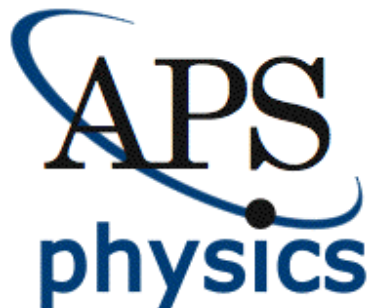


# AAPT Winter Meeting

*10 January 2016*

*New Orleans, LA*

## ***APS Bridge Program: Overview and Evidence for Success***



*Theodore Hodapp*  
Director of Education and Diversity

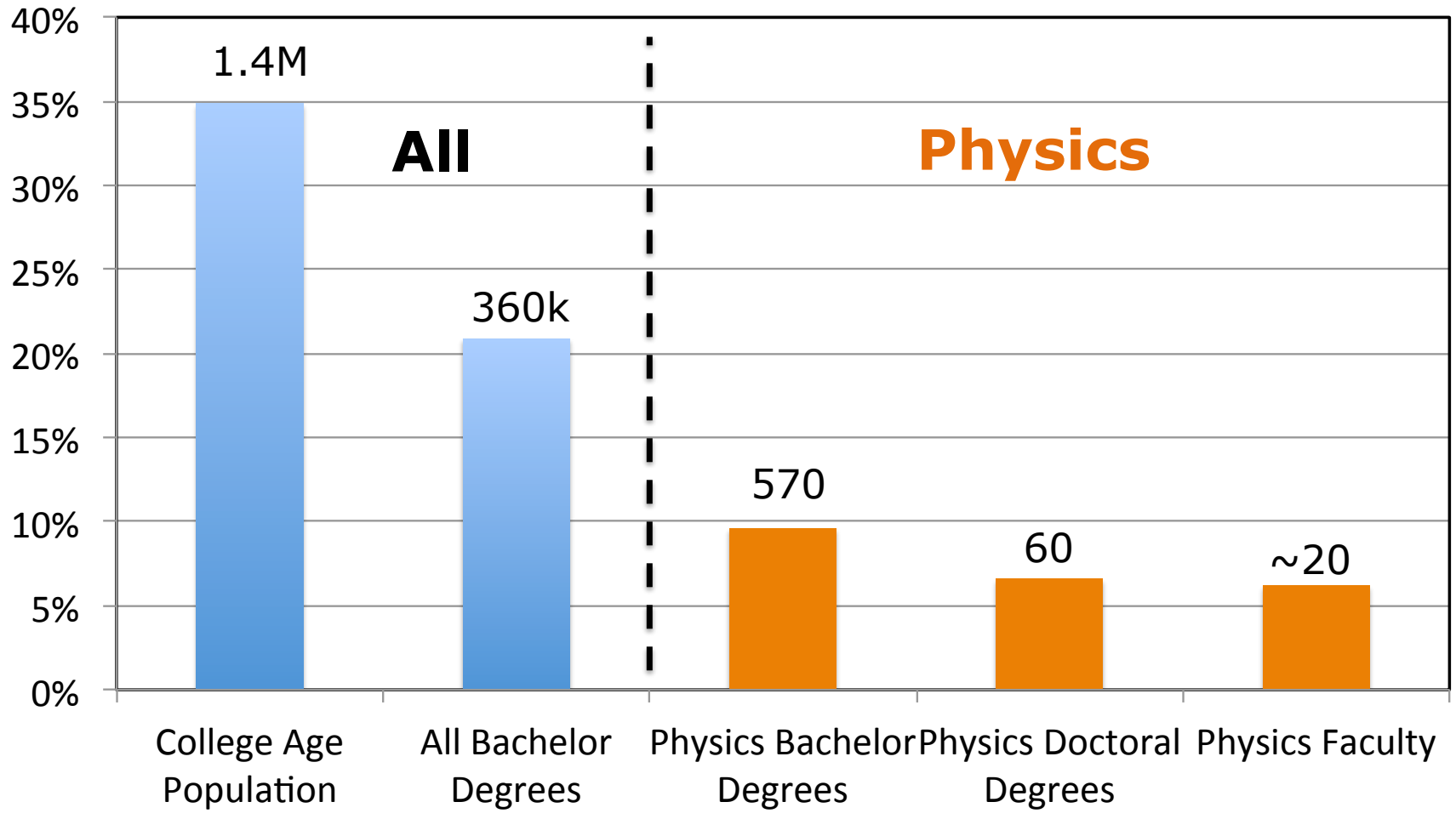
## 8.2 JOINT DIVERSITY STATEMENT

*(Adopted by Council on November 16, 2008)*

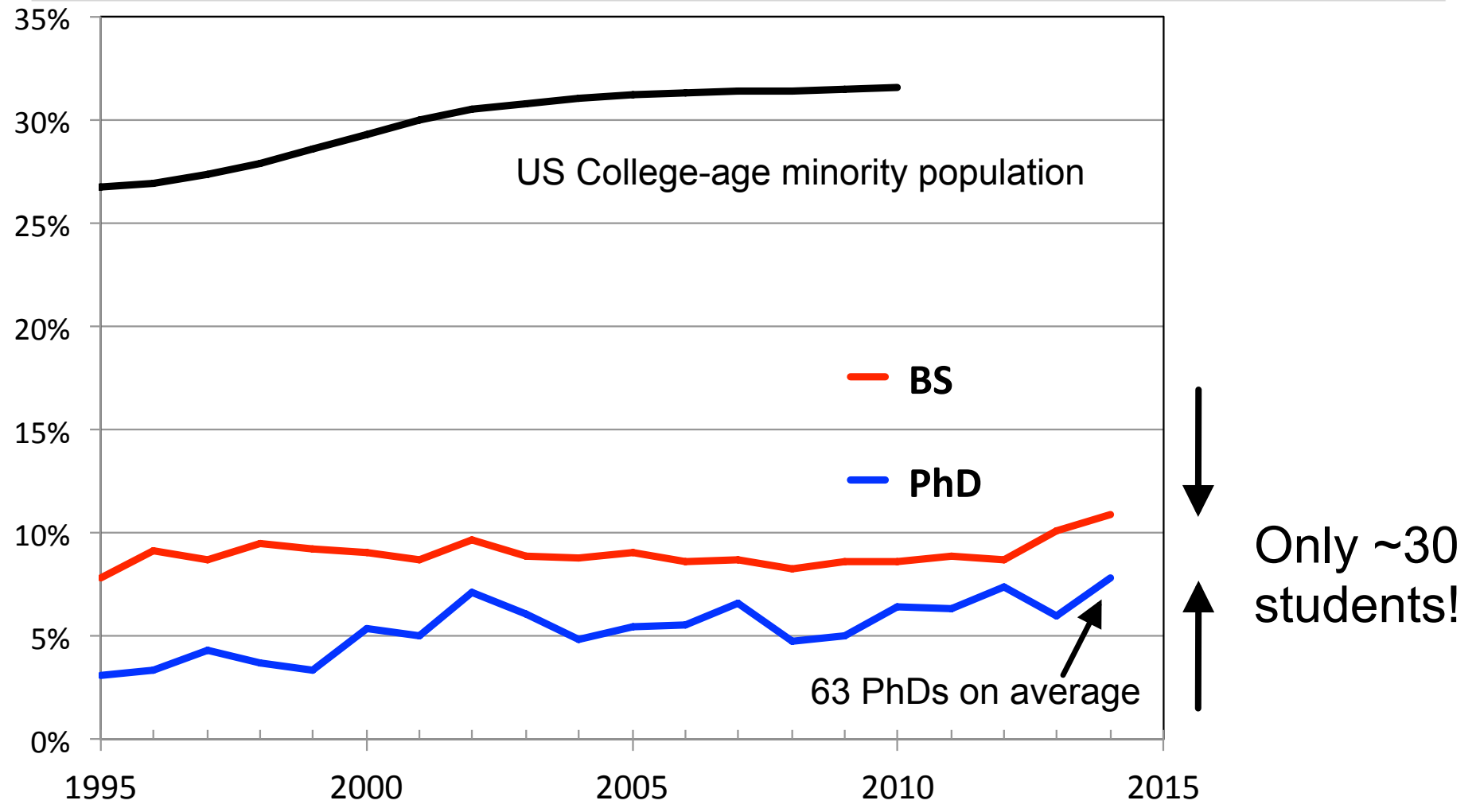
To ensure a productive future for science and technology in the United States, we must make physics more inclusive. The health of physics requires talent from the broadest demographic pool. Underrepresented groups constitute a largely untapped intellectual resource and a growing segment of the U.S. population.

Therefore, we charge our membership with increasing the numbers of underrepresented minorities in physics in the pipeline and in all professional ranks, with becoming aware of barriers to implementing this change, and with taking an active role in organizational and institutional efforts to bring about such change. We call upon legislators, administrators, and managers at all levels to enact policies and promote budgets that will foster greater diversity in physics. We call upon employers to pursue recruitment, retention, and promotion of underrepresented minority physicists at all ranks and to create a work environment that encourages inclusion. We call upon the physics community as a whole to work collectively to bring greater diversity wherever physicists are educated or employed.

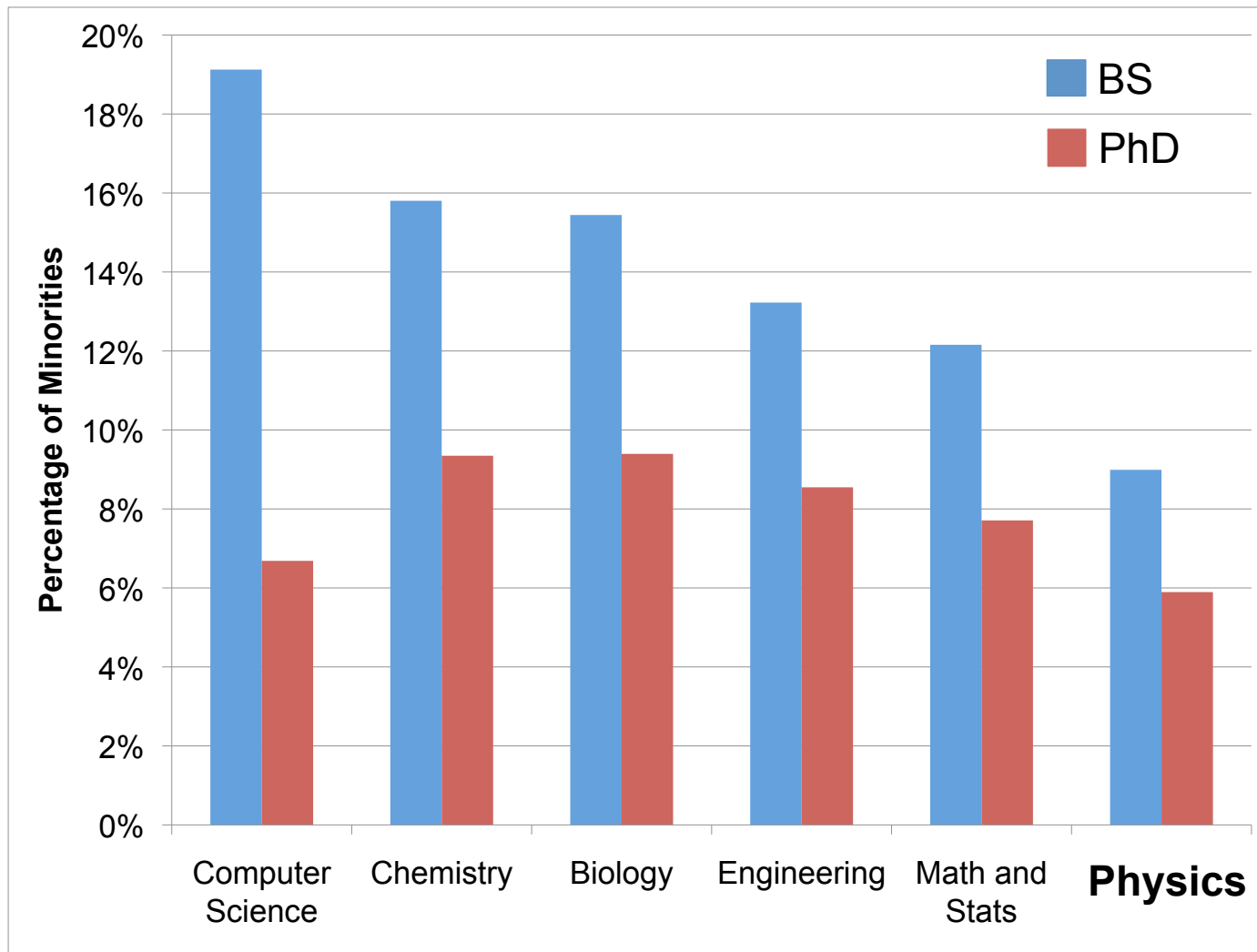
# Minorities in Higher Education



# URM Physics PhDs to Minority Population



# Bachelor and PhD STEM Degrees



# Bridge Program Design: Underlying Themes

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- Focus on underrepresented minorities (Hispanic, African American, Native American)
- Base components on published scholarship and operational successes of similar programs
- Design program to avoid “rearranging the deck chairs”
- Bring unique position of APS to bear on the problem
- Measurable outcomes must be immediately recognizable by an APS member as having significant value
- Must have significant national impact

# Leadership / Oversight

## National Advisory Committee

- J.D. Garcia (Arizona)
- Yolanda George (AAAS)
- Paul Gueye (NSBP)
- Wendell Hill (UMCP)
- Anthony Johnson (**Chair**, UMBC)
- Brittany Kamai (Grad student)
- Ramon Lopez (UT Arlington)
- Luz Martinez-Miranda (NSHP)
- James Mathis (Grad student)
- Steve McGuire (Southern University)
- Ritchie Patterson (Cornell)

## Funding

- NSF
- APS
- Bridge sites



## Architect's Council

- Marcel Agüeros (Columbia)
- Ed Bertschinger (MIT)
- Andreas Bill (CSU Long Beach)
- Simon Capstick (Florida State)
- Cagliyan Kurdak (Michigan)
- Garrett Matthews (USF)
- Jon Pelz (Ohio State)
- Talat Rahman (UCF)
- Keivan Stassun (Fisk/Vanderbilt)
- Jon Urheim (Indiana)

## Research / Assessment

- Geoff Potvin (FIU-Research advisor)
- Rachel Scherr (SPU-Project evaluator)

## APS Staff

- **Geraldine Cochran** (Project Manager, Jan 2016)
- **Renee Michelle Goertzen** (IRB, Assessment)
- **Theodore Hodapp** (Project Director)
- **Asmaa Khatib** (Project Coordinator)
- **Arlene Modeste Knowles** (Project Management Team)
- **Monica Plisch** (Project Management Team)
- **Kathryne Woodle** (Project Manager)

## APS Strategic Plan

### Goal 2: To Better Serve the Physics Community

#### Objective 3: Education and Diversity:

- Coordinate and lead an innovative program to increase the number of underrepresented minorities obtaining a PhD in physics.



# APS Bridge Program: Key Features

- **Recruit** through graduate programs (unaccepted students), undergrad programs (promising students)
- **Establish** Bridge Sites (6):
  - Year 1: Advanced undergraduate or grad courses, introduction to grad-level research, active mentoring, progress monitoring, social integration into grad school ([Project funds](#))
  - Year 2: Take 1<sup>st</sup> year grad courses, apply to PhD program, research underway ([Department funds](#))
- **Place** additional students (at Partnership Institutions):
  - 46 graduate programs looked at “other” applications (2015), recruited additional students; No direct support, some travel
  - “COM approved” Partnership Institutions; national recognition of program
- **Monitor** student/site progress
- **Research**
- **Disseminate / Advocate**

- Bachelor's degree in physics or closely related discipline
- US citizen or permanent resident
- Either:
  - Applied but was not accepted
  - Did not apply to graduate program this year
- Be committed to improving diversity in physics
- Meet individual requirements of the institution
- Students may not be currently enrolled in a graduate program

**We review applications AFTER April 15**

# Bridge Programs in Physics

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## APS Sites :

- Cal State Long Beach
- Florida State University
- Indiana University
- Ohio State University
- University of Central Florida
- University of South Florida

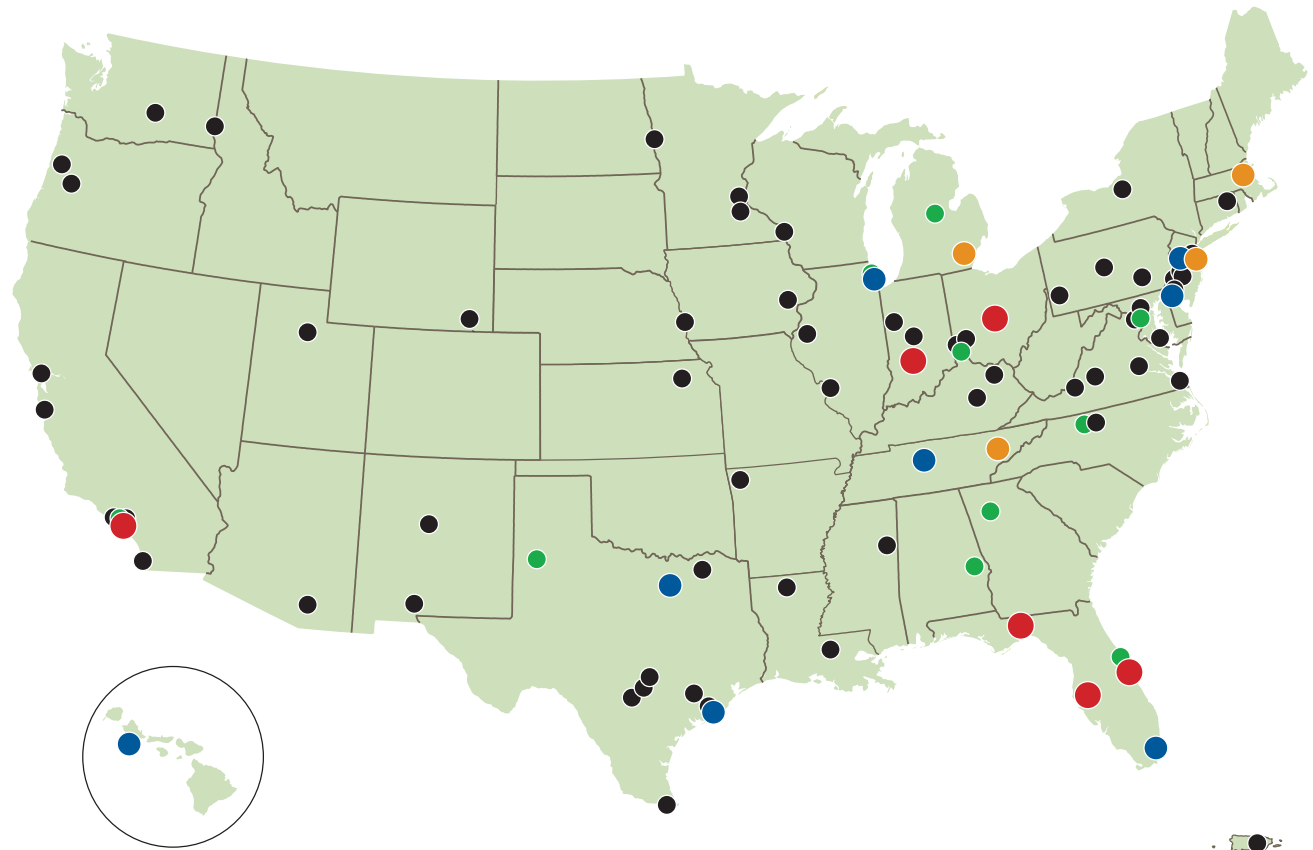
## Non-APS Sites:

- Columbia University
- Fisk / Vanderbilt
- MIT
- Princeton University
- University of Chicago
- University of Michigan
- several others  
developing...

# Institutional Members

- Member Institutions
  - 92 in 36 states
- Partnership Institutions
  - 16 in 12 states
- Bridge Sites
  - Pre-existing: 4
  - APS: 6
  - Developing: 4

● APS Bridge Sites  
 ● Additional Bridge Sites  
 ● APS Partnership Sites  
 ● APS Affiliate Sites  
 ● APS Member Institutions



# Bridge Sites and Partnership Institutions

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- Admission decisions (“holistic” criteria)
- Financial support (timing)
- Coursework (induction advising critical, allow advanced undergrad courses, alternative plan)
- Progress monitoring (timing, tutors if needed)
- Multiple mentors (intervention, peer involvement)
- Research (appropriate match)

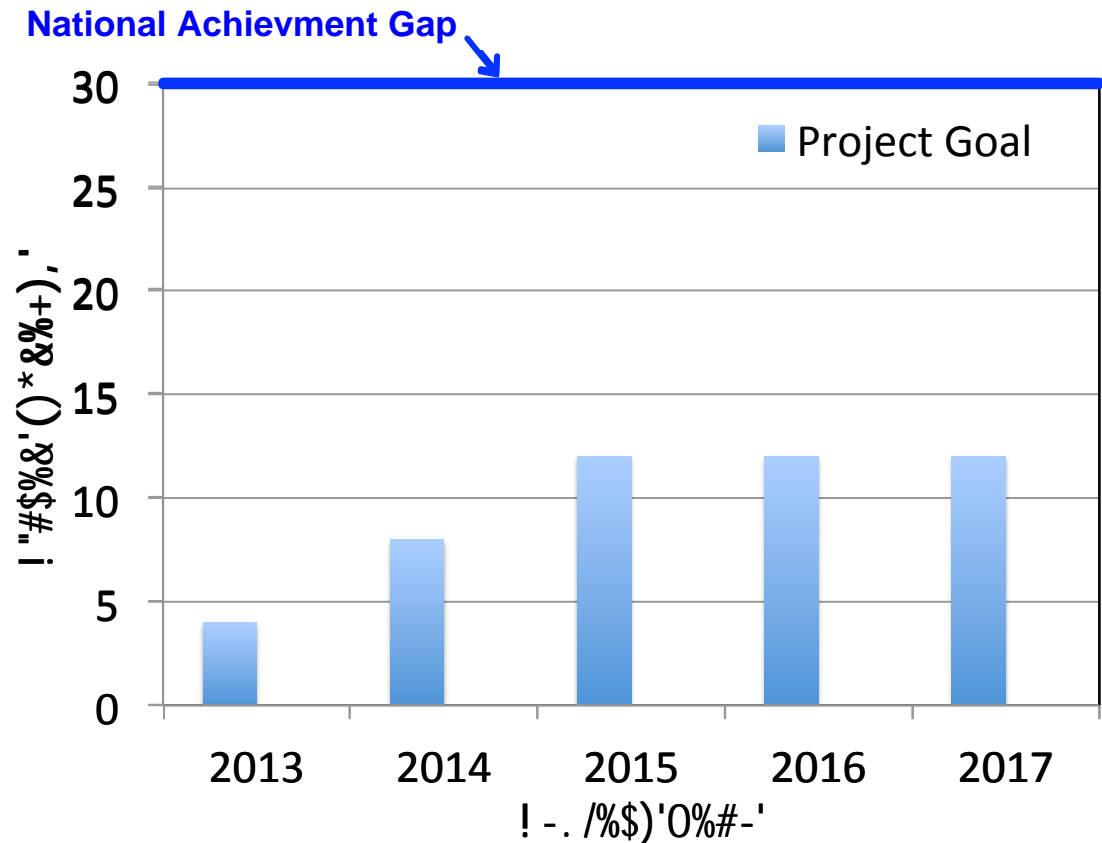
# Admissions Decisions

2013	2014	2015	Actions
28	38	53	Eligible applications
8	18	22	Bridge students selected
23	69	45	Departments expressing an interest in recruiting these students
12	20	29	Remaining applications circulated
5	7	6	Additional students recruited by "Affiliated" sites
<b>13</b>	<b>25</b>	<b>28</b>	Total number of students entering grad studies
<b>11</b>	<b>24</b>	<b>28</b>	Retained in physics graduate programs

**None of these students would have entered graduate studies**

# Bridge Program Achievements

- 6 Bridge Sites
  - 5 promised
  - 2+ now self funded
- 95% retention rate
  - 60% is average for physics
- Increasing by ~30/year answers national need
- Growing interest by departments and students



## What we didn't know...

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### ...and learning this surprised us!

1. Aggregating applications is a powerful tool
2. Graduate programs (most) want to do better
3. Admissions are not what they seem
4. Applications are expensive
5. Importance of graduate student groups



# Some reasons students are not admitted

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## Students:

- Low Physics GRE scores
- Apply to too few places
- Apply to wrong places
- “Feel” unprepared (self-esteem)
- Inadequate preparation: will fail in grad courses
- Application materials do not tell a predictive story

## Admissions Committees:

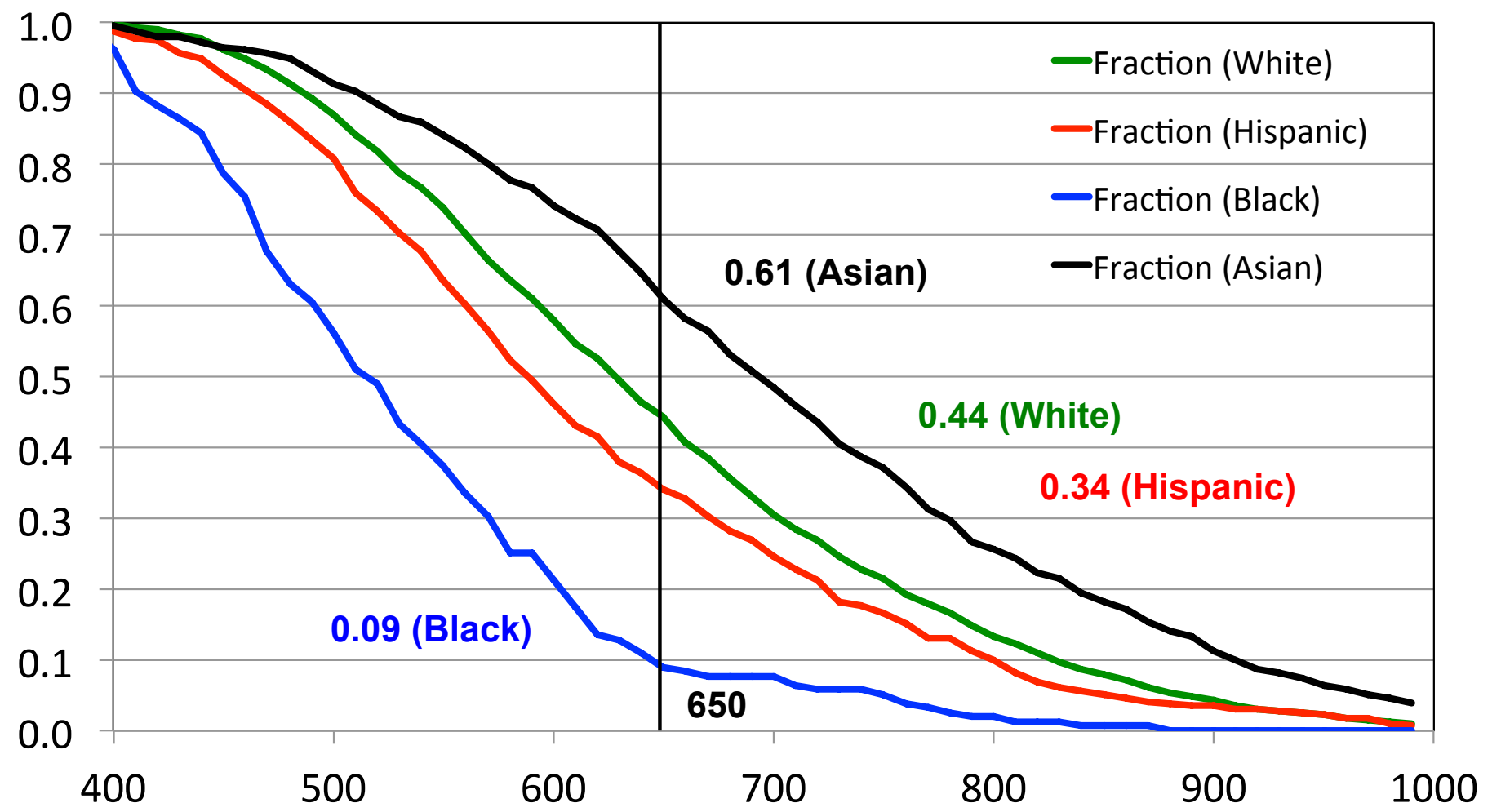
- Members overwhelmed
- Members unaware of admissions research findings

- **Graduate admissions study**
  - Doctoral institutions
  - Master's institutions
- **GRE (and other) admissions data:** Correlations with student success; impact on diversity
- **Holistic admissions practices:** practical use of non-cognitive measures or other practical techniques for use by physics graduate admissions faculty (parallel effort by CGS)

**Near future: (hiring a postdoc at FIU this spring)**

Student perspective on admissions

# Physics GRE: Impact of Cutoff Scores



- Maintaining high URM fraction in the applicant pool
- Long-term role for APS
- Application deadlines
- How to best tie together various new bridge programs
- Wider dissemination of good practices in graduate education
- Understanding fundamental drivers that impact participation

## Next Steps...

- Broader implementation of advances made by Bridge Program (*admissions, induction, 1<sup>st</sup> year support, peer and faculty mentoring*)
- Interface with **APS National Mentoring Community** ([www.aps.org/nmc](http://www.aps.org/nmc))
- Better understand graduate admissions and advocate for a better informed process
- Spawning related research efforts in graduate education
- Planning joint Bridge Program / Graduate Education in Physics Meeting: **February 2017**

**Happy Physicists ⇒ Great Physics**

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