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Honors Research

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Spring 2023 Honors Research

OBERLIN COLLEGE

Sunniva Sheffield

Majors: Chemistry, Biochemistry and Environmental Studies

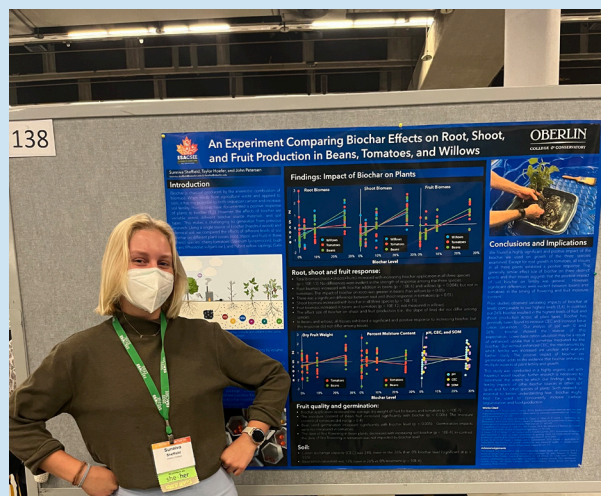
Minor: Spanish Language Studies

Hometown: Rochester, NY

Honors Dept: Environmental Studies

Biochar has positive but distinct impacts on root, shoot, and fruit production in beans, tomatoes, and willows

Biochar is a type of charcoal produced through burning plant material in a no oxygen environment and has been shown to increase soil fertility when added to soils. Our study investigated the effects of biochar (waste wood from a local hazelnut orchard), in an organic soil on different plant tissues (roots, shoots, and fruits) of three distinct species: cherry tomatoes, green beans, and willow saplings. We found a highly significant positive relationship between the amount of biochar added to the soil and total plant biomass in all species, with no significant difference in total biomass response among species.



OBERLIN COLLEGE

Niels Vanderloo

Majors: Physics and Mathematics

Hometown: New York, NY

Honors Dept: Physics

Simulating Plasma Physics to use Nuclear Fusion for Renewable Energy

Producing nuclear fusion on Earth is a promising source of renewable energy without the waste products of nuclear fission or land required for wind or solar power. I study one candidate for a nuclear fusion reactor, the gas-puff Z-pinch, an experiment that uses magnetic fields to compress a jet of gas to high temperatures. I use the FLASH plasma physics simulation code to simulate a gas-puff Z-pinch and have found good agreement with experimental data.



Sophie Qano

Majors: Psychology and Environmental Studies

Hometown: Houston, TX

Honors Dept: Psychology

Are Smartphones Outsmarting Us? Examining the effects that smartphone presence has on connectedness to nature

Social psychology research has documented the effects of smartphones and technology on social interactions and relationships. Research in this field has yet to be done on the effect that smartphones have on other forms of connectedness. My primary research goal is to find out if the presence of a smartphone affects connectedness to nature, in turn disrupting the benefits typically gained from spending time in nature.



HONORS RESEARCH

Larissa Michel

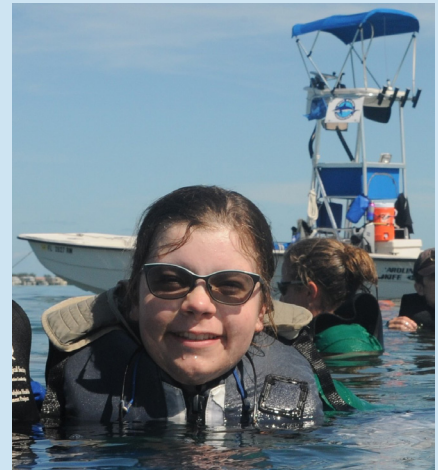
Majors: Biology and Violin Performance

Hometown: Bloomfield, Michigan

Honors Dept: Biology

*Vocal copying responses of bottlenose dolphins (*Tursiops truncatus*) to playbacks of *T. truncatus* whistles*

My research explores whether, and in what contexts, bottlenose dolphins copy other dolphins' whistles. I examine recordings of playback experiments, where previously recorded dolphin whistles (the stimuli) were played to another dolphin, whose vocalization responses were recorded with a hydrophone. I am specifically interested in copy responses to the stimuli, where the dolphin mimicked the pre-recorded whistle. I then analyze the data to determine if there are associations between whistle copying and contextual variables.



HONORS RESEARCH

Cassie Davies

Majors: Biochemistry and Vocal Performance

Minor: Latin

Hometown: Newport News, VA

Honors Dept: Biochemistry

Competitive Activity-Based Protein Profiling of RHBDL2 and RHBDL4 for Inhibitor Discovery

Rhomboid Intramembrane Proteases (RIPs) are a subclass of serine hydrolases that are associated with diseases such as cancer and Alzheimer's disease. However, their physiological functions are not fully characterized. To study these enzymes, we use Activity-Based Protein Profiling (ABPP) technology which utilizes a small molecule probe to monitor their activity. We are employing our ABPP assays for inhibitor discovery of two of these RIPs, RHBDL-4 and RHBDL-2. Selective and potent inhibitors for these two enzymes would be valuable tools for interrogating their biology and assessing their potential to serve as therapeutic targets.

