NSBP Meeting
27 February 2015
Boston, MA

The Ultimate Safety School:
The APS Bridge Program

Theodore Hodapp
American Physical Society
Director of Education and Diversity
Joint Diversity Statement

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.
Physics / STEM Bachelor Degrees

Source: IPEDS Completion Survey
Underrepresentation in Physics

Source: IPEDS, US Census

www.APSBridgeProgram.org

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

Only ~30 students!

52 PhDs awarded to minorities in 2010

Sources: IPEDS Completion survey by race, US Census

www.APSBridgeProgram.org
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
Leadership / Oversight

National Advisory Committee
- J.D. Garcia (Arizona)
- Yolanda George (AAAS)
- Wendell Hill (UMCP)
- Anthony Johnson (UMBC)
- Ramon Lopez (UT Arlington)
- Steve McGuire (Southern University)
- Cherry Murray, chair (Harvard, APS President 2009)
- Luz Martinez-Miranda (President, NSHP)
- Paul Gueye (President, NSBP)
- Brittany Kamai (Grad student)
- James Mathis (Grad student)

Funding
- NSF (PHY, DMR, HRD)
- APS

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)
- Keivan Stassun (Fisk/Vanderbilt)

Project Leadership
- Brian Beckford (APS, Project Mgr.)
- Theodore Hodapp (APS, Project Dir.)
- Bushraa Khatib (APS, Project Coord.)
- Arlene Modeste Knowles (APS)
- Geoff Potvin (FIU-Research advisor)
- Monica Plisch (APS)
- Rachel Scherr (SPU-Project evaluator)
• **Recruiting** through graduate programs (now 115+ institutions, representing 73% of all doctoral students), undergrad programs

• **Establish** Bridge Sites:
  - Year 1: Advanced undergraduate courses, introduction to grad-level research, active mentoring, progress monitoring, social integration into grad school (APS funds)
  - Year 2: Take 1st year grad courses, apply to PhD program, research underway (Department funds)

• **Place** ancillary students (at Partnership Institutions):
  - 69 graduate programs look at “other” applications, recruited additional 8 offers to these students (2014)
  - Beginning approval of APS “COM approved” Partnership Institutions; national recognition of program
  - No direct support for students, some travel support possible

• **Monitor** student/site progress; **Research; Dissemination**
Institution Involvement

- **Member Institution** (any institution)
  Free; receive information / updates; reduced fees for APS-BP conferences (~70 institutions)

- **Partnership Site** (graduate only)
  APS COM approval process; recommended site for Bridge Fellows (and others) to attend; demonstrate effective practices in graduate student support

- **Bridge Site** (graduate only)
  Receive significant funding from APS; build sustainable program; prepare 2+ students each year for graduate study; significant institutional commitment
Member Institutions

61 Approved
17 Pending
Bridge Sites and Partnership Institutions

• Admission decisions (criteria, process)
• Financial support (timing, amount)
• Coursework (induction advising critical, allow advanced undergrad coursework)
• Multiple Mentoring (timing, intervention)
• Progress monitoring (coursework, tutors if needed, research “fit”)
• Community (induction, socialization)
• Research (appropriate match)
Partnership Institutions

• Accept students into their program (either from APS application pool, or Bridge Fellows)
• Follow guidelines of Bridge Programs

• “Approved” by APS Committee on Minorities (COM)
• Programs promoted on APS website
• Get early access to applicant pool
• “Recommended” by URM student advisors

Next Deadline: June 1
## Bridge Programs in Physics

<table>
<thead>
<tr>
<th>Non-APS Sites:</th>
<th>APS Sites:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Columbia University</td>
<td>• Cal State Long Beach</td>
</tr>
<tr>
<td>• Fisk / Vanderbilt</td>
<td>• Florida State</td>
</tr>
<tr>
<td>• MIT</td>
<td>• Ohio State</td>
</tr>
<tr>
<td>• Princeton University</td>
<td>• South Florida</td>
</tr>
<tr>
<td>• University of Chicago</td>
<td>• #5</td>
</tr>
<tr>
<td>• University of Michigan</td>
<td>• #6</td>
</tr>
</tbody>
</table>

**APS adding 2 more in 2015**

- RFP in progress
- Selection by March 2015
- 3-years of funding to build a sustainable bridge program
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
Student Recruitment

- Application Packets sent to all physics departments:
  - BS: 500; MS: 82; PhD: 171
- Advertisements (newsletters, publications, websites)
- Applicant pool shared with all physics bridge programs

Results:

2013
- 29 Completed
- 93% URM
- 18% Female

2014
- 41 Completed
- 93% URM
- 32% Female

APS in unique position to do this
## Admissions Decisions

### Actions

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>8</td>
<td>Bridge students selected</td>
</tr>
<tr>
<td>23</td>
<td>69</td>
<td>Departments expressing an interest in recruiting these students</td>
</tr>
<tr>
<td>12</td>
<td>23</td>
<td>Remaining applications circulated</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>Additional students recruited by “Affiliated” sites</td>
</tr>
<tr>
<td>13</td>
<td>25</td>
<td>Total number of students entering grad studies</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>Students withdrew – most with offers available</td>
</tr>
</tbody>
</table>

### Summary

25 students total!

None of whom would have entered graduate studies
Admissions Decisions

- Each bridge site uses their own criteria
- Physics GRE not required
- APS provides support for students who meet our criteria – insures we increase the number of URM students
- Increasing use of “non-cognitive” assessments – explored through Skype or in-person interviews
  - Self-concept
  - Realistic self-appraisal
  - Long-range goals
Bridge Program Achievements

National Achievement Gap

Placed Students vs. Project Year

Project Goal
Project Achievement

2013 2014 2015 2016 2017
0 5 10 15 20 25 30

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www.APSBridgeProgram.org
Student/Site Progress

- Visits to all sites that accepted students
  - Each APS site has developed a “team” to address multiple components of admissions/advising/mentoring/research
  - USF had change in leadership – resolved
- APS stays in contact with students ~1/semester
- Ohio State reports that URMs in their regular applicant pool went up substantially
- Only 2 of 38 students admitted thus far have departed
Annual Meeting

• 25–27 June 2014, College Park, MD
• 68 attendees; 43 institutions
• Themes:
  • Role of Master’s degrees in promoting URM students
  • Mentoring
  • Non-cognitive variables
  • Building bridge programs
• Next meeting: 10-11 October 2015: Mentoring for Success
  • Held in conjunction with 1st meeting of National Mentoring Community (9-10 October), FIU, Miami, FL
Research Efforts

• 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

Considering:
• Data gathering on MS programs
• Departure paths from physics graduate programs
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)
Selected Project Findings

- Students either don’t apply or apply to too few places to be successful
- There are departments who are very willing to work with students who lie outside of the standard acceptance criteria
- Sites admit students for 2-year program (APS covers costs for one transitional year)
- Some students offered direct admissions to PhD program (7 of 13 in 2013, 9 of 25 in 2014)
- Sites plan on admitting students to their own doctoral program
- Students take advanced undergraduate courses and some grad courses in first year
- Of 38 admitted so far, only 2 have left the program.
Next Steps

• Recruit APS “COM Certified” Partnership Institutions
• Accept MS students into (separate, non-funded) applicant pool (יועץ)
• Add two more bridge sites
• Research questions
• Building a better pipeline

National Mentoring Community
National Mentoring Community (NMC)

Plans (established November 2014):

- Increase URM degree completion in physics
- APS identifies / connects mentors
- Mentors recruit mentees (locally)
- Provide an annual gathering of mentors and mentees to:
  - Spread best-practices; conduct professional skills workshops; connect students and their mentors with others (9-10 October 2015)
- Provide merit-based honors
- Needs-based scholarship program
- Track student progress
- Math Alliance has developed a network of 350+ mentors providing local mentoring to 600+ undergraduates
Key Takeaways

• APS acts as “super-recruiter” for many graduate programs (PhD and MS) – Essentially the “Ultimate Safety School” – applying for students to more than 70 institutions – **at zero cost to students**!

• Program could actually “solve” national achievement gap in physics (very rare!); APS in unique position to advance solution

• Now recruiting first “Partnership Institutions”

• ACS already interested in possible replication; AMS also showing interest

• Annual meeting: 9-11 October 2015; Miami, FL at FIU

• National Mentoring Community arising from COM

  www.NationalMentoringCommunity.org
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