The APS Bridge Program: Changing the Face of Physics Graduate Education

Theodore Hodapp
Director of Project Development
Senior Advisor to Education and Diversity
Underrepresented Minority (URM) Physics degrees

Only ~35 students!

Source: National Center for Education Statistics, US Census, and APS
Bachelor and PhD STEM Degrees

<table>
<thead>
<tr>
<th>Subject</th>
<th>BS</th>
<th>PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Science</td>
<td>78</td>
<td>6</td>
</tr>
<tr>
<td>Biological Sciences</td>
<td>639</td>
<td>63</td>
</tr>
<tr>
<td>Chemistry</td>
<td>161</td>
<td>16</td>
</tr>
<tr>
<td>Engineering</td>
<td>386</td>
<td>38</td>
</tr>
<tr>
<td>Mathematics and Statistics</td>
<td>61</td>
<td>7</td>
</tr>
<tr>
<td>Physics</td>
<td>67</td>
<td>7</td>
</tr>
<tr>
<td>Astronomy</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>
Leadership / Oversight

National Advisory Committee
- Emilio Codecido (OSU, Grad student)
- J.D. Garcia (Arizona)
- Yolanda George (AAAS)
- Wendell Hill (UMCP)
- Renee Horton (NSBP)
- Anthony Johnson (Chair, UMBC)
- Ramon Lopez (UT Arlington)
- James Mathis (UM, Grad student)
- Steve McGuire (Southern University)
- Jesús Pando (NSHP)
- 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)
- Kelly Holley-Bockelmann (Fisk/Vanderbilt)
- Cagliyan Kurdak (Michigan)
- Garrett Matthews (USF)
- Jon Pelz (Ohio State)
- Talat Rahman (UCF)
- Jon Urheim (Indiana)

Research / Assessment
- Deepa Chari (FIU-Postdoctoral Assoc.)
- Geoff Potvin (FIU-Research advisor)
- Rachel Scherr (SPU-Project evaluator)

This material is based upon work supported by the National Science Foundation under Grant No. 1143070. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.
APS Bridge Program: Key Features

• **Recruit** students through graduate programs (unaccepted), undergrad programs (promising but uncompetitive, or unsure)

• **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 1st year grad courses, apply to PhD program, research underway *(Department funds)*

• **Place** additional students at Partnership Institutions (23):
  • 65 graduate programs looked at “other” applications (2017), recruited additional students; No direct support, some travel
  • “COM approved” Partnership Institutions; national recognition of program

• **Monitor** student/site progress

• **Research**

• **Disseminate / Advocate**
Student Eligibility

• 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
Institution Involvement

• **Member Institution** (any institution, 125)
  Free; receive information / updates; reduced fees for APS-BP conferences

• **Partnership Site** (graduate only, 32)
  APS COM approval process; recommended site for Bridge Fellows (and others) to attend; demonstrate effective practices in graduate student support

• **Bridge Site** (graduate only, 6)
  Receive significant funding from APS; build sustainable program; prepare 2+ students each year for graduate study; significant institutional commitment

---

**APS Bridge Partnership Sites**

*Bowling Green State University
*California State University Long Beach
*California State University, Los Angeles
Columbia University
Delaware State University
*DePaul University
Embry-Riddle Aeronautical University
Fisk-Vanderbilt
Florida International University
Florida State University
Illinois Institute of Technology
Indiana University
MIT
North Dakota State University
Ohio State University
Princeton University
*Texas State University
*Towson University
University of Central Florida
University of Chicago
University of Cincinnati
University of Connecticut
University of Hawai‘i at Manoa
*University of Houston Clear Lake
University of Michigan
University of North Carolina at Chapel Hill
University of Rochester
University of South Florida
University of Texas at Arlington
University of Texas, San Antonio
University of Virginia
*Wright State University
Member and Partner Institutions

Member Institutions
• 125 in 38 states

Partnership Institutions
• 32 in 18 states
  ▪ 24 PhD
  ▪ 8 MS
Bridge Sites and Partnership Institutions

- 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)
Bridge Program Achievements

Bridge Program Physics PhDs

- 23% Women (20%)
- 93% URM (6%)
  - 64% Hispanic
  - 24% African American
  - 5% Native
- 88% Retention (60%)

National Achievement Gap

Students

- Left Program
- Placed/Retained
- Project Funding

2013 2014 2015 2016 2017
Where did the 48 students go (2017)?

- Bowling Green State University
- CSU Long Beach (2)
- CSU Los Angeles (5)
- Delaware State University (2)
- DePaul University
- Fisk-Vanderbilt University (3)
- Florida State University (6)
- Indiana University (2)
- Ohio State University (3)
- Texas A&M University, Commerce
- Texas State University
- University of Central Florida (5)
- University of Cincinnati (3)
- University of Connecticut
- University of Houston, Clear Lake (3)
- University of Kansas (2)
- University of Massachusetts Dartmouth
- University of Minnesota Duluth
- University of North Carolina, Chapel Hill
- University of Rochester
- University of South Florida (2)
- University of Virginia