

# Diversity in Academic Biomedicine: An Evaluation of Education and Career Outcomes with Implications for Policy



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Conference



# Acknowledgements

## Coauthors on this project:

Walter T. Schaffer, Senior Scientific Advisor for  
Extramural Research, National Institutes of  
Health

Joshua Schnell, Director, Analytics, Discovery  
Logic,

Beth Masimore, Analyst, Discovery Logic

Faye Liu, Analyst, Discovery Logic

Laurel L. Haak, Chief Science Officer, Discovery  
Logic

Raynard S. Kington, Deputy Director, National  
Institutes of Health



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# Research Question

How will changes in the  
demographic composition of the  
biomedical workforce affect the pool  
of new investigators ?



# The Economic Perspective

- **Markets Matter**
- **Equally productive scientists will be similarly paid, promoted, and awarded grants**
- **Becker (1971): Discrimination eliminated by competition**
- **Yet, we observe gender and race/ethnicity differences in career outcomes**

# The Economic Perspective

- **Gender and Race/Ethnicity Differences in outcomes result from:**
  - **Differences in productivity**
  - **Differences in choices:**
    - **Family**
    - **Career type—High powered jobs**
  - **Job matching**
  - **Tournament Model**
  - **Discrimination**

# Purpose of Study

- ***Evaluate Demographic Differences in:***
  - **Educational pipeline**
  - **Career transitions**
    - Tenure Track Jobs
    - Tenure
    - NIH Funding

# Phase 1: Transitions Data Sources

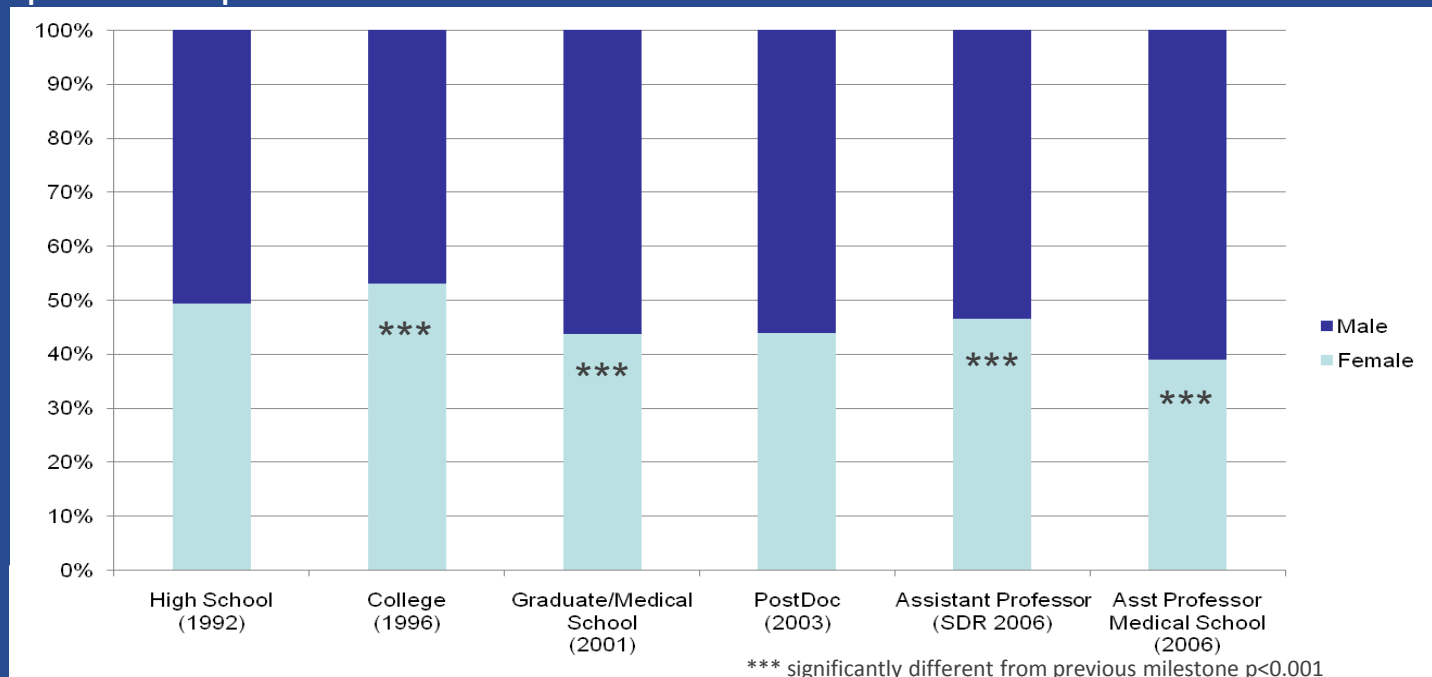
| Stage                  | Metric                    | Data Source  |
|------------------------|---------------------------|--|
| High School Graduation | Graduation                | DOEd National Center for Education Statistics              |
| College                | Biology Bachelor's Degree | DOEd Integrated Postsecondary Education Data System        |
| Graduate School        | Biomedical Doctorate      | NSF Survey of Earned Doctorates                            |
| Medical School         | Medical Doctorate         | AAMC Data Book   |
| Faculty                | Tenure                    | NSF Survey of Doctorate Recipients and AAMC Faculty Roster |





# Career Transitions – Women

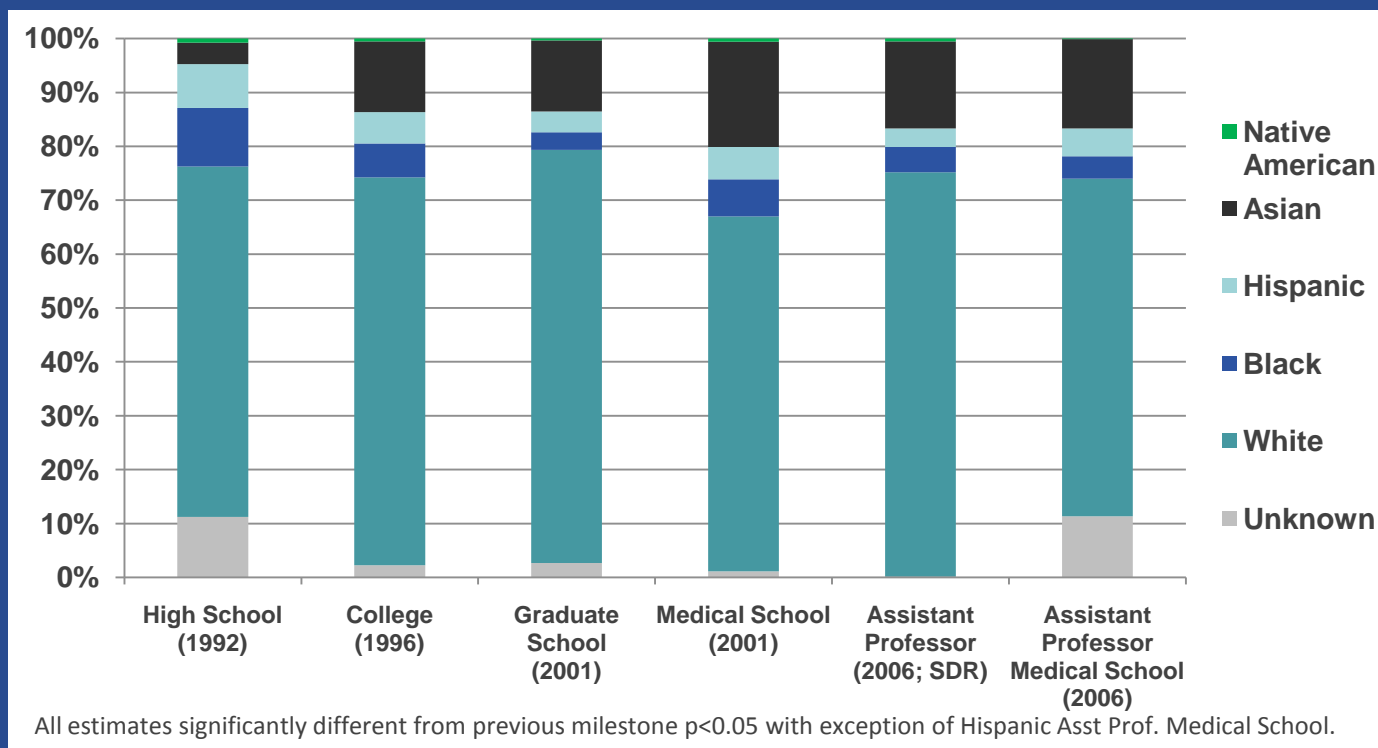
- 4% more likely to transition from high school to college and receive Bachelor's
- 9% less likely to transition from college to receive PhDs
- 3% more likely to transition from graduate school into assistant professor position
- 5% less likely to transition from graduate school into medical school assistant professor position.



Gender Breakdown at Career Milestones  
2006 Assistant Professor Cohort

# Career Transitions Race/Ethnicity

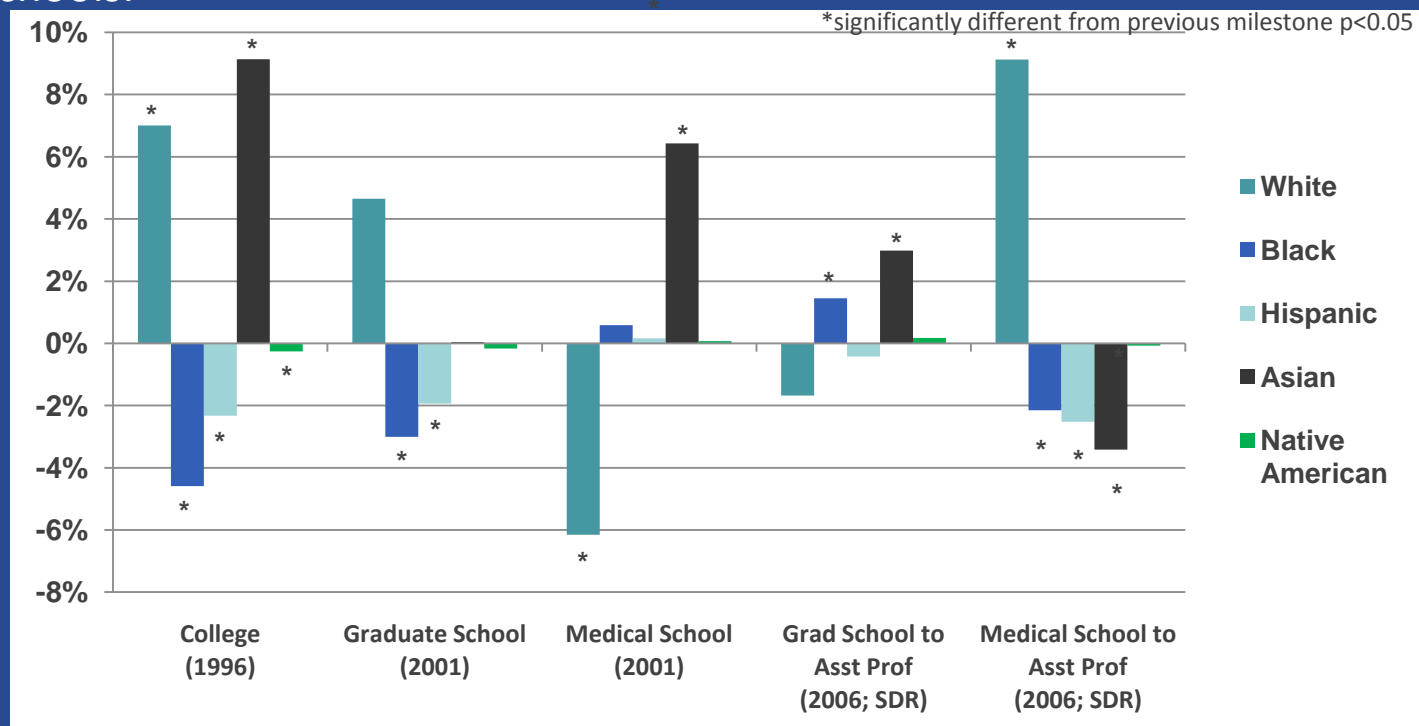
- Blacks, Hispanics and Native Americans are less likely than Whites to attend college, receive biomedical PhDs and be assistant professors.
- Blacks, Hispanics and Native Americans complete doctorates in biological sciences but similar to women are less likely to have appointments in medical schools.



**Race/Ethnicity Breakdown at Career Milestones  
2006 Assistant Professor Cohort**

# Career Transitions – Race/Ethnicity

- Blacks, Hispanics, and Native Americans are less likely to transition from high school to college
- Asians are more likely to attend medical school
- Blacks, Hispanics, and Asians are less likely to be junior faculty in medical schools.



Change in Percent Representation vs. Previous Milestone  
2006 Assistant Professor Cohort

# Career Outcomes – Methods

For PhDs in Biomedical Sciences granted between 1985 and 1996 (N=1,120), examined outcomes using the NSF Survey of Doctoral Recipients:

- Tenure track position at 4 year institution within 7 years
- Tenure within 10 years of PhD
- NIH funding within 10 years of PhD



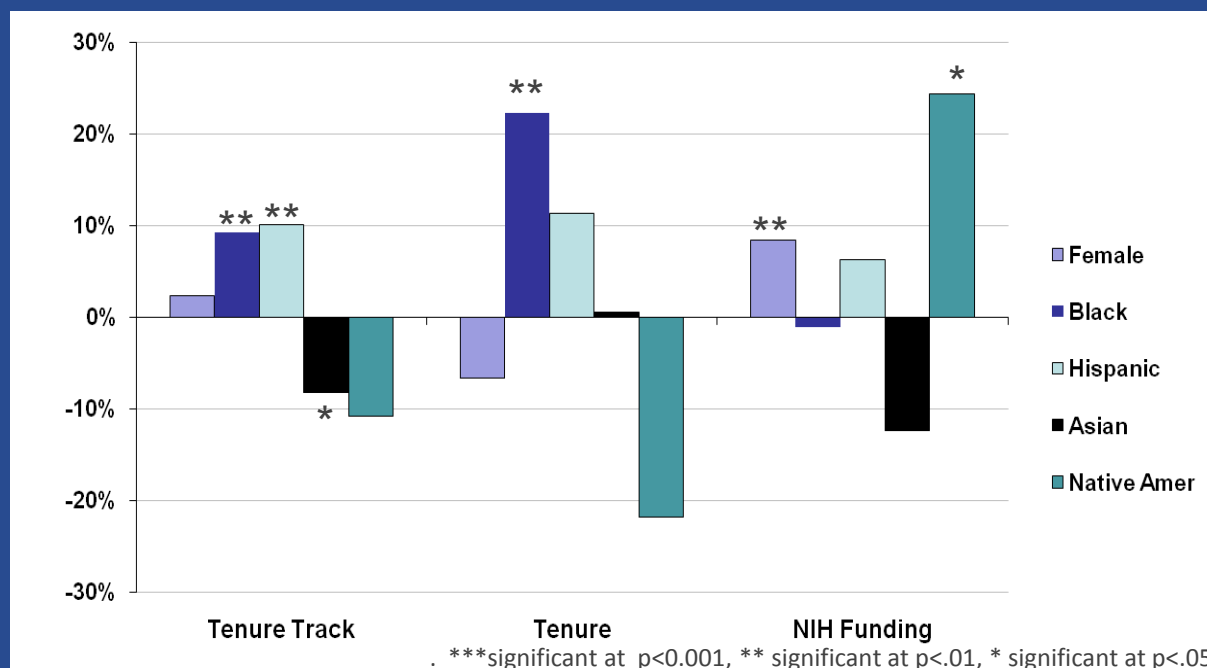
Tested the effect of covariates on outcomes:

- |                        |                           |
|------------------------|---------------------------|
| •Age                   | •Marital Status           |
| •PhD Year              | •Children                 |
| •Doctorate Institution | •Employer Characteristics |
| •PhD Field             | •Publications             |



# Career Outcomes - Results

- Women, Blacks, and Hispanics are equally likely to obtain tenure track jobs and getting tenure compared to white men; indeed Blacks and Hispanics are more likely to get tenure track job.
- Asians are less likely to get tenure track job.
- Women are more likely to get NIH Funding. *Caveat: SDR Provides no information on type or amount of NIH funding.*



## Tenure Track Jobs, Tenure, and NIH Funding Relative to White Men

SOURCE: NSF Survey of Doctoral Recipients

# Percent Tenured within 10 Years

- Blacks and Women are more likely to be at Liberal Arts Institutions.
- Men, Whites and Asians are more likely to be at Research I institutions.

| <u>Type</u>          | <u>Total</u> | <u>White</u> | <u>Black</u> | <u>Asian</u> | <u>Native American</u> | <u>Hispanic</u> | <u>Women</u> | <u>Men</u> |
|----------------------|--------------|--------------|--------------|--------------|------------------------|-----------------|--------------|------------|
| Liberal Arts         | 33.8%        | 29.2%        | 45.8%        | 33.3%        | 80.0%                  | 60.0%           | 37.5%        | 31.0%      |
| University           | 15.2%        | 16.6%        | 12.5%        | 9.5%         | 0.0%                   | 12.0%           | 14.6%        | 15.8%      |
| Research I           | 34.8%        | 36.0%        | 33.3%        | 42.9%        | 20.0%                  | 20.0%           | 31.3%        | 37.5%      |
| Other                | 16.2%        | 18.2%        | 8.3%         | 14.3%        | 0.0%                   | 8.0%            | 16.7%        | 15.8%      |
| Percent w/<br>Tenure | 37.1%        | 38.5%        | 46.2%        | 22.8%        | 29.4%                  | 38.5%           | 37.6%        | 36.8%      |
| Total in<br>Sample   | 883          | 657          | 52           | 92           | 17                     | 65              | 383          | 500        |

University Type by Race/Ethnicity and Gender

SOURCE: 1985-2006 Survey of Doctorate Recipients

# Implications for Career Outcomes by Race/Ethnicity and Gender

- Blacks, Hispanics, and Native Americans are less likely to graduate from High School, and less likely to receive biomedical PhDs
- Asians are more likely to attend college and medical school
- Blacks more likely to get Tenure Track Jobs and tenure in teaching institutions
- Whites are more likely to become Medical School Faculty.
- Women are more likely to attend college, but less likely to become faculty in medical schools.
- Women are more likely to receive NIH funding.

# Implications for Policy

- As others have found,
  - » Transition from high school to college
  - » Transition from PhD to professor are prime targets for policy intervention.