

Moving the Needle: Broadening the Participation of Underrepresented Students in Engineering Education

The Problem

The representation of women and underrepresented minorities (URMs) in the student body of UC Berkeley's College of Engineering is markedly low in comparison to the rest of the Berkeley campus and to our engineering peers. The College recognizes its compelling interest in achieving diversity. Diverse learning environments develop the analytical and communications skills that prepare students to succeed in an increasingly interconnected world.

We are committed to improving this situation. We are engineers, so we will focus on actions that truly "move the needle" and deliver real results, as measured by greater numbers of underrepresented students enrolling in the College and by our success in supporting underrepresented students as they achieve their academic goals. Indeed, we want to meet raised expectations for what constitutes acceptable progress, and we are keen to see results as early as spring 2012.

The Solution

This working paper represents the best of our current thinking on how to recruit and retain higher numbers of underrepresented students. It incorporates findings and recommendations from many sources, including:

- The College's executive team, including the Dean, Executive Associate Dean, Associate Deans, and the chairs of our seven departments
- The College's faculty
- The College's Committee on Broadening Participation
- Engineering Student Services (ESS) leadership and staff
- Our students, including the leaders of AIGSA, AISES, BGEES, GWE, HES, LAGSES, SWE, and WICSE

Our thinking also draws on a lot of activity now taking place in the College. We can report strong success with some efforts, particularly in widening the pipeline. Our faculty, staff, and students are extensively involved in outreach to K-12 schools, community colleges, and minority-serving institutions. With our own student body, we have broadened the reach of our diversity programs to include such populations as LGBT students, students with disabilities, veterans, students from challenging socioeconomic circumstances, and students of mixed ethnicity. We are pleased to call attention to the new UC Berkeley chapter of Out in STEM (oSTEM), a student group for LGBT and allied students.

We know there is much more work to do, and that leadership, staffing, space, and resources must be committed to achieve results in the near term and stabilize these results for long-term gains. Here, we outline a workable plan for "moving the needle" on recruiting and retaining underrepresented engineering students:

1. Organizational Leadership:

- a. We are delighted to announce that Oscar Dubon, Associate Professor of Materials Science & Engineering, has accepted an appointment to the newly created position of **Associate Dean for Equity and Inclusion** in the College, starting Jan. 1, 2012. Professor Dubon is widely recognized for his passion on issues surrounding diversity and aims to create "disruptive" progress in his new role. The Associate Dean carries the following mandate:

- i. Oversight and coordination of departmental and ESS efforts to recruit and retain underrepresented students, at the undergraduate and graduate levels.
 - ii. Oversight and coordination of College and departmental efforts to recruit and retain underrepresented faculty.
 - iii. Strengthening communication among the equity officers in each departmental faculty body.
 - iv. Planning, monitoring, and assessment of recruitment and retention activities.
- b. The Associate Dean, reporting directly to Dean Shankar Sastry, will be supported with staff and other resources. Advisory bodies include the **Committee on Broadening Participation**. As ratified by the College's faculty in a Dec. 12 vote, this committee now includes two more student seats, in addition to the seat held by the incumbent president of the Engineering Student Council. The office of Gibor Basri, Vice Chancellor for Equity and Inclusion, will also serve as a valuable resource for ensuring the success of the Associate Dean's efforts.

2. Staff Resources:

- a. We plan to make funding available to the departments to ensure **adequate staffing dedicated to equity and inclusion** programs at both the undergraduate and graduate levels. We expect the departments will match the College's contribution to build up staff support for their faculty equity officers. The level of College funding we propose is approximately 0.5 FTE for each of the four departmental clusters: BioE/MSE, CEE, EECS, and ME/IEOR/NE.
- b. Additionally, we will develop staff support in ESS to support the Associate Dean for Equity and Inclusion in strengthening recruitment and retention programs for underrepresented students.

3. Space:

- a. The recently renovated Kresge Engineering Library and Bechtel Engineering Center include improved meeting and office space for the College's **student organizations**, including those serving women and URM students.
- b. In summer 2012, we will also renovate space in 225A/B Bechtel Engineering Center in consultation with our students, so that they are further supported with space for community building and outreach.

4. Near-Term Initiatives:

- a. In spring 2012, we will focus on **strategies to improve yield** for fall 2012. The data show that our biggest challenge in recruiting underrepresented students lies in converting admitted students into enrolled students. Many students who are keen to attend Berkeley instead enroll at peer institutions offering more generous funding packages and other incentives.
 - i. In **undergraduate recruiting**, strategies such as overnight visits and extensive personal contact have met with some success with women students, and we will build on these efforts with other populations. Plans are already underway for at least three **recruiting events** in April 2012. Another ready solution is to make use of individual faculty research funds to offer **paid research experiences** to undergraduates, with mentorship from faculty and graduate students. These funds can be awarded to students without compromising their eligibility for financial aid. We are also seeking to **expand SUPERB**, which offers paid research

experiences to undergraduates during the summer, beyond the EECS department to the College as a whole. In addition, we are investigating partnerships with foundations and other funding sources external to UC that could serve as **legally permissible sources of aid** for underrepresented students. We will reach out to Stiles Hall, which has traditionally focused primarily on non-engineering students, and to entities such as the Berkeley Foundation for Opportunities in Information Technology (BFOIT), <http://www.bfoit.org/>.

- ii. In **graduate recruiting**, we are making gains in offering admission to more women and underrepresented minorities. Yet we see a significant loss in yield, due primarily to our low levels of fellowship support relative to our peers. For example, in 2007, we admitted 28 Hispanic graduate students and enrolled 19. In 2011, we admitted 42 Hispanic students and enrolled just 18. We know that **fellowship support is the primary factor in improving yield** and we are working at developing more sources for this.
- b. To support the **retention** of underrepresented students, ESS is offering its second **LeaderShape Institute** from Jan. 8–13, 2012. Sixty engineering undergraduates (primarily underrepresented, first-generation, and low-income) have been selected to participate in this intensive immersion in leadership development.
- c. We will also ensure that the College's **website and publications** speak to the interests and concerns of prospective students from underrepresented populations. As recommended by the Committee on Broadening Participation, we will highlight the accomplishments of a diverse range of our students and faculty in an upcoming issue of the College's *Forefront* magazine and in ongoing communications.

5. Middle- and Long-Term Initiatives:

- a. By March 2012, we will complete an update of the College's **undergraduate and graduate recruitment and retention plan** for underrepresented students, with performance metrics to be met over five years starting with the 2012–13 academic year. The updated plan identifies goals, action steps, and needed resources in such areas as:
 - i. Outreach to prospective undergraduate students and to middle schools, high schools, and community colleges.
 - ii. Outreach to prospective graduate students and to HCBUs and other institutions serving underrepresented, college-age STEM populations.
 - iii. Marketing and communications to reach underrepresented populations.
 - iv. Participation in national conferences to recruit students.
 - v. Leveraging recruitment efforts with outreach directors in NSF-funded centers, building on the success of our partnerships with COINS, E3S, and TRUST as well as the UCB Graduate Diversity Program and SUPERB. We also work closely with the Berkeley Edge Program, the Berkeley Science Network (supported by the Mitchell Kapor Foundation), and the SMASH partnership.
 - vi. Successful retention of underrepresented students through measures that promote a welcoming and inclusive learning environment and provide students with resources to excel and lead.
 - vii. Adequate staff support and space for the College's student groups, which play a key role in the recruitment, retention, and cultivation of a diverse and accomplished student body.
- b. By September 2013, we will implement a College of Engineering-wide **minority faculty recruitment plan**. We are looking at best practices at public institutions nationwide and

consulting with Janet Broughton, Vice Provost for the Faculty, to set and meet performance metrics in this area.

6. Advocacy:

- a. College of Engineering faculty members have a long history of advocating on behalf of underrepresented STEM students on the Berkeley campus and nationwide, as exemplified by Karl Pister, Chang-Lin Tien, Alice Agogino, George Johnson, Richard Newton, and Lisa Pruitt, to name just a few. In a recent instance, Dean Shankar Sastry and Executive Associate Dean Fiona Doyle contacted Vice Chancellor for Equity and Inclusion Gibor Basri and L&S Dean Carla Hesse, expressing concern over the planned relocation of **Cal NERDS** from 230 Stephens Hall. Vice Chancellor Basri is working with us to resolve this issue.

7. Tracking Results:

- a. As engineers, we know that problems get solved when performance goals – and the metrics that define success – are clearly understood and endorsed by all stakeholders. Data regarding the College of Engineering’s admissions, enrollment, and retention of its students, including underrepresented students, are currently maintained by several public sources, including the ASEE’s [UC Berkeley College of Engineering profile](#) (using data provided by the College) and the Berkeley campus’s [Office of Planning & Analysis](#), which maintains a diversity data dashboard among other tools. We can think of at least two things we can do to track our progress in diversifying the student body and fostering an inclusive climate:
 - i. We can maintain an FAQ section on the College website, where questions and concerns regarding the College’s diversity, equity, and inclusion are aired and addressed.
 - ii. The FAQ section will also post, or provide links to, data on undergraduate and graduate student admissions and enrollments, including women and URM students. We will work with ESS to develop a good methodology for collecting and publishing these data so that they serve as reliable assessment tools, driving our decision-making while keeping all interested parties informed.

In Closing

This working paper is a work in progress, and we welcome comments and suggestions. Moving the needle on the College’s recruitment and retention of underrepresented engineering students calls for the dedicated efforts of the College leadership, faculty, staff, students, and external advocates, and we look forward to working together as a cohesive team to achieve our goals. Please feel free to contact Dean Shankar Sastry at Dean_Sastry@coe.berkeley.edu and the Associate Dean for Equity and Inclusion, Oscar Dubon, to help shape this plan and its action steps.