Cross-cutting Investments

Diversity across STEM at Yale

Strategic planning, improvements in campus climate, and resource investments are needed for Yale to leverage diversity and excellence in the sciences.

STEM fields should be accessible to all scholars regardless of background. However, these fields often reflect societal challenges, falling short of being truly inclusive and lacking gender and racial/ethnic diversity. Without active intervention, this status quo is self-perpetuating due to implicit bias, non-inclusive recruitment practices, and shortfalls in the training of the next generation of diverse scholars. Organizations such as the NIH and the NSF have placed significant emphasis on the creation and cultivation of diversity and inclusion. As eloquently noted by Francis Collins, director of the NIH, “The inescapable conclusion is that we are missing critical contributors to our talent pool.”

Indeed, diversity and inclusion has been shown to improve the performance of an organization and to inspire scientific innovation through greater depth and scope of ideas, alternative perspectives, methods, and approaches. Science is an increasingly collaborative process that advances through contributions from teams that include faculty, postdocs, graduate and undergraduate students, residents, and staff. This is the science talent pipeline where diversity and inclusion needs to be developed and fostered. Multiple studies have shown that greater gender and racial/ethnic diversity leads to improved outcomes for laboratories, academic departments, and even peer reviewed publications. Maximizing the ability of all scholars, including those at Yale, to thrive in the sciences, requires the development and support of diversity efforts throughout the scientific talent pipeline.

Diversifying the scientific pipeline at Yale:

A key element of Yale’s mission statement is its commitment to an “ethical, interdependent, and diverse community of faculty, staff, students, and alumni.” Yale has established several programs of national prominence to promote diversity at many steps of the talent pipeline, from high school students in the New Haven area to faculty diversity recruitment efforts. The USSC surveyed these programs and met with the program directors. We were impressed with many of these initiatives and there is evidence of their positive impact. We offer four observations based upon these discussions:

1. There are challenges specific to the STEM fields, where diversity and inclusion significantly lags behind that in other disciplines.
2. Greater coordination is needed between the programs and initiatives that have been implemented at various levels across the University.
3. To increase their impact, a campus-wide strategic plan for diversity at all levels of the organization needs to be articulated.
4. University-wide diversity efforts need to be integrated into mission crucial aspects of university life, such as faculty and leadership searches as well as graduate student recruitment.

We offer a partial overview of programs that are in place on campus and challenges that need to be overcome to nurture diversity in STEM fields at Yale.

Diversity at the K-12 level:

Yale has undertaken significant efforts to promote STEM outreach training for K-12 students in the New Haven area. The Yale Pathways to Science Program is an effective STEM outreach program in partnership with the New Haven, West Haven, and Orange public schools. Pathways coordinates outreach and...
education efforts geared to K-12 populations across Yale and allows middle and high school students to take part in engaging demonstrations, lectures, and laboratory visits to learn about cutting-edge advances in science. Pathways initiatives include science-based after-school programs with a proven track record of placement in selective undergraduate institutions. Of particular significance, the Pathways program has maintained a best-in-class longitudinal database of its roughly 1,500 student participants, providing a valuable tool to track and evaluate the program's effectiveness. Currently, ~45% of Pathways students identify as Black or Hispanic. The percentage of Black or Hispanic students in the greater New Haven region is 70-80%. Greater awareness of Pathways as a resource for faculty and students interested in outreach, as well as support for programs that successfully serve a representative sample of New Haven school children could further increase the impact and visibility of this program.

Diversity at the undergraduate level:

The Science, Technology and Research Scholars (STARS) Program has served as Yale's flagship program to support women, minority, economically disadvantaged, and other historically underrepresented students in STEM since 1995. Data collected over two decades clearly demonstrate that STARS improves the retention and performance of its participants. STARS students are almost nine times more likely to persist in science than students at large. STARS is complemented by the Summer Undergraduate Research Fellowship (SURF) and the Post-Baccalaureate Research Experience Program (PREP) Programs, which help provide graduate-level research experiences to a diverse group of undergraduate students. An institutional plan is needed to provide sustained support and continue development of these important programs.

Diversity at the graduate student and postdoctoral level:

Yale works to promote diversity in graduate enrollment, participates in dedicated recruitment efforts at Historically Black Colleges and Universities, Hispanic Serving Institutions, and Tribal Colleges and Universities, and provides financial support for Emerging Scholars from diverse backgrounds. Despite these efforts, most STEM graduate departments at Yale have low participation among underrepresented minorities. Beyond targeted recruitment efforts, and based on successful STEM recruitment programs at other research intensive institutions, we recommend programs that power meaningful relationships with minority-serving institutions through faculty exchanges, research collaborations and other targeted approaches for STEM fields. Postdoctoral positions are also an important step along the career path for young scientists, particularly for those interested in academic positions. Across the country, men tend to occupy a majority of postdoc positions, even in fields with gender balance in graduate programs. Yale should work to identify barriers to under-represented groups in postdocs and pilot new policies to address issues that become evident.

Diversity at the faculty level:

In November 2015, Yale announced a $50 million partnership between the Office of the Provost and the FAS and professional schools to promote excellence and diversity of its faculty. In addition to the Emerging Scholars initiative mentioned above, this includes funds for visiting scholars, faculty development offerings, and resources to complement the recruitment of faculty that could enrich the excellence and diversity of the University. While the Faculty Excellence and Diversity Initiative has contributed resources to support the recruitment of fifty ladder and ladder equivalent faculty university-wide over the past two years, diversity within the professoriate in STEM fields remains a significant challenge.

Faculty diversity in STEM is a nationwide issue, but there are institutions and programs that have shown success in attracting and recruiting diverse scholars and promoting inclusive environments through
cluster hiring, faculty peer mentoring and support, and tangible rewards for faculty that engage in mentoring and service. In addition, studies show that major inroads could be made, particularly in the sciences, for programs focused on the Ph.D.-to-faculty transition. Other programs, such as the NIH-IRACDA and the HHMI Hanna Gray Fellowship, have found success at improving diversity in the academy by investing in diversity at the postdoctoral level. These programs include mentor training for both the mentor and the fellows and professional development for the transition into a faculty position.

In order for Yale STEM programs to fully leverage the body of exceptional and increasingly diverse talent of tomorrow’s students, postdocs, faculty, and staff, the University must promote the integration of best practices in recruitment and retention across all STEM departments. These efforts must implement strategies that address challenges that are specific to STEM fields.

The USSC makes the following recommendations to recruit, develop and retain diverse community of STEM researchers:

• Coordinate existing STEM diversity initiatives within a single administrative home that has broad responsibility for strategic planning across the entire diversity pipeline. This would include not just faculty diversity, but all aspects of diversity and inclusion in the STEM pipeline. The most logical base for this responsibility would be with the Deputy Provost for Faculty Development and Diversity within the Office of the Provost. This position need not run all the programs, but it should have authority for strategic planning for the full pipeline.

• Continue investment in early stage diversity programs, including outreach efforts to local middle and high schools, research and mentoring for undergraduates and graduate students, the Dean's Emerging Scholars Initiative, and the Presidential Visiting Fellowships.

• Continue investment in programs designed to help undergraduates from underrepresented groups advance in the sciences, such as the Summer Undergraduate Research Fellowship (SURF) and the Post-Baccalaureate Research Experience Program (PREP) Programs.

• Establish and maintain productive relationships with minority serving institutions. These relationships should be purposeful and resourced for success, including coordinating mechanisms to bring students for summer research, internships and post-baccalaureate periods and promoting faculty exchanges and student-centered research collaborations.

• Recruit senior scientists and administrative leaders committed to diversity, who, through their influence and status, will improve the culture of inclusion in STEM fields.

• Tailor efforts to address specific challenges related to the recruitment of postdocs and to the transition from a Ph.D. to a faculty position in STEM fields. Consider establishing, emulating or supporting the development of programs that are successful in the recruitment of postdocs from diverse backgrounds, such as programs that secure time for teaching (similar to IRACDA) or provide resources for student and mentor pairs (like the Hanna Gray Fellowships).

• Make the Presidential Visiting Fellowships within the Faculty Excellence and Diversity Initiative more applicable to STEM fields by providing research space and resources to talented diverse scientists who would develop independence while having “insider access” to the STEM networks of the university.

• Implement recruitment, hiring and retention practices and policies that increase representation in the STEM faculty ranks, including cluster hires.
• Reaffirm and continually improve mechanisms to assess and evaluate the impact of efforts to increase diversity in STEM. All efforts should incorporate best practices and evidence-based strategies and should be designed to integrate ways of monitoring and assessing progress.

• Ensure that the University-wide infrastructure to promote scientific innovation and entrepreneurship, such as the Office of Cooperative Research, Tsai CITY, the Blavatnik Fund for Innovation, and the Center for Biomedical and Interventional Technology, is inclusive and supportive of diversity.

• Provide mechanisms that allow faculty to conceptualize, implement and measure interventions that improve diversity in STEM. Being Human in STEM and Yale Ciencia are two examples of faculty-initiated programs that have allowed faculty, students and staff to design, implement and evaluate innovative programs in research inclusion, mentorship and education.

• The decline in the proportion of female scientists in the STEM fields begins during the postdoc-to-faculty transition, and continues through to becoming full professors. Lack of access to affordable and local childcare is a major reason behind this decline. To attract and retain the brightest female scientists, Yale should provide more opportunities for affordable on-campus day care and after-school childcare programs at all levels of the scientific career ladder. This serves as a specific example to the general concept that University should establish processes that systematically evaluate and address historical and institutional barriers that disproportionately affect under-represented groups in STEM.