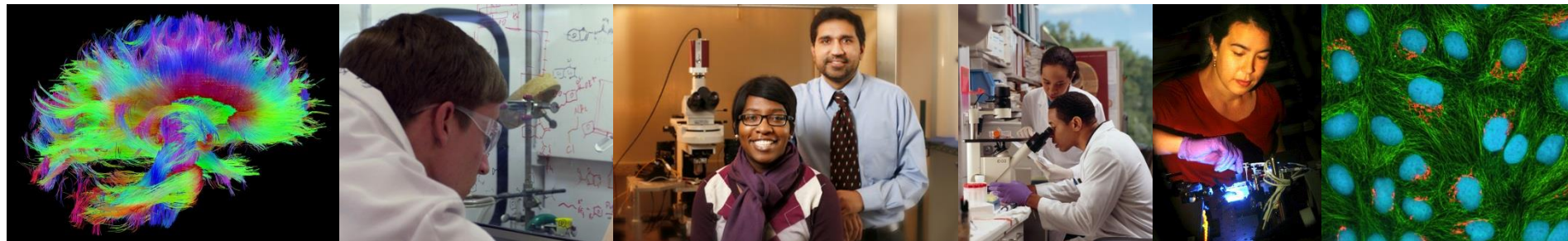


NIH Addresses the Science of Diversity

Hannah A. Valentine, MD

NIH Chief Officer for Scientific Workforce Diversity

Resource Centers on Minority Aging Research | April 13, 2017



National Institutes of Health

Office of the Director

Scientific Workforce Diversity

Addressing the Science of Diversity

Time for Scientific Rigor and Integrated Approach

Presentation Outline

- Defining diversity and its impact
- Why diversity?
 - Driving force for excellence and innovation
 - The evidence
- Addressing four cross-cutting diversity challenges with scientific rigor
 - Science of diversity
 - Recruitment and retention (evidence, context)
 - Sociocultural factors (bias)
 - Sustainability: fundamentals and models (Hubs of Innovation)

National Institutes of Health Priorities

- Largest federal biomedical research agency
- 27 Institutes and Centers
- Intramural research labs on NIH campus (~10% of NIH budget)
- Extramural research funding to universities and medical schools (~80% of NIH budget)

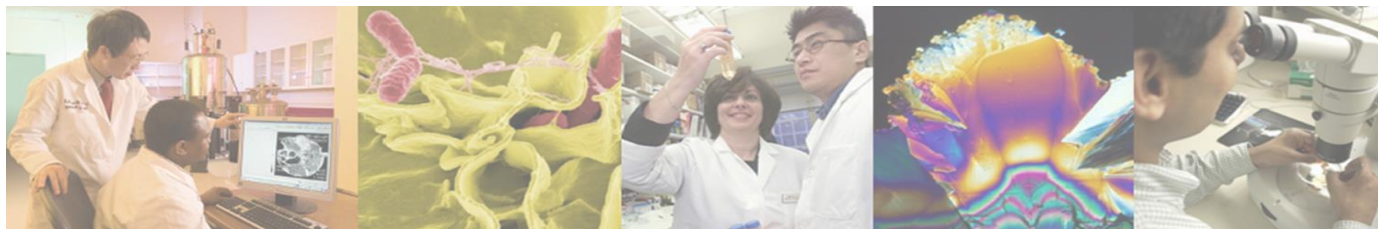


ACD WG Recommendation (2012)

Chief Officer for Scientific Workforce Diversity

Accountability, Evaluation, Coordination

- Recruit an active biomedical researcher with commitment to diversity and strong credibility in the academic community
- Charge: Coordinate diversity programs across NIH
- Intramural research program can be a critical space for learning about diversity recruiting/retention
- All programs must be subject to rigorous evaluation



My Career Path



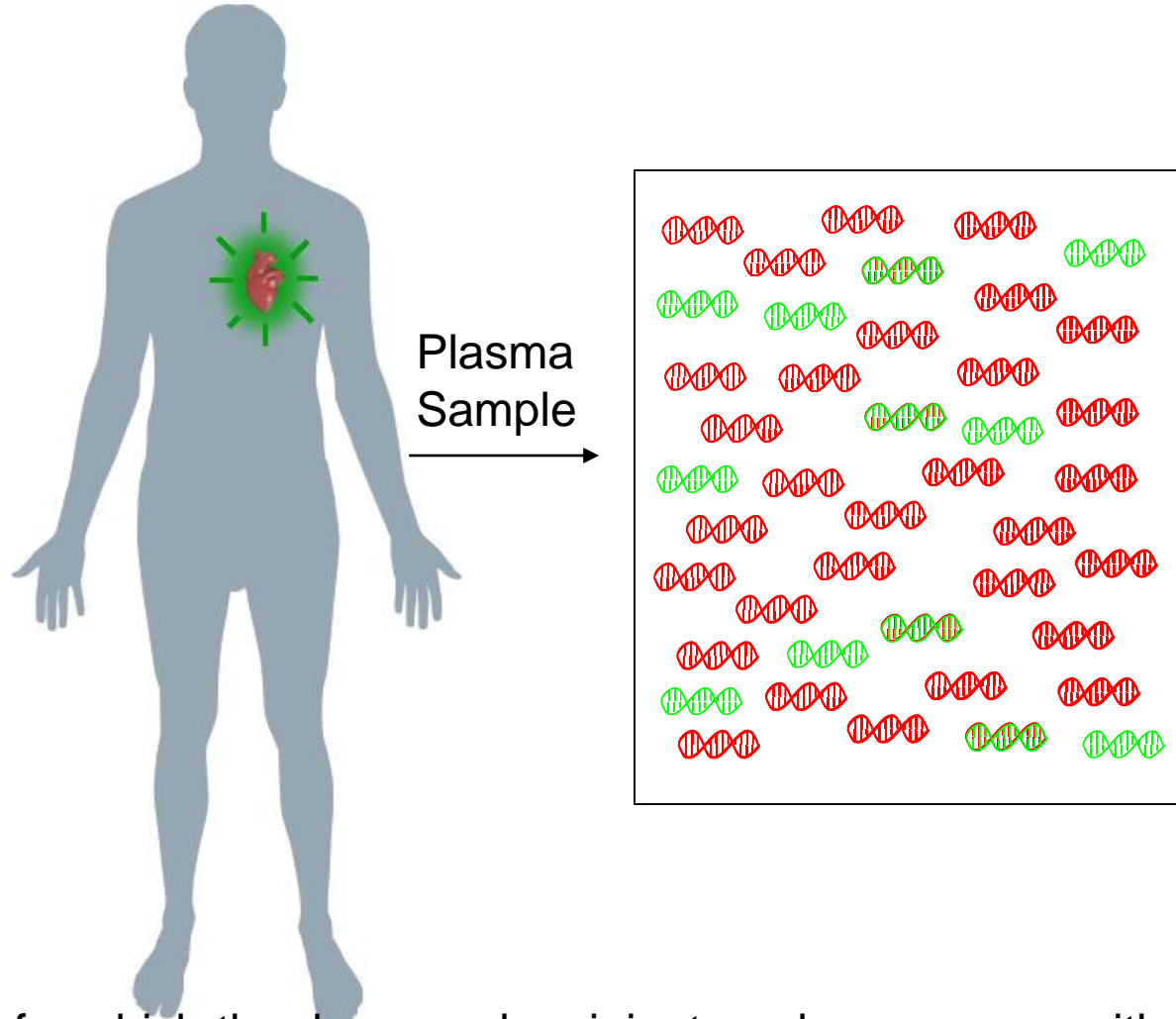
NIH Chief Officer
for Scientific
Workforce
Diversity

2016

NHLBI Senior
Investigator
Laboratory of
Transplantation
Genomics



My Research: Organ Transplant as Genome Transplant



SNP positions for which the donor and recipient are homozygous with a single base present in both alleles allow discrimination of donor and recipient derived sequences

Why Diversity Matters

Capitalizing on the Opportunity

- Excellence, creativity, innovation
- Broadening scope of inquiry - solutions to complex problems of health and disease
- Impact of workforce diversity on health disparities
- Ensuring fairness
 - Changing demographics
 - Leveraging the entire U.S. intellectual capital



Why Diversity Matters for NIH

NIH-Wide Strategic Plan

Fiscal Years 2016-2020



Turning Discovery Into Health



Enhance Stewardship

- Recruit/retain outstanding research workforce
- Enhance workforce diversity
- Encourage innovation
- Optimize approaches to inform funding decisions
- Enhance impact through partnerships
- Ensure rigor and reproducibility
- Reduce administrative burden



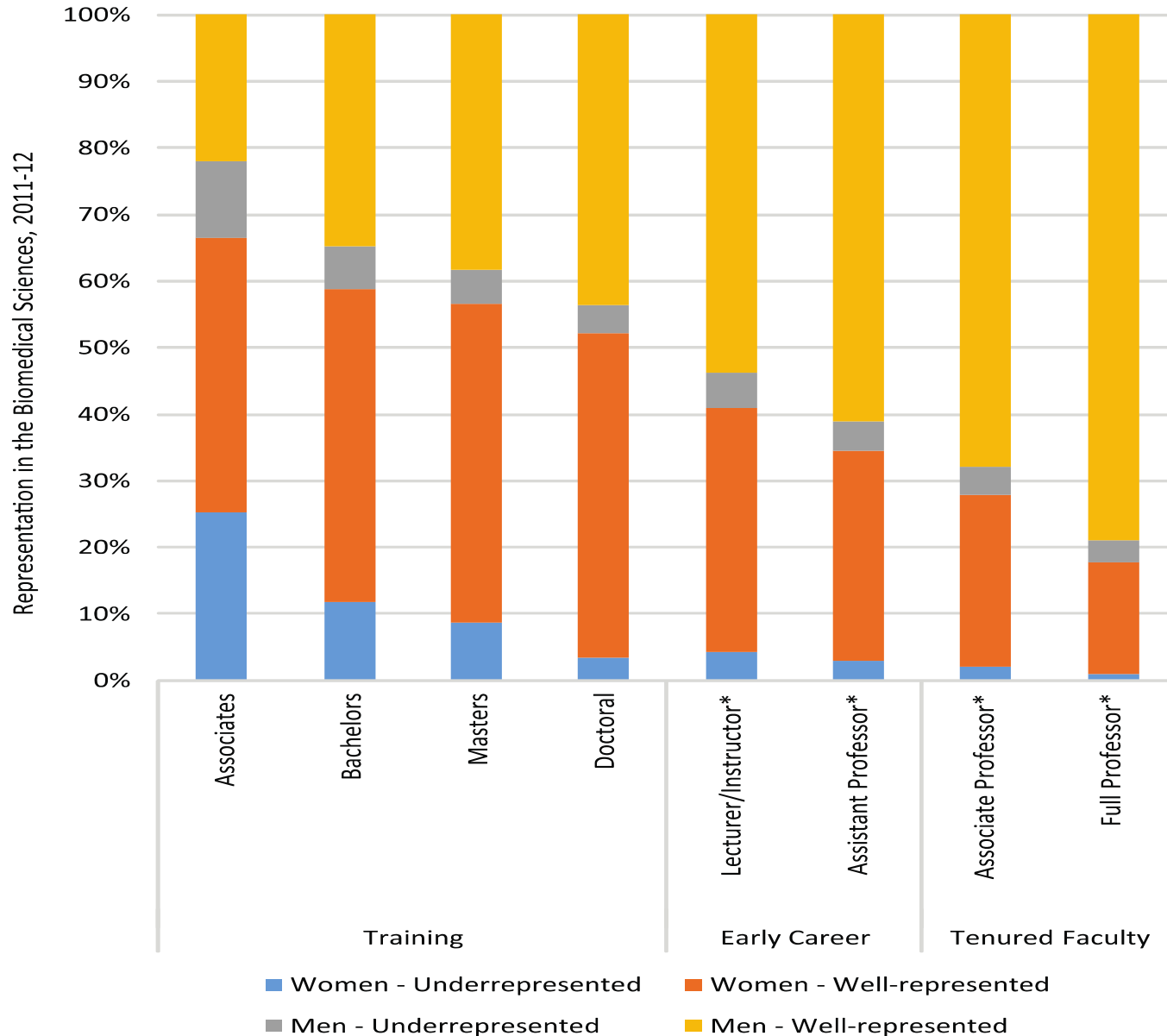
Capturing the Benefits of Diversity

Identity is a Proxy for Cognitive Diversity



Diversity Across the Biomedical Career Path

Underrepresented: African American, Hispanic, Native American, Pacific Islander, Alaska Native

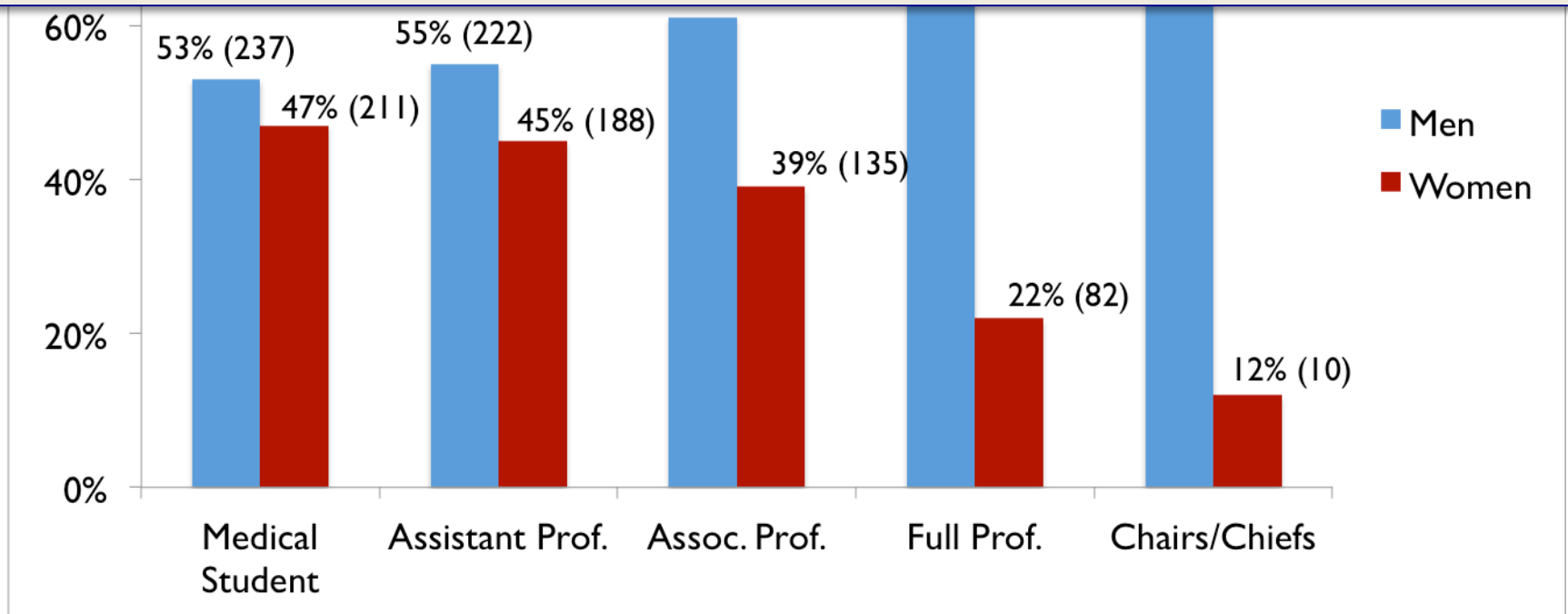


Diversity Across the Biomedical Career Path

Women

Gender gap in academic medicine (2013-14)

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



Adapted from: The state of women in academic medicine 2013-14: AAMC Report
Diana M. Lautenberger, et. al.

NIH Scientific Workforce Diversity

Mission: *Lead and catalyze scientific workforce diversity through data-driven innovations to recruit and retain the most talented scientists*

Strategies

Intramural

Recruitment strategies and tools

- Diversity in applicant pool
- Outreach to diverse candidates
- Reducing implicit bias

Retention strategies

- Build community
- Mentoring groups
- Professional development

Postdoc recruitment and retention

Graduate student partnerships

Extramural

Diversity Program Consortium

- BUILD
- NRMN
- CEC

Eliminate R01 funding disparities

Fairness in peer review

Evaluate existing programs

- Diversity supplements

National strategy for sustainability

- Hubs of Innovation in scientific workforce diversity

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

Diversity Science

Sociocultural Factors

THE DIFFERENCE
HOW THE POWER OF DIVERSITY
CREATES BETTER GROUPS, FIRMS,
SCHOOLS, AND SOCIETIES
Scott E. Page

**DIVERSITY
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Portraits of four individuals: a woman with dark hair, a man with long brown hair, a woman with short brown hair, and a man with a beard.

Innovation
Perspectives, Styles, Opinions, Beliefs, Skill Sets, Leadership, Education, Ability, Race, Gender, Backgrounds, Ethnicity, Gender Identity, Veteran Status, Services, Generational, Contractors, Vendors, Work Experience, Work Location, Region, Business Unit, Technical, Business, Admin, Sexual Orientation, Parental Status, WorkLife Inclusion, Marital Status.

Recruitment,
Retention:
What Works
and Why?
Context matters

Sustaining
Diversity

Better Problem-solving Results From a Larger Informational, or Cognitive Space

Scott E. Page

THE DIFFERENCE™

HOW THE POWER OF DIVERSITY
CREATES BETTER GROUPS, FIRMS,
SCHOOLS, AND SOCIETIES

- Argument: diversity outperforms ability
- Test: hypothetical scenarios designed to reflect individual's problem solving abilities toward making a hiring decision - 1,000 applicants
- Result: 20 people randomly selected from the qualified applicant pool were better at solving the problem than the highest-scoring individual or 20 individuals with the next highest 20 scores

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

Diversity and Jury Decision Making

Black Defendant

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

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

Diversity Science

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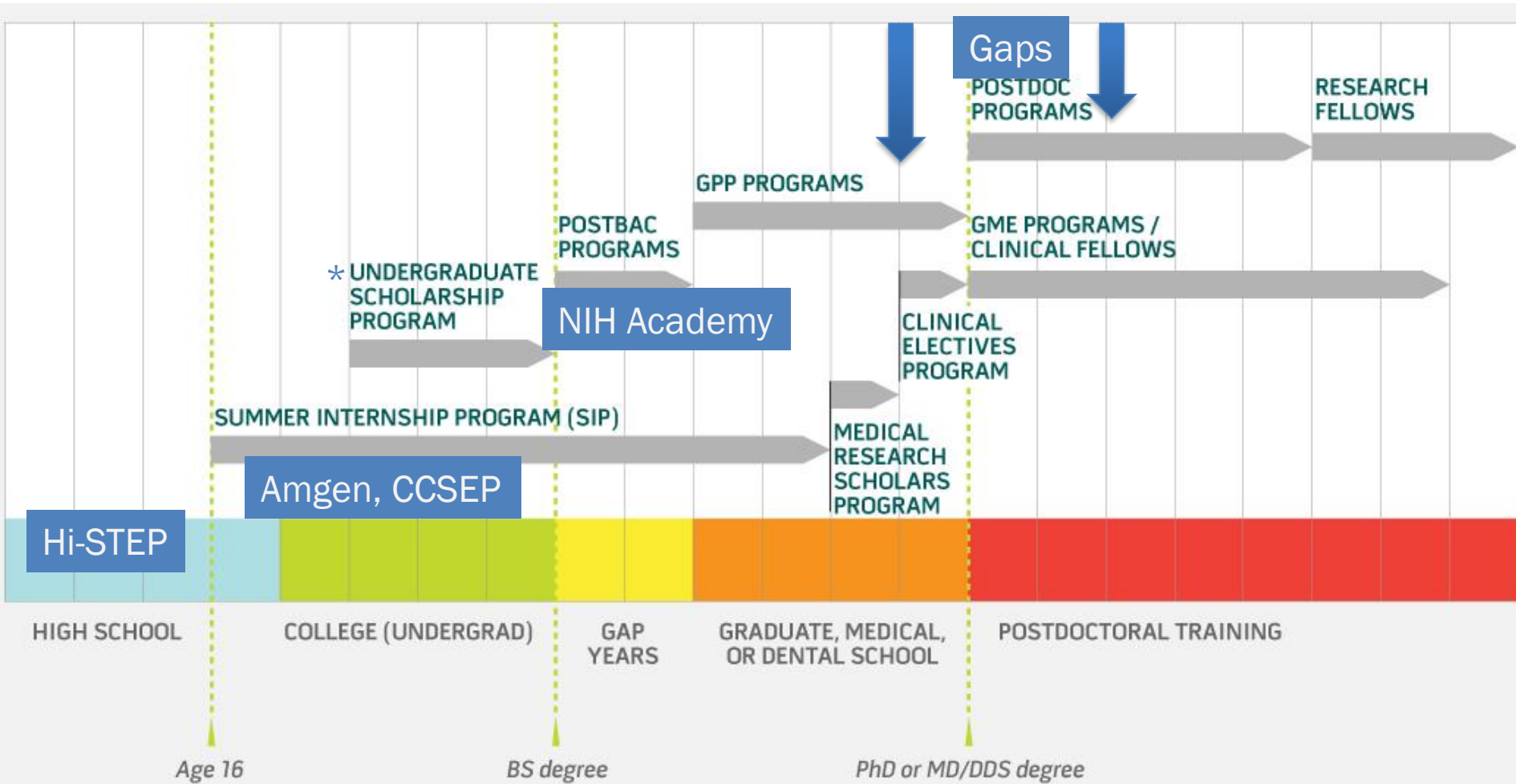
Recruitment,
Retention:
What Works
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Context Matters

Sustaining
Diversity

Targeted Recruiting and Retention: Enhancing NIH Intramural Diversity

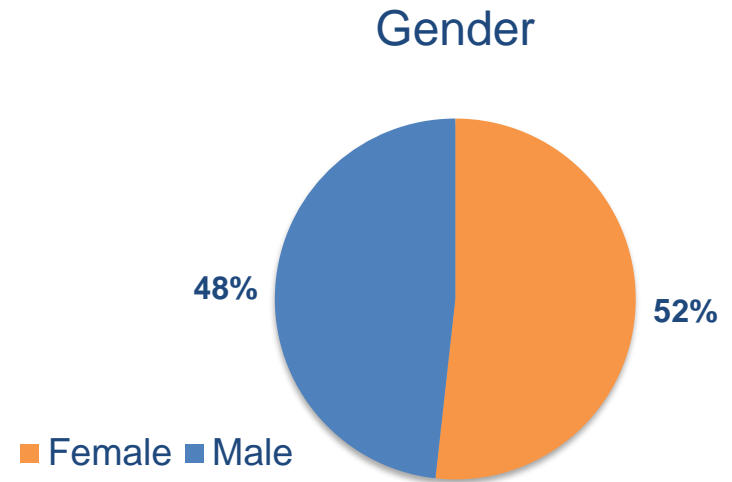
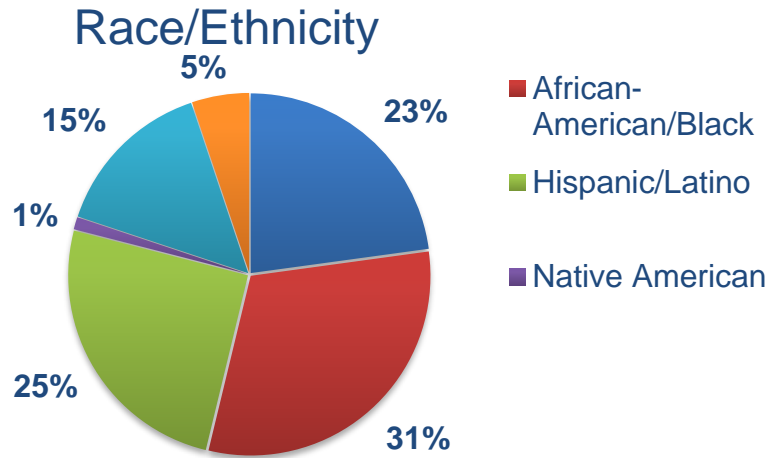
- Scientific opportunities in the intramural research program (IRP)
- Underrepresentation: Pipeline, attrition
 - Women
 - Race/ethnicity
- Enhancing diversity in the IRP – SWD partnership
 - Recruitment and retention of tenure-track scientists
 - SWD tools
 - Implicit bias education

Scientific Opportunities in the NIH Intramural Research Program



Expanding Diversity of Candidate Pools: Junior Career Stage

Post-Doctoral and Assistant Professors



- ~ 543 total, top 1/3rd culled
- 4-10 years post-doctorate (most 4-7)
- Authorship in top journals
- 10+ publications: 357
- 100+ citations: 407
- 200+ citations: 311



The NEW ENGLAND
JOURNAL of MEDICINE

Endocrinology



Neuron



2016 | NIH FUTURE RESEARCH LEADERS CONFERENCE

SEPTEMBER 13-15 | NIH Main Campus

#GREATMINDS
THINK DIFFERENTLY...



FRLC@NIH.GOV

Trans-NIH effort to engage talented early-stage biomedical and behavioral scientists from diverse backgrounds to promote knowledge and awareness about scientific career opportunities in the NIH intramural research program

September 12 - 14, 2017 Applications are currently being accepted until April 27



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

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Recruitment,
Retention:
What Works
and Why?
Context Matters

Sustaining
Diversity

Study: “Who is a Scientist?”

- Pictures of actual faculty members in STEM at elite universities
- Rated for masculinity and femininity
- Separate group of students rated pictures for likelihood of being a scientist

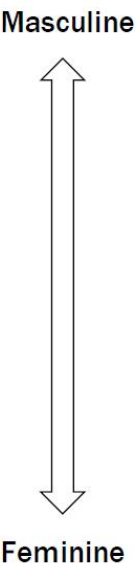
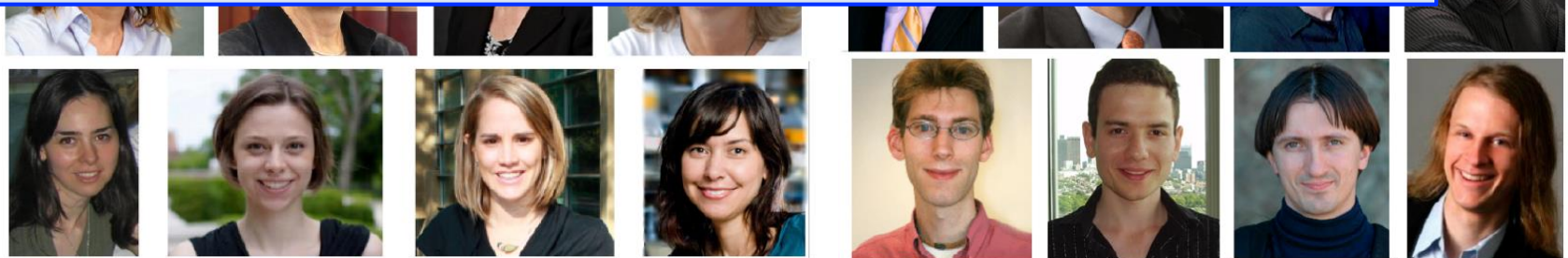


Banchefsky, S., Westfall, J., Park, B., & Judd, C. M. (2016). But You Don't Look Like A Scientist!: Women Scientists with Feminine Appearance are Deemed Less Likely to be Scientists. *Sex Roles*, 1-15.

Study: “Who is a Scientist?”

- Pictures of actual faculty members in STEM at elite universities
- Rated for masculinity and femininity
- Sexism: Women with a more feminine appearance are less likely to be

Result: For females, the more feminine the person is rated, the more likely she is rated to be an early childhood educator and less likely to be a scientist.



Implicit Bias: Habits Can Be Broken

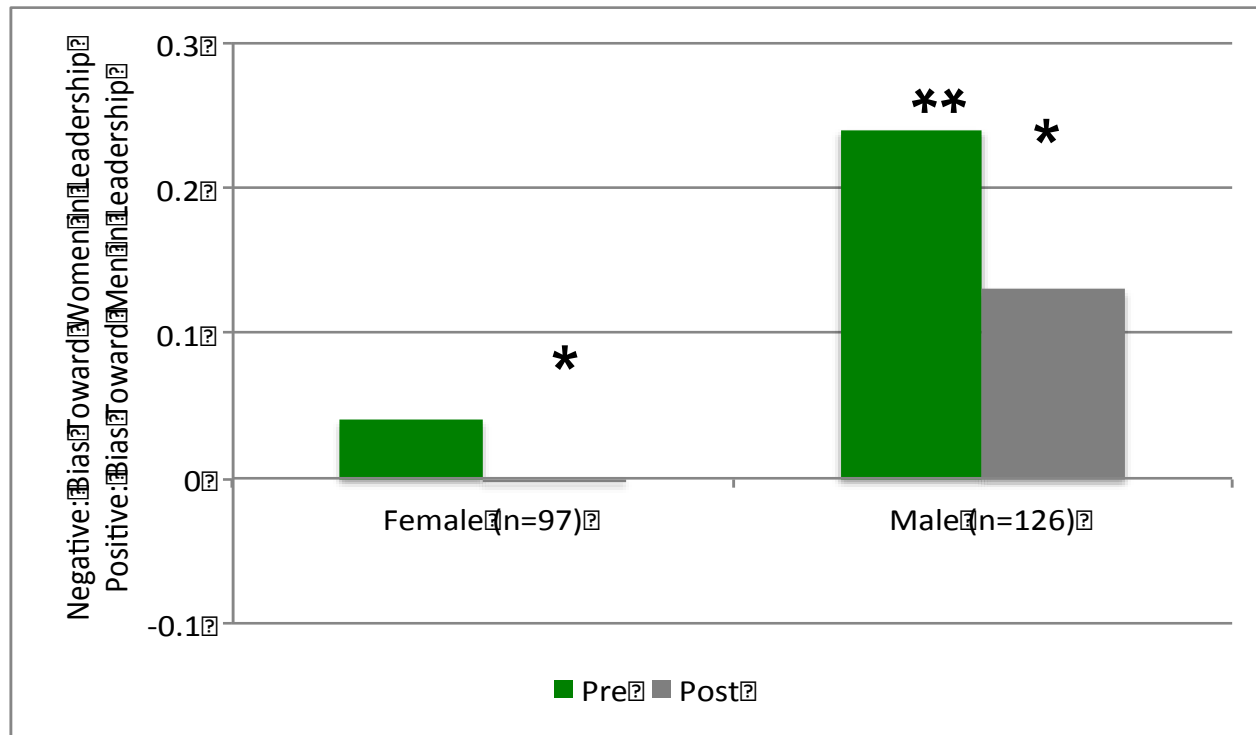
- 92 departments, matched by school/college
- Randomized controlled intervention
- Intervention group reported:
 - Greater personal bias awareness
 - More motivation to promote gender equity
 - More confidence in being able to enact gender equity
 - Feel that it would be personally beneficial to promote gender equity in one's department
- Persisted 3 months

Carnes, M., et al. (2015). The effect of an intervention to break the gender bias habit for faculty at one institution: a cluster randomized, controlled trial. *Academic Medicine*, 90(2), 221-230.

Reducing Implicit Gender Leadership Bias in Academic Medicine With an Educational Intervention

Sabine Girod, MD, DDS, PhD, Magali Fassiotto, PhD, Daisy Grewal, PhD, Manwai Candy Ku, PhD, Natarajan Sriram, PhD, Brian A. Nosek, PhD, and Hannah Valentine, MD **2016, Jan. 27**

Pre and Post Scores on the Implicit Association Test (IAT)



Significant effect of gender: ** $p=0.001$; significant effect of the intervention: $p=0.02$

Trans-NIH IRP Implicit Bias Education Goals and Objectives

- Raise awareness of implicit bias and reduce its impact in the search process
- Test feasibility
- Scientifically test the efficacy of the educational module

- Does implicit bias education affect the Stadtman search process and outcomes?
- Pre- and post-measurements of implicit/explicit bias

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

Diversity Science

Sociocultural Factors

The composite image features four main elements:

- Book Cover:** Titled "THE DIFFERENCE" by Scott E. Page. The subtitle reads: "HOW THE POWER OF DIVERSITY CREATES BETTER GROUPS, FIRMS, SCHOOLS, AND SOCIETIES".
- Logo:** The "DIVERSITY PROGRAM CONSORTIUM" logo, which consists of four stylized human silhouettes in blue, orange, green, and red. It is supported by the National Institutes of Health.
- Tree Diagram:** A tree structure where the trunk is labeled "Innovation". The branches represent various sociocultural and organizational factors, including: Perspectives, Styles, Opinions, Beliefs, Skill Sets, Leadership, Education, Ability, Race, Gender, Backgrounds, Ethnicity, Gender Identity, Veteran Status, Services, Generational, Contractors, Vendors, Work Experience, Work Location, Region, Business Unit, Business, Admin, Technical, Business, Sexual Orientation, Parental Status, and WorkLife Inclusion.
- Portraits:** Four circular headshots of individuals, two women and two men, representing diverse backgrounds.

Recruitment,
Retention:
What Works
and Why?
Context Matters

Sustaining
Diversity

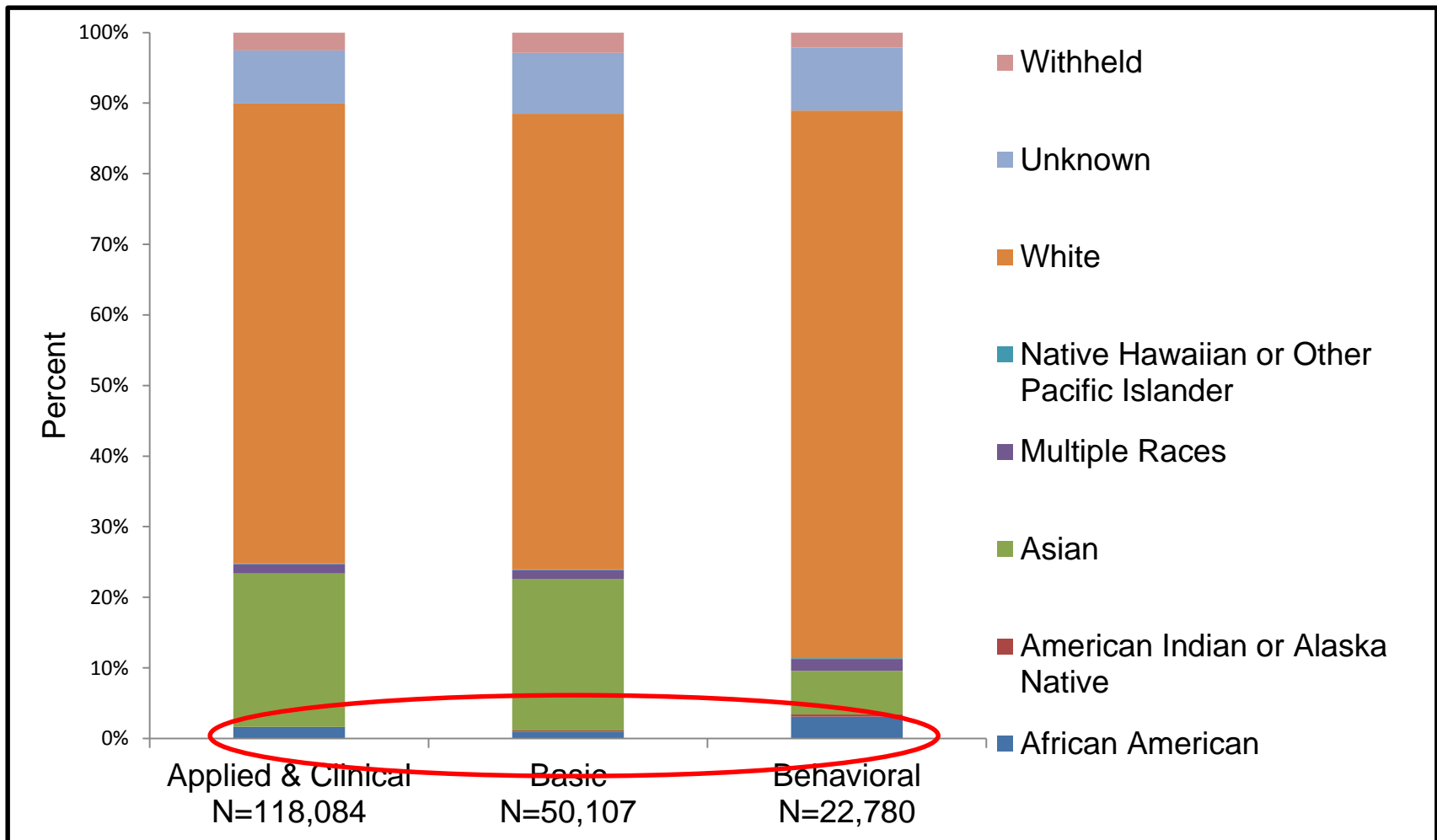
Addressing Racial Funding Disparities: New Data

- Ginther et al. (2011): AA/B applicants (FY2001-2006) less likely than whites (WH) to get R01 grant
 - Controlled for demographics; education/training; employer characteristics; NIH experience; research productivity
- AA/B Funding Disparity Working Group follow-up analysis with more recent data (FY2011-2015)
 - Relative gap slightly lower than in 2000-2006: Award rate – 11% vs. 17%
 - Multifactorial, disparity at each stage in the process
 - Initial applications, re-submissions, review outcome (score), number of applications discussed, funded; **topic choice**

Cumulative disparity: Overall, AA/B scientists funded at half the rate as WH scientists, taking into account lower AA/B submission rates

Applications from AA/B Scientists Constitute Only 1.5% of the Pool

Source: NIH Office of Extramural Research



Analysis of R01 Success Rates in the Era of Declining Pay Lines: Disparity Persists

Success rate for:
FY 2000 – 2006

African American applicants: 17%

White applicants: 29%

Differential success (AA:W)

0.59

*

Ginther, 2011

FY 2010 - 2015

African American applicants: 11%

White applicants: 17%

Differential success (AA:W)

0.65

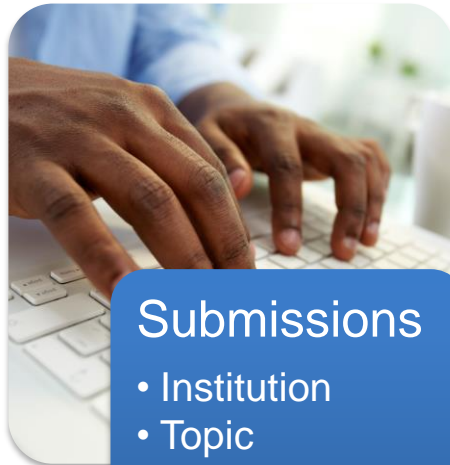
OER, 2016

Cochran-Mantel-Haenszel statistics

Effect of race adjusted for time period: 154.40; $p < 0.0001$

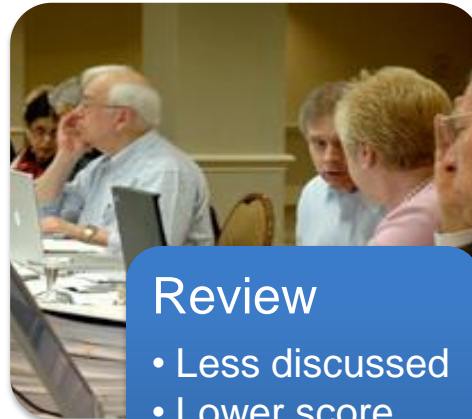
Effect of time period difference: $\chi^2 = 5.14$; $p < 0.023$

Intervention Targets



Submissions

- Institution
- Topic



Review

- Less discussed
- Lower 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

Sustaining Diversity: Retiring the Pipeline Metaphor.....



... and thinking about a system

Underrepresentation is Not Just a Pipeline Issue

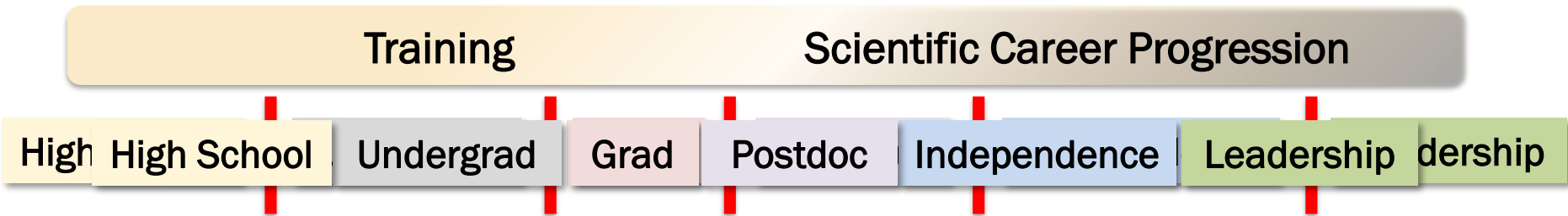


Gibbs KD et al. *Elife*. 2016 Nov 17;5.

- URG talent has grown 9-fold over past 20 years
- Academia is not tapping into the pool of URG scientists
- Filling the “pipeline” is necessary but not sufficient
- The math
 - AAMC institutions (about 150) hire ~1,000 assistant professors per year
 - 10% URG representation = 100 URG faculty

If 2/3 of AAMC institutions hired and retained one URG faculty member per year for 6 years, there would be parity in hiring assistant professor pool in one tenure cycle (5-6 years)

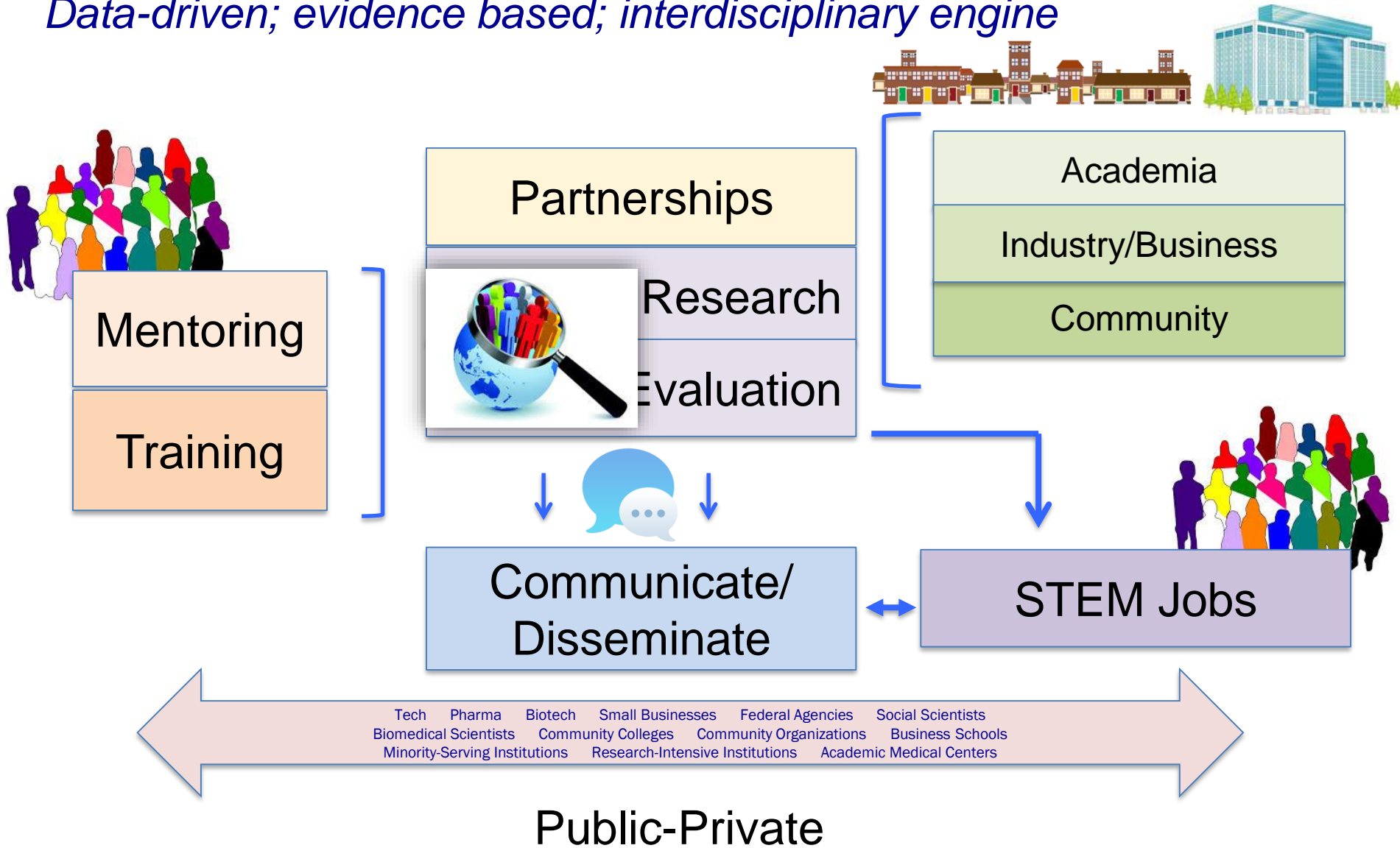
Integrated National Strategy for Scientific Workforce Diversity



- **Overarching Goal:** To eliminate transition barriers and achieve sustainable transformation in scientific workforce diversity
- Identify gaps (postdoc -> faculty/other research careers)
 - Needed: Program linkages across career stages
- Draw evidence from existing programs
 - Needed: research on integrated approaches to address:
 - Unconscious bias, microaggressions, career flexibility, network access, sponsorship, etc

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

Data-driven; evidence based; interdisciplinary engine



Great minds think
differently ...

@NIH_COSWD 