

Participant Abstracts

EMU Academic and Creative Excellence Festival 2019

(Listing is in alphabetical order by presenter's last name)

Oral Presentations

Environmental Audit

Travis Abele

Faculty mentor: Leaman, Jim

I will be conducting an environmental audit of my life. This means collecting data on my family and household including the use of gas, heating oil, food, and electricity. After gathering information, I will break down the analysis of these topics and compare and contrast them against national and regional averages. Finally, I will make decisions on how to make changes to better my current footprint on the world.

Complementary Therapy in Chronic Pain Management: An Answer to the Call of Wholism

Marina Baker with Danielle Davidson, Amber Dodson

Faculty mentor: Lisa Burkholder

Chronic pain is one of the most common reasons adults seek medical care, and a direct link to decreased mobility, anxiety, depression, and reduced quality of life. It affects 20% of America's adults (Dahlhamer et. al., 2015). It also is a significant cause of opioid dependence. In the stifling climate of the opioid epidemic, where 130 US citizens die of an opioid overdose every day and 80% of heroin users started their journey with prescribed opioids (NIDA, 2019), pain treatment and management must be reevaluated.

It is the nurse's role to be a part of that evaluation, as the American Nurses Association (ANA) (2018) states "nurse leadership is necessary for society to appropriately address the opioid epidemic" (para. 2). Healthy People 2020 has voiced a goal to "decrease the prevalence of adults having high-impact chronic pain," (Dahlhamer, 2018). These priorities and goals will be shared and addressed by future nurse leaders in this presentation.

Complementary therapies including therapeutic touch, pet-assisted therapy, acupuncture, and oils, including cannabidiol (CBD) are evidence based complements to pharmacological analgesics and can reduce the amount needed opioids. This presentation will serve as a review of the literature, the science of pain, as well as ways patients and nurses can treat pain in more ways than one.

It is the nurse's responsibility to advocate for the whole client, not just a client's symptoms. As stated by the ANA (2018) "Nurses have an ethical responsibility to relieve pain and the suffering it causes" (para. 2). At Eastern Mennonite University, nurses not only answer to their ethical call summarized by the ANA, but also to EMU's sacred covenant. The covenant serves as the faith-based foundation for the addiction-free, pain-free, healthy community that is desired. Education of those on EMU's campus, the Harrisonburg region, and beyond is just the beginning.

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¿Por qué Vienen? (Why do they come?) : A look into immigration into the United States

Raul Baltazar Mendoza

Faculty mentor: Rojas, Adriana

¿Por qué Vienen? (Why do they come?) : A look into immigration into the United States

Raul Baltazar Mendoza

Faculty Mentor: Dra. Adriana Rojas

When we don't know the situation of a certain group of people. There are one of two things that happen. We either choose to ignore it or learn more about. Immigration into the US is one of those topics. The reason being that it's not a topic that either side wants to talk about in conversation rather in how it's portrayed through various media outlets. The problem with this is that it causes conversations of hate and not of understanding. This paper informs the reader of immigration to the US from two countries, México and El Salvador. It provides an overview of the waves of immigration from these two countries and the reason for past, current, and future migration. In this paper, I examine these broad situations, but also bring focus to personal stories. Rather than just statistics and charts this paper also includes an interview with two women who came to the US. One who is currently in the US and one who isn't. This interview is also shown in a visual medium, specifically, a documentary can better communicate some of the personal stories of immigration. Therefore leading to conversations with questions like, "why do they come?" or "what can we do to help?" Rather than just hearing about it and simply ignoring it, I hope to create a space of understanding and starting that conversation.

Voter Suppression and Identification Laws: Why Is Participation Being Stifled?

Christopher Bennett

Faculty mentor: Hurst, Carol

This presentation explores the social problem of voter suppression and many of the methods of suppression, but more closely it examines state voter identification laws. Understanding the history of oppressive laws meant to disenfranchise certain populations, we see that the modern day methods of those laws are no different in their aim, it remains a measure meant to silence a voice or larger population. Included in this paper is a description and history of the social problem, why it remains a tool used to stifle certain groups of people, and why some groups are so transparent in their application of this form of discrimination. In addition, an analysis of the economic consequences inflicted upon those impacted by these policies is probed. As more is discovered there will be an explanation of the political ramifications of these policies, including who is set to benefit from these, as well as recent examples of alleged instances of voter

suppression and clear cut attempts from around the country. Finally, the presentation will analyze the policy of voter identification laws and other voter suppression tactics and we will further analyze them through the lens of sustainability. What will it mean to future generations of voters if we maintain this system of oppression? This presentation will endeavor to answer that question.

Healing of Wounds? Analyzing the Unite-the-Right Rally of August 12, 2017 Through a Reconciliatory Faith-Based Lens

Victoria Billups

Faculty mentor: Kim, Ji Eun & Sprunger, Mary

Although the Unite-the-Right Rally on August 12, 2017, reflected the escalation of racist ideologies, resulting in numerous casualties and injuries, Charlottesville continues to move forward through the reconciliatory efforts taken by the Charlottesville Clergy Collective. Comprised of 29 different Faith Groups in Charlottesville, the Charlottesville Clergy Collective represents a variety of different faith perspectives on issues involving social justice, peacebuilding, and race. The primary reconciliatory efforts that the Charlottesville Clergy Collective has worked on since the Unite-the-Right Rally include collaboration with the Charlottesville affiliate group of Coming to the Table, the Pilgrimage from Charlottesville to Jamestown, the Interfaith Worship Service that took place at the One-Year Anniversary of the event, and conversations toward reconciliation. Through these reconciliation efforts, the Charlottesville Clergy Collective has been able to build more positive relationships between different faith groups in Charlottesville, better understand and evaluate systemic racism within different faith groups in Charlottesville, and better understand historical biases on issues of race in Charlottesville and in the U.S. Until historical biases and ideological principles like systemic racism can be recognized, racism in America will continue to be implemented through Institutions and through hate crimes like the Unite-the-Right Rally.

Teaching probability: Math in a special education resource setting

Mallory Bontreger

Faculty mentor: Wheatley, Barbara

The Documentation of Student Learning project involves the creation and implementation of a full unit of learning. The primary objective is to document student learning from beginning to end of the unit in order to measure student success. The unit I created focused on the Math 5.15 Virginia Standard of Learning which states, "The student will determine the probability of an outcome by constructing a sample space or using the Fundamental (basic) Counting Principle." I taught this unit to five fifth grade students in a special education resource setting over the course of two weeks. The five students have a range of disabilities, including specific learning disabilities, multiple disabilities, and emotional disabilities. In order to provide a clear direction and purpose for learning, I created multiple overall unit objectives and several learning objectives for each lesson taught. To best assist students in achieving the academic goals for this unit and to help them overcome any obstacles from their disabilities, I provided a variety of differentiation strategies to cater to each of their unique needs. In addition, I administered a pre-assessment and post-assessment to measure student growth and success. Overall, the careful documentation and reflection that came out of this process provided evidence of

student learning and insight into best teaching practices to use for several of the students in the future.

Digital Anabaptism: Anabaptist Responses to Technology Addiction and Social Networking

Solomon Brenneman

Faculty mentor: Sawin, Mark

The technological revolution has played a critical role in society's changing values and forms of expression. The changes happen so rapidly that we rarely (if ever) pause to reflect on the good and the bad, let alone plan for how to engage with future technological improvements. North American society (and arguably the rest of the world) is quickly aligning itself with some sort of cyborg future where humans and technology not only coexist but are codependent on one another. This future is potentially already here without our even realizing.

At one point in time, Mennonites valued separatism, a complete neglect of secular American values. Do our Mennonite values call us to abstain from technology? What is the Mennonite response to a cyborg future? Do Mennonites have anything to add to the conversation about how to build a healthy society using the technological tools available to us? Can we produce a Mennonite digital ethic which addresses the problems technology causes such as screen time addiction, the disintegration of offline communities, and social networking divisiveness?

These are the questions I have been exploring over the past semester. Unfortunately, there has been very little written on Anabaptists and technology which means this report is an exploration into uncharted territory. Most of the literature involved comes from growing secular explorations of healthy technological habits which I connect with Mennonite values such as Restorative Justice, love for enemies and anti-materialism.

This semester has been a personal journey of fighting my technology addiction, journaling, reading, studying and meditating. All of which culminated in a written work called "An Anabaptist Pocket Guide to Digital Detoxing and Healthy Social Networking". My presentation will outline the ideas in this written piece.

Cooking Mennonites: A Half-Century of Mennonite Change Through the Lens of Mennonite Cuisine

Solomon Brenneman

Faculty mentor: Kim, Ji Eun & Sprunger, Mary

Viewing culture through the material objects of importance can provide a solid basis for reflecting cultural ideology. Though historically Mennonites have emphasized anti-materialism, this does not mean that a study of Mennonite materiality will not provide ample discourse around Mennonite identity and values. The most abundant aspect of Mennonite cultural distinctness today is Mennonite cuisine. Just as it is difficult to define the term Mennonite, given a history of ideological duality as well as recent Mennonite globalism, it is also difficult to define Mennonite cuisine. However, due to their democratic nature, Mennonite cookbooks reflect changes in Mennonite identity over the past 7 decades (the span of time in which three major cookbooks were published) the most significant aspects of which are globalism, feminism, and environmentalism.

This research paper looks at the three major cookbooks published in the Mennonite world from the "Mennonite Community Cookbook" published in 1950 to "More With Less" published in 1972, all the way to "Simply in Season" published in 2007. The recipes from one cookbook to another show drastic changes in Mennonite cookery. Why did Mennonite cuisine change so rapidly over the past half a century? Did it simply reflect or did the changing cuisine have an impact on Mennonite Values? Does the current Mennonite consensus on food (the local food movement represented by "Simply in Season") complete the transition? These are the questions addressed in the paper and the presentation will give a brief summary of the research paper itself.

The exploration of emergency department use as primary care

Lauren Brintzenhofe with Audrey Martin, Joleah Hamilton, Kayla Sauder

Faculty mentor: Burkholder, Lisa

Over the years, a cycle of improper emergency department (ED) use has emerged in the United States, which has led to diminished health outcomes for many Americans. Current research shows the ED is being overused for non-urgent care. In 2015, the Center for Disease Control and Prevention (CDC) reported that 35.4% of patients that received care in an ED were there for less than 15 minutes and only 9% of those patients were admitted to the hospital. This poses a problem because hospital resources and staff are being used to address non-urgent health needs. One of the major contributing factors to this problem is availability and accessibility of primary care services (Wang et al., 2015). A few other barriers include lack of transportation, inadequate insurance, presence of chronic disease, and insufficient understanding and knowledge of how the United States healthcare system works. This presentation will explore specific evidenced-based interventions to reduce the number of ED visits for primary care concerns and encourage greater use of primary care providers (PCPs) and other community resources. Overall, these interventions aim to increase PCP use, decrease barriers to accessing primary care, provide patient education, and help patients navigate the healthcare system. This presentation will address the nurse's role in reducing non-urgent ED use. By raising awareness of this issue, we hope to empower nurses, other members of the multidisciplinary team, and residents of the Harrisonburg community to work together to be a part of the solution to create the necessary change.

Improving culturally informed care for LGBTQ+ clients

Abby Byler with Esther Ghale, Anna Gibbs, Haley Kuehle

Faculty mentor: Burkholder, Lisa

"Improving culturally informed care for LGBTQ+ clients" by Abby Byler, Esther Ghale, Anna Gibbs, and Haley Kuehle

Gender and sexuality has been a topic of discussion for centuries now. As this topic has been shaped and brought to light, it has influenced the way through which we see ourselves and others. Because of the vast history of the LGBTQ+ community, many still face inequalities in our society today, particularly in the healthcare industry. Our goal of this presentation is to inform and educate our community about improving culturally informed care for the LGBTQ+ population.

We want to share with all of EMU's community about this topic to align with EMU's goals for inclusivity and diversity. As future healthcare professionals and active community members, we want to share in giving a voice and platform to a marginalized population in order to promote a healthy community. We recognize and welcome that as a group, we are all on a spectrum of experience and exposure to the topic of gender and sexuality preferences.

Our purpose is to present evidence based research on this topic through an extensive literature review. From our research, we found that the barriers of LGBTQ+ healthcare include past negative healthcare experiences, fear and/or anxiety about social stigmas, not knowing whether gender and sexuality disclosure is necessary, and lack of health competency by healthcare professionals. All of these barriers affect the patient healthcare relationship, which can lead to poorer health outcomes. This correlates with multiple personal interviews with members of LGBTQ+ and EMU community. We acknowledge that while our presentation is informative, it did not cover all aspects of LGBTQ+ health and culture. If we are given this opportunity to present our topic our hope would be to continue this conversation with our peers, faculty, and community.

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The Hysterical Grief of Septimus Warren Smith and Clarissa Dalloway

Lydia Chappell Deckert

Faculty mentor: Eads, Martha

Hysteria's root, found in such words as "Hysterectomy," display its association with female embodiment; many use the term to describe uncontrollable waves of emotion sometimes attributed to women. Virginia Woolf critiques gendered prescriptions, such as the experience of grief, in both *A Room Of One's Own* (1929) and *Mrs. Dalloway* (1925). Woolf argues in *A Room Of One's Own* that the patriarchal structure of England in her day must be reexamined. In *Mrs. Dalloway*, Woolf focuses specifically on the systematic prescription of grief. Through the

examination of both Clarissa Dalloway and Septimus Warren Smith, two parallel characters in *Mrs. Dalloway*, Woolf challenges the reader to understand the dangers of gendering grief by meditating on memory, collective trauma, systems of oppression, and self-harm.

Stories from the bedside: Living the Sacred Covenant

Danielle Davidson with Joy Driver, Tarsha Baker, Aaron Gusler, Kaitlyn Klager

Faculty mentor: Yoder, Laura

Clinical Nursing Students will share short professional exemplars of living the Sacred Covenant Model for Nursing. The session will be introduced with a summary of the Sacred Covenant Model and close with summary reflections by a senior nursing student.

Park Woods Project: BMPs For Stormwater Management

John Dudley with Ethan Mathews

Faculty mentor: Yoder, Jim

some cultures do not change and their belief is to continue the traditions of their ancestors. Simon Denyer stated that Japan has killed more than 1,500 sei whales in the last 16 years. With rules and regulation with “fishing” the whale catchers stated that the whales that were killed were for research. With suspicion, the regulators decided to track the whales after the slaughter and determined that they were not for research. The whales were tracked throughout the cities and was being sold in restaurants. The Sei whale was on the verge of extinction a few decades ago but made a turnaround. However, the Sei whale has on the endangered species list currently. The illegal killing of the whales, or any species, hurts the population and can, like the whales, cause the species to be endangered. Even though some cultures stay within their norm, it is important that the regulators work with cultures that stick to their norms. The whales provide food for lower income countries that have adapted to do whatever it takes to not only feed themselves and their families but the community as well. This is why poaching becomes a huge concern.

UNTITLED

William Ewart with Isaac Longacre, Anna Ressler, Andrew Stoltzfus, Christian Stutzman

Faculty mentor: Holsopple, Jerry

This is a senior show short film. Here is the synopsis; Mike and Alice are third years at a university and share a class. They do not know each other until they are paired for a class project. They also share the class with a young woman who was in a relationship with Mike and is now spreading lies about him. They plan on meeting at a local coffee shop to work on the project. It is during these meetings that Mike develops a crush on Alice. He has been alone for a while because he had been secluding himself from other people. They get into a rhythm and Mike thinks things are going great between them, but one night Alice shows up with a guy holding hands, this is her boyfriend. Mike chooses to let his crush go. Not long after he sees Alice's boyfriend drop her off at school. He is arguing with her about her college education being a waste of time. She enjoys college and excels in her studies. Mike wants to help her, so he turns to writing a letter explaining his thoughts. Mike delivers the letter after one of their work nights. It is the next day that Alice chooses to leave her boyfriend. Mike shows up for their next work night but she did not show up, thinking that he had offended her he leaves early to find

her outside. She thanks him, and seeing the letter in her hands figures out what happened and asks if she would like to have some coffee sometime. Roll credits.

Perception of the LGBTQ+ Community in Guantanamo, Cuba.

Emilio Fajardo

Faculty mentor: Rojas, Adriana

Since the turn of the century, the continuous effort to eradicate gender discrimination has been winning battles. Our society is moving towards receptiveness and inclusiveness. Unfortunately, this progressivist movement has gotten opposition and it hasn't reached global acceptance. My country of birth, Cuba, is among those places in which sexuality is only seen as a rigid binary structure. Moreover, people's perception goes beyond mere ideas; the mistreatment, segregation, and exclusion of the LGBTQ+ community are tangible. Even though multiple initiatives to achieve gender equality have been carried out by some institutions, the wide majority of Cubans still believe that homosexuality is not acceptable in their society. This research was conducted with the purpose of giving voice to those who suffer in silence the conundrum of social displacement due to their sexuality. For this research, we interviewed not only members of the LGBTQ+ community but also experts in the sociological and medical field to examine the current relationship between this community and the society at large. We identify that the main driver against the LGBTQ+ community is toxic masculinity and intrinsic homophobia pass down through generations.

Design and Implementation of a Subsonic Educational Wind Tunnel

Dylan Grove

Faculty mentor: Tian, Esther

With the birth of EMU's new Engineering program comes the need for new workspaces, tools, and lab equipment. One such necessary piece of test machinery is a low-speed wind tunnel to be used in testing lift and drag properties of scale-model planes, wings, cars, and other objects. This equipment is essential for engineering students taking the Fluid Mechanics course, set to be offered for the first time next year. Senior Dylan Grove took on the design of such a machine for his Senior Capstone Project.

People have been building wind tunnels for many years, whether for research, prototyping, or hobby. Designs range from simple, square, plywood construction to massive, complex, highly controlled systems like NASA operates. Subsonic tunnels, like this one, operate below the speed of sound and are simpler to build than supersonic tunnels. While a few variations of subsonic tunnels exist, the configuration chosen for this project is a 12-foot pull-through tunnel which places the fan at the outlet and sucks air through the chamber. Air enters through the inlet, is conditioned and accelerated, passes through the test chamber, is decelerated, and then passes through the fan before being ejected back into the laboratory. Bernoulli's principle, along with the law of conservation of mass, is the guiding principle in the shape and function of the wind tunnel. A second major descriptor is the Reynold's number of the flow which indicates the amount of turbulence in the air. Minimizing this metric is the goal.

This presentation will outline the basics of the governing principles of aerodynamics, describe the operation of such a wind tunnel, detail the design objectives and constraints,

communicate the process of design, and summarize all that has been learned throughout the process.

Thanks to all who have contributed time, money, ideas, and resources to the project!

How to Build Controversial Facilities on EMU's Campus

Adam Harnish

Faculty mentor: Kim, Ji Eun & Sprunger, Mary

If you find yourself as an administrator of Eastern Mennonite University, how should you go about building a facility on campus that is vehemently opposed by students, faculty and staff? This paper offers a how-to guide on securing funding, managing public relations, and ultimately breaking ground with your wildly unpopular project. Three case studies will be examined in this paper: the construction of the Discipleship Center in the early 1970s, the turf field in the late 1980s, and the University Commons of the 1990s and 2000s. The recurring factors that cultivate widespread backlash from the EMU community are individual "loaded" donations funding the project, a worldly intention for the facility that does not reflect the university's Mennonite values, and a refusal to include students and faculty in the decision-making process. By combining these characteristics with a staunch determination to break ground on the project as soon as possible, you'll be well on your way to installing your very own controversial facility on EMU's campus.

The effects of student engagement on retention in STEM programs at EMU.

Mario Hernández

Faculty mentor: Yoder, Jim

Interest in STEM (Science, Technology, Education, and Science) majors at colleges and universities across the United States has increased in recent years. Students in these field face a rigorous and taxing curriculum, often resulting in lower retention rates within STEM programs. At EMU, the student population interested in pursuing STEM programs has exhibited an increase in its proportion of first generation students (FG) and underrepresented minorities (URM). There is also interest by faculty in improving STEM retention rates. This study seeks to determine the likelihood of FG and URM status impacting retention rates of first year STEM students and, more specifically, the role of student engagement in the decision to remain in a STEM program. We utilized measures of student engagement collected through the NSSE (National Survey of Student Engagement) along with demographic and first year STEM retention data of first year students from three years (2012, 2014, and 2016) in a multiple linear regression analysis. One goal of STEM faculty is to provide support and resources to ensure student success in STEM programs. Insights from this analysis should be useful to faculty in designing specific strategies based on the student engagement characteristics of FG and URM students, with the goal of improving overall retention in STEM at EMU.

A New Way of Dealing with Adversity: A Critique of the Arthurdale Experimental Community

Mario Hernández

Faculty mentor: Kim, Ji Eun & Sprunger, Mary

Just over the mountains in West Virginia, you can find a town named Arthurdale with an unknown and unusual past. In 1933, amidst the Great Depression, Eleanor Roosevelt designed

what was called the “Arthurdale Experiment” under the New Deal. With backing from the federal government, Roosevelt created the experimental community of Arthurdale to improve the state of local mining communities that had been struck with unemployment and poverty. This government-issued community was truly a unique environment to live in—a place enveloped by Progressive ideals of education and labor, but plagued with crises and concerns. This presentation will look at what made the Arthurdale community special, what led to the eventual cancellation of Roosevelt’s “Experiment,” what it means for the government to create a “community”, and whether or not we can call the Arthurdale Experiment a successful one.

The Choice Between Career and Family in Dorothy L. Sayers's GAUDY NIGHT

Josh Holsapple

Faculty mentor: Eads, Martha

Although Dorothy L. Sayers and Virginia Woolf would have agreed on numerous issues relating to women and academia, Dorothy L. Sayers provides a more holistic view of female potential. In *Gaudy Night* (1935), one of the most famous of Sayers’s Lord Peter Wimsey detective novels, Sayers portrays a number of woman scholars in different walks of life. Her feminism echoes to some degree Woolf’s in *A Room of One’s Own* (1929), but she does not criticize women who chose a domestic life. Rather, she condemns the bitterness Annie Wilson feels towards female academics, which echoes Woolf’s bitterness towards male elitism in academia.

Across the Water

Josh Holsapple

Faculty mentor: Gusler, Chad

Across the Water offers a glimpse into the relationship of a man and his niece as they travel together. This story finds them attempting to cross a river—a much more difficult task than one might expect—and shows how both of them fill the roles of teacher and learner in different ways and at different times.

A Social Work Study on College Campus Environments for Students with Autism

Rebekah Hoskins

Faculty mentor: Pannell, Melody

This paper looks at what affects the campus environment for students with autism. Extensive researcher has common findings on what opens the learning environment for these students. This paper will also consider community agencies and how social work relates to this topic.

Feminist Links to Virginia Woolf in Dorothy L. Sayers's STRONG POISON

Terry Jones

Faculty mentor: Eads, Martha

Feminism linking in *Strong Poison* through Virginia Woolf
Terry Jones

Dorothy L. Sayers’s novel *Strong Poison* (1930) depicts a woman framed for a crime she has not committed; Virginia Woolf’s extended essay *Three Guineas* (1938) helps explain the situation Sayers dramatized in her novel, in which only men pose around a white-wigged male judge.

Woolf would find this expose of institutionalized patriarchy both appealing and dissatisfying. Woolf explains this situation directly, while Sayers offers a fictionalized account in which Vane must prove her innocence to men.

The Effects of Solitary Confinement

Jakya Jones

Faculty mentor: Hurst, Carol

In the United States, we lead the world in the number of juveniles and adults we incarcerate. The effects of this are long lasting and detrimental to the development of all in confinement. However, the effects we induce on juveniles can be considered child abuse. In this presentation I will define solitary confinement, trace its historical roots, and discuss the prevalence of the contemporary use. I will also discuss House Bill 1642, proposed in 2019, which will allow more accurate documentation of the use of solitary confinement for isolated prisoners. It's goal to be able to stop the deterioration of these prisoner and rehabilitate as successfully as possible. I will end with explaining how important it is to advocate for changes like these, through means of your local delegate and senator. Using my own experiences visiting the Virginia General Assembly.

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Virginia Woolf and Dorothy L. Sayers and the Church

Abraham Kamau

Faculty mentor: Eads, Martha

Twentieth century British writers Virginia Woolf and Dorothy L. Sayers both wrote based upon their feminist convictions. Despite this similarity, their works have significant differences based on their different relationships to Christianity. While Woolf's works questioned faith in a way that challenges traditional Christian teaching. Sayers emphasized and wrote in support of Christian teaching. Although Dorothy L. Sayers was too casual in the way that she handled language, she tries to make Christianity winsome in *THE MAN BORN TO BE KING*. In *THREE GUINEAS* however, Virginia Woolf implicates Christianity and the church in war. She suggests that St. Paul's teachings about women's covering their hair and keeping silent in church helped build the framework in which women are and were repressed and men use their power to promote war.

ISSUES OF GUN VIOLENCE

Abraham Kamau

Faculty mentor: Hurst, Carol

Leiyen Kariuki

Social Work

Issues of Gun Control.

Throughout history, Guns have always been synonymous with political advantage, dominance, murder, and ultimately power. Despite the fact that Anglo-Saxons and European explorers of old were significantly low in population tallies as compared to the other countries, their early mastery of the firearm gave them huge advantages over the other nations. Guns, historically, have almost never served the purpose of protection, mostly forceful dominance of masses. Fast forward to 2019, Guns have never been so rampant like our present day. As an African, I was fairly ignorant of the matters concerning Gun control as civilians are not allowed to generally carry guns. As a result, a sense of safety accompanied me wherever I went.

The issue of gun control, with a focus on the western countries, has been a topic of heated debate over the past several years. Mass shootings, murder rates, and repeated large-scale homicides have forced governments like the United States government to reconsider the people's rights to carry firearms. On this contrary, there have been a couple of bills laid down before the 2019 Virginia General Assembly with the aims of manifesting at least a reduction with the hope of a stop to gun violence. During this presentation, we shall be looking at this predicament and facts that lead to its rise and what actions should be done. Finally, whether we should allow the possession of guns among civilians.

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THE PROBLEM OF EVIL IN A SECULARIZED WORLD

Yonas Ketsela

Faculty mentor: Dula, Peter

In our modern era, most of our activities seem to be far away from the reality of our world, we are constantly haunted by the idea of our humanity. Our scientific understanding and rationality seemed to fade away when it comes to the nature of our own self. Are we good or evil by nature? Our world is getting more and more complicated in many aspects of its nature. Science seems to win the race but along the way many questions are arising from our experience of reality. In the News, daily we hear the killing of people and many other tragedies. There are some tragedies we can rationally understand and relate to the wrongdoing in some degree. There are also some tragedies that we find it difficult to relate to, to rationalize and even to comprehend. The historian Jeffrey Russell called this phenomenon, "Radical evil." It is the tragedy we call "evil" because we cannot comprehend it or it is beyond our imagination. For instance, the killing of nine black church members by Dylann Roof in South Carolina; the ISIS beheadings of twenty Ethiopian Christians in Libya; the Holocaust, 9/11, and countless massacres in every part of the world. These incidents are hard to process in our minds. They grieve us deeply. But what can we do about it? How can we even try to understand them? Who is responsible for this? In this research paper, I will explore the problem of evil in our world from the perspective of the Christian community. Especially, in the Western tradition, some Christians disregarded the Devil that the gospel warned us to be cautious about. This unbelief in the existence of the Devil, I will argue, disrupts many aspects of Christian community.

Clara Schumann: A True Pioneer of 19th Century Music

Kiara Kiah

Faculty mentor: Berry, David

In today's society, we often equate greatness with an individual's accomplishments, and their titles are often used as markers of success. Unfortunately, this measure is not always applied equally for women. Discrimination of this kind is particularly evident in the case of female musicians in the 19th century. Female composer, Clara Schumann, was one of the most talented musicians of the Romantic era. She was a gifted pianist, teacher, editor, mother, and wife of renowned composer, Robert Schumann. However, because of Clara's gender, many of her accomplishments have not been brought to light or celebrated like those of her male counterparts. Clara published many works such as piano pieces, lieder, part songs, canons, chamber music works, and orchestral compositions. Her early career flourished, however once she married Robert it was put on hold. While she did have a happy marriage in many ways, Robert's career came first and having the responsibility of raising seven children, left her with little to no time for her own music. However, Clara's music eventually had to become the main source of income for their family once her husband became sick. Clara Schumann has been influential to the 19th century and to women in her ability to balance life as a concert pianist, composer, mother, and wife, all in a male-dominated 19th century music world. This

presentation will examine Clara's piece, "Er ist gekommen," which not only reveals her compositional genius, but can also be seen as a reflection of her life.

Changing Beliefs: An Empirical Study of College Student Religiosity and Spirituality

Andy King

Faculty mentor: Holsinger, Jenni

The epistemological conflict narrative states that religion and science cannot coexist and therefore that students who achieve a college education will experience belief change over the course of their undergraduate career. The purpose of this study is to examine the effects of higher education on the religious and spiritual beliefs of undergraduate students at a private, religiously affiliated university. To explore this I developed and distributed an electronic survey based on questions used in previous research to measure the norms and values associated with religiosity, spirituality and what constitutes belief change. I discuss findings from the data about belief change between the freshman and senior years. I also discuss ways this might inform how we view spiritual/religious events at Eastern Mennonite University.

The White Underbelly of Lynching

Yasmiene Mabrouk

Faculty mentor: Seidel, Tim

While there has been work done to collect oral histories of African-American experiences of lynching, there has not been similar work in collecting the stories of white people who participating in lynching. This is understandable because, at this point in time, it would mean admitting to a criminal act that no longer has the widespread acceptance that it once did. In this project, I explore the white experience of lynching, in order to take the first step of the Transforming Historical Harms framework, "Facing History." Hooker & Potter (2013) explain that Facing History requires that: "The history of harm often has to be uncovered, inaccuracies, myths and lies need to be identified and, because it relates to a societal event, people from the different groups involved in the historical harm need to be involved in researching and recounting it." As a white and middle-eastern person, I will look into my families' histories to better understand my own connection to lynching in the U.S. Photographs, notes on postcards and newspaper articles will give insight to white people's experiences at the time of lynching. Photographs and postcards indicate that lynchings were moments of pride and, sometimes, pleasure for participants. Looking back, it is hard to understand how people could enjoy such horrific incidents. In order to deal with the harm of these tortures and killings and to prevent their recurrence, we need to develop a narrative that explains how they happened. This project explores the myths, lies and facts to get at the truth of what happened, while also acknowledging that it is sometimes impossible to find the whole "truth" of a historical harm. Personal experience will be woven with theory, facts and others' stories to provide a holistic approach.

The Decolonizing of Puerto Rico

Alicia Maldonado-Zahra

Faculty mentor: Rhodes, Gloria

I can tell you from experience that not many people know of Puerto Rico, much less that Puerto Rico is a “commonwealth” of the United States. Those who do know of Puerto Rico don’t know the colonial history of the island and it’s rather recent economic, political and civil struggles. Rather, they know about the hurricanes that pummelled and destroyed the island in 2017. In this paper I seek to inform you of the history of Puerto Rico and the island’s current situation. Finally, informing the reader of a solution through “food sovereignty” which aims to help in the decolonization of Puerto Rico, as well as bring some autonomy to the island.

Men, Women, and the Room

Gwen Mallow

Faculty mentor: Eads, Martha

Although many critics view Virginia Woolf’s *Jacob’s Room* (1922) as a stream-of-consciousness *Bildungsroman* of a young Jacob Flanders, Woolf brings the stream of thought together to create a serious critique on war and the roles men and women play in the culture of war. In the pursuit of rooms, women struggle to establish space for themselves, whereas men easily obtain the room and abuse it; war features men as its main proponents and participants. Therefore, war is inherently masculine and perpetuated by the hegemony of the patriarchy. *Jacob’s Room* does not, however, bring forth the critique blatantly, but rather through the ambiguity of Jacob and the flashes of text in which he exists. In *Three Guineas* (1938), Woolf addresses the question, “[h]ow does one prevent a war?”; the answer, it seems, is to give women the room beyond that of the household. Jacob and men of his day have the room women are denied, and as subsequence plunge the greater world into a war from which recovery is not fully achieved. To alter the rooms of masculinity and femininity is to prevent physical deaths like Jacob’s and historical deaths like those of the professional woman, thus answering the question posed in *Three Guineas* and promoting the notion of having a room, a space of one’s own in *A Room of One’s Own* (1929).

What it Means to Be a Woman in Jane Austen’s SENSE AND SENSIBILITY

Anali Martin

Faculty mentor: Eads, Martha

Although Jane Austen’s *SENSE AND SENSIBILITY* (1811) has received critique for its strict moral teachings, Austen’s female relationships, ruled by convention and propriety, bring *SENSE AND SENSIBILITY* into the realm of Virginia Woolf. Reading *SENSE AND SENSIBILITY* through Virginia Woolf’s *A ROOM OF ONE’S OWN* (1929) helps readers appreciate Austen’s novel for its comprehensive view of woman-to-woman relationships. Austen develops her characters within their social context, thus Austen uses polite society to frame individual characters and critique social establishments. Austen’s in-depth development of female characters compares with the introduction of “Chloe-and-Olivia” relationships in *A ROOM OF ONE’S OWN* and Austen’s defense of women through iconoclasm mirrors Woolf’s own. Looking through a female-centered lens, Austen establishes dynamic relationships among women that Woolf would inherently support.

Famous Americans

Taylor Martin

Faculty mentor: Shultz, Ron

In the first eight weeks of the 2019 spring semester, second graders from a local public elementary school learned about ten famous Americans that helped change the lives of Americans forever. This unit follows the Virginia Standard of Learning 2.4, which requires the students to understand the major contributions of the following Americans: Benjamin Franklin, Abraham Lincoln, George Washington Carver, Helen Keller, Thurgood Marshall, Rosa Parks, Jackie Robinson, Cesar Chavez, and Martin Luther King, Jr. A few of the activities these eighteen students participated in involved leading a march, playing baseball, acting out skits, and designing their own inventions. The purpose of these activities was to motivate the students to learn about why each of them are considered famous Americans. The students discovered a common theme among these great leaders, which was they all devoted their lives to helping others. This documentation of student learning project provides information on the school/classroom learning atmosphere, how each lesson was taught, and specific assessment strategies that were used to track the students' progress.

Stories Through Food - A Collaborative Cookbook

Sylvia Mast

Faculty mentor: Mullet, Judy

This project will result in the creation of a recipe book answering the question, "where does our food come from?" Though many recipe books address this question through farm-to-table compilations, this book aims to, instead, narrate food culture within Harrisonburg by exploring the roots and stories that extend beyond our community. Presented as recipes, stories and photos, this collection will be a colorful celebration of community, of fellowship and of identity. Recipe collection involves cooking a recipe alongside willing individuals as they share their stories, allowing for multiple means of documentation (a conversational interview and photos of the process). Through the arts of food, photographs, and storytelling, this cookbook will explore a language that connects us all, recognizing the diversity in where we come from yet the commonality of a shared experience.

Identifying water contaminant input location and timing in a local agricultural watershed.

Ethan Mathews with Micah Buckwalter

Faculty mentor: Graber Neufeld, Douglas

In the Shenandoah valley, agriculture plays a vital role in the economy. Communities downstream can be negatively impacted from local farms or industrial sites that have contributed excess bacteria, sediment, and nutrients into the stream. Not only is it important to identify the specific location where these contaminants are coming from, it is important to understand the time at which they are mobilized .

This study was conducted in Bergton Virginia. Bergton is a small community in that is located at the headwaters of the North Fork Shenandoah River. It is also surrounded by agricultural and national forest land. The purpose of this study was to identify if one specific location is responsible for most of the contaminant input. It was also important to identify if rain events are responsible for the most contamination in the shortest time. Previous data suggests rain events are important when addressing stream health because more sediments, nutrients, and

bacteria are mobilized from the excess water., The water quality parameters tested for include nutrient levels, sediments, bacteria, dissolved oxygen, conductivity, and temperature. Our data shows that it was difficult to identify one source of contamination. Distribution of contaminants were relatively even between sub watersheds in the region. Most contamination loads were closely associated with rain events. For example, fecal coliform concentrations increased from 300 cfu/100ml to 3800 cfu/100ml during a November rain event. Sediment concentrations were relatively high at 0.0029 g/L in the national forest land, when compared to sites further downstream that reported concentrations of 0.0006 g/L and 0.0003 g/L. This indicates that the source of the contaminants is not limited to agricultural land. It is unclear that a specific area of land was responsible for most of the contamination, however, it was found that more input occurs during rain events.

Addressing vaccination compliance through nursing actions: Opinions, obligations, and opportunities

Emma Millar with Katlyn Shelton, Maria Cardoso-Martinez, Heyrin Cha

Faculty mentor: Burkholder, Lisa

Vaccinations are known to be among the most effective means of defense against communicable and infectious diseases, some of which have been completely eradicated thanks to this medical intervention (Greenwood, 2014). However, vaccination regimen compliance and completion have decreased in the United States, causing the reappearance and resurgence of deadly diseases in recent years (Ventola, 2016). Changes within society have influenced this trend and have even gone so far to change legislation surrounding the issue (The College of Physicians of Pennsylvania, 2018). The decision to vaccinate has been viewed as an individual choice, but has proven to be a matter that can significantly impact the lives of many. Because of situations this has created, such as the declared State of Emergency in Washington, discussions surrounding the ethics behind this and the liberties individuals have been allowed to take are being questioned (Gstalter, 2019; Hendrix, et. al, 2014; Romo & Neighmond, 2019). The way this is dealt with will set precedence for public health issues that arise in the future.

The goal of this research and presentation is to identify current practices, understand what has influenced many in their decision making process surrounding vaccinations, as well as to understand why and how these views are changing. Additionally, the presentation will focus on nursing actions and interventions to increase vaccination completion and compliance as fundamental pieces of the healthcare society.

Throughout the presentation, the controversy, political, and emotional stakes will be acknowledged, but the primary focus will be on actions and interventions within a nurse's scope of practice. This will be done as a Capstone presentation for the Bachelor's of Science in Nursing program. Research is drawn from professional, peer-reviewed articles completed within the past five years; these were compiled to write a review of literature in the American Psychological Association style.

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Marginalized Voices in Filadelfia, Paraguay

Emma Millar

Faculty mentor: Rojas, Adriana

Each Latin American country has a similar shared history of colonization and with it, the marginalization of certain people groups; Paraguay's history stands out as unique among them. From the beginning, there has been a certain association between Europeans and the Indigenous, creating a culture and society that is characterized by mestizaje the concept of Paraguayidad.

This is especially evident in sociologic dynamics that exist in the Chaco. Mennonite refugees arrived during the 1930's and established colonies that today exist within larger cities. While they have created programs that establish relationships between the Mennonites and Indigenous, they have failed to recognize the impact of their presence in the Chaco. Through this lack of awareness, by mandating where those whom the Mennonites consider 'Latino Paraguayans' will live within the city, and by placing strict regulations on membership expectations within the colony, they have systematically marginalized voices other than their own.

Restorative justice conversations with each group present and room for acknowledgement of each other's backgrounds may help in beginning to mend these relationships, see each other as equals, and deconstruct the social structures that have marginalized so many.

Conserving and Restoring Park Woods

Bekah Mongold with Nidhi Vinod

Faculty mentor: Yoder, Jim

Another problem with the old program was that the processing was too slow. One easy fix was to get rid of a one second pause on each displayed frame. The updated version also solved this problem in by ignoring small parts of the image decreasing the processing needed. The final improved project will be shared with the worm tracking community.

In Home Audit

Lindsey Morris

Faculty mentor: Leaman, Jim

I will conduct an audit on my house and present it and fixes in a video presentation.

Makayla's Environmental Audit Project

Makayla Morris

Faculty mentor: Leaman, Jim

The main purpose of this Environmental Audit project/ research is to see how much my house constitutes to the world's energy use and learning about measures that can be taken to improve its sustainability. The Environmental Audit project/ research will conduct a complete environmental/ ecological audit on the house I am currently living in. This project will include a research of accounting for indirect and direct environmental impacts, a calculation of cost and pricing, and recommendations for improvements that can be made for more suitable results. These findings of this research will be shown by an economic and ecological cost-benefit analysis.

Linking Woolf's and Sayers's Feminist Perspectives

Nikki Mumaw

Faculty mentor: Eads, Martha

ABSTRACT

Linking Woolf and Sayers Feminist Perspectives

Nikki Mumaw

Readers of Dorothy L. Sayers's novel *Strong Poison* (1930) may view it as an ordinary mystery novel about a framed woman proving her innocence. Virginia Woolf, however, is likely to have appreciated the novel's expression of the feminist ideals she presented in *A Room of One's Own* (1929). Sayers creates her novel using several characters to promote feminism and create a strong female persona. This project analyzes several characters depicted in *Strong Poison* in an attempt to connect the shared beliefs of Sayers and Woolf on feminism in the 20th-century they both knew.

Benefits of Kinship Foster Care in Virginia

Rhonda Obaugh

Faculty mentor: Hurst, Carol

Van Wormer and Link report "the key tension for social workers is tolerating risk so that children are not removed from the family, culture, affection, and community that they know to a system that in itself can be damaging (Katherine S. Van Wormer & Rosmary J. Link, 2016)". This presentation will discuss, HB – 2758, Kinship Foster Care; Notice to Relatives, which proposes a solution to the problems that often arise with foster care. This bill will require local boards of social services, when placing children in foster care, to determine if the child has relatives who may be a suitable kinship foster parent, inform those relatives the eligibility and opportunities they have to participate in the care of the child. This system will help keep some constant in a child's life during a hard and confusing time. Kinship care is the care of children by relatives or people they have a close family relationship with, such as grandparents or family friends. Kinship foster care is important to child welfare and the field of social work because it allows children to

keep their connections with their families, culture, and values while removed from their birth parents. Kinship care is a way to lessen the trauma of being separated from a primary caregiver where attachment is formed during development. Being in the same family unit helps children stay connected to family and feel less removed from what they know, compared to living with a traditional foster family.

Mennonites Dropping “Mennonite”: Branding in the Twenty-First Century

Trevor Oyer

Faculty mentor: Kim, Ji Eun & Sprunger, Mary

This presentation aims to share my research findings on why Mennonite entities are dropping “Mennonite” from their titles. The presentation will look specifically at three case studies: Everence, Western Christian High School, and Eastern Mennonite University. Everence changed their name from Mennonite Mutual Aid in 2010, Western Christian went from Western Mennonite in 2018, and Eastern Mennonite University is in the process of rebranding. The presentation will address the historical context of these institutions and how they got their names; the reasons behind these places letting go of “Mennonite” from their titles; and the process they underwent to do so. This paper argues that a primary reason for dropping “Mennonite” for all of these institutions was the understanding of a Mennonite name being a barrier in reaching out to people. The paper will conclude with a discussion of what Mennonites should do about these findings.

The iGEL and King airway: A surveillance study comparing supraglottic airways on out-of-hospital cardiac arrest patient outcomes

Allan Peng

Faculty mentor: Halterman, Julia

This surveillance study examines the efficacy of two supraglottic airway devices during cardiac emergencies: the iGel and the King airway. Because sudden cardiac death results from abnormal electrical activity in the heart, the biggest determinants to survival of cardiac arrest patients are response time of emergency medical services (EMS) and a shockable presenting rhythm. Current cardiac arrest guidelines recommend cardiocerebral resuscitation (CCR) for primary cardiac arrest, which emphasizes initial uninterrupted chest compressions. Previous studies have proven a statistically significant advantage of CCR over traditional cardiopulmonary resuscitation (CPR) in achieving greater survival rates. This project does not challenge current chest compression guidelines; it looks, instead, to improve airway management. EMS-collected data from the greater Harrisonburg, VA population was used to analyze the efficacy of airway devices on their ability to maintain patent and functional airways. The iGEL is a second-generation supraglottic airway that was compared to the more traditional King airway laryngeal tube. Efficacy (the end point) of each airway was determined by return of spontaneous circulation (ROSC) rates. ROSC is defined as the restoration of a palpable pulse or a measurable blood pressure, sustained for 20 consecutive minutes. Results suggest no advantage of the iGel airway in achieving ROSC ($p > 0.05$) when compared to patients treated with the King airway. These results may prove useful in secondary cost-benefit and ease-of-use analyses of emergency airway devices.

Documentation of student learning: Rhombi, squares, and trapezoids in a high school geometry class

Sarah Beth Ranck

Faculty mentor: Smeltzer Erb, Cathy

This DOSL project originates from a unit on rhombi, squares, and trapezoids that I taught in my first student teaching placement in a high school geometry class. It included creating a unit of content, documenting student learning, and reflecting on what went well and what could be changed next time. As part of a larger unit on quadrilaterals, the students learned the properties of rhombi, squares, and trapezoids and applied these principles to various problems and situations. I used a preassessment, several exit tickets, a create-a-problem assignment, a Kahoot, and a post assessment to assess student learning. The presentation will examine the classroom context, learning objectives, instructional strategies used in teaching the unit, and data gathered to provide evidence of student learning. A reflective practice framework informs my analysis of the research findings and the implications on future teaching practices.

The Blacken Galaxy

Rances Rodriguez

Faculty mentor: Holsopple, Jerry

This is a short stylized animation movie, around fifteen minutes in total. This animation is to be produced as a "paper-cutout" presentation style onto characters and overall environments within a sci-fi setting. The story centers between two main female characters and the galaxy itself far from our own, all to be narrated by one of the two characters on a situation involving the fate of their galaxy, currently being ravaged by an antagonistic force called "Ruta'hka". Halii, a student, seeks out potential recorded documentation on her galaxy's survival. After witnessing the horrors of the dying neighboring worlds her mentor, Anna, tries to ease her confusion by relaying the source of their destruction until present day. As the history slowly comes into light, all the chaos had manifested by a single mistake from just one being. A mysterious being, called Rannunonakii Unnakii, and his addictive gift called "Black Origin".

Moving Forward

Jeremy Schaar

Faculty mentor: Leaman, Jim

This environmental audit includes several aspects of my life, including my house, my family, and our lifestyle. This will include ways to lessen our impact on the environment with regards to how we live and ways to improve the houses overall efficiencies to become more sustainable. The role of economics will play a role in some of the proposals I make to make the house more sustainable, and how we live out our daily lives.

Environmental Audit

Tiffani Shaheen

Faculty mentor: Leaman, Jim

My environmental audit is a tool that will help inspect where the majority of my environmental activities come from. I will be using information gathered from the past year of my home in

Scottsville Va. I am looking into my environmental activities because I want my home to become more sustainable for the environment and I can do better by realizing what activities are producing more negative affects to the planet. Being able to gather this information now will help me in the future by knowing what needs to be used in my household and what shouldn't be used.

Diving deep: An integrated study of the ocean environment

Rachel Shenk

Faculty mentor: Shultz, Ron

Over the course of three weeks, Rachel Shenk and her curious fifth grade class dove into an exploration of the Earth's amazing ocean environment. Aligned directly with Virginia SOL standards, this 15 day unit provided authentic opportunities to integrate key subject such as history, math, and writing into the standard science curriculum. The class of fifteen students enthusiastically explored the ocean environment by graphing the ocean floor on Google spreadsheets, sculpting ocean models of clay, conducting experiments regarding salinity and density, and even writing a unique narrative from the perspective of an ocean animal. The documentation of student learning project succinctly demonstrates the intricate planning, facilitation, and reflection required to make this hands-on unit possible. Daily assessment held students accountable for their learning, yet looked very different; taking the form of creative expression, small group discussion, computer quizzes, or writing assignments. Over the course of the unit, critical reflection proved most important in order to gauge the needs of the students, as well as make the curriculum relevant to their lives in the Shenandoah Valley of Virginia.

Feasting and Footwashing: The Five Senses of Maundy Thursday

Valerie Showalter

Faculty mentor: Clark, Kevin

From the time that Mary anoints Jesus (John 12) through the Passover meal and in footwashing (John 13), the Gospel of John appeals to us to engage our senses, profoundly embodying the last days of Jesus. The smell of nard, the gentle touch of hands on feet, the sumptuous feast that invites us to 'taste and see,' and the difficult words of truth and parting ... all invite us to step in a bit closer, to a spirituality that is grounded in who we are: the imperfect and beautiful children of God.

Park Woods Project: Stakeholder Management

Xander Silva with Victoria Barnes

Faculty mentor: Yoder, Jim

Park Woods is a small, urban forest on the edge of a thriving metropolitan area. In recent decades, the forest has been managed to a minimal degree by Eastern Mennonite University. In recent years there has been renewed interest in revitalizing and restoring the area. As a first step in a larger project, a list of stakeholders has been developed in order to gather information on level of interest, use, and opinion about the space. As part of this stakeholder analysis, we are conducting interviews and surveys to better understand how best to

incorporate people and groups in the process of planning for the future of Park Woods. Primary stakeholders include groups at Eastern Mennonite University, Eastern Mennonite High School, Virginia Mennonite Retirement Community and others in the surrounding community. Findings will be presented along with recommendations for next steps.

Changing Views of Conscientious Objectors: An Analysis on the Transformation of the Public's View of CO's from the WWII Era to Vietnam.

Kara Smith

Faculty mentor: Kim, Ji Eun & Sprunger, Mary

The public's view of Conscientious Objectors changed from the World War II Era to Vietnam as the label of CO shifted to encompass more than just those in the pacifist religious sector. I will prove this thesis through primary source newspaper articles from the different time periods (1941-1945 & 1955-1975). My findings thus far have uncovered that generally newspapers from the Vietnam era depict CO's in a better light than the WWII era. They described protesters as activist and objectors as noble. Whereas during WWII there were almost no articles that spoke positively about CO's, instead they were referred to as, "Draft Dodger", and "Worm".

Through my research I will identify major societal shifts that occurred that could have led to this shift. Including two court cases (Seeger VS United States & Welsh VS United States), the unpopularity of the Vietnam War, and people starting to identify how biased the draft war. The overall theme of my research is as the Conscientious Objector label becomes more of a moral obligation than a religious one it also became more of an accepted belief than one people looked down upon.

EQUAL RIGHTS AMENDMENT:WHAT DOES VIRGINIA SAY?

Eliana Tejedor Hernandez

Faculty mentor: Hurst, Carol

This presentation will focus on women have long struggled for the same rights as men. It has not been a century when women were federally allowed to vote. Some western states, such Wyoming, had granted women the right to vote. However, for it to be nationwide approved an amendment to the constitution was required, the 19th amendment. This struggle and advocacy have been led by women at different times in history. Alice Paul among other women created the National Women's Party (NWP) from which they worked on women's rights (Lynn, 2014). This era is best known as the first wave of feminism. During the first wave of feminism, the Equal Rights Amendment (ERA) was proposed in 1923 (Miller, 2015). The intention of this presentation is to discuss the history of the Equal Rights Amendment including its changes, the opposition, and why or why not it is necessary today. Even more, this paper will discuss the current political situation of the ERA in Virginia and its implications for the proposed amendment. Finally, I will analyze the ERA by using an ethic of care framework to consider whether or not the ERA should or not should be supported by social workers.

A Blossom

Yordanos Tesfa

Faculty mentor: Gusler, Chad

Springtime brings warm weather and beautiful flowers, but Beshadu would beg to differ. She despises flowers because for her, they represent weakness. Beshadu has been a maid on Getachew's compound for over ten years and still has not received a specific job title. She can only experience Addis Ababa past the compound's gate once a week. She feels that this is unfair, but worries for Getachew's daughter, Zahra, who is not allowed to experience the world beyond the compound's protective barrier. Will Beshadu work towards changing the rules of the compound or continue keeping her thoughts about its current state to herself?

The Overrepresentation of Black Males in U.S. Prisons

Yordanos Tesfa

Faculty mentor: Rhodes, Gloria

African American males are more likely than any other racial group to be under some form of criminal justice supervision at some point in their lives. According to the NAACP, African American males account for 34 percent of the imprisoned population in the United States. They are more likely to be arrested, convicted and given long prison sentences. Through my research on this issue, I have been following the work of three criminal justice reform groups that have a focus on decreasing the unjust imprisonment of minority groups and address the overrepresentation of black males in prison. Firstly, the Reform Alliance, a new criminal justice reform organization launched by rappers Jay-Z and Meek Mill, and Michael Rubin, a co-owner of the Philadelphia 76ers is determined to change the laws of parole and probation. Since black males are highly affected by extensive sentences for less serious crimes in association of parole violations, this organization has the potential to shrink the racial gap further. Secondly, The American Civil Liberties Union (ACLU) strives to restructure the criminal justice system in order to protect the rights of all, reduce racial bias, and take fair and necessary action to keep communities safe. Lastly, The Sentencing Project has been working towards a criminal justice system that is fair and effectively protects all communities since 1986. This criminal justice reform organization addresses racial disparities and other evidence of racial discrimination within the system. I believe that the first step to resolving this issue is educating the public about the intensity of the situation and advocating for African American males and other minority groups overrepresented in U.S. prisons on large public platforms. Getting communities across the country involved is vital in making a change and decreasing the overrepresentation of black males in U.S. prisons.

Documentation of student learning in geometry

Anika Thomas

Faculty mentor: Yoder, Paul

My documentation of student learning project investigated the degree to which students met the overall goals of a triangle congruence unit. I taught the unit to single block Geometry students during my student teaching placement at a high school in the area. I tracked fourteen of my students' learning through the unit, and was able to see what learning objectives the students had learned from the beginning to the end of the nine lessons. The three unit goals were for the student to be able to define congruence, determine which triangle congruence

shortcut could be used to prove two triangles are congruent, and to write a two-column proof to prove that two triangles are congruent.

I reflected on the nine lessons after I taught them to consider what worked well and what did not so I could improve if I taught them again. I collected a piece of the classwork practice three times over the unit to help me assess student progress with the material. The other days I kept a checklist of the content objectives for the day and counted how many students met each goal. Based on this assessment data, I was able to plan review or practice time in subsequent lessons to help the students meet the goals. The project revealed the extent to which math content builds upon skills. As a result, I plan to be more reflective with the lessons I teach to help differentiate my instruction to best teach my students and to help them succeed. It was beneficial for me to keep track of what students met each learning objective because it helped influence my future lesson plans.

Increasing Public Health Nurse Engagement

Jeannine Uzel

Faculty mentor: Tyson, Don

Abstract

Objective: Increase engagement by connecting staff to the agency mission, vision and key initiatives.

Design: Quality improvement initiative, observational uncontrolled study.

Sample: Public health nurses (PHNs) and public health professionals.

Measurements: Post- intervention evaluation using a 4-point Likert scale. Demographic information was obtained, and opportunity was provided for open ended comments.

Intervention: Online orientation module linking the mission and vision of the Virginia Department of Health (VDH) with PHN programs and agency strategic initiatives.

Results: 13 individuals participated. Participants agreed that the module increased understanding of the PHN role in supporting the agency's goals. Process measures indicated the technology was difficult to use.

Conclusions/Limitations: As public health agencies shift from clinical to population-based initiatives, engaging and retaining PHNs is critical for maintaining a workforce capable of responding to public health threats. Although the response to the module was positive, this initiative was limited by the low number of participants, self-report nature of the evaluation questionnaire, and short time frame for measuring outcomes. The delivery platform will be used to track future participants' tenure with the agency and determine if the intervention results in increased future engagement scores and commitment to remain with VDH.

Key words: engagement, nursing, orientation, public health, public health nursing

Virginia Woolf and Gendered Expectations

Claire Waidelich

Faculty mentor: Eads, Martha

ABSTRACT:

In *A Room of One's Own* and *Three Guineas*, Virginia Woolf reflects on the historical absence of women's opportunity for education and discusses the idea of "thinking back through our mothers (*AROO*, p. 101)." Her novel *Orlando* illustrates this difficulty. Although *Orlando* may

appear to be about a transgender individual, Woolf's concern is really with women's lack of opportunity. The change in Orlando's sexual identity affects people's perception of them, though their core self has not changed. Changing into a female body led Orlando to witness first hand the difficulties of being a woman. These three books have a common theme of gender discrimination and how gender affects opportunities for success.

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Keywords: Woolf, gender, social expectation, women *AROO - *A Room Of One's Own* by Virginia Woolf

The mad genius: the connection between mania and creativity

Leah Wenger

Faculty mentor: Berry, David

Robert Schumann is considered to be among the greatest and most celebrated composers of the 19th century. However, in addition being known for his accomplishments, Schumann is also known as a composer who experienced manic depressive disorder, which is more commonly known as Bipolar Disorder today. He went through recorded periods of melancholy, followed by periods of hypomania and mania, a state which is often marked with mood elevation, decreased need for sleep, increased talking speed, disconnected and racing thoughts, euphoria, delusions and over-activity. Robert Schumann's work output directly correlated to his mood states. He is well known for his use of ciphers in his music, specifically the recurrence of the "Clara motive", a tribute to the love of his life. This is one example of the many poets, composers, artists, writers, and others with profound creativity who have experienced this kind of mental illness. In this presentation I will be exploring the connection between this creativity and the mania found in bipolar disorder, as well as focus on Robert Schumann, his compositions, and his love for his wife, Clara.

Give Me Back My Pants: An Independent Publishing Project

Clara Weybright with Lydia Chappell Deckert

Faculty mentor: Gusler, Chad

On March 12th, 2016, we had a bad day. Hunched in the corner of Eastern Mennonite University's library, we opened a blank google doc and began to write. What started out as an outlet for our endless streams of satire and sass has quickly turned into one of our greatest

academic joys. Over the course of our junior year at EMU, we have attempted to write and edit a collection of creative nonfiction essay-length pieces specifically about our experiences as college students at a small liberal arts college. We've written about friends, relationships, school, and early steps in adulthood. With the assistance of our advisor, Chad Gusler, we have considered the implications of creative nonfiction writing; we have investigated the nature of truth-telling in stories, the lines between fiction and nonfiction, and the significance of the stories that we choose to tell. However, we are also dealing practically with the work of writing creative nonfiction in essay form with the intention of creating a book-length work in the future.

This year, we created a weekly independent study class under Chad's direction in which we have submitted essays for critique, read other written works, and learned more about the process of writing creative nonfiction. This reading for the ACE Festival is one of the culminating projects for this year. During our reading time, we intend to share more details about our project and the work we have done thus far, but also read aloud two selections from our current collection of essays.

Environmental Audit

Paul Wilson

Faculty mentor: Leaman, Jim

I will be exploring the environmental impact that my house causes and solutions that we can implement to change the impact we have.

Community outreach string quartet

Maria Yoder

Faculty mentor: Bergey, Benjamin

An outreach string quartet was organized to perform outreach concerts within the Harrisonburg community. The purpose of this project was to reach groups that would not typically be exposed to string quartet music and to investigate the effects on both performers and listeners. Four quartet members were recruited, a repertoire of music was rehearsed weekly, and two organizations were contacted (Shenandoah Valley Juvenile Center and Our Community Place) as venues for two concerts each. Qualitative evaluation by both performers and listeners was collected anonymously following performances and compared to literature on the neuropsychological effects of music. Challenges and future applications are discussed. An audio clip or short performance may be included.

A Case For Medical Cannabis

Noah Yoder

Faculty mentor: Hurst, Carol

A Case For Medical Cannabis

This presentation explores both the potential benefits and dangers of medical cannabis. Rooted in scholarly literature, the history of cannabis regulation in the United States is carefully detailed. Findings from modern scientific studies which aim to explore the potential medical benefits of cannabis are utilized, along with those that indicate long-term health risks from continued cannabis use. Special detail is paid to the legality of medical cannabis, both in Virginia and elsewhere in the United States. Findings from states such as Colorado and Washington,

where cannabis has been legalized for a number of years, give a clearer picture of how the residents of states with medical cannabis are affected by the legislation.

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The Effect of Perceived Sexual Norms on Behavior

Emma Yoder

Faculty mentor: Holsinger, Jenni

Building off previous research by Fabiano, Perkins, Berkowitz, Linkenbach, Stark, (2003), I study the effects of perceptions of sexual norms on behavior. My study population consists of undergraduate students at a small, private university in a predominantly rural area. Through an electronic survey, respondents report on their own behavior in sexual relationships and their beliefs about other students' behavior in sexual relationships. Findings of perceived campus norms are presented and implications for sexual violence prevention are discussed.

Sustainability of House Heating Through Eastern-Constructing Style: Korean Underfloor Heating System

Kyungho Yu

Faculty mentor: Leaman, Jim

This paper comparatively analyzes between the Western and the oriental constructing styles for demonstrating how efficient the Korean underfloor heating systems (UFHSs) is in order to reduce carbon emissions and energy consumption. Energy-reducing technologies become one of

the most significant elements which a nation should encourage firms or households to utilize. UFHSs have saved a large amount of heating energy in household level. According to Kim et al. (2018), UFHSs can save a statistically significant amount of energy and reduce carbon emissions in specific climatic conditions. Baek and Park (2017) studied the best conditions such as the thickness of floors or the materials of floors which UFHSs can save the largest amount of energy. This paper utilizes realistic data to compare between a household in South Korea and a household in the United States. As a result, this paper demonstrates that UFHSs have a higher possibility to reduce carbon emissions and energy consumption in a household level than the Western-style heating systems.

Poster Presentations

Gatorade - Environmental Analysis

Travis Abele

Faculty mentor: Miller, Andrew

I will be breaking down the company Gatorade using a SWOT analysis as well as history and timeline of the company. This will also show how the company is positioned in the beverage/sports industry.

Determination of the Effects of Electronic Cigarette Juice on the Growth, Fecundity and Stress Response in C.Elegans

Virtue Adowei with Wendy Stapleton

Faculty mentor: Schmidt, Kristopher

Electronic cigarettes have been marketed to the public as being a harmless alternative to traditional smoking, however, data is quickly accumulating that indicates adverse effects associated with E cig use. *Caenorhabditis elegans* are soil nematodes that can function as a model organism for mammals with short, predictable lifespans and high birth rate making them ideal organisms to test the effects of chemicals..In order to test the long term effects of electronic cigarettes on *C. elegans* , *C. elegans* embryos will be divided into a control group on NGM agar and a test group grown on NGM agar with 0.2% popcorn flavored e-cigarette liquid. Comparative measurements will be performed of the growth rate, fecundity, and oxidative stress.

Identification of Aromatic Compounds in Queensland Fruitfly Beer Waste Bait

Jared Bergman

Faculty mentor: Siderhurst, Matthew

Characterizing the winter-spring physiological changes of several EMU campus conifers

Elliot Bowen with Savannah Bontrager, Ethan Mathews, Bekah Mongold, Alexander Navari, RJ Ocampo, Nidhi Vinod

Faculty mentor: Cessna, Stephen

Winter is a stressful time for plants, so much so that many perennial plants just lose their leaves and grow new ones every spring. However, most conifers keep their needles year around, meaning that some other means of stress tolerance must be at work in these plants to allow them to tolerate the stressful winter conditions. In this poster, we present our findings in which several different conifers were compared through the winter-spring transition in terms of chlorophyll and antioxidant content, photosynthetic efficiency, and other measures. These findings might be of use to foresters and horticulturalists working with these trees in variable and changing climates.

Everence FCU

Micah Boyer

Faculty mentor: Miller, Andrew
Environmental Analysis

The effects of college tuition costs

Kelli Brady with Alia Miller, Makayla Morris

Faculty mentor: Lee, Joohyun

The purpose of this study is to look at the relationship between college tuition cost and the effect that tuition has on enrollment. We will also explore college students' level of satisfaction with tuition costs and the services they receive in return. The use of tuition dollars at Eastern Mennonite University (EMU) will be explored along with comparing EMU's costs and quality of services to other universities in the region. D.E. Marcotte and S.W. Hemelt stated that tuition increases had a direct effect on college and universities enrollment. They determined that a \$100 increase would have an effect on enrollment (2011).

Research Method: This research will be conducted using online surveys. In determining who to send the emails out to, we sampled fellow students in classes we attend during the spring 2019 semester. Emails will be sent to about fifty Eastern Mennonite University students, however we understand that the response rate may be less than this. The population of this research is Eastern Mennonite University with the samples being attending students. Students will have until the end of March to complete the survey and then the data will be gathered into a database where results can be interpreted and presented in a final report.

Reference:

Hemelt, S. W., & Marcotte, D. E. (2011). The Impact of Tuition Increases on Enrollment at Public Colleges and Universities. *Educational Evaluation & Policy Analysis*, 33(4), 435–457. <https://doi-org.hartzler.emu.edu/10.3102/0162373711415261>

Environmental Analysis of Airbnb

Kelli Brady

Faculty mentor: Miller, Andrew
Environmental analysis of the company Airbnb.

Evaluating the Longevity and Lasting Effects of Enterobacter aerogenes Resistance to Tetracycline

Chelsea Brubaker with Shelby Alto, Rachel Musselman

Faculty mentor: Copeland, Jeff

Bacterial antibiotic resistance is a continually developing problem around the world and is the source of many deadly infections. This experiment characterized two strains of *E. aerogenes*, either sensitive or resistant to tetracycline. Tetracycline is an antibiotic that inhibits protein synthesis within a bacterium in a reversible process by attaching to the ribosomal complex. The antibiotic binding prevents the union of aminoacyl-tRNA with the bacterial ribosome.

Enterobacter aerogenes relies on the use of its ribosomal complex in metabolic processes, and as a result, *E. aerogenes* is vulnerable to its antibiotic properties. The *E. aerogenes* resistant strain has managed to bypass tetracycline sensitivity, but doing so caused a decrease in growth rate. Antibiotic assays, metabolic differential tests, and growth curve analyses were utilized to expand the understanding of these strains of bacteria and the differences between them. A reversion test was performed to study the time required for the tetracycline resistant strain of *E. aerogenes* to increase in susceptibility to antibiotics as well as any persisting effects of antibiotic resistance. Characterization of the resistant bacteria allows us to understand the functions that must be sacrificed in order to become resistant including efficiency, metabolism and division process.

Environmental Audit

Julie Burkhardt

Faculty mentor: Leaman, Jim

The Environmental Audit is looking at my household to see how green we are. I will look into our electric, heating, waste, etc. and see how to make our household more green. Upon looking at the results, I will then come up with ideas to improve our household.

Toyota Environmental Analysis

Julie Burkhardt

Faculty mentor: Miller, Andrew

This environmental analysis is digging into how Toyota makes their company functions. The analysis uses Porter's Five Forces, which looks into threat of new entrants, bargaining power of supplies, threat of substitute products of services, bargaining power of buyers, and rivalry among existing competitors.

An Environmental Analysis on Chipotle

Andrea Cable

Faculty mentor: Miller, Andrew

My project outlines an environmental analysis of Chipotle; how the restaurant is strengthening its weak points in the restaurant industry, and what they're currently doing that's setting them apart.

SONY ANALYSIS

Sergio Canales

Faculty mentor: Miller, Andrew

Environmental analysis SONY

Tearing Down the Wall: Removing the barriers between Classical and Popular Music

Robert Chaplin

Faculty mentor: Keebaugh, Ryan

The goal of this project is to highlight the similarities between the two broad categories of classical music and popular music. Classical music and popular music can be used as umbrella terms to refer to styles of music that are somewhat similar, but still differ in many key areas. Specifically this study will focus on how minimalist music and electronic influenced popular music use patterns through an additive means. The pieces of music being used for this study include: Etude 5 by Philip Glass, Drumming by Steve Reich, and We Found Love in a Hopeless Place by Rihanna. The method of studying each piece of music will be through an in-depth analysis of each piece looking at aspects of melody, harmony, and rhythm. Sources for research behind this study include: Twentieth-Century Music by Robert P. Morgan and New Directions in Music by David Cope. This study will also examine the history that minimalist music has had on popular music, and areas where the two have overlapped. The overall goal of this study is to help break the barriers between these two small, but influential styles of music.

Would the environment of the bladder and kidneys lead to albumin denaturation?

Rachel Clatterbuck

Faculty mentor: Cessna, Stephen

Human serum albumin is the most abundant protein found in human blood and is responsible for transporting hormones, metabolites, ligands, fatty acids, and drugs. Albumin is utilized for various research projects due to its abundance, availability and low cost. Protein stability is determined by conditions such as temperature, pH and ionic strength. Proteins can be exposed to denaturation if in the presence of denaturing agents or exposure to higher temperatures. Albumin experiences reversible conformational isomerization regulated by pH and temperature conditions. Albumin measurements in urine are used to identify kidney damage/disease. The amount of albumin measured in urine is directly related to renal disease progression. Acidic pH level in the kidney signifies kidney damage and disease. These acidic environments can result in the denaturation of albumin. Changes in pH levels affect residues on amino acids and subsequently hydrogen bonding. Acidic pH levels cause protonation of amino acid residues and can alter participation in hydrogen bonding, which ultimately denatures proteins.

-5M urea will be made and mixed with albumin. Daily excretion of 342 +/- 67 mmol in 490 to 2690 mL urine.

-Measurements will be taken with different amounts of Urea present

-Measurements will then be taken with the pH of the Urea at various levels.

-Measurements will then be taken at various temperatures

Emotional contagion on social media: Effects of Facebook post valence on reader's emotional affect

Clayton Cordell

Faculty mentor: Koop, Gregory

Phytoremediation of Copper Polluted soil with Radish and Zinnia plants

Katelyn Dean with Destiny Ritchie

Faculty mentor: Siderhurst, Matthew

The purpose of doing this research project is to see how well radish plants, and zinnias remove copper from varying copper soil concentrations. And we will look at the effect copper has on the plant growth, but also how tolerant they are to heavy metals. At the end of this research project we will then see which plant was better at doing this by doing a Phytoremediation analysis. Lastly, we hypothesize that the radish plants will be more tolerant to copper than the zinnia flowers and that there will be more radish plants that grow in the higher copper concentrated soil.

Characterization of Tetracycline-sensitive and Tetracycline-resistant strains of Enterobacter aerogenes

Sreeneetha Devineni with Linda Ouedraogo

Faculty mentor: Copeland, Jeff

Antibiotic resistance in bacteria is a serious global public health threat and poses a burden on the medical system. The clinical usefulness of Tetracycline has been declining because of the appearance of an increasing number of tetracycline-resistant isolates of clinically important bacteria. This laboratory project will characterize the antibiotic resistance of both Tetracycline-resistant and Tetracycline-sensitive strains of *Enterobacter aerogenes*. *Enterobacter aerogenes* is an opportunistic pathogen and is commonly found in the intestinal tract. The minimum inhibitory concentrations for eight antibiotics: Tetracycline, Neomycin, Kanamycin, Streptomycin, Chloramphenicol, Erythromycin, Penicillin, and Novobiocin are tested in both strains of *Enterobacter aerogenes* to test for multidrug resistance. These test results are also used to choose the drug of choice for treatment and to monitor how resistance may change over time. The growth rates and the generation times are calculated for both Tetracycline-sensitive and Tetracycline-resistant strains of *Enterobacter aerogenes* to see if there is a biological cost to drug resistance. Also, gram stain, phenol red assays, citrate tests and nitrate reduction tests are performed to determine the characteristics of the bacteria and how they might change over time as the bacteria gains or loses resistance to an antibiotic. Tetracycline resistance is often due to the acquisition of new genes, which code for energy-dependent efflux of tetracyclines or for a protein that protects bacterial ribosomes from the action of tetracyclines. Therefore, an efflux test is performed to test whether antibiotic resistance in both Tetracycline-sensitive and Tetracycline-resistant strains of *Enterobacter aerogenes* is based on efflux.

Environmental Audit

Victoria Dinges

Faculty mentor: Leaman, Jim

Environmental Audit Project

We tend to go about our daily lives without thinking about the effects that our actions have on the environment. For this project I will be researching my own household and the effect that we have on the environment. After figuring out our impact I will discuss ways in which we can reduce the impact that we have. Media types from different sources such as images and footage to better represent the meaning behind the project along with different data sources.

The meaning to this project is to show the impacts that we can have on the environment in hopes to spread information to others and work towards reducing the environmental and ecological effects.

From Decorations to Meaningful Narratives: What Can Organic Chemistry Students Do with EFP?

Anastasia Dronov

Faculty mentor: Kishbaugh, Tara

A problem encountered among organic chemistry courses is a struggle for students to use the electron-pushing formalism (EPF) as a tool to determine a feasible (set of) products (Ferguson and Bodner 2008) (Bhattacharyya and Bodner 2005). Barriers to student use of EPF is a lack of student understanding of the physical reality that the arrows are representing electrons, and an insufficient knowledge of the chemical language or basic concepts crucial to using EPF (Bhattacharyya and Bodner 2005; Ferguson and Bodner 2008; Markic and Childs 2016). With so much research about student learning under a deficit model framework, this study sought instead to develop student potential to use EPF as a problem-solving tool under a capacity model framework.

Photosynthetic Activity of in Vitro Chloroplast

Emilio Fajardo

Faculty mentor: Cessna, Stephen

Photosynthesis is, arguably, the one biological process that shaped life on earth as we know it. Photosynthesis is a process in which light energy is captured and stored by organisms, this energy, in turn, is used to drive energy-requiring cellular processes. The most widely known photosynthetically active organisms are plants, however, many bacteria are also capable of carrying out photosynthesis. In plants, this process has two phases, the light dependent reaction and the Calvin cycle, both processes occur in the chloroplast. Within these two stages, plants use water and CO₂ to generate nutrient and as a byproduct, they produce the molecular oxygen we breathe. Through the Calvin cycle, plants can convert gaseous CO₂ into sugars. This does not only serve as the main source of energy for the plants but also serves as the CO₂ filter of the atmosphere. This precise function is the subject of this research project. With this investigation, we are measuring the photosynthetic activity of in vitro chloroplast, and in doing so, we'll be accessing the possibility of using isolated chloroplast to fixate CO₂ into carbohydrates. This project is divided into two parts. First, we will isolate the chloroplasts from spinach leaves and second, we will measure the gaseous exchanges of the isolated chloroplast using a LI-6800 Portable Photosynthesis System. With this project, we hope to lay out the foundations for a carbon fixation system based on the inner workings of the chloroplast.

Assessment of the levels of phosphatases on the EMU compost in comparison to soil samples from various locations at EMU.

Emilio Fajardo

Faculty mentor: Cessna, Stephen

Plants use phosphorous (P) as a constituent of macromolecules in nucleic acid and as part of the phospholipids in biomembranes. The uptake of phosphorous by plant occurs in the form of phosphate anions $H_2PO_4^-$. Once inside the plant, phosphorous forms part of the control system of very important metabolic processes such as determining the rate of starch synthesis in the chloroplast

and the formation of the energy-rich pyrophosphate bonds such as ATP. Since plants mainly uptake phosphorous in its anion form, the large reservoir of organic phosphorous present in soil is unavailable to them. This organic phosphorous is contained in the form of inositol phosphates, nucleic acids and contained within microbial biomass. To capture this phosphorous, plants create a symbiotic interaction with the soil fauna in which the enzyme phosphatases plays the main role. Phosphatases belong to the family of hydrolases; these enzymes remove phosphate groups from molecules thus making the phosphorous available to plants. In general, the presence of these enzymes is a good index of soil quality given the major role they play in the mineralization processes (dephosphorylation) of organic P substrates. The purpose of this research is to measure the phosphatases levels in various locations of the EMU campus and compare them to those of the newly created EMU compost. It is well documented that the enzymatic activity of the phosphatases is directly related to the content of organic substances in the soil such as carbon and nitrogen. Moreover, the source of phosphatases in the soil is microbial and other forms of life present in the compost such as worms and plant material. Therefore, we believe that the level of phosphatases activity will be highly increased on the EMU compost. The determination of phosphatases in the soil is going to be carried out by spectroscopy measurements of the interaction between phosphatases and para-Nitrophenylphosphate. With this research, I aspire to obtain comprehensible measurements of this very important enzyme in the EMU soil and to evaluate the presence and quantity of the phosphatases on the EMU compost.

Moral Distress in Critical Care Nurses

Miriam Ferguson

Faculty mentor: Tyson, Don

Abstract: Moral Distress Poster

Moral distress occurs when a person understands the right action to take but is restrained from doing so. First identified in nurses, moral distress also affects all healthcare personnel. Common sources are end-of-life issues, futile care, inappropriate use of health care resources, as well as inadequate staffing and working with incompetent providers. The most detrimental outcomes of moral distress are caregiver apathy, burnout, and turnover. These results have adverse consequences for patients, staff members, and the organization. This project identified characteristics of moral distress in a 24-bed combined critical care unit in a non-profit community hospital. Data was obtained from employee engagement scores, turnover rates, and the National Database of Nursing Quality Indicators (NDNQI) scores. Goals of the project were moral distress reduction, enhanced moral distress awareness, identification of available resources, decrease turnover, and increase staff morale and retention. A pre-intervention survey was completed followed by two separate educational opportunities for staff members. Participation was voluntary, and any data collected was anonymous. A final survey was conducted six weeks after the initial education. Staff members found this education to be

helpful and verbalized appreciation of knowing available resources and the need to utilize them sooner. However, more work is needed to provide support and resources to bedside staff. The results of this project were shared with the shared governance council and nursing leadership. Expansion of this education to include all staff members may prove beneficial for morale, retention, patient care, and outcomes. Long-term evaluation of turnover rates, NDNQI data, and employee engagement scores will be used to follow trends.

Keywords: moral distress, nurses, critical care, burnout, turnover

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United Kingdom Banking Industry

Fred Flores

Faculty mentor: Miller, Andrew

An environmental analysis (PESTEL) about the banking industry in United Kingdom.

JAG

Jourdyn Friend

Faculty mentor: Miller, Andrew

Environmental Analysis on JAG construction company

Phytoremediation Capacity of Brassica Rapa

Garrett Howard with Cesar Perez

Faculty mentor: Siderhurst, Matthew

The experiment was executed to show the Phytoremediation abilities of Brassica Rapa. The Brassica Rapa was planted in different containers with various copper concentrations to determine how much copper the plant is able to consume from the soil. The growth of the plant was measured to see how copper effected the plants growth.

An investigation of the reversion of Enterobacter aerogenes tetracycline-resistant bacteria to a tetracycline-sensitive state

Anna Jemi-Alade with Sukriti Silwal

Faculty mentor: Copeland, Jeff

Tetracycline is a commonly prescribed broad-spectrum antibiotic that has characteristics of low toxicity and affordability, it is widely used for many types of bacterial infections (Trzeinski et al,

2000). Antibiotic-resistant bacteria are both an abundant and costly problem in the medical field as treatment becomes more complex and time-consuming when resistant bacteria are present. The object of this study was to investigate the time it takes for tetracycline-resistant *Enterobacter aerogenes* to be reverted back to its tetracycline-sensitive state. Since the tetracycline-resistant strain showed multi-drug resistance, the reverted *E. aerogenes* were examined for any lingering drug resistance. The level of growth of the tetracycline-resistant bacterial strain and the reverted tetracycline-sensitive strain in the presence of different antibiotics was determined by using a minimum inhibitory concentration (MIC) test. The tetracycline-resistant bacteria was then allowed to grow without any antibiotics and was tested every 24 hours to see the levels of bacterial growth in a broth with the tetracycline sensitive strain as the experimental control. Other testing such as gram staining, and antibiotic sensitivity testing were done to compare and contrast the differences and similarities between the *Enterobacter aerogenes* tetracycline-resistant and tetracycline-sensitive strain. Tests such as the phenol red assay and the nitrate reduction assay were performed to assess the metabolic properties of the bacteria to see if the reverted strain had similar properties to the sensitive strain. The collection of tests performed aided in the investigation of the properties of the once-resistant strain to see if they had also reverted to match those of the sensitive strain.

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Costco: Environmental Analysis

Riley Kingsley

Faculty mentor: Miller, Andrew

This research project illustrates an in-depth environmental analysis of the premiere wholesale club, Costco. Information included in this research consists of internal and external factors, as well as what plays a role in their strategic advantage.

To what extent does the Type of Plant affect the Copper Concentration in the Soil

Hannah Kurtz with Joshua Gomez, Martin Pou

Faculty mentor: Siderhurst, Matthew

In this experiment, two different plant types: turnips and mustard seed, were used to determine which most effectively pulls Copper from the soil. Both plants were planted in the presence of copper and in the absence of copper. After several weeks of growing, the copper concentration in the soil was be measured using BCA to determine which plant was most effective at pulling copper from the soil, thus relieving the soil of a metal and aiding in sustainability.

What is the effect of copper of the growth of cilantro and mustard

Spencer Laitinen with Javier Deltoro

Faculty mentor: Siderhurst, Matthew

Soil can retain heavy metal contamination even if it is washed thoroughly. Phyto-remediation is the process in which plants are used to remove some of the heavy metals from the soil. Cilantro and Mustard were planted with varying concentration of copper to determine which was able to phyto-remediate most efficiently. After several weeks of growing the each soil with varying amount of copper was tested to determine how much was removed and how much remained.

Testing Coffee Quality with an Electronic Nose

Leah Lapp

Faculty mentor: Siderhurst, Matthew

The coffee industry is an important part of the Hawaiian economy. There are many defects that can negatively impact the flavor of coffee, decreasing its value. These defects can be caused in the field or during the processing of the coffee beans. One defect, previously studied by students at Eastern Mennonite University, is caused by the invasive coffee berry borer (CBB), *Hypothenemus hampei*. From this previous study a method was developed to analyze defective coffee on the headspace gas chromatography mass spectrometer (HS/GC/MS). This same method was used in this study, but an additional instrument was also used to analyze the coffee: the electronic nose (enose). This instrument is a newly developed one, so this research project tested its ability to categorize different defects of coffee beans and compare its ability to the HS/GC/MS. Data was analyzed for both techniques using principle component analysis. The enose was found to be a weaker identifier of defects, yet its ability to be used in the field makes further development of this technology beneficial.

Satisfaction of on Campus Living at Eastern Mennonite University

Leigh Lumsden with Micah Boyer, Zeki Salehi

Faculty mentor: Lee, Joohyun

Purpose of Study: The purpose of our study is to acquire and compile data regarding the overall living conditions and well-being of on campus students at Eastern Mennonite University. "In recent years, the interest in research on living environments has risen, and various approaches, concepts and viewpoints have been applied by housing researchers from an extensive range of disciplines" (Muslim, Karim, & Abdullah, 2012). Students are required to live on campus accommodations until they are a certain age or they have a certain credit requirement. These stipulations force many students to live in similar housing arrangements as undergraduate students. These living conditions contribute greatly to the overall mental and physical wellness of the student body. These factors and conditions correlate with overall attractiveness to prospective students, as well as retention of current students at EMU.

Research Method: To conduct our research we will use a convenience sample throughout the campus population. We will obtain a sample of around fifty to one hundred on campus students and will be administered by either Leigh, Zeki, or Micah at various locations on the campus. The students will be given a link to a short survey to fill out while in the general area of an administrator in case of assistance. The survey questions will demographic information, then go into more details of on campus living experience. The format of the questions will majorly be linear usually on a scale of 1-5. The results of the survey recipients will be compiled to get an understanding of the on campus living experience.

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Muslim, M., H., Karim, H., A., & Abdullah, I., C., (2012). Satisfaction of students' living environment between on-campus and off-campus settings: a conceptual overview. *Procedia-Social and Behavioral Sciences*, (68), 601-614.

What are the main contributing factors that impact a student's college decision?

Cheyenne Marzullo with Jack Leyda, Fred Flores-Cano

Faculty mentor: Lee, Joohyun

Purpose of Study: Eastern Mennonite University is facing a struggle when it comes to recruiting students. More information is needed to discover what qualities the university should be marketing. The aim of this research is to determine what specific qualities students were seeking when they chose to attend EMU. The focus will primarily be on undergraduate degree-seekers and what attributes EMU can use to market the university in a way that highlights student needs. According to research conducted by Walsh, Moorhouse, Dunnett, and Barry, it was concluded that, finances aside, the most important factors in a student's college decision are course and university reputation (2015). Our research will test this hypothesis among others such as religious background, scholarships, family educational history, athletics, atmosphere, and post-graduation work opportunities to discover which of these values are most prevalent in EMU students. We will also include statistics on demographic information relating to age, ethnicity, household average annual income, and proximity to campus and how these elements impact what is important in each student's college choice

Research Methods: We plan to conduct an online survey with the population of the survey being EMU's undergraduate student body. Of this population, we intend to utilize a convenience sample of classmates and peers to total at least fifty students. This survey will be both quantitative and qualitative in nature. The quantitative questions seek to rate respondent's feelings toward the various attributes listed above, and the qualitative portion will pose an open-ended question about other factors that may have been missed.

Comparing conventional and green techniques for synthesizing potential pheromones for *Eudocima phalonia*

Sylvia Mast

Faculty mentor: Siderhurst, Matthew

While sex pheromones of various species within subfamily Calipinae have been identified, the specific sex pheromone of *Eudocima phalonia* is unknown. Sex pheromones that have been identified are of Type II character, containing chains of carbon with double bonds and epoxides. *Eudocima phalonia* are found within regions of Asia, Australia, Oceania, New Zealand and Hawaii, and cause significant economic concern within fruit agricultural industries due to their fruit-damaging behaviors. The synthesis of the sex pheromone of *E. phalonia* will provide means of population identification, control, and monitoring. The purpose of this research was to synthesize hexadecanal and octadecanal, two potential pheromones, using two separate techniques. The use of pyridinium chlorochromate (PCC) in the oxidation of a primary alcohol reagent allowed for efficient and effective synthesis of its aldehyde derivative. However, the chromate byproducts of PCC oxidation reactions are toxic and carcinogenic, increasing hazard in its use and disposal. The use of 2,2,6,6-tetramethylpiperidin-1-oxyl (TEMPO) as a primary

alcohol oxidant provides an alternative green route in the synthesis of aldehyde derivatives. Using IR, GC-MS, and NMR analysis, the successful synthesis of hexadecanal and octadecanal using both conventional and green techniques was confirmed.

Measuring the impact from various concentrations of Cu, Zn, and Fe on the germination and photosynthetic efficiency of two species in petri dishes: hybrid sweet (Zea mays) corn and mustard (Brassica juncea).

Ethan Mathews with Savannah Bontrager, Elliot Bowen, Bekah Mongold, Alexander Navari, RJ Ocampo, Nidhi Vinod

Faculty mentor: Cessna, Stephen

Metal ion uptake is crucial for plant survival. Metal ions like Copper, Zinc, and Iron are used in the anti-oxidation process for plants. Without these metal ions, plant leaves would be susceptible to light damage. Anti-oxidants act by removing oxygen free radicals which form from excess sunlight. This experiment will observe the effects of twenty-seven different concentrations containing zero, low (0.2ml), and High (20ml) amounts of the three metal ions mentioned above. Our findings will address the effects on germination rate, Photosynthetic efficiency (Fv/Fm), and mass of hybrid sweet corn and mustard.

What Does The Future Hold For Our Environment

Kenzie McBride

Faculty mentor: Leaman, Jim

The purpose of this environmental audit is to establish the baseline of existing environmental conditions in my home. Once this is determined, research is conducted to determine how the preexisting conditions are effecting the environment. After a detailed summary is created, the remainder of the presentation will suggest ways to reduce the harmful effects we are putting into the earth and the positive return reduction can have on the environment.

Starbucks SWOT Analysis

Kenzie McBride

Faculty mentor: Miller, Andrew

The purpose of this environmental analysis is to determine the strengths and weaknesses of Starbucks, as well as the threats and opportunities.

Multidrug resistance in Enterobacter Aerogenes

Xavier McCants with Allene Henderson

Faculty mentor: Copeland, Jeff

Investigating multi drug resistance is important because it is a global issue with many serious health implications. Antibiotic resistance has caused complications in the medical field because the commonly used antibiotics are no longer effective. Tetracycline is an example of an antibiotic that was overly used and developed resistance. In this experiment, we used Enterobacter aerogenes as our model organism to study resistance to tetracycline. After a series of differential tests identifying our studied organism, resistance to tetracycline was induced. Multi drug resistance (to..) was identified through the Minimum Inhibitory Concentration and Kirby Bauer test. Calculations of generation time revealed that there was a consequence to drug

resistance. The resistant strain was then reverted back into its original tetracycline sensitive property. To whom these tests were repeated, in order to compare whether the reverted strain had the same results as the original sensitive strain.

Flower Phytoremediation: Its Effect on Copper Levels In Soil

Nicole Miller with Kierra Zuercher

Faculty mentor: Siderhurst, Matthew

This study looks at different types of flowers and their effectiveness at removing heavy metals from the soil. Copper was added to soil, and through phytoremediation it was removed. We look at which flower removed the most copper by examining the root, stem, and petal of each plant to determine the amount of copper present through the use of BCA.

Honda Motor Company Environment Analysis

Lindsey Morris

Faculty mentor: Miller, Andrew

I will conduct a poster presentation of the environment analysis of Honda Motor Company.

Validation of CRISPR as the Mechanism of Phenotypic Change in E.coli in a Kit Available for the General Public

Aaron Moyer

Faculty mentor: Stapleton, Wendy

The ODIN, an independent biotech company, offers a wide variety of kits with the goal of allowing the general public to have access to biotechnology that can be performed in their own kitchens. In their 'DIY Bacterial Gene Engineering CRISPR Kit', they claim that their kit is able to execute a genome mutation to the rpsL gene in E. Coli, changing the 43rd amino acid, a Lysine(K) to a Threonine(T) thereby allowing the bacteria to survive on Strep media which would normally prevent its growth. However, we have found no report of independently performed research that confirms the change within the bacterial genome indicating CRISPR was used to cause the change in phenotype. The protocol followed in the kit would allow a simple transformation to yield the same phenotypic result. Our goal is to confirm that CRISPR is being used to generate the reported phenotypic change. In order to obtain data to determine the mechanism of phenotypic change, primers will be designed that flank the coding region for the 43rd amino acid in the rpsL gene. Subsequent PCR and sequencing of isolated bacterial DNA from original and post protocol bacteria will be used to confirm the appropriate genetic change within the genome.

Measuring photosynthetic efficiency, chlorophyll content, and antioxidant concentration in metal ion-induced hybrid sweet corn (Zea mays) and mustard (Brassica juncea) grown in soil.

Ron-Joseph Ocampo with Savannah Bontrager, Elliot Bowen, Ethan Mathews, Bekah Mongold, Alexander Navari, Nidhi Vinod

Faculty mentor: Cessna, Stephen

Plants require minerals to survive and function, but an excess of minerals can be toxic. Metal ion phytotoxicity may cause numerous effects on plants including inhibition of growth, damage

from free radicals, and secretion of antioxidants. In this poster we will compare the effects of metal ion-induced phytotoxicity on chlorophyll content, photosynthetic efficiency, and antioxidant concentration between two different plant species. These findings may provide insight on the mechanisms through which the plants use to adapt and survive.

The Role of *unc-53*, *aex-3*, and *nid-1*, in Axonal Guidance During Neurodevelopment in *Caenorhabditis elegans*

Ron-Joseph Ocampo with Marchelle Smucker

Faculty mentor: Schmidt, Kristopher

The development of the nervous system is a delicate process that is crucial both to the function and fitness of an organism. As such, it is controlled through the balance of many genes and the products they produce. In this project, *C. elegans* is used as a model system to observe the effects of mutations on three different genes, as well as the relationship between affected downstream mechanisms. Previous research has shown that *aex-3* and *nid-1*, when missing or mutated, can cause defects in axon guidance [1]. Additionally, *unc-53* is known to cause similar defects [2]. These defects can be observed microscopically by crossing fluorescent markers into the mutated strains. Defects include axons taking indirect paths to their usual destinations, having a new destination altogether, or otherwise deviating from that of wild-type organisms. Severity of the penetrance of the mutation can be scored by counting the average number of defects in the organisms. In addition, research from the previous semester has shown that worms with mutated *unc-53* and *nid-1* genes had significant neuronal defects. However, *aex-3* did not show as much defects compared to the other two strains.

The current goal of the project, to observe any interactions these genes may have on one another, will be achieved through the creation of double-mutant strains. By doing so, we will be able to determine whether the genes work mechanistically in the same pathway or individually. This project will explore the double-mutant of *aex-3*; *unc-53* and *unc-53*; *nid-1* by performing crosses between these strains and observing the resulting occurrences of defects as in the first part of the project. An additional goal of the project will be to assess synaptic vesicle transmission using the acetylcholinesterase inhibitor, aldicarb. Movement of the animals will be measured via video in order to analyze effects on synaptic transmission.

Solar Powered Greenhouse Aquaponics System

James Paetkau with Engineers for a Sustainable World Club

Faculty mentor: Tian, Esther

The goal of this project is to design and build an aquaponics system that will be installed in the greenhouse near the science center. An aquaponics system is a form of closed loop agriculture that combines aquaculture, the raising of fish, with hydroponics, growing plants without using traditional sources of soil. Water from the fish tank is pumped into the grow bed and the fish waste is utilized as a natural, organic fertilizer for the plants. The grow bed is filled with expanded clay pebbles that retain water and nutrients, when the grow bed is flooded with water, and then slowly allows these to be released to the plants throughout the grow bed. The excess water is then filtered back into the fish tank serving two purposes. The first of these purposes is that the water brings nutrients from the expanded clay pebbles that feed the fish, and the water falling from the grow bed into the fish tank disturbs the surface of the water

effectively oxidizing the water in the fish tank. The fish are supplemented with duckweed that will be grown in an separate tank. The final aspect of this project is that it utilizes a solar powered pump to distribute the water from the fish tank to the grow bed. This allows the project to be nearly completely dependent on natural energy. The club worked with folks at Black Forest Run Farm who currently are utilizing a greenhouse aquaponics system during multiple stages of the project. The hope of this project is to provide sustainably grown food to either the cafeteria or the Sustainable Food Initiative here on campus.

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Adidas- Environmental Analysis

Erik Peachey

Faculty mentor: Miller, Andrew

This poster displays and analyzes the environment of Adidas using a SWOT analysis, Porter's 5 Forces, and PESTEL.

Differences in Volatile Terpenes of Spruce Trees

Alexandra Raber

Faculty mentor: Cessna, Stephen

Spruce trees produce many volatile terpenes. These volatiles can be measured fairly easily using headspace gas chromatography/mass spectrometry analysis. We have developed an HS/GC/MS method by testing a number of parameters including temperature, pressure, and heating time. We have focused on trees on EMU's campus including the species Blue Spruce (*Picea pungens*) and Norway Spruce (*Picea abies*) in contrast to the Cedar of Lebanon (*Cedrus libani*). Our goal is to find differences in the volatiles by species, by individual trees, and by environmental conditions. Our results have showed several differences. Blue Spruce, Norway Spruce, and Cedar of Lebanon are all distinct from each other based on their volatiles. In both Blue Spruce and Norway Spruce we have seen differences between individual trees. Lastly, we have tested the volatiles in the branches, needles, and buds of each sample in Norway Spruce and Blue Spruce. Between those three components, we have seen differences in their volatiles and even differences in a component, such as branches, between Norway Spruce and Blue Spruce.

Genetic Transfer of Multi-Drug Resistance Between Non-Related Bacteria

Corrie Riggs with Jonathan Nielsen

Faculty mentor: Copeland, Jeff

Corrie Riggs/Jonathan Nielsen

Abstract

2/27/19

When exposed to an antibiotic, bacteria can incorporate novel genes into their genomes to increase survival. Transformation of genetic material or conjugation of plasmids result in new antibiotic resistant strains of bacteria (e.g. *Staphylococcus aureus*), commonly seen in the hospital setting. The ability of bacteria to acquire antibiotic-resistance (and sometimes multi-drug resistance) makes treatment of bacterial infection complicated. Due to the increasing numbers of antibiotic-resistant strains, it is important to understand the mechanisms of novel gene acquisition and expression. By co-inoculating and growing *Staphylococcus aureus* and tetracycline-resistant *Enterobacter aerogenes*, an increase in tetracycline-resistance of the *S. aureus* on selective medium may demonstrate that conjugation is the mechanism used by *E. aerogenes* to pass resistance to *S. aureus*. Using a revision of Frederick Griffith's 1928 experiment as a guide, heat-killed tetracycline-resistant *E. aerogenes* was used to determine if antibiotic resistance to tetracycline could be acquired by *S. aureus* through the mechanism of transformation. An increase in tetracycline resistance in *S. aureus* will require further experimentation to determine whether tetracycline-resistance was acquired via live strain of *E. aerogenes* or heat-killed strain (i.e. conjugation or transformation). To observe different cellular mechanisms and properties of *S. aureus* and *E. aerogenes*, metabolic tests, differential assays, minimum inhibitory concentration assays, and growth curves are used.

Tesla Environmental Analysis

Cristian Romero

Faculty mentor: Miller, Andrew

A poster performing an environmental analysis on Tesla

Email Communication at EMU

Austin Sachs with Gillian Zehr, Michael Wilhite

Faculty mentor: Lee, Joohyun

Due to increased forms of technology, communication of important information between college students and professors has progressed in many ways. Many universities including Eastern Mennonite University (EMU) are now paperless, or close to paperless, and all their information is shared to students via emails. However, there may be more effective ways of communicating important information to students other than email. According to Erjavex, Arsenijevic and Starc (2018), employees are more likely to be satisfied with email communication to receive important information, so it can be concluded that students will also prefer email communication. However, according to Braun, Hernandez, Kircher, Stegmann and Van Dick (2019) and Cung, Xu and Eichhorn (2018), students prefer face-to-face communication to receive all relevant information. Email communication is the next most preferred form of communication for college students. In this study it is hypothesized that EMU students prefer to have all relevant information for the week in one email.

The sampling the methods for this class will first focus on the population of college students at Eastern Mennonite University. The projected sample size will be fifty students. This sampling method is a non-probability convenience method. To gather data on email preferences at Eastern Mennonite University, the researchers will use an online questionnaire, with will be distributed out via campus email.

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Protect US: An Innovator in Private Ordering

Austin Sachs

Faculty mentor: Miller, Andrew

Environmental Analysis of Protect US: Education

Apple Environmental Analysis

John Sanchez

Faculty mentor: Miller, Andrew

This poster analyzes Apple's industry environment

Target Environmental Analysis

Tiffani Shaheen

Faculty mentor: Miller, Andrew

For my poster I will be presenting an environmental analysis of Target by using a SWOT analysis and some parts from a PESTEL analysis.

Absorbance of Copper

Luke Short with Andrew Bennett

Faculty mentor: Siderhurst, Matthew

We are testing green onions and cilantro to determine which plant will be able to absorb more copper from the soil. We will be looking at the amount of copper left in the soil when the plants have grown, and the amount of copper in the plants.

Raspberry ketone trifluoroacetate as a lure for *Bactrocera tryoni*

Jonah Short-Miller

Faculty mentor: Siderhurst, Matthew

The Queensland fruit fly is an agricultural pest native to Australia. This fly is responsible for extensive damage to fruit crops from various Australian states. Thus, methods of pest control are of primary concern and economic significance. Current methods of pest control involve chemical lures such as cuelure and melolure (Park et al., 2016). However, the existence of a more effective lure than either of these two would have significant economic implications in the agricultural industry of Australia. This project continues research investigating a promising compound, raspberry ketone trifluoroacetate (Raspberry T), as a more effective lure for use in

male annihilation technique in Australia. The research on this compound is based on research completed by Siderhurst et al. (2016). This research for this project involved fine-tuning of synthesis procedures of Raspberry T and investigation into the hydrolytic properties of the compound, identified as problematic in field use (Lehman & Siderhurst, 2017). Facilitation of research elsewhere was achieved by synthesis of samples of Raspberry T to be tested in a matrix developed by a cooperating chemical company outside the United States. Findings from this research will also prove useful in further development of Raspberry T and its potential for field use. This project establishes an important first step in potential projects with far-reaching implications for pest control and agriculture.

Lehman, K. A., & Siderhurst, M. S. (2017). Raspberry Ketone Trifluoroacetate Trapping of *Zeugodacus cucurbitae* (Coquillett) in Hawaii.

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Characterization of Tetracycline Resistance in Enterobacter aerogenes

Jonah Short-Miller with Matthew Troyer

Faculty mentor: Copeland, Jeff

Antibiotic resistance is a major issue in modern healthcare and disease prevention. Antibiotics are used to kill bacteria without killing cells of the host (Foster, Aliabadi, & Slonczewski, 2018). In theory, this works perfectly. However, some bacteria may contain specifically mutated genes that provide them with the evolutionary advantage of resistance to an antibiotic (Davies & Davies, 2010). This exact process can happen in bacterial species such as *Enterobacter aerogenes*. In this project we have characterized the resistance to the antibiotic tetracycline in the bacterial species *Enterobacter aerogenes*. Though the class Enterobacteriaceae is a common part of the microbiota of the human gastrointestinal tract, *E. aerogenes* is an opportunistic pathogen. This project utilized various practices in clinical microbiology to characterize this strain. Methods included Kirby-Bauer assays, minimum inhibitory concentration assays, metabolic assays, and generation time/growth curve determination. In addition, investigation into the efflux pumps using an ethidium bromide dye was conducted to analyze the efficiency of the efflux pumps of the strains. All investigations and assays were conducted in comparison to tetracycline sensitive strains.

Davies, J., & Davies, D. (2010). Origins and Evolution of Antibiotic Resistance. *Microbiology and Molecular Biology Reviews*, 74(3), 417-433. doi:10.1128/mmbr.00016-10

Foster, J. W., Aliabadi, Z., & Slonczewski, J. L. (2018). *Microbiology: The Human Experience*.

Influences of different factors on student scientific literacy

Abigail Shumaker with Savannah Bontrager

Faculty mentor: Cessna, Stephen

Approximately 50 students were responded to in a survey that assesses their overall scientific literacy. This survey included statements which students ranked on a scale from 1-10 their level of agreement. The classes selected to take this survey are ones that consist mainly of non-science majors such as education, nursing, and general studies. Additional open-ended questions were included in the survey along with several interviews of students willing to share more about their thoughts, ideas, and experiences. Students often have misconceptions about the STEM discipline, major, and professions. The goal of this research is to pinpoint these possible misconceptions and to find out how these they are associated with students' understanding and view science as part of their lives. These data are a first step in understanding how different student groups might differently view and appreciate science.

Improving Self-Regulation in Children through a Yoga Class

Ashlee Simmons

Faculty mentor: Tyson, Don

Local and national statistics point to the fact that there is an increase in mental, behavioral or developmental disorders (MBDD) in children ages 2 to 8 years old. This school has had an increase in ADHD diagnoses from 21 to 39 in a ten-year span. Emotional support classrooms have also expanded to offset the large number of students with negative classroom behaviors. The purpose of the self-regulation and yoga program is to decrease negative student behaviors. Over six weeks, 11 kindergarten students with known behavior challenges were taught relaxation techniques, body and mind awareness, self-regulation, stress and anxiety management. Each 30-minute weekly class utilized yoga poses along with books and discussion to focus on feelings, listening to your body, pausing before reacting and mindfulness. Instructors included a certified yoga instructor, the school counselor and the school nurse. After each session, classroom teachers completed a five question Likert-type behavior assessment for the participating students. Parents also completed a behavior questionnaire and open ended comment form halfway and at completion of the program. Results from the self-regulation and yoga group remained inconsistent until after week three. The last half of the intervention assessments showed improvement in almost all behavior categories. Ability to redirect anger and a decrease in disruptive classroom behavior were identified as having the most improvement. Qualitative data from parents and teachers was also included in the program evaluation. All parents felt the class was of value to their child and several encouraged continuing the classes for a full year duration. For expanded results, the program should include a larger population of student participants as well as a longer duration of implementation. Outcomes from the program indicate positive benefits for the students at this school.

An Analysis of Copper Contaminated Soil and The Possible Effects on The Growth of Plants

Hannah Sipe with Heather Graham

Faculty mentor: Siderhurst, Matthew

The purpose of this experiment is to determine if it is safe to grow summer squash, turnips, and mustard, in copper contaminated soil. Due to copper being a known contaminant in soil, we're hypothesizing that through the use of phytoremediation, the plants will actually lessen the concentration of the previously stated contaminate.

Coca-Cola - Open Happiness

Jacob Sloan

Faculty mentor: Miller, Andrew

Environmental Analysis: Coca Cola Company

My Environmental Audit

Virginia (Ginny) Sorrell

Faculty mentor: Leaman, Jim

In my video I will provide a detailed analysis of my house from an environmental viewpoint. I will give an estimate of the amount of carbon and other gases that my household is putting into the atmosphere. I hope to place a lot of importance into how simple changes could impact the environment in great ways. My main focus is on how placing solar panels on our roof could be beneficial to my family from both an economic and environmental standpoint. I also hope to give individuals ideas for simple changes in their life that could be beneficial to them and the world as a whole. I measured items such as electricity and energy usage, natural gas used, average water and trash amounts collected, etc. My house is not environmentally friendly at all right now and through this process I learned that a few simple changes could be beneficial to me and others in the future. I hope to portray this importance to others and show them how simple changes could go a long way.

Beyond Civility: transforming learning communities through gratitude

Emma Stutzman with Judy Mullet, Alexis Rutt

Faculty mentor: Mullet, Judy

Philosophers and religious groups have long recognized the value of gratitude - a psychological state and trait of appreciation - for a life well lived. More recently empirical studies reporting positive correlations between gratitude and psychological well-being in adults and children have given impetus to school-based interventions within Social Emotional Learning (SEL) programs and character education initiatives. We present a case for teaching and modeling gratitude in P-12 schools in three summary sections:

1. Current research on gratitude interventions.
2. An action research study with English Learners by our third author.
3. Suggestions for cultivating gratitude through 28 Languages of Gratitude.

Environmental Analysis of PlayStation

Caldwell Tariq

Faculty mentor: Miller, Andrew

PlayStation Environmental Analysis

Environmental Analysis of Verizon

Austin Tomlin

Faculty mentor: Miller, Andrew

This poster demonstrates an environmental analysis of Verizon using the PESTEL method.

Getting the Worm Tracker on Track: Improving the Speed and Functionality of the Parallel Worm Tracker

Andrew Troyer with Daniel King

Faculty mentor: Schmidt, Kristopher

The goal of the project is to use computer software to track *C. Elegans* worms location and velocity to better analyze their behavior. Daniel Ramot and Miriam B. Goodman successfully made a worm tracker and released their version in 2008. The tracker is limited and out of date with the latest version of MATLAB making it difficult to run. A new version of the program makes it easier for a typical user to be able to get started quickly without needing prior experience in programming.

The Effects of Different Copper Sulfate Concentration on Typha sp. of Wetland Ecosystems

Andrea Troyer with Graciella Odella

Faculty mentor: Siderhust, Matthew

This experiment looks at how *Typha* sp. (Cattails) use phytoremediation to extract copper sulfate from wetland soil. Heavy metal pollutants are not environmentally safe and negatively affect the aquatic ecosystem; further, this is a human health concern, as the pollutants can collect within the human body (Rai and Tripathi, 2009; Malik et al., 2010).

Phytoremediation is a process that uses living plants to absorb the pollutants into their roots to detoxify the water. There are other techniques to remove heavy metals from the environment such as chemical precipitation and adsorption; however, most of these methods are expensive and have adverse side effects (Eccles, 1999; Volesky, 2001; Sharma, 2003). Thus, phytoremediation of metals is an economical substitute for costly chemical techniques, and it is also an eco-friendly process (Salt et al., 2000; Lasat, 2002; Miretzky et al., 2004). In this experiment, we aim to observe and analyze the plant growth of cattails in high and low copper concentrations, with a control of cattails without copper. We will measure the copper concentrations using the Atomic Absorption Spectrophotometry, where the amount of light absorbed can determine the elemental concentration.

Beauty in the Beast Set Design

Laura Troyer with Jonas Beachy, Jacob Horsley, Tessa Waidelich, Jason Wong, Andrew Schunn

Faculty mentor: Tian, Esther

The purpose of this project was to design a set for Eastern Mennonite University's theater department to be used in the spring production of Disney's *Beauty and the Beast*. This project was designed to give experience with the design process, from brainstorming to building along with greater exposure to working with a team and the struggles that come with that. It provided valuable insight into what it is like to work with clients that provide loose design guidelines, have a small budget and provide their own materials. More technical skills such as working with computer-aided design software, creating detailed designs and building the designs are also skills that were also developed.

The project was broken into different parts. First, a period of task definition and planning. This included designing what was needed for every element of the set. Then we met with the client to present our ideas for the set. They took our design, as well as the designs of the other groups, and chose the elements they liked the best. Each group was then given a specific element of the

preliminary designs to fully design. The set consisted of four main parts: the staircase, windows, door/table, and the pillars. Next, we completely defined and designed our specific element. The conclusion of this undertaking involved the physical construction of our set element. Each individual was able to experience growth in different areas. Collectively, we had the experience to build what we had designed, learning what is easy and difficult to physically build. This experience gave us valuable insight as to what design elements to include in futures projects, and what elements to change. Overall we were able to exit this project with an idea of what a real-world engineering project would look like.

The Absorbtion of Copper With Raddishes

Nick VanAmburg with Jikiran Richardson

Faculty mentor: Siderhurst, Matthew

Copper can be a big problem if there is too much of it in the soil, it might be beneficial every couple of years to plant something that will absorb as much as possible. Radishes may be good at absorbing the copper. We are testing it with different levels of copper concentration in the soil. BCA was the solution that is used to determine the amount of copper absorbed when the plants were fully grown/sprouted.

Systematic Characterization of Antibiotic Sensitive and Resistant Strains of Enterobacter Aerogenes

Seth Weaver with Jared Bergman

Faculty mentor: Copeland, Jeff

Drug resistant bacteria result from bacteria undergoing adaptations to antibiotics present in their environment. These adaptations result in difficult to treat bacterial infections within humans and other mammals receiving drug therapy. This is a major problem that occurs at high frequency within hospitals and has resulted in the spread of methicillin-resistant Staphylococcus aureus (MRSA), vancomycin-resistant enterococci (VRE), and penicillin-resistant pneumococci (PRP) (Gopal Rao, 1998). The purpose of this experiment was to characterize differences found in tetracycline-resistant and tetracycline-sensitive strains of Enterobacter aerogenes. The resistant and sensitive strains behave differently under varying conditions and understanding these differences allows for more effective treatment of bacterial infections that arise. Understanding differences identified amid strains of E. aerogenes provides broader application towards bacteria similar to E. aerogenes. The strains were characterized by performing Kirby-Bauer tests, minimum inhibitory concentrations, differential assays, generation times, and qPCR of cDNA residing in efflux pumps. Differential tests outlined differences in fermentation activity between the tetR and tetS strains. The results discovered tetR to possess greater resistance to tetracycline and antibiotics with similar mechanisms of action than tetS. Generation time testing found tetR to have a longer generation time than tetS and qPCR resulted in a greater concentration of cDNA in tetR.

Environmental Analysis of TaylorMade

Michael Wilhite

Faculty mentor: Miller, Andrew

My poster will show an environmental analysis of TaylorMade, who is a predominant company in the golf industry.

Environmental Audit

Sean Wright

Faculty mentor: Leaman, Jim

I will be presenting an environmental audit. It will touch on the environmental and ecological impacts, externalities, and a list on how we can improve sustainability. It will emphasize on the actions we need to take moving forward to better our choices and become economically sustainable as a whole.

Phytoremediation: removing heavy metal from contaminated soil by using plant.

Malade Yigremachew

Faculty mentor: Siderhurst, Matthew

Toxic metal is found in the ground degraded in an elemental form contaminating the soil. Plants can extract the heavy metals found in the soil through the process called Phytoremediation. Green plants metabolize heavy metals, and they reduce the toxicity concentration by accumulating and harvesting the toxic metals found in the ground. Plants vary in the way they absorb and accumulate the toxic metals from the soil. This experiment seeks to determine and understand the useful phytoremediation plant that can effectively be used to remove heavy metal from contaminated soil. In this experiment, three different types of plants used as sample plants to determine which plant is best in removing metal from soil. The plants then placed in a tube with the same quantity of soil and copper concentration. For an experimental purpose, the three sample plats received similar treatment and data was collected for each plant.

Effect of soil pH on the Phytoremediation capabilities of Radishes

Theo Yoder with Anna Paetkau

Faculty mentor: Siderhurst, Matthew

Phytoremediation is a technique that uses plants to remove harmful substances and pollutants from water and soil. More specifically, phytoremediation provides a convenient, cost effective way to reduce the destructive metals that can harm entire ecosystems. In this experiment, we will be testing the effect of altering the soil pH on the phytoremediation capabilities of Radishes. The substance used to measure the effectiveness of phytoremediation is copper, which was added to the soil where the radishes were planted. The soil is made more acidic by adding a standard amount of cold coffee diluted with water, and more basic by adding a standard amount of pulverized limestone or crushed egg shells. Each treatment will undergo numerous trials. The concentration of copper will be measured from each sample using spectroscopy and compared to draw the final conclusions.

Dylamato's Market

Gillian Zehr

Faculty mentor: Miller, Andrew

This is an environmental analysis of Dylamato's Market located in Hazelwood, Pittsburgh, PA. It is a small, family-owned grocery store. The environment in which Dylamato's is located is

analyzed based on SWOT and Porter's Five Forces. Her next strategic move is to create a commercial kitchen within Dylamato's in order to prepare hot foods for lunches.

Engineering Design of a Solar Panel Kiosk

Benjamin Zook

Faculty mentor: King, Daniel

The objective of this project was to create a solar powered plug in station on the turf field for a mobile concession stand. Because of electrical constraints, the current building on the turf field can only safely power one electrical component at a time. With the aid of this small solar array, the concession stand will be able to function at normal capacity. Two solar panels will be held in place by a wooden frame that is engineered to withstand appropriate wind and snow loads. The panels will be wired to a battery bank which will store the energy created by the sun. When anything is plugged into an exterior outlet, an inverter will convert the electricity to usable power that can heat up or cool down snacks for loyal fans of EMU.