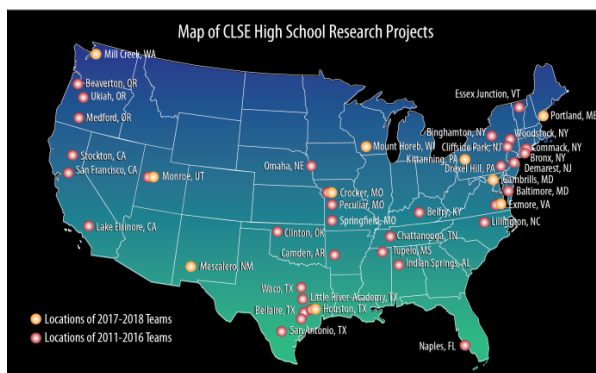


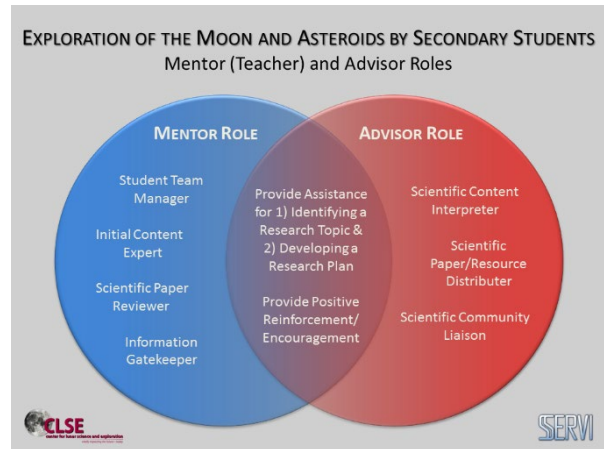
SCIENTISTS SHOULD ENGAGE YOUNG STUDENTS: WHY AND HOW. A. J. Shaner^{1,2} and D. A. Kring^{1,2},
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Introduction: Despite a mounting demand for science, technology, engineering and mathematics (STEM) workers in the United States [1], 20 countries outrank U.S. student performance in STEM [2]. Plus, these countries have a greater quantity of engineering and science students, causing the U.S. to gradually lose its global, competitive edge [3]. This lack of U.S. STEM talent can be tracked to the low retention rate, and lack of student interest, in STEM among pre-college students [3]. To counter this, various initiatives have been launched to promote STEM education to K-12 students with most of the focus being in secondary schools with the addition of engineering curricula [4,5,6] and experiential learning opportunities [7].

Program Description: The Exploration of the Moon and Asteroids by Secondary Students (ExMASS) program is a practical, effective model for engaging high school students with subject matter experts in authentic, open-inquiry research while stimulating positive attitudes toward science [8]. The program includes two elements: 1) two guided inquiry, introductory research activities that build students' knowledge of current lunar and asteroid science and available lunar and asteroid data and 2) an open inquiry research project. At the end of the school year, teams submit a research poster describing their work. These posters are scored independently with one team selected to present in person at the Exploration Science Forum (ESF). To date, approximately 200 students from 23 states have participated in the program.



Advising Students: The teachers and the scientist participating in ExMASS are the program's strongest, and most important, assets. Both teachers and advisors have important solitary, and collaborative, roles. The Figure below outlines those roles. ExMASS is always on the lookout for, and in need of, advisors for student teams. The next opportunity to serve as an advisor is the 2020-2021 school year. Because most of the ExMASS



program is run virtually (i.e. email, telecon, videoconferencing), advisors can be located anywhere.

Evaluation: At the end of each ExMASS program year, advisors are asked to complete an exit survey that gathers their feedback regarding their experience and their perceptions of the students' experience. Survey items include asking what advice they would provide for future advisors and their perspective on how much ownership students take in their research projects.

Future Work. Beginning in 2020, the program will examine its effect on other affective traits of students. Collaborating with education researchers at the University of Houston-Clear Lake, a mixed-methods approach will be used to study the program's impact on students' self-efficacy, or confidence, in conducting scientific research. Specifically, how the relationship with the advisor impact their self-efficacy.

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