NIH Addresses the Science of Diversity: Focusing on Institutional Change

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NIH Chief Officer for Scientific Workforce Diversity

University of Washington | SCI-STEM | February 23, 2018

National Institutes of Health
Office of the Director
Scientific Workforce Diversity

NIH Addresses the Science of Diversity

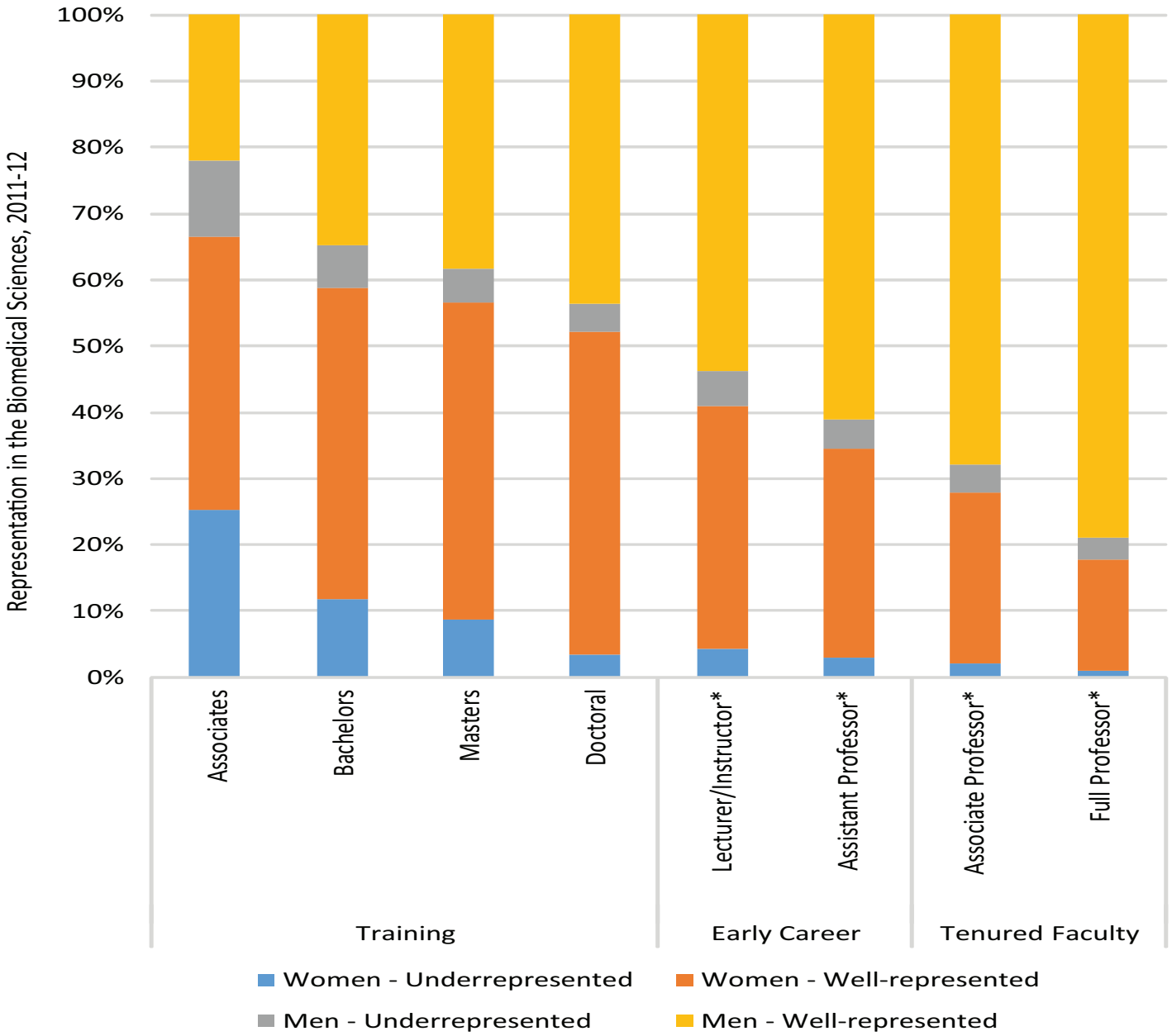
Presentation Outline

- Why diversity matters
- Keys to scientific workforce diversity
- Moving beyond individual-level diversity strategies
- Sustainability requires institutional-focused efforts

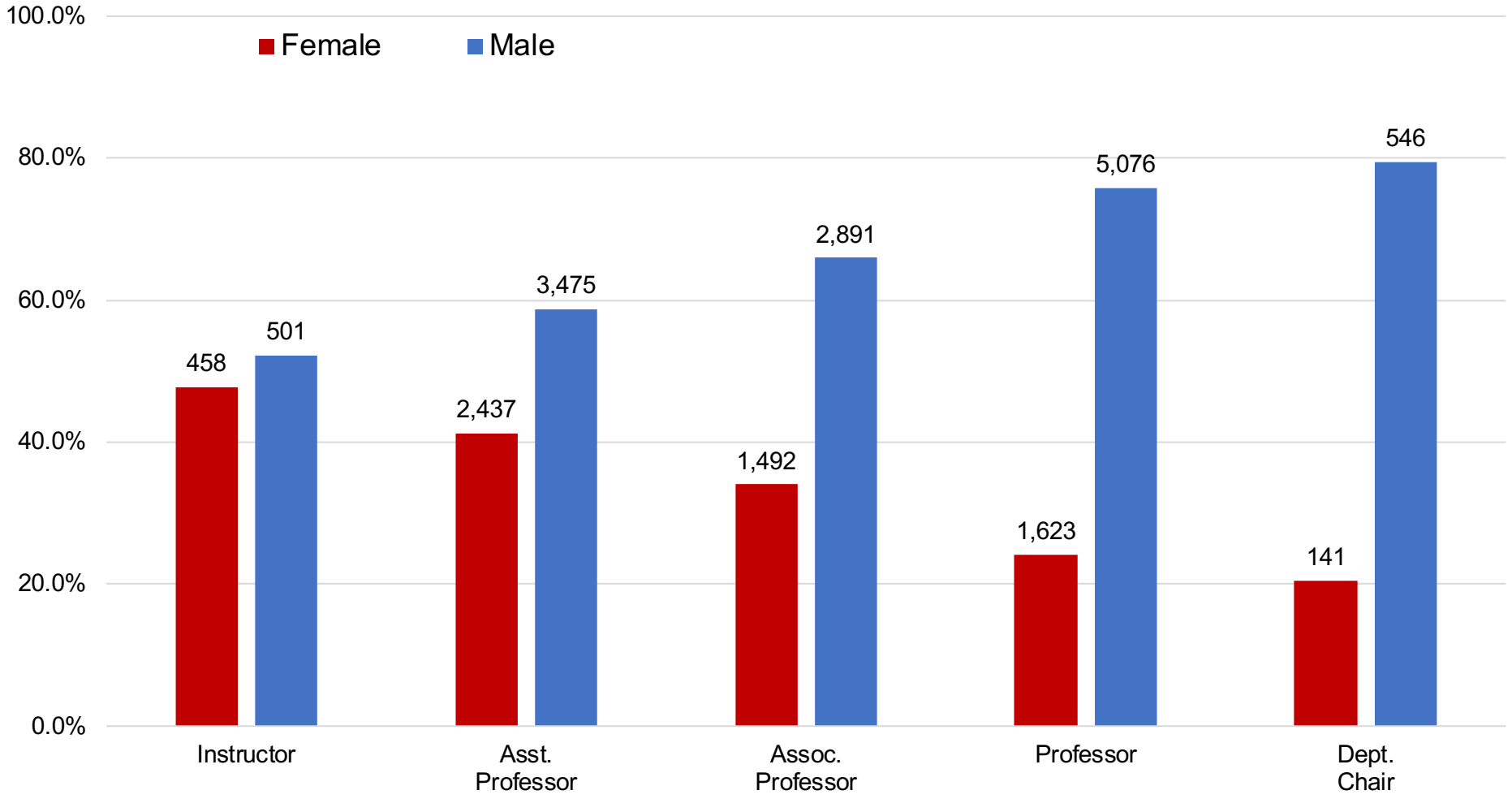
Why Diversity Matters
Capitalizing on the Opportunity

Capturing the Benefits of Diversity
Identity is a Proxy for Cognitive Diversity

URM Diversity Declines Along Career Path



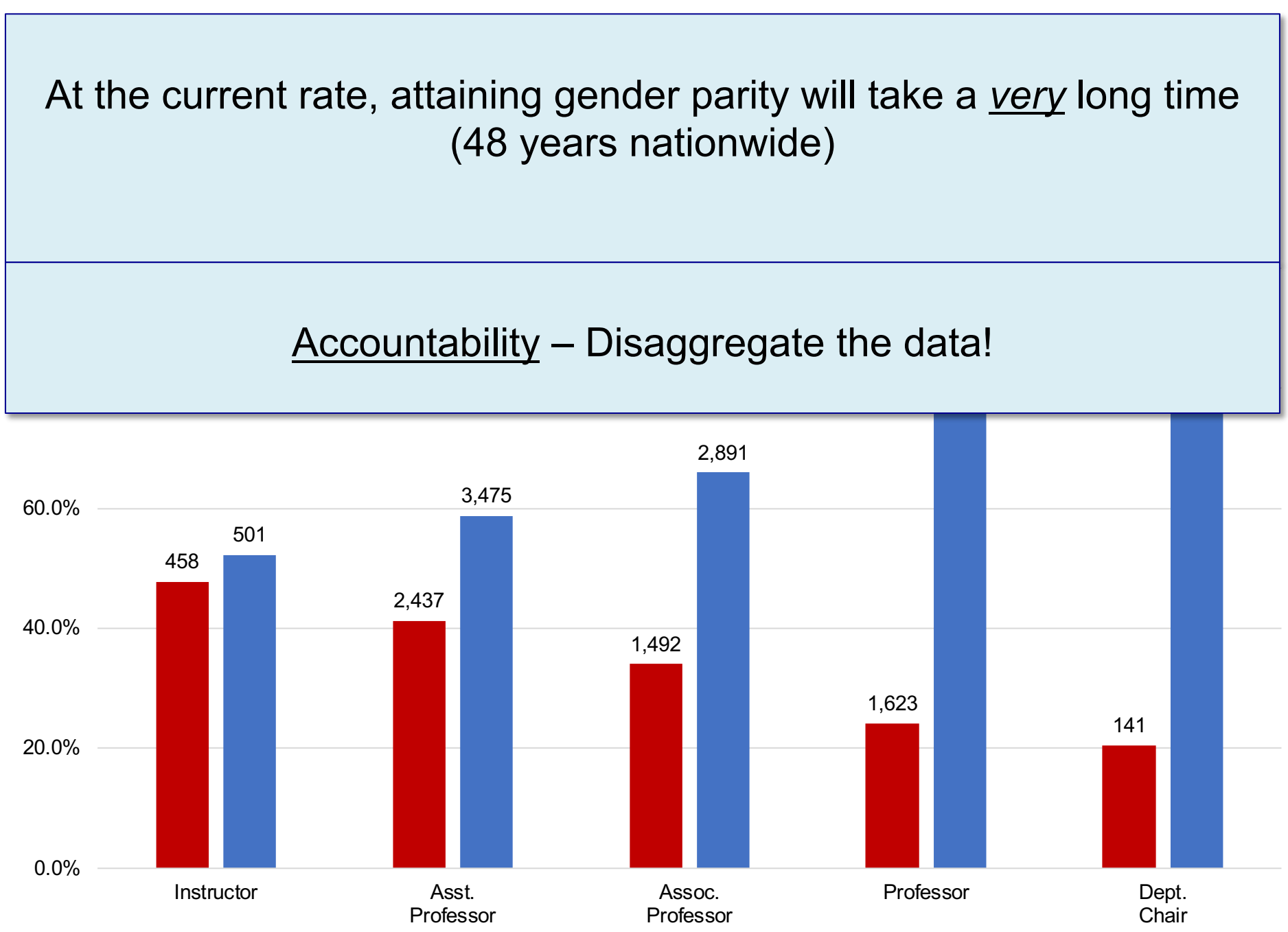
Declining Representation of Women in Leadership: Basic Sciences
(All Departments Combined)



AAMC, 2015 Faculty Roster Table 13; AAMC, The State of Women in Academic Medicine: The Pipeline and Pathways to Leadership, 2015-2016, Table 11

At the current rate, attaining gender parity will take a *very* long time (48 years nationwide)

Accountability – Disaggregate the data!



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DIVERSITY IN SCIENCE

Without inclusion, diversity initiatives may not be enough

Focus on minority experiences in STEM, not just numbers

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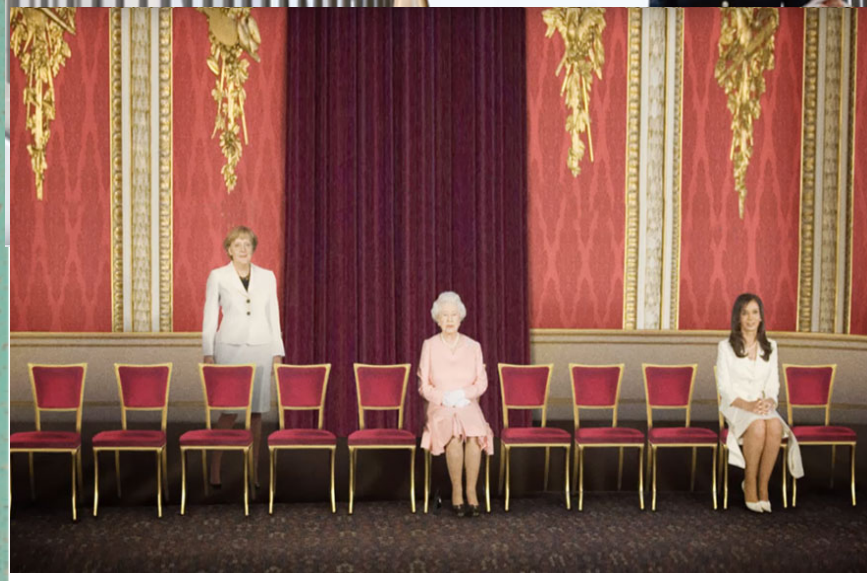

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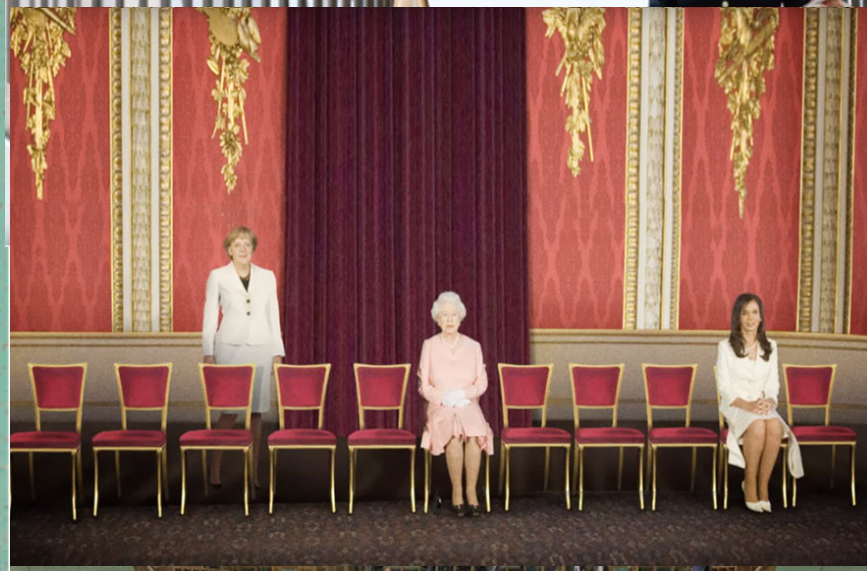

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But numbers matter .

PNAS

Gender diversity leads to better science

Mathias Wullum Nielsen[a,1], Sharla Alegria[b], Love Börjeson[c], Henry Etzkowitz[d,e], Holly J. Falk-Krzesinski[f,g], Aparna Joshi[h], Erin Leahey[i], Laurel Smith-Doerr[j], Anita Williams Woolley[k], and Londa Schiebinger[a]

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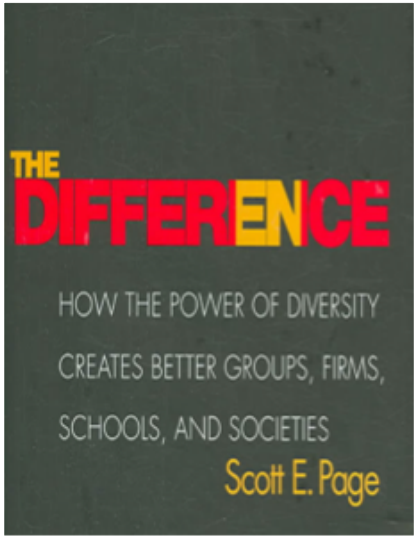
- Broader questions and research topics
- More rigorous science: gender-, sex-based analysis
- Higher quality: impact factor and citations

But…Critical mass is *Essential!*

- 15% and 30% must be women/URMs

PNAS Keys to Scientific Workforce Diversity

Diversity Science



Recruitment
Retention

DIVERSITY
PROGRAM
CONSORTIUM

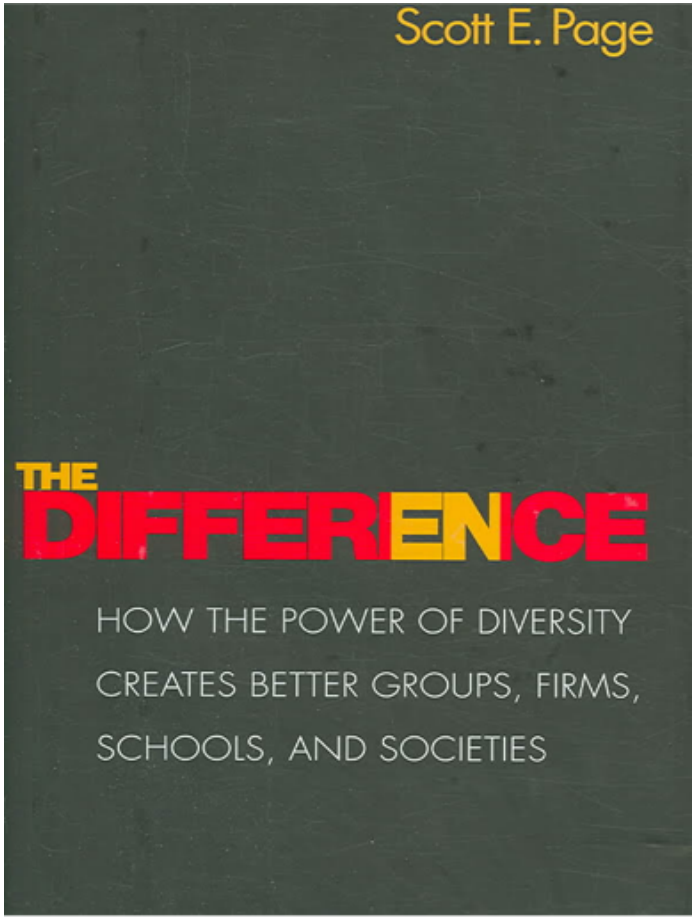
Supported by the National Institutes of Health

Sociocultural Factors

Sustainability

Valantine and Collins. *PNAS* 2015: Oct 6;112:12240-2

Diversity Outperforms Individual Ability



Groups of diverse problem solvers can outperform groups of high-ability problem solvers. *PNAS* 2004 Nov 16;101(46):16385-9.

- Test: Diverse vs. homogenous teams in solving hypothetical problems
- Result: Diverse teams of randomly selected participants outperformed homogenous teams of high-scoring/best individuals
- Diversity enhances:
  - Jury Decision Making*
  - Accurate stock trading predictions**
  - Publications in higher impact journals

*Sommers, S. R. (2006); ** Levine, S. S. (2014 PNAS)

Diverse Juries Make Better Decisions

Experimental study – randomly assigned

Racially homogenous jurors vs. Racially heterogeneous jurors

Measure	All-White Group	Diverse Group*
Deliberation length, in minutes	**38.49**	**50.67**
# of case facts discussed	**25.93**	**30.48**
# of factual inaccuracies	**7.28**	**4.14**
# of uncorrected inaccurate statements	**2.49**	**1.36**

Wider range of information exchange; in diverse group – whites cited more facts; more discussion; fewer errors

Sommers, S. R. (2006). *Journal of personality and social psychology*, *90*(4), 597.

Diversity Improves Quality of Science

- 2.57 million scientific papers between 1985-2008 (authors with U.S. addresses); 11 scientific fields
- Surnames of co-authors – ethnic diversity
- Controlled for # authors; population density etc.

Papers written by a diverse groups:

- Receive more citations
- Published in journals with higher impact factors

- Similar finding for gender diversity*

Freeman, R. B., & Huang, W. (2014).*National Bureau of Economic Research*, No. w19905.

* Campbell LG, et al. (2013) Gender-heterogeneous working groups produce higher quality science. *PLoS One*.

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NIH Diversity Program Consortium

Building Evidence- Awards made October 2014

Total: $250 million (5 years)

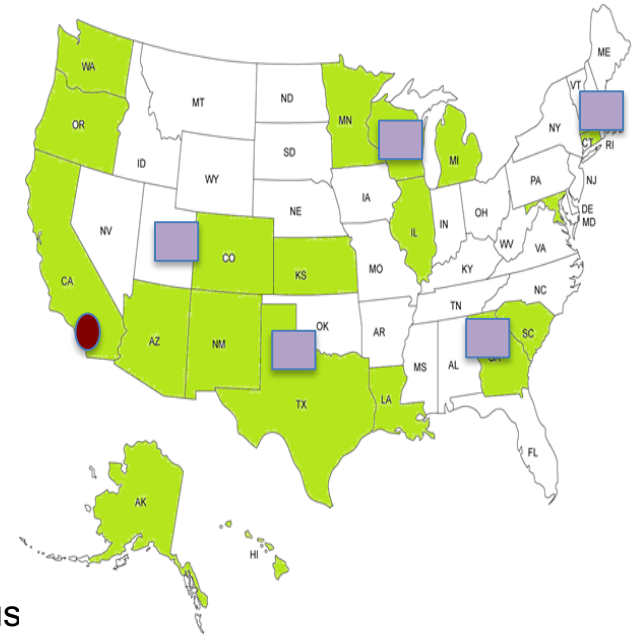
BUILD: 10 sites/experiments

NRMN

CEC

BUILD (2,400* students have participated to date)

- California State University Long Beach
- California State University Northridge
- Morgan State University
- Portland State University
- San Francisco State University
- University of Alaska Fairbanks
- University of Detroit Mercy
- University of Maryland Baltimore County
- University of Texas El Paso
- Xavier University of Louisiana



NRMN

- Boston College
  - Morehous SM; U. Utah; U. North Texas; U. Wisconsin

CEC

- University of California Los Angeles

*Data as of September 2017

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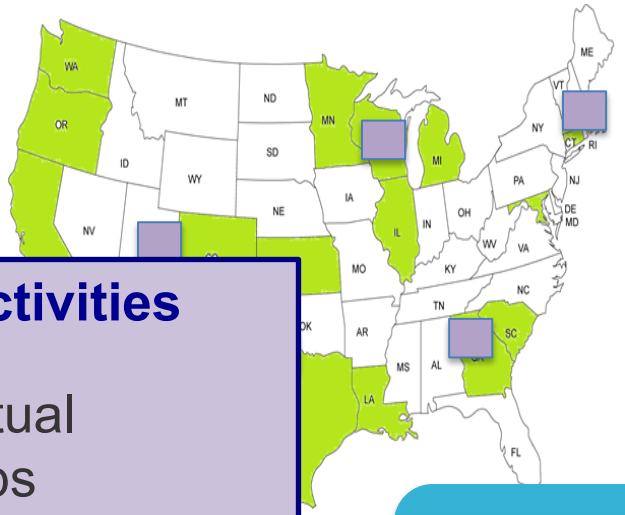
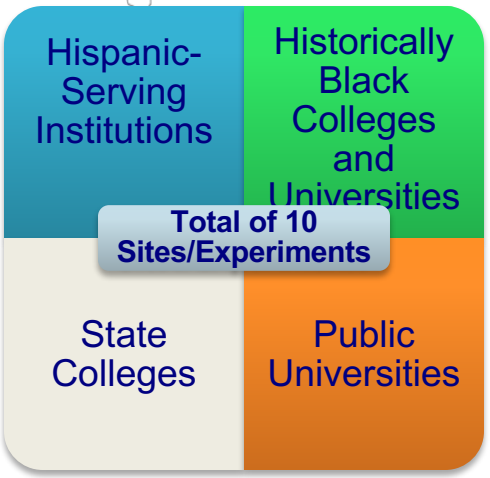


BUILD Tested Interventions

- Stereotype threat
- Critical race theory
- Student entrepreneurship
- Living and learning communities

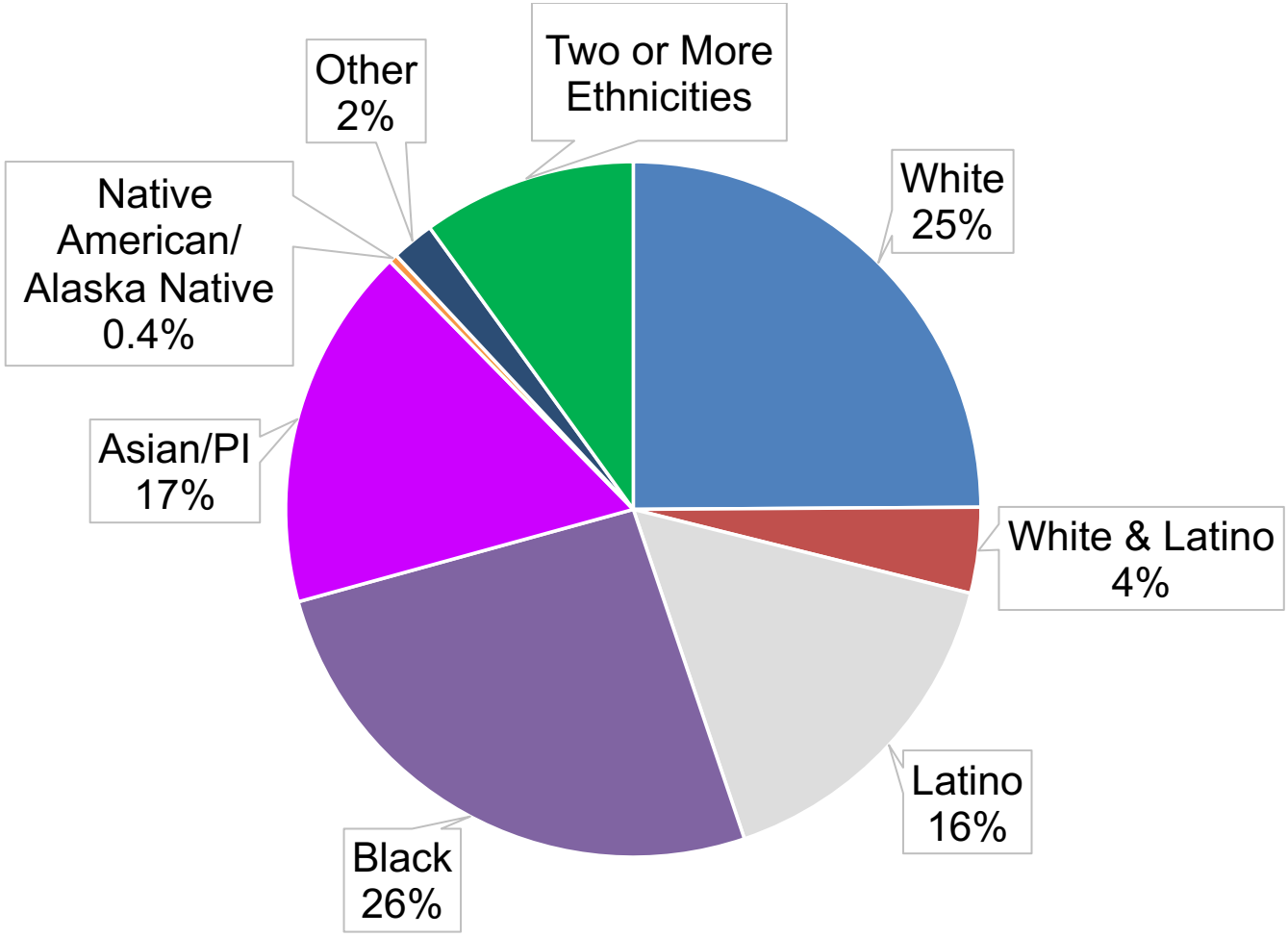
NRMN Activities

- Guided virtual mentorships
- MyNRMN tool
- Mentors: 2,066*
- Mentees: 3,844 *
- Grantwriting/coaching - mentees: 456 (July '17)



*Data as of September 2017

Race and Ethnicity of BUILD Participants



Note: Based on first cohort of freshmen in 2015

NRMN Grant-Writing Training: Race/Ethnicity of Participants Submitting Grants

resulting in improvements in research-related success

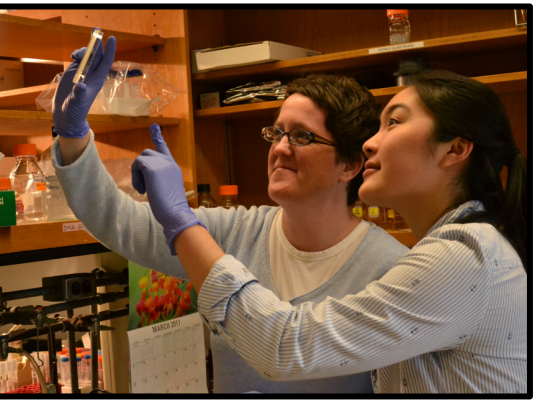
Interventions include:

- Rigorous pilot project funding process
- Protected time for research
- Grant writing workshops
- Grant writing coaches

BUILD NRMN

Surveys address self-efficacy

Hallmarks include: presentations at meetings, publications, external funding



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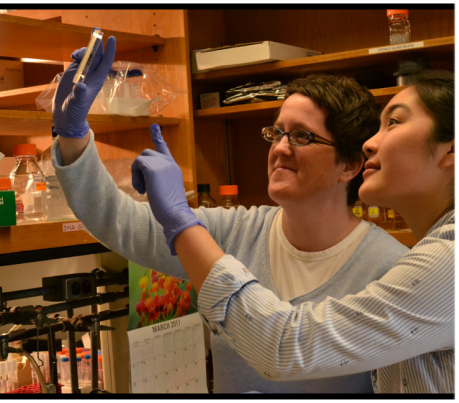
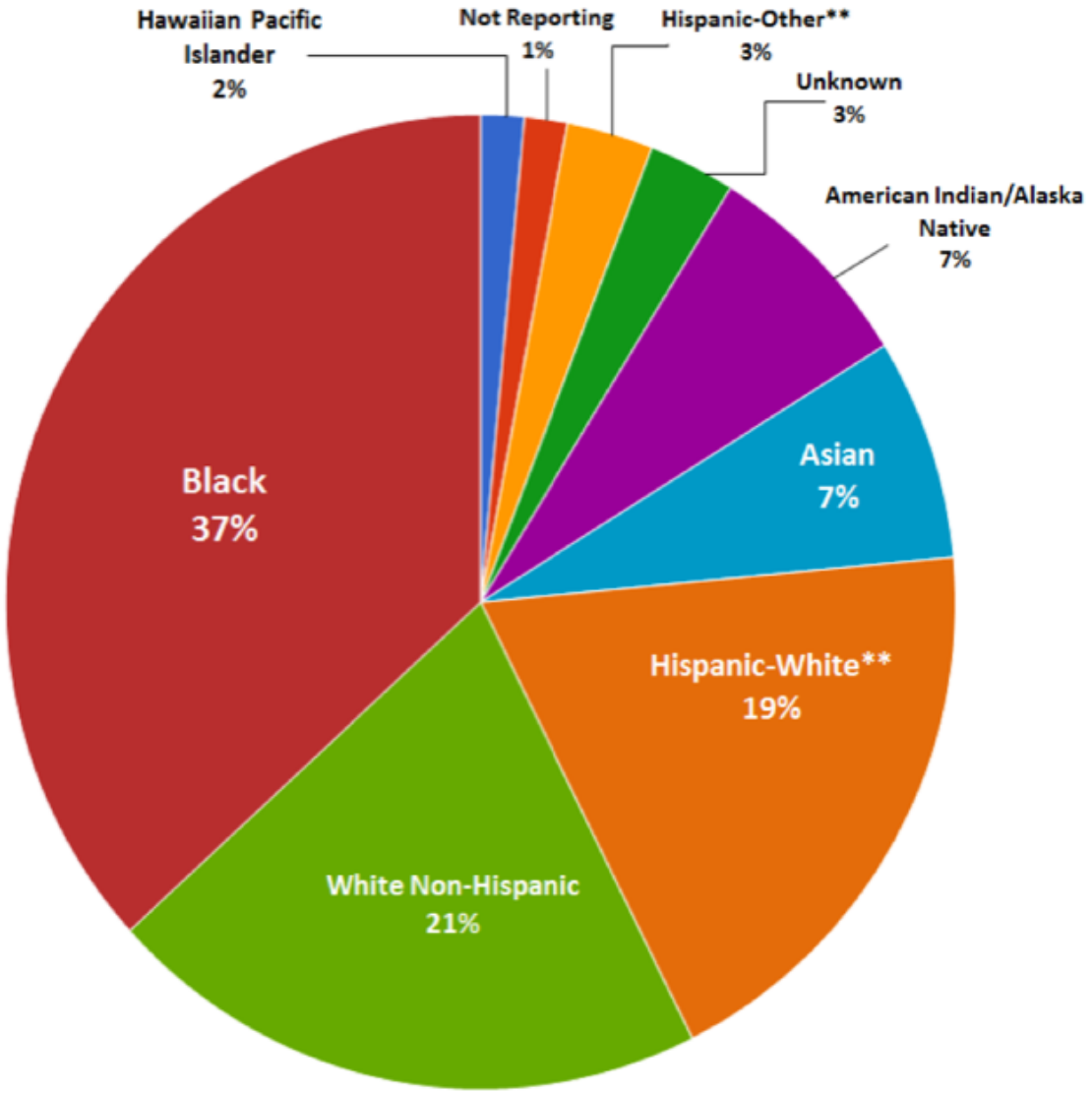




PNAS Keys to Scientific Workforce Diversity

Diversity Science

Recruitment
Retention

DIVERSITY PROGRAM CONSORTIUM

Supported by the National Institutes of Health

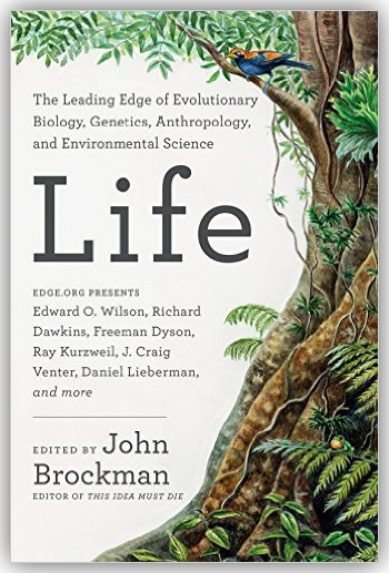
Sociocultural Factors

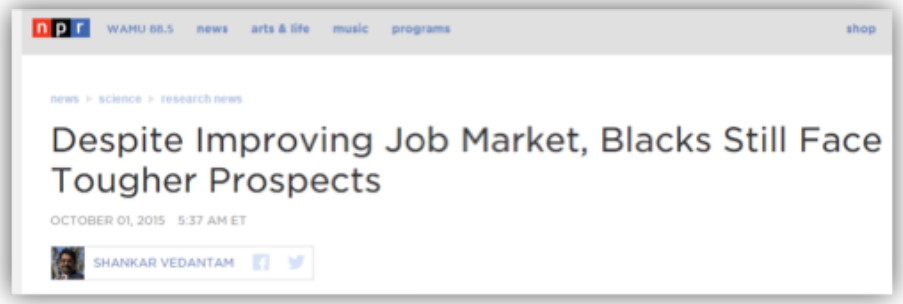
Stereotypes
Bias

Sustainability

Valantine and Collins. *PNAS* 2015: Oct 6;112:12240-2

Bias is Pervasive in Science and Beyond





"Black name applicants in our study received about 14 percent lower call-back rates than otherwise identical white applicants."

Recommendation letters for men:
Longer;
More references to CV, publications, patients, colleagues

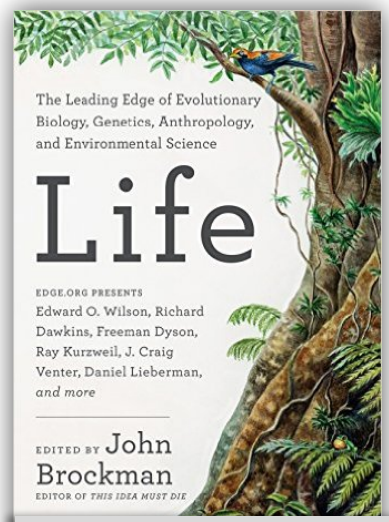
Welcome to the world of sport. It's a world where men are "strong, big, real, great or fastest"

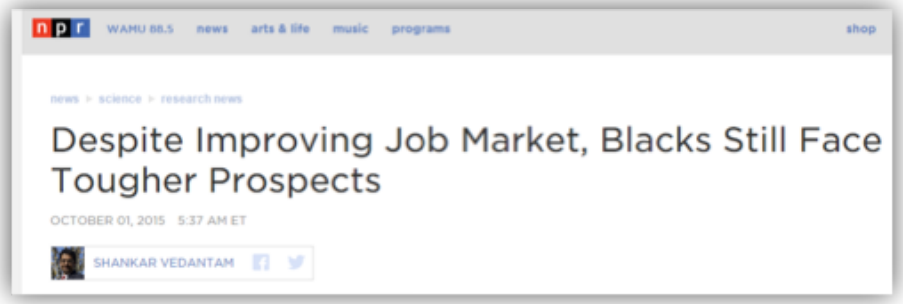
" … she became the third new mum to retain Olympic gold" … "asked how she cares for her skin and how training affects her hair."

Recommendation letters for women :
Shorter;
More "doubt raisers" (hedges, faint praise, and irrelevancies);
More references to personal life

"It's amazing how much she's accomplished."

Bias is Pervasive in Science and Beyond





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Rooted in Stereotypes and Begins Early

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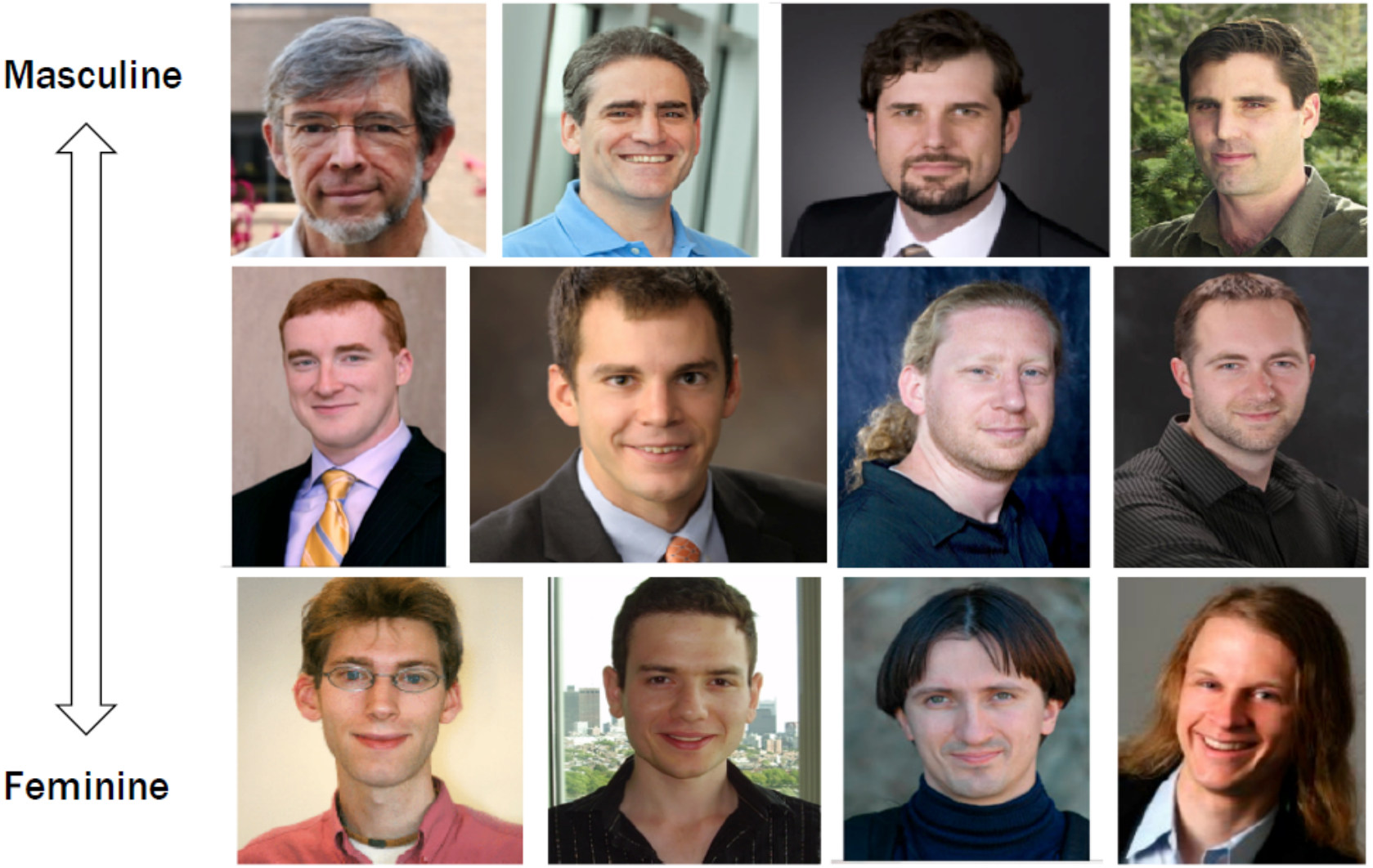
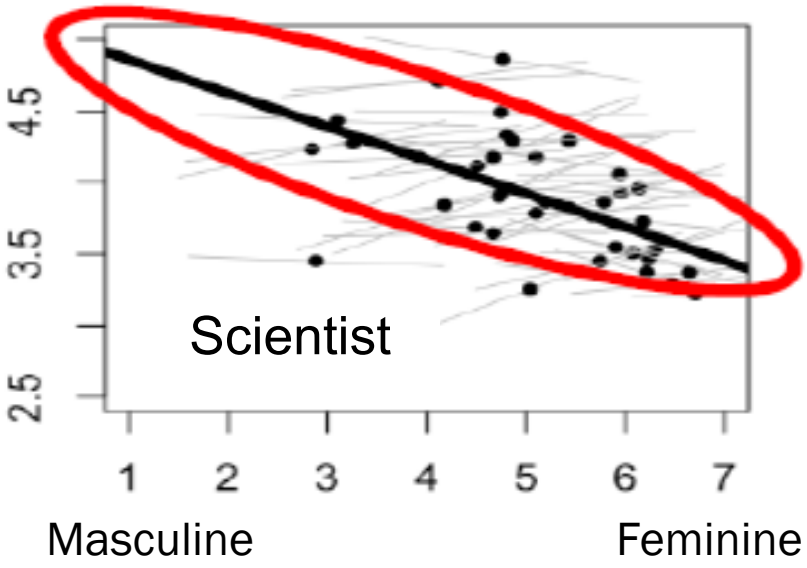
Study: “Who is a Scientist?”

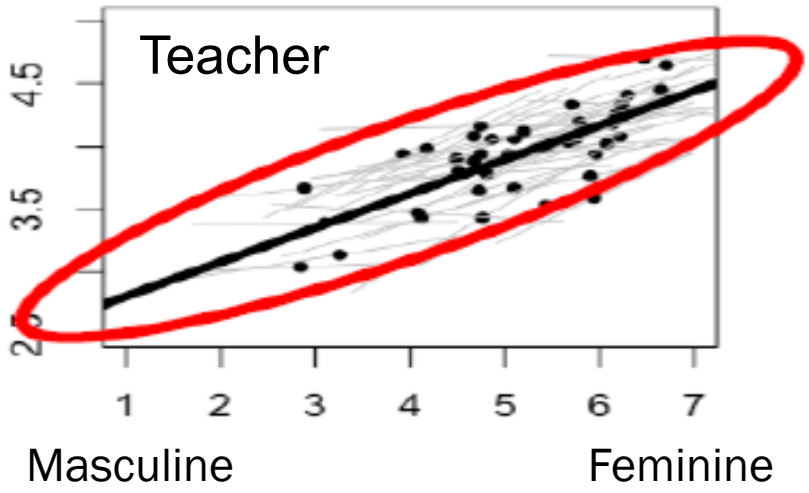


Banchefsky, S., Westfall, J., Park, B., & Judd, C. M. (2016). But You Don’t Look Like A Scientist!: Women Scientists with Feminine Appearance are Deemed Less Likely to be Scientists. *Sex Roles*, 1-15.

Study: “Who is a Scientist?”

Women





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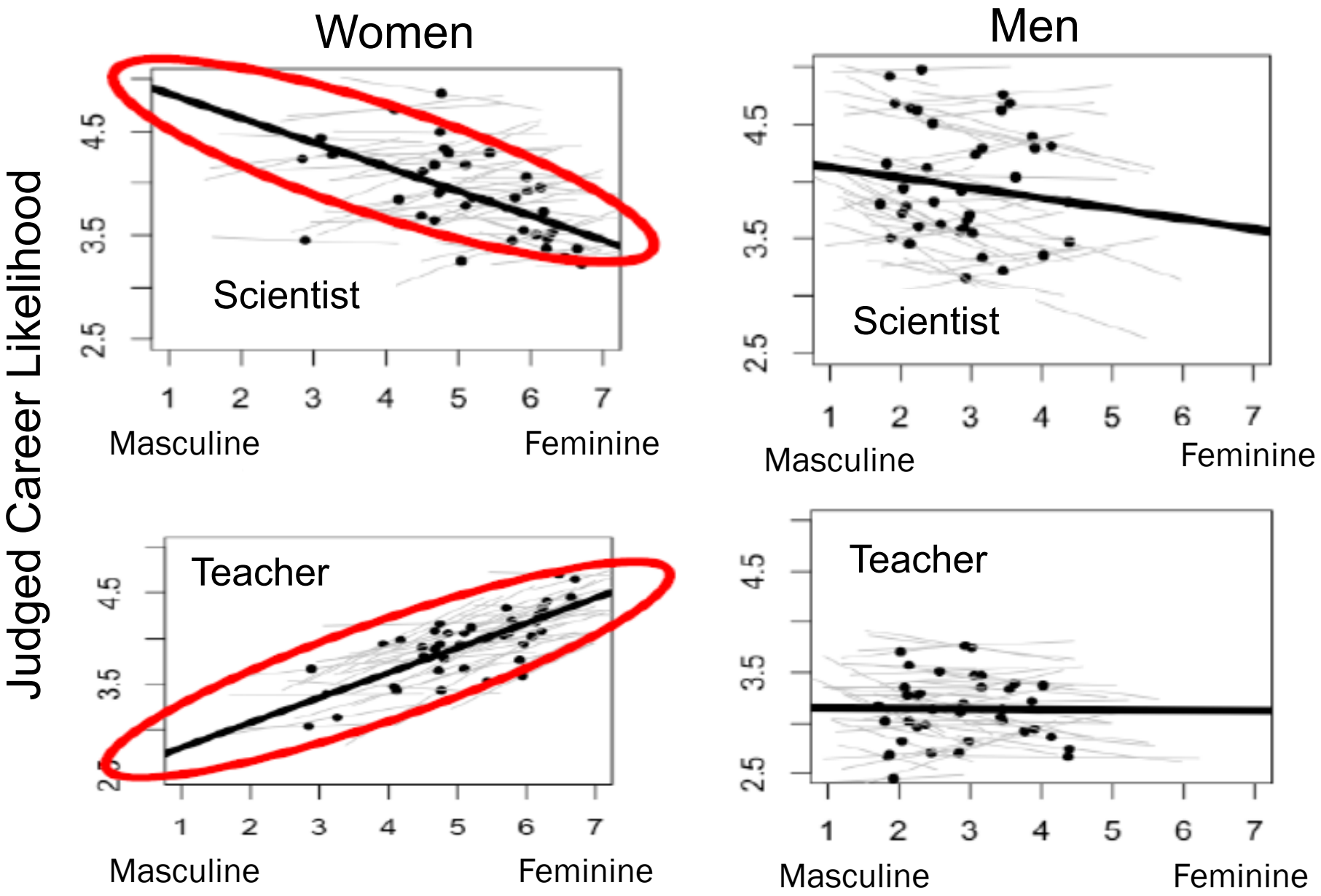

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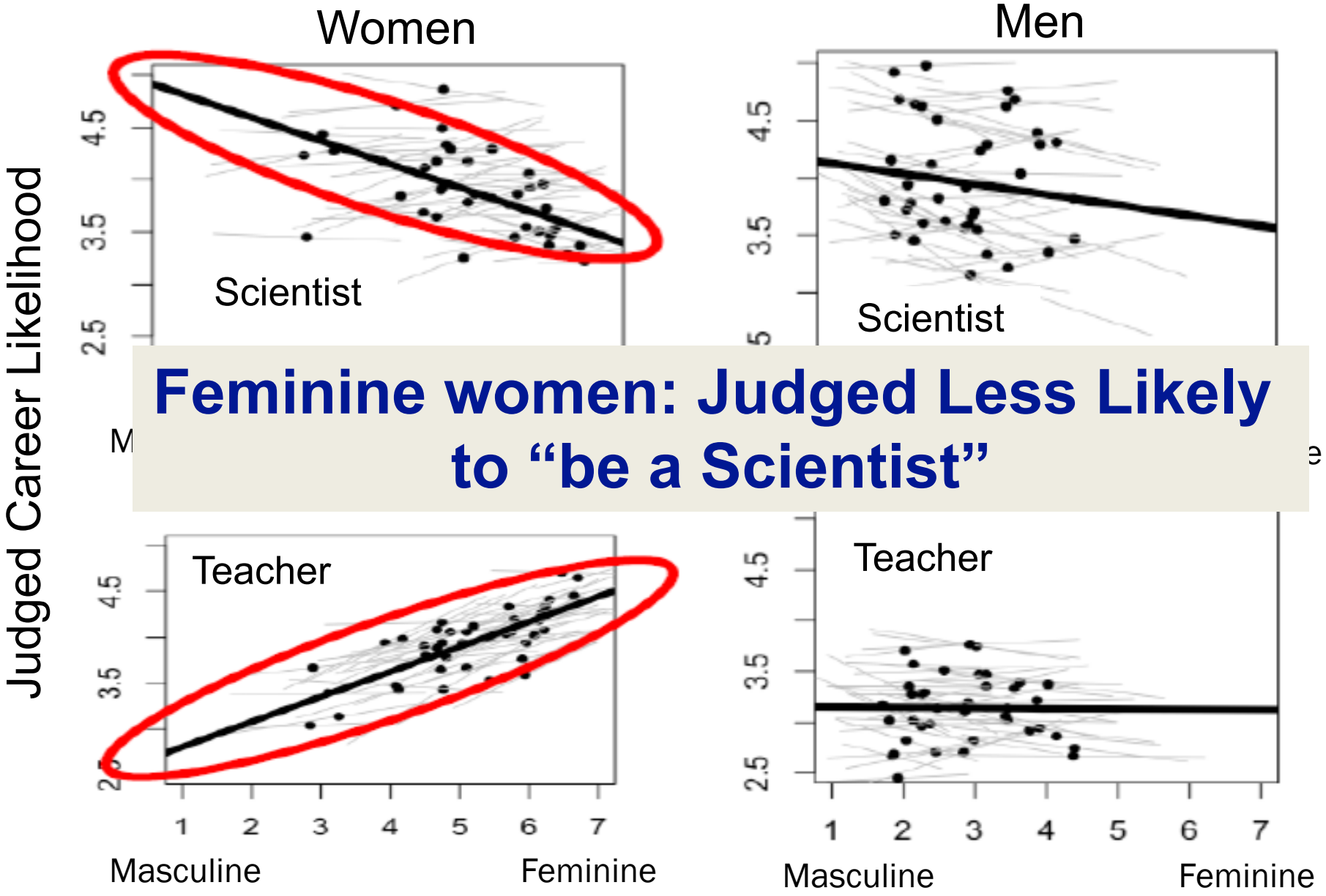


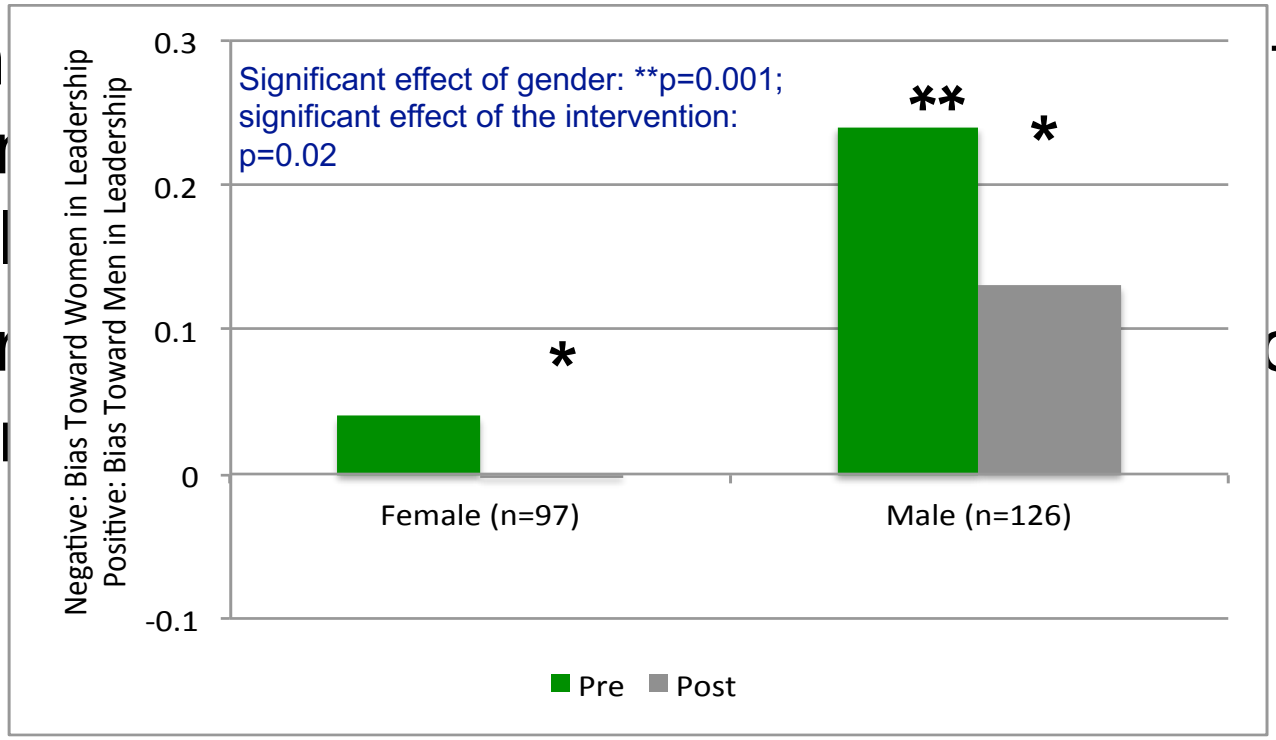
Feminine women: Judged Less Likely to "be a Scientist"

Implicit Bias Intervention: Women in Scientific Leadership

- Hypothesis: a standardized, 20-minute educational intervention will educate faculty about implicit biases and help overcome them
- Measured pre- and post-IAT test and collected demographic data

Implicit Bias Intervention: Women in Scientific Leadership

- Hypoth tional interver biases and hel
- Measur d demogr



Results of Intervention:

- Changed perception of implicit bias in males and females
- Reduced implicit bias about leadership and men

Girod S., Valantine H, et. al. Acad Med. 2016 Aug;91(8):1143-50

National Institutes of Health
Office of the Director
Scientific Workforce Diversity

NIH Scientific Workforce Diversity

What are we doing to help?

Interventions at ***Individual*** Level

Intramural

- Recruitment Strategies and Tools: NIH SWD Interactive Toolkit

- Retention strategies: NIH Central Equity Committee
- Graduate Student Diversity

Extramural

- BUILD, NRMN, CEC
- Diversity Supplements

DIVERSITY PROGRAM CONSORTIUM
Supported by the National Institutes of Health

- Eliminate R01 funding disparities
  - Next Generation Scientist
  - Peer Review Bias Study
- Sustain and Scale
  - Hubs of Innovation

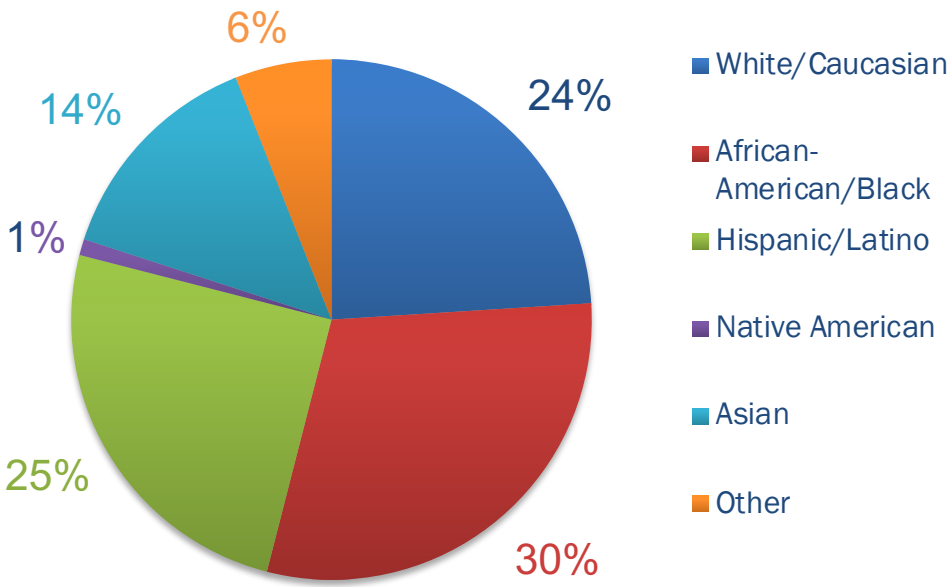
Expanding Diversity of NIH Candidate Pools: Junior Career Stage

Post-Doctoral and Assistant Professors

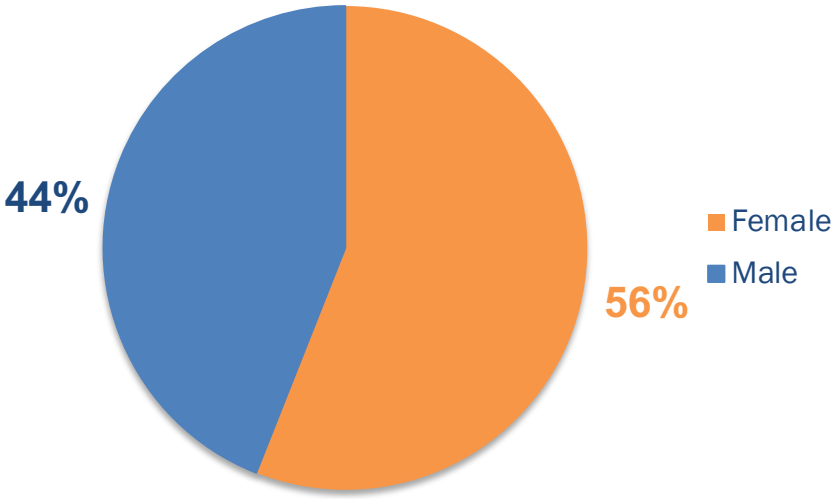
~ 693 total, top 1/3rd culled
4-10 years post-doctorate (most 4-7)
Authorship in top journals
10+ publications: 369
100+ citations: 490
200+ citations: 367

PLOS ONE
JAMA The Journal of the American Medical Association
The NEW ENGLAND JOURNAL of MEDICINE
Endocrinology
BMC Pediatrics
Neuron
JNeurosci THE JOURNAL OF NEUROSCIENCE
nature immunology

Race/Ethnicity



Gender



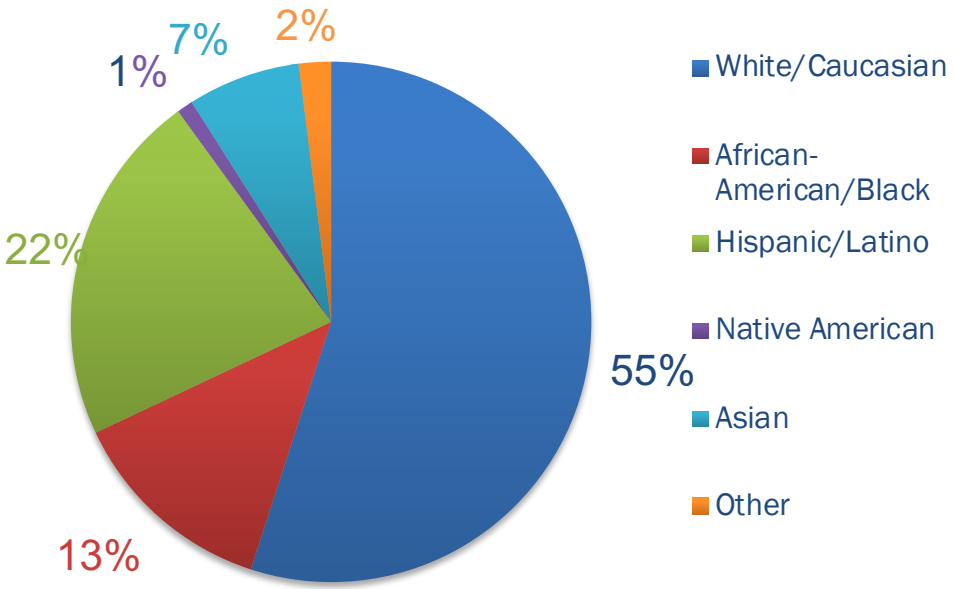
Expanding Diversity of NIH Candidate Pools: Senior Career Stage

Associate Professors and Full Professors

~ 706 total, top 1/2 culled
Authorship in top journals
100+ publications: 291
500+ citations: 586
2000+ citations: 414

PLOS ONE | EMERGING INFECTIOUS DISEASES (CDC) | American Journal of PUBLIC HEALTH | PNAS | Science | aps American Physiological Society | AMERICAN JOURNAL of PHYSIOLOGY Cell Physiology | JAMA Neurology

Race/Ethnicity



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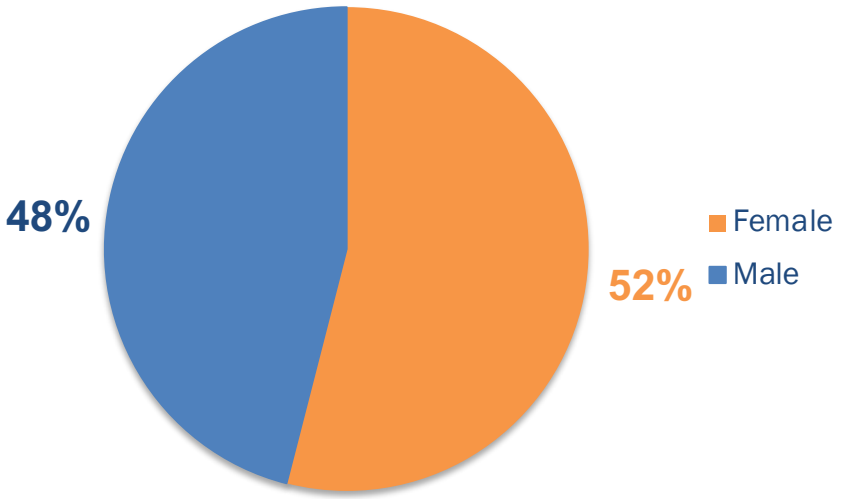
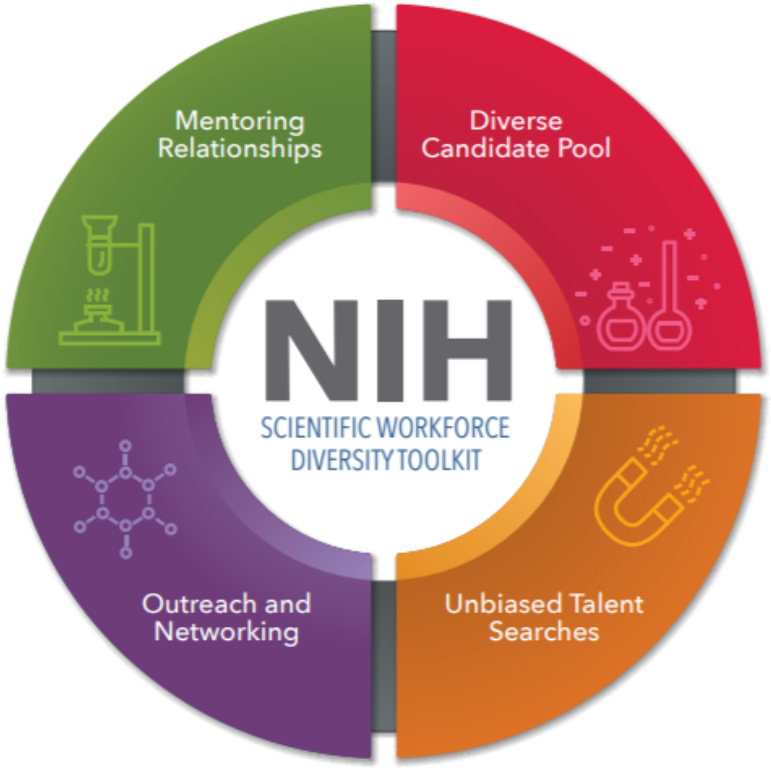


NIH Scientific Workforce Diversity Toolkit

The U.S. scientific research enterprise – from basic laboratory research to clinical and translational research to policy – requires intellect, creativity, and diverse skill sets and viewpoints.

Diversity

… enhances excellence, creativity, and innovation
… broadens the scope of biomedical inquiry
… addresses health disparities
… ensures fairness in our highly diverse nation

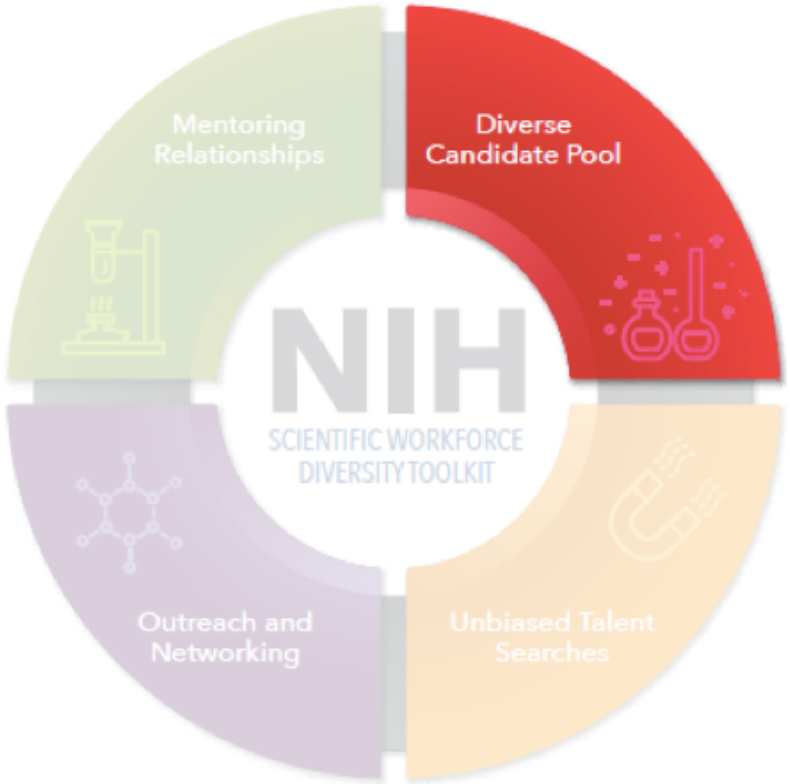


- Recruitment search protocol
- Tips for reducing implicit bias
- Future Research Leaders Conference

National Institutes of Health
Office of the Director
Scientific Workforce Diversity

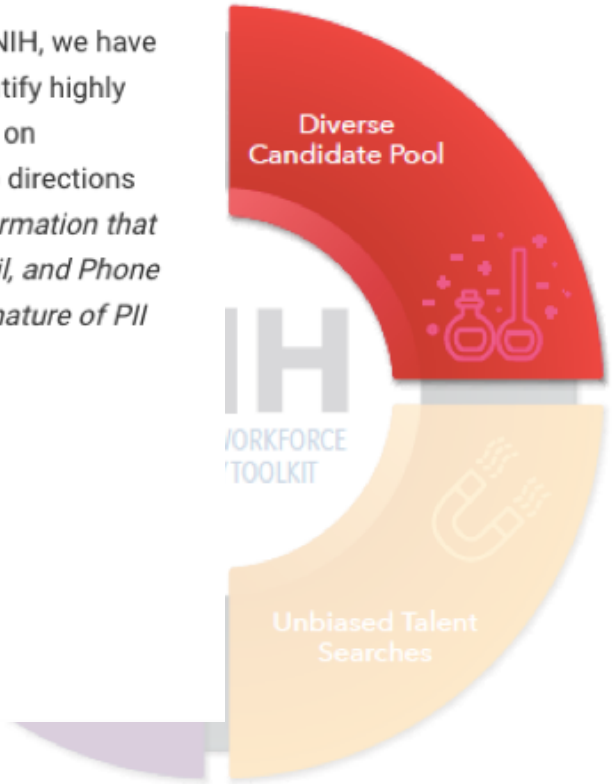
Diversify the Talent Pool

Learn about how our recruitment tool can help you identify a wider range of candidates



NIH Scientific Workforce Diversity Recruitment Search Protocol

This recruitment search protocol can be used as one tool to diversify faculty in biomedicine. At NIH, we have used it numerous times to help scientific leadership in the NIH intramural research program identify highly qualified scientists (both senior and early-career) from diverse backgrounds. (For additional tips on identifying early-career scientists from diverse backgrounds, click here). Below, find step-by-step directions to conduct a systematic, unbiased talent search tailored to a particular discipline. *Note: any information that is retrieved online such as Last Name, First Name, Degree, Race/Ethnicity, Focus/Interests, Email, and Phone Number are key examples of personally identifiable information (PII). Be aware of the sensitive nature of PII when storing, sending, and uploading protocol-related information.*



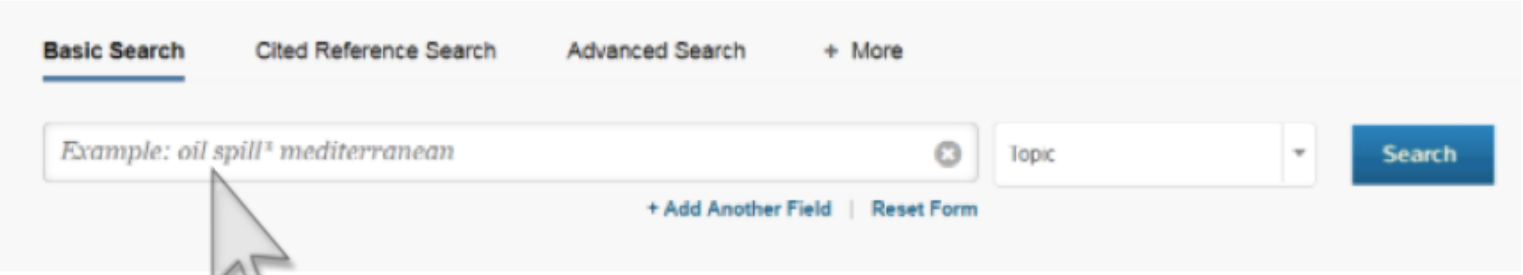
STEP 1: Generate dataset of top scientists in field of interest

STEP 2: Organize dataset by contact, professional, and demographic information

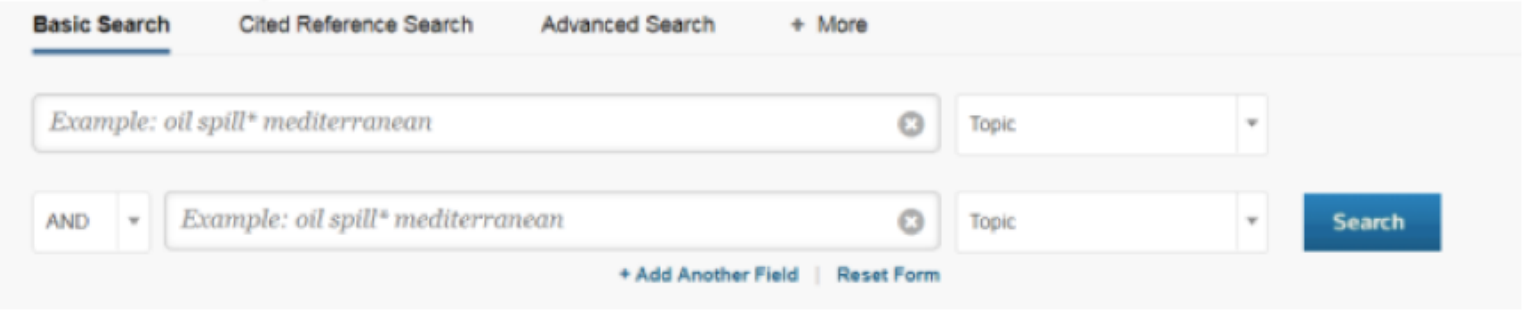
STEP 3: Vet candidates in the dataset using quantitative and qualitative measures

Web of Science (WOS) Method

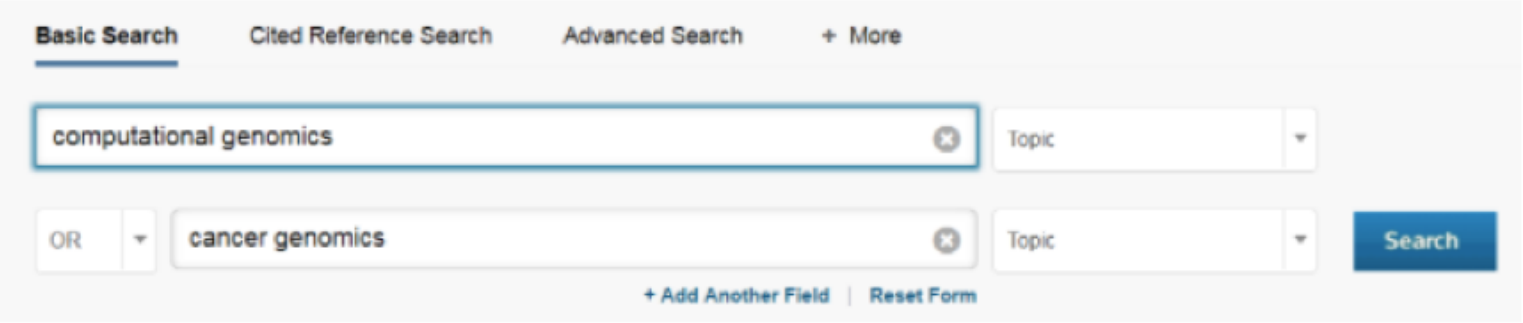
1. Using Web of Science, start by entering your keywords into the search bar under Basic Search. For this example, our keywords are "computational genomics" and "cancer genomics," and we will be searching for U.S.-funded scientists.



2. Use both keywords in combination to broaden the search (add another field).



3. Add "computational genomics" and select "Topic" in the top box. Change "AND" to "OR" and type in "cancer genomics." Click on Search.



4. Next, click "Analyze Results."

13. The results will provide a list of the top 100 (or 250) authors, as below.

View Records / Exclude Records	Field: Authors	Record Count	% of 1428	Bar Chart
☐	KHOURY MJ	14	0.980 %	I
☐	GARRAWAY LA	11	0.770 %	I
☐	MARDIS ER	9	0.630 %	I
☐	WANG Y	9	0.630 %	I
☐	BALADANDAYUTHAPANI V	8	0.560 %	I
☐	BEROUKHIM R	8	0.560 %	I
☐	BULT CJ	8	0.560 %	I
☐	DOLAN ME	8	0.560 %	I
☐	GETZ G	8	0.560 %	I
☐	KIM J	8	0.560 %	I

14. View records and further characterize authors using your desired search engine(s). Check the box by a name to look further.

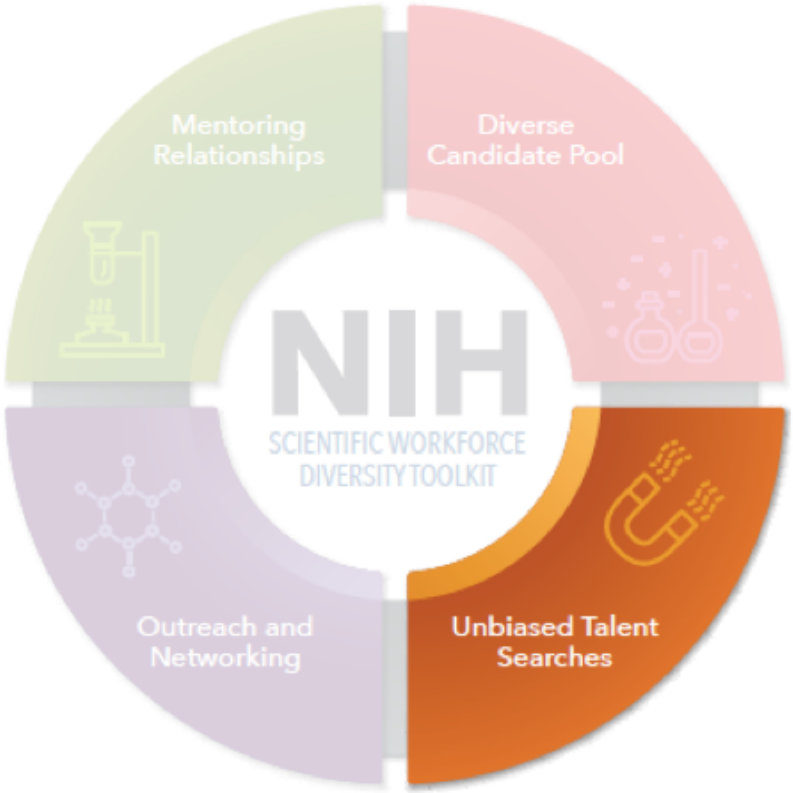
View Records / Exclude Records	Field: Authors	Record Count	% of 1496	Bar Chart
☐	KHOURY MJ	14	0.936 %	I
☑	GARRAWAY LA	11	0.735 %	I
☐	BALADANDAYUTHAPANI V	9	0.602 %	I

15. Click View Records. This will generate a list of the author's publications and analyze as desired, in addition to further characterizing the authors on your list with other search methods. ***Proceed to STEP 3.***

National Institutes of Health
Office of the Director
Scientific Workforce Diversity

Conduct an Unbiased Talent Search

Learn about implicit bias and find tips on how to reduce it



National Institutes of Health
Office of the Director
Scientific Workforce Diversity

How to Reduce Implicit Bias

We have developed an evidence-based educational tool to reduce implicit bias. It is a face-to-face workshop led by behavioral scientists – not an online tutorial. The session first presents empirical evidence and interactive demos to show how implicit bias affects all of us as we make judgements and decisions. The session then provides evidence-based strategies to reduce the impact of bias in hiring and performance evaluations. [14, 15, 19, 20, 27]

Unconscious Bias in Medicine Online CME Course (Stanford)

NIH SWD implicit bias presentation

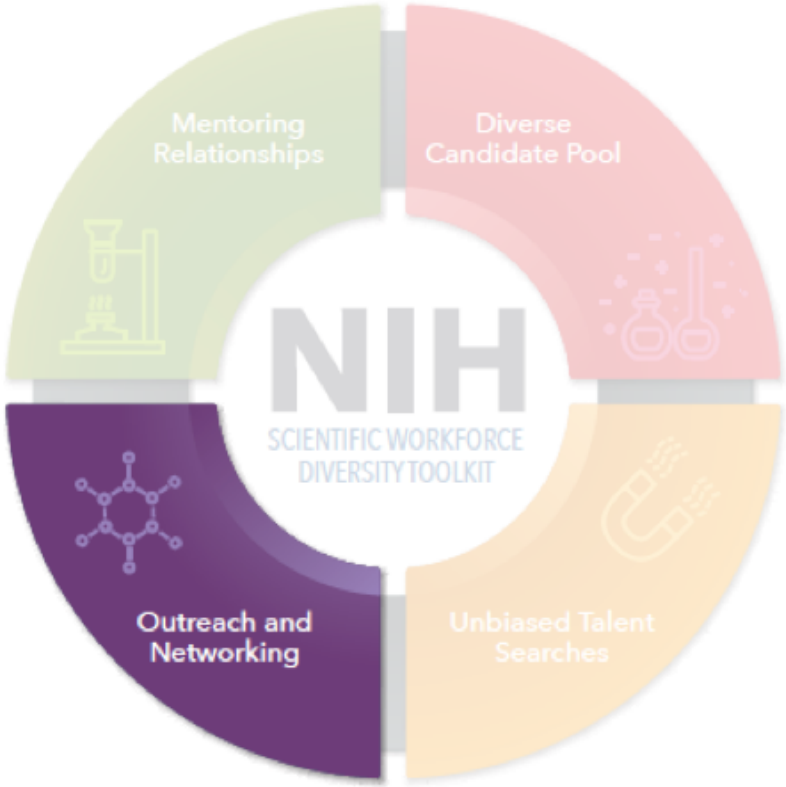
Breaking the Bias Habit® (WISELI)

Contact us for more information:
SWDToolkit@od.nih.gov

National Institutes of Health
Office of the Director
Scientific Workforce Diversity

Outreach and Networking

Learn about our Future Research Leaders Conference



YouTube

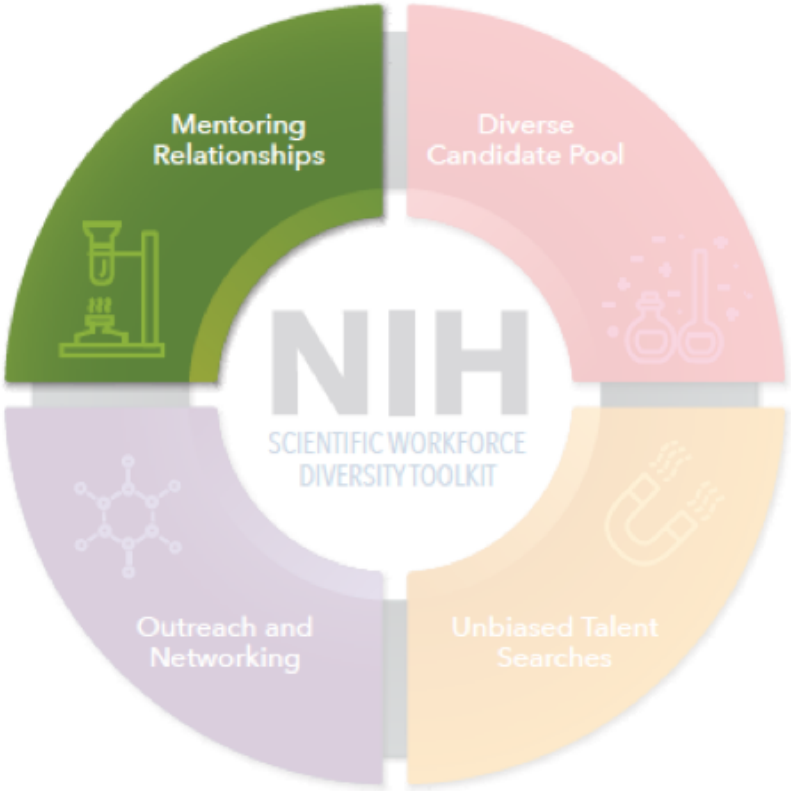
Search

NIH Future Research Leaders Conference (FRLC)

Relationships

Citation Library

National Institutes of Health
Office of the Director
Scientific Workforce Diversity



Mentoring Relationships

Institutional endorsement of mentoring relationships promotes inclusion and belonging

Optimizing Mentoring Relationships

Effective mentoring is relational, not hierarchical. Advisors convey disciplinary knowledge and information about career development. Role models inspire through example. And sponsors connect mentees to "power" through award nominations and membership in professional networks. The end goal of an effective mentoring relationship is a strong working[38] alliance built from trust and communication.[41]

What Does Good Mentoring Look Like?

Effective mentoring relationships address both career advancement and psychosocial issues. This can involve individual peers, group cohorts, and mentoring "mosaics" - communities that bring together individuals of different ranks, ages, genders, races, and ethnicities with a range of skills and experiences.

Mentoring mosaics are equally effective for women, men, and scientists from underrepresented groups.

Sponsorship Matters for Diverse Scientists

Good mentorship is important for productivity and career satisfaction, but sponsorship drives career advancement. Unlike mentors who advise and guide mentees, sponsors advocate intentionally. Sponsors use their positions of authority to help others get ahead. This is especially relevant for scientists from underrepresented groups, since research links connectedness with promotion in academia.

19. Blair IV, Ma JE, Lenton AP. Imagining stereotypes away: the moderation of implicit stereotypes through mental imagery. Journal of personality and social psychology 2001;81:828.

20. Gocłowska MA, Crisp RJ. On counter-stereotypes and creative cognition: When interventions for reducing prejudice can boost divergent thinking. *Thinking skills and creativity* 2013;8:72-9.

21. Bian L, Leslie SJ, Cimpian A. Gender stereotypes about intellectual ability emerge early and influence children's interests. Science. 2017 Jan 27;355(6323):389-391.

22. Moss-Racusin CA, Dovidio JF, Brescoll VL, Graham MJ, Handelsman J. Science faculty's subtle gender biases favor male students. Proc Natl Acad Sci U S A. 2012 Oct 9;109(41):16474-9.

23. Trix F, Psenka C. Exploring the color of glass: letters of recommendation for female and male medical faculty. Discourse and Society 2003; 14:191–220.

24. Rupa, B., Reitz, J.G., Oreopoulos, P. Do large employers treat racial minorities more fairly? a new analysis of Canadian field experiment data. 2017

25. Jacobi & Schweers. Justice, Interrupted: The Effect of Gender, Ideology and Seniority at Supreme Court Oral Arguments. Virginia Law Review, Forthcoming. Northwestern Law & Econ Research Paper No. 17-03

26. Files JA, Mayer AP, Ko MG, Friedrich P, Jenkins M, Bryan MJ, Vegunta S, Wittich CM, Lyle MA, Melikian R, Duston T, Chang YH, Hayes SN. Speaker Introductions at Internal Medicine Grand Rounds: Forms of Address Reveal Gender Bias. J Womens Health (Larchmt). 2017 Feb 16.

27. Galinsky AD, Moskowitz GB. Perspective-taking: decreasing stereotype expression, stereotype accessibility, and in-group favoritism. *Journal of personality and social psychology* 2000;78:708.

PNAS Keys to Scientific Workforce Diversity

Diversity Science

Recruitment
Retention

DIVERSITY PROGRAM CONSORTIUM

Supported by the National Institutes of Health

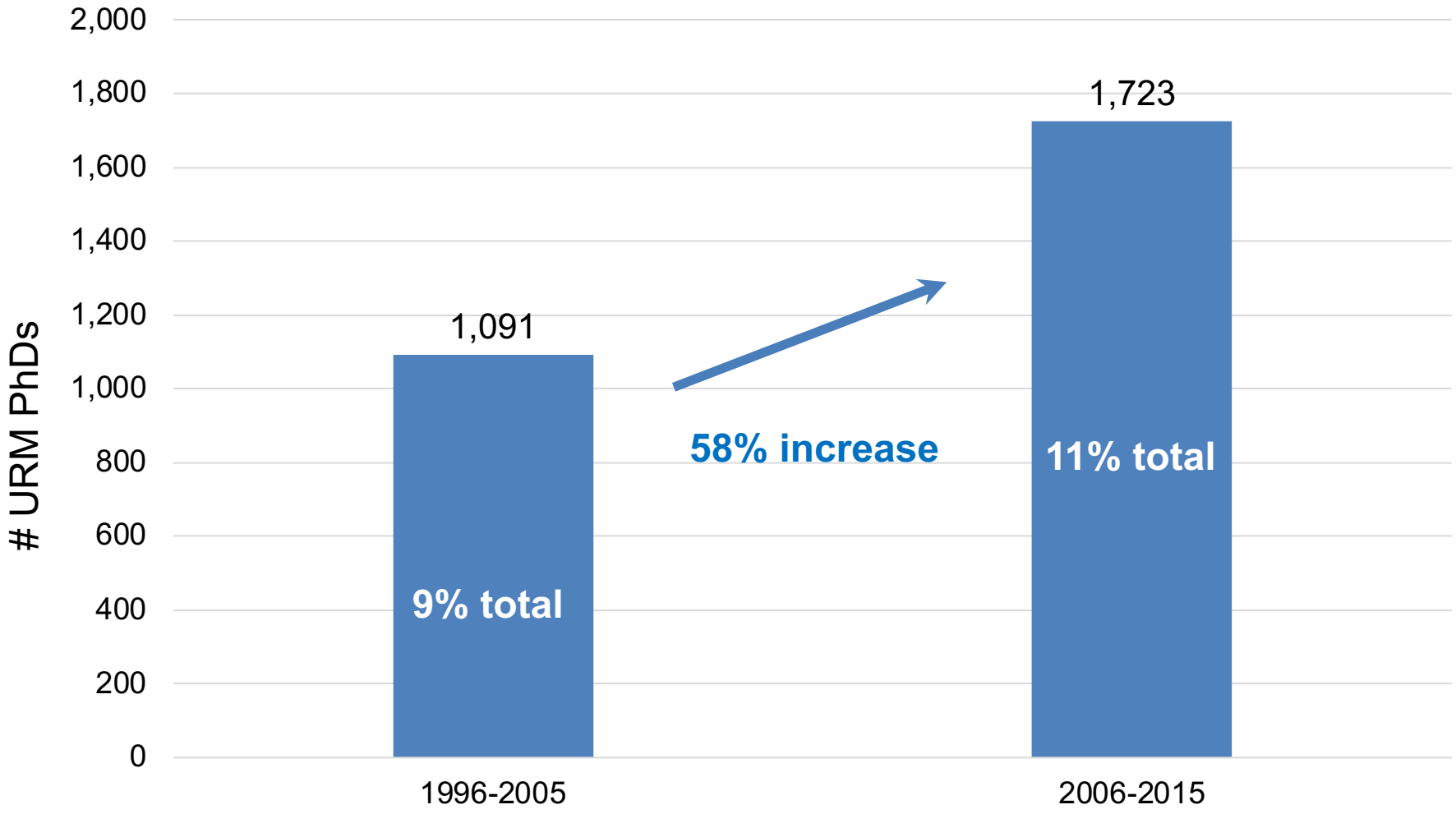
Sociocultural Factors

Sustainability

Institutional Accountability

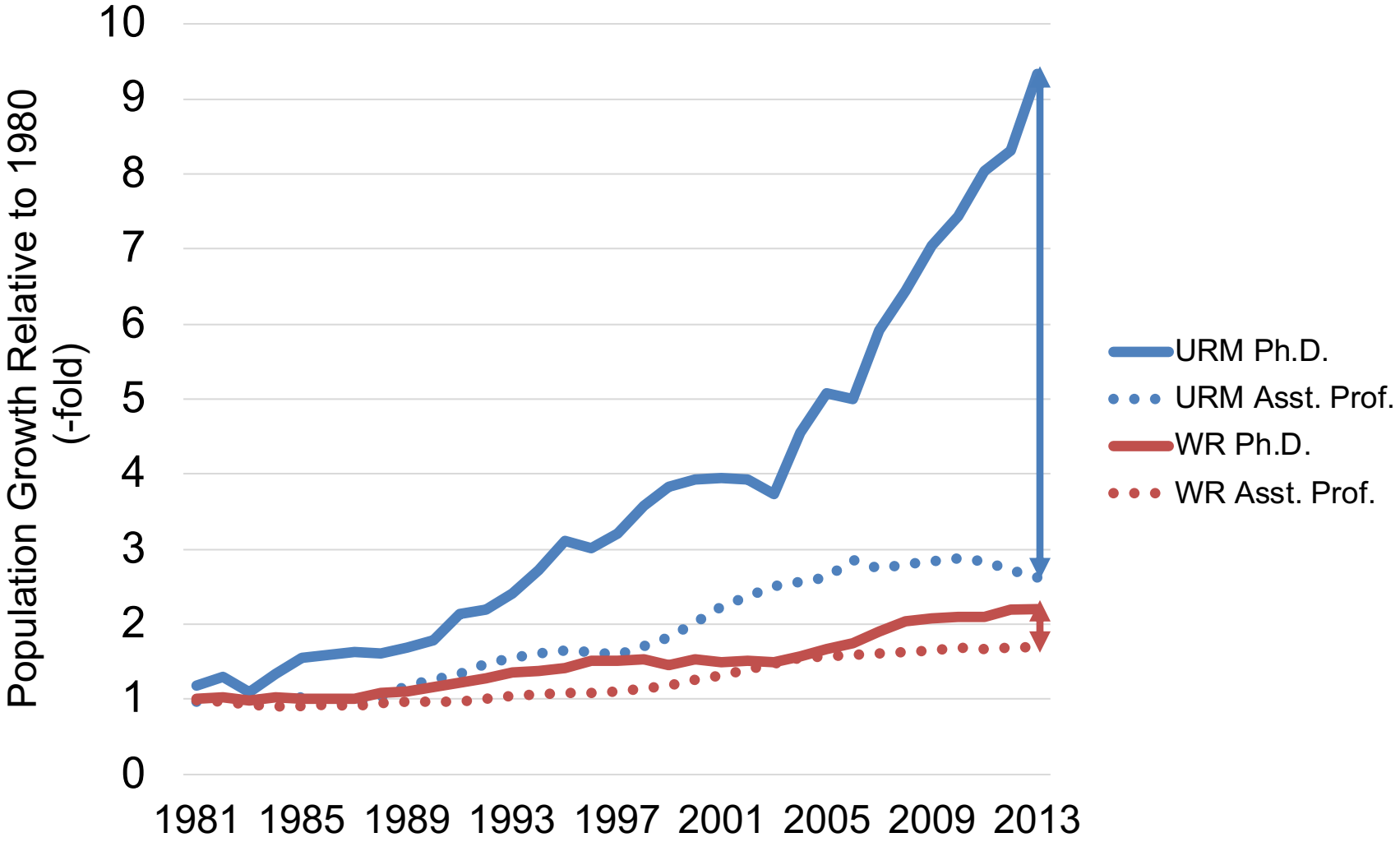
Valantine and Collins. *PNAS* 2015: Oct 6;112:12240-2

Race/Ethnicity and NIH Funding: Trainees (1996-2015)



NSF Survey of Earned Doctorates 1996-2015. Fields included: Biological Sciences (**53%**), Medical Chemistry (**19.2%**), Sciences (**7.5%**), Other Life Sciences (**5.2%**), Psychology (**14.7%**)

URM Assistant Professors:
Lags Behind Growth in Ph.D. Recipients



Gibbs, K. D., et al. (2016). *Decoupling the minority PhD talent pool and assistant professor hiring in the medical school basic science departments in the US*.

Addressing Racial R01 Funding Gap
New Data

- AA/B applicants less likely to get R01 grants (Ginther et al., 2011)
  - Controlled for education/training; employer characteristics; NIH experience; research productivity
- New NIH analysis with more recent data (FY2011-2015)
  - Relative gap slightly lower than in 2000-2006
  - Multifactorial, disparity at each stage in the process

Addressing Racial R01 Funding Gap
New Data

Fewer Submissions and Resubmissions

(3X Funding Improvement on Resubmission)

Lower Score

Topic Choice

Community/ Population vs. Basic/ Mechanistic

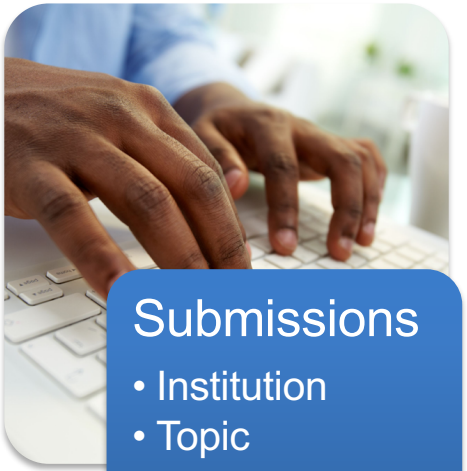
Smaller Pool

(1.5%)

Cumulative gap

AA/B scientists funded at <u>half</u> the rate of WH scientists

Intervention Targets



Submissions
- Institution
- Topic

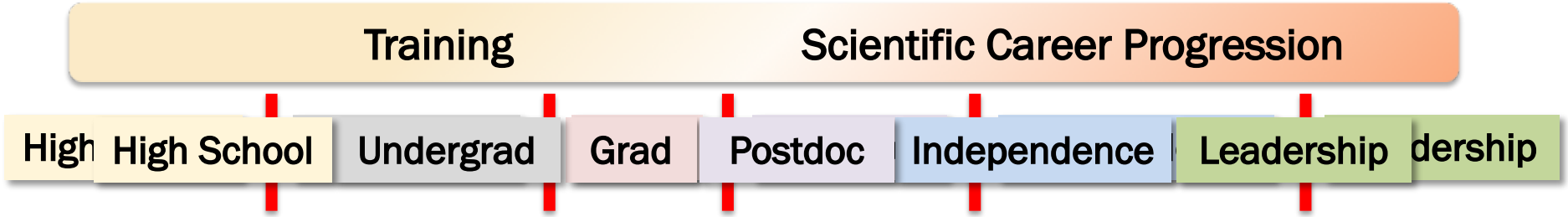
Review
- Less discussed
- Score
- Fewer re-submissions
- Topic

Funding
- IC Council review
- Paylines, select pay
- Topic

Mentoring/coaching pilot to enhance submission and re-submission	• Information on re-submission outreach
	• Anonymized application review study
		• IC select pay analysis
		• Topic further analyses
		  • Health disparities
		  • Minority health

Spring 2018	Underway	

Eliminate Transition Gaps: Enhance Faculty Diversity



- Postdoc -> faculty/other research careers
  - Needed: Program linkages across career stages
- Draw evidence from existing programs
  - Integrated approaches
  - Sociocultural factors

Goal: Eliminate transition barriers > achieve sustainable transformation in scientific workforce diversity

NIH Hubs of Innovation and Research in Scientific Workforce Diversity: Model

Data-driven; evidence based; interdisciplinary engine

Mentoring

Training

Partnerships

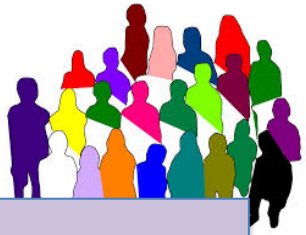
Research

Evaluation

Academia

Industry/Business

Community



Communicate/ Disseminate

STEM Jobs

Tech Pharma Biotech Small Businesses Federal Agencies Social Scientists
Biomedical Scientists Community Colleges Community Organizations Business Schools
Minority-Serving Institutions Research-Intensive Institutions Academic Medical Centers

Public-Private

Institutional Transformation and Culture Change

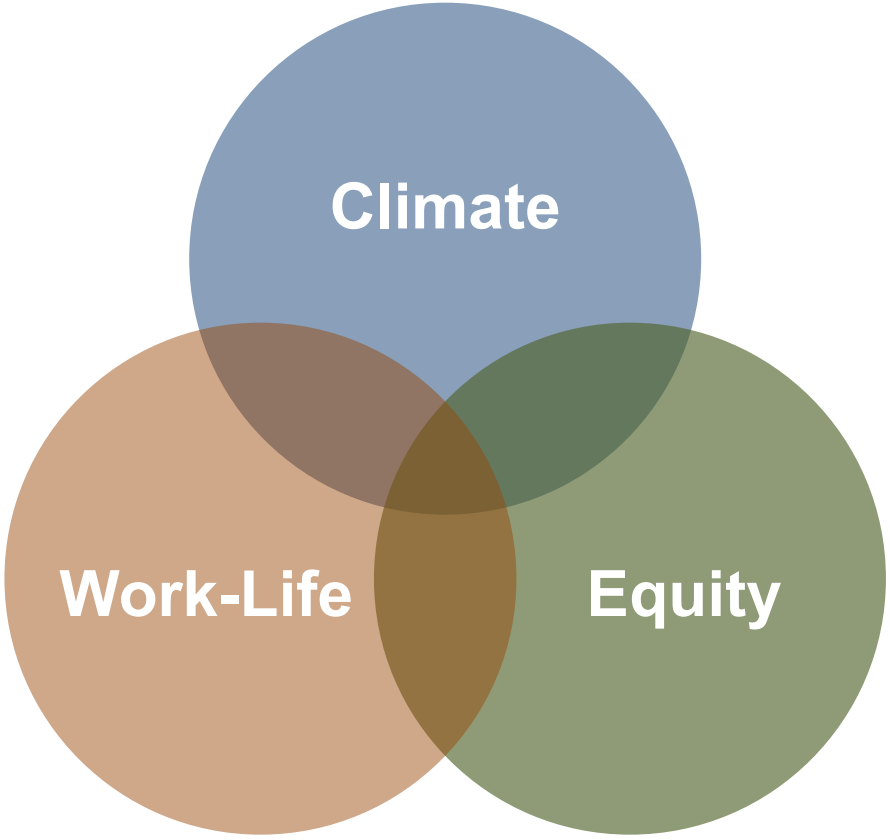
Programs are necessary but not sufficient:

Promote Transparency and Accountability

Link to Institutional Values and Reward Systems

- Systematic review and transparency of hiring and promotion procedures, policies
- Transparency: collect and publicize aggregate diversity metrics
- Provide tools to Divisions, Departments for enhancing recruitment and retention
- Evaluation of impact

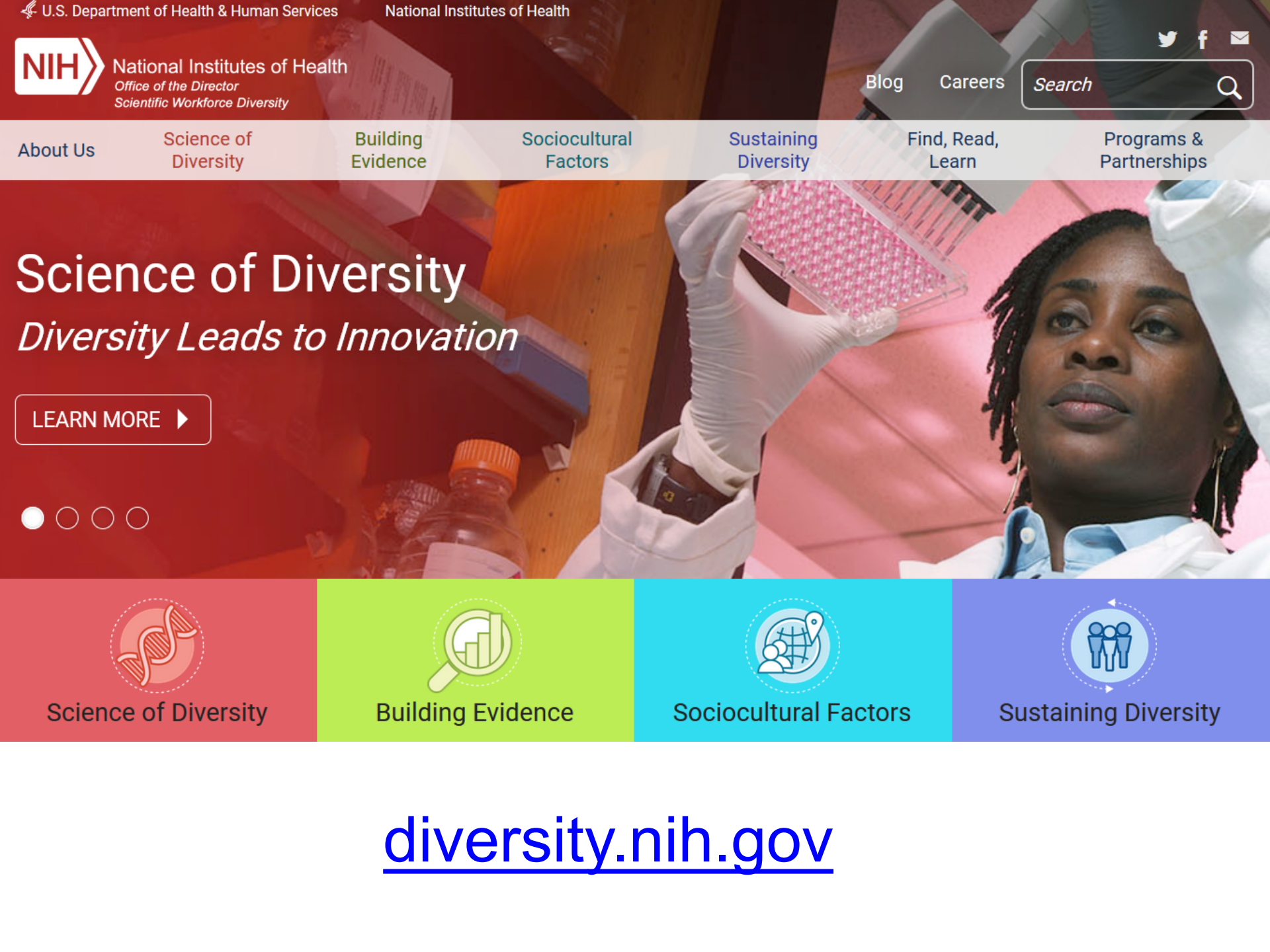
Institutional Leadership: Promotes Diversity and Inclusion



Three Pillars of Culture

Institutional Leadership: Promotes Diversity and Inclusion

Candidates are not faculty …
until they are hired!



diversity.nih.gov

Great minds think differently …

@NIH_COSWD

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