STC Education Workshop

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Cleveland, OH

Promoting Diversity in STEM
Graduate Education

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08.2 JOINT DIVERSITY STATEMENT
(Adopted by APS, NSBP, NSHP in 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.
US Demographics

Source: US Census
African American Physics Majors

Percentage of College-Age Black, Non-Hispanics in US Population

Source: IPEDS, US Census
Hispanic Undergraduate Majors

US College-Age Hispanic Population

- Engineering
- Biology
- Chemistry
- Math & Stats
- Earth Science
- Physics

1995 2000 2005 2010

105 273
Underrepresented Minorities: Undergraduate Majors

US College-Age Underrepresented Minority Population

- Biological Sciences
- Chemistry
- Engineering
- Mathematics and Statistics
- Physics
- Earth Sciences
- URM

1995 2000 2005 2010

277 490
Minorities in Higher Education

- College Age Population: ~1.5M
- All Bachelor Degrees: ~200k
- Physics Bachelor Degrees: ~450
- Physics Doctoral Degrees: ~35
- Physics Faculty: ~12
Physics Degrees Awarded to Underrepresented Minorities

- Bachelor's Degrees: ~400 degrees
- Doctoral Degrees: ~40 degrees
- Doctoral Degrees Goal: ~30 more PhDs

Source: IPEDS, US Census
URM Physics PhDs to Minority Population

9-10% of BS degrees in physics are granted to underrepresented minorities

52 PhDs awarded to minorities in 2010

Sources: IPEDS Completion survey by race, US Census
Percentage of African American Physics Majors from HBCUs

Source: IPEDS
APS Bridge Program: Key Components

- Recruiting through graduate programs across the US (now 115+ institutions, representing 73% of all doctoral students)
- Spend 1-2 years in a “Bridging program”
  - Take advanced UG or entry-level graduate coursework
  - Graduate-level research
  - Demonstrate ability to do independent research and succeed in graduate-level coursework
  - Receive coaching on preparing graduate admissions package (letters, GRE, statements)
  - Accepted into doctoral program
- Receive mentoring in doctoral program (especially in first years)
- Research into barriers; disseminate successful program elements
- Build a national coalition of departments committed to improving participation
APS Bridge Program: Project Goals

• Increase, within a decade, the number of physics PhDs awarded to *underrepresented minority* students to match the fraction of physics Bachelor’s degrees granted to these groups.

• Develop, evaluate, and document sustainable model bridging experiences that improve the access to and culture of graduate education for *all* students, with emphasis on those underrepresented in doctoral programs in physics.

• Promote and disseminate successful program components to the physics community.
Key Personnel

**Steering Committee**
- J.D. Garcia (Arizona)
- Yolanda George (AAAS)
- Wendell Hill (UMCP)
- Anthony Johnson (UMBC)
- Ramon Lopez (UT Arlington)
- Steve McGuire (Southern)
- Cherry Murray, chair (Harvard, APS President 2009)
- Luz Martinez-Miranda (President, NSHP)
- Paul Gueye (President, NSBP)
- Bernadette Cogswell (Vanderbilt Grad Student)
- Ximena Fernández (Columbia Grad Student)

**Architect’s Council**
- Marcel Agüeros (Columbia)
- Ed Bertschinger (MIT)
- Cagliyan Kurdak (Michigan)
- Casey Miller (USF)
- Jon Pelz (Ohio State)
- Keivan Stassun (Fisk/Vanderbilt)

**APS Staff**
- Brian Beckford (Project Manager)
- Theodore Hodapp (Project Director)
- Bushraa Khatib (Project Coord.)
- Arlene Modeste Knowles
- Monica Plisch
Bridge Types

Masters degree as a “transition” to PhD
• Take advanced UG and entry-level graduate coursework
• Do research with doctoral faculty
• Demonstrate ability to do independent research and succeed in graduate-level coursework
• Become “known” to graduate faculty
• Separate doctoral-level admissions
• Receive graduate-assistantship

Post-baccalaureate year
• Similar attributes to Masters program, but not formally admitted
• Begin research in summer
Bridge Programs in Physics

• Fisk / Vanderbilt
• Columbia University
• University of Michigan
• MIT

APS Sites (will add 3 more):
• Ohio State
• South Florida
Bridge Sites

- Recruitment (APS, and institution)
- Admission decisions (criteria, process)
- Financial support (timing, amount)
- Multiple Mentoring (timing, intervention)
- Progress monitoring (coursework, tutors if needed, research “fit”)
- Coursework (induction advising critical)
- Community (induction, socialization)
- Research (appropriate match)
- Application coaching (GRE, statements, schools)
Student Eligibility

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

Students may not be currently enrolled or have an existing physics graduate degree
Getting Involved

• **Member Institution** (any institution)
  Free; receive information / updates; reduced fees for APS-BP conferences

• **Partnership Site** (Doctoral granting institutions)
  APS COM approval process; recommended site for Bridge Fellows (and others) to attend; demonstrate effective practices in graduate student support; accepting additional URM students recruited by APS into graduate programs

• **Bridge Site** (MS or PhD granting)
  Receive significant funding from APS; build sustainable program; prepare 2+ students each year for graduate study; significant institutional commitment

www.APSBridgeProgram.org
Project Progress

• Bridge Site Selection
  • Selected two sites in 2013
  • Currently considering 7 proposals
  • 1-2 additional sites will be awarded (early March)

• Student Recruitment
  • 50 applicants in 2013
  • Application process open for 2014
  • Most (~75% of grad programs) recruiting for this
  • Many undergraduate programs also helping

• Summer Meeting (25-27 June 2014)

• Admissions Study
  • Doctoral data in
  • Gathering Masters data
The APS Bridge Program Summer Meeting will bring together experts to discuss efforts to increase the number of underrepresented minorities (URMs) who receive PhDs in physics. This year’s conference will focus on exploring and understanding the role of the M.S. degree in promoting URMs in physics.

Workshops, panel discussions, and presentations will address topics including:

- Establishing MS/PhD institutional relationships
- Role of Masters’ degrees for URM students
- Barriers to student advancement to the PhD
- Mentoring
- Non-cognitive admissions measures

Who should attend: faculty, students, and administrators interested in increasing the number of underrepresented students pursuing PhDs in physics.

www.APSBridgeProgram.org
2013 Bridge Students

**Ohio State University:**
- Brian (bridge fellow, AA, APS)
- Brady (bridge fellow, HA, APS)
- Kevin (Grad direct admit, HA, OSU)
- Meron (bridge fellow, A, OSU) [external recruitment, non-US]

**University of South Florida:**
- Carlos (bridge fellow, AA/HA, APS)
- Manuel (bridge fellow, HA, USF) [external recruitment]
- Kristin (bridge fellow, C, USF)
- Brian (Grad direct admit, HA, USF)

12 Applicants sent to other programs (7 others not sent), 6 selected for graduate programs.
Bridge Program
First Year Achievements

![Bar chart showing project goals and achievements over years.](chart.png)

- Students
- Project Year
- Project Goal
- Project Achievement
GRE Physics Scores: Impact of Cutoff Scores

Source: ETS

- Fraction (F): 0.25 (F)
- Fraction (M): 0.46 (M)

650
Physics GRE: Impact of Cutoff Scores

- Fraction (White)
- Fraction (Hispanic)
- Fraction (Black)
- Fraction (Asian)

0.09 (Black)
0.34 (Hispanic)
0.44 (White)
0.61 (Asian)
Conferences / Workshops

• Entrepreneurship Education (4-6 June; American Center for Physics, College Park, MD)
• Department Chairs (6-8 June; ACP)
• New Faculty Workshop (23-26 June; ACP)
• APS Bridge Program (25-27 June; ACP)
• New Faculty Workshop (November; ACP)
• PhysTEC (19-20 May; Austin, TX)
• Building Thriving Programs (February 2015)