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Addressing geoscience diversity with innovative at-sea experiences for students and educators

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Many countries face significant challenges in attracting, retaining and diversifying the workforce in the geosciences. In the U.S. likely contributing factors include the homogeneity of the pool of mentors/role models available both within the workforce and in the professorate. Another probable factor is “exposure gaps” among student populations; i.e., differing access to engaging facets of science, technology, engineering and mathematics (STEM). To address these challenges, the authors have created a set of NSF-funded programs. The STEMSEAS program recruits undergraduates from diverse backgrounds and institutions to sail on research vessels transits in the U.S. Academic Fleet – giving them relatively short, but transformative experiences at sea. Along with carefully selected mentors who are also from diverse backgrounds, these students spend 5-10 days at sea with a network of students from across the country experiencing a wide range of oceanography and Earth science research techniques and data collection methods.

For educators, the International Ocean Discovery Program (IODP) utilizes transits and tie-ups of the scientific ocean drilling vessel *JOIDES Resolution* to provide professional development for educators based on the science and technology of science drilling. School of Rock programs aim to address specific diversity goals, focusing on measures to broaden participation at all levels (i.e., pre-college, undergraduate and beyond) in innovative ways (e.g., from place-based curriculum to longitudinal peer mentoring through extracurricular STEM communities). We seek to add rich international experiences to enhance educators’ motivation and morale, while fostering connections to establish new mechanisms for increased engagement, broader recruitment, enhanced support, and improved retention of students from underrepresented communities from the middle school level to the undergraduate and graduate levels and into the workplace.

A sister program, Ambassadors for STEM Training to Enhance Participation (ASTEP) works with more upper-level undergraduate and graduate students to leverage both STEMSEAS and School of Rock. In particular, ASTEP participants take part in both STEMSEAS and/or School of Rock programming, and then build on these experiences to create outreach materials and presentations to share with diverse communities afterwards. This presentation will share best practices and survey results from these programs and our participants that contribute to the conversations around diversity and inclusion, and replication of these models in international

settings.