Workshop initial report: Expanding the geoscience pipeline by connecting educators with early career IODP scientists

Fall 2017 AGU Meeting
But first... 
our motivation for this session: 
*Diversity in the Geoscience Community: Expansion is Necessary*

The geosciences continue to lag other science, technology, engineering, and mathematics (STEM) disciplines in the engagement, recruitment and retention of traditionally underrepresented and underserved minorities.
School of Rock 2017
July 10-17
Transiting from Subic Bay to Townsville

Co-funded by USSSP/IODP and a workshop funding award made to Indiana University of Pennsylvania (IUP) through NSF under Improving Undergraduate STEM Education

Goals

• encourage new, diverse K12-higher education connections
• showcase and educate about JR/IODP capabilities
• increase the diversity of the talent pool that will apply to sail on IODP and related expeditions in the future
• build a diverse mentoring pool for undergraduate STEM/geoscience students
Instructor Team

- Mark Leckie, UMass, Amherst
- Jon Lewis, IUP
- Steve Hovan, IUP
- Lisa White, UCMP
- Sharon Cooper, USSSP/IODP
Participant teams

- Colleen Henegan, KIPP Austin Collegiate High School & Rachel Bernard, UT Austin PhD student
- Julia Domenech, Buena High School & Chloe Branciforte, Ventura College Asst. Prof.
- David Hansen, Salisbury Middle School & Thomas Cawthern, Salisbury University Asst. Prof.
- Kim Hatch, Long Beach City College Prof. & Lisa White, UCMP
- Kerrita Mayfield, Holyoke High School & Mark Leckie, UMass-Amherst, Prof.
- Stephanie Milam-Edwards, Tempe High School & Marilyn Raming, Tempe Union High School
- Dori Read, Gates Middle School & Diane Thompson, Boston University Asst. Prof.
- Suzy Urbaniak, Kent Street Senior High School, Perth Australia & Matthew Campbell, University of Queensland PhD student
Curriculum covered

- Sedimentology
- Biostratigraphy
- Core flow
- Paleomagnetism
- Oxygen and carbon isotopes
- Earth structure and tectonics
- K-Pg Boundary
- PETM
- EO Boundary
- Diversity and inclusion strategies
- JR technology/engineering
- Oceanography 101
- Mentoring
- Project planning time
Working in labs

Simulating seismic energy

Team exercises

Gallery walk

Crossing the equator: pollywog → shellback
School of Rock 2017 - Outcomes

• 10 action plans for implementing IODP content and enhancing diversity in the geosciences in 10 different communities
• At least three diversity-themed proposals in the works for upcoming NSF (one submitted in October)
• Most participants plan to apply to sail in the near future – either as scientists or EO officers
• Lots of new synergistic connections!
Initial survey results indicate that SOR 2017 was successful in helping participants:

A. Understand current obstacles in promoting diversity in STEM (STEAM) fields and how to facilitate changes.

B. Develop deeper knowledge in geosciences (specifically oceanography, climatology, sedimentology, micropaleontology, structural geology, meteorology and plate tectonics).

C. Increase overall knowledge of the nature and process of science.
**Action Plan examples**

**Austin, TX:** Five classroom kits with thin sections will be created for use in conjunction with the lesson plan. These kits will be advertised to other middle and high school teachers (science and physics) at KIPP Collegiate, and beyond. At KIPP Collegiate, 97% of the students are Hispanic/Latino.

**Tempe, Arizona:** “By engaging students and teachers, we hope to promote the entry of more geoscience related science projects at the annual science fair especially at the 4th and 5th grade where science interest drops off significantly and re-ignite interest within the geosciences.”

**Salisbury MD:** Opportunities are rich for the largely African American students of Salisbury Middle School to connect with Salisbury University undergraduates and faculty in the collection of field samples and data from historically important yet threatened barrier islands in MD.
New Developments

**Seawater sampling during transit:** see Diane Thompson’s poster on Thursday; PP53B-1131

**URM high school student science club field trip:** hear Kerrita Mayfield’s talk next; ED21C-02

**IUSE Geopaths proposal in the hatching:** I am working with a colleague at another PA State System of Higher Education university to use place-based instruction to set the stage to a new onramp

**SOR team *Perspectives* piece on why diversity matters:** target would be a widely read scientific journal
I use IODP science in my teaching.

**Pre-SOR**
- STRONGLY DISAGREE: 2
- DISAGREE: 7
- NEITHER: 0
- AGREE: 7
- STRONGLY AGREE: 0

**Post-SOR**
- STRONGLY DISAGREE: 0
- DISAGREE: 0
- NEITHER: 0
- AGREE: 3
- STRONGLY AGREE: 13

Other outcomes from SOR 2017 for you?

“Meeting a whole new group of inspiring educators from all diverse backgrounds was the most rewarding outcome for me!”
Survey Results

I was working on one or more proposals for funding aimed at diversity.

What do you see as SOR’s most significant impacts on you?

“Gave me ideas for ways to fight for diversity in science at all levels.”
Survey Results

I plan to work with a nearby scientist/teacher to broaden STEM participation among underrepresented communities

Pre-SOR

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Post-SOR

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What impacts do you see yourself having on others as a result of your experience during SOR?

“Striving for greater diversity among the geosciences.”
Conclusions

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School of Rock video