Engaging Underrepresented Minority Students in the Ocean Sciences

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American Geological Institute

The American Geological Institute

- Non-profit federation of 46 geoscientific and professional associations.
  - American Society of Limnology and Oceanography (ASLO)
  - American Geophysical Union (AGU)
  - Consortium for Ocean Leadership - Liason

- Main purpose:
  - Provide information services.
  - Strengthen geoscience education.
  - Increase public understanding of the role of the geosciences in society.
Talk Overview

- Geoscience Demographics and Minority Participation
- Geoscience Employment Outlook
  - Why should we care about diversity?
- Challenges to engaging minorities in the ocean sciences
  - Attitudes toward Geo- and Ocean Sciences Careers
- Strategies for engaging underrepresented students
  - Recommendations
  - AGI’s approach

Student Demographics

- Geosciences degree production has been steady over the past 10 years, but enrollments are on the rise.
- Participation of women in geoscience degree programs is approaching parity
- Participation by underrepresented minority (African Americans, Hispanic/Latino and Native American) students is LOW.
Minority Participation in STEM


Workforce Supply Shortage

US Geoscience Degrees Granted (1973-2009)

Source: American Geological Institute
**Workforce Supply Shortage**


- **Undergraduate**
- **Graduate**

Source: American Geological Institute

**Workforce Supply Shortage**

**Oceanography Degrees Conferred (2003-2008)**

- Doctorate
- Master’s
- Bachelor’s

Source: AGI Geoscience Workforce Program, data derived from IPEDS.
Gender Representation

**Percentage of Geoscience Degrees Conferred to Women by Degree Level (1990-2009)**

- Bachelor's
- Master's
- Doctorate

Source: AGI Geoscience Workforce Program. Data derived from AGI's Directory of Geoscience Departments.

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Gender Representation

**Percent of Oceanography Degrees Conferred to Women (2003-2008)**

- Bachelor's
- Master's
- Doctoral

Source: AGI Geoscience Workforce Program, data derived from IPEDS.
Minority Representation

Percent of Geoscience Degrees Conferred to Minorities (2003-2008)

<table>
<thead>
<tr>
<th>Year</th>
<th>Hispanic</th>
<th>African American</th>
<th>Native American</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>2.8%</td>
<td>0.6%</td>
<td>0.0%</td>
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<tr>
<td>2004</td>
<td>3.4%</td>
<td>0.8%</td>
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<tr>
<td>2005</td>
<td>3.7%</td>
<td>1.2%</td>
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<tr>
<td>2006</td>
<td>3.6%</td>
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<td>0.0%</td>
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<td>2007</td>
<td>3.2%</td>
<td>1.7%</td>
<td>0.0%</td>
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<tr>
<td>2008</td>
<td>4.1%</td>
<td>1.8%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Source: AGI Geoscience Workforce Program, data derived from IPEDS.

Minority Representation

Percent of Oceanography Degrees Conferred to Minorities (2003-2008)

<table>
<thead>
<tr>
<th>Year</th>
<th>Hispanic</th>
<th>African American</th>
<th>Native American</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>3.3%</td>
<td>0.6%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2004</td>
<td>2.0%</td>
<td>1.5%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2005</td>
<td>3.7%</td>
<td>0.3%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2006</td>
<td>2.2%</td>
<td>1.2%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2007</td>
<td>3.0%</td>
<td>1.8%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2008</td>
<td>3.5%</td>
<td>2.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Source: AGI Geoscience Workforce Program, data derived from IPEDS.
Degree Backgrounds

Bachelor Degree Fields of Oceanography Graduates (2006)

Source: AGI Geoscience Workforce Program; data derived from NSF's SESTAT Restricted Access Database. SESTAT is the Scientists and Engineers Statistical Data System. The use of NSF data does not imply NSF endorsement of the research, research methods, or conclusions contained in this report.

US Population Demographics

- African American, Hispanic/Latino and Native American minorities comprise 30% of the US population.
- By 2050, they are expected to comprise 45%.
**College Demographics**

**Minority Enrollments at Colleges and Universities (1976-2007)**

- African American 4yr
- African American 2yr
- Hispanic 4yr
- Hispanic 2yr
- American Indian 4yr
- American Indian 2yr

Source: American Geological Institute, data derived from NCES Digest of Education Statistics

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**Workforce Demographics**

**Geoscience Age Demographics by Professional Society**

- Petroleum Geologists (AAPG)
- Exploration Geophysicists (SEG)
- Economic Geologists (SEG)
- Oceanographers / Limnologists (ASLO)

Workforce Demographics

Age Distribution of Oceanographers in Government (2003-2007)

Source: AGI Geoscience Workforce Program, data derived from the Office of Personnel Management fedscope database

Minority Representation in the Workforce

Minorities in Environmental Science and Geoscience Jobs (2003-2008)

Source: AGI Geoscience Workforce Program, data derived from the U.S. Bureau of Labor Statistics
Workforce Projections

Projected Job Growth for Geoscience Occupations with Replacement for Attrition (2006-2016)

- All Industries: 31% growth
- Professional, scientific, technical services: 59% growth
- Federal Government: 11% growth
- State Government: 11% growth

Source: AGI Geoscience Workforce Program, data derived from BLS OES National Employment Matrix.

Why should we care?

- Maximize human resource potential
- Incorporate diverse ideas and approaches to spur innovation
- Have enough trained scientists to meet workforce demand

National Academies study:
“Academic leadership...should articulate underrepresented minority participation as a key commitment to set a tone that raises awareness and effort.”
Challenges to engaging students in STEM fields?

- K-12 Preparedness
- Academic and financial support
- Family influence
- Cultural sensitivities
- Completion rates

What challenges are unique to the geosciences and ocean sciences that makes us the bottom of the barrel?

Challenges to engaging students in Geosciences/Ocean Sciences?

- Image
- Career and opportunity awareness
- Career Mobility
- Lack of college programs where students live, and at Minority Serving Institutions
- Isolation
Geosciences: An Image Problem?

- Caucasian (often mature men)
- Hard Hats and safety suits
- Dirty
- Unfamiliar setting
- Makes money?

Geosciences: An Image Problem?

- Diverse peers
- Professional
- Clean
- Familiar, located in my town
- Helps my family
- Makes money
How do you get there?

- College
- Medical School
- Residency

Strategies to increase diversity

- Tackle our image problem
- Promote clear career paths
- Address concerns of parents and families
- Support MSI's
- Provide academic and social support
AGI’s programs

- Understand the problem
  - Workforce Data Analysis
- Academic and social support:
  - Minority Participation Program scholarships
- Career Awareness and family support
  - Student Engagement Campaigns
- Communication and dissemination

Marketing the geosciences

- Campaign to raise awareness of the geosciences
- Careers brochure sent to high scorers on the SAT
Students want to make a difference

As a geoscientist, you will help solve some of society’s most pressing problems.

- Develop the energy resources that keep our economy running.
- Protect cities and communities from destruction by natural hazards, such as floods, wildfires, earthquakes, landslides, and tsunamis.
- Predict the behavior of Earth Systems and the climate.
- Find sustainable supplies of natural resources, including clean water, petroleum and Earth resources.
- Understand changes in global climate patterns.
- Advise policymakers on how to ensure that the benefits and hazards of the Earth can be kept to a minimum.

Make A Difference

Parents want them to make a living

Average Annual Salaries

<table>
<thead>
<tr>
<th>Year</th>
<th>Geoscientists</th>
<th>Life, Physical, and Social Science Occupations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>$40,000</td>
<td>$45,000</td>
</tr>
<tr>
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<td>$42,000</td>
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<td>$74,000</td>
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<td>2014</td>
<td>$70,000</td>
<td>$76,000</td>
</tr>
</tbody>
</table>

Job prospects are excellent for geoscientists, and salaries are high. The demand for geoscientists is expected to grow by at least 19% by 2025 — meaning more jobs for graduates with geoscience degrees. Salaries in the geosciences are already outpacing all other science fields and are on the rise.
Where will I work?


- 23% in Management
- 19% in Science and Engineering Laboratories
- 18% in Manufacturing
- 11% in Physical and Life Sciences
- 9% in Health Services
- 6% in Elementary and Secondary Education
- 5% in Agriculture and Forestry
- 4% in Non-profit Organizations
- 2% in Religious Bodies
- 2% in Educational Services
- 1% in Government
- 1% in Professional Organizations
- 1% in Arts and Humanities

Source: AGI Geoscience Workforce Program; data derived from NSF’s 2006 SESTAT Restricted Access Files. SESTAT is the Scientists and Engineers Statistical Data System. The use of NSF data does not imply NSF endorsement of the research, research methods, or conclusions contained in this report.

Joining the “club”

- Reduce isolation for minority students
- Promote professional Societies’ role in communicating science and creating community
Ongoing student support to increase completion and retention

- Once students join your departments, they need:
  - Inclusive atmosphere
  - Mentoring
  - Academic support
  - Career counseling
  - Community (including families)

American Geological Institute

- AGI's demographic and workforce data is available in the Status of the Geoscience Workforce, 2009

www.agiweb.org/workforce