

# BROADENING PARTICIPATION ACROSS THE EDUCATION AND RESEARCH ENTERPRISES

**James H. Wyche, Ph.D.**  
*Provost & Chief Academic Officer*  
HOWARD UNIVERSITY

**MIT**

**July 21, 2011**

# OVERVIEW

- **Brookhaven /DOE Experience**
- **The changing face of diversity: A look back**
- **Demographic projections: 2050**
- **Pathways to diversifying the workforce**
- **Achieving distinction in the academy**

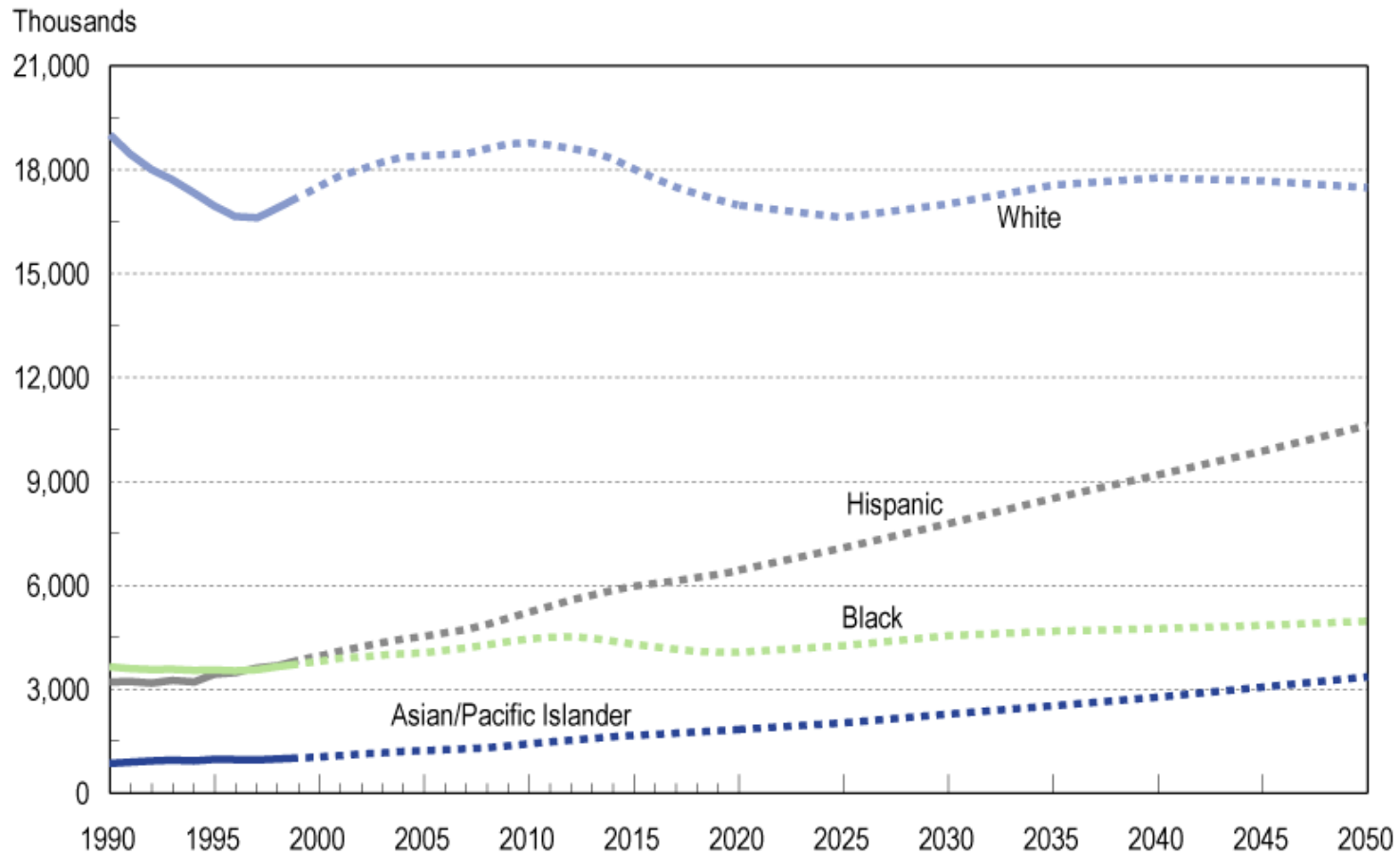
# THE CHANGING FACE OF DIVERSITY

- **Reflections about Brookhaven National Laboratory Experience**
- **Personal/professional journey: Opening doors, improving access and opportunity**
- **Leadership Alliance, since 1992**

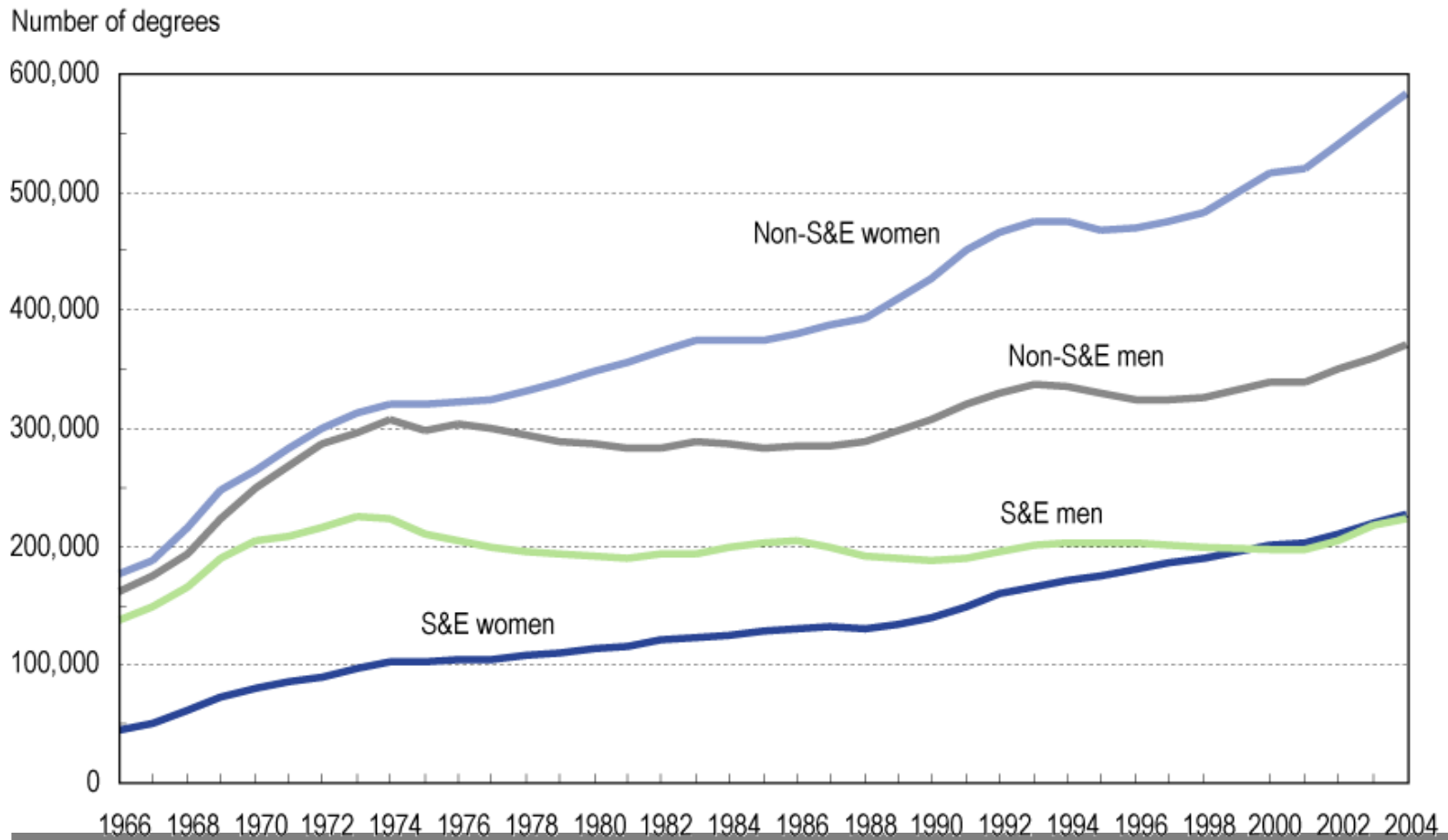
# DEMOGRAPHIC PROJECTIONS: 2050

- **US population: increasingly diverse**
- **Gap between increasingly diverse population and diversity in science and technology**

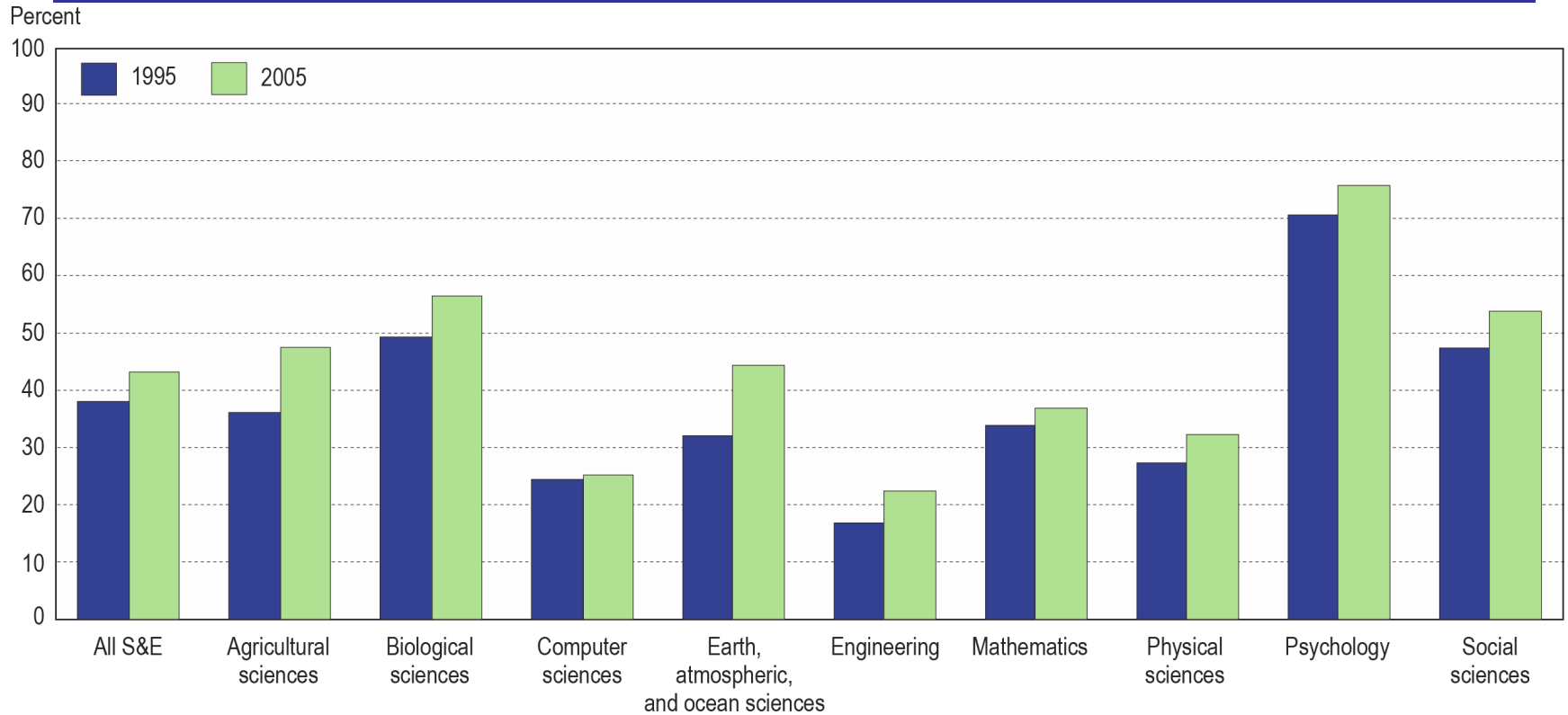
# U.S. POPULATION 18–24 YEARS OLD, BY RACE/ETHNICITY: JULY 1990–99 AND PROJECTIONS TO 2050



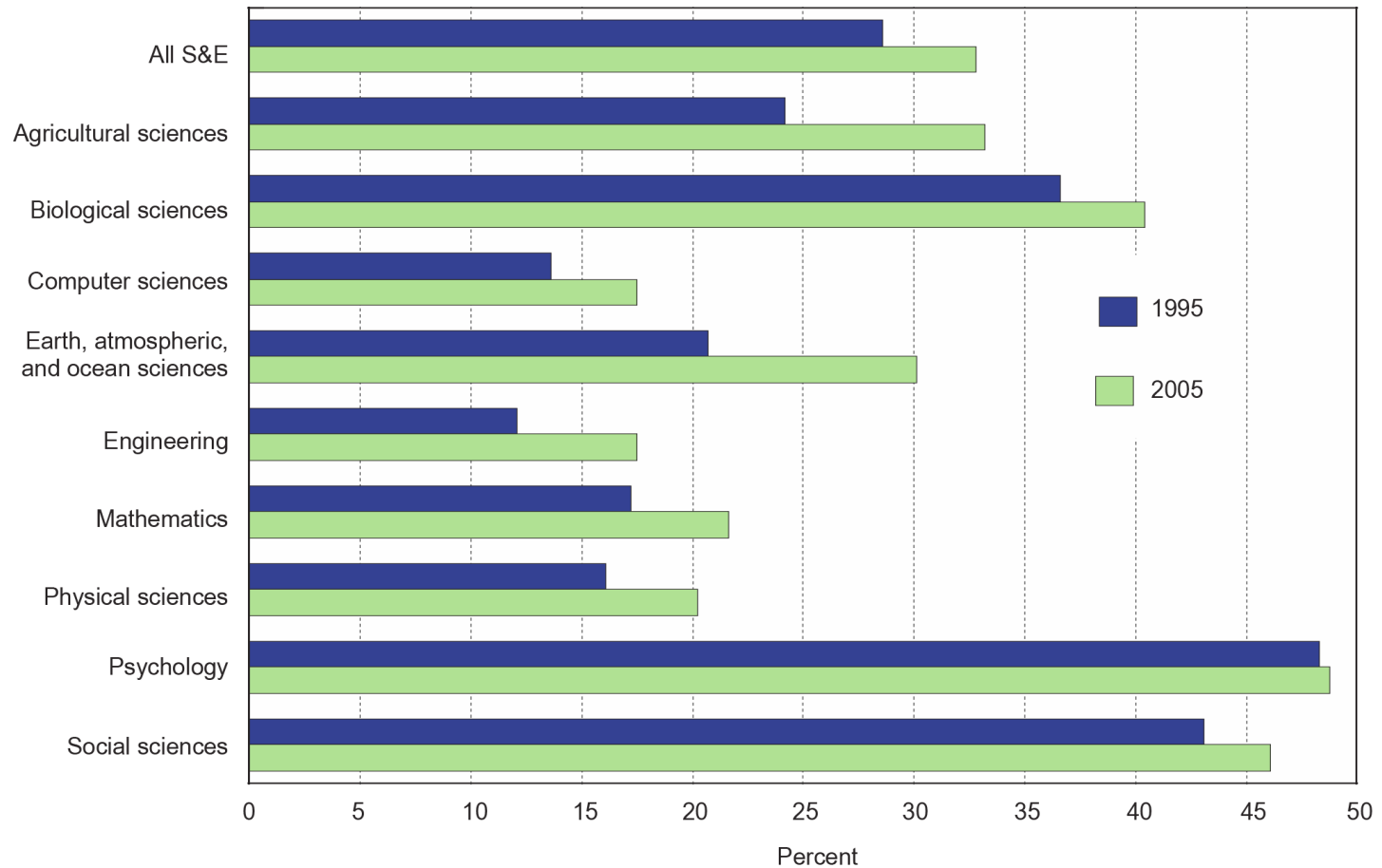
# BACHELOR'S DEGREES AWARDED IN S&E AND NON-S&E FIELDS, BY GENDER: 1966–2004



# FEMALE SHARE OF S&E GRADUATE STUDENTS, BY FIELD: 1995 AND 2005



# FEMALE SHARE OF S&E POSTDOCTORAL FELLOWS, BY FIELD: 1995 AND 2005





# PATHWAYS TO BROADENING PARTICIPATION

- Exemplars, lessons learned

## NSF: National Science Foundation

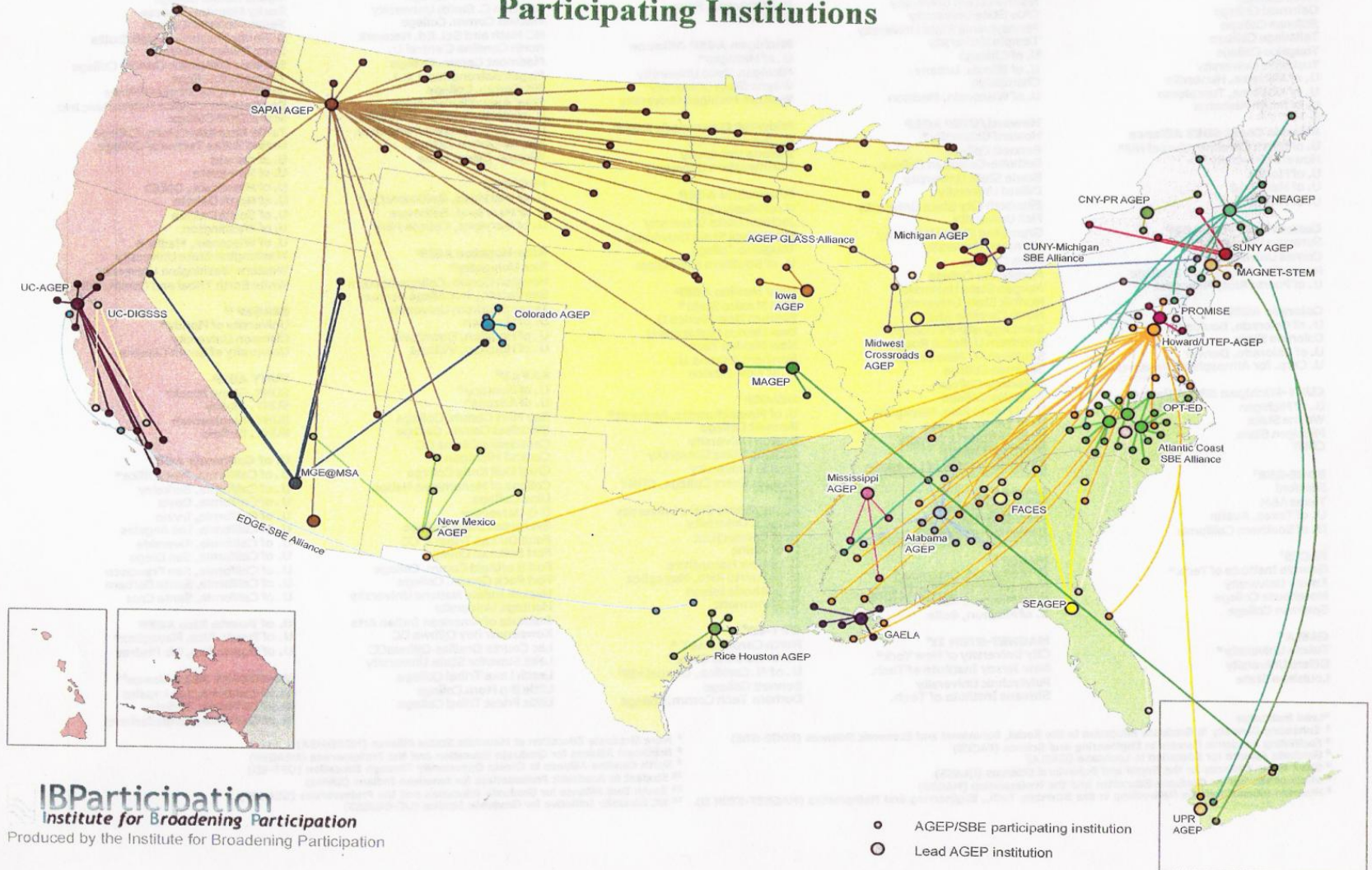
- LSAMP: Louis Stokes Alliance for Minority Participation
- AGEP: Alliances for Graduate Education and the Professoriate





# AGEP and SBE Alliances for Graduate Education and the Professoriate Participating Institutions

\*See back for complete listing of institutions

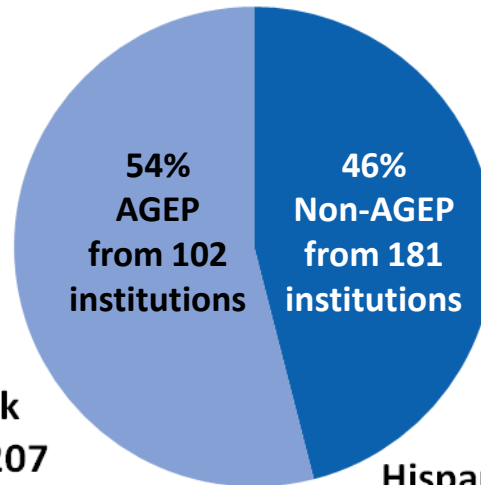


**IBParticipation**  
Institute for Broadening Participation  
Produced by the Institute for Broadening Participation

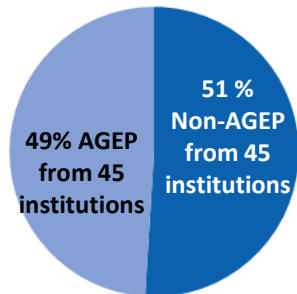
- AGEP/SBE participating institution
- Lead AGEPE institution

# UNDERREPRESENTED MINORITY PHDs PRODUCED ACROSS ALL STEM DISCIPLINES (2002–2006)

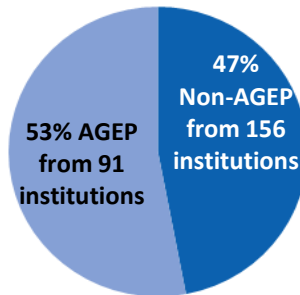
## All Underrepresented Minorities n = 6425



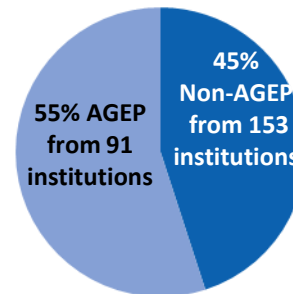
### American Indian / Alaska Native n = 142



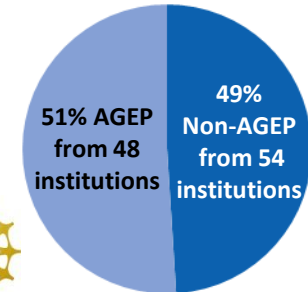
### Black n = 2207



### Hispanic n = 3871



### Native Hawaiian / Pacific Islander n = 205

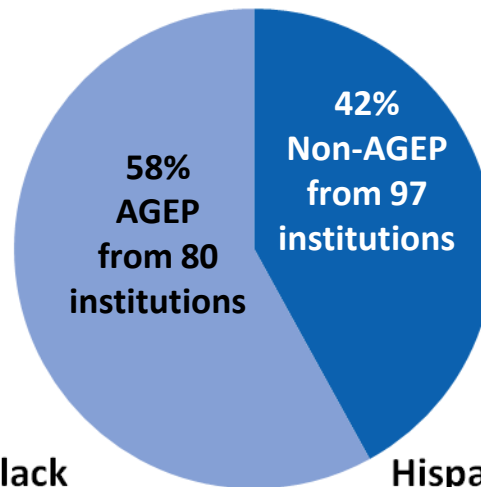


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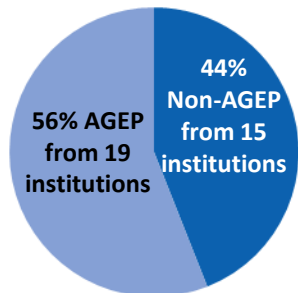
Source: NSF Survey of Earned Doctorates/Doctorate Records File and AGEPS.us

# UNDERREPRESENTED MINORITY PHDs PRODUCED IN ENGINEERING (2002–2006)

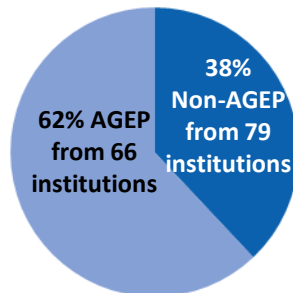
## All Underrepresented Minorities n = 1921



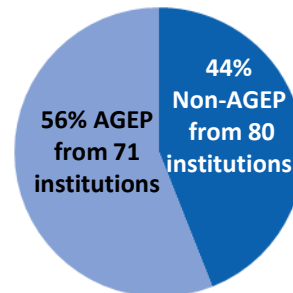
### American Indian / Alaska Native n = 36



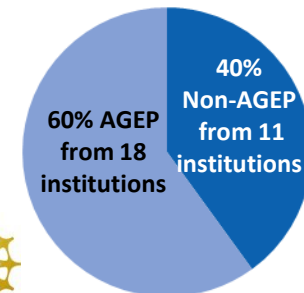
### Black n = 619



### Hispanic n = 1231



### Native Hawaiian / Pacific Islander n = 35



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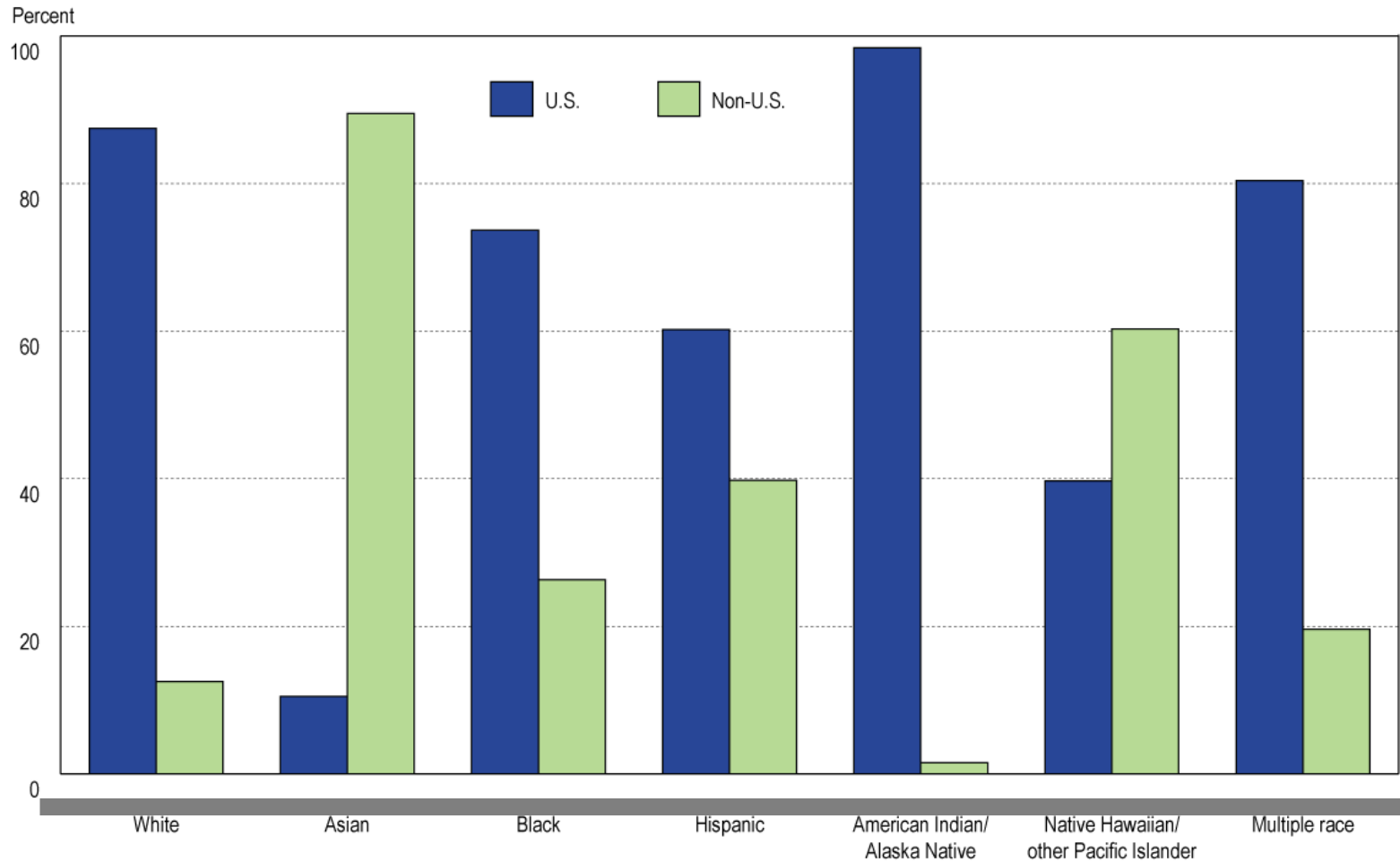
Source: NSF Survey of Earned Doctorates/Doctorate Records File and AGEP.us

# **PATHWAYS TO BROADENING AND SUSTAINING PARTICIPATION IN THE ACADEMY**

# HIGHLIGHTS: EXPANDING UNDERREPRESENTED MINORITY PARTICIPATION

- Underrepresented minority students lagging behind white and Asian students dramatically
- Goal? US will have to **more than double** the proportions of underrepresented minorities with a postsecondary degree in order just to meet the 55 percent mark achieved by Asian Americans/Whites.
- 25-34 year old cohort with an associate's degree:
  - 26 percent of African Americans
  - 24 percent of Native Americans/Pacific Islanders
  - 18 percent of Hispanics and Latinos

# DOCTORAL SCIENCE AND ENGINEERING FACULTY, BY RACE/ETHNICITY AND COUNTRY OF BIRTH: 2003





## Baccalaureate Origin of African American Doctorates in the Natural Sciences & Engineering (2002-2006)

Rank	Institution	2002	2003	2004	2005	2006	Total
	<b>Total</b>	<b>399</b>	<b>386</b>	<b>464</b>	<b>495</b>	<b>488</b>	<b>2232</b>
1	Florida Agricultural and Mechanical University	3	6	10	19	13	51
2	Howard University	10	5	7	12	14	48
3	Hampton University	9	6	11	7	11	44
4	North Carolina Agricultural & Tech State Univ	6	6	12	8	10	42
4	Spelman College	13	5	7	9	8	42
6	Morehouse College	3	7	7	9	9	35
7	Southern University A&M Col at Baton Rouge	4	6	7	11	5	33
8	Xavier University of Louisiana	1	4	12	10	5	32
9	Tuskegee University	9	4	5	4	9	31
10	Morgan State University	3	7	7	4	9	30
11	University of Maryland Baltimore County	2	3	6	6	7	24
12	Massachusetts Institute of Technology	3	6	6	3	3	21
12	University of Maryland at College Park	1	5	6	5	4	21
14	Alabama Agricultural and Mechanical University		4	2	6	7	19
14	North Carolina State University at Raleigh	3	3	3	4	6	19

Source:

NSF/SRS, WebCASPAR (Survey of Earned Doctorates)

Key:

Historically Black Colleges and Universities

Predominantly White Colleges and Universities

Table excerpted from:

Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroads  
<http://www.nap.edu/catalog/12984.html>

**Arlie O. Petters**  
**Professor of Mathematics, Physics,  
and Business Administration**

**Duke University: Arts & Sciences and  
Fuqua School of Business**



**Education:**

Ph.D. MIT, 1991 (Mathematics); advisors: Bertram Kostant (MIT) and [David Spergel](#) (Princeton University)

Ph.D. thesis title: *Singularities in Gravitational Microlensing*

PRINCETON UNIVERSITY, 1988-1991 (Exchange Scholar; in absentia from MIT)

MIT, 1986-1988 (Department of Mathematics);

B.A./M.A. HUNTER COLLEGE - C.U.N.Y., 1986 (Mathematics and Physics)

M.A. thesis title: *The Mathematical Theory of General Relativity*



**Erich D. Jarvis, Ph. D.**

**Exploring the Neurobiology of  
Vocal Communication**

**Duke University Medical Center**

**EDUCATION**

1979-1983 Scholarships to Geoffrey Ballet and Alvin Ailey Dance Schools, NY

1979-1983 Dance Major, High School of the Performing Arts, NY

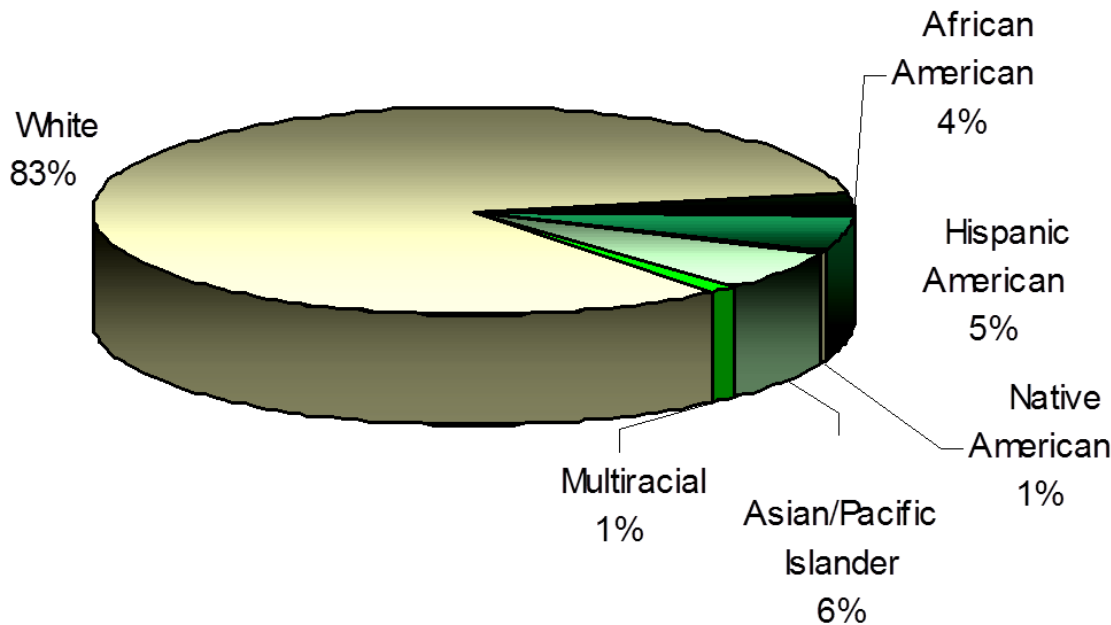
1983-1988 B.A., Double: Biology & Mathematics. Minor: Chemistry. Hunter College, NY

1988-1995 Ph.D., Molecular Neurobiology & Animal Behavior, The Rockefeller University, NY

1995-1998 Postdoc. Molecular Neurobiology & Animal Behavior, The Rockefeller University, NY

# TRANSCENDING BORDERS: BROADENING PARTICIPATION AS AN INTERNATIONAL IMPERATIVE

Race/Ethnicity of U.S. Students Studying  
Abroad, 2005-2006



Source: CPST, data derived from Institute of International Education, Open Doors Report 2007.

## Most Current Data:

**Whites: 83.0%**

**African Americans: 3.5%**

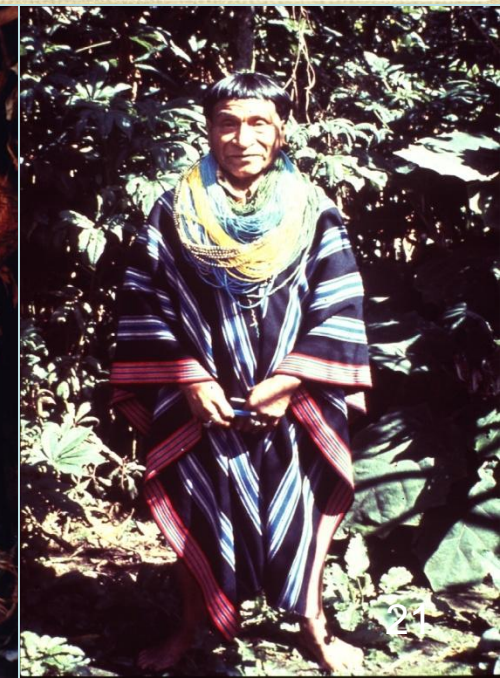
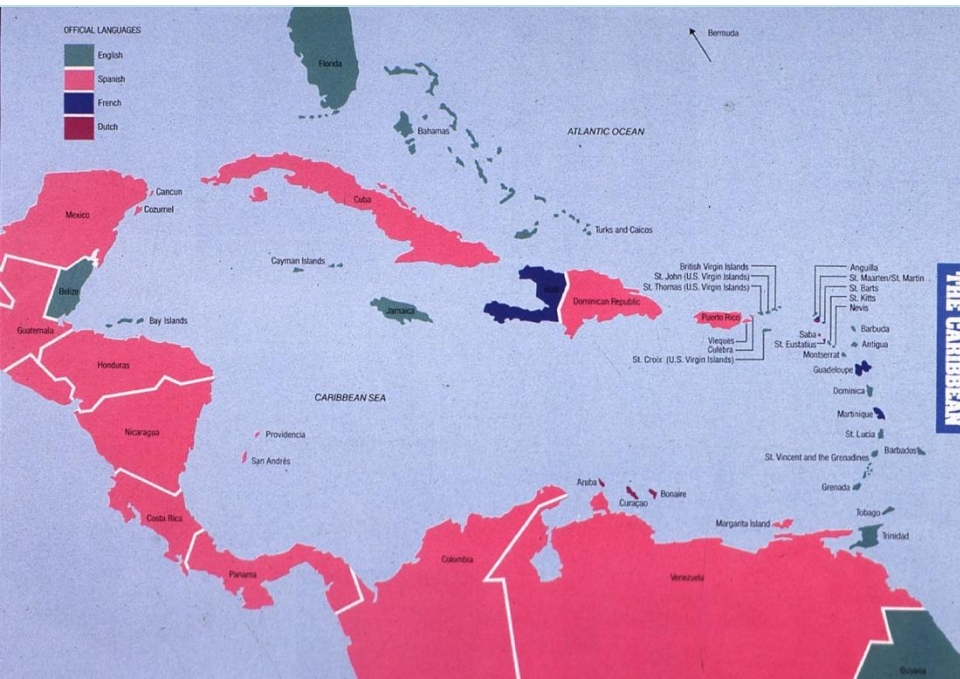
**Hispanics: 5.4%**

**Asian Americans: 6.3%**

**American Indians 0.6%.**

# International Research Activities

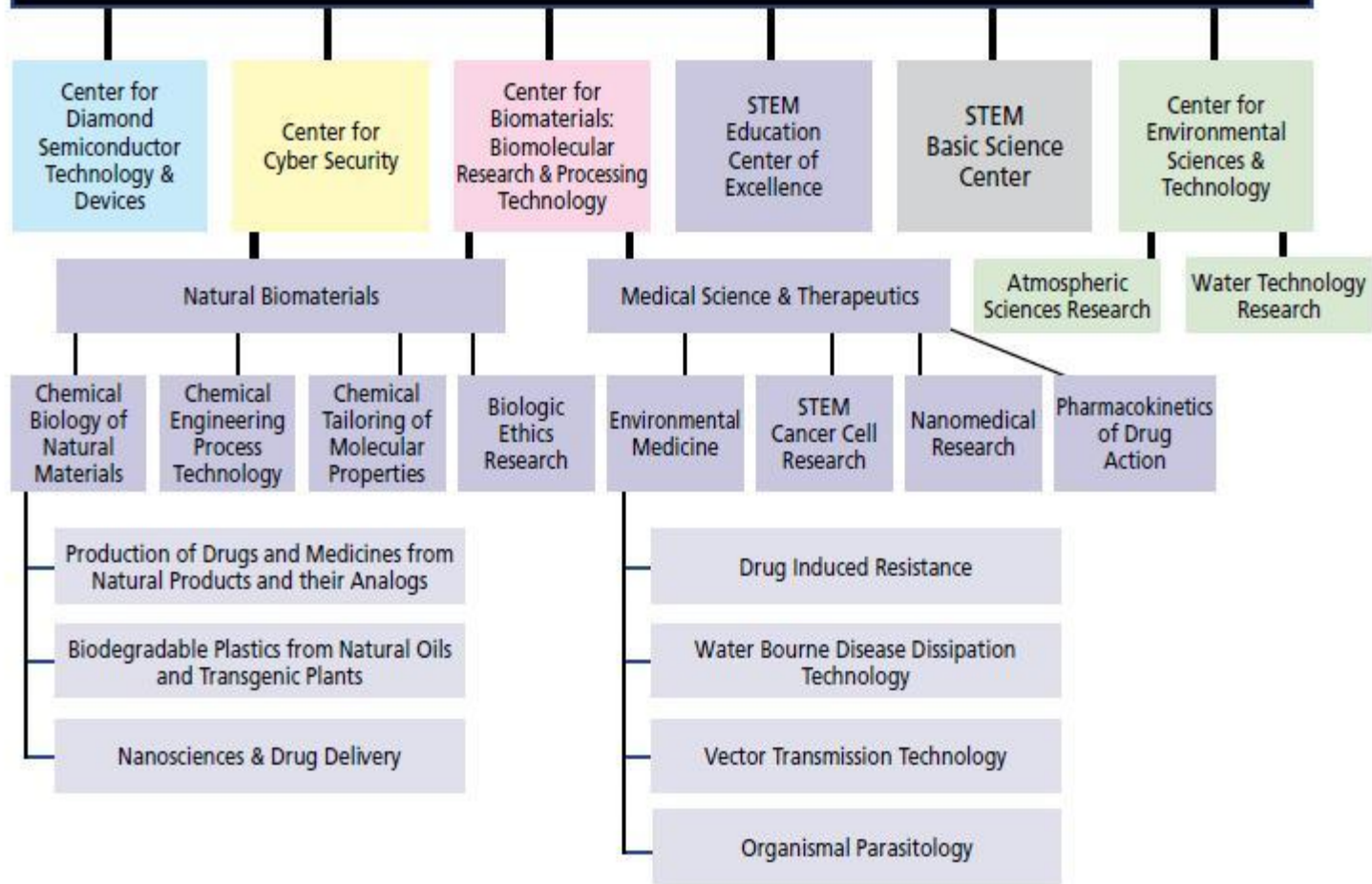
- Africa
- Caribbean/Latin America
- South America



# MODEL PROGRAMS TO SUSTAIN PARTICIPATION IN THE ACADEMY

- **Howard Applied Science and Technology Institute:** Recruiting junior scientists of color, providing both research and teaching opportunities
- **Leadership Alliance**

# Howard Applied Science and Technology Institute



# THE LEADERSHIP ALLIANCE

ENCOURAGE  
INSPIRE  
ENHANCE  
INVIGORATE  
SUPPORT

Example of a model initiative geared toward increasing the number of African American and underrepresented students pursuing careers in the STEM disciplines.



# THE LEADERSHIP ALLIANCE

## *The Leadership Alliance*

[www.theleadershipalliance.org](http://www.theleadershipalliance.org)

- ▶ **A Consortium** of 33 Outstanding Academic Institutions
- ▶ **Shared Vision:** Greater diversity in the nation's institutions of higher learning
- ▶ **Shared Commitment:** Assist underrepresented minority students become future educators and leaders for our academic, public and government organizations
- ▶ **Shared Engagement:** By focusing on critical transitions along the academic pathway, the Alliance provides trainees with trusted information and experiences to envision their next horizon

### Member Institutions

Brooklyn College  
Brown University  
Chaminade University  
Claflin University  
Columbia University  
Cornell University  
Dartmouth College  
Delaware State University  
Dillard University  
Harvard University  
Howard University  
Hunter College  
Johns Hopkins University  
Montana State University–Bozeman  
Morehouse College  
Morgan State University  
New York University  
Prairie View A&M University  
Princeton University  
Spelman College  
Stanford University  
Tougaloo College  
Tufts University  
University of Chicago  
University of Colorado at Boulder  
University of Maryland, Baltimore County  
University of Miami  
University of Pennsylvania  
University of Puerto Rico  
University of Virginia  
Vanderbilt University  
Xavier University of Louisiana  
Yale University

# Programs of The Alliance

## Programs at Four Levels

1. Undergraduate Summer Research
2. Graduate/Postdoc Transitions
3. Leadership Alliance National Symposium
4. Faculty Resource Network



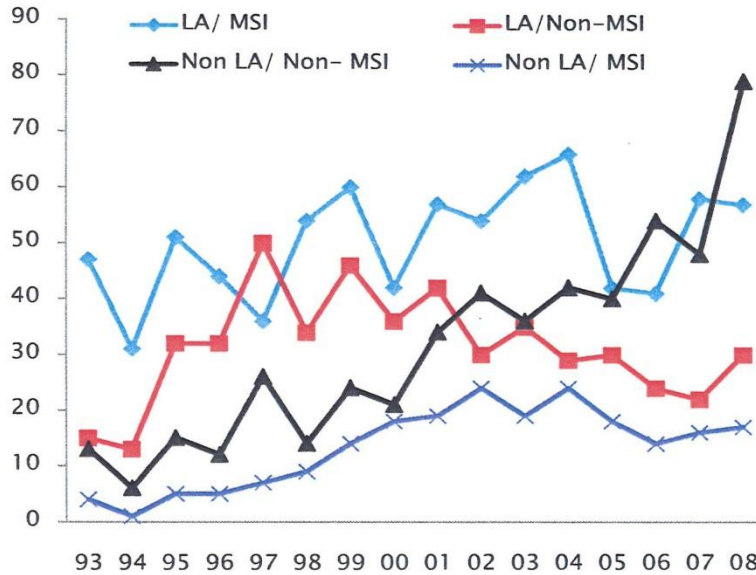
Faculty  
Resource  
Network



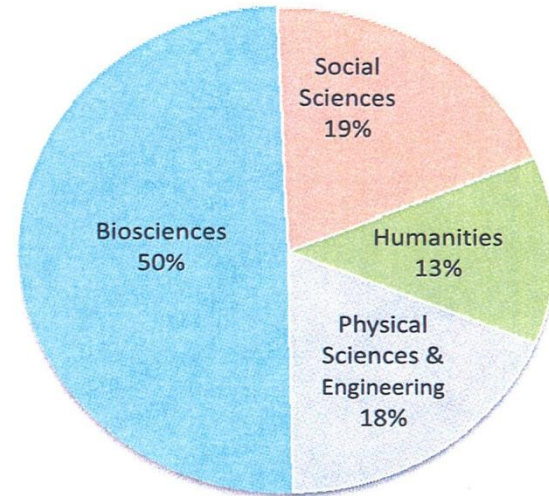
**An academic partnership devoted to faculty development.** After twenty years in operation, we remain committed to this partnership, and to fostering connection, collaboration, and collegiality among our members.

# Origins and Disciplines of Participants in Undergraduate Summer Program

Institutional Origins of Alliance Summer Students



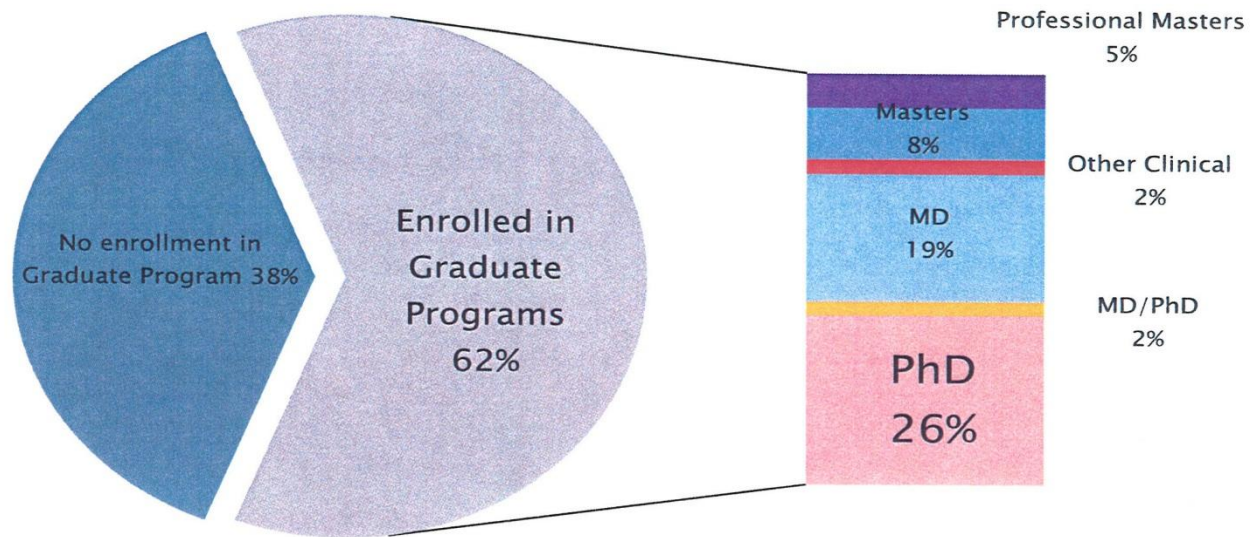
Undergraduate Majors of LA Students 1993–2008; n=2022



Increasing numbers of students from Non-MSIs

Students are principally in the STEM Fields

## Graduate Enrollment of Leadership Alliance Students 1993–2006 n=1346

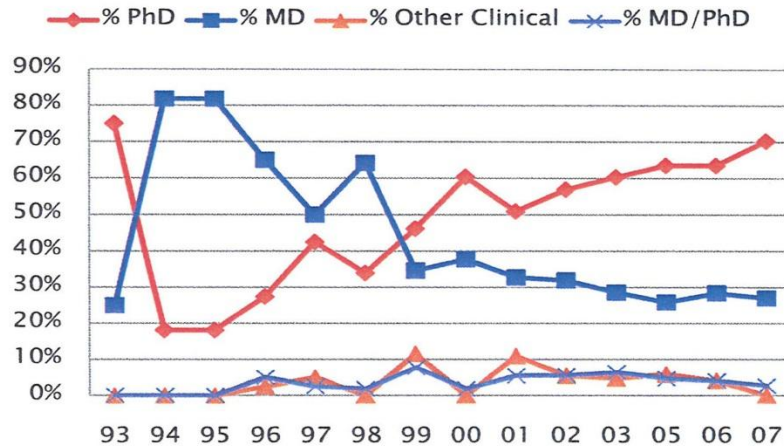


### What Types of Training do Students Pursue?

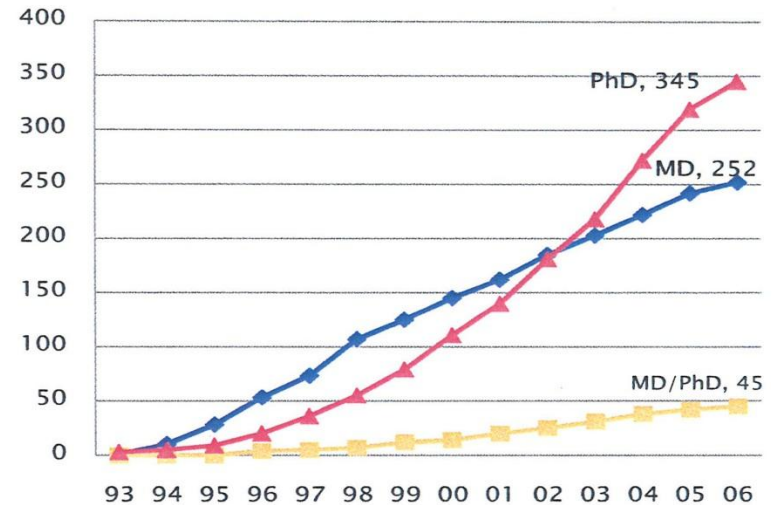
The Majority of Students enroll into graduate training programs  
With one quarter of these enrolling into PhD Programs

# Enrollment in Doctoral Programs Over Time

Doctoral Training Choices –  
Proportion by Year of BS Degree



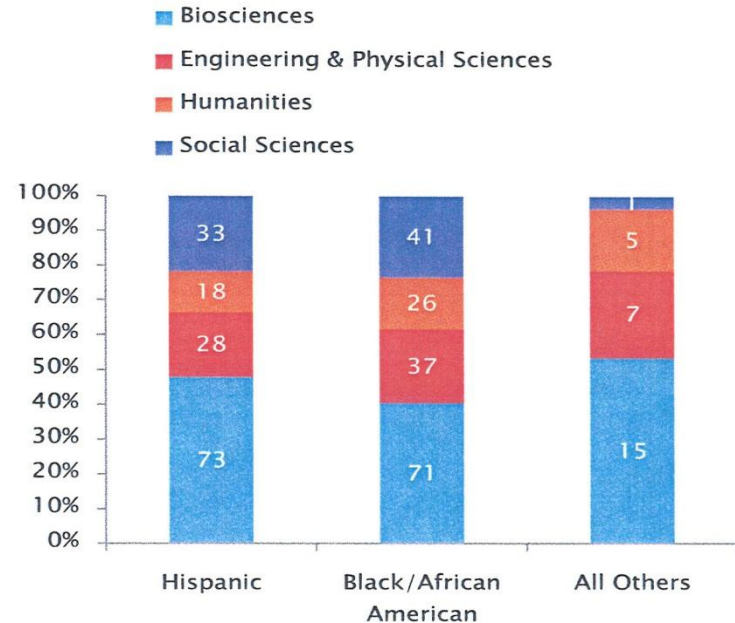
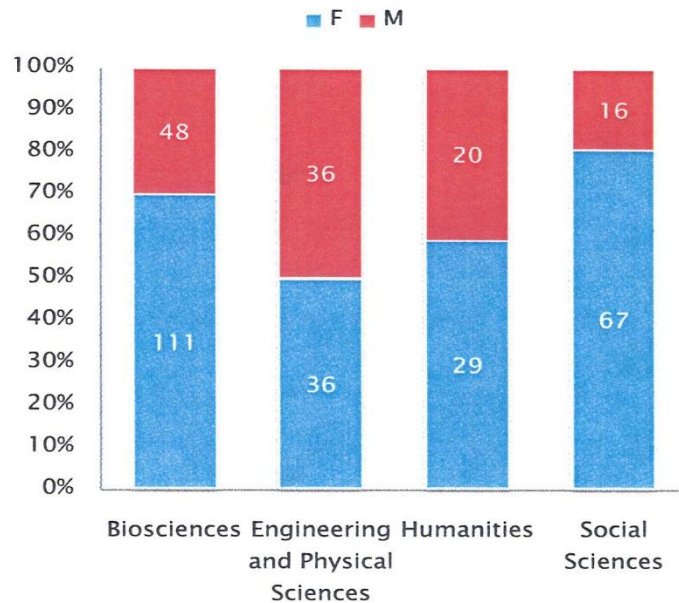
Student Entering Doctoral Programs  
– Cumulative



The proportion of those entering PhD programs has increased...

...so that the overall outcome is more students in PhD training

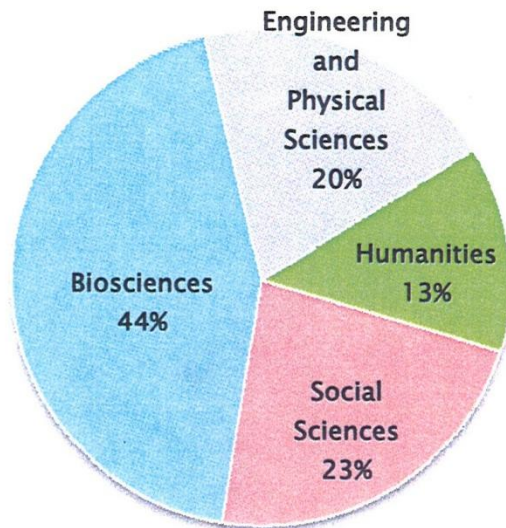
# Gender and Racial/Ethnic Distributions



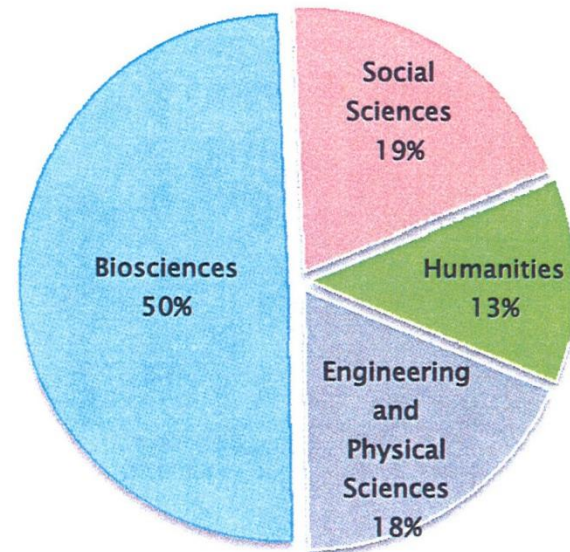
Women enrolling in doctoral programs dominate the Biosciences and the Social Sciences, but...

...there is no difference in disciplines by race or ethnicity

Disciplines of Doctoral Students,  
Cumulative 1993–2006



Undergraduate Majors of LA  
Students 1993–2008; n=2022



The disciplinary mix of those entering graduate training....

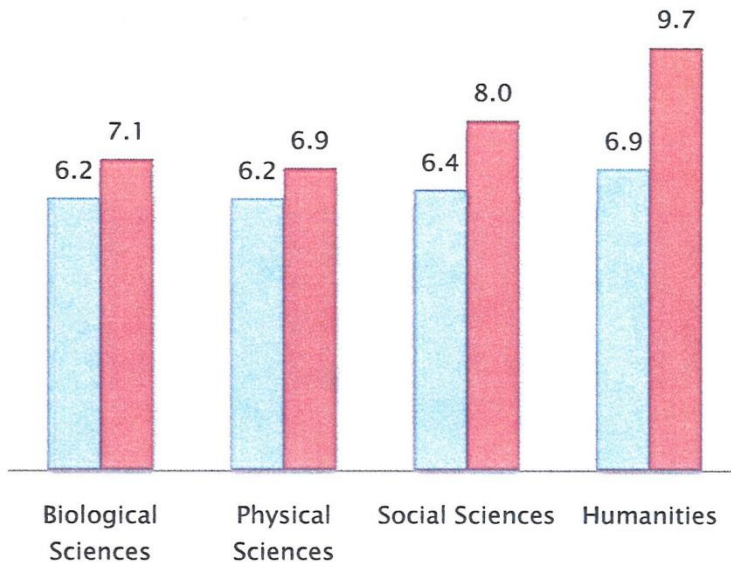
...is similar to the disciplinary mix of the entire entering undergraduate pool

# Completion and Advance Training

## Time to Degree

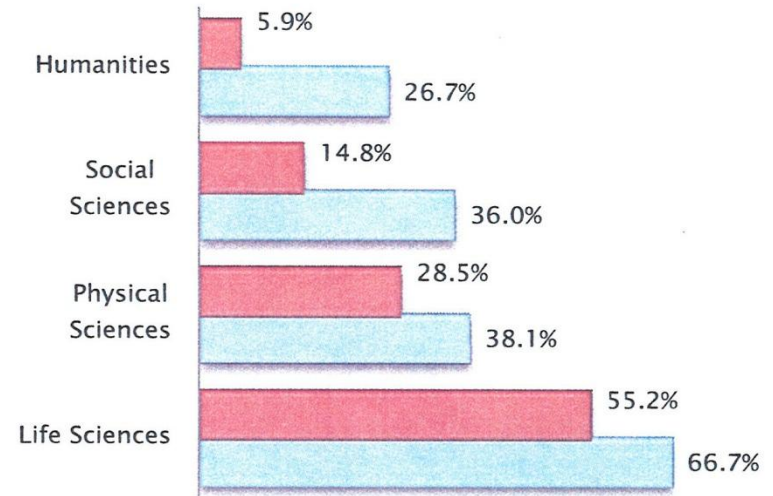
Source: NSF Survey of Earned Doctorates, 2005 Table 16

■ Leadership Alliance   ■ National Average



## Engaged in Postdoctoral Study at Higher than National Rates

■ National Average   ■ LA







**Howard University Black Male Initiative:**

# **An Overview**

## **Howard University Black Male Initiative: An Overview**

### **I. The Process**

- A. Historical Perspectives
- B. Research and Literature Review
- C. National Outcomes to Date
- D. Best Practices

## Howard University Black Male Initiative: An Overview

### II. The Howard Model

- A. Pre-college K6-8 program (e.g., **MS<sup>2</sup>** HU Middle School)
- B. Linkage to DC K9-12 (Banneker, Dunbar, Phelps, etc.); other targeted regions (Houston, LA, Chicago, NY, KC)
- C. Summer Bridge Academic Enrichment Programs
- D. Pre-college Advising Programs: The DC Academy
- E. College Prep Transition Programs
- F. HU Advising Deanery and Honors College
- G. Frosh-Senior Summer Research Programs
- H. International Research/Study Abroad Experience
- I. Career and Awards Planning and Preparation
- J. Metric analyses and Student Tracking



*"I think what this committee wants to know is whether or not the situation at the end of the rainbow can be sustained without a bailout."*