A photograph of an offshore oil rig at night, illuminated by its own lights, with the lights reflecting on the water. The sky is dark with some clouds. The rig is a large structure with a tall derrick and various platforms.

# WORKSHOP INITIAL REPORT: EXPANDING THE GEOSCIENCE PIPELINE BY CONNECTING EDUCATORS WITH EARLY CAREER IODP SCIENTISTS

GSA Annual Meeting - Seattle  
October 24, 2017

*Sharon Cooper, Columbia  
Univ./IODP*

*Jon Lewis, Indiana Univ. of PA*

*R. Mark Leckie, UMass Amherst*

*Steve Hovan, Indiana Univ. of PA*

*Lisa White, University of California,  
Berkeley*

# School of Rock video



# School of Rock 2017

## *Evolution of an Idea*

*“...the United States is at risk of losing its competitive edge as fewer students pursue advanced degrees and careers in STEM disciplines and insufficient progress is made in engaging the full diversity of the Nation’s potential talent pool in those fields.” - NSF*

IODP School  
of Rock

STEMSEAS

2017 School  
of Rock



# School of Rock 2017

July 10-17

*Transiting from Subic 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

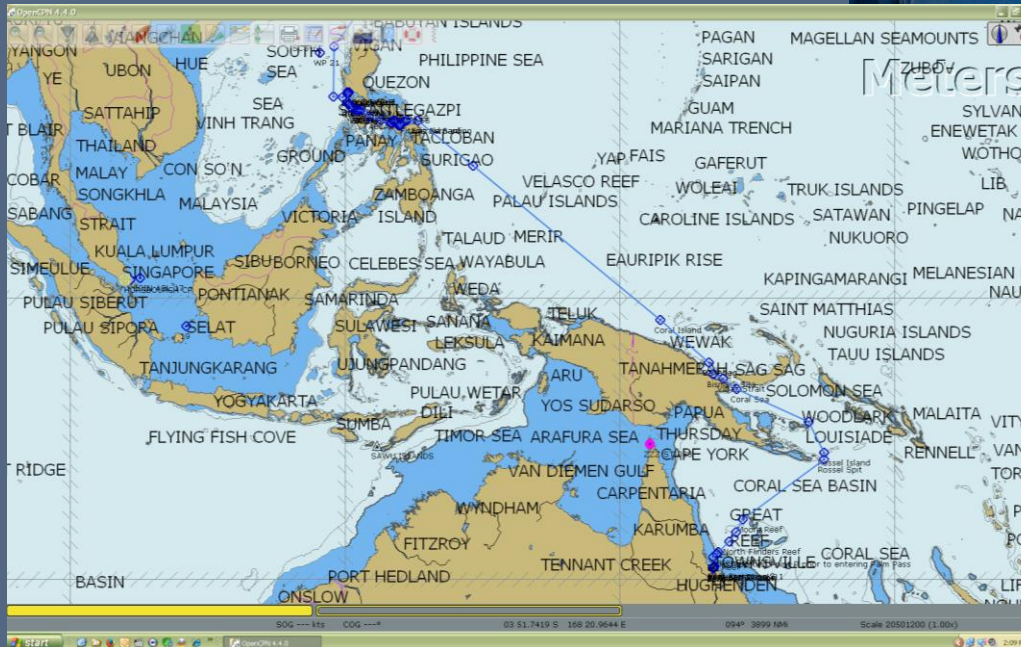
- encourage early career scientists and secondary-level educators from communities that remain poorly represented in STEM fields, and particularly geosciences, to participate.
- showcase and educate about *JR*/IODP capabilities.
- increase the diversity of the talent pool that will apply to sail on IODP and related expeditions in the future.
- build a diverse mentoring pool for undergraduate STEM/geoscience students.
- create local partnerships to bolster the STEM/geoscience pipeline.





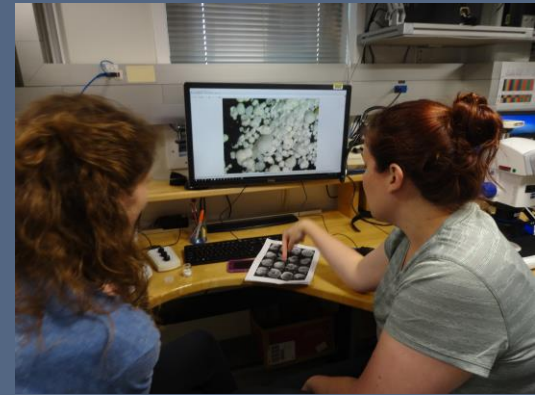
# Instructor Team

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



# Participant teams

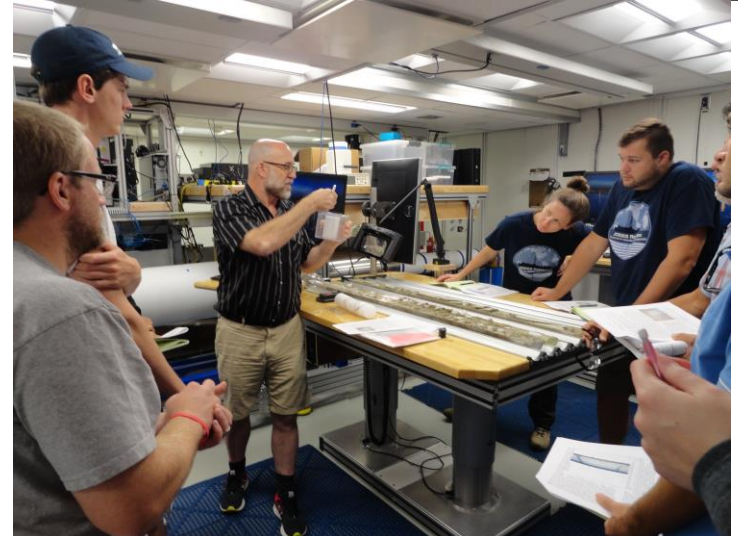
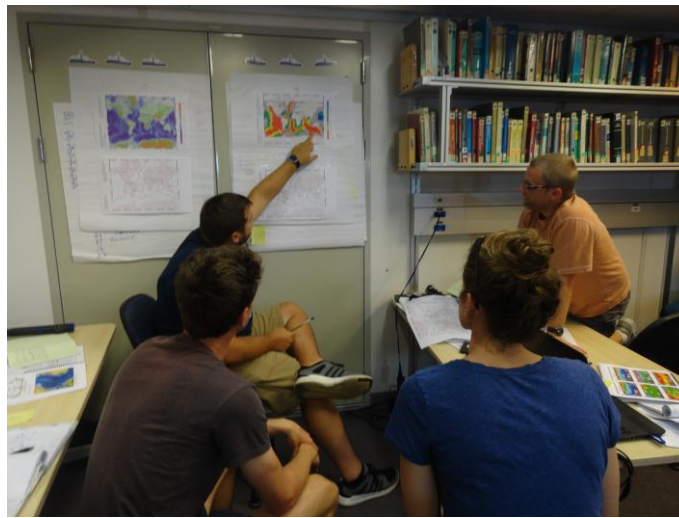
- Rachel Bernard, UT Austin Phd student/ Colleen Henegan, KIPP Austin Collegiate High School
- Chloe Branciforte, Ventura College Asst. professor/Julia Domenech, Buena High School
- Thomas Cawthern, Salisbury University Asst. professor/David Hansen, Salisbury Middle School
- Kim Hatch, Long Beach City College/working with Lisa White
- Kerrita Mayfield, Holyoke High School/working with Mark Leckie
- Stephanie Milam-Edwards, Tempe High School/Marilyn Raming, Tempe Union High School
- Dori Read, Gates Middle School/Diane Thompson, Boston University Asst. professor
- Suzy Urbaniak, Kent Street Senior High School, Perth Australia/Matthew Campbell, University of Queensland Phd student
- Helenice Vital, Universidade Federal do Rio Grande do Norte – UFRN/ Miguel Borges, Federal Institute of Education, Science and Technology of Paraíba





## 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





Demonstrating tectonic movements



Work in labs



Team exercises

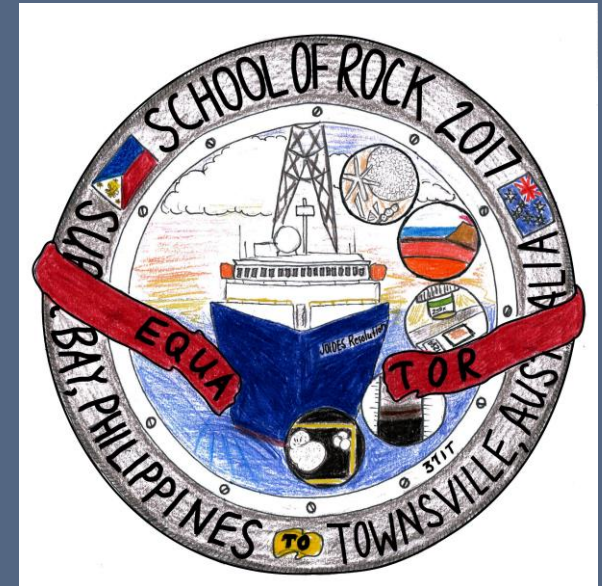


Equator crossing certificates on the bridge

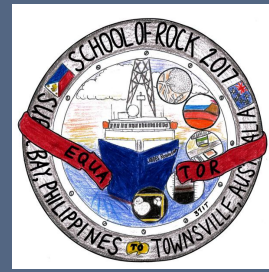


# School of Rock 2017 - Outcomes

- Workshop initial report – draft completed
- 10 action plans for implementing IODP content and enhancing diversity in the geosciences in 10 different communities
- At least four proposals in the works for upcoming NSF solicitations for addressing geosciences (one submitted last week!) diversity at the undergraduate, graduate and high school levels
- Most of the group intends to apply to sail in the near future – either as scientists or EO officers
- Ideas for articles for scientific journals (instructors)
- Lots of new energy, ideas and connections!



# Results



**Initial survey results indicate that SOR 2017 was successful in helping participants:**

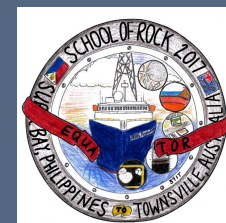
- A. Understand current obstacles in promoting diversity in STEAM fields and how to facilitate changes.*
- B. Develop deeper knowledge in geosciences (specifically oceanography, climatology, sedimentology, micropaleontology, structural geology, meteorology and plate tectonics).*
- C. Increase overall knowledge of the nature and process of science.*

# Action Plan examples

**Austin, TX:** *Due to the inaccessibility of rock thin sections to most K-12 teachers, we plan to construct five classroom kits that can be loaned out to be used 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.*

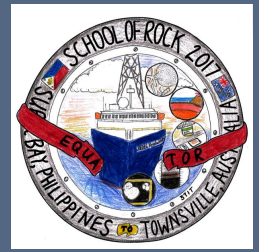
**Tempe, Arizona:** The level of instruction and subsequent knowledge obtained from this experience help us to better connect the process of science with these diverse groups of students. We hope to connect students to geoscience through STEAM driven lessons. We believe that by showing that science is accessible to these students, they will seriously consider the geosciences as a possible major.

**Mt. Holyoke, MA:** *Mt. Holyoke High School after school science club. HHS is: 70% Latinx, 40% of the HoH are women, 96% FRL, 30% are ELL students Latinx – ungendered designation of Spanish heritage persons in the American diaspora; HoH – Head of Household; FRL – a marker denoting family income below the Federal poverty line; ELL – English Language Learner who may be fluent/literate in a language other than English*

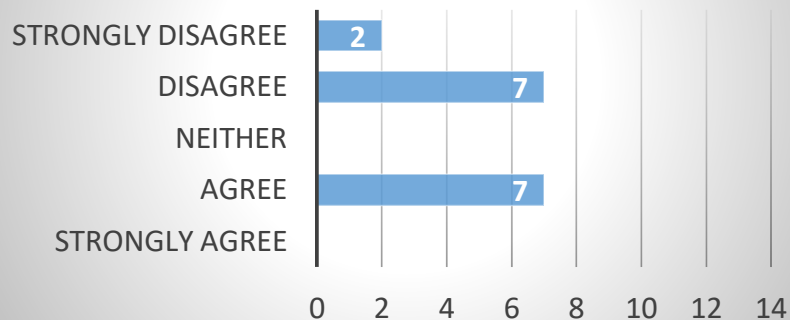




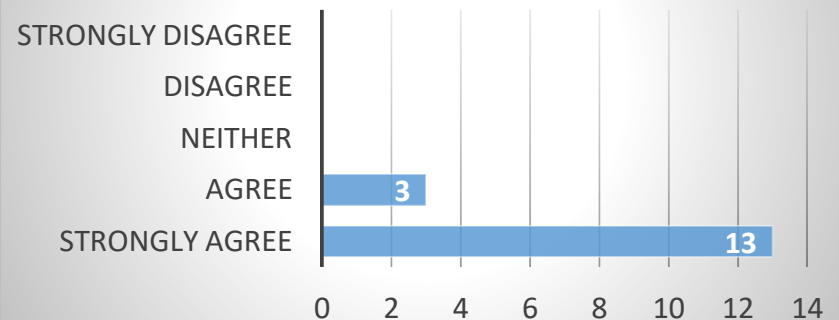
# Survey Results



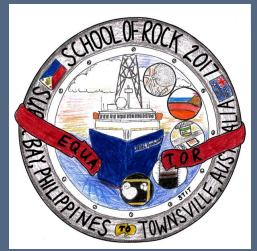
## Pre-SOR Use of IODP science in teaching



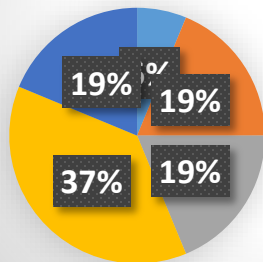
## Post-SOR Use of IODP science in teaching



# Survey Results

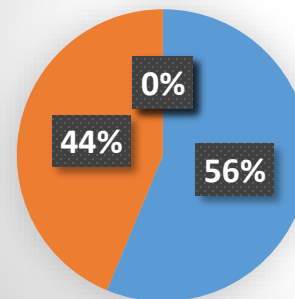


## Pre-SOR working on proposals for funding aimed at diversity in the geosciences



- Strongly Agree
- Agree
- Neither
- Disagree
- Strongly disagree

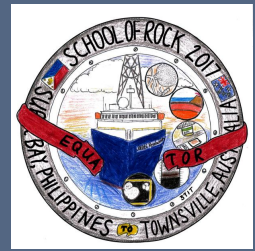
## Post-SOR working on proposals for funding aimed at diversity in the geosciences



- Strongly Agree
- Agree
- Neither
- Disagree
- Strongly disagree



# Survey Results



**Pre-SOR collaborating with  
colleague to broaden STEM  
participation among UR...**



**Post-SOR collaborating  
with colleague to broaden  
STEM participation...**





# Conclusions



Contact:

Sharon Cooper: [scooper@Ideo.Columbia.edu](mailto:scooper@Ideo.Columbia.edu)

Jon Lewis: [jclewis@iup.edu](mailto:jclewis@iup.edu)