

June 13, 2014

To: Chancellor Nicholas Dirks, Betty Deakin (outgoing Chair of the Academic Senate); Panos Papadopoulos (incoming Chair of the Academic Senate)

From: Members of the Undergraduate Teaching Collegium (Serena Chen, Faculty Director; Marianne Constable; Mitch Breitweiser; Kent Lightfoot; Craig Evans; Jay Wallace; Glynda Hull; Eileen Lacey; Lisa Iwamoto; Ron Gronsky)

## **Undergraduate Teaching Collegium**

### **Narrowing the Gap between Teaching and Research**

#### **Broad Vision**

UC Berkeley is without question one of the leading research institutions in the world. Across disciplines, Berkeley faculty are committed to intellectual discovery and creation. Our faculty also strive for excellence in teaching—in transmitting knowledge and expertise to an exceptionally diverse and bright pool of undergraduates. A critical component of this endeavor is introducing students to research, meaning the process by which intellectual curiosity is translated into discovery, expression, and understanding. While many Berkeley students already engage in this process as part of their undergraduate training, the Collegium believes that the undergraduate experience should be more comprehensively connected to the research enterprise that is the hallmark of the Berkeley campus. Immersion in the methods and practices of research promotes a disposition conducive to creative activity and the generation of new knowledge in the diverse disciplines for which Berkeley is known. This type of experience should be a central component of our teaching and mentorship. Regardless of the professional tracks that undergraduates take after leaving Berkeley, the ability to translate a question or idea into the systematic and productive acquisition of knowledge (i.e., the research process) is a critical component of success. Accordingly, we propose that narrowing the gap between research and the undergraduate educational experience should be a priority for the Berkeley campus.

To achieve this objective, we urge that a serious research component be integrated into the Berkeley experience for all of our undergraduates. Our aim is, over the long term, to promote a cultural shift on campus, whereby faculty and students alike come to view undergraduate engagement in research as a fundamental, assumed, and desirable element of a Berkeley education. For faculty, this would involve explicit recognition that our pedagogical mission goes beyond transmitting content to students—it also entails actively guiding students through the process of intellectual discovery and creation. For undergraduates, this shift would mean that every freshman who passes through Sather Gate would graduate from Berkeley—one of the world's premier research universities—having experienced firsthand the process by which the campus has achieved and maintains that status.

## Current State of Affairs

Recent data suggest that our vision would be received with enthusiasm by the Berkeley undergraduate population. For example, 90% of respondents to the 2012 UC Undergraduate Experience Survey (UCUES) indicated that they agree with the statement “attending a university with world-class research is important to me” (26% “agree somewhat,” 36% “agree,” and 28% “agree strongly”). Still more recently, at least three-fourths of respondents to the 2013 Survey of New Students (SONS) rated the following research-related aspects of the undergraduate experience to be important, very important, or essential: (1) learning about faculty research (74%), (2) learning research methods (83%), (3) assisting faculty in their research for pay or as a volunteer (84%), and (4) pursuing your own research (73%).

The Collegium recognizes that multiple pathways currently exist by which undergraduates may engage in the research enterprise. Undergraduates in all disciplines work in faculty laboratories, write honors theses under faculty supervision, and participate in faculty-led, research-oriented seminars. Facilitating these efforts are campus programs such as the Undergraduate Research Apprenticeship Program (URAP), a successful undertaking that pairs interested undergraduates with individual faculty mentors to work on specific research projects. The problem, as we see it, is not that there is not enough interest in making research an integral part of the undergraduate educational experience at Berkeley; past and ongoing programs and efforts speak to the level of interest that the faculty and administration have in this broad aim. But collectively, these programs and efforts reach only a small percentage\* of Berkeley’s undergraduates. Moreover, research opportunities are often geared toward specific segments of the undergraduate population (e.g., a minimum GPA is required to write an honors thesis in many departments). More generally, existing programs operate in relative isolation from one another. The aim of the Collegium is to make meaningful research opportunities available to *all* undergraduates on campus, and to create a cultural umbrella to unite the diverse paths that lead to such opportunities.

In working towards this goal, the Collegium proposes, first, to build upon the success of current efforts—in other words, expand upon our existing strengths in engaging undergraduates in the research enterprise. Multiple units on campus have developed initiatives with the goal of engaging undergraduates in research. These include the Office of Undergraduate Research (e.g., URAP; Haas Scholars Program), whose mission hews very closely to our vision, as well as specific departments and institutes on campus (e.g., MARC and IMSD programs in Integrative Biology; Greater Good Science Center Undergraduate Fellowship program; SMART; Miller Scholars Program). Second, the Collegium envisions encouraging exploration of new and innovative ways to narrow the gap between teaching and research (e.g., experimenting with courses focused on new ways to report and share research via the Internet or on introducing first- and second-year students to the research enterprise)—all with an eye toward creating a campus-wide culture and programmatic structure that expands awareness and pursuit of research for all our undergraduates.

*\*We do not yet have definitive numbers, but based our “small percentage” claim in part on responses to an informal survey we had distributed to the Undergraduate Advisors mailing list, and in part on a recent report from the Center for Studies in Higher Education at UC Berkeley*

*on aggregated data obtained from the Student Experience in the Research University (SERU) undergraduate survey, an online census administered in 2010 at fifteen major research-intensive universities, including UC Berkeley. Based on initial data from these sources, one can tentatively conclude that (1) the percentage of Berkeley undergraduates involved in research (formally or informally) varies widely by department, ranging from as little as 2-5% to as large as 60-70%% of a department's majors, and (2) upper-level students are substantially more likely to be involved in research than lower-level students. Regardless of the exact numbers, there is no question that a non-trivial number of Berkeley undergraduates have not yet had a substantive research experience and, assuming the status quo, may not have one before they graduate.*

## Challenges

We are very cognizant that realizing our vision will be challenging. Chief among a range of challenges we face is the sheer size of the undergraduate population at Berkeley. Many institutions that have implemented initiatives like the one we propose here have much smaller undergraduate populations. Our faculty-to-student ratio precludes simply adopting their practices for integrating undergraduate teaching and research. Instead, we will need to think broadly and innovatively about realistic and sustainable models for providing research mentoring to all of our undergraduates, beyond the traditional model of one-on-one mentoring of students by a faculty member. In short, the grand challenge for our campus will be to find ways to narrow the gap between research and undergraduate education within the constraints imposed by the size of our undergraduate programs. This will require innovation, experimentation, and excitement—all things at which Berkeley excels.

## Key Definitions and Elements

For many undergraduates and faculty alike, the term “research” is likely to conjure up images of working in a laboratory and conducting some kind of a controlled experiment. Following campus practice, we define research more broadly, encompassing any endeavor that involves the process of intellectual inquiry and/or creative accomplishment. The culture we aim to create will explicitly highlight the diverse forms of intellectual discovery and creation that happen at Berkeley, and the value of such diversity.

The following points elaborate on what we consider to be essential elements of a meaningful research experience and of the culture we aim to create.

- A meaningful research experience provides undergraduates with a comprehensive understanding of the research process—from the incipient phase of hypothesis generation to the latter stages involving the dissemination of research findings and consideration of next steps. Undergraduates should get a firsthand taste of the creativity and rigor involved in designing and implementing research, and should be able to situate the research question at hand within a broader field of knowledge. At the conclusion of a research experience, undergraduates should have a deeper awareness and appreciation of how knowledge is created—of the research foundations on which the volumes of knowledge that they consume via textbooks, lectures, the Internet, and so forth are built.

- A meaningful research experience for undergraduates should also include serious attention to the communication of research methods and results. Whether they are working in a laboratory, seminar room, performance space, in the field, or some other off-campus research site, students should learn to communicate effectively—both in writing and orally—about the rationale and results of their investigations. Such communication will likely include digital composing and the circulation of products/artifacts via the Internet.
- We think it will be important to underscore that research and public service are often compatible endeavors. Many undergraduates come to Berkeley with the aspiration to “change the world,” and may not grasp the potential relevance of engaging in research toward realizing such aspirations.
- Our goal is to engage all undergraduates substantively in the research process, but not necessarily to convince all undergraduates, or even a majority of them, to pursue research careers. If engaging in research at Berkeley leads an undergraduate to realize that research is not in his or her future, this would itself be an important insight, comparable in its importance to discovery by other students that they are passionate about the research activities we have encouraged them to pursue. On the other hand, we would hope that all graduates of Berkeley would associate their degrees with the critical and creative habits of mind associated with scholarly work.
- At present, we do not plan to make research a formal graduation requirement, although that may make sense down the road. Our current focus is on inducing a cultural shift in acknowledging the importance of research to the educational experience of all Berkeley undergraduates. As we proceed, we will be attentive to avenues for foregrounding and sustaining the shift.
- Again, we recognize that various units, departments, and individual faculty members are already engaged in activities that are consistent with the broad vision we have articulated, just as there are many undergraduates already engaged in research. Our contribution, therefore, is to make undergraduate participation in some form of meaningful research activity a universal experience and an inextricable part of the culture at Berkeley. We aim to do this indirectly via the cultural shift we have described, and directly via finding ways to expand undergraduate research opportunities.

### Toward More Concrete Steps

Progress toward our ambitious goal will clearly require efforts on numerous fronts, including experimentation with different models in different parts of the university, and partnerships with and assistance from various campus units. As with any shift in culture, our vision can be realized only over the long term. Regardless, our core conviction is that Berkeley’s research expertise is its strongest asset for enhancing undergraduate education.

Below is a list of possible concrete steps toward realizing our long-term vision:

1. Obtain further data from departments and other relevant units and programs on campus about current research opportunities, participation rates, level of demand relative to what is available, etc. Ask for assistance from the Deans on this data gathering endeavor.
2. Pursue the possibility of having the undergraduate teaching section of the periodic Department Reviews include consideration of undergraduate involvement in research. This would not only provide relevant data, but also help build the culture we envision by signaling to departments that providing research opportunities and encouraging students to pursue them are among their teaching responsibilities.
3. Hire an undergraduate or graduate RA to assist with gathering relevant data during the summer on existing research opportunities, similar efforts/visions on other campuses, etc.
4. Generate a menu of existing research opportunities on and off campus, to create a “clearinghouse” where undergraduates can find an appropriate research experience. Confer with the Office of Undergraduate Research about their efforts to do this.
5. Articulate different templates for research experiences, reflecting the diversity of research activity represented at Berkeley.
6. Identify areas of campus where there are fewer research opportunities, as well as segments of the undergraduate population that are least likely to be engaged in the research enterprise.
7. Conduct focus group interviews with students and/or consult campus student groups or otherwise elicit feedback from students about their awareness of and engagement in research.
8. Support and/or pair up with existing units, programs, and special initiatives that are already engaging in or planning activities consistent with integrating undergraduates into research. The Chancellor’s Undergraduate Initiative has had discussions about similar ideas, and the Center for Teaching and Learning is poised to help out in any way it can.
9. Look into conveying that what is special about a Berkeley education is the opportunity to interact with researchers and engage with them about their work as part of CalSO and/or Welcome Week.
10. Identify ways to get involved with, and encourage, fundraising directed toward our vision. Consider the use of the Collegium’s work as a fundraising tool. Confer with John McKee and other relevant parties on this topic.
11. Consider establishing a second award (the first being the Collegium Award for Excellence in Undergraduate Education that recognizes an existing program or initiative for its excellence in improving undergraduate education) to recognize innovation in undergraduate education, including innovative efforts aimed at realizing our proposed vision
12. Ensure and/or encourage college, departmental, and residential advising staff to be aware of the full span of undergraduate research opportunities. We will need to get advising services on

board with our vision, as advising may be an important means of spreading the culture we aim to create.

13. As Berkeley extends its study abroad programs, research opportunities may increasingly include ones that take place abroad. Confer with Berkeley Study Abroad on existing opportunities and how they might be expanded.

14. Develop an engaging presentation or YouTube clip to help spread the culture we are aiming to create.