Welcome to AGI’s Leadership Forum 2014

Accommodating Geoscience Workforce Diversity: Including the Talents of All Geoscientists
Ice-Breaker Activity

Guiding Question:

What is the first word that comes to mind when you hear about someone living with a disability?
Developing an Accessible Geoscience Workforce through Inclusive Training Opportunities

Christopher Atchison
University of Cincinnati

Heather Houlton
American Geosciences Institute
Attrition, Growth and Replacement in the next 10 years in the U.S.

297,000 geoscience jobs exist today (BLS)

143,000 geoscientists expected to retire by 2022 (AGI)

43,000 geoscience job growth by 2022 (BLS)

16,000 new MS/PhD + 35,000 BS/BA graduates (AGI)

Equals

51,000 total new graduates (with BS, MS and PhD)

Net deficit of over 135,000 geoscientists by 2022
Industries where graduating students have accepted a job in the geosciences

Source: AGI Workforce Program, 2013
Industries where graduating students have accepted a job in the geosciences

- Oil & Gas: 74%
- Federal Government: 11%
- Environmental Services: 4%
- Mining: 4%
- State or Local Government: 7%
Industries where graduating students have accepted a job in the geosciences
The Breakdown: Workforce Trends

2013 Median Annual Salaries for Geoscience-Related Occupations

Management Occupations:
- Engineering Managers: $128K
- Natural Science Managers: $117K
- Environmental Science Managers: $96K

Architecture and Engineering Occupations:
- Mining and Geological Engineers: $132K
- Petroleum Engineers: $130K
- Environmental Scientists and Specialists: $87K

Life, Physical and Social Science Occupations:
- Soil and Plant Scientists: $61K
- Atmospheric and Space Scientists: $59K
- Geologists: $65K

Education, Training and Library Occupations:
- Hydrologists: $92K
- Geographers: $76K

Postsecondary Teachers:
- Engineering Postsecondary Teachers: $75K
- Atmospheric Postsecondary Teachers: $42K
- Space Sciences Postsecondary Teachers: $46K

K-12 Teachers:
- Environmental Science Postsecondary Teachers: $91K
- Geography Postsecondary Teachers: $82K
- K-12 Teachers: $78K

All U.S. Occupations: $35,080

AGI Geoscience Workforce Program; Data derived from the U.S. Bureau of Labor Statistics, National Occupational Employment and Wage Estimates
The idealistic image of our science?
Preparing the Next Generation of Earth Scientists:
An Examination of Federal Education and Training Programs

“A key goal of federal government recruitment policies is to attain a workforce that draws from all segments of society and that leverages diversity to deliver the best public service. However...”

(OPM, 2011)
Although women and members of minority groups now constitute approximately 70% of college students, they are underrepresented among students receiving undergraduate degrees in STEM subjects (approximately 45 percent). These students are an “underrepresented majority” that must be part of the route to excellence.

- President’s Council of Advisors on Science and Technology (PCAST)  
  February 7, 2012
Disability is defined as "...a physical or mental impairment that substantially limits a major life activity."

- Americans with Disabilities Act of 1990
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Disabled or Disability
Re-envisioning ACCESSIBLE programs

The current “state of the union”

• Anticipated workforce shortages should encourage a review of recruitment strategies and training methods
• The past is NOT the key to the present, or the future: geoscience careers are NOT the same today as they have been in the past
• Current momentum of diversity awareness
• Perceptions of current geoscience faculty and industry representatives regarding access and full-inclusion
Geoscience diversity will be most heavily impacted by:

- Undergraduate programs that are designed to retain diverse students and increase graduation rates
- Teacher preparation for increased and inclusive participation

(NRC, 2011)
Eliciting broad participation

• K-6 programs to foster interest
• 7-12 outreach activities aligned to higher education
• Student opportunities to network with peers and mentors in geoscience disciplines
• Financial assistance to support inclusive undergraduate and graduate study
What curricular requirements are necessary for future geoscientists?
The importance of a strong foundation in STEM, including applied mathematics, reading for information, and locating information, basic interpersonal skills, effective communication, and creative thinking

Emerging Workforce Trends in the U.S. Energy and Mining Industries: A Call to Action (NRC, 2013a)

Future U.S. Workforce for Geospatial Intelligence (NRC, 2013b)
Diverse-ability of Future Geoscientists

• Data Mining
• Advanced technological languages; computational aptitude
• High observation and interpretation skills; attention to detail
• Content specialization, enhanced through diverse perspective
• Trained through social ability, rather than physical inability
Are inclusive programs viable?
Eliciting Programmatic Change

Individual Empowerment and Mentoring

Faculty Training

Industry Partnerships

Sustained Communication and Networking
We also have to consider...

• Federal, state and university bureaucracy
  • Medical/Insurance accommodation
    • Institutional liability
  • Departmental finance and logistics
  • Faculty time and relevance to RPT
    • Social acceptance
  • Individual ability and perseverance
Initial considerations (top down)

• Understand the community perspective
  – What are the questions that need to be asked?
• The voice of multiple stakeholders must be heard
  – Determining industry need
  – Understanding perspectives of
    • Students (personal and social service barriers)
    • Faculty (geoscience, psychology and disability studies)
  – Obtaining **institutional support and buy-in**
  – Coordinate with insurance providers and governmental agencies that provide student support services
But even more... (bottom up)

• How do we include K-12 and 2YC perspective?
• Stop focusing on the limitations of the core curricular requirements in secondary education, and focus on what can be changed.
• Develop after school and summer programs that provides full participation of SWD in the earth sciences.
Advancing Awareness and the Impact of Diversity

- Geoscience organizations promoting diversity
- Instructional workshops
- Increasing diversity networks
- Years of successful diversity research
• K-12 instruction of earth science
  – accessible informal/after school programming
• parent/teacher/student communities
• pathway programs for higher education
• faculty instructional training
• curriculum evaluation
• accommodation and inclusion in classroom, lab, and field
• guidebook of institutional resources: accommodating and understanding student needs in the face of liability constraints
• student/expert mentoring
• pathways to graduate training and the workforce
Examples: current exploratory studies

• Evaluation of accessible field courses
• Perceptions of current geoscience practitioners
  – Improving pathways from academia to industry
• Spatial abilities of students with physical disabilities
• Transformational effects of student-mentor experiences
• Cognitive engagement of simulated environments
The IAGD mission is to improve access to the geosciences for individuals with disabilities while promoting communities of research, instruction and student support.
IAGD Vision

• Celebrate the diverse abilities of all geoscientists while fostering student engagement in geoscience career pathways
• Provide faculty professional development in instructional access and inclusion
• Unify and promote efforts of collaboration in research and instructional best practices
• Develop a community of resources for faculty and student support
• Advance knowledge of access and accommodation within the geosciences through scientific research
How the IAGD can help you!

• Specific resources to accommodate:
  – Physical (mobility/non-mobility)
  – Blind / low vision
  – Deaf / hard-of-hearing
  – Cognitive / learning

• Instructional development for faculty and student instructors

• Research on fully-inclusive instructional practices including developing alternative field-based learning opportunities
IAGD Foundation

Advancing access and inclusion in the geosciences for individuals with disabilities through the development of innovative research and instruction

Travel support for scholars with disabilities attending geoscience meetings and conferences

Seed funding for innovative research and curricular development focus on access and inclusion in the geosciences

Awarding outstanding achievements in scholarship and service that promotes the advancement of access and inclusion in the geoscience profession.

foundation@theiagd.org
Faculty Training

Designed to instruct current geoscience faculty and graduate teaching assistants to apply the principles of universal design to their own lessons, labs, and field trips in order to accommodate students with physical, cognitive, and emotional disabilities.

Key topics: accommodation in the geosciences; the physical barriers to access and inclusion; and the personal, psychological and social challenges that students may face away from the classroom.

info@theiagd.org
Faculty Engagement

Instructional Approaches to Access, Accommodation, and Inclusion in the Geosciences

AGU, 2013
GSA 2014

Field Trip #416 “Full Access to the Geology of the Sea to Sky Highway” - fully accessible!

Exhibit Hall Booth #319

IAGD Annual Meeting, Sunday, October 19, 4-5pm. Hyatt Regency, Georgia B
Community Engagement

Students  |  Faculty  |  Industry
Student Community
Chris Atchison
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