear that much of this work exists in silos, either organizationally by unit or by functional area. By crossing these boundaries, we have greater opportunity to learn from each other, to foster best practices, and spark new ideas. Recruitment processes, such as using a rubric for candidate assessment, for example, are useful in both the student admissions process and in faculty recruitments. Inclusive teaching and mentorship training and techniques benefit students, trainees and faculty. Coordinated outreach efforts to underrepresented groups can not only improve our applicant pools but build community and foster deeper belonging. Expanding on David Asai's conclusions in *Race Matters*<sup>8</sup>, we posit that moving beyond a siloed approach to DEIB is necessary not only to extend the responsibility for DEIB to all faculty, but to build an academic culture of inclusive excellence. We believe that by developing these efforts as a life science community, we will have the opportunity to influence change at the departmental, decanal, and campus levels in a new and powerful way. This will advance a culture shift wherein the principles of diversity, equity, inclusion, and belonging are fully integrated into all that we do.

A plan for a common DEIB strategy across the life sciences is furthermore timely. In addition to simply being long overdue, and in anticipation of Berkeley becoming a Hispanic Serving Institution<sup>9</sup> by 2027, the call for change is made even more urgent by the impact of the COVID pandemic. The pandemic has had a devastating financial impact on the university and its students. Current data<sup>10</sup> show that 34% of undergraduates report food insecurity and 26% report housing insecurity with slightly lower, but similar numbers for graduate students. These impacts are much greater for URM, for example more than 50% of Black, Latinx, and Native American students reporting food insecurity. Students who experience housing and food insecurity have lower GPAs, lower graduation rates, and for graduate students, take longer to graduate, thus this problem directly impacts any remedies we propose here. These problems require a financial solution. In addition, early campus data strongly suggests that “learning gaps” and “learning losses”, resulting from the pandemic will leave more high school students unprepared for college and will continue to impact Berkeley students for the next four years. Given the racial, ethnic and socioeconomic disparities that were highlighted during the pandemic, our first generation, low income, immigrant, and URM students will be much more likely affected and severely impacted, broadening the gap between these students and majority students even more. We already have students coming in with disadvantages, and now these disadvantages will be amplified.

## BACKGROUND

The Future of Biology 2 (FOB2) Steering Committee was convened in the fall of 2020 with a charge to “consider effective interventions and programs, to investigate areas for growth and development, and to make recommendations for concrete action” as well as “to develop recommendations that help guide the planning

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<sup>6</sup> <https://ofew.berkeley.edu/data-and-initiatives>

<sup>7</sup> <https://diversity.berkeley.edu/ei-initiatives>

<sup>8</sup> DJ Asai; *Race Matters*. Cell. 2020 May 14;181(4):754-757

<sup>9</sup> <https://hsi.berkeley.edu/>

<sup>10</sup> <https://drive.google.com/file/d/1euzEsAUD47zw1kgnY3M7isRZz5MFRVz/view>

and development of diversity, equity, inclusion, and belonging (DEIB) initiatives across the life sciences, at the departmental, college and campus level.”

The Committee was led by Co-Chairs Diana Bautista and tyrone B hayes. It included faculty representing life sciences departments from across campus: Greg Aponte, Stephanie Carlson, and Arash Komeili (Rausser College of Natural Resources), Diana Bautista, Gian Garriga, and tyrone B hayes (Biological Sciences Division the College of Letters and Sciences), Michelle Chang (College of Chemistry), Sanjay Kumar (College of Engineering), and Eva Harris (School of Public Health). The Committee benefited from facilitation provided by Katherine Mitchell, UC Organization Development Internal Consultant, and Heidi Wagner, Assistant Dean of Finance and Administration for the Biological Sciences Division. The members of the committee brought diverse perspectives and priorities to this work, informed by their personal and professional experiences, and their home department cultures. Several committee meetings were used to discuss and define the common principles for the committee, resulting in the statements below.

**Vision Statement:**

Diversity, equity, and inclusion will be integrated within the core of our educational and research endeavors, rather than segmented to the work of a single committee or subgroup. Continued excellence in the Life Sciences at Berkeley must put advancing diversity, equity, and inclusion up front in all areas.

**Mission Statement:**

The Future of Biology 2 Steering Committee aims to provide cohesive, coherent, and collaborative integration of Diversity, Equity, Inclusion and Belonging (DEIB) principles into our pursuit of excellence in teaching, training, and research across the Life Sciences at Berkeley. We will discuss initiatives, programs, and strategies and make recommendations on evidence-based best practices for campus commitments to advance DEIB. We will seek synergies across departments and colleges and look for ways we can work together as a community.

In total, the Committee met 20+ times in a variety of formats. The Committee reviewed the diversity, equity, and inclusion strategic plans for the participating departments, reviewed campus data and reports, and discussed external efforts and publications. The full committee also met with campus subject matter experts to develop a greater understanding of current efforts and best practices. At the end of the fall 2020 semester, the Committee self-selected into three groups based on constituency groups: undergraduate students, graduate students, and faculty. These groups met to discuss and prioritize previously surfaced areas and ideas for further investigation. Discussions were supported by the use of a rubric to evaluate ideas based on impact, cost, and potential for implementation. Ideas with the greatest likelihood for success were developed and are now presented as our recommendations in three sections.

## A FEW CAVEATS

Collecting and analyzing data for this report was challenging. Some available data, such as the results from the campus climate survey, proved to be too difficult for us to meaningfully digest by discipline and this led to more questions in the Committee rather than conclusions. Other sets, such as faculty demographics, were only available at the college level, which includes several units outside of life sciences. While we were able to be

more specific in collecting demographic data for students, this resulted in comparisons across different data sets, as in Figures 1.a & 1.b above.

We furthermore recognize that the Future of Biology 2 Committee does not include faculty representation from the full breadth of the life sciences on campus. It should be also noted that there are significant campus populations that were not considered by the Committee: staff, non-faculty academics, and postdocs. The omission of postdocs in this report has been particularly noted as a flaw by some reviewers, and rightfully so. Postdocs represent the transition of graduate students to careers as independent researchers and future faculty members and, as such, they are intrinsically connected to both groups.

We put forward several recommendations to advance DEIB for faculty, undergraduate students and graduate students in separate sections, representing each population. (For a summary of all recommendations see [Attachment 1](#).) This approach allows a certain degree of organizational ease and supports a deeper analysis for each group. However, it obscures important commonalities that we believe, if promoted, will make the level of impact needed to advance DEIB in the life sciences, and on our campus at large. For example, many of the ideas and recommendations expressed in [Section 3, Graduate Students](#) and [Section 4, Faculty](#), would benefit postdoc populations as well; ideas to foster inclusion and belonging could successfully apply to all populations on campus and as could many of the interventions to increase DEIB via recruitment and outreach.

Furthermore, readers will note that we did not address significant disparities that LGBTQ+ community experiences on campus nor did we discuss the challenges for our disabled, low-socioeconomic, and first-generation communities. This is due, in some degree, to the lack of historical information that has been collected but also to our lack of resources. We recognize that to fully meet our aims as an academic community and institution, we must advance DEIB in all areas. However, due to time and effort constraints, we limited our focus. As we will discuss below, this report should not be regarded as a conclusion, but the beginning of a larger effort.

Lastly, we recognize that many of the suggestions in this report will require additional resources. Current strategies for funding include both philanthropy and grant writing, but this is a game of chance pitted against an ensured outcome. The current campaign priorities<sup>11</sup> focus on growth of faculty positions and scholarships for graduate and undergraduate students, but as of yet, do not focus on a plan for financial support for DEIB interventions; we are not sure where the support for DEIB is spelled out in the campaign. The cost of living, housing and child care in the Bay area also increase the difficulty for our students and trainees to focus on their studies and for new faculty to gain a foothold and put down roots. These financial concerns must be addressed if we are to be able to truly advance DEIB at Berkeley.

## SUMMARY OF RECOMMENDATIONS AND OVERALL CONCLUSIONS:

Our efforts to advance DEIB must become an ongoing, coordinated effort and one that is pushed to be incorporated into all areas teaching, research and service rather than a fourth, and separate dimension. Below we make two overall recommendations to help advance DEIB across the student/faculty divide and ensure lasting change.

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<sup>11</sup> <https://light.berkeley.edu>

**Invest in more robust assessment and reporting for DEIB in the life sciences:** The work of this committee proved to be a colossal undertaking, and while we have put great effort into this report, it is only a start. More robust data analysis is needed to provide a clearer picture of the current state of DEIB in the life sciences and to assess and measure the effectiveness of interventions to advance it. At the campus or decanal level, we must invest in an office of assessment and reporting on DEIB across the life sciences. Unified programmatic assessment of DEIB forward activities, and clear and consistent data collection and reporting will support our ability to make evidence-based decisions internally. Communicating consistent and accurate data will not only aid decision making but support grant funding efforts which often rely on these points.

**Life Sciences DEIB Collegium:** Many of our recommendations require additional resources and development to implement, as well as an investment in additional leadership. Furthermore, as mentioned above, this effort must be expanded to include all titles and dimensions. Advancing DEIB is important work and creating the critical mass needed is more than we can tackle as a committee, or indeed, as individuals, departments and programs. To this end we urge the campus to convene a new standing body, described below.

To ensure that advancing DEIB in the life sciences is ongoing and vitally incorporated in all areas, we propose the establishment of a collegium modeled on the Berkeley Collegium.<sup>12</sup> The Life Sciences DEIB Collegium should be convened and charged with developing and promoting efforts to advance diversity, equity, inclusion and belonging across the life sciences. Members of the Collegium should include faculty leaders in DEIB, associate deans for DEIB from represented colleges, senior staff members from E&I and OFEW, and other subject matter experts. Faculty participation should be recognized with service or teaching relief, or a stipend to offset the additional work. Additionally, administrative staff support and program funding should be allocated by the campus and participating decanal units. The Collegium should serve as an advisory council on DEIB to departments and individual faculty seeking to develop new programs or improve existing ones as well as a forum for developing and sharing innovations and resources. The Collegium should furthermore be empowered to dig deeply into data and report to identify areas for additional intervention. The Collegium should also be responsible for an annual symposium on advancing DEIB in the life sciences and promoting continuous discussion. We strongly recommend that the campus institute a Life Sciences DEIB Collegium in the 2023-2024 academic year and support it indefinitely. Such a permanent, standing body will help unite current efforts at the departmental, college and campus levels and push forward with the critical mass necessary for true culture change.

## **SECTION 2. UNDERGRADUATE STUDENT DIVERSITY, EQUITY, INCLUSION & BELONGING**

Increasing the diversity of our student population is not only part of our University's mandate but critical to fostering the future leaders of the life sciences. Furthermore, while ensuring equitable and inclusive educational opportunities for our students is inherent in our mission as a public institution, this goal is the key to persistence

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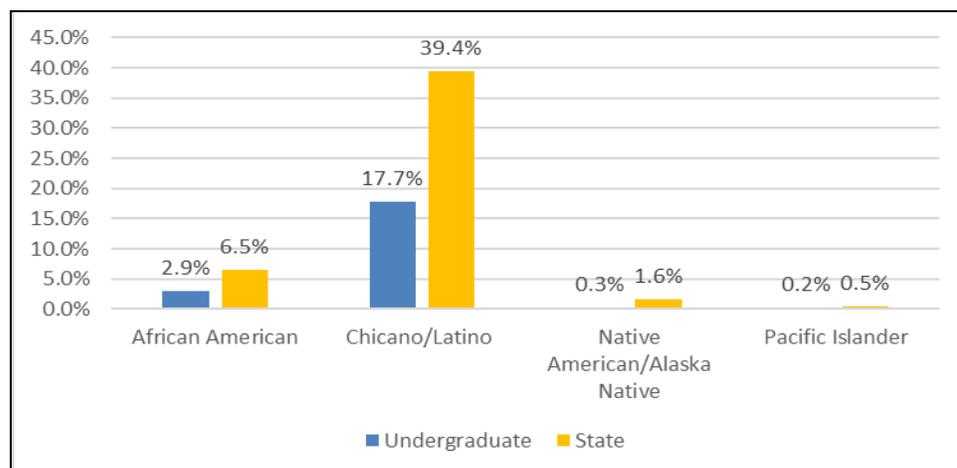
<sup>12</sup> <https://ue.berkeley.edu/committees/berkeley-collegium>

for students from underrepresented groups. As we will discuss below, we have collectively made some progress in these areas but there is much more to be done. Although we describe our current state (as a call to action) and the strategies to address them under several headings, it is important to recognize that this structure is an organizational artifice. These areas are intrinsically connected. Success in recruitment must be supported by community building which also must be supported by inclusive teaching and retention efforts.

## UNDERGRADUATE STUDENT DIVERSITY

According to 2019 population estimates by the census bureau, the US population is approximately 18.5% Hispanic/Latinx, 13.4% Black, 1.3% Native American, 5.9% Asian, 0.2% Pacific Islander, and 60.1% non-Hispanic White<sup>13</sup>, while California's population is approximately 39.4% Hispanic/Latinx, 6.5% Black or African American, 1.6% Native American, 15.5% Asian, 0.5% Native Hawaiian or Pacific Islander, 4.0% two or more races, and 26.5% non-Hispanic White<sup>14</sup>. Thus, California is much more diverse than the US as a whole. By contrast, our campus undergraduate student body is composed of only 14% Chicano/Latinx, 3% Black, 1% Native American, and 0.2% Pacific Islander. Turning to the undergraduate populations in the life science units on campus, as we see in the highlighted in Figure 2 below, we fall short of representing the population of California.

**Fig 2. URM Undergraduate Students in Life Science Units\* to State Population, Fall 2021 (% of Total)**



\* California Census data for July 2021 (<https://www.census.gov/quickfacts/CA>); Campus data from CalAnswers Census Reports for Bioengineering, Chem & Biomolecular Eng, Env Sci, Policy, & Mgmt, Integrative Biology, L&S Public Health, Molecular & Cell Biology, Nutritional Sciences & Tox, Other Bio Sciences Pgms, Plant & Microbial Biology, Fall 2021

While the passing of Proposition 209 caused a dramatic decrease in URM enrollment, percent plans and holistic reviews instituted at CAL significantly (but not completely) mitigated the loss of affirmative action<sup>15</sup>. Further, in November of 2018, Chancellor Christ, announced the Undergraduate Student Diversity Project, which has two immediate goals: to expand diversity in the undergraduate student body by increasing the enrollment of underrepresented, low socio-economic status, and first-generation-college students and to qualify for federal designation as a Hispanic-Serving Institution by 2027. She identified three subject areas for study teams: 1) admissions outreach, recruiting, marketing and yield; 2) undergraduate admission policy and process; and 3)

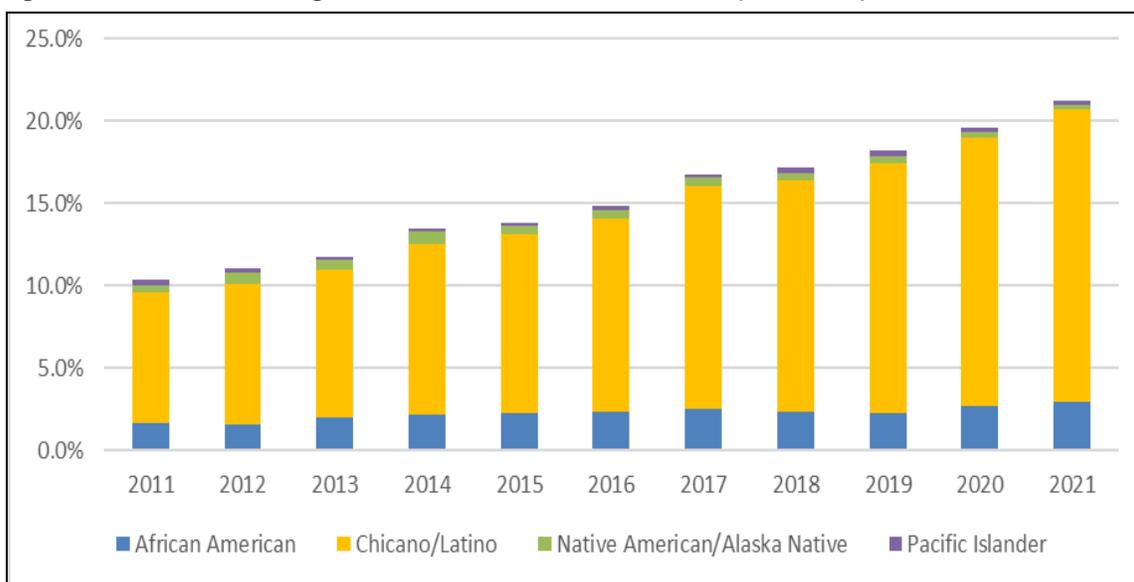
<sup>13</sup> <https://www.census.gov/quickfacts/fact/table/US/PST045219>

<sup>14</sup> <https://www.census.gov/quickfacts/CA>

<sup>15</sup> <https://cshe.berkeley.edu/sites/default/files/publications/rops.cshe.6.19.bleemer.urmadmissions.7.15.2019.pdf>

experience on campus for underrepresented students<sup>16</sup>. Furthermore, the efforts of the new Director of Undergraduate Admissions, Olufemi Ogindele, who began in 2019 and made increasing diversity of the undergraduate population a priority, have begun to bear fruit: the number of URM students increased from 18.3% in 2018 and 2019 to 25.6% in 2020; the number of Pell Grant recipients, an indicator of lower income households, was 5,106 freshman and transfer students in 2020 compared to 4,556 in 2019; and first generation students increased to 4,106 in 2020 compared to 3,118 in 2019. Indeed, these are heartening trends, however, as shown in Figure 3 below, while there have been positive gains in Chicano/Latinx representation, the other underrepresented undergraduate groups have remained relatively flat over the last ten years. Indeed, there has been no change or very marginal changes at best.

**Fig 3. URM % of Total Undergraduate Students, Life Science Units\* (2011-2021)**



\*Source: CalAnswers Census by Two Fields Report, Bioengineering, Chem & Biomolecular Eng , Env Sci, Policy, & Mgmt , Integrative Biology , L&S Public Health , Molecular & Cell Biology , Nutritional Sciences & Tox , Other Bio Sciences Pgms , Plant & Microbial Biology. Fall 2011- Fall 2021

The modest changes we see are understandable given the challenges of improving diversity via undergraduate admissions. California's public institutions of higher education have distinct missions. The Master plan for higher education<sup>17</sup>, which was set more than 50 years ago, has an enrollment framework whereby UC selects from the top 12.5 percent of students, CSU selects from the top 33 percent, and the California Community Colleges (CCC) offer access to all state residents. It is a goal of UC Berkeley to have its undergraduate student population be a direct representation of the demographic distribution of the state demographic. However, it is recognized that there are barriers of economics and education that result in the disproportionate number of students entering the CSU system rather than the UC system. Increasing the diversity of the pool of students applying for admission to UC is an important goal that requires a statewide effort. However, the academic and psychological support that is necessary for the retention and graduation of our admitted students is an obligation that falls within the purview of the Berkeley campus. Thus, we will focus primarily on this throughout this section and discuss advancing DEIB for admitted undergraduate students in two dimensions, outside and inside the

<sup>16</sup>[https://chancellor.berkeley.edu/sites/default/files/uc\\_berkeley\\_undergraduate\\_student\\_diversity\\_project\\_outline.pdf](https://chancellor.berkeley.edu/sites/default/files/uc_berkeley_undergraduate_student_diversity_project_outline.pdf)

<sup>17</sup>[https://www.ppic.org/wp-content/uploads/content/pubs/report/R\\_410HJR.pdf](https://www.ppic.org/wp-content/uploads/content/pubs/report/R_410HJR.pdf)

classroom. Given the underrepresentation in our undergraduate admissions, it is critical that we focus on recruiting and retaining Cal URM students into life science fields, and the larger STEM disciplines.

## UNDERGRADUATE INCLUSION & BELONGING: ACADEMIC SUPPORT OUTSIDE THE CLASSROOM

Academic literature, as well as our own experience, underscores the importance of inclusion and belonging for minoritized students in science. In one example, “Sustaining Optimal Motivation: A Longitudinal Analysis of Interventions to Broaden Participation of Underrepresented Students in STEM,”<sup>18</sup> Hernandez et al found that “contextual factors (research experiences) and individual differences (mindset and scientific self-identity) exert influence on individuals’ achievement goals, over and above background characteristics and prior achievement.” A conclusion of this paper is “interventions to broaden participation work in part because students align their goals with the norms, values, and contextual demands in STEM fields.” This alignment is driven by lab work experience and effective mentorship. Institutionally, we can foster inclusion and belonging in life science by ensuring students from underrepresented backgrounds are proactively engaged with research opportunities inside and outside of the classroom and by supporting the development of their identity as life scientists.

In “Improving Underrepresented Minority Student Persistence in STEM”<sup>19</sup> Estrada et al discussed several successful program models; two of which are active on our campus: the Biology Scholars Program (BSP) and Stem Excellence through Equity and Diversity (SEED). The BSP employs a tiered approach focused on student-centered mentoring, teaching, and alliance to support UCB enrolled undergraduates in their academic careers. The BSP, which has been active for 30 years, demonstrates that these models indeed provide this needed support leading to gains of 30% in retention of URM students<sup>20</sup>. SEED is an honors program modeled after the Meyerhoff Scholars Program<sup>21</sup>; this program begins with recruitment and includes a deep focus on developing a cohort community. SEED is in its second year and, while it appears to be off to a strong start, no metrics on its effectiveness are yet available. These two programs highlight the need to have a portfolio of programs that increase diversity in distinct ways, by supporting racialized students with an early interest in science and by introducing students to careers in biosciences and recruiting them to the life sciences; BSP supports and encourages students to see themselves as biologists, SEED recruits first-year undergraduates who are already interested in advanced study.

Our undergraduate population includes a great variety of backgrounds, goals and needs (academic, societal, financial). It is important to support multiple DEIB-centered programs around campus to cast a wide net and ensure that programs can be tailored to specific disciplines and target populations. Early in our investigations as a committee, we were impressed by the volume of programs to support DEIB at the undergraduate level on campus. In 2017, the Division of Equity and Inclusion published the Berkeley STEM Equity & Inclusion Initiative Executive Summary<sup>22</sup> which reported findings from 118 programs on campus with the majority “targeting undergraduates (66%) or benefitting undergraduates (77%)” from a great variety of groups.<sup>23</sup> Interestingly, the

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<sup>18</sup> Hernandez, Paul R. et al. “[Sustaining Optimal Motivation: A Longitudinal Analysis of Interventions to Broaden Participation of Underrepresented Students in STEM.](#)” *Journal of educational psychology* 105 1 (2013), pg 17

<sup>19</sup> Estrada, M., Burnett, M., Campbell, A. G., Campbell, P. B., Denetclaw, W. F., Gutiérrez, C. G., ... & Zavala, M. (2016). [Improving underrepresented minority student persistence in STEM.](#) *CBE—Life Sciences Education*, 15(3), es5. doi: 10.1187/cbe.16-01-0038

<sup>20</sup> BSP: <https://bsp.berkeley.edu/>; SEED: <https://seedscholars.berkeley.edu/home>

<sup>21</sup> <https://meyerhoff.umbc.edu/about/>

<sup>22</sup> [https://diversity.berkeley.edu/sites/default/files/stem\\_ei\\_executive\\_summary\\_final.pdf](https://diversity.berkeley.edu/sites/default/files/stem_ei_executive_summary_final.pdf)

<sup>23</sup> [https://diversity.berkeley.edu/sites/default/files/stem\\_ei\\_executive\\_summary\\_final.pdf](https://diversity.berkeley.edu/sites/default/files/stem_ei_executive_summary_final.pdf)

report included this conclusion on the longevity of programs: “greater than half (~53%) have been in existence for 0-5 years with a general decreasing trend of longevity.” The report further stated that “this suggests a high turnover of programs and a possible resulting loss of strong work, resources, and tools for increasing STEM diversity.” While remedying this trend has been part of the mission of the STEM Equity & Inclusion Initiative<sup>24</sup>, we believe a more intentional effort is needed to preserve and support these programs.

Presently, the Biology Scholars Program (BSP) is administratively housed in the Division of Biological Sciences in the College of L&S and is therefore viewed as an ‘L&S program.’ In reality BSP serves biology students in STEM majors across the Colleges of L&S, Natural Resources, Chemistry, and Engineering, and the School of Public Health. Conversely, DEIB-forward undergraduate research programs in other units, such as the Bioengineering Scholars Program (BioESP) in COE, serve students outside of their home units. A third group of DEIB programs, including SEED and CalNERDS, are administratively in the Division for Equity and Inclusion. Irrespective of the administrative home, mechanisms should be created for campus to administratively and financially support such programs. A centralized approach would provide but not be limited to direct financial support, administrative help submitting training grants, philanthropic fundraising (development), and marketing. We therefore recommend the following:

**Development and strengthening of the Biology Scholars Program and other DEIB-forward undergraduate research programs:** We propose that BSP (and potentially other programs related to academic success) be relocated to Undergraduate Education, an institutional ‘home’ that reflects this cross-campus role.

**Development and strengthening of the Coalition for Excellence and Diversity in STEM:** We also suggest that BSP (and analogous programs), SEED, CalNERDS and other identified diversity, equity and inclusion programs in STEM be included and coordinated through a newly formed Coalition for Excellence and Diversity in STEM. The benefits of this effort include coordinated fund-raising, administrative coordination between programs, and a hub for assisting students and helping them find these resources.

## UNDERGRADUATE INCLUSION & BELONGING: RESEARCH OPPORTUNITIES

As discussed above, research opportunities are critical in the career development of undergraduate students for several reasons. Working in a laboratory makes science more real; students’ overall performance and understanding of science can be dramatically improved through these experiences. Research opportunities help a student better see themselves as a scientist and choose a career path. Furthermore, research experiences introduce students to new academic opportunities and can lead to funding, such as fellowships, and other honors. Perhaps most critically, lab experiences are important mentoring opportunities and they are vital for acceptance into graduate, professional school, or other career opportunities. In the life sciences, undergraduate research opportunities can be found in laboratories on campus, laboratories off-campus (e.g. UCSF, LBL, CHORI, etc.), and via internships (with private laboratories, companies, hospitals and other medical facilities etc.). However, there are several barriers which render these opportunities out of reach for many students. Firstly,

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<sup>24</sup> <https://diversity.berkeley.edu/our-work/stem-equity-and-inclusion-initiative>

students are often unaware that these opportunities exist, this is especially true for minoritized populations and our transfer students. Furthermore, even if students are aware of these opportunities, these positions are often offered to students on a volunteer basis. Many of our students from minoritized populations cannot afford to volunteer and need a paying position to support themselves and, potentially, their families. In particular students on financial aid, who are already carrying a full course load, most often must also work to pay for living and school expenses along with other financial obligations, simply cannot afford the time to volunteer.

To remove these barriers, we need to develop strategies to introduce students to these opportunities early in their undergraduate careers and immediately with regards to transfer students. These introductions can come through announcements or attention to these opportunities through our courses, but also through workshops and programs. This one area where the common administration of programs through the aforementioned Coalition for Excellence and Diversity in STEM will be critical. Another improvement is to introduce these opportunities in our introductory courses and in courses targeted to our transfer students, as we will discuss later in this section.

Most importantly, we need to develop scholarship/fellowship programs and other ways to fund students so that they can participate. There are already some programs at the campus level: SURF, Amgen Scholars, and NSF REU, are examples. However, these opportunities vary in number and availability from year to year. These programs need to be institutionalized and made sustainable. We therefore recommend that, at the campus level, the life science units unite their efforts.

**Develop a program that will fund undergraduates from across departments to obtain paid research positions in labs.** Such a program would serve freshmen and transfer students via targeted outreach and communication. It would support development of student community groups and support efforts to unite, strengthen and expand existing programs. Most importantly, this program will develop partnerships with industry partners to fund student research on a larger scale than is now possible.

## UNDERGRADUATE INCLUSION AND BELONGING: CURRICULUM

Classroom instruction is at the heart of our teaching mission and it is through our teaching that we have the opportunity to reach a high number of students. The structure and content of our courses as well as the delivery methods used can build inclusion and belonging with URM students. However, without intentional design, they can have the opposite effect.

A clear example is found in the Division for Equity and Inclusion's 2018 report, UC Berkeley STEM Pathways<sup>25</sup>, which points to courses which function as barriers to URM and women students. To quote the report: "STEM departments have a known problem of persistence with large gaps between undergraduates overall and students from marginalized communities (women, underrepresented minorities, students with disabilities, and students from low socioeconomic status backgrounds)." This is displayed in Figure 4, from the report, in which deeper shades of orange indicate worse persistence in a group.

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<sup>25</sup> [https://docs.google.com/presentation/d/1nPUNszTVmhr8iW\\_eWkmX42mzFmvWS9VQThafvuT5nsw/edit?usp=sharing](https://docs.google.com/presentation/d/1nPUNszTVmhr8iW_eWkmX42mzFmvWS9VQThafvuT5nsw/edit?usp=sharing)

**Fig 4. Equity Barrier Courses by Division (From: UC Berkeley STEM Pathways, See Attachment 2.)**

Division	Equity Barrier Course	Equity Gap*		Equity Step Gap#	
		URM	Women	URM	Women
Chemistry	Math 53	-21.10%	-11.10%	-11.40%	-4.80%
Chemistry	Chem 3A/112A	-21.30%	-0.90%	-14.70%	-1.40%
Engineering	Math 53	-9.60%	-3.20%	-4.50%	-1.40%
Engineering	Physics 5B/7B	-12.80%	-4.70%	-3.50%	-1.00%
CNR	Chem 3A	-18.70%	0.10%	-3.50%	-0.50%
L&S Bio	Chem 3A/12A	-17.80%	0.00%	-4.20%	0.70%

\*The equity gaps are calculated by comparing the overall persistence to a given point in the sequence with the persistence for women or URM. #The equity step gap looks at the attrition from the previous stage. So for Chem 3A, the equity step gap shows the number of percentage points of attrition between completion of Chem 3B and completion of Chem 3A.

In addition to having low exam scores and higher failure rates, these courses are typically taught in standard lecture style. Faculty teach this way, because that is the way that they were taught. Few faculty take the time or have the incentive (departmental, financial, etc.) to seek pedagogical training to offset these issues. In particular, first generation students, and underrepresented students, who already may not feel welcome on campus, may be more vulnerable. These large introductory courses can be made more welcoming. Furthermore, bridge courses or pre-gateway courses can be critical to the success of talented students who have not had the opportunity for academic access in secondary schools.

There are eleven departments in the life sciences (including the newly proposed Neuroscience). This creates challenges for solving the question of barrier courses as well as advancing DEIB in the larger life sciences curriculum.

Below we make a series of recommendations to be taken up by individual departments, instructors and Chairs to advance curriculum. We also recommend a larger working group be convened to further investigate these from a cross-divisional perspective.

**Re-imagining courses in the life sciences:** One reason for the low participation of students of color, first generation, low income students, students with disabilities, and students from LGBTQ+ community is the inability to connect with course material. In addition, many of the introductory courses are designated “gateway” (or “weed-out”, as they are referred to by the students) courses and may be unwelcoming to students. In addition to the new welcoming course, current courses need to be revamped so that they are more inclusive and anti-racist. There are several programs designed to train faculty<sup>26</sup> on how to reimagine their courses. Campus should provide continued programmatic and all new faculty should be required to take this training.

**New bridge programs:** The campus should consider investment in a bridge program that provides students who need additional instruction to prepare them for college level courses. For many students

<sup>26</sup> FLOSS is one example see: <https://sites.google.com/berkeley.edu/floss>

coming from high schools that provide less preparation, large lecture courses such as introductory math, physics, chemistry and biology can be overwhelming. This is especially true for students who come from schools that do not offer many AP courses or other forms of college preparation. The bridge program would address math, physics, chemistry, and biology, depending on the students' needs. These courses would undertake multiple active-learning approaches, limited enrollment, and consist of a series of lectures that are combined with a peer-led team-learning discussion section. BSP and similar programs might be utilized in developing and teaching these courses. These courses should start in the summer or be offered in the entering semester (fall semester of freshman year for regular admits, spring semester of freshman year for spring admits). The SEED scholars offered a successful remote bridge program that was a relatively low-cost option. In addition, units from this program should not be counted against the students, if those extra units are taken in this program offered in the academic year. The extra expense in taking courses after exceeding the unit limit and graduation is prohibitive for many of our URM students. Another alternative is to admit students, but allow students to defer for a year to take the introductory courses at community colleges as a bridge before matriculating to Berkeley. We also encourage the exploration of a similar program for transfer students.

**New “Welcome to the Life Sciences” Course:** The life sciences are spread out over ten departments, (the addition of the new dept. of Neurosciences will make this eleven). Incoming Freshmen will not likely immediately recognize the many ways that they can study life sciences at CAL. We propose a survey course that will introduce students to all 11 Life Science departments. The course will have no prerequisites and be targeted to Freshman and transfer students who intend to major in the Life Sciences. Each department would participate and will provide an overview of what their department offers, followed by four 30-min research seminars per department. Speakers can also highlight career options for those receiving a BS, Master’s, or PhD degree from their departments. Research presentations should seek to provide inclusive content (highlighting the accomplishments of underrepresented individuals in the field, highlighting research relevant to underserved communities, etc.). Research presentations should also provide a discovery-oriented format that challenges the students to think about experimental design, data interpretation, planning experiments, etc. Rather than quizzes, students would be asked to submit reviews of each department after each presentation. These reviews would be compiled and made available to departments. In lieu of a final exam, students would submit a resume and a personal statement introducing themselves, their motivation for studying the biological sciences and what they hope to achieve with their degree. The resume and personal statement would provide the basis for applications to the undergraduate research program for those students who would like to conduct independent research.

**Consider additional intervention courses:** The campus should consider investment in intervention courses in the life sciences that undertake multiple active-learning approaches, limited enrollment, and consist of a series of lectures that are combined with a peer-led team-learning discussion section. This would be in addition to an increase of pre-gateway courses and a total unit grace for students undertaking these courses.

## UNDERGRADUATE INCLUSION AND BELONGING: PEDAGOGY

The Center for Teaching & Learning provides concise resources supporting the call for more equitable and inclusive learning environments and we encourage all readers to visit their website.<sup>27</sup> We also encourage instructors and departments to consider the following recommendations:

**Inclusive teaching:** Lectures can be revamped to highlight accomplishments and contributions of individuals from historically underrepresented or minoritized populations. One way to accomplish this is to provide spotlights of researchers that reflect on their journey in addition to their scientific contributions. There are many resources that can provide this material including sites like History Makers <sup>28</sup>and Scientists Spotlight Initiative<sup>29</sup> .

One other way to teach more inclusively is to include topics that involve or appeal to historically underrepresented or minoritized populations. In some cases, these may be negative stories, e.g. the Tuskegee experiments, testing birth control pills in Mexico and Puerto Rico before it was allowed in the U.S., but these stories also allow for a discussion of social justice that are important lessons to learn.

**Discovery based approaches:** A hands on or discovery-based approach may be more appealing to students. Group exercises where students are asked to examine and interpret a data set or to design the next experiment may appeal to students. Teaching material that uses historical literature will help students see the processes of discovery. For example, the original papers that reported the discovery of growth hormone involved scientists surgically removing the pituitary and subsequently injecting pituitary extracts. Over time, growth hormone was purified and its function examined in vitro. Eventually, the gene was identified and knock-out and knock-in experiments were performed to demonstrate the functions of growth hormones. By presenting the story historically, students will be able to see how science unfolds and how each study builds upon another, which allows the students to experience the discovery.

**Smaller sections with hands-on approach:** Smaller sections that offer hands-on approaches or reading may be helpful. This can be accomplished in many ways depending on the size of the course. Students can be asked to work in small groups to design experiments or solve problems. Some courses may also provide special experimental or field sections for students. Chairs and Deans should consider developing initiatives to ensure broad adoption.

**Instructor training and outreach:** There are many platforms available to train faculty, lecturers and GSIs on techniques to make their courses more inclusive and develop more discovery-based material. These include FLOSS<sup>30</sup>, Discovery<sup>31</sup>, and the National Science Foundation's Transforming STEM Teaching Faculty Learning Program (FLP)<sup>32</sup>. The latter program trains faculty in methods of inclusive teaching practices and deepens instructors' knowledge of how students learn. FLP is run by scientists and

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<sup>27</sup> <https://teaching.berkeley.edu/resources/promoting-equitable-and-inclusive-learning-environment>

<sup>28</sup> <https://www.thehistorymakers.org/>

<sup>29</sup> <https://scientistspotlights.org/>

<sup>30</sup> FLOSS: Faculty Learning Opportunities for Student Success <https://sites.google.com/berkeley.edu/floss>

<sup>31</sup> Discovery Initiative: ( <https://evcp.berkeley.edu/news/berkeley-discovery-initiative> )

<sup>32</sup> <https://teaching.berkeley.edu/programs/transforming-stem-teaching-faculty-learning-program>

educators at the Lawrence Hall of Science and faculty on our campus. The FLP program is time intensive, and providing incentives for faculty to take this course would help improve instruction, especially in large entry level courses.

**Faculty Incentives:** Even with the resources available, departments need to develop incentives for faculty to restructure their courses. Some universities and programs offer financial incentives: stipends for faculty who attend workshops and small grants for improving their courses are offered at Syracuse funded by the Howard Hughes Medical Institute. UCB does provide Instructional Improvement Grants and Presidential Chair Fellow Curriculum Enrichment Grants. Promoting and expanding the number of these grants would facilitate experimenting with approaches for course improvement. Incentives include emphasizing DEIB efforts for faculty during Merit and Promotion reviews. Other incentives may include teaching relief in semesters where faculty attend workshops, training, and spend time restructuring their courses. In addition, faculty should simply be expected, and at the tenure level, required to take a pedagogy course.

## UNDERGRADUATE EQUITY & INCLUSION: ASSESSMENT

As a Committee, we struggled with the lack of available data on the effectiveness of programs that support DEIB. Improved assessment for new programs and for the effectiveness of our recommendations is clearly needed. Centralizing STEM programs, as described above, will facilitate a deeper understanding of program effectiveness. Additionally, we hope that such assessments would address the collective and synergistic effect of multiple programs that could not be readily assessed by examining individual programs in isolation. Nonetheless, our campus would certainly benefit from a centralized assessment. We must have an effective and comprehensive way to identify programs which contribute to the recruitment, support, retention, and success of a diverse group of students in STEM. Furthermore, we should collect data on the success of programs and student resources in order to make data-driven decisions about how best to support our students. This assessment should not only include collecting and analyzing data that has already been collected for ongoing programs, but to also initiate and coordinate data collection from newly emerging programs.

**Convene an evaluation and assessment committee with staff support:** To this end, we should first gather a small group (steering committee) to examine existing data, initiate data collection for emerging programs, and to coordinate ongoing data collection. It is suggested that the initial subset of the coalition (steering committee) include Ira Young (SEED), Collette Patt (Asst Dean, Math and Physical Sciences), John Matsui (BSP), Jules Winters (FLOSS), Robert Full (HHMI Teaching Professor and Discovery Initiative), Bree Rosenblum (Discovery Initiative), Andrew Eppig (Office of Equity and Inclusion), Fabrizio Mejia (Asst Vice Chancellor, Division of Equity and Inclusion), Diana Bautista (Professor MCB, and Co-Chair FOB2), and tyrone B hayes (Professor and Co-Chair IB and Co-Chair FOB2). The Committee charge should include: 1) coordinate data collection (kinds of data, methods, etc.) so that programs can be assessed for the individual programs' effectiveness; 2) assess how programs are working together to drive recruitment, support, retention, and success of our students; and 3) address how effectively the campus guides students to (and through) the programs and resources that they may need.

We are aware of the size of the task. To accomplish our goals, the steering committee alone will not suffice. We should provide support for an individual to specifically coordinate data collection and to analyze data within and

across programs. This individual will be responsible for consulting with individual programs and ensuring that useful data are collected across programs and will be responsible for the horizontal analysis of data (across programs) and the vertical analysis (how individual students navigate and benefit from multiple programs and resources).

Ultimately, we expect to have overall assessments of how effective these programs are for our students as a whole, and also have information on how each of these programs and resources contributes to a given student's recruitment, support, retention, and success, but a number of other questions remain to be addressed. We should have statistics to examine the age-related census and analyses should be based on age of students coming in. We should have analyses that address the cost per student for all strategies. In addition, the impact of the pandemic and disparities in learning loss need to be addressed. The Vice Chancellor for Undergraduate Education suggests that we will see this impact for at least five years as students come to Berkeley less prepared academically and socially. Although the office of the Vice Chancellor for Undergraduate Education, in conjunction with the Student Learning Center, is analyzing data on the impact of the pandemic on learning loss, these surveys were not designed to address disparities. For example, first generation students, low income students, students with disabilities, students with high schools that provide less preparation and resources are likely to suffer greater losses. Their surveys are already suggesting that STEM students are more impacted, so our recommendations and strategies here are even more timely.

### **SECTION 3: GRADUATE STUDENT DIVERSITY, EQUITY, INCLUSION & BELONGING**

The societal and cultural biases that fuel systemic racism are endemic in scientific research and in academia. Indeed, the National Science Foundation reports that the percentage of underrepresented minorities in the sciences<sup>33</sup> decreases with progression through the academic career path (NSF 2019). Although these groups, together, make up more than 30% of the U.S. population, only 20.2% of biological sciences bachelor's degrees are awarded to URM students, and only 9.3% of biological sciences doctorates and 4.3% of biological sciences professors are from URM groups. Note that the representation of scientists who identify in multiple minority groups (e.g. Black women) is even more dismal, which highlights the need to consider intersectionality in efforts to promote an inclusive biomedical workforce. Finally, the number of young investigators from underrepresented groups in the biomedical sciences who receive R01s is actually declining<sup>34</sup>. Sadly, these numbers have not improved in the last 20 years<sup>35</sup>. While it is well-established that Black, Latinx, Indigenous and people of color (BIPOC) leave STEM fields at higher rates than non-BIPOC trainees, recent studies show these trainees leave STEM fields at alarmingly higher rates than non-STEM fields<sup>36</sup> suggesting that there is something unique about science education that is leading to the disproportionate loss of URM students.

Our goals are to maximize Ph.D. student diversity in the life sciences at UC Berkeley; to foster success among students from underrepresented backgrounds by equipping them with the technical, operational and professional skills needed to conduct rigorous research; and ultimately to launch these students toward successful research careers to diversify the U.S. biomedical research workforce. To achieve these goals it is

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<sup>33</sup> URMs; defined as African American, Latinx, American Indian, Alaska Native, and Pacific Islander individuals

<sup>34</sup> <https://diversity.nih.gov/building-evidence/racial-disparities-nih-funding>

<sup>35</sup> National Center for Science and Engineering Statistics (NCSES), 2019

<sup>36</sup> Cell, 2020 May 14;181(4):754-757

imperative that we create and sustain a training environment across the life sciences that acknowledges and celebrates diversity and promotes inclusive practices.

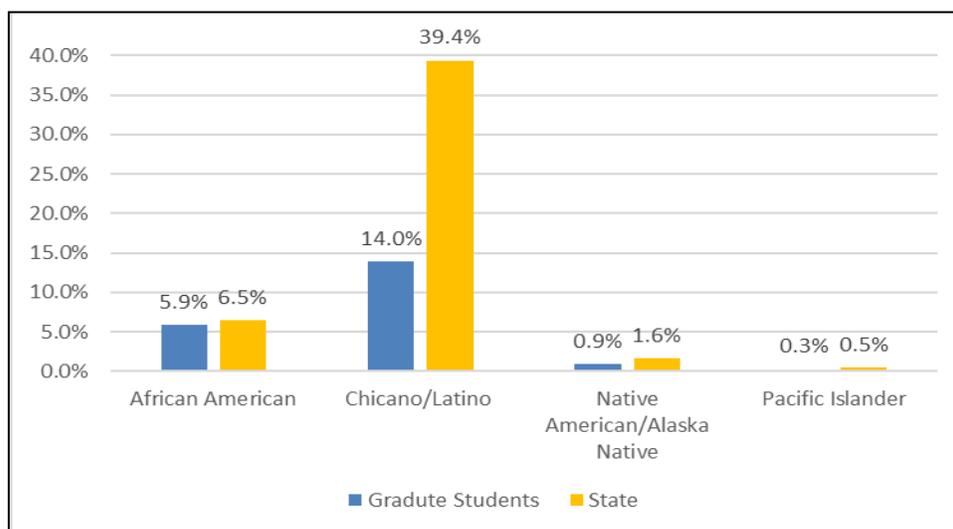
Here we outline a set of proposals that address two key goals for our graduate programs in the life sciences: 1) to achieve a more diverse and inclusive membership; and 2) to create and sustain an environment that acknowledges and celebrates diversity and promotes inclusive practices. Our mission is to empower our PhD students to overcome systemic barriers through evidence-based activities.

## GRADUATE STUDENT DIVERSITY

Our goals are to achieve increased enrollment of students from diverse backgrounds and from ethnic groups that are currently underrepresented in the biological sciences. 65% of the students in California’s colleges and universities are from populations that would be considered minority groups at the national level<sup>37</sup>. However, individuals from these groups are underrepresented in STEM PhD programs, which leads to vanishingly small representation at the faculty level<sup>38</sup>. These disparities at the national level also manifest locally in UC Berkeley’s life science PhD programs. Indeed, Figure 5 below shows that our URM graduate student populations are far below the representation seen at the State level.

Especially alarming is the number of Black graduate students in the life sciences at UC Berkeley. With the exception of the School of Public Health (8% in 2021), all programs are currently well below the state (6.5%) and

**Fig 5: % URM Graduate Students in Life Science Units\* (2021)**



\*California Census data for July 2021 (<https://www.census.gov/quickfacts/CA>); Campus data from CalAnswers Census Report for Bioengineering , Chem & Biomolecular Eng , Env Sci, Policy, & Mgmt , Integrative Biology , L&S Public Health , Molecular & Cell Biology , Nutritional Sciences & Tox , Other Bio Sciences Pgms , Plant & Microbial Biology , Ag & Env Chem Grad Grp , Bioengineering-UCSF Grad Grp , Biophysics Grad Grp , Biostatistics Grad Grp , Comparative Biochem Grad Grp , Computational Biology Grad Grp , Epidemiology Grad Grp , Health & Medical Sci Grad Grp , Infectious Diseases & Immun GG , Metabolic Biology Grad Grp , Microbiology Grad Grp , Molecular Toxicology Grad Grp , Neuroscience Graduate Program , Public Health

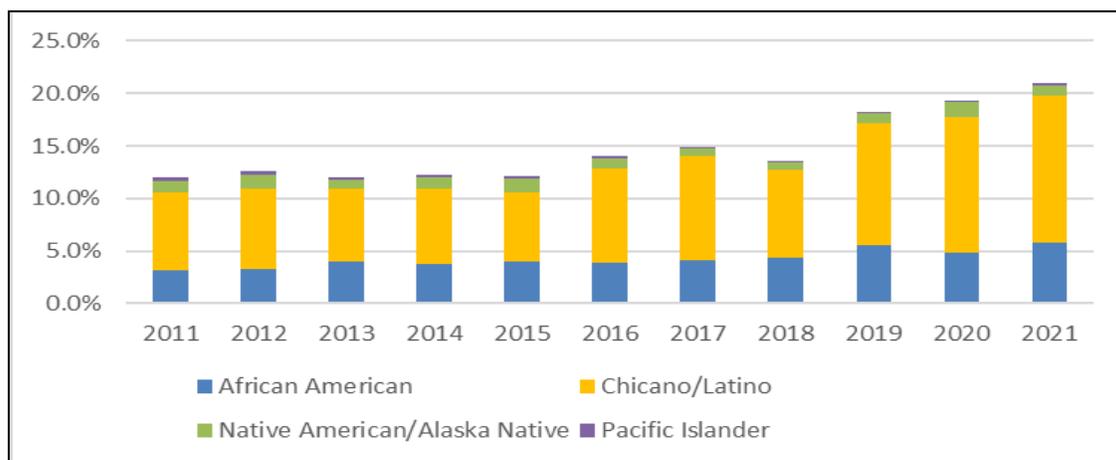
U.S. (13.4%) population. Using MCB, PMB and the HWNI graduate programs as an example, data from 2008-2021 highlight two critical challenges that call for further action. The first issue is that of the 679 graduate students who entered these programs in the last 12 years, only 21 are African American/Black. The second issue

<sup>37</sup> Left Out Report, 2018 <https://collegecampaign.org/wp-content/uploads/2021/07/Left-Out-Report-FINAL.pdf>

<sup>38</sup> Left Out Report, 2018 <https://collegecampaign.org/wp-content/uploads/2021/07/Left-Out-Report-FINAL.pdf>

is at the level of retention, where the retention rates of URM students are lower than that of non-URM students (28.6% African American/Black, 14.7% Latinx, 18.8% Pacific Islander, 12.2% other identities). Looking at recent trends, we see similar slow advancement in graduate student diversity; as at the undergraduate level, change has been relatively static. As shown in Figure 6, the representation of Chicano/Latinx graduate students in the life sciences has shown some improvement in the last decade while representation of other URM groups have remained relatively modest, or static.

**Fig 6. URM % of Total Graduate Students, Life Science Units\* (2011-2021)**



\*Bioengineering , Chem & Biomolecular Eng , Env Sci, Policy, & Mgmt , Integrative Biology , L&S Public Health , Molecular & Cell Biology , Nutritional Sciences & Tox , Other Bio Sciences Pgms , Plant & Microbial Biology , Ag & Env Chem Grad Grp , Bioengineering-UCSF Grad Grp , Biophysics Grad Grp , Biostatistics Grad Grp , Comparative Biochem Grad Grp , Computational Biology Grad Grp , Epidemiology Grad Grp , Health & Medical Sci Grad Grp , Infectious Diseases & Immun GG , Metabolic Biology Grad Grp , Microbiology Grad Grp , Molecular Toxicology Grad Grp , Neuroscience Graduate Program , Public Health. Source: Cal Answers Census Data by Two Fields Report, Fall 2011- Fall 2021

## GRADUATE STUDENT DIVERSITY AND INCLUSION: RECRUITMENT

The sustained trend for disproportionately low recruitment and failed retention of URM-identifying PhD students show that our current PhD programs do not sufficiently support the training needs of under-represented students. We therefore recommend the following

**Coordinated Recruitment Efforts Across the Life Sciences:** Coordinate attendance and recruiting as a campus effort at national conferences such as the Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS), Annual Biomedical Research Conference for Minority Students (ABRCMS), and American Indian Science and Engineering Society (AISES). Joint outreach and recruitment efforts could benefit all departments by sharing resources and will help students find programs that best fit their interests. This will help generate a cohort across departments for students of color, first generation, and low-income graduate students. Currently efforts are duplicated across departments often causing resources to be spread thinly as well as limiting participation in each conference.

**Expanded Recruitment Efforts:** Historically, successful applicants for our graduate program have mostly come from so-called “top-tier” institutions which often include faculty who are alumni of our university. This can be self-perpetuating and result in the false perception that students with the potential to succeed need to have been educated in such institutions. To break this cycle, we need to cultivate new relationships, and enhance existing relationships, with research and teaching faculty at institutions that have not traditionally been training grounds for our graduate students. Indeed some of these

institutions have programs that specifically attract highly talented students from underrepresented groups. We have already developed relationships with California State University campuses (SFSU, San Jose and CSU LA) and the University of Puerto Rico that have programs such as the NIH-funded Maximizing Access to Research Careers (MARC) program. We need to establish relationships with additional minority-serving institutions, especially HBCUs.

Instead of traditional site visits, we need to establish impactful relationships. Towards this end, we should provide virtual and in-person training for students in these schools by organizing workshops and bootcamps to help students prepare their graduate school applications and interview processes (inspired by Denzil Streete's Yale Bouchet Bootcamp and ongoing efforts at UC Berkeley). Furthermore, we need to present information about life during and after graduate school, highlighting the diverse career paths of our PhD alumni to attract a broader base of students. Finally, we should connect our graduate students who are from CSUs or HBCUs with the students that we meet with during our visits in order to establish affinity-based peer-mentoring. This approach has been effective through the Amgen Scholars Program, where we have many students matriculating from various University of Puerto Rico campuses based on summer undergraduate research internships where they receive this type of support including a graduate student mentor who assists them with preparing oral and poster presentations. We observe a correlation with increased graduate applications from University of Puerto Rico students, high acceptance rates, and successful outcomes for graduating Ph.D. students. During outreach efforts, we have found that students are sometimes surprised to learn that they can receive a stipend for the entire duration of graduate school if they work in a lab. Indeed, many departments include guaranteed support via GSI appointments. It is important to dispel false beliefs that might discourage students from many institutions from applying to graduate school at Berkeley. As stated above, we should coordinate efforts across the life sciences and create an online website listing of all our programs to make it easier for students.

**Standardizing the application review process:** In collaboration with the Black and the Red Consulting Group, MCB developed a holistic review process and rubric for graduate admissions. This rubric, or similar as in ESPM and PMB, should be adopted across the Life Sciences.

## GRADUATE STUDENT INCLUSION AND BELONGING: CLIMATE

Our goal is to maximize Ph.D. student diversity in the life sciences at UC Berkeley; to foster success among students from underrepresented backgrounds by equipping them with the technical, operational and professional skills needed to conduct rigorous research; and ultimately to launch these students toward successful research careers to diversify the U.S. biomedical research workforce. To achieve these goals, it is imperative that we create and sustain a training environment across the biomedical sciences that acknowledges and celebrates diversity and promotes inclusive practices.

**Recent climate surveys provide baseline data to support our urgent need for tailored interventions to improve our trainees' research environment.** The campus-initiated "My Experience" survey of graduate students revealed significant equity gaps in the Life Sciences in campus climate comfort levels and the experience of exclusionary behaviors by URM graduate students, as tabulated in the table below (Figure 7a).

Indeed, such issues were at the forefront of a recent survey spearheaded by graduate students in three of our graduate programs (PMB, MCB & HWNI). In the student-led survey, 92.9% of respondents supported

establishing a system for reporting incidents of racial discrimination by others in the department; 81% of the respondents requested mandatory DEIB training for all faculty, staff and trainees; 88.5% of the respondents suggested the programs need to be proactive, rather than reactive in regards to anti-racism by holding regular town hall meetings to discuss DEIB issues; 82.7% of respondents stated that programs should incorporate an anti-racist teaching curriculum in their courses.

**Figure 7.a: Graduate Student Climate**

Experienced Exclusion		Do NOT feel comfortable with the campus climate	
ALL Grad Students	URM	ALL Grad Students	URM
21%	37%	22%	35%

*Our analysis of recent trainees’ outcomes from these training programs provide additional justification for the implementation of new programs to enhance the climate.* Although outcomes between URM and non-URM students are similar in terms of time to degree, more URM students leave graduate school without a PhD than non-URM students, and pursue research careers (defined as a postdoctoral fellowship, scientist or research position at a company or an academic faculty position) at a substantially lower rate post-graduation (57% of URM graduates vs. 73% overall)

**Figure 7.b.: Graduate Student Retention in Scientific Careers**

Time to degree (years)		Left Graduate School without degree (%)		Persistence in a research position (%)	
ALL	URM	Non-URM	URM	ALL	URM
5.7	5.6	12.2	18.8	73.2	56.9

Together, our climate surveys, admissions data and 10-year outcomes analysis identify the following barriers in our progress toward our overarching goals:

- More than sixty percent of URM trainees experience exclusion and discomfort in our current research training environment, a higher percentage compared with the training pool as a whole.
- Our programs receive many applications each year from research-focused URM individuals but successfully recruit only about a dozen of these individuals.

Looking to the larger question of climate on campus<sup>39</sup>, we see 51% of African American, 22% of Chicax/Latinx , and 29% of Native American/Alaskan Native graduate students reporting that their affinity group is NOT respected on campus .<sup>40</sup> The My Experience Survey report concluded that while graduate students on campus have an overall positive academic experience, this does not hold true for those from minoritized groups: “this

<sup>39</sup> <https://myexperience.berkeley.edu/sites/default/files/myexperiencesurvey2019-final.pdf> (pg 14)

<sup>40</sup> No data reported for Pacific Islander

worsened climate was most notable in seeing enough faculty or staff with whom they identified (56% vs. 20%); feeling pre-judged by faculty (48% vs. 32%); and having similar opportunities for academic success to their peers (84% vs. 94%).”<sup>41</sup>

Our mission is to break these barriers by launching a series of initiatives in the life sciences tailored to underserved students using evidence-based guidelines. We therefore make the following recommendations for advancing DEIB through climate interventions:

**iBIO Graduate Student Network:** Foster the development of a graduate student-led organization that works across the biological sciences to promote a supportive climate for trainees. With one-elected representative from each life science department/school acting as co-chairs who will meet once a month to plan events and set initiatives. This group will allow students to develop a cohort which they may not be able to do within departments, because there are so few underrepresented students. Additionally, this group will foster interaction across departments.

**Inclusive Mentoring Training:** Across campus, faculty should receive evidence-based mentor training every semester to enhance academic outcomes and foster a safe and inclusive training environment. We propose that ongoing training topics and workshops be organized by the Life Sciences Collegium, as discussed in the Introduction to this report.

**Summer bridging program:** Bridge programs, where students from underserved groups enhance research skills before entering graduate school, are known to boost retention of the participants in their Ph.D. programs proper<sup>42</sup>. We should implement a bridge system, as follows. Trainees will come to campus six weeks before the start of the academic year for Summer LITES (Lab-based Interactive Training Experience for Students). Each trainee will be paired with a faculty mentor to conduct a research project prior to the start of the fall semester. Besides research excellence, the faculty who will participate in Summer LITES will be selected based on demonstrated excellence in mentorship and training and commitment to equity and inclusion. Summer LITES will include customized peer-mentoring (see below) as well as academic tutoring and access to undergraduate courses that may strengthen graduate school readiness. Recognizing the financially precarious situation of trainees from historically underrepresented backgrounds starting a new PhD program in a new city, trainees will receive a stipend and on-campus housing for participation in this program.

**Community-building and one-on-one advising:** Much of a trainee’s sense of belonging at an institution is tied to the social and emotional support that exist to sustain that trainee outside of the lab and classroom environments<sup>43</sup>. Trainees will benefit from frequent, structured mentoring and group sessions that help demystify the process of graduate school and build confidence. The Graduate Division has piloted a close mentoring program in the Paths to Professoriate program for 3rd year graduate

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<sup>41</sup> <https://myexperience.berkeley.edu/sites/default/files/myexperiencesurvey2019-final.pdf> (pg 38)

<sup>42</sup> DJ Asai; [Race Matters](#). Cell. 2020 May 14;181(4):754-757 and, Hinton AO Jr, Termini CM, Spencer EC, Rutaganira FUN, Chery D, Roby R, Vue Z, Pack AD, Brady LJ, Garza-Lopez E, Marshall AG, Lewis SC, Shuler HD, Taylor BL, McReynolds MR, Palavicino-Maggio CB. [Patching the Leaks: Revitalizing and Reimagining the STEM Pipeline](#). Cell. 2020 Oct 29;183(3):568-575

<sup>43</sup> Estrada M, Young GR, Nagy J, Goldstein EJ, Ben-Zeev A, M rquez-Maga a L, Eroy-Reveles A.; [The Influence of Microaffirmations on Undergraduate Persistence in Science Career Pathways](#); CBE Life Sci Educ. 2019 Fall; 18(3) and, Estrada M, Eroy-Reveles A, Matsui. [The Influence of Affirming Kindness and Community on Broadening Participation in STEM Career Pathways](#). J. Soc Issues Policy Rev. 2018 Jan;12(1):258-297.

students interested in faculty careers<sup>44</sup> and the STEM Ambassadors program for first-year Ph.D. students from across fields<sup>45</sup>. We propose a similar program is developed and tailored to the Life Sciences. In their first year, trainees will gather in a weekly discussion group to build community and share the journey while also being reassured and affirmed that they have what it takes to become a great scientist. Discussion leaders will be drawn from a rotating pool of the Office for Graduate Diversity staff; LSI faculty management team; and Audrey Knowlton, Biological Sciences Diversity Director. In addition, each trainee will participate in one-on-one advising sessions with faculty and staff once a month in their first and second years, and twice yearly thereafter.

**Peer mentoring network:** In establishing mentoring relationships, we note that academic kinship<sup>46</sup> is central to the academic success and retention of students from historically underrepresented backgrounds in STEM fields. As a complement to the above community-building and mentoring by faculty and staff, we should establish a peer mentoring system. Each trainee will be partnered with a senior peer mentor via affinity-based matching, upon arrival on campus in the summer of their first year. Fellows and their mentors will participate in monthly social events throughout graduate school (ice cream socials, Tilden Park hikes, Berkeley Botanical Garden tour, pizza and movie nights). Across life sciences, we must be intentional in identifying a constellation of mentors for participants in the program across life sciences, building upon the Mentoring Map established by the National Center for Faculty Development and Diversity<sup>47</sup>.

**Justice, Equity, Diversity and Inclusion (JEDI) Seminars:** JEDI seminar series featuring scientists who are also leaders in science diversity, equity and inclusion. Exposure to a diverse group of scientists who have succeeded at the highest echelons of the field is essential for inclusivity<sup>48</sup>. Toward this end, we should run a trainee-hosted Science and Diversity Seminar Series to organize four seminars a year. Speakers will be investigators who are leaders both in their scientific field and also in diversity, equity and inclusion efforts at their universities and/or at a national level. Each speaker will participate in a two-day visit. Day 1 will include a traditional scientific seminar open to the entire university community, including one-on-one meetings with faculty and a trainee lunch. On Day 2, the speaker will give a second seminar on their career path and successful efforts at their institution to increase DEIB, and meet with graduate students, allowing them to share personal experiences and strategies to advance equity and inclusion in science.

**Sense of belonging workshop:** Develop a new workshop for graduate students at the end of their first year focused on confidence, identity, and sense of belonging. The structure will have three parts. First, we will have an invited speaker who will speak on their work regarding the experiences of diverse students in the life sciences, including imposter syndrome, sense of belonging and overcoming adversity. Next, trainees will read published statements from URM and first-generation faculty, postdocs and Ph.D. students on these topics. Then, each current trainee will write his/her/their own statement

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<sup>44</sup> <https://grad.berkeley.edu/graduate-diversity/current-grad-students/path-to-the-professoriate-program/>

<sup>45</sup> <https://grad.berkeley.edu/graduate-diversity/current-grad-students/stemfyi/>

<sup>46</sup> Windchief S, Brown B. [Conceptualizing a mentoring program for American Indian/Alaska Native students in the STEM fields: a review of the literature](#). Mentor Tutoring Partnersh Learn. 2017;25: 329–345.doi:10.1080/13611267.2017.1364815

<sup>47</sup> <https://ncfdd-production-file-uploads.s3.amazonaws.com/media/399d28e3-a382-44b1-8bfa-4394ad6148d5-MentoringMap-Interactive.pdf>

<sup>48</sup> [https://sites.nationalacademies.org/cs/groups/pgasite/documents/webpage/pga\\_186162.pdf](https://sites.nationalacademies.org/cs/groups/pgasite/documents/webpage/pga_186162.pdf)

and if they wish to, they can share these and/or record video segments of themselves reading these pieces to share with future students, or others in the community. This workshop is designed based on strategies with proven success rates in studies of retention for students from underrepresented groups in academic programs.

**Inclusive Excellence for Quads Prep (IEQP):** Students need support to achieve academic milestones in Ph.D. programs<sup>49</sup>. MCB, for example, is currently piloting a program for second-year students whereby trainees gear up for their oral qualifying exam. Each student will do practice exams in their one-on-one mentoring meetings with faculty, and with a panel drawn from current and former trainees. Additionally, one-day workshops to build other research skills are needed. Topics will be solicited from the trainee student body each year and may include interactive workshops on “How to Prepare a Killer NSF GRFP Application,” “How to Critically Evaluate a Scientific Paper,” “Using the UC Berkeley Ombuds office,” “How to Make the Best out of Individual Development Plans,” “How to Choose a PhD Mentor and Lab,” and “Social Media Basics for Scientists.”

**Scientific communication course:** A cross-listed biology course should be offered based on: PMB290, *Making Yourself Clear: How to Give an Engaging Science Talk*, led by PMB Professor Britt Glaunsinger, that develops and refines verbal scientific communication skills. Content includes best practices for structuring lectures, including organization, slide design, balancing background information and data; how to engage the audience when on stage; and development of a short research elevator pitch.

**Technical skills for career readiness annual workshop:** Per recommendations for training of a diverse biomedical workforce by the NIH and the National Academies, we should develop a program to steep trainees in professional practices relevant for both academic and industry career tracks. Example: week-long computer scripting boot camp, a long-running, existing program run by graduate students in the UC Berkeley Center for Computational Biology.<sup>50</sup>

**Equity practices course:** Across biology course should be offered based on: MCB 290, *Diversity, Equity and Inclusion in STEM*, led by MCB faculty member Professor Diana Bautista, that provides a forum for discussion of evidence-based practices to promote equity and inclusion in science teaching and mentoring. Topics may include: What is diversity? Why is diversity important in science? What are the main challenges facing underrepresented students in science? What equity and inclusion programs are working at UC Berkeley and other institutions? What are the most effective approaches of supporting students from all backgrounds? These questions can be explored through reading and discussion of research literature on the intersection of identity with experience, persistence and success in science. The aim is to explore evidence-based practices in inclusive learning and mentoring in science with a goal of adopting successful programming on campus to promote a more inclusive culture.

**Wellness:** Promoting wellness is a key recommendation for success among graduate students<sup>51</sup>. Toward this end, trainees should participate in a monthly psychoeducation workshop from the UC Berkeley

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<sup>49</sup> [https://sites.nationalacademies.org/cs/groups/pgasite/documents/webpage/pga\\_186162.pdf](https://sites.nationalacademies.org/cs/groups/pgasite/documents/webpage/pga_186162.pdf)

<sup>50</sup> <https://ccb.berkeley.edu/outreach/workshops-bootcamps/>

<sup>51</sup> [https://sites.nationalacademies.org/cs/groups/pgasite/documents/webpage/pga\\_186162.pdf](https://sites.nationalacademies.org/cs/groups/pgasite/documents/webpage/pga_186162.pdf)

Psychology Clinic<sup>52</sup> on resiliency, self-care, and mental health best practices specific to the underrepresented student experience. Survey trainees for suggested topics of other workshops, “Imposter Syndrome and How to Overcome,” “Finding Your People in Academia,” and “Mental Health in Academia.”

**Mentor training:** Faculty training and buy-in is critical for efforts to diversify graduate programs.<sup>53</sup> We need a life sciences-wide ongoing training program where faculty develop skills for building inclusive, productive, culturally responsive, research mentoring relationships. Toward this end, each year, all faculty members teaching first-year graduate students or serving as principal investigators for trainees in the life sciences departments might participate in evidence-based, interactive workshops. Example: Center for Improvement of Mentored Experiences in Research <sup>54</sup>(CIMER) based at the University of Wisconsin-Madison. CIMER is an NIH-funded organization that has twenty years of experience in designing, implementing, and evaluating mentor training in the sciences, including graduate biomedical research programs. CIMER has not only developed a broad mentoring curriculum but also established metrics with which to assess the impact of interventions designed to improve the student-mentor experience. In addition, all faculty members who teach will participate in the *Creating Inclusive Classrooms* and the *Exploring Unconscious Bias* workshops offered by the Multicultural Education Program<sup>55</sup>. Finally, all staff members in leadership positions should complete the Multicultural Education Program Certificate Curriculum series to enhance learning and exploration of equity and inclusion.

## SECTION 4. FACULTY DIVERSITY, EQUITY, INCLUSION & BELONGING

As a committee, we considered DEIB within the faculty in two dimensions. The first, and perhaps most measurable, focuses on the diversity of our faculty. Are we meeting our goal to have a faculty that reflects the diversity of the State and of our student body? If not, how can we influence change? The second dimension focuses on our cultural climate. Do we foster inclusion and belonging amongst all faculty in our departments? Are advancement opportunities for all faculty equitable? If not, what can be done to foster a DEIB-forward climate? Below, we will discuss our findings and recommendations for both dimensions separately. Ultimately, however, these questions require deeper investigation and holistic consideration as they are inherently connected. We urge the campus to convene a standing committee or collegium charged to do so. To make significant and lasting institutional change for DEIB, faculty must be empowered and supported.

### FACULTY DIVERSITY

Over the last decade there has been limited progress towards meeting our goal of a faculty that reflects the diversity of the State, particularly in comparison with steeper gains in our student populations. In fact, the change in faculty demographics has been essentially static.

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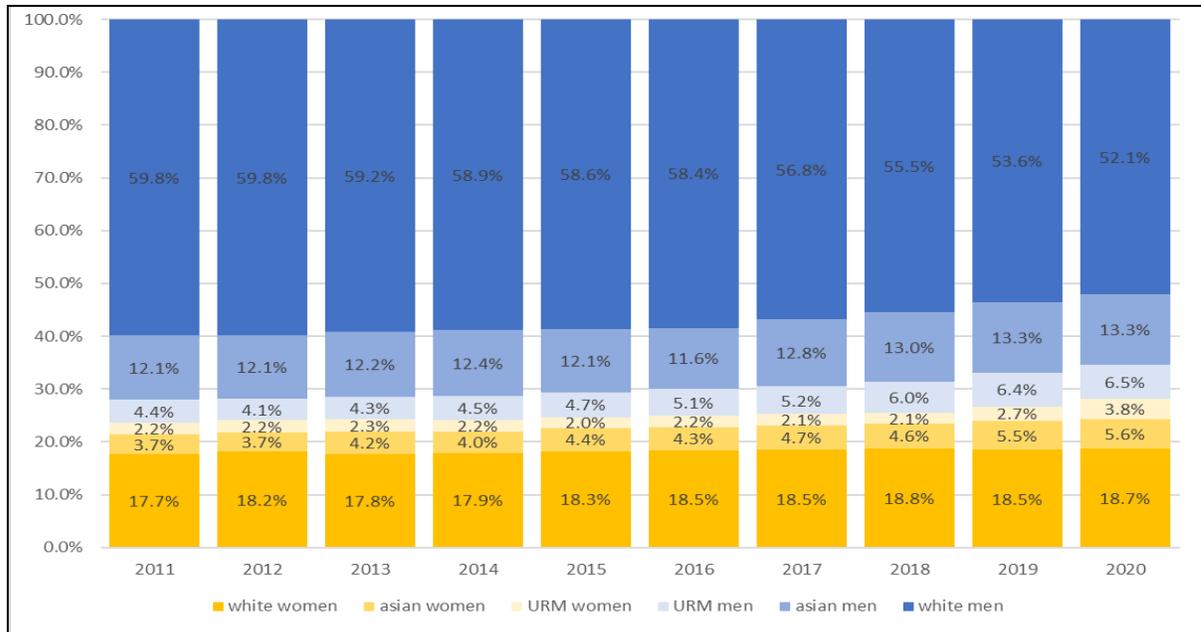
<sup>52</sup> <https://psychology.berkeley.edu/clinics/our-services>

<sup>53</sup> [https://sites.nationalacademies.org/cs/groups/pgasite/documents/webpage/pga\\_186162.pdf](https://sites.nationalacademies.org/cs/groups/pgasite/documents/webpage/pga_186162.pdf)

<sup>54</sup> <https://cimerproject.org/>

<sup>55</sup> <https://mep.berkeley.edu/workshops/faculty>

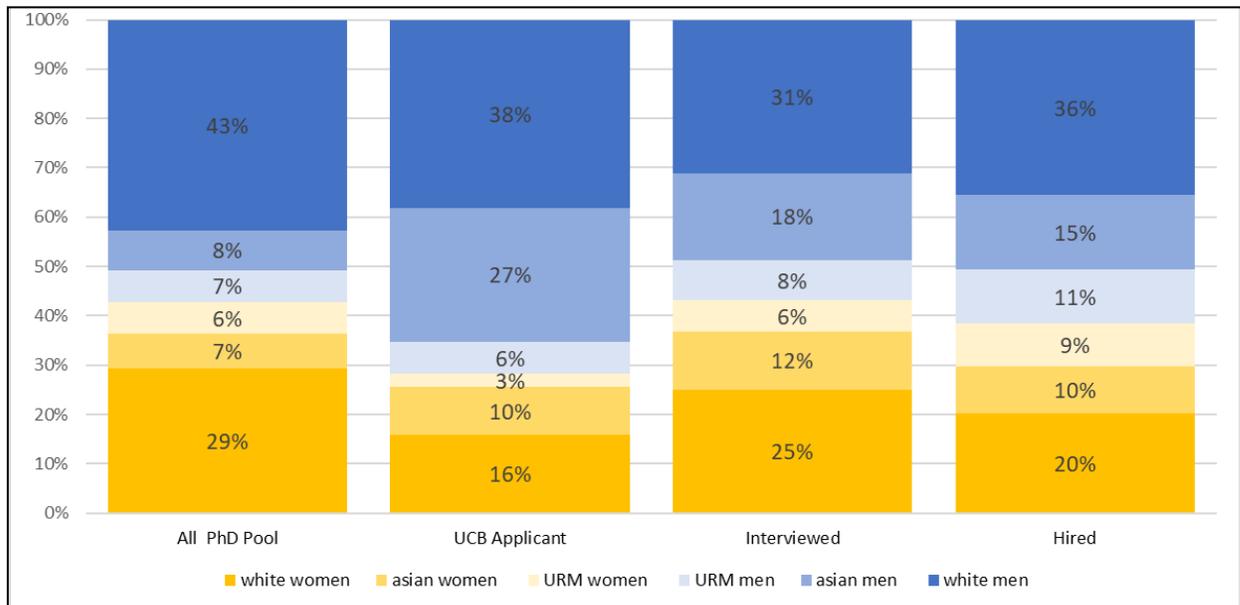
**Figure 8. Faculty Demographics, Life Science Units\* (2011-2020)**



Source: OFEW 2021 Benchmark Data for CoE, CoC, RCNR, BioSci and SPH. UCB Degree File, 2015-15–2019-20; Survey of Earned Doctorates (All US PhDs, 2014-18); UCB APRecruit, AY 2013-14–2020-21; Faculty Personnel Records, AY2016-17–2020-21 (Spring). Faculty FTE data as of 4/30/2021.

In part, this can be attributed to the typical length of employment of Berkeley faculty. The student populations change with greater rapidity than the faculty; while students spend between two and six years on campus, faculty are generally active for two decades or more. **As such, it is all the more important for us to push our faculty outreach and recruitment efforts towards inclusive excellence. In order to meet our faculty diversity goals, we must aggressively advance DEIB in all faculty recruitments.** When considering faculty hired more recently, as represented by the “hired” column in Figure 9, we see promising improvement in the diversity of

**Fig 9. PhD Pathway to Faculty Hire, Life Science Units\* (by % of Total)**



Source: OFEW 2021 Benchmark Data for CoE, CoC, RCNR, BioSci and SPH. UCB Degree File, 2015-15--2019-20; Survey of Earned Doctorates (All US PhDs, 2014-18); UCB APRecruit, AY 2013-14--2020-21; Faculty Personnel Records, AY2016-17--2020-21 (Spring). Faculty FTE data as of 4/30/2021.

our faculty. This column represents faculty hired between AY 2016-17 and AY 2020-21, a period when many of our participating departments began requiring DEIB statements in searches and began using candidates' understanding of DEIB, contributions in DEIB, and future plans in this area as selection criteria.

## FACULTY DIVERSITY & INCLUSION: RECRUITMENT EFFECTIVENESS

The Office for Faculty Equity and Welfare (OFEW) maintains recruitment benchmark data<sup>56</sup> by college. As we see in Figure 2 above, this is an important measure of our recruiting practices and illustrates our ability to conduct successful outreach and achieve a diverse candidate yield. Additionally, these data show our ability to improve faculty diversity through recruitment by measuring the percent change from PhD pool to applicants to successful hires. The figures below (Figures 10.a & 10.b) represent the change in percentage by gender and ethnicity reflected as a percent of the total for PhD pool availability, search applicants, and faculty hires, with remarkably different levels of success. Not accounting for discipline or the specialization of the search area, we see that in all units, applicant pools show a decrease in representation of underrepresented minorities and women from available PhD holders to applicants.

Figure 10.a. URM: PhD Pool to Applicant Pool (% of Total)

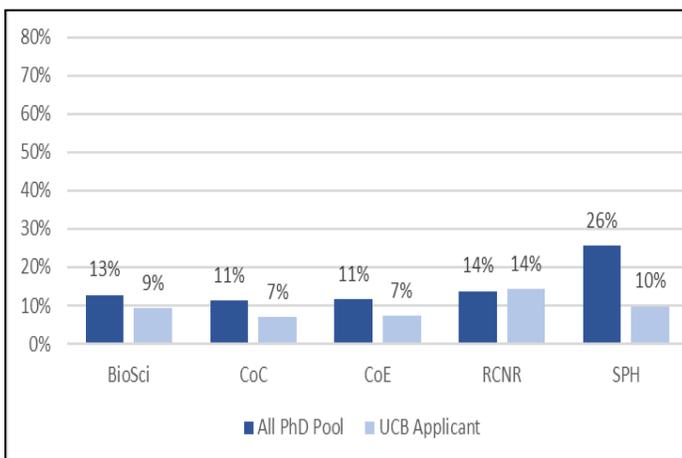
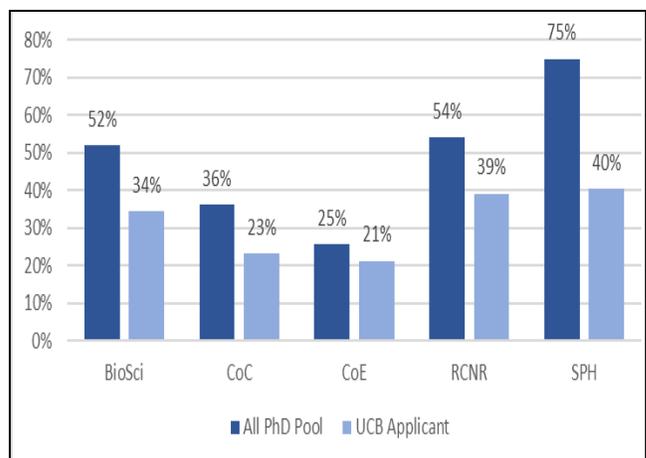


Fig. 10.b. Women: PdD Pool to Applicant Pool (% of Total)



Source: OFEW 2020 Benchmark Data for CoE, CoC, RCNR, BioSci and SPH. UCB Degree File, 2014-15--2018-19; Survey of Earned Doctorates (All US PhDs, 2014-18); UCB APRecruit, AY 2013-14--2019-20; Faculty Personnel Records, AY2015-16--2019-20 (Spring). Faculty FTE data as of 4/30/2020

Considering the percent of applicant pool against total hires, as in Figures 11.a and 11.b below, reveals a need for interventions in recruitment practice to eliminate potential biases or inequitable practice. While most decanal units show positive increases in URM hiring outcomes in comparison to applicant availability, the yield of URM candidates is still very low and points to the need for additional strategies to speed up the pace of change. Here is a hypothetical scenario to help highlight the issue. Imagine that CoC is allocated 5 FTEs in a given year. Based on recent hiring data (Figure 11.a.), the expectation is that 1 of 5 individuals hired in CoC will be a URM candidate. While the applicant pool to hire percent in CoC is greater than expected based on availability in the pool (Figure 11a), hiring a single URM per year at the decanal level does little to move the needle. In

<sup>56</sup><https://ofew.berkeley.edu/faculty-pipeline-benchmark-data>

essence, the absolute number of target applicants in the pool is much greater than the number hired. For this reason, we propose a series of strategies to increase the pace of change in faculty diversity.

Figure 11.a. URM: Interviewed to Hired (% of Total)

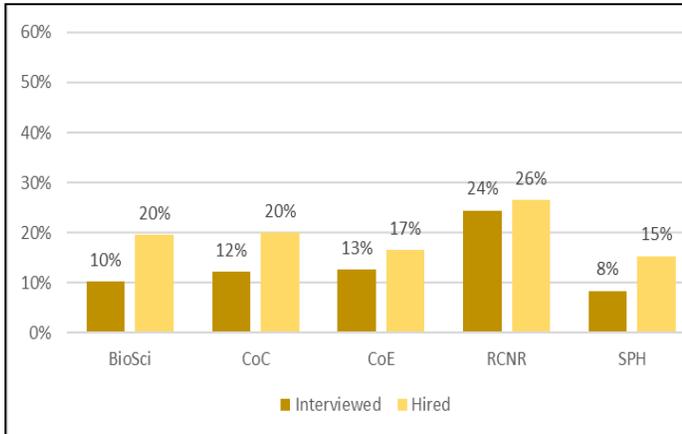
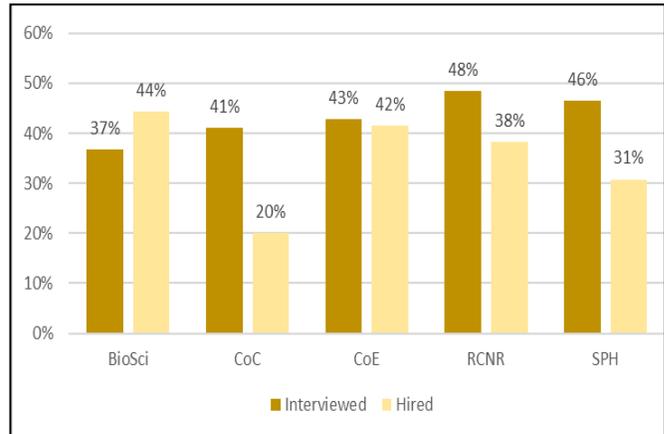


Figure 11.b. Women: Interviewed to Hired (% of Total)



Source: OFEW 2020 Benchmark Data for CoE, CoC, RCNR, BioSci and SPH UCB Degree File, 2014-15--2018-19; Survey of Earned Doctorates (All US PhDs, 2014-18); UCB APRecruit, AY 2013-14—2019-20; Faculty Personnel Records, AY2015-16—2019-20 (Spring). Faculty FTE data as of 4/30/2020

## FACULTY DIVERSITY & INCLUSION: RECRUITMENT STRATEGIES

In 2018, then Associate Vice Provost for the Faculty, Angelica Stacey, OFEW Director Karie Frasch, Director of Data Initiatives Marc Goulden and Vice Provost Emerita Janet Broughton, published a comprehensive study, “Searching for a Diverse Faculty: Data Driven Recommendations”<sup>57</sup> with the conclusion that “**conventional search practices are not enough for consistent success in hiring top women and URM faculty.**” The report identified several promising or very promising search practices. We encourage deep reading of this report by all Department Chairs, Search Committees and Equity Advisors. For our purposes, we include a summary of their recommendations below. These all have low cost to departments but potentially high impact in search outcomes.

- Shaping job descriptions: “...link the description to issues of gender, race, or ethnicity; the second was to emphasize an interest in public scholarship or translational research; and the third was to draw upon field-specific observations about demography and research interests.” (pg. 19)
- Tapping UC pipelines: “...use the information and resources available through the system-wide UC President’s Postdoctoral Fellowship Program (PPFP).” (pg. 26)
- Emailing or phoning selected women or URM scholars and encouraging them to apply
- Including the diversity needs of the department among its hiring priorities
- Including women and URM faculty on search committees, while also being cognizant of the diversity tax and reducing service elsewhere
- Monitoring national resources to identify candidates from minoritized backgrounds (or, candidates from groups historically excluded from academia...)

There has been progress made to improve outreach and recruitment practices on campus. Centrally, OFEW has

<sup>57</sup> [https://www.ofew.berkeley.edu/sites/default/files/searching\\_for\\_a\\_diverse\\_faculty\\_data-driven\\_recommendations.pdf](https://www.ofew.berkeley.edu/sites/default/files/searching_for_a_diverse_faculty_data-driven_recommendations.pdf)

made a great impact in establishing campus standards for equitable recruitment, including providing guidance on evaluating candidate contributions in DEIB in faculty searches and tools for evaluation<sup>58</sup>. Many of our departments and colleges have also made concrete efforts to advance faculty DEIB. An extract from the recent NIH FIRST/TIES proposal<sup>59</sup> highlights two high-impact initiatives:

“The College of Engineering (CoE) Faculty Diversity Initiative was launched in 2017 and focused on four broad categories: 1) increase the diversity of applicant pools; 2) emphasize and require contributions to diversity, equity, and inclusion; 3) improve evaluation and reduce bias; and 4) increase the effectiveness of interviews, recruiting, and professional development. The innovations CoE introduced during the search process yielded a substantial increase in the percentage of URM finalists and new faculty in 2017-18: CoE saw a 20.0% increase in URM faculty hired compared to 2015-17. With 26.7% URM faculty hired in 2017-18, CoE exceeded the national availability by 16.1 percentage points. The second, the Life Sciences Faculty Diversity Initiative (LSI), launched in 2018. Building on the College of Engineering’s work, the LSI brought together faculty across academic divisions with several goals focused on transforming the culture in the life sciences on our campus: 1) program support for new faculty; 2) engaging in discussion on successful strategies that forge a synergy between research and education, and other efforts to advance diversity and equity; and 3) ongoing faculty support and development. As in the CoE cluster search, there was a substantial increase in the percentage of URM finalists and hires in 2018/19. Both Initiatives featured cluster recruitments as methods to increase URM candidate yield and demonstrate the effectiveness of use of standardized rubrics and other search protocols. It is clear that cluster hires should remain a campus priority for increasing the pace of change.”

Indeed, cluster (or pool) searches are a proven method to increase diversity in faculty recruitments<sup>60</sup>. Additionally, preliminary findings from a recent study by OFEW confirm that the percentage of successful faculty hires from underrepresented backgrounds, both in terms of ethnicity and gender, increase significantly when a diversity statement is required in the search<sup>61</sup>. The study authors posit that the requirement of statements, combined with a thorough assessment of DEIB throughout the search process, leads to these positive outcomes. We propose that all life science departments adopt these innovations and best practices for increasing the diversity of our faculty.

**Standardize DEIB forward practices:** Standardize DEIB forward recruiting practices and require DEIB statements in all recruitments. Assess DEIB throughout the search process and consider this selection criteria when evaluating applications and, at the short-list stage, by having all candidates discuss DEIB in their job talk or chalk talk, by having the graduate students also discuss DEIB with candidates, and by ensuring there is an opportunity for the candidate to learn about the types of DEIB activities and opportunities available in the department, college, campus (e.g. via meetings with the department Equity Advisor or Chair). Request and conduct faculty searches at the broadest level, as recommended in the Report.<sup>62</sup> Each search committee must have a designated Equity Liaison as a full voting member of

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<sup>58</sup> <https://ofew.berkeley.edu/recruitment/contributions-diversity>

<sup>59</sup> Authors: Rebecca Heald, Sharon Inkelas, Karie Frasch

<sup>60</sup> <https://www.ascb.org/publications-columns/career-navigator/can-cluster-hires-move-the-needle-to-advance-faculty-diversity/>

<sup>61</sup> According to a soon to be published study, searches requiring a diversity statement from applicants resulted in 51% female and 23% URM hire; this fell to 30% female and 14% URM in searches that did not require a statement.

<sup>62</sup> [https://www.ofew.berkeley.edu/sites/default/files/searching\\_for\\_a\\_diverse\\_faculty-\\_data-driven\\_recommendations.pdf](https://www.ofew.berkeley.edu/sites/default/files/searching_for_a_diverse_faculty-_data-driven_recommendations.pdf)

the committee, appointed by the Equity Advisor. The Liaison will participate in OFEW training on equitable search practices and work with the Equity Advisor to review the selection process as the search proceeds. Committees should be encouraged to solicit input from students, such as being a member of the committee. This can be an important factor in discussions, particularly in advancing DEIB.

**Improve outreach:** Invest in outreach to postdoctoral fellows from programs that promote DEIB, such as the PFPF and Hanna Grey Fellows (HHMI). This could include a lecture series to showcase potential candidates by sponsoring campus visits. Develop and promote DEIB forward recruiting practices and convene a working group to establish a standardized toolkit of resources for all biology-related search committees. Provide opportunities for cluster searches across departments and divisions.

## FACULTY DIVERSITY & INCLUSION: RECRUITMENT BARRIERS

California is a particularly challenging state for faculty recruitment given the high cost of living. It is fashionable to say that it's not enough to throw money at the problem. But in this case, the economic barriers are real. It is difficult to buy into and live in the Bay Area without access to generational wealth. Without housing and child care security, new faculty face a steep incline in establishing a successful career at UC Berkeley. In addition to the challenges of establishing a new lab, a teaching program, and engaging with a new community, they must also manage a prohibitive housing market and incredibly high cost of living. This growing disparity, which disproportionately impacts those from underrepresented groups, is a major issue. Access to familial/generational wealth will disproportionately impact faculty from underrepresented groups or faculty that were first generation college students, perhaps best illustrated in terms of the scale of change in housing prices relative to salary: the Bay Area has seen an 88% increase in house prices from 2012-2019 according to one analysis<sup>63</sup>, whereas in the same time period, tenure-track assistant professor Step I salary increased by 20%<sup>64</sup>. While the MOP loan program and temporary below market rentals continue to be important mechanisms for assisting new faculty, they are no longer sufficient given the rapid rise in housing costs in the Bay Area and many of our newest hires are experiencing enormous stress and financial insecurity due to the cost of living in the Bay Area. Additional living expenses, such as child care, have outpaced salary increases and below market options are limited or no longer available on campus.

**Support housing and family needs:** Stated simply, the campus must be more creative in finding solutions to this very real problem. Expanding and subsidizing child care on campus is an obvious first step, and creative solutions like 90-year mortgages need to be explored. For example, Stanford University has a number of housing assistance programs<sup>65</sup> that are more reflective of strategies needed under current market conditions, including housing salary benefits at hire and after tenure (\$150k spread across nine years in both cases); loans with very low interest, and no payments until you sell; down payment assistance loans with 0-1% interest, and no payments until you sell; subsidized apartments on and off campus; on-campus houses that are for sale below market rates, among others. There is much more that UC Berkeley could do to address this major barrier to advancing faculty diversity.

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<sup>63</sup> <https://www.bayareamarketreports.com/trend/3-recessions-2-bubbles-and-a-bab>

<sup>64</sup> <https://www.ucop.edu/academic-personnel-programs/compensation/historic-academic-salary-scales/index.html>

<sup>65</sup> <https://fsh.stanford.edu/>

We believe that UC Berkeley can successfully increase the diversity in the Life Sciences with broader faculty searches, in addition to searches that more specifically address issues of race or gender, or that emphasize public or engaged scholarship. We also believe that the Life Sciences could more successfully increase diversity as well as “make the biological sciences more than the sum of its parts” by seeking more joint recruitments across departments. However, the way that faculty positions (FTE) are allocated will need to change to make this strategy effective. The UCLA model provides an excellent example for incentivizing departments within the UC system. UCLA Biology developed a cluster hiring strategy using a banked approach wherein after a pool recruitment, the hiring department contributes 0.5 FTE, with the other 0.5 FTE coming from a central allocation. This continues to be a successful approach, per conversations with peers on that campus. In the ten years since the program started in 2011, 13 successful recruitments have been made in four participating departments. This model has been expanded to UCLA School of Engineering and the Division of Physical Sciences.

**Change the FTE allocation process:** UC Berkeley should investigate and advocate for alternative methods of FTE allocation to better support innovative faculty searches and consider the UCLA model as means to improving diversity in faculty searches.

We should recognize that many people seeking positions may have academic partners also seeking positions. These instances can be outstanding opportunities and a huge benefit to the secondary department. However, our process and ability to consider partners often seems slow compared to competitor campuses, which has caused us to miss out on excellent candidates and reduce potential recruitments. Funding  $\frac{2}{3}$  of the appointment for a predetermined period of time is one incentive from campus, but there is considerable anxiety within units that accepting such a position will have consequences for future hiring. We need to rethink the opportunities that we can offer (e.g. full tenure track positions, adjunct positions, lecturers with security of employment, etc.) and consider additional processes to bring them to fruition, such as incentives for the secondary department. Furthermore, we need to foster a change in the culture: even the terms “spousal” or “partner” hires, like the term “diversity hire”, need to be retired. There is also a real perception on campus that these types of arrangements will have a cooling effect on departmental FTE requests. More transparency is needed in both the process and impact of these dual hires.

**Improve support for partner or dual hires:** Campus should investigate and advocate for alternative methods of FTE allocation to better support partner or dual hires

## FACULTY INCLUSION AND BELONGING: CLIMATE

The OFEW issued a comprehensive analysis of the 2019 “My Experience” climate survey, the “Report on the 2019 University of California, Berkeley Faculty Climate Survey”<sup>66</sup> (hereafter “the Report”). We are including extensive extracts from this report to raise awareness of their findings and support the call to action.

Department/Campus Climate: “...Overall rates of satisfaction with various aspects of respondents’ department/unit colleagues and climate are generally positive and have increased over the three survey periods. When asked how they feel overall about the climate in their department, for example, about 80% report feeling comfortable (and a similar percentage with the climate of the campus). This, however, means that about one in five faculty continue to be uncomfortable in their department and on

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<sup>66</sup> [https://ofew.berkeley.edu/sites/default/files/faculty\\_climate\\_survey\\_report\\_final\\_.pdf](https://ofew.berkeley.edu/sites/default/files/faculty_climate_survey_report_final_.pdf)

campus, a concerning percentage. And faculty in minoritized groups express a less positive assessment of their department climate overall and of the climate on campus. Faculty from minoritized groups are also much less likely than faculty from majority groups to feel that individuals who share their identity are respected at Berkeley. For some identities, these differences are quite large, particularly for URM faculty and faculty with disabilities. These findings parallel those related to department and campus climate by groups. When considering faculty opinions about the importance and value of diversity, equity, and inclusion, minoritized faculty are more likely to indicate that it is very important or important to them, and much less likely to feel that DEI is promoted in their department and at Berkeley.”

Exclusion and Bullying: “Faculty were asked about exclusion, bullying and harassment. Based on their responses, there appear to be concerning rates of faculty experiencing these behaviors at UC Berkeley, with one quarter reporting having such experiences in the last year. The most common report, among one in five faculty, is of experiencing behaviors that a reasonable person would find hostile and offensive; and second most common are behaviors or language that is frightening, belittling, humiliating, or degrading. Women, faculty from underrepresented minority groups, LGBTQ+ faculty, and faculty with disabilities are dramatically more likely to report experiencing exclusionary, harassing, or bullying behaviors than faculty from majority groups. For some groups the differences are stark, with twice as many individuals from the minoritized group reporting an experience than those from the majority group. For these individuals, the experience of department and campus climate is likely significantly impacted.”

The Report provides further analysis on career progression, job satisfaction, mentorship and leadership opportunities. Additional extracts are included below:

Slow or delayed career progression: “Most faculty feel that their career progression is similar to or faster than their peers. The University of California’s step system, with its regular reviews and transparent processes, incentivizes faculty to maintain regular progress throughout their career. Fewer than one in five faculty feel that their progress is slow or delayed. Of this group, however, there is a disproportionate percentage of associate professors, faculty in the humanities, women, underrepresented minorities, and faculty with disabilities. In particular, faculty with four or more minoritized characteristics are significantly more likely to report they are slow/delayed, and more commonly cite service, teaching and mentoring loads as contributing factors to their slower progress.”

Mentoring and Support: “In several areas, faculty from URM groups... report receiving less mentoring and support than they desire compared to faculty from other ethnic/citizenship groups. Specifically, URM faculty would like more help with mentoring for leadership, advice about late career and retirement, and support advancing DEI. Compared to other racial/ethnic groups, Asian faculty would like more help with managing negotiations or conflicts and establishing professional contacts. White faculty are less likely than others to want additional advice about late career and retirement and help with establishing professional contacts. Of note, white men are less likely than others to want additional mentoring across 10 of the 13 items included in this question series. Similarly, faculty without any minoritized characteristics are also less likely than others to want additional mentoring on 9 of the 13 items; whereas faculty with 4 or more minoritized characteristics express a greater desire for

mentoring/support than others on 5 items: grant submissions, leadership, negotiating conflict, late career/retirement, and advancing DEI.”

Additional study of the “My Experience” data is needed to determine how these findings may differ in the life science departments. While we were able to access some tables, regrettably, we were unable to allocate the time or resources needed for a meaningful analysis.

## FACULTY INCLUSION AND BELONGING: CLIMATE STRATEGIES

Strategies for improving faculty inclusion and belonging are evident in the preceding section, some of which can be addressed more readily on an institutional level. **For example, the Report indicates that our traditional, informal one-to-one mentoring of new faculty underserves those from underrepresented minority groups.** A clear remedy is to invest in a more structured, multifaceted approach. The Launch Committee Program at the University of Michigan<sup>67</sup> offers a potential and exciting model for us. As discussed in “Launching New Faculty Careers: Building A Strong Foundation For A Diverse Faculty”, this program is built on the understanding that “no single person can provide individuals all of the career advice they may need but that a group of people, who may or may not meet together, can collectively do that”<sup>68</sup>. A similar program in the life sciences at UC Berkeley could also address issues of slow career progression.

**Support new and junior faculty success:** Support and expand Faculty Link and develop new faculty onboarding/development programs to create networks, success, belonging, and build skills in inclusive teaching and mentorship, grant writing, time management etc. Fund new faculty participation in the NCFDD Faculty Success Program<sup>69</sup> one time before their midcareer review; provide funding for newly tenured faculty to participate in the Pathfinders program.

In another example, we would note that many of our colleagues have expressed frustration with the “diversity tax”, also referenced in the Report. Too often, faculty who are perceived as a member of an underrepresented group are asked or expected to carry a larger load in service, teaching and mentoring, and outreach than their non-minority colleagues<sup>70</sup>.

**Provide consistent and clear expectations:** Written teaching and service load expectations for new faculty can and should be provided as part of a more structured mentorship program, as well as support for managing such requests. We also encourage departments to review their service and teaching load assignments within an equity audit (e.g. using this tool developed by the American Council on Education<sup>71</sup>).

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<sup>67</sup> <https://advance.umich.edu/launch-committees/>

<sup>68</sup> Abigail J. Stewart, Janet E. Malley and Jennifer J. Linderman, [Launching New Faculty Careers: Building A Strong Foundation For A Diverse Faculty](#), *The Journal of Women and Minorities in Science and Engineering*, 27(1):85–106 (2021) (pg.89)

<sup>69</sup> <https://www.facultydiversity.org/fsp-bootcamp>

<sup>70</sup> Jimenez, M.F., Laverty, T.M., Bombaci, S.P. et al. [Underrepresented faculty play a disproportionate role in advancing diversity and inclusion](#). *Nat Ecol Evol* 3, 1030–1033 (2019).

<sup>71</sup> <https://www.acenet.edu/Documents/Equity-Minded-Faculty-Workloads.pdf>

**Provide mentorship training for junior faculty** (including via trainings on best mentorship practices and culturally aware mentoring) and flexible models of mentoring (including mentorship teams to accommodate the mentees' personal, disciplinary, and cultural preferences)

Remedying the department and campus climate requires more than a new program or initiative. Department leadership and individual faculty must express inclusiveness and respect on a personal level. Campus offers resources for improving departmental climate. We recommend the toolkit, Strategic Planning for Equity, Inclusion, and Diversity<sup>72</sup>, developed by the Division of Equity and Inclusion as a starting point for all departments. Similarly, building opportunities for cohorts and peer-networks to develop is something the life sciences department and colleges can work collectively towards. Mentoring and support groups, such as Faculty Link<sup>73</sup>, Every Other Thursday,<sup>74</sup> can be critical to not only developing a sense of belonging for faculty from underrepresented backgrounds but helping their careers to flourish. We encourage the Deans and Department Chairs to consider ways to build and support similar groups in the life sciences on our campus and make the following recommendations:

**Support cohort and community building on a cross-disciplinary level:** Foster cohort and junior faculty connections. Develop regular faculty lunch opportunities to support development of networks for faculty and reduce isolation.

**Increase transparency and impact of departmental strategic plans for DEIB:** Posting existing DEIB plans or a statement of values and current activities would increase visibility of department efforts and encourage greater participation from faculty. Engage in regular assessments to gauge their progress. OFEW has developed the DEIBBlueprint<sup>75</sup> that will hopefully be successful and help departments in this direction. Establish formal departmental mentoring, training, and onboarding procedures for new faculty with clear expectations for service and teaching.

**Explore additional methods for increasing inclusion and belonging, especially in countering bullying behavior:** As identified above, bullying behavior and exclusion continues to be a major concern. These behaviors are often not reported and when they are, there is no set response unlike with other forms of workplace harassment. The current reporting and response structure must be reviewed and improved.

**Convene a collegium of faculty engaged in advancing DEIB** to be charged with sharing best practices in DEIB across the life sciences and ensuring continued support for these initiatives, as well as investigating and championing improvements and future interventions. We recommended that all colleges/divisions have a faculty Associate Dean for DEIB and that the campus convene them on a regular basis.

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<sup>72</sup> <https://diversity.berkeley.edu/sites/default/files/academic-strategic-toolkit-final.pdf>

<sup>73</sup> <https://ofew.berkeley.edu/faculty-link>

<sup>74</sup> Daniell, Ellen (2006). *Every Other Thursday: Stories and Strategies from Successful Women Scientists*. Yale University Press.

<sup>75</sup> <https://ofew.berkeley.edu/data-and-initiatives/faculty-deib-initiatives/deiblueprint>

## CONCLUSION

Our findings and recommendations here represent just the start of what we can accomplish. However, to make meaningful change, the campus must commit faculty time and additional resources. Faculty involved in developing these recommendations will need to regularly work towards secure funding, authoring reports and proposals, and meeting with senior administrators in addition to regular committee meetings. A standing collegium must be formed to advocate for best practices and see major initiatives through. It also must be made clear, that without a commitment of financial for support from the campus, for the collegium, for the assessment center, and proposals put forth here, we are unlikely to make the level of change needed to truly advance DEIB in the life sciences.

We sincerely thank you for reading this report and considering our recommendations. We also thank our colleagues who served as reviewers of early drafts. Their comments and suggestions were hugely beneficial and helped shape this report.

The Future of Biology 2 Committee:

Greg Aponte, Professor of Nutritional Sciences and Toxicology  
Diana Bautista, Professor of Molecular and Cell Biology  
Stephanie Carlson, Professor of Environmental Science, Policy, and Management  
Michelle Chang, Professor of Chemistry, and of Molecular and Cell Biology  
Eva Harris, Professor of Public Health  
tyrone B hayes, Department Co-Chair and Professor of Integrative Biology  
Arash Komeili, Professor of Plant and Microbial Biology  
Sanjay Kumar, Department Chair and Professor of Bioengineering

## ATTACHMENT

SUMMARY OF RECOMMENDATIONS FROM THE FUTURE OF BIOLOGY 2 REPORT

## ATTACHMENT: SUMMARY OF RECOMMENDATIONS FROM THE FUTURE OF BIOLOGY 2 REPORT.

(Priority recommendations marked with \*)

### OVERALL RECOMMENDATIONS:

**Invest in more robust assessment and reporting for DEIB in the life sciences:** The work of this committee proved to be a colossal undertaking, and while we have put great effort into this report, it is only a start. More robust data analysis is needed to provide a clearer picture of the current state of DEIB in the life sciences and to assess and measure the effectiveness of interventions to advance it. At the campus or decanal level, we must invest in an office of assessment and reporting on DEIB. Unified programmatic assessment of DEIB forward activities, and clear and consistent data collection and reporting will support our ability to make evidence-based decisions internally. Communicating consistent and accurate data will not only aid decision making but support grant funding efforts which often rely on these points.

**Life Sciences DEIB Collegium:** Many of our recommendations require additional resources and development to implement, as well as an investment in additional leadership. Furthermore, as mentioned above, this effort must be expanded to include all academic and staff titles. Advancing DEIB is important work and creating the critical mass needed is more than we can tackle as a committee, or indeed, as individuals, departments and programs. To this end we urge the campus to convene a new standing body dedicated to this work.

To ensure that advancing DEIB in the life sciences is ongoing and vitally incorporated in all areas, we propose the establishment of a collegium modeled on the Berkeley Collegium focused on innovation and excellence in undergraduate teaching.<sup>76</sup> Members of the Collegium should include associate deans for DEIB from STEM colleges, senior staff members from E&I and OFEW and other subject matter experts. Faculty participation should be recognized with service or teaching relief, or a stipend to offset the additional work. Additionally, administrative staff support and program funding should be allocated by the campus and participating decanal units. Such a collegium should be charged with developing and promoting efforts to advance diversity, equity, inclusion and belonging in the life sciences. The Collegium should serve as an advisory council on DEIB to departments and individual faculty seeking to develop new programs or improve existing ones as well as a forum for developing and sharing innovations and resources. The Collegium should be empowered to dig deeply into data and report to identify areas for additional intervention. Ideally, it would also formally recognize outstanding efforts to advance DEIB, perhaps through an annual award. Additionally, the Collegium should be responsible for an annual symposium on advancing DEIB in the life sciences and promoting continuous discussion. We strongly recommend that the campus institute a Life Sciences DEIB Collegium in the 2023-2024 academic year and support it indefinitely. Such a permanent, standing body will help unite current efforts at the departmental, college and campus levels and push forward with the critical mass necessary for true culture change.

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<sup>76</sup> <https://ue.berkeley.edu/committees/berkeley-collegium>.

## RECOMMENDATIONS AT THE UNDERGRADUATE LEVEL:

**Development and strengthening of the Coalition for Excellence and Diversity in STEM:** Diversity, equity and inclusion programs in STEM be included and coordinated through the Coalition for Excellence and Diversity in STEM. The benefits of this effort include coordinated fund-raising, administrative coordination between programs, and a hub for assisting students and helping them find these resources.

**Improve undergraduate research opportunities:** Develop and support scholarship/fellowship programs and other ways to fund students so that they can participate. Develop a program that will fund undergraduates from across departments to obtain paid research positions in labs, freshmen and transfer students should be targets. Support development of student community groups. Support efforts to unite, strengthen and expand existing programs.

**\*Develop “on-ramping, Entryway, or Bridge programs”:** Free enrollment summer or first semester program to bolster math, physics, chemistry, and biology skills for incoming students.

**Offer new “Welcome to the Life Sciences” Course** This survey course will introduce students to all 11 Life Science departments. The course will have no prerequisites and be targeted to Freshman and transfer students who intend to major in the Life Sciences and provide a pathway to research mentorship.

**\*Re-imagining courses in the life sciences** Review and revamped curriculum to be more inclusive and anti-racist. Provide/require faculty training to develop inclusive course materials. Use discovery-based approaches to engage students and foster scientist identities. Students can be asked to work in small groups to design experiments or solve problems. Some courses may also special experimental or field sections for students.

**\*Provide instructor training at all levels:** There are many platforms available to train faculty, lecturers and GSIs on techniques to make their courses more inclusive and develop more discovery-based material. These include FLOSS, Discovery, and the National Science Foundation’s Transforming STEM Teaching Faculty Learning Program (FLP).

## RECOMMENDATIONS AT THE GRADUATE STUDENT LEVEL

**Coordinate Organized Recruitment Efforts Across Biosciences:** Joint outreach and recruitment efforts at national/regional conferences benefit all departments by sharing costs and efforts and leading students to departments that may be of their interests. This will additionally support community/cohort cohesion across departments for students of color, first generation, and low-income graduate students.

**Expand Recruitment Efforts:** Cultivate new relationships, and enhance existing relationships, with research and teaching faculty at institutions outside of traditional training grounds. Establish impactful relationships: provide virtual and in-person training for students in these schools by organizing workshops and bootcamps to help students prepare their graduate school applications and for the interview process. Increase transparency: present information about life during and after graduate school, highlighting the diverse career paths of our PhD alumni to attract a broader base of students. Create an online website listing all our programs to make it easier for students. Connect our graduate students who are from CSUs or HBCUs with the students that we meet with during our visits in order to establish affinity-based peer-mentoring.

**Standardizing the application review process:** Use holistic review process and rubric for graduate admissions (such as MCB, ESPM, PMB).

**\*iBIO Graduate Student Network:** Foster the development of a graduate student-led organization that works across the biological sciences to promote a supportive climate for trainees.

**Inclusive Mentoring Training:** Across campus, faculty should receive evidence-based mentor training every semester to enhance academic outcomes and foster a safe and inclusive training environment. We propose that ongoing training topics and workshops be organized by the Life Sciences consortium.

**\*Summer bridging program:** Develop and offer a bridge program for incoming graduate students to enhance research skills. Offer stipend and housing support.

**Community-building and one-on-one advising:** Develop a first-year program for trainees including a weekly discussion group to build community and share the journey while also being reassured and affirmed that they have what it takes to become a great scientist. Institute one-on-one advising sessions for trainees with faculty and staff once a month in their first and second years, and twice yearly thereafter.

**Peer mentoring Network:** Establish a peer mentoring system. Each trainee will be partnered with a senior peer mentor via affinity-based matching, upon arrival on campus in the summer of their first year. Fellows and their mentors will participate in monthly social events throughout graduate school (e.g., ice cream socials, Tilden Park hikes, Berkeley Botanical Garden tour, pizza and movie nights).

**Justice, Equity, Diversity and Inclusion (JEDI) Seminars:** Institute trainee-hosted Science and Diversity Seminar Series to host four seminars a year. Speakers will be investigators who are leaders both in their scientific field and also in diversity, equity and inclusion efforts at their universities and/or at a national level.

**Sense of belonging workshop:** Offer 1st Year Biosciences trainees a workshop based on strategies with proven success rates in studies of retention for students from under-represented groups in academic programs on confidence, identity, and sense of belonging, including imposter syndrome, and overcoming adversity and developing a DEIB statement.

**\*Inclusive Excellence for Quads Prep (IEQP):** Offer institutional support to achieve academic milestones in Ph.D. programs. Second-year life sciences students gear up for their oral qualifying exam via practice exams in their one-on-one mentoring meetings with faculty, and with a panel drawn from current and former trainees. Additional workshops to build research skills on topics solicited from the trainee student body each year.

**\*Offer Scientific communication course:** *A cross-listed biology course should be offered based on: PMB290, Making Yourself Clear: How to Give an Engaging Science Talk*, led by Professor Britt Glaunsinger, that develops and refines verbal scientific communication skills.

**\*Career readiness workshop:** Develop a program to steep trainees in professional practices relevant for both academic and industry career tracks.

**Equity practices course:** Offer course for all first-year life sciences graduate students on *Diversity, Equity and Inclusion in the Life Sciences* as a forum for discussion of evidence-based practices to promote equity and inclusion in science teaching and mentoring.

**Wellness:** Offer a monthly psychoeducation workshop from the UC Berkeley Psychology Clinic on resiliency, self-care, and mental health best practices specific to the under-represented student experience. Survey trainees for suggested topics of other workshops, “Imposter Syndrome and How to Overcome,” “Finding Your People in Academia,” and “Mental Health in Academia.”

**\*Faculty Mentor training:** Offer life sciences-wide ongoing training program where faculty develop skills for building inclusive, productive, culturally responsive, research mentoring relationships such as *Creating Inclusive Classrooms* and the *Exploring Unconscious Bias* workshops offered by the Multicultural Education Program. Encourage completion of the Multicultural Education Program Certificate series to enhance learning and exploration of equity and inclusion.

## RECOMMENDATIONS AT THE FACULTY LEVEL

**\*Standardize DEIB forward recruitment practices:** Require DEIB statements in all searches and assess DEIB throughout the search process, including as selection criteria when evaluating application. Request and conduct faculty searches at the broadest level and encourage pool/cluster recruitments. Include an Equity Liaison as a full voting member of the committee, appointed by the Equity Advisor. Convene a working group to establish a standardized toolkit of resources for all life sciences-related search committees.

**Improve outreach:** Invest in outreach to postdoctoral fellows from programs that promote DEIB, such as the PFPF and Hanna Grey Fellows (HHMI). This could include a lecture series to showcase potential candidates by sponsoring campus visits.

**\*Support housing and family needs:** Stated simply, the campus must be more creative in finding solutions to this very real problem. Expanding and subsidizing child care on campus is an obvious first step, and creative solutions like 90-year mortgages need to be explored. For example, [Stanford University has a number of housing assistance programs](#) that are more reflective of strategies needed under current market conditions, including housing salary benefits at hire and after tenure (\$150k spread across nine years in both cases); loans with very low interest, and no payments until you sell; down payment assistance loans with 0-1% interest, and no payments until you sell; subsidized apartments on and off campus; on-campus houses that are for sale below market rates, among others. There is much more that UC Berkeley could do to address this major barrier to advancing faculty diversity.

**\*Change the FTE allocation process:** UC Berkeley should investigate and advocate for alternative methods of FTE allocation to better support innovative faculty searches and consider the UCLA model as means to improving diversity in faculty searches.

**Improve support for partner or dual hires:** Campus should investigate and advocate for alternative methods of FTE allocation to better support partner or dual hires

**\*Support new and junior faculty success:** Support and expand Faculty Link and develop new faculty onboarding/development programs to create networks, success, belonging, and build skills in inclusive teaching and mentorship, grant writing, time management etc. Fund new faculty participation in the NCFDD Faculty

Success Program<sup>77</sup> one time before their midcareer review; provide funding for newly tenured faculty to participate in the Pathfinders program.

**Provide consistent and clear expectations:** Written teaching and service load expectations for new faculty can and should be provided as part of a more structured mentorship program, as well as support for managing such requests. We also encourage departments to review their service and teaching load assignments within an equity audit (e.g. using this tool developed by the American Council on Education

**Provide mentorship training for junior faculty** (including via trainings on best mentorship practices and culturally aware mentoring) and flexible models of mentoring (including mentorship teams to accommodate the mentees' personal, disciplinary, and cultural preferences)

**Support cohort and community building on a cross-disciplinary level:** Foster cohort and junior faculty connections. Develop regular faculty lunch opportunities to support development of networks for faculty and reduce isolation.

**Increase transparency and impact of departmental strategic plans for DEIB:** Posting existing DEIB plans or a statement of values and current activities would increase visibility of department efforts and encourage greater participation from faculty. Engage in regular assessments to gauge their progress.

**Explore additional methods for increasing inclusion and belonging, especially in countering bullying behavior:** As identified above, bullying behavior and exclusion continues to be a major concern. These behaviors are often not reported and when they are, there is no set response unlike with other forms of workplace harassment. The current reporting and response structure must be reviewed and improved.

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<sup>77</sup> <https://www.facultydiversity.org/fsp-bootcamp>