



Jon Lewis (IUP) and Sharon Katz Cooper, LDEO (Columbia University)

UNOLS Council Meeting: November 1, 2018

What is STEMSEAS?



- STEMSEAS takes advantage of under-used capacity on (UNOLS) vessels to provide undergraduate students with high-impact experiences.
- STEMSEAS sails both declared geoscience majors and non-majors with undergraduate faculty mentors for 5-10 day ship transits.
- STEMSEAS aims to increase the number of meaningful shipboard experiences available to undergraduate students, introducing students to essential skills and competencies for geoscience careers, and exposing non-STEM students to STEM issues and careers.

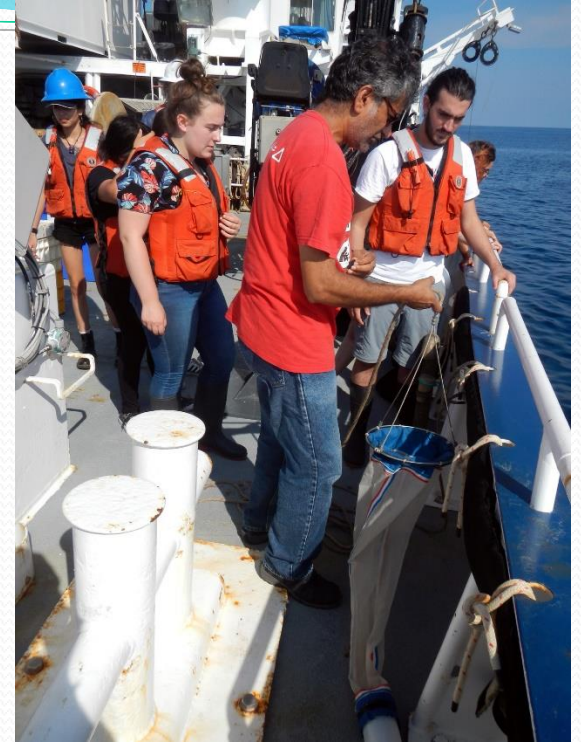
2018 Year in Review

| Ship | # of days | Port and Depart Date | Port and Arrival Date |
|----------|-----------|-----------------------|--|
| Sikuliaq | 8 | San Diego 2 Feb | Newport 10 Feb |
| Endeavor | 8 | Narragansett 26 April | Bridgetown, Barbados 3 May with Joe Montoya |
| Revelle | 12 | San Diego 30 May | Newport 11 June with UCSD graduate students |
| Endeavor | 8 | Narragansett 8 Aug. | Gulfport 17 Aug with Ajit Subramanian (LDEO) |
| Sikuliaq | 6 | Nome 3 Oct | Seward 8 Oct, with UAF BLAST program |



Instructors

- Chris Hintz, Savannah State University
- Cynthia Hall, West Chester University
- Joe Montoya, Georgia Tech
- Steven Pekar, Queens College
- Raquel Bryant, University of Massachusetts
- Valeria Ortega, UCSD
- Ajit Subramanian, Lamont Doherty Earth Observatory, Columbia Univ.
- Judah Epstein, Brookhaven College
- Daniel Hauptvogel, University of Houston
- Anne-Lise Ducluzeau, University of Alaska



Student snapshot

48 students



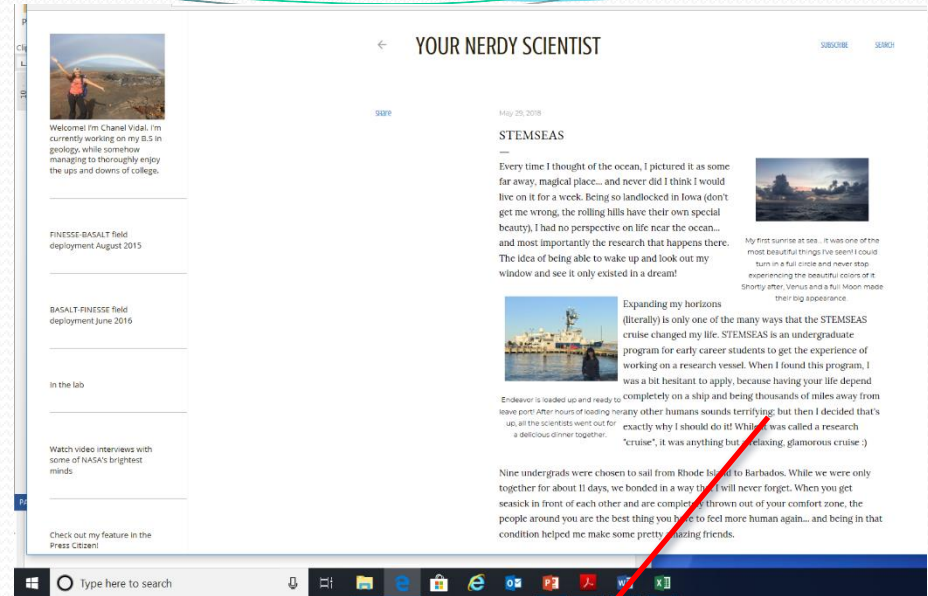
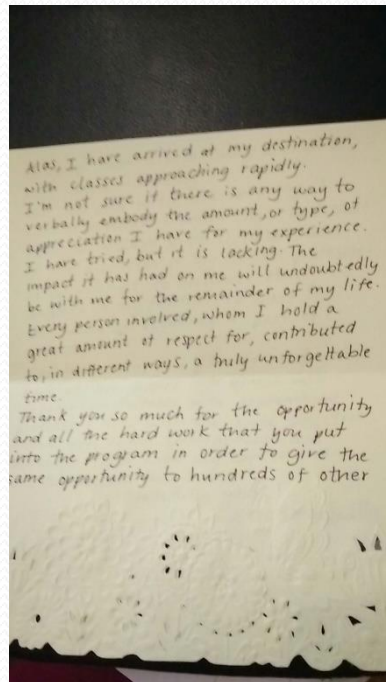
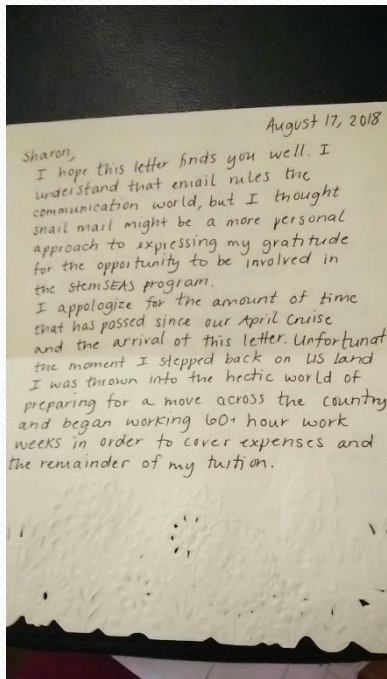
| | |
|-----|--------------------------------------|
| 13% | (1) African-American/Black |
| 15% | (2) Asian-American/Asian |
| 42% | (3) Hispanic or Latino |
| 4% | (4) Native American or Alaska Native |
| 2% | (5) Pacific Islander |
| 44% | (6) White/Caucasian |
| -- | (7) Other (please specify) |

| | |
|-----|------------------------|
| 29% | (1) 2-year institution |
| 71% | (2) 4-year institution |

| | |
|-----|------------|
| 31% | (1) Male |
| 67% | (2) Female |
| 2% | (3) Other |



Gratitude!



While this cruise was only a week long, the impact it has had on me will help me throughout the rest of my lifetime. I'm so grateful to have mentors in my life who push me to do things like this, and to do them with a full heart! I'm sad it's over, but more excited for what is to come!

On another note... I have been unable to stop thinking about being at sea since I stepped off of R/V Endeavor. I am avidly searching for more opportunities to have more experience at sea. I came across a program called SeaMester. Have you heard of this program? I am very interested in it but I want to be sure it is something you'd recommend for a good experience at sea as well. Here is the link I have been looking at: <https://www.seamester.com/voyages/bvi-to-dominica/>

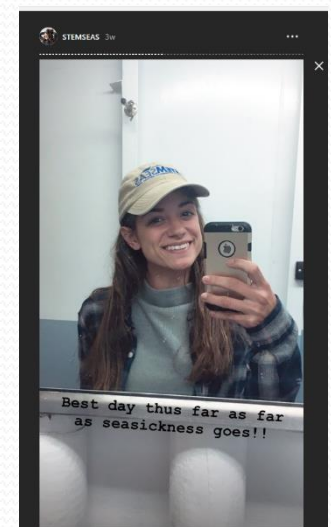
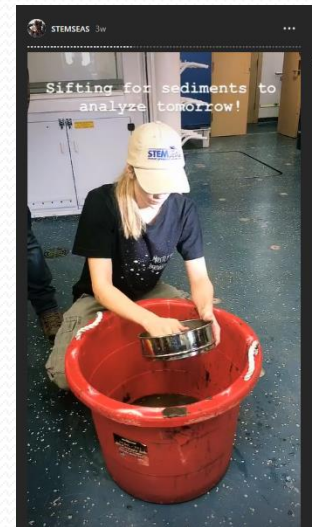
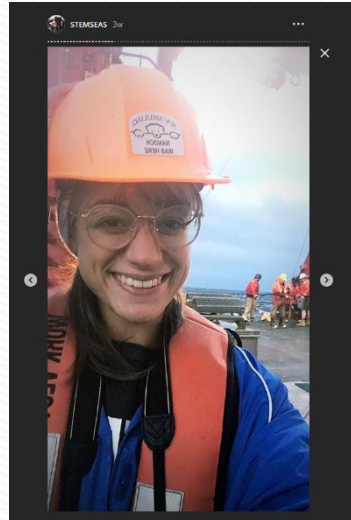
STEMSEAS definitely changed my life and made me love the ocean even more than did before. I was constantly exposed to new knowledge and sights I have never seen before. I had such an incredible experience and it is one that I will remember forever.

Spending time with scientists, crew members, and students whom have stories to share. Gaining the opportunity to learn from others who have careers, stories, and experiences that they can share. The trip itself goes beyond science and STEM as it engages students in an better understanding of how careers, interests, passions, and wants can shape our lives.

It was an experience unlike any other allowing students to learn from crew-members about maritime practices, practice science while being mentored by fantastic scientists, and venturing in places (such as the Bering Sea) that not just anyone can visit.

I learned so much about different fields and about life at sea. Everyone, including the crew, were so invested in our learning and it really just made this an incredible experience. Joe and Steve are insanely awesome! I feel incredibly fortunate to have them as mentors now!!!

Social media posts



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Hauptvogel sails for STEMSEAS

October 16, 2018



Program Lets Undergraduate Students Learn about Science at Sea

Daniel Hauptvogel, instructional assistant professor in the University of Houston's Department of Earth and Atmospheric Sciences, will be working with the Alaska Science Center as chief scientist and lead instructor for a STEMSEAS (Science, Technology, Engineering, Math) program in Alaska from October 2-9.

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BLENDING COMMUNICATIONS MEDIA AND MARINE BIOLOGY AT SEA

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An IUP student will spend a week aboard a research vessel in the Bering Sea and North Pacific as part of the Science Technology Engineering and Math Student Experiences Aboard Ships (STEMSEAS) Program, which gives college students hands-on learning experiences in STEM.

Katie Campbell, a **communications media** major from Bellwood, departed for Alaska on Tuesday, October 2, and will board the R/V *Sikiluaq*, a 261-foot research vessel operated by the University of Alaska at Fairbanks, on which she will learn with other students in the STEMSEAS and UAF Biomedical Learning and Student Training programs. She will board the vessel in Nome, Alaska, and make the week-long journey to Seward. During the trip the students will be exposed to a wide range of cutting-edge methods aimed at research in oceanography, marine geology, and marine biology.

Campbell, who plans to pursue a career in documentary filmmaking, said she hopes to use the trip to document some of the work done on the ship with video and photography.



STEMSEAS

A Vehicle for the US Academic Fleet to
Serve Undergraduates from Diverse Backgrounds

By Sharon K. Cooper and Jonathan C. Lewis

Having the opportunity to go on this trip with STEMSEAS has been the single greatest thing I have ever done. I am so thankful for the opportunity that it has given me. I will never forget it. – STEMSEAS student

The Science, Technology, Engineering, and Math Student Experiences Aboard Ships (STEMSEAS) program began, as many inspiring ideas do, on the back of a napkin. Author Cooper has worked for many years for the International Ocean Discovery Program (IODP) and its School of Rock, which provides teacher professional development workshops on the drillship *JOIDES Resolution* (JR). Author Lewis, an academic, is fortunate to have sailed twice as a School of Rock

instructor on the *JR* and had been pondering since 2013 how undergraduates might be provided similar opportunities. Having but one *JR* that is usually in far-off waters presented an obvious challenge. Over coffee in Pittsburgh one day, we discussed the fact that the 19 ships of the University National Oceanographic Laboratories System (UNOLS) often have repositioning transits as well, and these voyages frequently sail out of US ports without full science

parties, meaning there are multiple available berths. Why not use this capacity to provide undergraduates—particularly those from underrepresented groups—the engaging opportunity to climb aboard a research vessel and experience what it's like to conduct research at sea? We are well aware that the geosciences overall, and oceanography in particular, lack diversity (NRC, 2011; NSF, 2011; Slovacek, 2011; Wilson, 2014), and these transits seemed like a perfect opportunity to address this issue in one small corner of our world.

When the National Science Foundation's GEOPATHS solicitation came out in fall of 2015, it was a perfect match with our nascent idea. The NSF program's goals include increasing the number and diversity of students who participate in the geosciences, preparing students for geoscience careers, and contributing to the evidence base for effective student engagement and retention in STEM fields. Our goals for STEMSEAS also aligned perfectly with NSF's long-term goals for improving STEM learning and learning environments, broadening participation and institutional capacity for STEM, and building the STEM professional workforce of tomorrow.

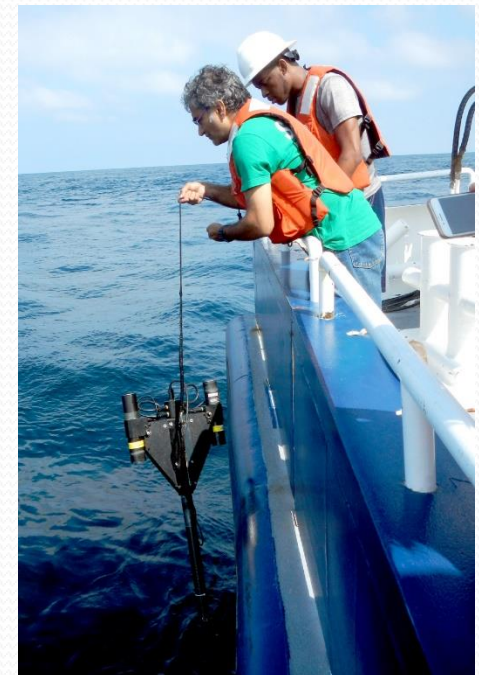
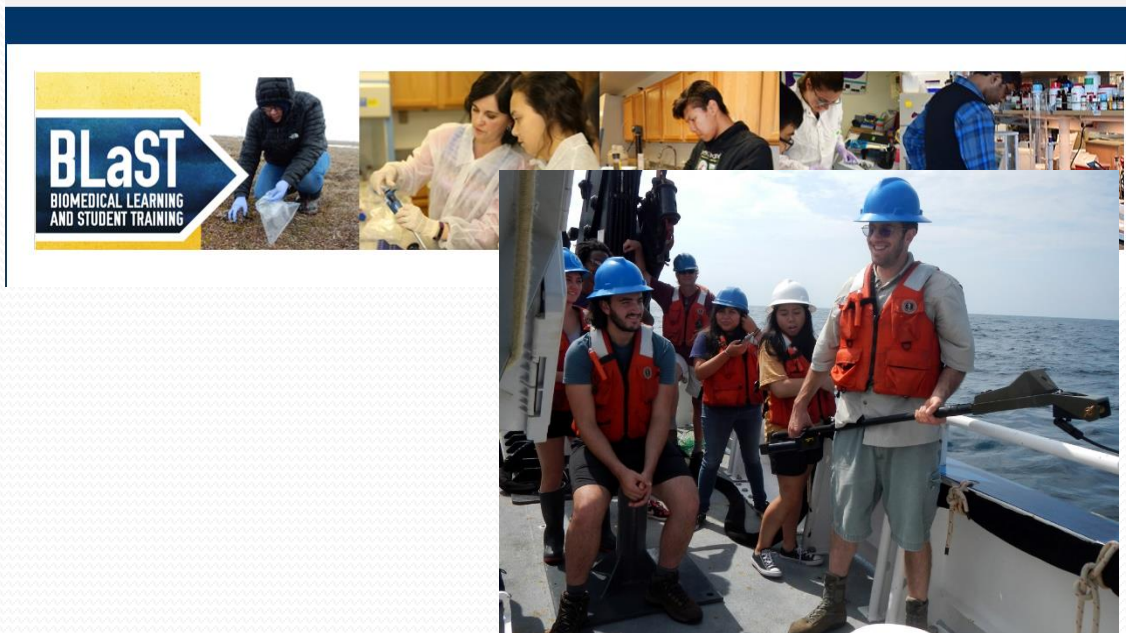
Our successful one-year pilot program allowed for four transits on four different UNOLS vessels and included a total of 36 students. STEMSEAS attracted nearly 900 applications for those 36 spots. We targeted undergraduates at key junctures in their career decision-making, leveraged ship capabilities, established



STEMSEAS cohort on R/V *Sikuliaq*. Mentors from right to left are author Lewis, Karen Thomson, Kris Ludwig, and UMass-Amherst graduate student Raquel Bryant. The group sailed from Seattle, Washington, to Seward, Alaska, in 2016.

Collaboration

- Worked with Joe Montoya (Georgia Tech) on the transit prior to his science cruise out of Barbados
- Worked with two graduate student groups from Scripps on R/V Ravelle
- Worked with LDEO team on transit prior to their science cruise into the Gulf
- Placed a STEMSEAS alumna on this following cruise
- Collaborated with UAF's BLAST program on R/V Sikuliaq
- Working with Dr. Jessica Conroy at University of Illinois to collect water samples on all transits for studying stable isotopes



Looking to 2019

- Putting together schedule for 2019
 - June 3-11, Morehead City to Barbados on Endeavor
 - Aug. 6-14, Gulfport to Narragansett on Endeavor
 - Aug. 27-Sept. 2, Kodiak to Newport on Sikuliaq
 - Looking for 2-3 more
- Have ideas for collaborations? Let us know?
- Have a lead on any gently used microscopes? We need some!
- <https://youtu.be/9UKBr93Rrqq>

Questions? scooper@ldeo.columbia.edu or jclewis@iup.edu

