

FINAL REPORT
The STEM Center at SHSU – Mini-STEM Grant
Course Enhancement Grant

Developing a Virtual Field Lab with Application-Based Activities on Mapping a Stream Profile and Measuring Stream Velocity at the SHSU Center for Biological Field Studies

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Funding for this project: \$2000 (Spring 2022) and \$1000 (Summer 2022 – Supplemental Funding)

STEM course targeted and enrollment for Spring and Fall 2022:
GEOL 1401 labs – *Geologic and Environmental Hazards* – Spring (120 students); Fall (250 students).

Thanks to the Mini-STEM grant, the Department of Environmental and Geosciences' Geology program now offers a fully online introductory science core class and lab! The enrollment doubled for *Geologic and Environmental Hazards* due to the online lab section opening up this Fall 2022.

Project Description:

In the Spring of 2022, the Department of Environmental and Geosciences' Geology program did not offer any fully remote introductory science core courses. Our *Geologic and Environmental Hazards* (GEOL 1405) course offered the lecture section online, however, students were required to attend a 2-hour face-to-face lab once a week. The online lab for this course was not available due to two mandatory field labs that required hands-on field measurements and instructions, essential to the course/lab.

Thanks to funding from this grant, the PI was able to purchase a video camera, microphone and supporting materials (memory card, batteries, etc.) to film at the SHSU Biological Field Station. With the assistance of two lab TAs (GIS student, Melissa Moya and Geology major, Meghan Puente) and a videographer (Entrepreneur major/sports film minor, Zech Cossey), the group spent 3 days in the field, filming and adding moderated content to what we would do in the field with a face-to-face lab. Background information and video footage of the collapsed dam, instructions and visual demonstrations of how to measure a stream profile and stream velocity, were all performed. The field lab used simple equipment out in the field (i.e., a stopwatch, two stakes, a tape measurer, and cork). The hope is that online students, if interested, can replicate the field part of this lab in any stream near where they live.

Later, the videographer took all of the photo and video footage, edited the content and compiled it all to the virtual field lab. The PI then checked for accuracy and went through areas where text should be added to the video. The video was then uploaded to YouTube and is an easy link that can be included to the online lab. YouTube link: <https://www.youtube.com/watch?v=oS2y1VL3-0A>

In addition, for the calculation section of the lab, the PI did a self-recorded Zoom with the data collected in the field. On Zoom, while sharing her screen and using the whiteboard, the PI was able to show how the students could take the data and calculate the average stream velocity and use Manning's equation that takes into account the stream velocity, slope and flow area. Sample data from various face-to-face labs were compiled and posted on Blackboard for the online lab students to complete the required calculations.

Project Reflection:

The project was a success, and the PI really appreciates the support of The STEM Center. One minor obstacle was finding a videographer on campus. The PI contacted a Mass Communications honors student in her class to work on the project. However, the student was too busy to take on the project. As a result, the PI got on YouTube and started watching various vloggers at SHSU. After watching a wide range of vlogs, the PI contacted Zech Cossey and interviewed and then hired him for the “job” 😊.

The summer's supplemental grant supported the second field lab in the Spring Lakes subdivision in Huntsville, TX. In this subdivision, there are 4 sites where there is evidence of flooding and mitigation strategies that have been employed.

Financial Reporting – Spring 2022 (\$2000) and Summer 2022 (\$1000)

- Video camera and supporting materials - \$300 (purchased and paid for)
- 2 teaching assistants helping with virtual field lab – Melissa Moya and Meghan Puente - \$100/each (paid)
- 1 videographer for filming and editing – Zech Cossey - \$500 (paid)
- Faculty stipend – Ava Fujimoto-Strait - \$1000 (payment pending final report submission)
- 1 videographer for filming and editing 2nd field lab – Zech Cossey - \$500 (not paid yet)
- Faculty stipend for publication or presentation at conference – Ava Fujimoto-Strait - \$500 (not paid yet)

