

Participant Abstracts and Project Summaries

EMU Academic and Creative Excellence Festival 2021

This listing is in alphabetical order by the last name of the presenter.

(In the case of group projects, the entry is alphabetized under the name of the student who submitted the entry, which is the first name listed in the schedule document.)

Oral Presentations

Water quality between forested and agricultural land use zones in the western Shenandoah Valley

Isaac Alderfer with Micah Buckwalter
Faculty Advisor: Doug Neufeld

Most stream quality research associated with land use has focused mostly on developed and agricultural zones rather than less impacted areas, such as forested regions. This study in the western Shenandoah Valley of Virginia is unique because the watersheds include distinct adjacent regions of protected headwaters in national forest and higher order streams in agricultural lowlands of the valley. Most low order streams originate in the mountains under land conditions generally accepted as more 'pristine,' and combine with several major rivers in the Shenandoah River system. The rivers included in this study were the North River as well as major tributaries Dry River and Briery Branch. This study measured metrics such as phosphates, nitrates, bacteria, conductivity, and sediments along river transects as river order increases from headwaters on the mountain into larger rivers in the valley. Most metrics generally increased in the agricultural valley bottom as compared to the national forest; however, due to elevated nutrient levels at several headwater sites, water quality in national forest rivers may be impacted by sources other than current agriculture. In the national forest and valley respectively, we found mean nutrient levels of 0.026 ppm and 0.036 ppm for PO₄, and 0.548 ppm and 1.195 ppm for NO₃. Numerous sites in the valley crossed the EPA nitrate impairment threshold of 0.75 ppm, and several crossed the severely impaired threshold of 1.5 ppm. For phosphates, several sites crossed the impairment threshold of 0.05 ppm, but none exceeded the severely impaired threshold of 0.1 ppm. Our results aligned with past land use research that show water quality decreases in agricultural and developed zones, but it also suggested that there may be other impacts on water quality in the more 'pristine' regions.

Mars Capsule

Jonas Beachy with Andrew Schunn, Laura Troyer
Faculty Advisor: Stefano Colafranceschi

The goal of this project was to test grow plants in various combinations of Earth's soil, Martian soil, and Martian atmosphere by creating a capsule. The capsule will be airtight and will be filled with Carbon Dioxide, since that is what makes up the majority of Mar's atmosphere. This capsule will contain both Earth soil and Martian soil for plants to grow. The ideal place for the capsule is in the Eastern Mennonite University greenhouse. The design team will work together to design and build the capsule.

1. Test how plants grow in Martian soil and atmosphere compared to Earth's soil.

2. Design and build a sealed capsule to simulate Mar's atmosphere
3. Create an Internet of things Arduino system to measure the temperature, and regulate the water and Carbon Dioxide in the capsule.
4. Incorporate Linux and CherryPy to run a server for the Internet of Things.

Electronic Memory Game

Benjamin Bontrager-Singer with Caleb Hostetler, Logan Jones, Conrad Nyce

Faculty Advisor: Daniel King

This presentation demonstrates the design process, prototyping, and joining together of a 3D object from 2D laser cut sections. In this project, an electronic memory game was built for the Engineering Design II class.

Super-Mileage Car

Benjamin Bontrager-Singer with Ethan Spicher, Luke Wheeler, Tessa Waidelich, Laura Troyer, Joel Kornhaus, Noah Swartzentruber, Sean McClary, Caleb Hostetler

Faculty Advisor: Dub Stansberry

For the last two years we have been working on the Super-Mileage Car for the Shell Eco-Marathon Competition. Although the competition was cancelled the last two years we have finally had a chance to finish the vehicle that we have been working so hard on. In our presentation we will focus on the main aspects of the vehicle design including; chassis, engine, drivetrain, braking, and the body. Over the last two years our team has spent an estimated 2200 hours carefully researching, designing, and building the car. Through this project we have had the opportunity to close the design loop and construct our own designs and ideas. This project has been an extremely significant learning experience for everyone involved and has pushed us in the areas of problem solving, collaboration, communication, and dedication.

Documentation of Student Learning: Narrative Writing Unit in Seventh-Grade English

Megan Breidigan

Faculty Advisor: Paul Yoder

The Documentation of Student Learning project outlines a unit that I taught within a virtual seventh-grade English classroom during my first student teaching placement in the fall of 2020. The project provides five lessons from a fifteen lesson unit, which covers the topics of fiction and nonfiction characteristics with specific emphasis on author's purpose, figurative language, and the writing process. Although the unit is closely aligned with state content standards, my cooperating teacher and I intentionally focused on relationship-building and attending to students' emotional needs after several potentially difficult months of social distancing. Some of the activities from the unit include small group discussions via Zoom breakout rooms, Schoology discussion posts, class read-alouds, prewriting with graphic organizers, creation of a collage on a Google Slide, and peer editing shared Google Docs. Student learning was assessed with brief exit tickets, reading response free-writes, Zoom chat box check-ins, and submission of writing assignments to Schoology. Data from pre-assessments and post-assessments indicated student learning and informed instruction for the remainder of the unit. The project taught me the importance of assessment and reflection in determining instruction based on students' understanding and responses to past content.

Community carbon and nitrogen tracking; quantifying the City of Harrisonburg C and N footprints

Rachael Brenneman with Rebekah Amstutz and Jim Yoder

Faculty Advisor: Jim Yoder

Similar to carbon, excessive reactive nitrogen has detrimental environmental impacts, including a role in climate change and as a heavy polluter of natural waterways and aquatic systems. Excessive reactive nitrogen is a byproduct of food production, transportation, electricity production, and even wastewater treatment. By tracking these sources of nitrogen, a nitrogen footprint can be produced at an institutional, city, or state level. While relatively common at institutions of higher education, this has rarely been done at the city/municipal or church/business level. Using numerous public data sources, Harrisonburg's nitrogen footprint was calculated at the census block level. This footprint allows identification of the areas most contributing to the footprint and a better understanding of the impact of Harrisonburg's footprint on the environment surrounding the city. To spread awareness of nitrogen tracking and explore the effort needed at the smaller institutional level within Harrisonburg, we also contacted area churches with offers of assistance with carbon and nitrogen tracking. The Harrisonburg City footprint as well as any progress made with area churches will be presented.

Nitrogen footprinting at EMU

Rachael Brenneman

Faculty Advisor: Jim Yoder

Often overlooked in the grand scale of pollutants, nitrogen plays an important role in degrading our streams and water. Figuring out how exactly EMU contributes to this issue allows for more accurate and innovative sustainability practices. I will be focusing on EMU's calculated nitrogen footprint and my current social outreach to establish nitrogen footprinting as important in the general consciousness at EMU.

"You are the Petals", poetry

Anna Cahill

Faculty Advisor: David Brennan

Writing was always something I was destined to do. I'm quiet, but everything impacts me personally. I'm an observer by nature, and I love creating stories about every stranger I pass. I value people and the stories that they can provide. This is how I create life on pages. College gave me the chance to explore my love for writing. After being pushed to, "Study something you can make a career out of," I added Writing Studies as my second major, and I grew more as a writer than I ever had before. Somehow poetry had a way of always creeping into my art. This is a collection about me and the themes that highlight my life as a listener, observer, and storyteller.

Gun Ownership Identity and the Fear-Victimization Paradox

Garrett Cash

Faculty mentor: Matt Tibbles

The goal of this presentation is to inform the listener about how people come to own guns, how they attach their identities to gun ownership, and the demographics of gun ownership. The presentation will draw significantly on the fear-victimization paradox framed in gun ownership, which is the idea that people who experience less danger overall are more likely to own guns. The purpose of the presentation is to explore, not to judge, gun ownership and one's identification with guns so that people can gain greater understanding and empathy toward those who own firearms.

Exploring the art of filmmaking

Silas Clymer

Faculty Advisor: Chad Gusler

What exactly does it take to make a movie? A study in both process and product, this experiential learning project examines all aspects of crafting a story to be told through the screen and culminates in the presentation of a short fiction film.

Underground Comix: Thinking Outside of the Panel

James Dunmore

Faculty Advisors: Mary Sprunger and Kevin Seidel

I will be sharing my research into the Underground Comix movement, looking at it as a culture and trying to track its various influences and how it changed society.

Mental Health Policy in the Criminal Justice System

Elizabeth Eby

Faculty Advisor: Debbi DiGennaro

This paper examines the passage of Virginia House Bill 2047 and the broader issues that may be affected by the bill's passage. The bill allows for the presence of certain mental health conditions to be used as evidence for the defendant, as well provisions made to give bail to those suffering from mental illness. Public opinion of mental health, as well as treatment of mental health in the criminal justice system in the United States, are examined in connection to the bill and its possible effects and context. The history of mental health in the criminal justice system continues to evolve as more options for those struggling with mental health issues become available. Areas for increased reform include further expansion of mental health courts and increased accessibility of bail. In accordance with the NASW Code of Ethics, the author suggests that policies of mental health reform in the criminal justice system need to be expanded and continued further than what is described in HB 2047.

Caenorhabditis elegans as a model for Elizabethkingia anophelis infections

Emilio Fajardo

Faculty Advisor: Kris Schmidt

C. elegans is an excellent model organism for studies of innate immunity. In this work we examine the use of C. elegans as a model for infections with E. anophelis (Ea), a poorly understood Gram-negative bacterium that cause infections and death in immunocompromised hosts. In this work we show that Ea is highly pathogenic to C. elegans. Animals die quicker when exposed to Ea compared to non-pathogenic E.coli and show profound tissue damage. Animals employs common chemosensory pathways and innate immune pathways to avoid prolonged exposure to Ea and to prevent death.

Restorative Justice for Human Rights Violations in Lebanon

Yasmine Hawshar

Faculty Advisor: Amy Knorr

With the growing number of crimes and discrimination against women around the world, this paper seeks to address the issues of sexual abuse, domestic violence, and discrimination against women as human rights violations in the context of the country of Lebanon. This paper seeks to

provide evidence that challenge the criminal justice system in Lebanon by presenting its inadequate law while suggesting restorative justice RJ as an urgent alternative that has the potential to heal the community and prioritize the needs of the victims.

Mental Health Care Reform in Virginia

Olivia Hazelton

Faculty Advisor: Matt Tibbles

The purpose of this project is to explore where reform is needed within Virginia's mental health care system and how it can be improved to better meet the needs of the population.

It will specifically look into areas such as level of access to quality mental health care, investment in local community-based resources and early intervention, effectiveness of current programs, and the balance of funding between emergency in-patient services and community-based outpatient programs. It will examine how systematic failures have led to social issues such as increased homelessness, incarceration, and suicide rates. It will also investigate current reform efforts, as well as possible future action to better serve the residents of Virginia.

Peacebuilding Model: Leadership is Influence

Jim Herman with Tilbe Yaglioglu

Faculty Advisor: Amy Knorr

Peacebuilders and restorative justice practitioners work passionately to co-create a better, more just world. The best practitioners constantly learn, build networks, reflect on their work, and adapt to circumstances. They study how to manage, how to lead, and how to build organizations in order to become more effective practitioners. Although there are many well-studied and useful management/leadership models, none meet the particular needs of peacebuilders and restorative justice practitioners. We offer a model that strips away complicated design and that rests on the belief that leadership is influence. From that base, our model is centered on "me." What do we bring to each interaction? How does who we are influence what we are trying to accomplish? The model can be used to design training, in organizational development, and for personal growth. It assumes that each practitioner asks each practitioner to ask, "Who am I and what skills do I need in this process? In this interaction with people? In relation to community? It requires that practitioners reflect on themselves as they work on transforming the world.

A Worthwhile Communion

Aaron Horst

Faculty Advisor: Mary Sprunger and Kevin Seidel

Beer has been a means of bringing together communities of persons in a manner that allows each other to learn from, reach out, and support one another since the discovery of yeast. The theological confessions of Anabaptism and the mixological values of craft beer are not unlike each other and the two, when fused, just may be a worthwhile communion.

For over a century the Mennonite faith in the United States has set, more or less, a ban on alcohol especially in regard to the prohibition movement. In the more recent decades, people in the Mennonite community have begun to question and push against the notion that alcohol is innately evil. This presentation focuses on the characteristics of hospitality, creativity, community, and art and portrays how these characteristics can coalesce the Mennonite faith and the craft beer communities, and can, in fact, inform one another.

Principles in Action: Secretary of State Henry Kissinger and the Indonesian Invasion of East Timor

Paige Hurley

Faculty Advisor: Mary Sprunger

This is an investigation focused on two of Henry Kissinger's early academic works--Nuclear Weapons and Foreign Policy and Essays on American Foreign Policy--and their interactions with Kissinger's decisions as National Security Advisor and Secretary of State. Kissinger's works reveal a set of principles he proposed for diplomacy. The Indonesian invasion of East Timor in 1975 is used as a case study to see if these principles were upheld when Kissinger became the figure conducting diplomacy.

Queer theory through my eyes

Hannah Leaman

Faculty Advisor: Shemaina Jory Miller

"Queer theory through my eyes" is a portfolio of watercolors illustrating how various queer struggles have shown up throughout my journey with my sexuality. While both a synthesis of academic theories and an analysis on how our heteronormative culture permeates my life, it is also a personal reflection, a dive into figuring out my identity and how to use my experiences to support others.

Through Photovoice: Exploring Integration of Congolese Refugees in Roanoke, VA

Robin McLamb

Faculty Advisor: Amy Knorr

This research explores the perspectives of young adult Congolese refugees on their integration process in Roanoke, Virginia, using photovoice. Examining what precisely happens when one person moves, for a variety of reasons, to a place rich in a differing culture is something worthy of study. Unheard in many texts and policies relating to refugee resettlement are the perspectives of the refugees themselves. It is not enough to have host countries and communities define needs and expectations for refugee integration. It is meaningful to explore how successful integration is defined by young adult Congolese refugees, in light of their assets, needs, and desires. Additionally, as refugees integrate into a new place, what intercommunity bridges must be built for that integration to be experienced? Photovoice, a strategy of participatory action research, seeks to produce knowledge with impacted community members, not on their behalf. Participants of this study were viewed as co-researchers actively engaged in data gathering, analysis, and action.

To gaze with love: visual arts as spiritual formation

Carmen Miller

Faculty Advisor: Sarah Bixler

The visual arts are a gift to all people. This presentation will share several specific spiritual practices. These intentional rhythms draw one towards greater love for God and shape one to be more fully present to others in love - particularly in chaplaincy ministry. Inspired to create, as a reflection of God's enlivening, the creative process and scholarly research, the presenter will share her work.

Playing and praying with scripture: rediscovering biblical imagination through Ignatian contemplation

MaryBeth Moore

Faculty Advisor: Sarah Bixler

Does your heart long for greater intimacy with Jesus Christ? Have you lost the wonder of reading a biblical story as if for the first time? In the 16th century, St. Ignatius of Loyola, a founding member of the Society of Jesus, was passionate about using the imagination to enter the biblical story to reveal the holy desires of one's heart and deepen one's devotion to Jesus. By using Ignatian Contemplation techniques to play and pray with scripture, 21st-century readers can enliven their spiritual connection with Jesus by inviting the Holy Spirit to breathe fresh, life-transforming power into their imaginative engagement of biblical narratives that have become mundane, under-impressive, or overly intellectualized. During this presentation, we will spend time entering a biblical narrative, experiencing it with our senses of sight, hearing, touch, taste, smell, feelings, and emotions.

Northern saw-whet owl (*Aegolius acadicus*) migration patterns in Northwestern Virginia

Jacob Myers with Clair Mellinger, Charles Ziegenfuss, James Yoder

Faculty Advisor: Jim Yoder

The Northern Saw-whet Owl (*Aegolius acadicus*) is a small owl that migrates south through the eastern United States every fall. Until the late 1900s, the saw-whet owl was considered rare due to its cryptic nature, roosting in conifers and remaining quiet away from its breeding grounds. In 2001, Clair Mellinger, a professor at Eastern Mennonite University, set up a banding station 20 miles north of Harrisonburg, one of the first stations in this region. This station has operated for 19 of the past 20 years, capturing and banding 1967 saw-whet owls through 2019. We analyzed annual differences in sex ratio, mean arrival date, and age ratio, and compared these patterns with data collected at various other stations located throughout the eastern U.S.

Engineering capstone flight sEMUlator

Douglas Nester with Ethan Beiler, Aaron Zimmerman, Joshua Schlabach, Noah Sargent

Faculty Advisor: Stefano Colafranceschi

The objective of this project was to construct a partial motion flight simulator rig for the purpose of training pilots. The rig is compatible with Microsoft Flight Simulator and uses a recycled and modified Cessna 120 cockpit.

Motion is provided to the flight simulator using a system of pneumatic cylinders controlled by data pulled from the simulator software. The user controls the simulated plane using a physical yoke, as well as a digital onboard display.

3D printing a muon detector (materials science and prototyping)

Reuben Peachey-Stoner

Faculty Advisor: Stefano Colafranceschi

A team lead by Stefano Colafranceschi is exploring the feasibility of building muon detectors using graphene doped PLA and novel construction techniques. I will present with a particular emphasis on the materials science challenges this work presented.

Two Digit by Two Digit Multiplication: Fourth Grade Math Progress with Limited Instruction

Emma Pirrung

Faculty Advisor: Ronald Shultz

Fourth graders in Virginia Public School are faced with the challenge of learning detailed, multi-digit multiplication and division. This typically difficult concept was made even more

challenging, as these fourth grade students were attending school two days a week and receiving very limited math instruction due to the COVID-19 pandemic. This particular documentation of the student learning project was altered to follow and document progress over four weeks, rather than one due to the special circumstances. Comprehension was particularly important during this unit, as students often went days without math instruction. Students were taught tools and skills to help them meet the Standard of Learning (SOL) 4.4 The student will a) demonstrate fluency with multiplication facts through 12 x 12, and the corresponding division facts; b) estimate and determine sums, differences, and products of whole numbers throughout the four weeks. I focused on the utilization of technology, such as nearpods, jeopardy games and kahoot activities, and was able to see many students make tremendous progress throughout the unit despite limited instructional time.

Dismantling Binaries through a Color-Wheel Identity Exploration

Emily Powell

Faculty Advisor: Amy Knorr

Current common exercises for discussing the basics of queer identities (like a genderbread person) often feature binary visualizations. I, at the beginning of 2019, felt some gender disorientation and was frustrated as a facilitator and budding genderqueer person that in these paradigms gender is shown as man on one end of a line with woman on the other and you can either be in between somewhere or maybe not on the line at all. This otherizes individuals who are trans and reinforces cis-normativity. I wanted to make room for the depth of gender experience and those of us who move fluidly with ideas of gender and make our own expressions and language. Western education is built on heterocispatriarchal, white supremacist understandings of identity, and I didn't want to contribute to a false binary that causes real, direct harm.

In response to this frustration, I added a color wheel to the exercises I use in my queer education activism spaces at EMU. I used a color picker gradient wheel with 100% saturation so the color, rather than any intensity or dark-light scale, was the focus. The exercise has been refined in the last 2 years, and I am developing usable versions for different contexts. For the ACE festival I will be facilitating a live exercise with dialogic reflection as well as setting up a space on campus in the evenings where students, faculty, and staff can come collaborate on an interactive collage of the full rainbow of diversity our identities carry.

Thus far, feedback has been overwhelmingly positive on the Color Wheel tool. Participants have stated that it caused them to think about themselves in brand new ways, and helped in imagining themselves outside restrictive, sometimes oppressive labels. This is, however, an innovative approach, so further feedback is welcome.

Building Community

Julia Powers

Faculty Advisor: Matt Tibbles

There are too many negative circumstances people endure because they were forced into or felt the effect of isolation, when in most of these cases having an extra ear or hand for support is all that was needed. Community is the strongest stepping stone toward improvement for the numerous, "normal" everyday adverse situations people may find themselves in. However, finding or cultivating community in a way which truly supports and nourishes its members is unfortunately quite difficult. Much of today's society highlights a need for individuality, personal consumption, and competition. In and of themselves, none of these values are inherently wrong

or harmful. Nonetheless, any gain from perpetuating a cycle of living by oneself and for oneself has little standing ground against the benefits from lives lived together.

Through participation in the ACE Festival I aim to speak about the importance of broader and deeper community building between any and all persons affiliated with Eastern Mennonite University (EMU). In addition to my goal of simply illustrating the importance of further building our community, I wish to offer a single example of how the construction may begin. EMU's students, faculty, and staff are constantly providing opportunities and suggestions for community development, although I personally cannot recall much emphasis on ways to build EMU's community by interacting further with the greater community of Harrisonburg. I argue that providing more education and guidance on how to specifically interact with people who are experiencing homelessness in Harrisonburg would not only identify individuals who are perhaps less seen by us as a community, but would also build stronger bonds within EMU as we learn together and broaden the circles of people we connect and grow with. There are many places where such aforementioned interactions can begin, we only need to go and learn together.

PopViolence: Critical Perspectives on Structural Violence

Tim Rasmussen

Faculty Advisor: Amy Knorr

The stories humans tell for entertainment, intentionally or not, are reflections of their social structures and the violence within them. Systems and intersections of violence have been studied and theorized about extensively, and this analysis and body of knowledge is invaluable to building more just and peaceful societies. PopViolence is a podcast that integrates critical perspectives about conflict, justice, violence, and peace into pop-culture reviews of films, shows, and music. The podcast aims to present these critical perspectives in fresh, catchy, and accessible ways in order to increase listeners' awareness, understanding, and consciousness about structures of violence, and how those structures might be dismantled.

Fracciones y decimales: Teaching math in an online dual language environment

Ruth Reimer-Berg

Faculty Advisor: Barbara Wheatley

In the month of February, I taught a 15-lesson unit on comparing fractions and decimals to fifth grade dual language students (in English and Spanish). Due to the pandemic, this learning took place in a virtual environment via Google Meets, a virtual video conferencing platform. This unit focused on Virginia Math Standard of Learning 5.2, which requires students to find decimal and fraction equivalences, to compare fractions and decimals using greater than, less than, and equal to signs, as well as order fractions and decimals from either least to greatest or from greatest to least. This unit was taught entirely in Spanish, during the daily hour of Spanish instruction,. Each lesson was about 30 minutes long, taught to four separate groups of about 10 students each day. Throughout the unit I utilized several different instructional technologies, including Google Classroom, Google Slides, Nearpod, Peardeck, and BrainiacCamp (a virtual manipulatives platform). This presentation will focus on assessment measures to assess and document student learning over the course of a unit and on key take-aways from my first experience teaching a unit during my first student teaching placement in the Spring of 2021.

DOSL: Introduction to money

Sarah Ressler

Faculty Advisor: Kathy Evans

This Documentation of Student Learning Project follows a local 1st grade classroom's math instruction for the month of February. Over four weeks, this class focused their math instructional time on VA SOL 1.8: "The student will determine the value of a collection of like coins (pennies, nickels, or dimes) whose total value is 100 cents or less". Over the course of the unit, students practiced the foundational money skills outlined in this SOL and expanded beyond. The unit introduced what money is and focused on making learning hands-on and including real world connections. Students engaged with the unit through a variety of activities including songs, close observations, Chatterpix, and project based learning. As an extension of the essential objectives, students participated in conversations about money's purpose, budgets, and poverty. The DOSL will outline the classroom environment, how lessons were planned and implemented, as well as the extent to which students met the instructional objectives.

Documentation of Student Learning: Fraction Times Whole Multiplication

Rachel Sauder

Faculty Advisor: Cathy Smeltzer Erb

The Documentation of Student Learning project includes the creation, implementation, and analysis of a unit to demonstrate P-12 student growth. This unit follows the Standard of Learning 6.5a which states that the student will be able to multiply and divide fractions and mixed numbers. Due to COVID-19, classes were offered virtually. To prevent students from sitting in front of a computer all day, class periods were limited to a 50-minute time block. Within that time, a six lesson unit was taught and focused on multiplying fractions analytically and pictorially. The unit was implemented in a class of nineteen students, twelve of which were English language learners who logged in to GoogleMeets from the same classroom each day. One student logged in from the Academic Success Center at the school and the remaining five logged in from their homes. The differing learning environments and English levels made differentiation imperative throughout the teaching of the unit. To analyze their growth a pre-assessment and post-assessment were given to determine how many of the students were able to meet the unit objectives. Of the three objectives, about a quarter of the class were able to answer four out of the six modeling questions completely correctly or earn an overall score of 8 on the post-test as outlined on the rubric. Two-thirds of the class met the objective of correctly completing the computation problems. Ideally, a larger portion of the students would have met the unit objectives, but the growth demonstrated by the class was tremendous and many students fell just short of the objectives. COVID-19 threw a wrench in the way educators approached the classroom and is imperative to the context of the project and the outlook of the final analysis. Ultimately, the project allowed for a thorough reflection of the unit in order to determine ways in which the instructional delivery could be improved in the future.

Personal and Political Food: The Jungle, Silent Spring, and World War II

Allison Shelly

Faculty Advisor: Mary Sprunger and Kevin Seidel

What do The Jungle, Silent Spring, and World War II have in common? They all brought about major shifts in American food creation and consumption. In order to counteract climate change, a large shift in eating habits and food production must take place, particularly in the animal agriculture industry. This shift will be difficult because of our strong attachments to food, but the shift can also be fueled by our strong attachments to food. I argue that rather than labor rights and environmental concerns, The Jungle and Silent Spring gained prominence because of their appeals to one's own stomach. And additionally, rather than isolated in war time, I argue that

the tactics used to usher in food rations during World War II were a government effort still possible today.

Procedural Generation in Game Development

Christian Stutzman

Faculty Advisor: Charles Cooley

This project is an attempt to use what I have learned during the past 4 years, and extend that knowledge to learn more about how games are designed and built, and learn how to think in terms of procedural generation as a developer. The project is created using the Godot engine. I will be presenting what I have done, what I have learned, and what my mistakes were on traversing this path.

Envisioning Queer Justice: Restorative Visions from LGBTQ+ Youth Voices in Minnesota

Connor Suddick

Faculty Advisor: Amy Knorr

Across the United States, LGBTQ+ youth are overrepresented in the juvenile legal system and school disciplinary processes. Given these disparities, the Envisioning Queer Justice Collaborative of Minnesota sought to amplify the voices of self-identified lesbian, gay, bisexual, transgender, and Queer (LGBTQ+) youth to identify pathways to Queer justice. In early 2020, restorative justice practitioner-researchers held six community peacebuilding circles with 33 LGBTQ+ youth to provide a space for them to reflect on what justice means to them, as well as what actions must be taken for their visions to manifest. This presentation focuses on the theme of “justice as nourishment” and its implications for the predominantly heterosexual and cisgender field of restorative justice working with LGBTQ+ people.

Restorative (In)Justice: Examining the Carceral Aspects of Restorative Justice in Education

Connor Suddick

Faculty Advisor: Amy Knorr

Policing is not exclusive to the police. As the movement for police-free schools gains momentum across the United States, the proposed alternatives must be examined to ensure they do not use identical carceral tools and tactics of policing: coercion, control, surveillance, and punishment. As restorative justice continues to be lauded as an alternative to police, without identifying and wholly transforming carceral culture, restorative justice becomes yet another iteration of the carceral state within schools. Therefore, what are the carceral aspects of restorative justice in schools? This analysis draws from the personal experiences of a schools-based restorative justice practitioner and existing literature in restorative justice, critical education studies, and carceral studies. This research suggests that restorative justice must be augmented by an anti-oppression framework to address both interpersonal and ongoing structural harms in schools.

Bessie Smith to Cardi B: Sexual Liberation and the Music of Black Women

Katherine Szambecki

Faculty Advisor: Mary Sprunger

This project is a research paper with this thesis: The empowering effects of Black women’s music alongside feminist theory prove that displays of sexual liberation in Black women’s music have been and continue to be highly successful in dismantling sexist power dynamics. But while it may be liberatory or empowering, highly sexualized music also perpetuates some unhealthy stereotypes. If we want to create a culture in which sexually explicit media can be solely

liberatory without consequence, we must rework society's relationship with sex as a whole, aiming to end sexist oppression.

"Pizzas in Pittsburgh" (Working title), fiction

Thoreau Zehr

Faculty Advisor: Chad Gusler

The story of young cook working alongside a curmudgeonly chef, dealing with inheritance and the beauty of food.

Poster Presentations

Nitrogen tracking and footprint reduction scenarios at EMU

Faculty advisor: Jim Yoder

Rebekah Amstutz with Rachael Brenneman, Jim Yoder

Reactive nitrogen is a significant contributor to climate change, both as a greenhouse gas, and through pollution of waterways. Nitrogen tracking is the process of monitoring the amount of reactive nitrogen produced by an entity, which allows organizations to identify areas of consumption that excessively contribute to this nitrogen production. At EMU, the largest source of nitrogen is linked to food served in the cafeteria, especially meats, and more specifically, beef. Reducing meat consumption overall, or at a minimum replacing beef with chicken or pork, could help mitigate some of those excess nitrogen emissions. This project consisted of analyzing several scenarios for reducing or replacing meat or beef in the EMU dining hall and identifying what percentage of nitrogen emissions could be reduced. The first scenario explored the effects of cutting out meat altogether from the dining hall, and the second examined how much nitrogen would be reduced by just cutting back meat consumption by 10, 20, and 30%. The amount of nitrogen currently being mitigated through the composting program at EMU was also calculated. These scenarios will be helpful for setting overall nitrogen reduction goals for the campus.

Español de Puerto Rico

Rebecca Arias

Faculty Advisor: Wendell Shank

El español de Puerto Rico es diferente de los otros países hispanohablantes. Cuando Puertorriqueños hablen, puedes notar su acento. Su acento es muy famoso y todo el mundo sabe si eres de Puerto Rico. La cultura de Puerto Rico es rica también y todos encantan su cultura. Por ejemplo, la área turística de Puerto Rico es considerado de la mas alta cualidad. Todos quieren ir y quieren estar en la cultura y ambiente de Puerto Rico. También mucho famoso cantantes vienen de Puerto Rico y son muy exitosos. Como Bad Bunny, Daddy Yankee, Anuel AA, Luis Fonsi, Marc Anthony, Jlo, y etc. Cero que son muy exitoso por su acento porque todos lo encantan. Mi investigación será porque los puertorriqueños tienen una español diferente de los otros hispanohablante países y como eso afecta su forma en la acento.

The development of inclusive and gender-neutral language in Spanish

Emma Burkhart

Faculty Advisor: Wendell Shank

This study seeks to explore the development of gender-inclusive language in Spanish language and culture. The foundation of this project is found in literature on linguistic elements of Spanish and cultural shifts toward gender inclusivity and nonbinary thinking. Elements of the research include the distinctions between grammatical gender, biological sex, and social gender and the relationships of these three elements with the Spanish language. This study will offer several grammatical options for inclusive language in Spanish, critiquing them and exploring their current use, as well as the ways they influence and are influenced by the culture around them.

Are introverts sad?

Anna Cahill

Faculty Advisor: Susannah Moore

Considering the negative impact of COVID-19, this study attempts to find relationships between personality types and harmful behaviors such as depression and alcohol use. Four personality tests are used along with Beck's Depression inventory and the Alcohol Use Disorder Inventory. Participants from EMU took surveys to explore these potential relationships and correlational analysis were used. Does personality type correlate with depression and alcohol use? If the hypothesis for this study is supported, then personality characteristics like introversion and neuroticism will correlate with depression and alcoholism. The COVID-19 Impact Survey takes the pandemic into consideration when considering depression and alcohol use in the past year.

Childhood Parental Styles as a Factor in Aggression and Empathy in College Students

Julie Crouse

Faculty Advisor: Susannah Moore

The current study will focus on the relationship between the parental styles a person was raised by and the current levels of aggression and empathy in a person. Surveys were used to measure parental styles, aggression, and empathy with subscales for aggression and empathy to look at specific areas of these categories. The current study examines the following questions: What is the relationship between the different types of parental styles and the current aggression levels of college students? How do specific aspects of these parental styles relate to subcategories of aggression? What connections can be seen between aggression and empathy in college students? Which parental style is the most common among high levels of aggression or empathy?

The influence of the Spanish education system in native speakers

Jessamine Domingo with Edith Ortega-Sanchez

Faculty advisor: Wendell Shank

The researchers interviewed a young student who immigrated to Harrisonburg as a teen from the Caribbean. They find it harder to communicate with her family as an English speaker. The study was conducted via an hour long interview through Zoom where the interviewee answered multiple questions relating to their personal, professional, and student life. They analyzed recordings and videos to note linguistic changes in her Spanish caused from moving to the United States at a young age and being around different Spanish speakers. With the findings, the researchers concluded that her Spanish has English influences caused by the education system in the United States.

Effects of Ibuprofen on viability and regeneration in Planaria

Hannah Giagnocavo

Faculty Advisor: Kris Schmidt

Planaria are well known for their ability to regenerate whole body segments following transection. In this work we examine a role for ibuprofen in both regeneration and viability in a common planaria model. We observed changes in viability as measured by LC50 as well as changes in morphology and regeneration potential following various doses of ibuprofen.

The impact of the Spanish soccer league in Harrisonburg

Joshua Gomez with Jesus Trejo

Faculty Advisor: Wendell Shank

In this investigation we are going to interview the president, participants, players, and sponsors that are involved in the Harrisonburg Spanish soccer league and how it affects it economically and culturally. The Spanish soccer league has provided a safe space for Hispanics from all over central and south America to connect as they enjoy playing the most popular sport from their countries. We are also studying the history of the league by how and why it was created and the future plans of the league coordinators. Through this investigation we want to learn how this soccer league has impacted the Hispanic community, and how it has helped this community find a safe place in the U.S. We also want to find information regarding the unification of other cultures thanks to the sport of soccer. We hope that this investigation will help us promote the sport of soccer to our community, because of the positive effects that it brings it.

Local Resources in Harrisonburg for Spanish-Speaking Immigrants

Olivia Hazelton

Faculty Advisor: Wendell Shank

My research focuses on the local resources available in Harrisonburg for Spanish-speaking immigrants, centering around legal services, healthcare, and educational programs. Through contact with local programs and advocates, I was able to learn more about what kind of community supports there are for Spanish-speaking immigrants in Harrisonburg and surrounding areas.

Chronic Illness and Mental Health

Brandon Higgins

Faculty Advisor: Susannah Moore

The consensus in research regarding the topic states that there is a much higher incidence of mental health problems, including depression and anxiety, among individuals with a chronic illness or disease. However, there is not a lot of current research regarding how often these individuals seek treatment for their mental health. In this study, I am looking to see if there is any difference in counseling seeking behavior and attitudes towards professional mental health counseling between young adults who were diagnosed with a chronic illness in childhood or adolescence and young adults without a chronic illness.

Preference Assessments: Comparing Different Modes and Methods

Lindsey Histan

Faculty Advisor: Susannah Moore

The purpose of this research is to compare different methods and modes of preference assessments in children. Preference assessments identify favorite items of individuals, usually either toys or food items. These assessments are most commonly used with individuals with Autism Spectrum Disorder, but could also be used with neurotypical children or adults with neurodegenerative disease. After the favorite items have been identified, they can be used as

motivation or reward for performing well in an activity and increasing desirable behaviors. Each participant underwent four different types of preference assessments: Researcher-led paired stimulus, researcher-led multiple-stimulus-without-replacement, computer-based paired-stimulus, and computer-based multiple-stimulus-without-replacement. The success of each preference assessment type was assessed, in terms of identification of preferred items, prevention of problem behavior, and time it takes to complete, to identify which preference assessment mode and method works best.

Visualization of Fluorescence in Isoptera (Termites)

Garrett Howard with Matthew Siderhurst

Faculty Advisor: Steve Cessna & Matthew Siderhurst

In this project, termites will be looked at under a high powered microscope to see where they fluoresce. Different levels of UV lights will be tested to show which wavelengths cause the Isoptera to fluoresce and where in their bodies it fluoresces. Many pictures will be taken to compare and contrast the different wavelengths and show our results. It will also be determined which compound is responsible for the fluorescence in the Isoptera. We will be able to add on to previous research on the Isoptera and update our findings on the various compounds that cause it to fluorescence and also show different UV lights wavelengths that can all cause the Isoptera to fluoresce.

Covid Impact on Mental Health in the Retirement Community

Josiah Kanagy

Faculty Advisor: Susannah Moore

The impact of Covid-19 has impacted people across the world in a lot of different ways and some are more vulnerable to its negative effects than other. While many people have been staying isolated for their physical health, their mental health is also important to take care of. The elderly population in the U.S has had higher rates of depression and other mental health problems than other age groups, and those living in retirement homes during Covid-19 have been shut off from other people in varying degrees due to safety restrictions. This research project was done to investigate how Covid-19 has impacted specifically loneliness and depression in older adults living in retirement homes as they tend to be higher risk for Covid-19.

The Use of Negative Peace

Molly King

Faculty Advisor: Matt Tibbles

My intended message of this project is to give insight into ways theories of peace can be implemented into regions and people groups that are in conflict. Exploring the civil war in Yemen can provide insight to how conflicts can be resolved peacefully to those who are not aware of the different theories of peace. The ceasefire in 2015 to deliver humanitarian aid was unsuccessful and only lasted a few days before fighting began again. From this research I will provide the ways to discover other actions to attempt using negative peace to change the direction of this war.

Recursos educacionales para hispanohablantes: Un análisis de la accesibilidad lingüística en Harrisonburg, VA

Hannah Landis with Elizabeth Miller

Faculty Advisor: Wendell Shank

The objective of this study was to analyze the education opportunities and resources available to Spanish-speaking families in Harrisonburg, Virginia, and offer suggestions for future improvement. By investigating websites, online resources, and programs offered by various organizations including Harrisonburg City Public Schools, Boys and Girls Club, Parks and Recreation After School and Second Home Learning Center, we determined various benefits already in place. These include a thriving bilingual education program and before and after school programs that care for students and families that speak Spanish exclusively in the home. Areas for improvement included accessibility of online translations of information, better representation of Spanish-speaking people in personnel at schools and child care programs, and increased attention to fundraising initiatives in order to keep prices affordable for these families.

Examining changes in anti-microbial expression in *C. elegans* exposed to *Elizabethkingia anopheles*

Skylar List with Sarah Grossen, Wesam Albayati

Faculty Advisor: Kris Schmidt

C. elegans is a powerful model organism used in studies of innate immunity. In this work we examined changes in the expression of the anti microbial proteins DOD-24, IRG-1 and T024B8.5 in *C. elegans* exposed to *E. anophelis* using transcriptional reporter GFP strains. We have so far observed marked decreases in the expression of T024B8.5 and increases in IRG-1. IRG-1 is general marker of infection and is induced upon endotoxin driven translational inhibition, providing a window into how nematodes may recognize *E. anophelis* as pathogenic.

Linguistic Phenomenons in Reggaeton Music

Rachel Loyer

Faculty Advisor: Wendell Shank

Long-term linguistic and social contact in multilingual communities, such as the communities that enjoy reggaeton music, results in certain language-mixing phenomena like code-mixing and Spanglish. Historically, the use of code-mixing and Spanglish by bilingual and multilingual youth has been seen as an unfortunate and disadvantageous habit, rather than as a useful tool for communication. Recent studies have shown that artists who attract multilingual communities use these linguistic functions as an artist device to attract a wider audience, to express cultural identity, and to aid in the structure of songs.

Immigrants Living in Harrisonburg

Maria Menjivar

Faculty Advisor: Wendell Shank

There are many immigrants living in the Harrisonburg, Virginia area. I was interested in researching about how it would be for an immigrant to transition to living in Harrisonburg. Finding key things like housing, legal help, jobs, health care services, education services, and much more are very important. I used various online sources and services, such as government websites, intended to help immigrants find resources to help them find what they need while transitioning to living in Harrisonburg. Transitioning to living in a new country can be a very complicated and long process. My findings prove this, however, Harrisonburg services provide many great resources and people willing to help immigrants work through these challenges. Harrisonburg proves to be "the friendly and welcoming city" that it is known for.

The History of "English Only" Education and How It Affects the Bilingual Program

Sara Mumbauer

Faculty Advisor: Wendell Shank

This project entails an in-depth study of the formation of "English Only" in governmental and educational use. As "English Only" became less of a phenomenon promoted by individuals throughout important organizations in the United States, the Dual Language program took over as a way of promoting linguistic diversity. This presentation discusses the evolution of "English Only", the Dual Language program, and personal observations from Dual Language classrooms.

Bilingual Relationships and Linguistic Growth

Abby Olmstead with Katie Johnson

Faculty Advisor: Wendell Shank

In this study, we would like to determine the different factors that cause linguistic growth in a bilingual or multilingual relationship such as influence on diction, syntax, and dialect spoken. More details to come.

Effects of Machismo in the U.S

Bri Rodriguez

Faculty Advisor: Wendell Shank

Machismo is a controversial tradition in Hispanic communities. It can be a form of toxic masculinity and in the Hispanic community it has become much more. It has become an exaggerated macho culture, impacting other people, for example Latino women or their families, repressing them by making them feel less than they do. Much of the linguistic aspects of machismo - the reason it has become a global abbreviation for hyper masculinity - stems from the mid to late 20th century anxieties about security, the Cold War, immigration, and overpopulation, in particular the close neighbors of the United States, Mexico and Puerto Rico. The term machismo is often used among Spanish-speaking people, mainly those who are used to the tradition of the old country. It means "manhood". The use of the word and its application to the contemporary problems of the country feed the ways in which machismo was emerging as a word in this world.

Is a Lecture Just a Lecture?: A Comparison of Online and In-Person Learning Environments

Cora Sawin

Faculty Advisor: Susannah Moore

Educational systems have had to make rapid adjustments in response to COVID-19. While a large percentage of these adjustments utilize online methods, not much is known about the effectiveness of virtual mediums when hosting classes synchronously. In other words, is listening to a lecture online just as effective as listening to one in-person? This study was designed to look at long-term memory retention in participants who listened to a lecture virtually relative to those who listened to the same lecture in-person.

Motivation and Memory: The Role of Reward on Encoding and Retrieval

Josh Wenger

Faculty Advisor: Susannah Moore

This study analyzes the effects that reward-based motivation has on memory. Previous literature has shown that extrinsic motivation can be used to improve memory performance, however, it has been unclear how exactly this boost to memory performance fits into information processing theory. This study seeks to identify whether the motivational effects work to improve memory as it is being learned (encoding) or as it is being remembered (retrieval). Three experimental groups

(control, reward before encoding, reward before retrieval) each run through a memory test comprised of a learning phase, filler task, and testing phase. The only difference between these three groups is the presence and timing of a reward (in this case a lottery ticket) whose delivery is dependent on their memory performance. With this experimental design, the motivational effects of reward on encoding and retrieval can be isolated and examined to further integrate the study of motivation into the traditional information processing model.

Working Memory and Reward: A Time-based Model

Josh Wenger

Faculty Advisor: Joy Kreider

This study seeks to test a theory as to the nature of motivational effects on memory performance. Chemical-based hypotheses of memory (e.g. Dopaminergic Memory Consolidation Hypothesis) have been implicated in memory and motivation studies when there is a long gap (i.e. a week) between the reward and memory test, yet do not hold up when memory is tested immediately. This finding begs the question as to what mechanism reward-motivation uses to improve memory in these short-term studies. This study hypothesizes that motivation helps increase executive function, further improving working memory and the ability to manage attentional resources. We examine whether this motivational boost to executive function is tied specifically to the task being rewarded, or simply operates over a period of time in which the reward is active. In other words, if a reward is promised for an unrelated task, will we see an increase in working memory performance if tested between the time of introduction to the reward and reception of the reward?

Terpene Emission in spruce trees

Aden Weybright

Faculty Advisor: Matthew Siderhurst

This project is a following up on previous research done on terpene emission in spruce trees. This project is looking at how differences in light and shade effect the terpene's that are emitted from the spruce tree.

A sense of belonging: relationships between nursing students and their learning environments

Malade Yigremachew with Stephen Cessna

Faculty Advisor: Stephen Cessna

The determination that students make to become a skilled nurse through their bachelor's degree programs is enhanced by their desire to provide care in the clinical field. During their college period, students go through various phases. The emotional exhaustion and stress could undermine students' academic achievement and confidence. A vital component of college performance is belonging to colleagues, in classrooms or on campuses. It may affect the academic adjustment, performance and ambitions of a student, or even whether a student is in school to graduate or not. This research project investigates the sense of belonging of first year nursing students at EMU. How the sense of identity varies on the basis of the social identities of students such as their ethnicity, academic achievement, social interactions, psychological orientation or their overall campus conditions.

GC-MS Analyses of Protein-Based Tephritid Fruit Fly Lures

Theodore Yoder

Faculty Advisor: Matthew Siderhurst

Tephritid fruit flies require various proteins for development and survival. Protein lures are used to attract fruit flies in an attempt to control their populations. Proper control of Tephritid fruit flies will benefit small farmers and preserve food supplies for entire communities. Because protein lures can attract many different insect species, we have worked to determine which compounds best attract Tephritid fruit flies specifically. Gas chromatography and mass spectrometry were used to determine the volatile compounds that are most abundant in commercially used fruit fly protein lures. The results showed that two classes of compounds, benzaldehyde and its analogs and alkylpyrazines, were most present, and can be later used in the synthesis of a synthetic protein-mimic fly lure. Further research later this year will utilize electrophysiology, bioassay and field work in Hawaii to understand the effectiveness of synthetic lures using these classes of compounds.

The Migration from Puerto Rico to Philadelphia & New York

Rebecca Yugga

Faculty Advisor: Wendell Shank

The research I conducted is on the migration from Puerto Rico to Both Philadelphia and New York. The methodology used came from secondary sources such as scholarly articles as well as books that contain quantitative numbers as well as qualitative data. The key results on why Puerto Ricans migrated towards the United States was due to labor and citizenship. Recruitment for labor programs were created and Puerto Ricans were used for labor and merchants and deemed the preferred "source" for labor. Puerto Ricans created communities and built businesses, organizations, and well as affirmed their traditions and customs in their settled establishments.

Spanish as an official language of the United States

Verda Zook

Faculty Advisor: Wendell Shank

The U.S. doesn't have a legally declared official language, though there have been several attempts to make English the official language. In this paper, I will argue that both English and Spanish should be made the official languages of the U.S. Spanish has been spoken in what is now the U.S. as long as English has, and the Spanish-speaking population continues to grow. Obviously, having Spanish as an official language would benefit the Spanish-speaking population. However, it would also benefit the English-speaking population by encouraging the growth of bilingualism and allowing more Spanish speakers to work up to their education level. But most importantly, recognizing Spanish as an official language would be a way to strengthen and unify the U.S. and provide justice to a group of people that is often discriminated against.