Science Session Abstracts
Room A2133

9:00–10:00am – Science Session 1 – Biology
Moderator: Dr. Chris Wang, Associate Professor of Biology, Science Co-Chair

The Interaction Between VIG-1 and miRNA in the Maintenance of the Balance Between Proliferation and Differentiation in C. elegans
- Jonathan Brown

This research proposal aims to investigate the interaction between VIG-1 and miRNA in the maintenance of the balance between stem cell proliferation and differentiation in the Caenorhabditis elegans (C. elegans) germ line. Stem cells are essential for tissue replenishment and development, and maintaining the balance between proliferation and differentiation of stem cells is critical for proper functioning. Several genes and proteins have been identified that interact to regulate this balance as well as some miRNAs. The vig-1 gene has been shown to regulate miRNA stability, but the interaction between VIG-1 and miRNA in regulating the balance between proliferation and differentiation has not been studied in detail.

The Interaction of VIG-1 and miRNA to Regulate the Balance Between Proliferation and Differentiation
- Saffron Godard

This research proposal aims to investigate the interaction between VIG-1 and miRNA in the maintenance of the balance between stem cell proliferation and differentiation in the Caenorhabditis elegans (C. elegans) germ line. Stem cells are essential for tissue replenishment and development, and maintaining the balance between proliferation and differentiation of stem cells is critical for proper functioning. Several genes and proteins have been identified that interact to regulate this balance as well as some miRNAs. The vig-1 gene has been shown to regulate miRNA stability, but the interaction between VIG-1 and miRNA in regulating the balance between proliferation and differentiation has not been studied in detail.

10:10–11:10am – Science Session 2 – Chemistry
Moderator: Dr. Liza Abraham, Associate Professor of Chemistry, and Dr. Kristian Caldo

Total Phenolics and Flavonoid Quantification in Edible Albertan Berries
- Annica Creighton

Plants synthesize a variety of compounds known as secondary metabolites. These compounds are termed "secondary metabolites" because although they are needed for plant survival, they do not contribute to growth and development like primary metabolites. The presence of secondary metabolites in a plant species is a useful indicator of species' beneficial uses as secondary metabolites exhibit different bioactivities. The secondary metabolite content of Albertan plants remains largely unexplored. In this study, we explored the possibility of using the Folin-Ciocalteu assay and aluminum chloride method to fill in this knowledge gap by determining the phenolics and flavonoid contents in edible berries.

Investigation of a natural surfactant Sapindus mukorossi, as an all-in-one reducing and protective agent for the green synthesis of silver nanoparticles
- Carter McLenahan

In response to our world's increasing concern about climate change, sustainability and society's overall environmental impact, the desire to find effective alternatives to synthetic chemicals has become a top priority. Unfortunately, many industries commonly use synthetic surfactants that can negatively impact the environment. The saponins found in the pericarp of Sapindus mukorossi, generally referred to as the “Soapnut”, is biodegradable, non-toxic and a plant-based alternative to synthetic surfactants with many of the same unique capabilities. Current research investigates surfactant properties, chemical structure, and environmental remediation potential of the natural saponin found in the Sapindus mukorossi pericarp. This study looks at the utilization of saponin found in the “Soapnuts” pericarp as an all in one reducing and protection agent in the green synthesis of silver nanoparticles (AgNPs).

2:10–3:10pm – Science Session 3 – Environmental Science
Moderator: Dr. Stephen Jeans, Lecturer in Earth and Space Sciences

Undergraduate Science Thinking: Pieces to the Career Puzzle includes Climate Change
- Lucas Cusanelli

This study is of a science undergraduate’s connection among three concepts; origins of interest in science learning, perception of academic disciplines, and options for a career-pathway. First, this investigation confirms that life experiences and mentors (primarily parents) substantially help with piecing together a concept of science as a career–a view supported by research literature. Second, university disciplines are intriguing, including ecology, math, physics, biology, and chemistry, but initially might not provide career paths (especially in pandemic chaos). With exploration, however, a student can rethink the conception of disciplines and throwing away misconceptions to begin career planning. Third, environmental science is found to be multidisciplinary, an area to ground an independent study project. Connecting the original science interest with a better understanding of academic disciplines is motivating (even addicting). These richer

inner thought processes around science careers are, therefore, revealed through the types of topics chosen. Examples will be discussed.

More than Climate Change: Finding Passion for Multidisciplinary Science through Subsidiarity

- Sierra Menchini-McHugh

Our duty as citizens, is to understand the environment around us to help conserve and preserve the Earth we were given. Subsidiarity, a faith concept, could instill in individuals a passion for academic interest and action on issues such as climate change. However, it seems as though learning (in the transition from high school to university specifically) is repetitive and narrows study into fields, reducing interconnection and citizen science. This inquiry, of the author's own experience, connects multiple interests in academics, e.g., environmental science, history, and business, to help bridge the gap between geosciences and knowledge that empowers stakeholders. Developing a project that shows people why they should care for environmental science, and resources that humans use, needs to be from social, political, and scientific perspectives in a multidisciplinary study. Raising the question of what university-based sustainability education project might best engage citizen science and empower active environmental science?

Climate Change and the Christian university: Geo-environmental education leads to action

- Dr. Stephen Jeans

Through parents, teachers, professors, or experience, undergraduates in sciences are aware of increasing environmental concerns and demand for more professionals. Additionally, most identify "doing good" as their career focus, especially within a liberal-arts Christian university and community. Passion, however, is just part of choosing a career pathway. Anthropogenic threats require action at all levels, but university programs of Earth and Space Science need to better address the literacy problem--of students with limited exposure to geo-environmental sciences. Exposing undergraduates to research through mentorship, by putting science into action, much like the principle of subsidiarity, gives the right and power of choice to the undergraduate. Therefore, can the teaching of inter-transdisciplinarity (to have undergraduates apply course knowledge to local real-world issues, and, as a discipline, incorporate other fields that include social factors) result in deeper engagement with curriculum, spark innovation, and give a richer science career focus that includes sustainability?