

INCREASING STUDENT ENROLLMENT AND RETENTION IN STEAM CAREERS CENTERED IN PLANETARY SCIENCE BY INCORPORATING NASA'S SOLVE PROGRAMS IN COLLEGE LEVEL SERVICE LEARNING AND INTERNSHIP PROGRAMS. J. G. Olgin^{1,2}, ¹El Paso Community College – Physics Department (9570 Gateway N. Blvd, El Paso, TX 79924), ²University of Texas at El Paso – Geological Sciences (500 University, El Paso, TX 79968).

Introduction: The recent successes of education – public outreach events at the El Paso Community College, such as the 2017 solar eclipse and Earth Science Day in October 2018, centered around the incorporation of Service Learning Program (SLP) participants and collaborations with universities and government and non-government organizations (NGO's). These events engaged students to learn more about interdisciplinary themes and how to apply them toward their career goals. In an effort to continue this approach to enhancing student experiences in STEAM, rooted in planetary science, the next phase would be to incorporate NASA SOLVE programs – GLOBE and Planet 4: Ridges – into the class curriculum, with incentive for SLP participants. This allows a conduit for participants to engage the general public, gain experience in STEAM fields, and promote graduation rates from college and universities, along with promote enrollment in STEAM careers.

Background: The incorporation of service learning in the geosciences is well documented [1-3], including its impact in astronomy education [4]. For each event, SLP's role proved to be beneficial to the overall success of each event; broadening EPCC's reach to students and the community.

Solar Eclipse 2017. This event provided the opportunity to teach the audience about solar eclipses through observation, NASA's live feed from sites of totality, and inviting the audience to participate in recording temperature variations during the eclipse using the NASA GLOBE Eclipse app (fig 1).

Earth Science Day 2018. SLP participants engaged the public in investigative activities ranging from geology tours, use of artificial reality (AR) sandbox, virtual reality (VR) tours of planetary environments, and talks on atmospheric processes and astrobiology. The event highlighted collaborations with EPCC's faculty, staff and the SLP and Tejano Passport programs, along with local educational institutions (e.g. UTEP and the Gene Roddenberry Planetarium) and research organizations (e.g. USGS). These collaborations were further enhanced through artistic representation of geologic events – modeling the “Dance your Ph.D.” approach – which helped cement the learning experience to the public (fig 2).

Goals. SLP integration into these events helped achieve the public outreach goals of STEAM recruitment, awareness, and community learning by provid-

ing the necessary groundwork for successful program execution. The next phase will incorporate NASA's citizen science projects from Zooniverse's Planet 4: Ridges program with the GLOBE program. SLP students will learn, measure, and record terrestrial atmospheric processes data through GLOBE protocols, utilizing weather stations to be installed at each EPCC campus to facilitate weather data collection and submission to the GLOBE database. Their experience will then be applied to find aeolian features on Mars through the Planet 4: Ridges project. They will compare and analyze terrestrial and martian weather processes. Their work will be transformed into working laboratory assignments for EPCC astronomy students and highlighted during the 2019 Earth Science Day through artistic performances for the general public. Incorporation of other institutions to help formulate and guide this project (i.e. the Educational Internship in the Physical Sciences – EIPS from UTEP Geological Sciences) provide a conduit of further learning and pathway for participating students to continue their education at 4-year institutions such as UTEP. These initiatives foster growth in STEAM careers, as well as increase enrollment, retention, and completion of the degrees for those enrolled in these related fields.

Measuring Program Efficacy: EPCC mini-mester (8 week) astronomy courses will be the target of this work during spring and fall 2019. Surveys will be conducted to monitor student's knowledge prior to and after completion of the class to test these initiatives presented here made an improvement in learning. Spring classes will incorporate the GLOBE-Ridges activities while the Fall classes will abide by the standard curriculum. Results will published on the efficacy of these activities.

Future Implementation: EPCC plans to continue these events with continual incorporation of activities provided from NASA and other related agencies to help make such events more robust, promote planetary science, and encourage those in the community to pursue STEAM related careers. Future collaborations with foreign institutions participating in NASA's GLOBE program will further enhance future endeavors.

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Fig 1: Top row photos of solar eclipse event. Credit KVIA Bottom row photos from lunar event. Credit: El Paso Herald Post



Fig 2: Highlights from Earth Science Day, October 17, 2019 at EPCC. Participation of various agencies – from USGS and LPI -and performances by EPCC Dance and EAR 1 project educated the general public in terrestrial and planetary science.

References: [1] B. F. Branco, et al. (2017) *AGU*, Abstract ED53C-0176. [2] S. Oconnell et al. (2016) *AGU*, Abstract ED13D-0948. [3] S. Truebe and A. L. Strong. (2016) *AGU*, Abstract ED13D-0950. [4] M. Orleski. (2013) *Phys Teach*, 51, 535 – 538.