APS Minority Bridge Program:
Overview, Findings and Direction in Preparing Minority Students for Graduate School

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Minority Bridge Program Manager
Minorities in Higher Education

Source: IPEDS Completion Survey by Race and U.S. Census Data
Bachelor and PhD STEM Degrees

Source: IPEDS Completion Survey by Race

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Bachelor and PhD Physics Degrees by Race

Source: IPEDS Completion Survey by Race and U.S. Census Data

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URM Physics PhDs
Normalized to Minority Population

100% would indicate full participation by minorities

36 PhDs awarded to URMs in 2008

Source: IPEDS Completion Survey by Race and U.S. Census Data
The Elephant in the Room?
Advisory Committee & Staff

Advisory Committee
• J.D. Garcia (University of Arizona)
• Yolanda George (AAAS)
• Wendell Hill (University of Maryland, College Park)
• Anthony Johnson (University of Maryland, Baltimore County)
• Ramon Lopez (University of Texas, Arlington)
• Steve McGuire (Southern University)
• Cherry Murray, chair (Harvard University)

APS Staff
• Ted Hodapp (Director of Education and Diversity)
• Kate Kirby (Executive Officer)
• Arlene Modeste Knowles (Career and Diversity Programs Administrator)
• Peter Muhororo (Project Manager)
• Sara Webb (Education and Diversity Projects Coordinator)
• Visited ~15 institutions where underrepresented minority (URM) students get BS physics degrees
• Met with and listened to students and faculty on issues faced by URM students, deciding factors for pursuing doctoral degrees and what needs improvement
• Consulted with existing programs that are active in advancing undergraduate URM students into doctoral programs (e.g., Fisk-Vanderbilt, Columbia University, University of Michigan, Timbuktu Academy, AGEP)
• Recruited ~10 research universities to begin discussions of what can be done to address the issues
• Gathered data on why URM students choose not to pursue PhDs
• Held several exploratory meetings with various focus groups
• June 2010 gathering of students, faculty, administrators and funders to shape ideas on how to move forward
# Institutions: Visited/Planned Visit

<table>
<thead>
<tr>
<th>Institution (Visited)</th>
<th>Average # of URM BS Degrees*</th>
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</thead>
<tbody>
<tr>
<td>Morehouse College</td>
<td>15</td>
</tr>
<tr>
<td>University of Puerto Rico, Humacao</td>
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<tr>
<td>Xavier University of Louisiana</td>
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<tr>
<td>University of Puerto Rico, Mayaguez</td>
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<tr>
<td>University of Puerto Rico, Rio Piedras</td>
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<tr>
<td>Florida International University</td>
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<td>University of Florida</td>
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<tr>
<td>University of Texas, Austin</td>
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<tr>
<td>Texas State University, San Marcos</td>
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<tr>
<td>University of California, Berkeley</td>
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<tr>
<td>Southern University</td>
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<tr>
<td>Spelman College</td>
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<tr>
<td>Dillard University</td>
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<tr>
<td>Hampton University</td>
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<tr>
<td>University of California, Davis</td>
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<td>Chicago State University</td>
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<tr>
<td>University of Texas, El Paso</td>
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<tr>
<td>California State University, Long Beach</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Institution (Planned Visit)</th>
<th>Average # of URM BS Degrees*</th>
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<tbody>
<tr>
<td>Benedict College</td>
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<tr>
<td>Delaware State University</td>
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<tr>
<td>Florida A &amp; M University</td>
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<tr>
<td>Norfolk State University</td>
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<tr>
<td>Tuskegee University</td>
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<tr>
<td>Jackson State University</td>
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<td>Howard University</td>
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<tr>
<td>New Mexico State University</td>
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<tr>
<td>North Carolina A &amp; T University</td>
<td>3</td>
</tr>
<tr>
<td>South Carolina State University</td>
<td>2</td>
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<tr>
<td>Morgan State University</td>
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</tr>
</tbody>
</table>

*Data averaged over a period of 5 years, between 2004 and 2009 and indicated degrees in physics.

Source: IPEDS Completion Survey by Race
Findings: Barriers to the PhD

• Relationships are important
  – Recruiting is more effective on a one-on-one basis
  – Dialogue v. Monologue → Building trust

• Continuum of support is needed (MENTORING)
  – Untimely advising - “What can I really do with physics?”
  – Unavailable coursework
  – Bachelor preparation - Late start in physics major - “Make physics more interesting”
  – Transition into graduate school (bridge experience) and through out the doctoral program
  – Low confidence – “Can I really be as smart as my professors?”

• Admissions policies
  – Using a portfolio approach
  – GRE preparation (both general and subject)
  – Flexibility and financial support

• Cultural and Social Support
  – Cultural and social isolation
  – English proficiency (PR)
  – Unwelcoming environment – “Why don’t physicists wear deodorant?”
What am I supposed to do with all of this information?
Minorities in Physics Education

Source: IPEDS Completion Survey by Race

URM Percentage

Bachelor Degree

Doctoral Degree

Faculty

~450

~20 more PhDs

~35

~12
The goal of the Minority Bridge Program is to increase, within the next decade, the fraction of Physics PhDs awarded to underrepresented minorities (African-Americans, Hispanic-Americans and Native-Americans) to 10%, an increase of about 20 more PhDs per year, the fraction that currently receive physics Bachelor's degrees.

Spawn Sustainable Bridge Experiences (~5)
- Transitional Master’s Degree
- Post Baccalaureate Year(s)
Masters Degree as a “Transition” to the PhD

- Take advanced undergraduate and first-year graduate level coursework
- Required to demonstrate ability to
  - Conduct independent research
  - Communicate research ideas strongly
  - Succeed in coursework taken
- Prepare for the GRE (subject and general tests)
- Build relationships with graduate faculty
- Separate doctoral-level admissions
- Receive graduate-assistantship
- Typically 2-years
- Masters degree awarded
Bridge Experiences

Post-Baccalaureate Year

• Similar attributes to Masters program
• Typically 1-year, in addition to a summer research
• No degree awarded, certificate of completion given.
Bridge Institutions (~5)

- Institution that will “host” the Bridge Experience for URM students
- Have a Masters or PhD program with a record of past success with URM graduate students
- Students may consider staying at same institution (if they do have a PhD) but can apply to any other institution
- Local champion at the university to ensure students are mentored and progress is monitored
Types of Institutions

Partnership Institutions (~20 Doctoral Granting Institutions)

- Institutions where students can end up after successfully completing a Bridge Experience
- Provides a “soft landing” for students coming out of a Bridge Experience
- A national network to provide flexibility for students to apply to
- Local champion at the university to ensure students are mentored and progress is monitored
- Flexibility in advising to accommodate academic, cultural and social needs
- Project provides funds for students attending Partnership Institution
Key Components
• Faculty site leader (Champion)
• Doctoral-Granting Institutions (DGI) visits to Minority-Serving Institutions (and vice versa)
• Improved mentoring / support at doctoral institutions
• Review of graduate admissions process
• Faculty sensitization at the DGI
• Resource commitment
• Committee on Minorities (COM) climate site visits
• Active recruiting / advocacy by APS
• Spread best-practice ideas, advocate on issues
• Change physics department culture to improve graduate education for all students
• **Existing Bridge Programs**
  – Columbia University
  – Fisk-Vanderbilt University
  – Massachusetts Institute of Technology
  – University of Michigan

• **Doctoral Granting Institutions**
  – Florida A & M University (MSI)
  – Florida International University (MSI)
  – Harvard University
  – New Mexico State University (MSI)
  – Stanford University
  – University of Arizona (MSI)
  – University of California, Berkeley
  – University of California, Davis
  – University of Colorado
  – University of Texas, Austin
  – University of Texas, San Antonio (MSI)

• **Minority Serving Institutions**
  – California State University, Long Beach
  – Chicago State University
  – Dillard University
  – Morehouse College
  – Southern University
  – Spelman College
  – Texas State University
  – University of Puerto Rico, Humacao
  – University of Puerto Rico, Mayaguez
  – University of Puerto Rico, Rio Piedras
  – University of Texas, El Paso
  – Xavier University of Louisiana

• **Foundations and Societies**
  – Florida Education Fund
  – National Society of Black Physicists (NSBP)
  – National Society of Hispanic Physicists (NSHP)
  – Society for the Advancement of Chicanos and Native Americans in Science (SACNAS)
Timeline

- Visit MSIs (AY 09/10)
- Meeting with Bridge Programs (November 2009)
- Meeting of DGIs (February 2010)
- Workshop with MSI faculty, URM students, DGI representatives (June 2010)
- Further discussions (Fall 2010)
- Proposal writing (Spring/Summer 2011)
- Planning (Summer/Fall 2011)
- Continued Visits to MSIs (Fall 2011)
- Funded project start (Spring 2012)
- First students (Fall 2012)
- First PhDs (2019)
Moving Forward……

www.minoritybridgeprogram.com
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