Making Good on the PROMISE: Academic Interventions for STEM Ph.D.s

Daryl E. Chubin

Independent Consultant & Co-Chair, Understanding Interventions That Broaden Participation in Science Careers

PROMISE-AGEP External Advisory Board Meeting

University of Maryland, Baltimore County

September 11, 2015
The Problem Thread

• Who *participates* in STEM—education to workforce—and who does not?

• How can *institutions* of higher education improve academic success and career advancement, i.e. utilization of talent?

• How does Federal *policy* help/hinder?
Maryland PROMISE—
The Public Face of the Program

- University System of Maryland (USM)-wide
- Principal institutions: UMB, UMBC, UMCP
- one of 8 NSF AGEP-Transformation projects nationally

Maryland’s AGEP is the development and implementation of activities that promote successful recruitment, retention, graduation, and professorial training that will involve and engage students from all three campuses.

The services and programs of PROMISE are open to all graduate students who are seeking or interested in obtaining the PhD, regardless of discipline. The focus of the services and programs is geared toward one of the goals of PROMISE: To increase the numbers and diversity of Maryland’s graduate student population in sciences, technology, engineering, and math (STEM) fields. . . . PROMISE seeks to increase diverse representation by designing programs that will successfully cultivate new students from diverse ethnicities; and facilitate retention, successful graduation through the PhD, and preparation for the professoriate.

Context

Fewer Scientists See Good Times Today

% of AAAS scientists saying it is a good time in each area

<table>
<thead>
<tr>
<th>Area</th>
<th>2014</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>For science</td>
<td>52</td>
<td>76</td>
</tr>
<tr>
<td>For their specialty</td>
<td>62</td>
<td>73</td>
</tr>
<tr>
<td>To begin a career in their specialty</td>
<td>59</td>
<td>67</td>
</tr>
</tbody>
</table>

AAAS scientists survey Sept. 11 – Oct. 13, 2014. Q1-2, Q34. AAAS scientists survey May 1 – June 14, 2009. Those saying bad time or giving no answer are not shown.

PEW RESEARCH CENTER
Perceived Challenges for Entering a Research Science Career

% of AAAS scientists who say each is a serious problem for people entering a career as a research scientist these days

- Not enough funding for research needs: 85
- Too few tenure-track job openings: 73
- Too few industry R&D job openings: 54
- Salaries below market competition: 50
- Long hours needed to succeed in research: 46
- Graduate training that doesn't meet today's needs: 31

AAAS scientists survey Sept. 11 - Oct. 13, 2014. Q36a-f. Those not selecting each as a serious problem or giving no answer are not shown.

PEW RESEARCH CENTER
FIGURE 1

Percentage of full-time STEM faculty, by demographic characteristics, 1973-2010

How Long Does It Take? STEM PhD Completion for Underrepresented Minorities*

Summary

Racial and ethnic disparities in median time to PhD completion in a STEM field continue to exist. Factors that are related to longer time to completion include:

- field of study (with students in agricultural, computer, and information sciences having longer TTCs),
- completion of a master’s degree,
- having over $30,000 in graduate school debt,
- receiving funding for graduate school from external or personal sources, and
- having dependents at the time of PhD completion.

Past studies have revealed that URM students are more likely to drop out of graduate school for a variety of reasons, including negative mentoring relationships and lack of funding (Milner 2004; Barnhill and Stanziune 2004). This brief demonstrates that racial/ethnic disparities exist even among Americans who have achieved the highest level of education—who not only entered a graduate program in a STEM field, but also completed a PhD.

A key finding of the data on student completion rates is that completion outcomes vary by student characteristics, with some of the most notable differences emerging in the analysis of race/ethnicity and field of study. Over a ten-year period, 54% of students completed a doctorate. Looking at ten-year completion data by student characteristics:

- Doctoral students in the life sciences completed at 63%, while candidates in physical & mathematical sciences experienced a rate of 45%.
- Hispanic/Latinos completed at a rate of 58%, while Black/African Americans completed at a rate of 50%.
- Women completed at a rate of 56%, while the ten-year completion rate for men was 52%.
- Ten-year completion was 57% for students with a prior Master’s degree, and 52% for those without a Master’s.

Early Academic Career Pathways in STEM: Do Gender and Family Status Matter?*

Key Findings

• Men were more likely than women to secure a position upon earning their STEM PhDs, but among those with secured positions, women were more likely than men to begin their careers in academe.

• At the same time, males were significantly more likely than females to secure the more prestigious or difficult-to-obtain academic position: faculty at a research university.

• Being married and having children suggests a disadvantage in securing a position at a research institution—for both men and women.

Leaks in the academic pipeline for women in STEM fields

% women at different academic ranks

- University graduates: 50%
- Ph.D. students: 37%
- Post-docs: 24%
- Assistant Professors: 22%
- Associate Professors: 12%
- Full Professors: 6% (in 2000)
- National Academy of Sciences members: 6%

Graphic for Top 50 Chemistry departments after http://ucfamilyedge.berkeley.edu/leaks.html
<table>
<thead>
<tr>
<th>Field</th>
<th>Male</th>
<th>Female</th>
<th>Females per 100 Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts and Humanities</td>
<td>46.4%</td>
<td>53.6%</td>
<td>115.5</td>
</tr>
<tr>
<td>Biological, Agricultural Sciences</td>
<td>47.6%</td>
<td>52.4%</td>
<td>110.1</td>
</tr>
<tr>
<td>Business</td>
<td>56.8%</td>
<td>43.2%</td>
<td>76.1</td>
</tr>
<tr>
<td>Education</td>
<td>32.4%</td>
<td>67.6%</td>
<td>208.6</td>
</tr>
<tr>
<td>Engineering</td>
<td>77.8%</td>
<td>22.2%</td>
<td>28.5</td>
</tr>
<tr>
<td>Health Sciences</td>
<td>29.2%</td>
<td>70.8%</td>
<td>242.5</td>
</tr>
<tr>
<td>Mathematics and Computer Sciences</td>
<td>74.8%</td>
<td>25.2%</td>
<td>33.7</td>
</tr>
<tr>
<td>Physical Sciences</td>
<td>66.6%</td>
<td>33.4%</td>
<td>50.2</td>
</tr>
<tr>
<td>Public Administration</td>
<td>43.6%</td>
<td>56.4%</td>
<td>129.4</td>
</tr>
<tr>
<td>Social, Behavioral Sciences</td>
<td>38.9%</td>
<td>61.1%</td>
<td>157.1</td>
</tr>
<tr>
<td>Other Fields</td>
<td>46.4%</td>
<td>53.6%</td>
<td>115.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>47.8%</strong></td>
<td><strong>52.2%</strong></td>
<td><strong>109.2</strong></td>
</tr>
</tbody>
</table>

*Source: Council of Graduate Schools*
Legal Matters

Many complex legal structures govern access and diversity efforts, and many legal issues are different for faculty than they are for students. This legal context makes designing successful diversity programs very challenging.

To help institutions understand these issue, AAAS, with participation by the Association of American Universities (AAU), has published a handbook that provides extensive legal and policy resources for academic and legal leaders to help them collaborate to improve access and broaden the diversity of their faculties and student bodies, particularly in STEM.

Handbook on Diversity and the Law—
Navigating A Complex Landscape to Foster Greater Faculty and Student Diversity in Higher Education
The Law Governing Effective Faculty and Student Body Diversity Programs in STEM and Related Disciplines . . . and Its Implications for Institutional Policy
AAAS-AAU, April 2010
http://php.aaas.org/programs/centers/capacity/publications/complexlandscape/

Summary and Highlights
January 2011
Affirmative Action Bans in the U.S.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>STATE</th>
<th>METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>Oklahoma</td>
<td>Legislatively referred constitutional amendment</td>
</tr>
<tr>
<td>2011</td>
<td>New Hampshire</td>
<td>Statute</td>
</tr>
<tr>
<td>2010</td>
<td>Arizona</td>
<td>Initiative constitutional amendment</td>
</tr>
<tr>
<td>2008</td>
<td>Colorado</td>
<td>Failed initiative constitutional amendment</td>
</tr>
<tr>
<td>2008</td>
<td>Nebraska</td>
<td>Initiative constitutional amendment</td>
</tr>
<tr>
<td>2006</td>
<td>Michigan</td>
<td>Initiative constitutional amendment</td>
</tr>
<tr>
<td>1999</td>
<td>Florida</td>
<td>Executive order by governor</td>
</tr>
<tr>
<td>1998</td>
<td>Washington</td>
<td>Initiative statute</td>
</tr>
<tr>
<td>1996</td>
<td>California</td>
<td>Initiative constitutional amendment</td>
</tr>
</tbody>
</table>
In *Regents v. Bakke*, the Supreme Court outlaws the use of quotas for minority admission but finds race a permissible consideration.

In *Grutter v. Bollinger*, the Supreme Court finds the University of Michigan does not violate the 14th Amendment in its law school admissions.

In *Hopwood v. Texas*, the University of Texas School of Law is prohibited from considering race in the admissions process. Proposition 209 passes in California.

August: President and chancellors of the University of California submit an amicus brief in favor of the University of Texas.

October 10: Supreme Court hears oral arguments in *Fisher v. University of Texas at Austin*.

The University of Texas decides to consider race as part of their holistic process following the Grutter decision.

In *Fisher v. University of Texas at Austin*, the United States District Court upholds the University of Texas admissions policy.
Opinion polls find the public opposed to Affirmative Action in employment, contracting, & other competitive arenas except . . .

---

**Americans Support Affirmative Action on College Campuses**

*In general, do you think affirmative action programs designed to increase the number of black and minority students on college campuses are a good thing or a bad thing?*

<table>
<thead>
<tr>
<th></th>
<th>BAD THING</th>
<th>GOOD THING</th>
<th>DK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>30%</td>
<td>63%</td>
<td>8</td>
</tr>
<tr>
<td>White</td>
<td>36%</td>
<td>55%</td>
<td>8</td>
</tr>
<tr>
<td>Black</td>
<td>8%</td>
<td>84%</td>
<td>8</td>
</tr>
<tr>
<td>Hispanic</td>
<td>15%</td>
<td>80%</td>
<td>5</td>
</tr>
<tr>
<td>Republican</td>
<td>50%</td>
<td>43%</td>
<td>8</td>
</tr>
<tr>
<td>Democrat</td>
<td>15%</td>
<td>78%</td>
<td>6</td>
</tr>
<tr>
<td>Independent</td>
<td>30%</td>
<td>62%</td>
<td>8</td>
</tr>
</tbody>
</table>

Note: Survey conducted Feb 27-Mar 16, 2014. Whites and blacks include only those who are not Hispanic; Hispanics are of any race. Figures may not add to 100% because of rounding.

PEW RESEARCH CENTER
Impact of Affirmative Action Bans on Graduate Enrollments

Figure 1. Findings for the impact of affirmative action bans across fields and by field of study.

Are These Reductions Large Enough to Matter?

These are meaningful declines in the context of graduate programs, where cohorts of classes can be smaller than undergraduate college classes and where even a difference of a few graduate students of color in a cohort can have important consequences for the experiences of all students. If a “critical mass” of students of color is no longer enrolled, students of color who remain may experience feelings of “tokenism” and stereotype threat, which can affect negatively an individual’s educational experience and persistence to degree (Chang, Eagan, Lin, & Hurtado, 2009; Steele, 1997; Taylor & Antony, 2000). Indeed, the social and cultural climate in science-related fields like STEM (science, technology, engineering, and mathematics) is one of the leading barriers to the persistence of women of color in STEM career trajectories (Ong, Wright, Espinosa, & Orfield, 2011). A large survey study of women of color in STEM graduate programs (Brown, 1994, 2000) revealed that isolation, racism, and being racially/ethnically identifiable, among other climate factors, present more difficulty for women of color than structural factors, such as financial aid or the composition of the faculty, in their persistence. Thus, a decline of one or two students of color in a science-related field can make it remarkably more challenging for students of color to persist through their program.

The lack of a racially and ethnically diverse student body also deprives students across all races and ethnicities of the benefits of a diverse learning environment, such as enhanced critical
Foreign Students Dominate Many STEM PhD Conferrals

### Foreign Students Earn Large Share of Advanced Degrees in Many STEM Fields

*Top fields of study by share of degrees earned by foreign students, 2012-13*

#### DOCTORAL DEGREES

<table>
<thead>
<tr>
<th>Field</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>57%</td>
</tr>
<tr>
<td>Computer and information sciences</td>
<td>53%</td>
</tr>
<tr>
<td>Mathematics and statistics</td>
<td>50%</td>
</tr>
<tr>
<td>Engineering tech./ engineering-related fields</td>
<td>49%</td>
</tr>
<tr>
<td>Physical sciences and science technologies</td>
<td>40%</td>
</tr>
</tbody>
</table>

#### MASTER’S DEGREES

<table>
<thead>
<tr>
<th>Field</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal professions and studies</td>
<td>55%</td>
</tr>
<tr>
<td>Construction trades</td>
<td>50%</td>
</tr>
<tr>
<td>Computer and information sciences</td>
<td>44%</td>
</tr>
<tr>
<td>Engineering</td>
<td>43%</td>
</tr>
<tr>
<td>Mathematics and statistics</td>
<td>43%</td>
</tr>
</tbody>
</table>

#### BACHELOR’S DEGREES

<table>
<thead>
<tr>
<th>Field</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics and statistics</td>
<td>10%</td>
</tr>
<tr>
<td>Mechanic and repair technologies</td>
<td>9%</td>
</tr>
<tr>
<td>Engineering</td>
<td>8%</td>
</tr>
<tr>
<td>Architecture and related services</td>
<td>7%</td>
</tr>
<tr>
<td>Business</td>
<td>6%</td>
</tr>
</tbody>
</table>

Source: National Center for Education Statistics

PEW RESEARCH CENTER
Doctoral Debt Disparities

Paying for a STEM Ph.D.

Debt Disparities: Among those who earned a Ph.D. in a STEM (science, technology, engineering and mathematics) field, African Americans and Hispanics were more likely to graduate with debt than their white and Asian peers.

Student Debt for Ph.D. STEM Graduates by Race/Ethnicity

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Over $30,000</th>
<th>$1,000 to $30,000</th>
<th>Zero</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>25%</td>
<td>24%</td>
<td>51%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>14%</td>
<td>22%</td>
<td>64%</td>
</tr>
<tr>
<td>White and Asian</td>
<td>10%</td>
<td>17%</td>
<td>73%</td>
</tr>
</tbody>
</table>

Source: The Price of a Science PhD: Variations in Student Debt Levels Across Disciplines and Race/Ethnicity, Center for STEM Education & Innovation at American Institutes for Research | air.org
Grants driving research and PhD production
NIH R01s—A Tale of Two Awardee Pools

Figure 3.17. Individual NIH Research Project Grant Awardees, PhD Degree by Race/Ethnicity, White and Asian (FY1999-2012)

Figure 3.18. Individual NIH Research Project Grant Awardees, PhD Degree by Race/Ethnicity, Underrepresented Groups (FY1999-2012)
Postdocs—A Temporary or Permanent Status?

http://blogs.nature.com/naturejobs/files/2015/03/postdocs2.png
Postdocs’ Expectations, 2008 -> 2012

http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2012_08_24/science.opms.r1200121
Excerpt from Karen Kelsky,
*The Professor Is In: The Essential Guide to Turning Your Ph.D. Into a Job*

Q: You're very honest about the state of academic job market. What should graduate students consider when thinking about trying to go that route, despite the long odds?

A: Understand that the tenure track job is the "alternative" career for Ph.D.s at this point. There is virtually no field in which the majority of new Ph.D.s achieve tenure-track positions. In many fields the figure is as low as 12 or 15 percent. Therefore, do not internalize a value system from your department that suggests that the tenure track job is the logical and linear outcome of the Ph.D. It is not. In light of that, constantly question whether a Ph.D. is a good idea at all and consider leaving to pursue other forms of career training. If you are totally invested in finishing, minimize any debt associated with it, and build a competitive record of peer reviewed publications, grants, major conferences, and sole-teaching experience, and network widely as a professional scholar. At the same time, stay abreast of non-academic options at every point in the process. Then, set an end date for trying to achieve the tenure track position (italics added).

In the Academic Workplace . . .

**Percent of U.S. Women in STEM Who Report...**

<table>
<thead>
<tr>
<th>Condition</th>
<th>BLACK</th>
<th>LATINA</th>
<th>ASIAN</th>
<th>WHITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having to provide more evidence of competence than others to prove themselves.</td>
<td>77%</td>
<td>65%</td>
<td>64%</td>
<td>63%</td>
</tr>
<tr>
<td>That colleagues have suggested they should work fewer hours after having children.</td>
<td>8%</td>
<td>9%</td>
<td>37%</td>
<td>26%</td>
</tr>
<tr>
<td>That at work, they find themselves pressured to play a stereotypically feminine role.*</td>
<td>8%</td>
<td>28%</td>
<td>41%</td>
<td>36%</td>
</tr>
<tr>
<td>That women in their work environments support one another.</td>
<td>56%</td>
<td>79%</td>
<td>71%</td>
<td>77%</td>
</tr>
<tr>
<td>They’ve been mistaken for either administrative or custodial staff.</td>
<td>48%</td>
<td>47%</td>
<td>23%</td>
<td>32%</td>
</tr>
</tbody>
</table>

*Such as “office mother” or “dutiful daughter.”

**Source** Joan C. Williams, Katherine W. Phillips, and Erika V. Hall

HBR.ORG
Young Academics “Testify”: Life Scientists of Color Speak in 2013

• Women faculty of color are publicly challenged by undergraduates who doubt they know or can teach the subject matter.

• Minority men are accused of being only “special admits” from fellow students in their graduate program.

• Many wonder aloud why race consciousness is being curbed as entrance criteria (in the wake of the Fisher decision), while “legacies” gain admission and access based mainly on the “plus factor” of family history.

Making Progress: How Do You Know?

Understanding Interventions Conferences

• **Origin:**
  - 2006 NIGMS grant to NAS to organize a workshop, to inject training program proposals with rigorous research & evaluation designs.
  - 2007 (inaugural conference: Washington, DC)

• **Conferences:**
  - 2008 (through ASCB, Atlanta, GA)
  - 2009 (through ASCB, Bethesda, MD)
  - 2011 (through LIU-AAAS, Nashville, TN)
  - 2012 (through LIU, Baltimore, MD)
  - 2014 (through LIU, Baltimore, MD)
  - 2015 (through LIU, San Diego, CA)

• **Outputs:**
  - Reports on *Understanding Interventions That Broaden Participation in Science Careers*, and resources at [www.understanding-interventions.org](http://www.understanding-interventions.org)
  - A portal that serves national clearinghouse: bibliographic database, newsletter, blog, and online journal to debut in 2017!!!
A Sample of What We Know—
Concepts Explored Empirically & Identified as Key at Past Understanding Interventions Conferences

- **Critical mass**—both the presence of large numbers of a particular minority, as in community colleges and HBCUs, as well as in research-intensive universities with modest minority enrollments, “sitting together in the lunchroom” (Tatum 2003)

- **Self-efficacy**—extending Bandura’s (1977) findings that one’s capacity to organize and execute the courses of action required to achieve relate to students’ beliefs in the likelihood that they can complete an undergraduate or graduate degree in a STEM discipline (Chemers et al. 2011)

- **Stereotype threat**—performance in academic contexts can be harmed by the awareness that one's behavior might be viewed through the lens of racial or gender stereotypes. It can also lead students to choose not to pursue a particular domain of study and, consequently, limit the range of professions they pursue (Steele and Aronson 1995)
Keeping the PROMISE—
Diversity at the STEM Department Level

Recognizing that STEM departments vary by size and resources, general questions to consider *for increasing diversity* at the department level include:

- How does the department recruit graduate students?
- What are the sources of funds for student recruitment (e.g., campus visitations, visits for interviews, graduate student days, etc.) and retention? Are grant overhead recovery funds a source for recruitment?
- How is the graduate student application/admissions process managed within departments? What are the *selection criteria*?
- How is *financial aid* used to foster and maintain diversity in the graduate school?
  - How does the department decide on the financial package for new graduate student admits?
  - Is financial aid offered as part of the admissions letter? How many years of financial aid is a new enrollee given?
  - Does the admissions letter include information about how graduate students are supported to Ph.D. completion? (*italics added*)

Career Planning/Monitoring

• Individual Development Plan:
  – Self-assessment
  – Skills, goals, timetable

• Promotion & Tenure:
  – Publication
  – Entrepreneurship
  – Other: mentoring, outreach

• Options & Opportunities:
  – Alternative sectors, organizations, roles
  – Becoming a “T-shaped Scientist”: communication, team-building, cultural competence, conflict resolution, networking, program design

• Transitions:
  – Bench to management
  – Leadership: local, national, international
Assessing Student Preparation for the Professoriate

Each STEM graduate program should collect and maintain quantitative and qualitative data for students focusing on activities related to preparation for the professoriate, leading to demonstrated competence in:

• Writing papers for peer-reviewed journals and preparing patent applications, including understanding how journal articles and patent applications are reviewed.
• Grant writing and management.
• Teaching and learning, including: understanding research on teaching and learning; how to develop curriculum and student assessments; use of student centered teaching strategies; use of technology for classroom management and teaching; and issues of adult learning and cognition.
• STEM student career counseling and advising, including advising and mentoring across cultural and sex lines and mentoring students with disabilities.
• Managing a research laboratory and teams, including understanding research ethics.
• University citizenship, including: understanding types of universities; requirements for promotion and tenure; navigating departmental politics; and time management skills for balancing time for teaching, research, service—and life (italics added).

Exemplar: Fisk-Vanderbilt Master’s to Ph.D. Bridge Program

How Vanderbilt Became the Nation’s Top Producer of Minority Ph.D. Recipients in Physics, Astronomy and Materials Science

Keivan Stassun, professor of astronomy, began building in 2004 on a newly forged alliance with Fisk University, a historically black college just two miles from the Vanderbilt campus, in an effort to increase the number of African Americans, Latinos, Native Americans and other minorities earning Ph.D. degrees in science. In 2013 the program became the nation’s No. 1 producer of minority Ph.D. recipients in physics, astronomy and materials science. Students typically receive two years’ training in the master’s program at Fisk before entering Ph.D. programs at Vanderbilt or another institution.

“We know that, by and large, the students we are trying to attract often under-perform on metrics like the Graduate Record Examination (GRE). A key insight for us was to get past the focus on standardized tests as the be-all and end-all. If the student has been working in your lab for two years, making discoveries alongside you, and taking hard graduate-level courses from you and publishing in peer-reviewed journals, then maybe we don’t need the GRE. We replaced a predictor of performance with actual performance. That has been one of the great innovations of our bridge program, and it’s the reason Columbia and MIT and Michigan are now emulating it” (italics added).

source:  http://news.vanderbilt.edu/vanderbiltmagazine/the-new-face-of-science/
1. Have you either experienced discrimination or barriers to achievement, felt isolated in your residential setting or educational and professional/work experience—or identified the existence of these or other barriers, and then removed such barriers and created an inclusive community for others? Describe.

2. Have you ever mentored or collaborated with a student/faculty member/staff from a different background, perspective or experience from your own (e.g., a different race, gender, sexual orientation, socioeconomic background, political perspective)? Was the collaboration, student/staff successful? Explain.

3. Have you helped an undergraduate with a different background, perspectives, or experiences from your own access a PhD program, or a junior staffer with a different background advance his or her career? Mentored such a PhD to completion? Hired such a postdoc into your lab? Describe.
Local Interventions

Keys to Successful Faculty Recruitment (and Retention)

- A welcoming/collegial environment
- Dual-career couples (more than talk about work-life balance)
- Professional growth opportunities
- Expectation of success
- A path to the top
- It’s about the money, but much more than the money
- Consult AAAS Science Careers http://jobs.sciencecareers.org/
Institutional Indicators of Changes in Faculty Behavior

• When rewards for academic performance (promotion, tenure, bonus, advancement) include metrics of student success (recruitment/outreach, retention, mentoring)
• “Champions of diversity” are recognized institution-wide as scholarly role models
• When a department/program appoints more than one minority faculty member
• When undergraduates, as well as graduate students are integrated into a faculty member’s research team/lab
At Tuesday's "Demo Day," a White House event to promote entrepreneurship, more than 100 engineering deans issued a pledge to promote diversity efforts. Specifically the deans -- through the American Society for Engineering Education -- said that they would *develop diversity plans* for their institutions, create at least one K-12 or community college "pipeline activity" to attract a more diverse pool of students to their institutions, and *promote partnerships with non-Ph.D. granting engineering colleges* that serve groups that are underrepresented in engineering *(italics added).*

source:  [https://www.insidehighered.com/quicktakes/2015/08/05/engineering-deans-pledge-promote-diversity](https://www.insidehighered.com/quicktakes/2015/08/05/engineering-deans-pledge-promote-diversity)

A measure of success will be the notable increase in diversity in enrollments, retention and graduation rates of engineering students, and increased diversity in our faculty and in the engineering workforce, over the next decade.

source: [https://www.whitehouse.gov/sites/default/files/microsites/ostp/EDC-DiversityInitiativeLetterFinal%208.3.15.pdf](https://www.whitehouse.gov/sites/default/files/microsites/ostp/EDC-DiversityInitiativeLetterFinal%208.3.15.pdf)

**Lesson:** Minimum Years to Demonstrating Program Effectiveness—10!!!
Other Resources

• Managing Unconscious Bias, http://managingbias.fb.com

• Making Diversity Not the Work of One Office, but a Campuswide Priority, http://chronicle.com/article/Making-Diversity-Not-the-Work/230543/?elqaid=1058&elqat=2&elqTrackId=73df4bbe64b240c291a7d688ce797ccd


• “Untethering science careers from the research frontier,” http://membercentral.aaas.org/blogs/driving-force/untethering-science-careers-research-frontier

• The Impact of Affirmative Action Bans in Graduate Education, http://escholarship.org/uc/item/6np398tm

• What Do I Want to Be with My PhD? The Roles of Personal Values and Structural Dynamics in Shaping the Career Interests of Recent Biomedical Science PhD Graduates, http://www.lifescied.org/content/12/4/711.full
Thank you!

Daryl E. Chubin, Ph.D.
daryl.chubin@comcast.net
www.understanding-interventions.org