

VAS Fall Undergraduate Research Meeting Awardees

October 28, 2017

Hampden-Sydney College, Hampden-Sydney

Undergraduate Research Grant Recipients

Poster #1

The Genetic Diversity of Apple (*Malus pumila*) Varieties

John Christman

Mentor: Janet Steven, Dept. of Organismal & Environmental Biology, Christopher Newport University

My research will estimate the genetic diversity, or lack thereof, in locally grown apples of Virginia. This project uses microsatellites in conjunction with techniques of statistical analysis in order to quantify levels of diversity across apple varieties and also within them.

Poster #7

Assessment of Zebra Mussel (*Dreissena polymorpha*) Colonization Potential Using Atomic Absorption Spectroscopy

Nick Blankenship and Kyle Haley

Mentor: Tim Durham, Maria Puccio and Delia Heck, Biology, Chemistry & Environmental Science Depts., Ferrum College

By collecting water samples via Van Dorn sampler, analyzing calcium and magnesium concentrations via atomic absorption spectroscopy (AAS), and comparing data from lakes infested with zebra mussels (*Dreissena polymorpha*), it can be determined if Smith Mountain Lake is a suitable habitat for zebra mussels

Poster # 8

Identification of FOXC2 Target Genes in Melanoma through Chromatin Immunoprecipitation

David Bushhouse

Mentor: Kristian M. Hargadon, Biology Dept., Hampden-Sydney College

To determine the gene targets of the FOXC2 transcription factor in B16-F1 melanoma, we are developing a chromatin immunoprecipitation/quantitative PCR assay. We are currently optimizing a protocol to produce consistent enrichment readouts with low background and propose to generate a novel CRISPR-Cas9- engineered FOXC2 knockout variant of wildtype B16-F1 melanoma for use as a negative control in these ChIP-qPCR studies.

Poster # 9**Low Level Atrazine Exposure Effects on Crayfish Development**

Nathan Chandler, Mackenzie Lecher, Austin Minuto, Samuel Owens, Abbie Suttle and Caroline Williams

Mentor: Kyle Harris, Dept. of Biology & Chemistry, Liberty University

Atrazine is a commonly used herbicide that acts as an endocrine disruptor in animal physiology. Its effects on invertebrates, primarily crayfish, is not well understood. This study will examine environmentally relevant concentrations, focused around the EPA limit of 3 µg/L. Morphological and histological data will be examined for signs of feminization and tissue degradation.

Poster # 11**Molecular Insights into Circadian Regulation of p53 Tumor Suppressor Function**

Sarah Jachim and Kelsey O'Hern

Mentor: Carla V. Finkielstein, Dept. of Biological Sciences & Biocomplexity Institute, Virginia Tech

The overall goal of this project is to understand how cells synchronize their division cycle to specific times of the day. To accomplish this, we propose to use a combination of biochemical, cell, and molecular techniques to better define key molecular players and evaluate the impact of cancer-related mutations for the function of the time-sensing signaling process.

Poster # 16**The Effect of Cognitive Stimulation on Senescent Cognitive Decline**

Alexandra Piercy

Mentor: R. Parrish Waters, Dept. of Biological Sciences, University of Mary Washington

The percent of elderly people in the US is increasing, making it important to understand senescent cognitive decline. This study aims to understand the effects of daily cognitive exercise on general cognition, by using a senescent mouse model to compare behavioral and physiological differences between a cognitively stimulated group and control group of mice.

Poster # 19**Characterizations of Terpene Extractions of *Abies fraseri* via GC Mass Spectroscopy**

Taylor Darnell

Mentor: Tim Durham and Laura Grochowski, Biology & Chemistry Depts., Ferrum College

By analyzing terpenes that were extracted from Fraser Fir trees in North Carolina and Virginia, via gas chromatography-mass spectroscopy, elevational differences and soil composition do influence terpene production. All samples were analyzed to determine structural differences in the terpene production levels between North Carolina and Virginia populations.

Poster # 21**Characterization of pH Regulation in *Cryptococcus neoformans***

Kristen I. John

Mentor: Michael Price, Dept. of Biology & Chemistry, Liberty University

Cryptococcus neoformans is an emerging fungal pathogen that is particularly skilled at adapting to its human host in order to avoid being killed by the immune system. One way it does this is by its pH regulation system of the Rim pathway. Four specific genes in this pathway will be characterized through gene deletion constructs and biolistic transformation.

Poster # 25**Sandcastle Worm Inspired Bioadhesive for Musculoskeletal Tissue Repair**

Philip James Mollica III

Mentor: Rupak Dua, Chemistry Dept., Hampden-Sydney College

Bone and tissue adhesives are beneficial and are mostly used as supplement to standards methods of musculoskeletal tissue repair. However, the adhesive that can do the repair all by itself is still a huge challenge. My research project aims to develop a synthetic glue inspired by Sandcastle worm's glue which is strong, quick setting, and functional in an aqueous environment.

Honorable Mention

Poster # 3

Effects of Diosmetin on Apoptosis and Protective Pathways in HEPG2 Cells

Caleb Abel, Jessie Rogers and Nicholas Lehning

Mentor: Gregory Raner, Dept. of Biology & Chemistry, Liberty University

This research will address health benefits that have been ascribed to the Brazilian Acai berry by exploring effects of certain components of the berry on specific genetic and biochemical pathways. Specifically, the flavonoid compound diosmetin, isolated from the acai, will be tested in cell culture to evaluate its influence on antioxidant and other protective pathways, along with apoptosis.

Poster # 18

The Effect of Herbicide on Soil Carbon Respiration in Peatland Soils with Different Hydrology Treatments

Katrina Napora

Mentor: Robert Atkinson, Dept. of Organismal & Environmental Biology, Christopher Newport University

Peatlands sequester carbon and mitigate climate change, but have been drained affecting water table levels. These water levels affect soil aeration and microbial respiration. In addition, selected forest stands were herbicided and replanted. This study seeks to simulate field conditions in soil core microcosms in order to predict the effect of natural resource management on respiration rates.

Poster # 24

DNA Detection by Thiazole Orange: A Safe, Non-damaging Replacement for Ethidium

Casey O'Neil

Mentor: Todd Gruber, Dept. of Molecular Biology & Chemistry, Christopher Newport University

This project investigates thiazole orange as a sensitive DNA detection reagent to replace common dyes such as ethidium bromide and SYBR Safe. It is a promising alternative to other dyes due its high fluorescence intensity, sensitive detection limits, lack of carcinogenic status, low cost, and visibility under blue light as opposed to UV light.