

Contract #	Term	Course	Contract Title	Description
414082	Spring 2019	BIOL 5215U	Effects of Salinity Concentration on Dictyostelium and E.coli Development	My lab partner and I will be developing a study focused on how changing salinity effects the development of Dictyostelium. We will have four different concentrations of sodium chloride that reflect levels in their natural environment of soil. The salinity concentrations range from no salinity to toxic salinity levels. By observing the development, with each trial, we will be able to determine if salinity concentration is detrimental to the growth of Dictyostelium. We will also be observing the effects of salinity on the food source of Dictyostelium, which is E.coli. We will be treating the bacteria with the same salinity concentrations and measuring the cell viability. The results will be presented at Tower Day.
416082	Spring 2019	BIOL 5535U	Mite Domatia Comparison in Costa Rican Forests	For this project, I will be comparing the number of mite domatia found on leaves at two sites in Costa Rica during my spring break study abroad trip. Many plants produce mite domatia, tiny burrows along the central vein of the leaf, to house mites that aid in defense for the plant. The purpose of the experiment is to determine if environmental factors due to location affects the number of mite domatia found on leaves. The two sites where samples will be collected are the La Selva Biological Station and Tortuguero National Park. The La Selva Biological Station is very inland and the Tortuguero National Park is coastal.
417082	Spring 2019	BIOL 2225K	Identification of Unknown Microbes	Throughout the duration of Microbiology, we are learning different techniques to be able to identify unknown microbes. Each week we have learned a new step in being able to successfully identify microbes that are previously unknown. Under the supervision of Dr. Lauren King, I will be give a mixed culture of 3 unknowns, where I will apply various tests to be able to identify the microbe properly. By the end of the this contract, I will have separated the 3 unknowns, applied tests to each different colony, then I will be able to identify and describe each of them.
417083	Spring 2019	BIOL 5215U	The effects vary salt concentrations have on the growth of Dictyostelium discoideum	The contract will consist of two students collaborating to create an experiment to test how different salt concentrations affect the growth of Dictyostelium discoideum. In addition, we will also test how the varying salt concentrations affect the growth of the bacteria (which supplies the nutrients to allow the Dictyostelium discoideum to grow). This will allow us to determine if the salt directly or indirectly affects the growth of Dictyostelium discoideum. Topics may include soil salt concentrations, amoeba growth, bacteria growth.
417085	Spring 2019	BIOL 3215K	Measuring Astrocyte Viability When Exposed to Testosterone	Astrocytes are specialized glial cells that are a huge component of the central nervous system. They are responsible for numerous essential, complex functions. For this project, an astrocyte culture will be exposed to a concentration of testosterone. Steroid hormones, like testosterone, are vital to early development and adult life. Although its mechanism has been detailed extensively, its effects on viability of astrocytes have not been explored. The astrocytes will be divided into two groups for observation, which include a control group and a testosterone exposed group. These concentrations will be determined based on experimental methods gathered from similar research publications. To measure astrocyte viability, a trypan B stain will be performed to differentiate living and dead astrocytes under a microscope. The dead cells and living cells will be counted using a cell counter.

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417086	Spring 2019	BIOL 32156K	DNA Barcoding the Orchid Flora of Ecuador	<p>The forests of Ecuador are known for their high levels of diversity and endemism, classifying the country as a biodiversity hotspot. Ecuador has one of the greatest densities of species per area of any country on Earth: it occupies only 0.2% of the Earth's land mass but possesses 10% of its plant species (Rios et al. 2007). The Andean montane forests, in particular, are richly populated with tropical orchid species that, unfortunately, have been little studied. Dr. Kevin Burgess's lab along with collaborators from Pontificia Universidad Católica del Ecuador are attempting to expand current knowledge of the orchid flora of Ecuador by using DNA barcoding. DNA barcoding has been widely used to address questions in ecology, evolution, and conservation biology (Losos 1996; Hebert et al. 2003; Valentini et al. 2008; Chen et al. 2010; Erickson et al. 2014; Muscarella et al. 2014). Currently, the Burgess Lab is working on a project in the Andean forests of Ecuador that involve diverse flora from orchid species. Outcomes from this project will vastly increase global plant biodiversity knowledge and encourage researchers to combine multiple fields of study including taxonomic, phylogenetic, and ethnobotanical information in order to provide new perspectives to these fields. These research projects will also facilitate the building of a DNA barcode sequence library that will enable future barcoding applications not only for the Burgess Lab but for researchers worldwide.</p>