

#GREAT  
MINDS  
THINK  
DIFFERENTLY...



# SCIENCE OF DIVERSITY



National Institutes of Health  
Office of the Director  
Scientific Workforce Diversity



**#GREAT  
MINDS**  
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DIFFERENTLY...



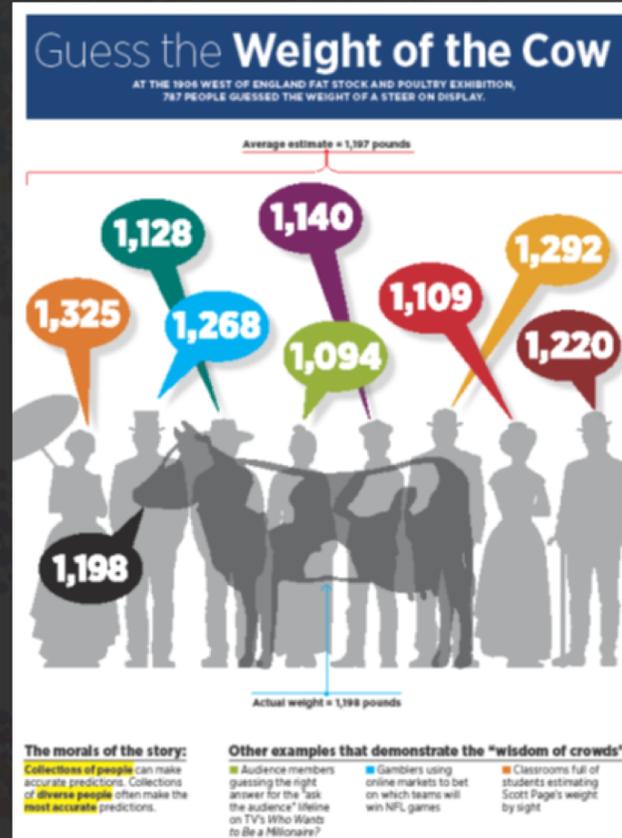
**Diversity matters  
at NIH because...**





# SCIENCE OF DIVERSITY

# Diversity leads to better problem-solving



"I stumbled on a counterintuitive finding ... Diverse groups of problem solvers—groups of people with diverse tools—consistently outperformed groups of the best and the brightest. If I formed two groups, one random (and therefore diverse) and one consisting of the best individual performers, the first group almost always did better. In my model, diversity trumped ability."

- Scott Page

Bui, Q. (2015, August 7). 17,205 People guessed the weight of a cow. Here's how they did. *NPR*, Retrieved from [http://www.npr.org/sections/money/2015/08/07/429720443/17\\_205\\_people\\_guessed\\_the\\_weight\\_of\\_a\\_cow\\_heres\\_how\\_they\\_did](http://www.npr.org/sections/money/2015/08/07/429720443/17_205_people_guessed_the_weight_of_a_cow_heres_how_they_did)

Hong, L., & Page, S. E. (2004). Groups of diverse problem solvers can outperform groups of high ability problem solvers. *Proceedings of the National Academy of Sciences of the United States of America*, 101(46), 16385-16389.

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# SCIENCE OF DIVERSITY



Research conducted by  
diverse teams is cited  
more often and is  
published in more  
prestigious journals.

Freeman, R. B., & Huang, W. (2015). Collaborating with people like me: Ethnic coauthorship within the United States. *Journal of Labor Economics*, 33(51), S289-S318.

Campbell, W.G., Mehtani, S., Dozier, M.E. & Rinehart, J. (2013). Gender-heterogeneous working groups produce higher quality science. *PLOS One*, 8(10), e79147.

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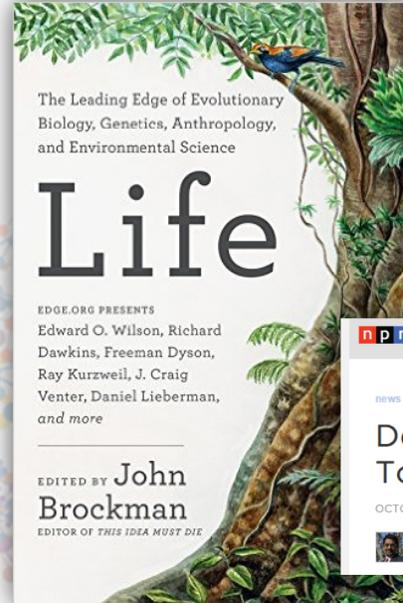
# SCIENCE OF DIVERSITY

**NIH can play a leading role in reducing bias and improving opportunities for everyone by developing and modeling effective strategies for increasing diversity.**



# SOCIOCULTURAL FACTORS

# Bias is pervasive ...



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



★☆☆☆☆ **Pathetic!**  
So pathetic! Have these people not heard of Hopi Hoekstra? Nicole King? Nancy Moran? Laura Landweber? Rosemary Grant? Mercedes Pascual? Joan Strassman? [Read more](#)  
Published 1 month ago by Danny Wells

“ ... 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 men:**  
Longer; More references to CV, publications, patients, colleagues

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# SOCIOCULTURAL FACTORS

# In SCIENCE



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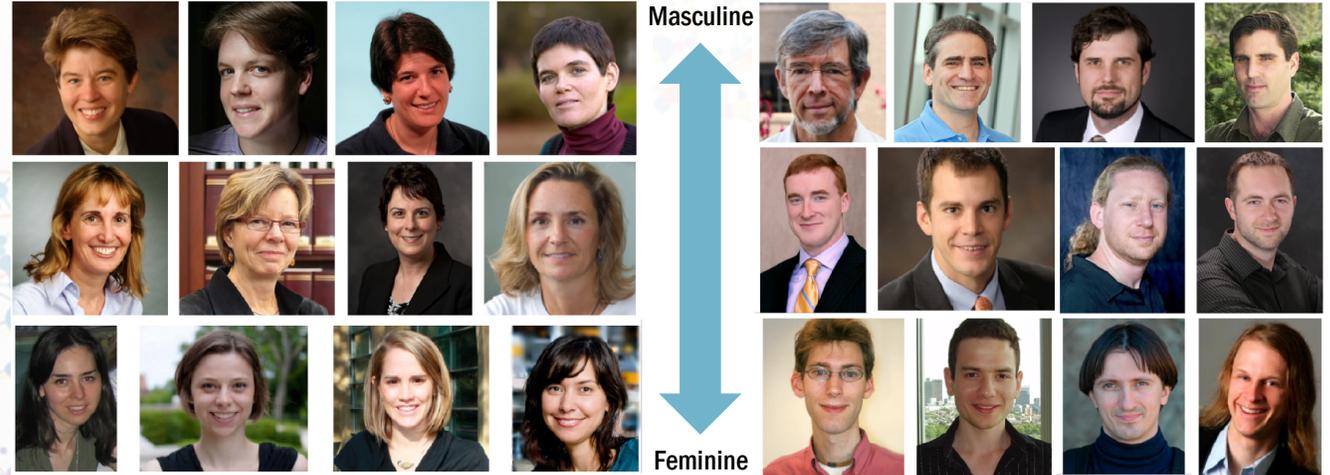


## **SOCIOCULTURAL FACTORS**

**Bias shapes who we think is a scientist, how qualified a scientist is perceived to be, and how likely someone is to be hired or promoted.**

# Who is a scientist?

## SOCIOCULTURAL FACTORS



- Pictures of actual faculty members in Science, Technology, Engineering, and Math (STEM) at elite universities
- Rated for masculinity and femininity
- Separate group of students rated pictures for likelihood of being a scientist



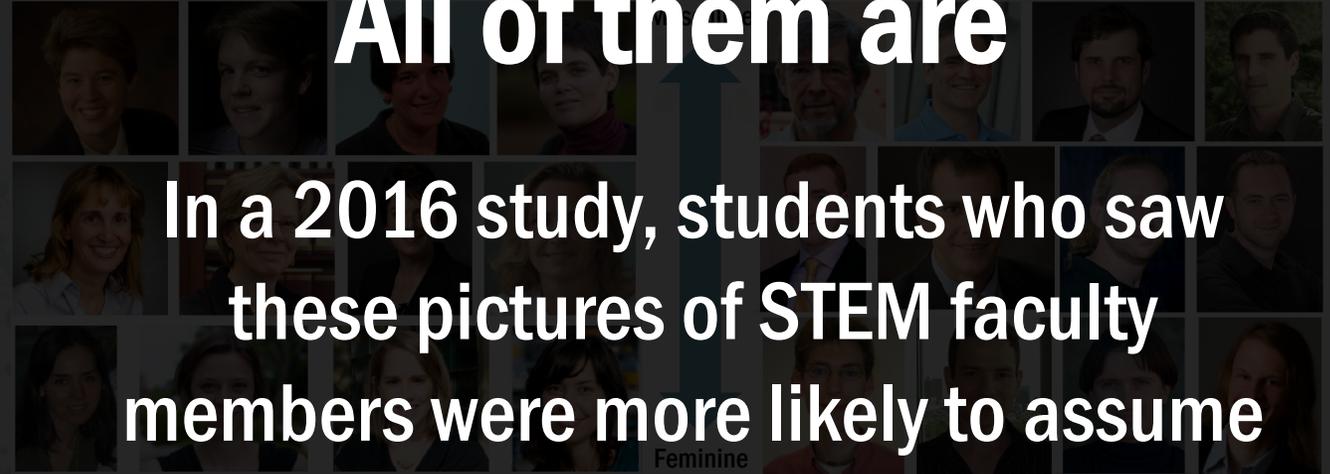


## SOCIOCULTURAL FACTORS



All of them are

In a 2016 study, students who saw these pictures of STEM faculty members were more likely to assume that the feminine-looking women were early childhood educators. For males, appearance made no difference.



Feminine

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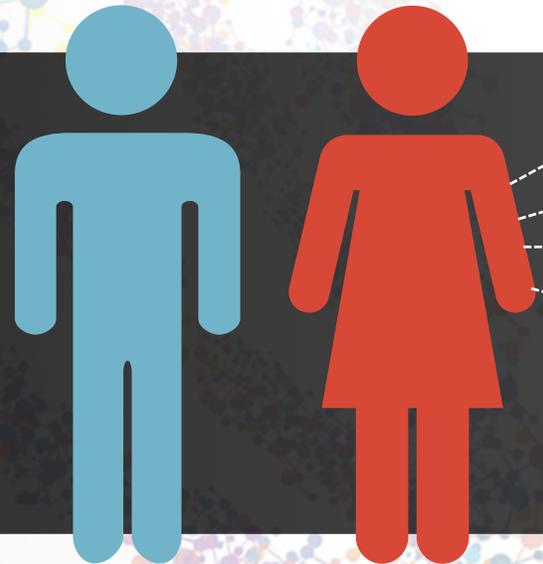
## **SOCIOCULTURAL FACTORS**

**Bias shapes hiring decisions  
and perceptions of  
competence.**



## SOCIOCULTURAL FACTORS

When asked to evaluate applications for a lab manager position... biology, chemistry, and physics professors across the country rated the **sample female candidate:**



- less competent
- less hireable
- offered less mentoring
- \$3,700 less salary than an identical application with a male name



## **SOCIOCULTURAL FACTORS**

**However, research shows  
that interventions can  
reduce bias.**



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NIH is **pioneering** and  
testing new approaches  
to promoting scientific  
**workforce diversity** by...



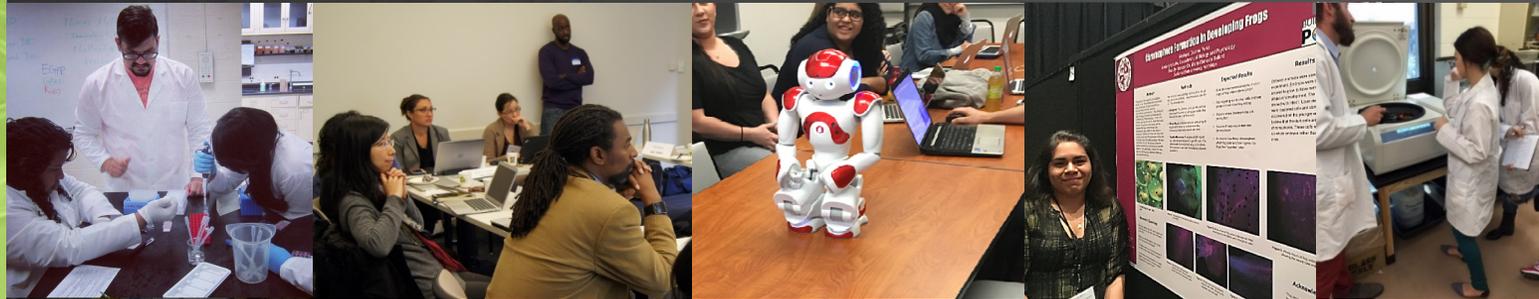
**BUILDING  
EVIDENCE**



**DIVERSITY  
PROGRAM  
CONSORTIUM**  
Supported by the National Institutes of Health

# Leading the Diversity Program Consortium (DPC)

A national collaborative effort to develop and test  
interventions to promote diversity in the biomedical  
sciences



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McCreath, H. E., Norris, K. C., Calderón, N. E., Purnell, D. L., Maccalla, N. M., & Seeman, T. E. (2017, December). Evaluating efforts to diversify the biomedical workforce: the role and function of the Coordination and Evaluation Center of the Diversity Program Consortium. In *BMC Proceedings* (Vol. 11, No. 12, p. 27).



# BUILDING EVIDENCE

Developing interventions that provide underrepresented students and faculty mentoring, research training, and professional development through...

# BUILD

Building Infrastructure Leading to Diversity

Targeting 3 Levels at once



Students



Faculty



Institution

Taking a scientific approach to interventions



# BUILDING EVIDENCE

# NIH Diversity Program Consortium (DPC)

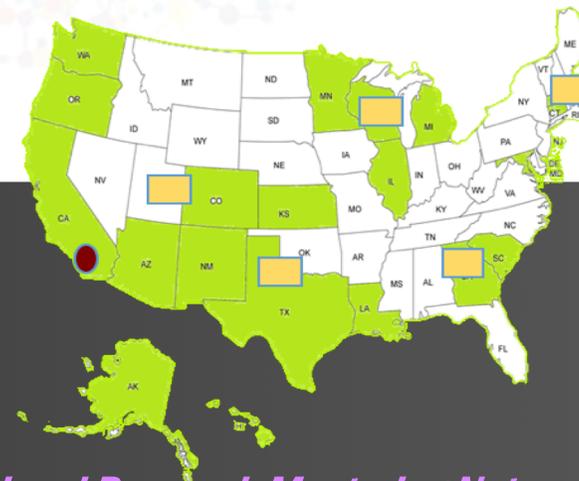
*Building Evidence*- Awards made October 2014

Total: \$250 million (5 years)

**BUILD: 10 sites/experiments**

**NRMN**

**CEC**



**Building Evidence Leading to Diversity (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

## *National Research Mentoring Network (NRMN)*

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

## *Coordination and Evaluation Center (CEC)*

- University of California Los Angeles

DPC Website: [www.nigms.nih.gov/training/doc/dpc/default.aspx](http://www.nigms.nih.gov/training/doc/dpc/default.aspx)

<https://acd.od.nih.gov/documents/presentations/06082017Valantine.pdf>

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# BUILDING EVIDENCE

# NIH Diversity Program Consortium

(Cont.)

## BUILD Tested Interventions

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

## NRMN Activities

- Guided virtual mentorships
- MyNRMN tool
- Mentors: 1,929\* (June '17)
- Mentees: 3,574\* (June '17)
- Grantwriting/coaching - mentees: 351\*\* (February '17)

Hispanic-Serving Institutions

Historically Black Colleges and Universities

Total of 10 **BUILD** Sites/Experiments

State Colleges

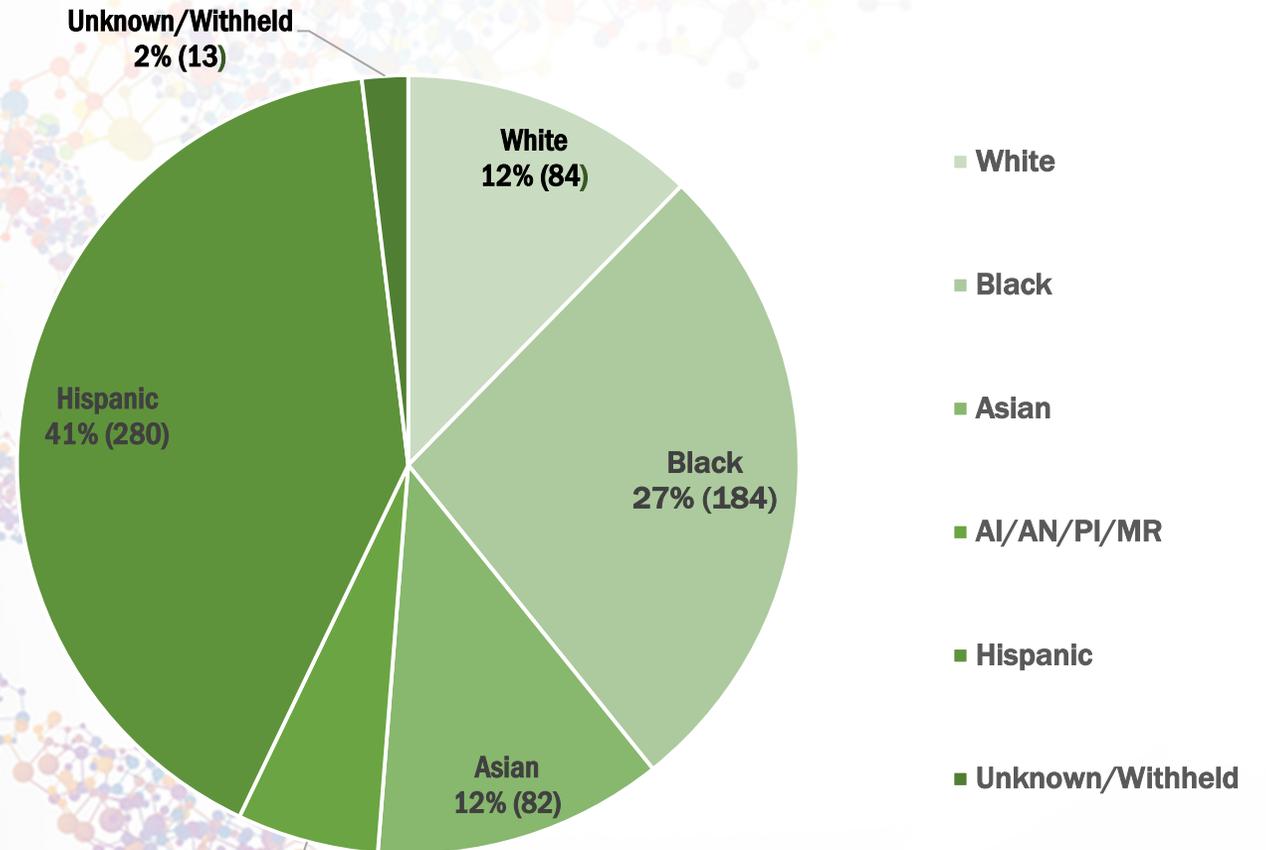
Public Universities

\*<https://acd.od.nih.gov/documents/presentations/06082017Valantine.pdf>

\*\*<https://acd.od.nih.gov/documents/presentations/06082017Valantine-Progress.pdf>

# BUILD Training Linked (TL4) Grant Award Participant Demographics (Total:683)

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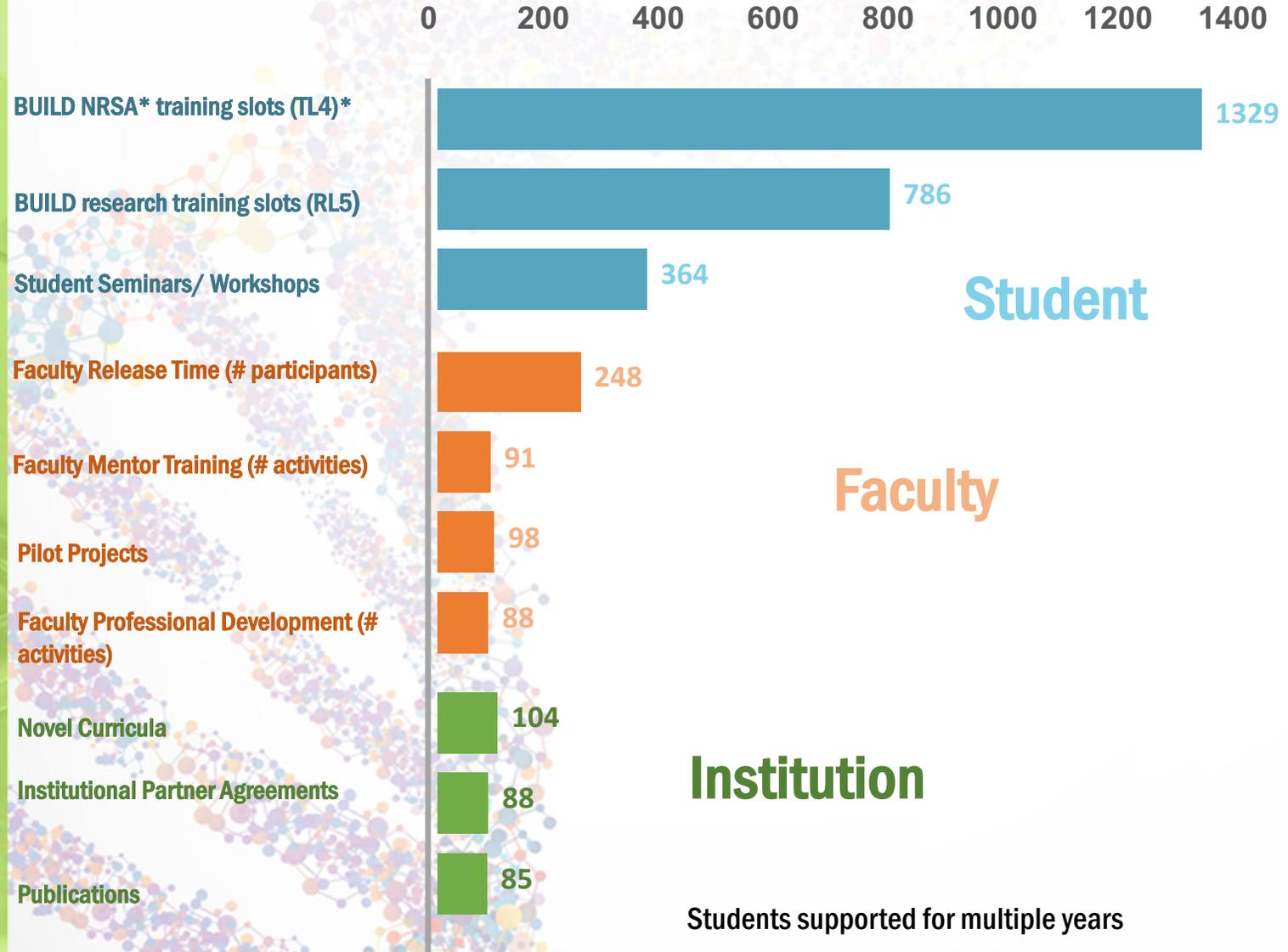
\*AI/AN/PI/MR = American Indian/Alaskan Native/Pacific Islander/Multiple Races





# BUILDING EVIDENCE

# BUILD Dashboard (Years 1-3) Intermediate Data



Students supported for multiple years

\*NRSA = National Research Service Awards



# BUILDING EVIDENCE



**DIVERSITY  
PROGRAM  
CONSORTIUM**

*Supported by the National  
Institutes of Health*

## **BUILD: Testable Interventions** *Impact on pre-defined outcomes of:*

### Site-Specific

- Reducing stereotype threat
- Diminishing imposter syndrome
- Overcoming microaggressions
- Mitigating unconscious bias
- Increasing cultural awareness and sensitivity
- Emphasizing cultural assets
- Engaging family and support systems

### Consortium-Wide

- Science identity
- Providing financial assistance
- Providing authentic research experiences
- Implementing active learning courses
- Forming supportive cohorts and learning communities
- Mentor training
- Creating professional networks

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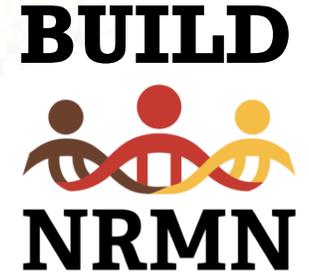


# BUILDING EVIDENCE

# Faculty-Focused Interventions

*Certain interventions increase self-efficacy and research success:*

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



<https://nrmnet.net/build/>

## *Surveys of self-efficacy*

**Hallmarks of success: presentations at meetings, publications, external funding**



Photos courtesy of University of Maryland, Baltimore County STEM BUILD, an NRMN Fellows Program, and California State University, Long Beach, CSULB BUILD

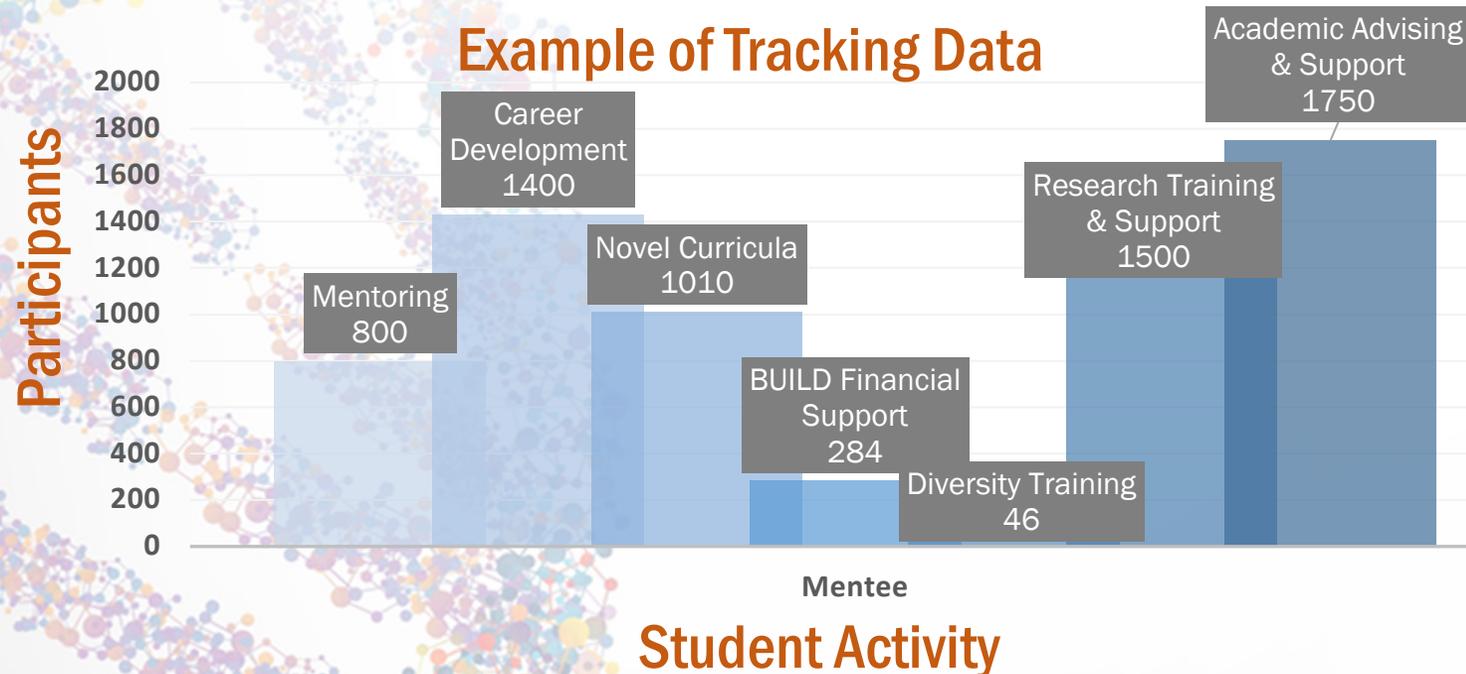
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## BUILDING EVIDENCE

# Coordination and Evaluation Center (CEC) Student Activity Tracking Tool

- Individuals tracked by their activities and linked to outcomes
- Data is tracked in the same way
- Stores all data in one location
- Ensures data will be accessible in future years

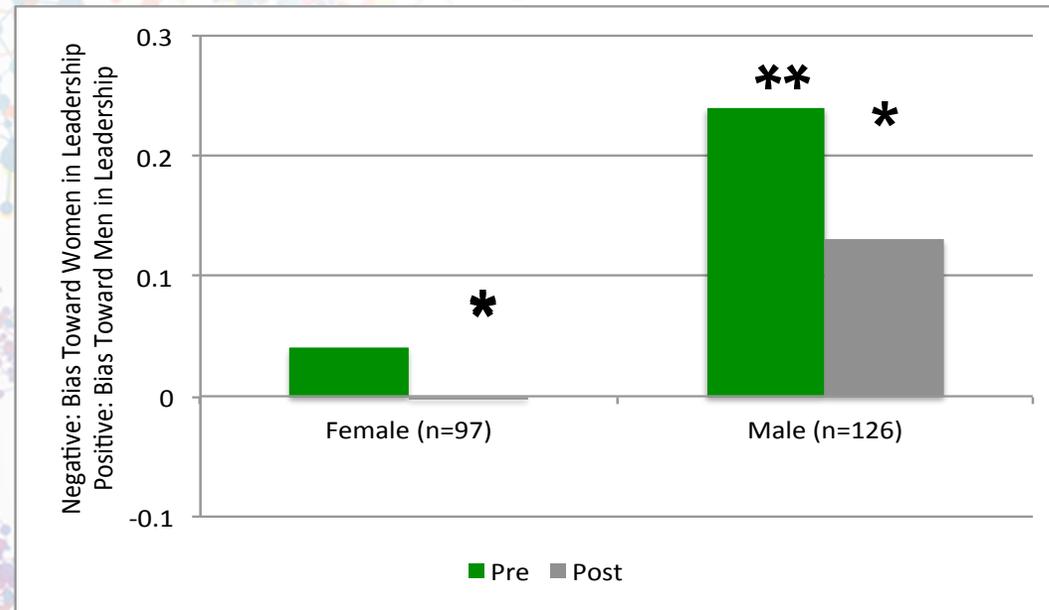




## BUILDING EVIDENCE

# 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-Implicit Association Test and collected demographic data



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

## Results of Intervention:

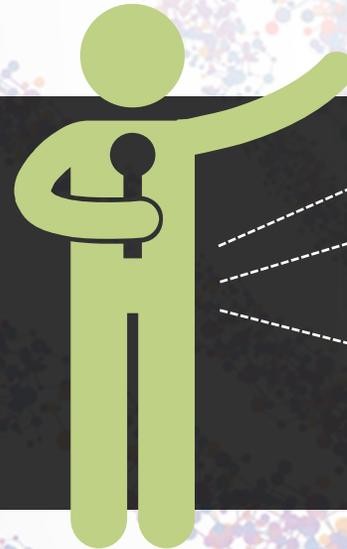
- Changed perception of implicit bias in males and females
- Reduced implicit bias about leadership and men



## BUILDING EVIDENCE

# A study conducted in 92 departments at the University of Wisconsin

found that faculty who underwent a 2.5 hour intervention...



- were **more aware** of bias
- showed **greater motivation** to promote gender equity
- considered it personally beneficial to **promote gender equity**



**BUILDING  
EVIDENCE**

# Studying R01 grant funding disparities at NIH

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# BUILDING EVIDENCE

## % OF SCIENTISTS WHO SUBMITTED AND WERE AWARDED AN NIH R01 GRANT BY RACE 2010-2015



BLACK SCIENTISTS ARE ONLY 1.5% TOTAL NIH R01 APPLICANT POOL

## BLACK SCIENTISTS

- LESS LIKELY TO APPLY OR RE-APPLY FOR AN NIH R01 GRANT
- HAVE FEWER APPLICATIONS DISCUSSED BY STUDY SECTIONS
- HAVE FEWER GRANTS FUNDED

## NIH ADDRESSES THE DISPARITY

- MENTORING AND COACHING TO INCREASE SUBMISSION & RE-SUBMISSION
- INFORMATION OUTREACH ABOUT FUNDING BENEFIT OF TRYING AGAIN
- PEER REVIEW ANONYMOUS BIAS STUDY

### CUMULATIVE DISPARITY SPANS SUBMISSION TO FUNDING

Black scientists are a tiny fraction (1.5%) of the applicant pool and are less likely to apply or re-apply for NIH R01 grant.

Grant applications from Black scientists are given lower scores and are less likely to be discussed by reviewers, compared to whites.

Topics that many Black scientists prefer to study are less likely to be funded.

APPLICATION

REVIEW

FUNDING

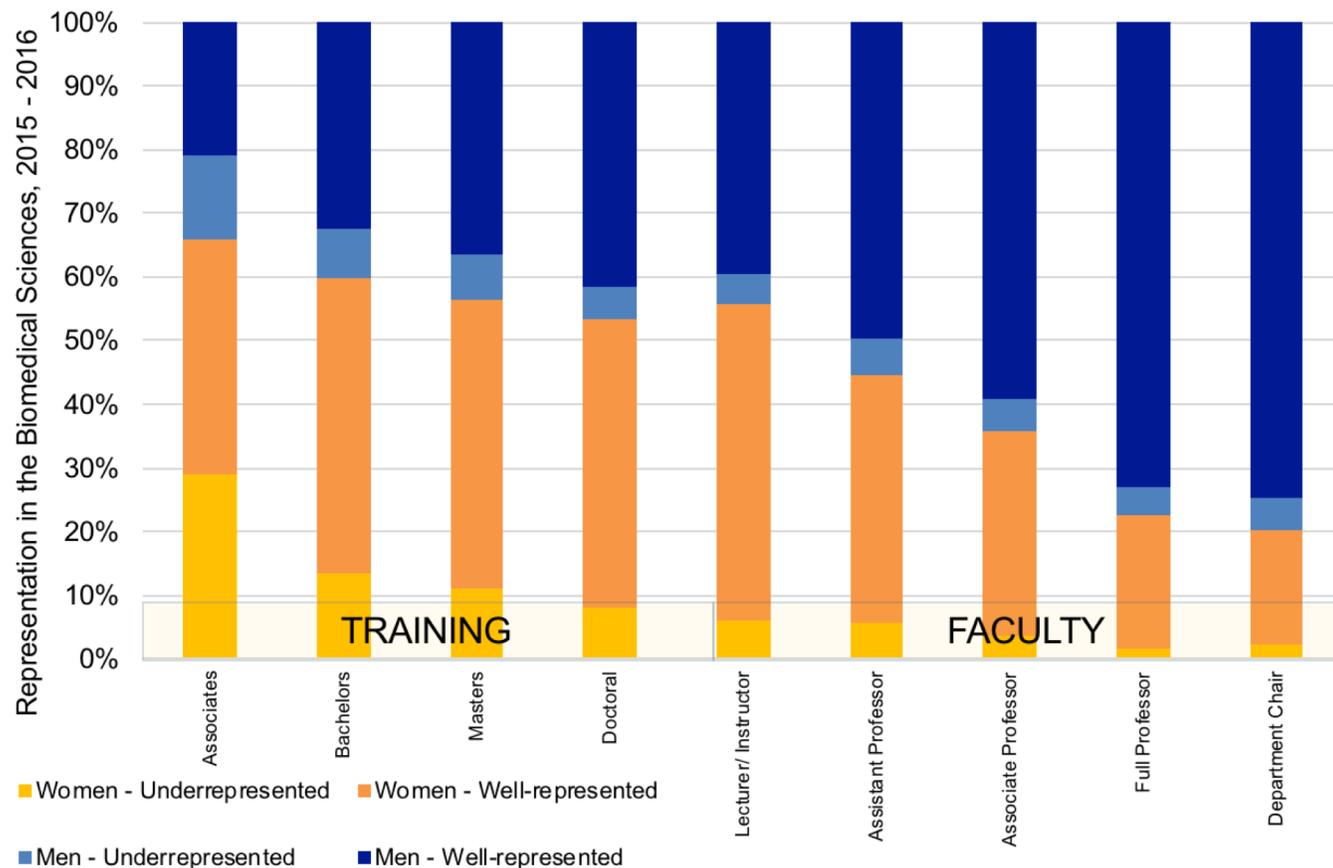
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# BUILDING EVIDENCE

NIH has invested heavily at the predoctoral level to increase workforce diversity. We lose underrepresented populations at the transition to career independence.

## Underrepresented Minority Diversity Declines Along Career Path

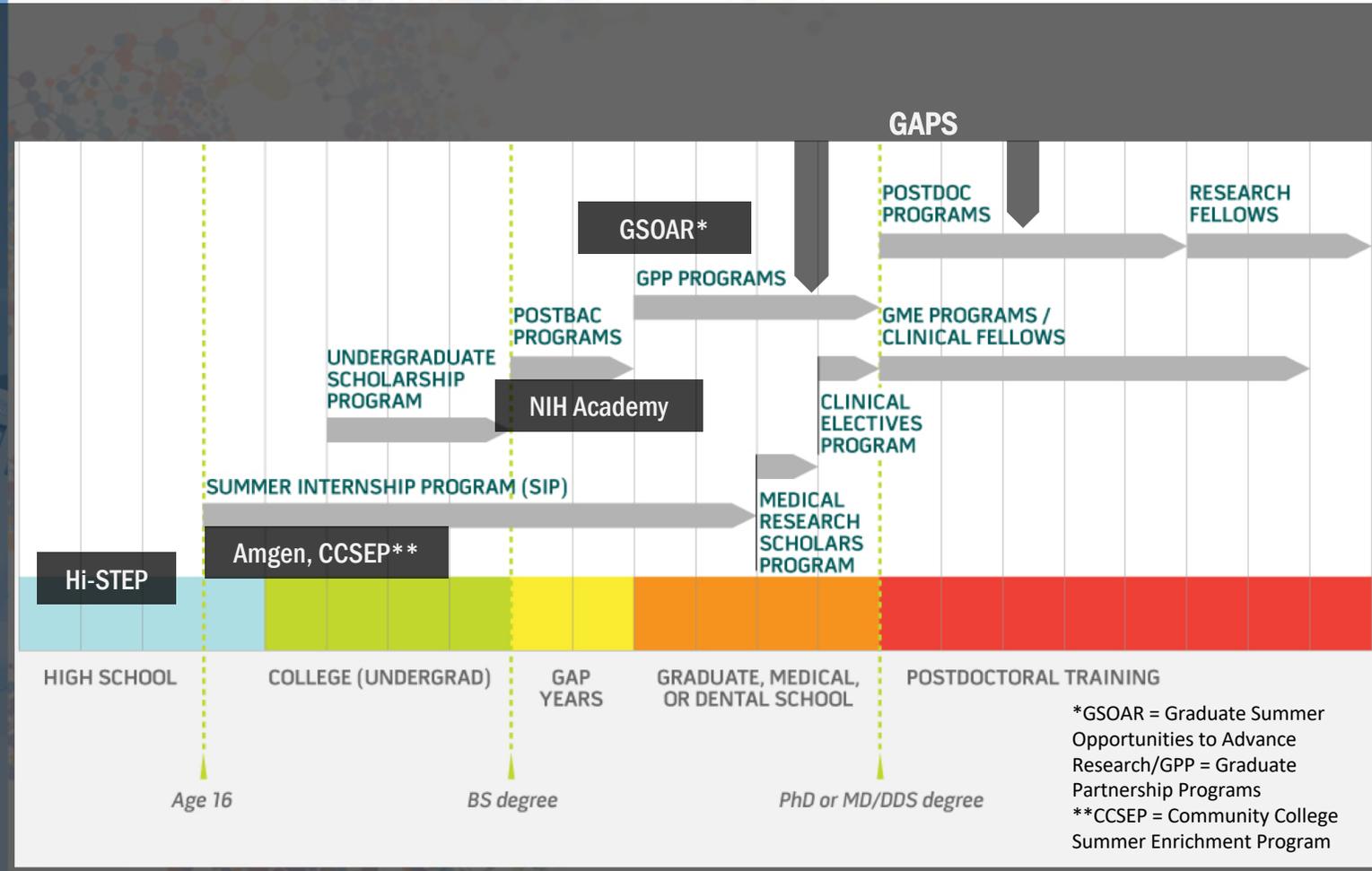


[https://nces.ed.gov/programs/digest/2017menu\\_tables.asp](https://nces.ed.gov/programs/digest/2017menu_tables.asp); <https://www.aamc.org/data/facultyroster/reports/475478/usmsf16.html>

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# Improving the NIH Intramural Research Program support initiatives by identifying gaps that contribute to disparities.

## SUSTAINING DIVERSITY



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**CAREERS  
IN SCIENCE**

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**2017 | NIH FUTURE RESEARCH  
LEADERS CONFERENCE**

September 12-14



National Institutes of Health | Bethesda, MD

**Hosting the Future Research  
Leaders Conference to bring  
smart, diverse talent to the NIH  
campus to learn about research  
and career opportunities.**



## **CAREERS IN SCIENCE**

**Developing interdisciplinary partnerships to identify, research, and mitigate barriers to career development for underrepresented groups.**

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**We study and  
promote diversity in  
the scientific  
workforce **because...****

Great minds think  
differently ...

@NIH\_COSWD



National Institutes of Health

*Office of the Director*

*Scientific Workforce Diversity*