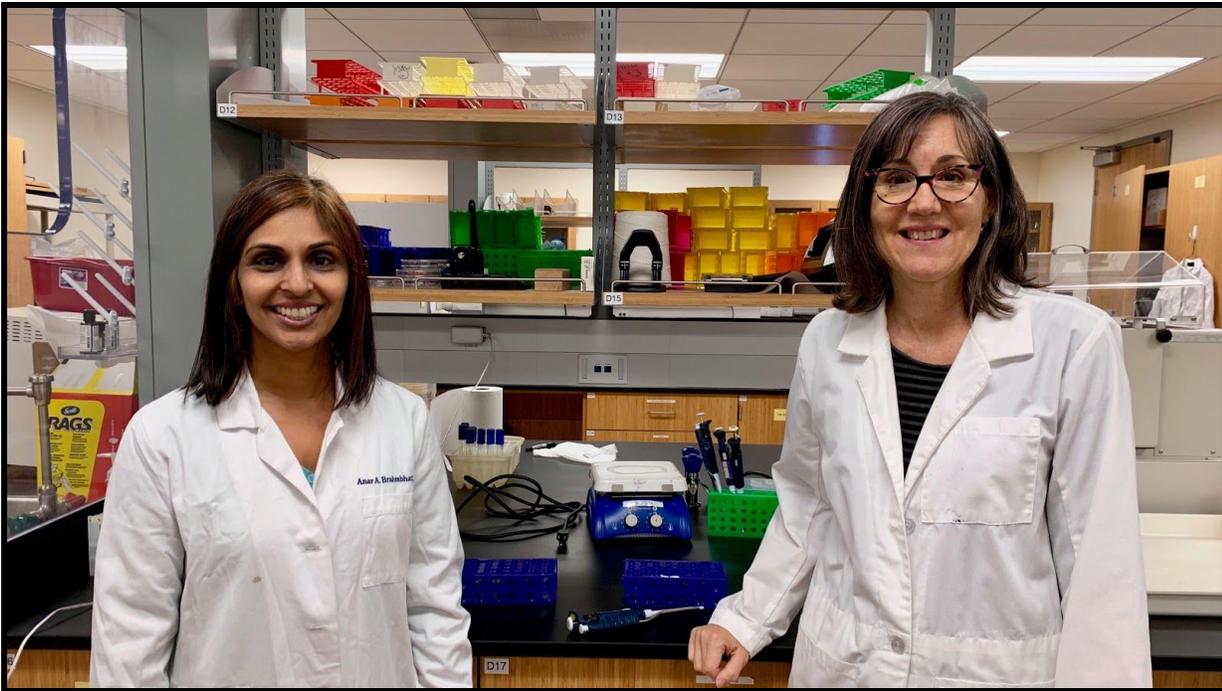




## STEM Professional Learning



### Lab Redesign Mini-Grant

**“Incorporation of an ELISA (Enzyme-linked immunosorbent assay) into microbiology labs”**

**Professor Anar Brahmbhatt (Biology) with Professor Belen Ybarrondo (Biology)**

This is a modern technique used by most clinical microbiology labs designed to test for the presence of harmful, disease-causing agents (pathogens), hormones, potential food allergens, and certain classes of drugs. I propose the introduction of a mock ELISA assay to enhance our students' current understanding of immunology and the real-world applications currently being used that involve immunology. I had previously purchased an ELISA plate reader with the plans to add this assay to our course but have not until recently had a microbiology ILT with subject matter expertise to help with this endeavor. The immune system response not only is a complex reaction, but also a microscopic reaction that cannot be seen with the human eye. In order to visualize the binding of antibody to a specific antigen there must be an accompanying colorimetric change that is accomplished through the use of an enzyme bound to a secondary antibody, binding to its substrate (reactant). This assay provides students with a visual,

hands-on encounter with a technique that in writing, or provided only as a textbook visual, is difficult to grasp.

I will be working closely with our Instructional Lab Technician (ILT) Dankhanh Pham and adjunct instructor, Belen Ybarrondo, to research current ELISA techniques as well as mock ELISA techniques (used in education). I plan to use inexpensive substitutes, of kits available through the biotech company Bio-Rad, to create our own version. A similar ELISA technique is being performed at Miramar College; we plan to communicate with the ILT there and discuss further how they set up for this lab. I have previously attended an ELISA workshop at Miramar College especially for this assay and have experience with the technique as well as their working protocol. I anticipate the following amount of time required to complete this task: 1) Research: 5+ hours 2) Discussion: 5+ hours 3) Write proposed method: 3+ hours 4) Testing: (5-10 hours). It may take multiple revisions before we have a method that works well for our students within the time constraints of the lab period. We plan to beta test the resulting method with at least 1-2 sections.

The integration of more modern techniques utilized in a microbiology lab, such as the addition of an ELISA array, as well as the real-world applications involving microbiology, allows us to better meet Course Learning Outcome #3: Skills and Technology Application since students should be able to investigate microbiological questions using appropriate laboratory tools and techniques. It will also help to strengthen our two additional CLOs: CLO #1: Critical thinking - Developing the skills to ask vital questions and solve microbiological problems and CLO#2: Communications - Incorporating effective listening, speaking and writing skills to report and/or explain microbiology concepts. We hope that the introduction of this technique will allow students that struggle with course concepts and terminology an opportunity to become more engaged in this experience-based procedure and make it more relatable to the real world. Studies show that experiential learning is extremely effective and that students not only absorb the material with greater ease, but also find it easier to retain the information in the future. In addition to performing the technique, the students will have a lecture and will have performed a virtual lab activity prior to the actual experiment in lab.



# Welcome to the STEM Center!

## Tutor Spotlight

### **Min Young, Math Tutor (Trigonometry & Precalculus)**

“My name is Min Young Hong and I am majoring in Mathematics. I became began tutoring Math in the Fall of 2019. I am currently taking prerequisite courses at Mesa College to apply for a Master's degree in Mathematics Education. At the STEM Center, all the tutors, tutees and staff are actively interacting with each other to contribute towards our students’ success. Tutors cooperate



with each other and students concentrate on their work for their academic development. The STEM Center has many experienced and enthusiastic tutors. They provide services that are appropriate to the students’ diverse educational background and level of mathematics. In addition to guiding my tutees, I also learn a lot from their passion for learning. I appreciate the help of more senior tutors and I am happy to meet ardent and passionate students at the Stem Center. Tutoring at the STEM Center has been a great experience for me!”

## Technology Loan Results

The STEM Center offers a variety of materials for checkout for Mesa students. By far the most popular items are graphing and scientific calculators (which can be borrowed for up to a week) as well as laptops loaded with STEM instructional software that can be used inside the building. This semester we increased our inventory to 20 laptops and nearly 80 calculators, and the results speak for themselves!

### **Circulation Counts: Fall 2019**

Graphing Calculators: 206 Checkouts

Scientific Calculators: 611 Checkouts

STEM Software Laptops: 945 Checkouts



# STEM Center

## Hours of Operation

<b><u>STEM Center</u></b> Monday - Thursday: 8 am - 8 pm Friday: 9 am - 3 pm	<b><u>Tutoring</u></b> Monday - Thursday: 9 am - 8 pm Friday: 10 am - 3 pm	<b><u>Counseling</u></b> Monday: 4 pm - 6 pm Tuesday: 12pm - 2pm Thursday: 10am - 12pm
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## Contact Our Team!

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