

Geo-Needs

Stakeholder Needs Assessment for Broadening
Participation in the Geoscience Workforce



GEO-NEEDS FOCUS GROUP MEETINGS REPORT
Executive Summary

Executive Summary

The full meeting report and additional resources are available from the Geo-Needs website (<http://serc.carleton.edu/geoneeds/index.html>).

Despite a significant investment of resources, underrepresented minorities constitute ~8% of the geoscience-related workforce, making the geosciences one of the least diverse of all science, technology, engineering, and math (STEM) disciplines. While this pattern of underrepresentation has been attributed to numerous factors, the Geo-Needs project is focused on lack of access to undergraduate courses and programs of study at two-year technical and community colleges (2YCs) and minority-serving institutions (MSIs). Based on our analysis, only about 2.5% of institutions with geoscience degree programs are federally designated as minority-serving. Furthermore, geoscience programs are rarely available at 2YCs, which typically have higher minority student populations. As a result, 2YC and MSI students are often excluded from the geoscience workforce simply because few pathways from these institutions to geoscience careers currently exist.

To address this issue, four focus group meetings were held in August 2015 at the Northern Illinois Conference Center, Naperville, Illinois, USA. Meetings were structured to learn about participants' perceptions of the needs, barriers, and opportunities facing 2YCs and MSIs in expanding or developing geoscience programs and experiences for their students. Specifically, the Geo-Needs project sought to achieve two overarching goals:

- Identify and clarify barriers and opportunities for better use of existing instructional resources that engage underrepresented students in the geosciences at 2YCs and MSIs.
- Explore with stakeholders what an "ideal model" of resources, partnerships, professional development, and ongoing support for faculty and institutions might look like.

At the focus group meetings, 40 participants from 34 institutions or organizations across the United States explored what is known about the status of geoscience instruction at 2YCs and MSIs, and made recommendations for expanding access to the geosciences for underrepresented students at these institutions. Participants were drawn from four key stakeholder groups: 2YC and MSI geoscience instructors, 2YC and MSI administrators, organizations that create and/or disseminate geoscientific resources and educational materials, and researchers with expertise in equity, access, and diversity in either the geosciences or broadly in higher education. These four groups provided a breadth of knowledge and expertise,

generating new perspectives on the persistent challenge of broadening participation in the geosciences.

Each focus group meeting was framed as a gap analysis in order to identify the current state of geoscience instruction at 2YCs and MSIs, articulate the desired state, and brainstorm about resources, programs, infrastructure, and other support needed to attain the desired state. Participants considered the broader context of the geoscience community as it relates to broadening participation. To facilitate out-of-the-box thinking, a series of activities guided brainstorming and discussion of how key stakeholders might interact to bring about the desired state. An ideal model methodological approach was used to compare current and desired levels of interaction among stakeholders. Finally, participants responded to guided prompts in order to implement what they learned in their own contexts to help the community reach the desired state of geoscience instruction at 2YCs and MSIs.

Barriers and opportunities to instructing minority students in the geosciences at 2YCs and MSIs fell into five major themes across the four meetings: (1) a misalignment between minority student needs and institutional cultures and structures, (2) use of place-based instructional resources, (3) uneven dissemination of "what works" for minority recruitment and retention in the geosciences, (4) the importance of trust and personal relationships, and (5) improved marketing of the geosciences. Based on these themes, participants made specific recommendations for key stakeholder groups, synthesized below.

For Instructional Faculty

- Build and participate in regional networks of 2YCs, MSIs, and four-year institutions. These networks have the potential to dramatically increase access to the geosciences for minority students.
- Use directed research, active learning, and place-based instruction, all of which have great potential for engaging minority students in and beyond the geoscience classroom.
- Establish relationships with alumni and local employers in order to optimize opportunities for internships, site visits, and invited speakers so that underrepresented students become aware of potential geoscience careers.
- Work with academic advising, student groups, the campus diversity office, and other existing resources to promote geosciences on 2YC/MSI campuses.

For Institutions and Administrators

- Determine and disseminate specific institutional contexts, needs, and opportunities for geoscience instruction and research. The strategies for a lone instructor at a suburban 2YC trying to attract more minority students may be quite different from actions needed to bring a degree program to an established MSI.
- In campuses with regional or distributed models, target geoscience courses to campuses with high populations of underrepresented students, and market these courses as serving community needs.
- Work with faculty to increase the presence and identity of geosciences on campus. If no dedicated geoscientists are on campus, work with faculty in the physical or environmental sciences or related disciplines.

For Funding Agencies

- Provide additional support for ongoing collaborations between stakeholders communities. These connections may sometimes go outside the typical duties.
- Provide funding for additional meetings like Geo-Needs, but focus on specific contexts and actionable plans.

For Geoscience Professional Organizations and Resource Providers

- Help facilitate networking between stakeholders. This could be most effectively done in a virtual format, or at regional conferences.
- Involve end users (2YC and MSI instructors) from the very first stage of product development to ensure that resources are adopted by these users.
- Create modular instructional resources that are easily adapted to local geologic contexts, and use local examples with minimal burden on the instructor.

For Geoscience Employers

- Build relationships with geoscience departments at local higher education institutions; local geoscientists can be a great resource for mentoring, providing guest lectures, internships, and field trip opportunities.

For Geoscience Researchers

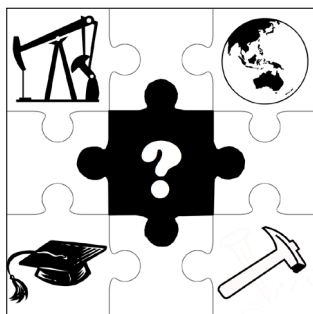
- Build and participate in regional networks of 2YCs, MSIs, and four-year institutions in order to develop trust between students, institutions, and researchers and to strengthen data collection methods.
- Build research partnerships with 2YCs that do not have access to the resources needed to do geoscientific research. Students who obtain research experience in their first two years of college are much more likely to persist and succeed in science disciplines.

For Geoscience Education and Higher Education Researchers

- Explore longitudinal studies, data clearinghouses, and other mechanisms for improved capture of data on student choices and career pathways.
- Collaborate on review papers that identify what strategies are and are not successful in recruitment and retention of minority students in the geosciences. Ensure that these strategies are disseminated to both the geoscience education community and the community of researchers in diversity in higher education.
- Partner successful student recruitment and retention programs with social scientists to explore theory behind the success and mechanisms that could work elsewhere.
- Work with professional societies and institutional administrators to elevate the status of geoscience education as scholarly work meriting tenure and promotion.

Across all of the meetings, participants recognized the need to move from a model that focuses on the lack of academic skills to a model that recognizes the skills and strengths that underrepresented students bring to the educational setting. They recognized the need to reframe and market the geosciences as a profession that serves the public good. Furthermore, multiple groups advocated for broadly defining the utility of a geoscience course of study for fields such as planning, education, and business, rather than presenting a singular pathway from a geoscience degree to employment in the traditional sectors such as oil and gas, mining, environmental consulting, and academia.

One step that would move these issues forward is improved dissemination of what works, both in terms of empirically tested models and theory. Broader dissemination may also bring more attention to the issue of underrepresentation in the geosciences. We suggest creating “action briefs” or “spotlights” of successful programs and/or specific strategies across different contexts and accumulating the existing strategies through published literature review papers. Furthermore, we recognize that not all 2YCs and MSIs have similar contexts. Future meetings should explore specific institutional contexts (e.g., a meeting for tribal colleges trying to establish geoscience programs, a meeting for increasing minority student participation at urban 2YCs). Bringing together individuals facing a common problem has greater potential to generate lasting solutions. The voices shared here are only a start; sustained effort from the entire geosciences community is needed to achieve our goal of a having a broad, diverse, and well-prepared geoscience workforce.



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