Poster/Portfolio

BEGINNING AT 9:00 A.M.

HENRY HALL ATRIUM 001

An Expanding Role of Protein Kinase N (Pkn) as a Rho1 Effector in *Drosophila melanogaster*

Participants attending 1:00 PM - 2:00 PM
Presenters: Molly McGuire, Lia Quatro
Mentor: Georgette Sass

Rho1 effectors in *Drosophila melanogaster* regulate actin filament nucleation, elongation, and stabilization. Protein kinase N (Pkn) was identified as a Rho1 effector, with mutants displaying defects in embryonic dorsal closure and actin-myosin contraction during nurse cell dumping. We have characterized the *delorean* mutant allele of *pkn* which exhibits pairing-dependent reduction in levels of pkn expression. A reduction of maternally contributed Pkn from *delorean* homozygous females revealed a range of embryonic defects. A GFP-tagged Pkn was used to examine the endogenous localization of Pkn to understand its role in early embryonic dynamics. Pkn-GFP in syncytial blastoderm was seen associated with centrosomes, mitotic spindles, and basal tips of plasma membrane furrows both prior to and during cellularization. A maternal loss-of-function phenotype was created using a mat*a*-GAL4 driver and CRISPR-Cas9 mediated knockout or deGradFP knockdown of Pkn-GFP, recapitulating embryonic phenotypes first seen with homozygous *delorean* mothers. To further explore Pkn's role, the moesin actin-binding domain was introduced into *delorean* homozygotes, enhancing the mutant wing phenotype, a result also observed with the actin-binding domain from human utrophin. We discuss how these unexpected results in conjunction with Pkn expression patterns in early embryogenesis contribute to our understanding of Pkn as a Rho1 effector.

HENRY HALL ATRIUM 002

Multi-Head Attention in Single Cell Variational Autoencoders

Participants attending 9:00 AM - 10:00 AM
Presenter: Jack Foreback
Mentor: Zachary DeBruine

Single-cell modeling with AI architectures offers unprecedented advancement in our understanding of the human genome, with applications in the fields of biology, pharmacology, and genetic engineering. While most current work in the field relies heavily on transformer(GPT)-based architectures, our current approach to modeling single-cell transcriptomics data utilizes Variational Autoencoders(VAEs). In this work, we investigate the performance impacts on counts-based cell modeling of adding the core mechanism of the transformer architecture, Multi-Head Self Attention, into the Variational Autoencoder. Through testing linear projections, embeddings, the number of heads, linear layers, and chained modules, we find the optimal structure of the attention module as it applies to our model. We test this structure in all configurations surrounding the latent space of our VAE and discover that implementing Multi-Head Self Attention into our single cell human Variational Autoencoder did not produce significant improvements in the modeling of counts based single-cell data.

HENRY HALL ATRIUM 003

Evaluating FeEDDHA from Commercial Fertilizers as an Electrolyte for an All-Iron Aqueous Redox Flow Battery

Participants attending 9:00 AM - 10:00 AM
Presenter: Christina Jiang
Mentor: Andrew Lantz

Redox flow batteries have gained attention recently as potential large-scale, low-cost energy storage systems for environmentally friendly renewable energy sources. Energy is stored in these batteries by

coupling two redox active species with a difference in reduction potential, which is related to the voltage output of the battery. Organometallic compounds are attractive electrolyte candidates since the reduction potential of a metal can be altered through binding with an organic ligand. Iron as a redox active metal in the complex is of particular interest due to its abundance, low cost, and low toxicity. Iron (III)-N,N'-ethylene-bis-(o-hydroxyphenylglycine) (FeEDDHA) is an organometallic compound that is commonly used in commercial fertilizers with a reduction potential of – 643 mV vs. Ag/AgCl. Here, FeEDDHA was studied to determine its diffusion coefficient, redox rate constant, and electrochemical characteristics. The effect of different working electrode materials on these parameters was also explored. Electrochemical characteristics of other iron organometallic complexes were evaluated as potential electrolytes to pair with FeEDDHA in an all-iron aqueous redox flow battery. Preliminary cell charge data is provided.

HENRY HALL ATRIUM 004

Defining the Herd: Using Virtual Anthropology to Distinguish Sheep and Goat at the Archaeological Site of Tel Dan, Israel

Participants attending 11:00 AM - 12:00 PM
Presenter: Anna Konold
Mentors: Elizabeth Arnold, Jonathan Greer, Mark Schwartz

This research applies geometric morphometrics to animal bones from the archaeological site of Tel Dan (Tell el-Qadi), Israel. The focus will be on caprines (i.e. sheep and/or goat) as the primary Near Eastern herd animals. Most sheep and goat remains are often lumped together in zooarchaeological investigations due to difficulties in reliably distinguishing the two species based on morphology, despite the possibility of significant differences in herding and slaughter patterns between the two species. Geometric morphometrics (GMM) is a method that allows for analyzing and comparing the whole landmark configuration of an object, in this case teeth, instead of using only single measurements. A variety of statistical procedures such as principal component analysis as well as evaluation of size, symmetry and asymmetry can be applied to study shape variation. Here, the focus will be on the third molar of sheep and goat to facilitate identification of either sheep or goat to allow for more accurate reconstruction of herd composition and exploitation of animals at the site. This project is part of a larger evaluation of herd composition at the site where other research focuses on GMM of astragali of sheep and goat at the same site.

HENRY HALL ATRIUM 005

The Company of Caprines: Applying Geometric Morphometrics to Animal Bone at the Archaeological Site of Tel Dan, Israel

Participants attending 11:00 AM - 12:00 PM
Presenter: Isabella Tyler
Mentors: Elizabeth Arnold, Jonathan Greer, Mark Schwartz

This research applies geometric morphometrics to animal bones from the archaeological site of Tel Dan (Tell el-Qadi), Israel. The focus will be on caprines (i.e. sheep and/or goat) as the primary Near Eastern herd animals. Most sheep and goat remains are often lumped together in zooarchaeological investigations due to difficulties in reliably distinguishing the two species based on morphology, despite the possibility of significant differences in herding and slaughter patterns between the two species. Geometric morphometrics (GMM) is a method that allows for analyzing and comparing the whole landmark configuration of an object instead of using only single measurements. A variety of statistical procedures, such as principal component analysis as well as evaluation of size, symmetry, and asymmetry, can be applied to study shape variation. Here, the focus will be on the astragalus of sheep and goat to facilitate identification of either sheep or goat to allow for more accurate reconstruction of herd composition and exploitation of animals at the site. This project is part of a larger evaluation of herd composition at the site, where other research focuses on GMM of third molars of sheep and goat at the same site.

HENRY HALL ATRIUM 006

Synthesis and Reactivity of Phosphine Oxide and Selenium Compounds

Participants attending 3:00 PM - 4:00 PM
Presenters: Abigail Miller, Nicolette Owen
Mentor: John Bender

Lewis acid-base chemistry is a foundational concept in all areas of chemistry, but its effect on the chemical reactivity of certain reactions is unknown. This project aims to study various Lewis acid and Lewis base reactions in the context of inorganic chemistry by studying phosphine oxide complexes and selenium compounds. Various aryl phosphine oxides were reacted with yttrium metal in order to study how a specific Lewis acid complexes with different Lewis bases. ^{31}P NMR was used as a tool to compare reactions. In an attempt to synthesize a selenium-selenium bond and a novel phosphine oxide, 4-bromobenzotrifluoride was reacted using several organometallic techniques, including the Grignard reaction. The results of this reaction scheme display the effect of the aryl bromide substituents on the synthesis of the diselenide and the phosphine oxide compounds. These reactions provide context to lesser studied inorganic compounds and demonstrate the well-known relationship between Lewis acids and bases.

HENRY HALL ATRIUM 007

Habitat Hero: Community Science and Participatory GIS as a Framework for Urban Pollinator Habitat Restorations

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM
Presenter: Griffin Thompson
Mentor: Alexandra Locher

As urbanization, sprawl and intensive agriculture continue to threaten pollinator species, populations are more susceptible to habitat loss/degradation/fragmentation. To mitigate these effects and increase pollinator connectivity/habitat in the area, the John Ball Zoo Conservation Team has formed the Habitat Hero program since 2022, which distributes 2,000+ native plants annually to community members. Pairing participatory GIS with community science, a framework for urban pollinator habitat restoration has been created, with a focus on establishing corridors of native host/nectar plants for pollinators across the urban-rural gradient. This project explores the results from the 2024 Habitat Hero season, analyzing the spatial distribution of participants and identifying Habitat Hero corridors throughout the city. Moreover, this analysis will incorporate environmental and socioeconomic factors into geospatial analysis, which will be used to form a data-driven approach to habitat restoration for all communities. These workflows are designed to be upscaled/replicated, as Habitat Hero is set to begin a pilot program with four institutions this summer! This research is paired with a manuscript that details the underlying processes of Habitat Hero and GIS analyses conducted to assess the effectiveness of the program. The GIS analyses for this research uses ArcGIS Online/Pro, with open-source data utilized throughout for replicability.

HENRY HALL ATRIUM 008

Design, Synthesis and Evaluation of Novel Triazole Derivatives to Treat Tuberculosis

Participants attending 3:00 PM - 4:00 PM
Presenters: Tung Hoang, Taylor Meade
Mentor: Matthew Hart

Tuberculosis (TB) is a bacterial infection that can spread through the air and has developed antibiotic resistance to some of the traditional medicines used to treat it. There is interest in developing new therapeutics to treat TB. Previously, our group has worked on the synthesis and evaluation of diphenyl ureas (DPU) with antimicrobial activity. Herein, we report a computational analysis of these DPUs with different bond rotations. Using AutoDock Vina, we examined the docking of these DPUs targeting a known TB target, InhA. Based on these results, we developed a novel triazole target that represents a conformationally restricted urea core. AutoDock was then used to screen potential triazole derivatives. The synthesis and biological evaluation of several triazole derivatives is reported. These triazole derivatives are produced utilizing click chemistry. It is hoped that the computer models can be validated and that new therapeutics can be developed to treat TB.

HENRY HALL ATRIUM 009

Identification of *AANATL-7* Expression Using the UAS-GAL4 System in *D. melanogaster* to Determine Where Histamine Acetylation is Occuring *in vivo*

Participants attending 12:00 PM - 1:00 PM
Presenter: Margaret Cubitt
Mentor: Martin Burg

Drosophila melanogaster has been used as a model system to study neurotransmitters, including processes involved in neurotransmitter metabolism. The metabolism of histamine, a neurotransmitter used by *Drosophila*, currently involves synthesis of an intermediate, carcinine, which can be converted back to histamine. Recently, mutations were discovered in a gene encoding the enzyme arylalkylamine N-acetyltransferase like-7 (*AANATL-7*), which acetylates histamine, leading to production of N-acetylhistamine (NAH). To identify the tissues that express the *AANATL-7* gene, and thus where N-acetylhistamine (NAH) is generated, we used the UAS-GAL4 heterologous expression system. The *AANATL-7* promoter (control) region was used to induce GAL4 expression in AANATL7-expressing cells by creating the $AANATL7^{2.2kb}$-*GAL4* transgene. The 2.2 kb *AANATL-7* promoter region was cloned into the pC3G4 plasmid, which contains the w^{+} gene marker and the GAL4 gene. Transgenic flies, identified by eye color conversion from white to red, were selected from the injected flies' offspring. After genetically mapping the transgene in each breeding line established, flies were mated with UAS-GFP flies to enable GFP expression in the progeny, identified using fluorescence microscopy. Examination of tissues has identified *AANATL-7* expression in adult male accessory gland "main cells" as well as central nervous system neurons in both larval and adult flies.

HENRY HALL ATRIUM 010

How Can I Learn About Gas Behavior? An Analysis of How YouTube Videos Help Support Students' Understanding of Gas Behavior

Participants attending 12:00 PM - 1:00 PM
Presenters: Lucian Forestieri, Gabriella Palombo, Isabella Senkowski
Mentor: Deborah Herrington

In the wake of COVID-19 and worldwide lockdowns, students have become more reliant on virtual learning materials than ever before. YouTube has become one of the largest platforms for students to learn new content, yet the posting of videos remains unregulated, leading to a wide range of video quality. For novice students who are learning core chemistry concepts, such as the topic of gas behavior, it is especially important that the videos they watch facilitate conceptual learning and support active participation. This project examines popular YouTube videos and how they portray the gas particle behaviors that lead to the ideal gas laws, the combined gas law, and real gas properties. Existing research suggests that videos that include the levels of Johnstone's Triangle, causal mechanistic reasoning, core ideas, and scientific practices and adhere to multimedia principles can strengthen student learning and engagement. These elements were incorporated into a framework that was used to evaluate how well these videos support student learning, with the intent of advancing students' cognition and improving future educational resources. This presentation will share the results of an analysis of many of the most highly watched YouTube videos that address gas behaviors.

HENRY HALL ATRIUM 011

Structural Weight Stigma in Healthcare

Participants attending 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM
Presenter: Magdalyn Hallead
Mentor: Rachel Fox

Weight stigma in healthcare manifests at multiple levels—internalized, interpersonal, and structural—shaping both patient experiences and provider attitudes. While previous research has extensively examined internalized and interpersonal stigma, structural stigma remains underexplored. Structural stigma operates through societal norms, policies, and institutional practices that systematically

disadvantage fat individuals, influencing both healthcare environments and clinical decision-making. This literature review examines two critical structural mechanisms: the use of Body Mass Index (BMI) as a form of medical gatekeeping and diagnostic overshadowing, where weight becomes the dominant focus of clinical encounters, often leading to misdiagnoses and delayed care. Drawing from research on weight bias, patient-provider interactions, and healthcare policies, this review highlights the ways in which weight stigma exacerbates health disparities. By identifying these structural barriers, this study highlights the need for weight-inclusive healthcare models and policy reforms to ensure equitable, patient-centered care for individuals of all body sizes.

HENRY HALL ATRIUM 012

GIS Analysis and Mapping of Parking Reductions in Grand Rapids, MI

Participants attending 9:00 AM - 10:00 AM
Presenter: Rebecca Lubbers
Mentor: Kin Ma

This project, undertaken through the John H. Logie Fellowship in collaboration with the City of Grand Rapids' Planning Department, aims to enhance urban sustainability and refine planning practices by mapping parking reductions. It focuses on three primary components: identifying currently active parking reductions, aggregating relevant data—such as impacted parcels and application records—and integrating this information into two GIS layer files. An interactive map will be developed to help city planners track and visualize which parcels have benefited from parking reductions, as well as the strategies used to meet the parking requirements. This tool will support future planning efforts by enabling city officials to monitor parking reductions and identify neighborhoods approaching critical thresholds. Additionally, a comprehensive report will be produced, detailing the map's development, implementation, and its potential to inform policy decisions. By incorporating GIS technology into these planning processes, this fellowship seeks to promote more sustainable urban development and improve policy effectiveness in Grand Rapids.

HENRY HALL ATRIUM 013

Raising the Steaks: Examining Cattle Exploitation at the Archaeological Site of Tel Dan, Israel

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM
Presenter: Orion Davis
Mentors: Elizabeth Arnold, Jonathan Greer, Mark Schwartz

This research will use zooarchaeological methods to study animal bone material of large domestic animals, primarily cattle at the Iron Age (1200-700 BCE) archaeological site of Tel Dan, Israel. While caprines (i.e. sheep and goats) are the most abundant taxa, cattle contribute a significant component of the diet. Using zooarchaeological methods this project will detail the use and management of cattle resources at the site. Attention will be given to butchering patterns, pathology and seasonality. Previously published comparative Iron Age zooarchaeological assemblages in the southern Levant will be utilized as comparison. The focus is not only the documentation of subsistence strategies but also how animal resources were distributed and provisioned within the urban center and their manipulation in economic, political and/or social arenas. Thus, this research looks not only at animals as food resources and items of trade and exchange, but also their role as markers of urban complexity (e.g. extent of outside provisioning, market systems, on-site raising of animals).

HENRY HALL ATRIUM 014

Restrictions, Laws and Unfamiliarity: A Study of LGBTQ+ Perceptions and Concerns on Visiting Non-Western Cultures

Participants attending 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM
Presenter: Kaitlyn Martin
Mentor: Mohammed Lefrid

This study aims to investigate the perceptions and attitudes of the LGBTQ+ community on visiting non-western cultures. Due to limited familiarity with local laws and customs, several visitors feel unprepared to visit non-western cultures. The fear of breaking laws and norms may lead LGBTQ+ travelers to steer away from visiting cultures in the non-western world. This qualitative research depends on interviews to deeply understand this subject. Data will be collected from the LGBTQ+ community in the United States. This study's outcome is expected to support the notion that visitors will tend to travel to familiar cultures to avoid the risks associated with visiting unfamiliar cultures. This study is expected to provide theoretical and practical contributions in relation to understanding LGBTQ+ travelers' behaviors and perceptions of the hosting destination.

HENRY HALL ATRIUM 015

Sauna Bathing as a Cardiovascular Intervention: A Systematic Review

Participants attending 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM
Presenter: Avery Schaeffer
Mentor: Chad Sutliffe

The objective of this research is to determine if there is a correlation between sauna bathing and the reduction of cardiovascular disease (CVD) risk factors, including but not limited to blood pressure, arterial stiffness, heart rate and overall cardiovascular mortality and morbidity. Cardiovascular disease is the leading cause of death globally. CVD is characterized as a group of disorders that affect the blood vessels and heart and are brought on by behavioral risk factors such as poor diet, tobacco use, alcohol consumption and lack of exercise. The long-standing Finnish tradition of sauna bathing has shown to be a holistic method that reduces the prevalence of chronic illnesses, including those that affect the cardiovascular system. Sauna bathing is a form of passive heat therapy characterized by exposure to dry air in combination with high environmental temperatures for a brief period. This systematic review included 20 peer reviewed articles composed of men and women 19 years of age or older. The research suggested that there is a correlation between sauna bathing and reduced cardiovascular risk factors.

HENRY HALL ATRIUM 016

Bridging the Gap: Integrating Basic Needs Assessment in University Counseling Center Triage

Participants attending 11:00 AM - 12:00 PM
Presenter: Toni Butler
Mentor: Jamie Langlois

Unmet basic needs—such as food insecurity, housing instability, and financial stress—are significant risk factors for student mental health and academic success, with a disproportionate impact on minority students. Emerging data suggests that millions of college students face basic needs insecurity across the country. This project aims to enhance the triage process at Grand Valley State's University Counseling Center by incorporating targeted screening questions related to students' basic needs. By integrating standardized questions into screening assessments and providing training to counselors on referring students to appropriate resources, the center can better identify students experiencing hardship and connect them with campus and community resources.

HENRY HALL ATRIUM 017

Unsheltered and Underserved: Increasing Access for the Most Vulnerable

Participants attending 1:00 PM - 2:00 PM
Presenter: Jaimee Ackley
Mentor: Jamie Langlois

At WGNO (West Grand Neighborhood Organization), I work directly with unsheltered and underserved communities to connect them with essential resources. Through this experience, I have identified significant gaps in easily accessible information, which can create barriers for individuals seeking assistance. These gaps may prevent community members, particularly those without reliable access to technology, from finding the help they need. I developed several resource sheets to address this issue

covering inclement weather survival, local shelters and shelter etiquette, job opportunities and preparedness, and LGBTQ+ services. These sheets provide clear, concise information tailored to specific needs, ensuring individuals can quickly find relevant resources. By making these resources available as downloadable PDFs on the WGNO website, they can be easily accessed, shared, and printed as needed, increasing accessibility and long-term usability. WGNO Resource Sheets are important because they empower individuals with the knowledge to navigate available services independently while supporting organizations in efficiently distributing accurate, up-to-date information. To maximize the impact of these resources, I encourage community members, service providers, and local organizations to utilize, share, and provide feedback on these materials. Together, we can work toward bridging information gaps and ensuring that critical resources reach those who need them most.

HENRY HALL ATRIUM 018

Scapular Stability Muscle Activation During Multiplanar Shoulder Exercise Using Fiberglass Resistance Poles

Participants attending 10:00 AM - 11:00 AM
Presenters: Andrew Clarent, Anastasia Misson
Mentor: Stephen Glass

Scapular stability is essential to sports performance and daily activities. This may involve baseball (Throwing), volleyball (Spiking) and swimming (Strokes). Movements involving both the shoulder and scapula, such as opening a door, where the scapula rotates and the shoulder extends, involves movement through multiple planes. Weight training limits movements to one plane. Core sticks resistance poles allow exercise in multiple planes and therefore can translate to the daily activities and sports performance listed above. The purpose of this design project is to examine muscle activation in shoulder and scapular support muscles. Potential muscles include posterior deltoid, vastus lateralis and trapezius. We will be using a standing row with isometric lateral resistance exercise. Final design will be used as part of an IRB submission.

HENRY HALL ATRIUM 019

Assessing the Role of the Chaperone Protein TRAP1 on Modulating α-synuclein in the *Drosophila* Model of Parkinson's Disease

Participants attending 9:00 AM - 10:00 AM
Presenters: Nicolette Owen, Lillie Waldron
Mentor: Georgette Sass

Parkinson's disease is a neurodegenerative disorder characterized by the aggregation of α-synuclein and gradual loss of motor function. *Drosophila melanogaster*, commonly known as fruit flies, has been established as an effective model of Parkinson's because it shares essential features of the human disease. Chaperone proteins are involved in maintaining protein homeostasis and mediating α-synuclein misfolding. In order to better characterize the relationship between the chaperone protein TRAP1 and α-synuclein in the *Drosophila* model, the expression of TRAP1 was driven in the testes with bam-GAL4 and subsequently knocked down through RNA interference (RNAi) in the presence and absence of UAS-α-synuclein. The effects of TRAP1 knockdown on the α-synuclein phenotype were assessed through morphology and fertility assays. This work will provide insight into the novel α-synuclein phenotype in the testes, and will elucidate the role of TRAP1 in preventing α-synuclein fibril formation.

HENRY HALL ATRIUM 020

Be Mindful Juniors

Participants attending 9:00 AM - 10:00 AM
Presenter: Terrence Bolden
Mentor: Jamie Langlois

Research indicates that one in seven adolescents globally experience mental health conditions, yet these issues often go unrecognized. The "Be Mindful Juniors" training program is designed to support Junior

Staff members at the Boys and Girls Club of Greater Holland, who not only work, but attend school and participate in extracurricular activities. Given the fast-paced and dynamic nature of their work environment, many Junior Staff members tend struggle with emotional regulation and task management. Without proper support, adolescents may engage in risk-taking behaviors, experience social exclusions, or develop chronic mental health conditions that persist into adulthood. This four-week program will provide structured training on recognizing stress triggers, practicing breathing and relaxation exercises, utilizing mindfulness-based problem-solving techniques, and maintaining focus in a high energy setting. In partnership with the Northside Boys and Girls Club of Greater Holland, this initiative will be implemented through interactive sessions facilitated in a supportive learning space. This initiative not only benefits individual staff members but also contributes to a more positive and effective organizational culture.

HENRY HALL ATRIUM 021

Burnout and Compassion Fatigue in Healthcare Workers

Participants attending 12:00 PM - 1:00 PM
Presenters: Anthony Caprara, Callyn Goodman
Mentor: Jamie Langlois

Reports indicate that close to half of the twenty-two million healthcare providers in the United States have experienced burnout, compassion fatigue, and secondary traumatic stress (or STS) in the workplace. Yet, most healthcare workers receive very little education about the symptoms and management of STS. With healthcare being one of the fastest growing sectors in the country, it is more important now than ever to address this crisis in the workplace. Our project listens to healthcare workers on a subacute rehabilitation unit and their experiences regarding burnout, STS, and compassion fatigue. This project aims to better understand these experiences of healthcare workers and further provide specialized resources for them based on their needs. From our research and analysis, specific stressors were identified, and education and resources grounded in best practices were provided. The overarching goal is to raise awareness and support for healthcare workers. We need to take care of our healthcare workers so they can take care of us.

HENRY HALL ATRIUM 022

Neglected Tropical Diseases as a Doorway to Discuss Science with Kids

Participants attending 1:00 PM - 2:00 PM
Presenter: Brookelyn Rought
Mentor: Viviane Correa Santos

Neglected tropical diseases (NTDs) affect more than one billion people worldwide. NTDs are a group of diseases found in tropical and subtropical regions that lack research and treatment. For this reason, we are writing an article geared towards children to spread awareness on such a pressing topic. In this process, we have read several scientific research articles to gather information that would appeal to children. To ensure we accomplish this correctly, we have chosen to publish our paper through the *Frontiers for Young Minds* Academic Journal. With this publisher, kids and scientific editors will be able to review and critique our article. This publishing process will allow our research article to be fact-checked and kid-approved in one space. We are making significant progress in this process as we have chosen and read four research and review papers and have started extracting factual information to incorporate into our paper. We have also started planning out the manuscript and creating our illustrations. This publication will work as a science outreach piece and will inspire children to help advance research on NTDs.

HENRY HALL ATRIUM 023

Health Literacy and Its Impact on Patient Compliance and Health Outcome

Participants attending 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM
Presenters: Allison Guo, Bree Potter, Madelline Waite
Mentor: Lilianne Nelson

Health literacy is defined as the public's ability to access, understand, and utilize health information to make informed decisions about their care. There is an undeniable parallel between low health literacy in patients and unsuccessful recovery rates. This is attributed to factors such as mistrust in health information sources and lack of motivation to engage with available health information. The diminished understanding that patients have of their health conditions leads to inappropriate prescriptions, unnecessary laboratory tests, and misuse of medical intervention.

Although Medical Laboratory Science (MLS) often operates behind the scenes, it is integral to multidisciplinary treatment decision-making. Patients frequently receive laboratory results and treatment without fully understanding their significance. In this literature review, the correlation between health literacy and patient understanding of laboratory results is examined by synthesizing the results of multiple studies. Findings indicate that those with chronic health conditions have a higher level of health literacy and confidence to interpret laboratory results than those without. These findings underscore the need for accessible educational resources to help patients better understand their health data. Defining insufficient health literacy will play a major role in bridging the gap between physicians, laboratorians, and patients.

HENRY HALL ATRIUM 024

An Evaluation of Monocyte Distribution Width as a Sepsis Biomarker

Participants attending 10:00 AM - 11:00 AM
Presenters: Megan Budai, Lauren Hicks, Marlena Pinelli
Mentor: Lilianne Nelson

Early identification of sepsis is critical in reducing patient morbidity, mortality, and healthcare costs. Monocyte distribution width (MDW) is emerging as an accessible and cost-effective biomarker for assessing a patient's infection status and sepsis risk. MDW quantifies the variability in monocyte size as the cells activate in response to bloodborne pathogens. It has been employed in emergency, intensive, and infectious disease care settings to distinguish sepsis from other inflammatory conditions with similar clinical presentations, thus enabling prompt sepsis diagnosis before the onset of severe symptoms. Moreover, MDW is applicable across all age groups and sexes and is readily available on a routine complete blood count (CBC). Accumulating evidence suggests that MDW demonstrates greater sensitivity and specificity than other inflammatory biomarkers such as C-reactive protein, erythrocyte sedimentation rate, and procalcitonin. This literature review critically evaluates findings from twelve peer-reviewed studies published between 2017-2024 to synthesize the evidence supporting the efficacy of MDW as a sepsis biomarker, highlighting its role in the early diagnosis of sepsis and the timely treatment initiation.

HENRY HALL ATRIUM 025

Exploring Insulin Signaling Genes Across *Drosophila* Genomes: A Classroom Research Experience in Comparative Genomics using the PATHWAYS Project

Participants attending 9:00 AM - 10:00 AM, 11:00 AM - 12:00 PM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM, 4:00 PM - 5:00 PM
Presenters: Jessica Lukins, Gabrielle Monterusso, Daniel Nichols, John Rozema, Abdikeni Sharif, Taylor Wimberley
Mentor: Martin Burg

The CURE-based course, CMB 440: Research Applications in Drosophila Genomics, examined conservation in the insulin-signaling pathway between various Drosophila species. Research conducted in-class was supported through the Genomic Education Partnership's (GEP) PATHWAYS project, using bioinformatics tools such as FlyBase, BLAST, and the UCSC Genome Browser. Several candidate genes in the insulin signaling pathway were chosen to be examined in various species, examined first in *D. melanogaster* to determine their structure and placement in the genome. Each candidate gene's ortholog was identified in a target species after a number of steps using the tBLASTn tool were taken. The candidate gene and its surrounding genomic neighborhood were compared between *D. melanogaster* and the target species to determine the positional relationship between the candidate gene and its neighbors, known as synteny. Within the target gene, coding sequences were identified and annotated with tBLASTn searches, and

verified with GEP-supplied Gene Record Finder and Gene Model Checker. The Gene Model Checker provides a dot plot, protein alignment graphics, and relevant data files, allowing for an accurate gene model to be submitted to the GEP for publication and conclusions to be drawn about the candidate gene's similarity between the two species.

HENRY HALL ATRIUM 026

Comparing Pelvic Dimesions of Precocial and Altricial Species to Investigate Human "Secondary Altriciality"

Participants attending 10:00 AM - 11:00 AM
Presenter: Emma Long
Mentor: Natalie Laudicina

Why are human infants helpless compared to our closest living relatives, the great apes? For decades researchers have been trying to understand the life history pattern of human infants, with little consensus. Human helplessness has been described as a way to allow for extra brain growth outside the womb to alleviate obstetric constraints during birth. However, when comparing human pelvic dimensions to the other apes, there are too many confounding factors to allow for an accurate comparison. For example, humans have much larger brains for their body size and a vastly different locomotor pattern than other apes, which impacts the pelvic shape compared to apes. In this research, we measured the pelvic canal in a set of closely related species (hares, rabbits, and pikas) without these confounding factors (brain size and locomotor differences) but who exhibit differences in their life history pattern. Hares are born more independent (precocial) while rabbits and pikas are born more helpless (altricial). Preliminary results suggest that there are shape differences in the pelves between precocial and altricial species, lending support to the hypothesis that altriciality may be an evolutionary strategy to alleviate obstetric constraint.

HENRY HALL ATRIUM 027

Environmental Indicators and Schools of Choice for Children Living in the Detroit Area

Participants attending 10:00 AM - 11:00 AM
Presenter: Lelia Sigmon
Mentor: Heather Moody

School of choice types - public, private, for-profit charter, and not-for-profit charter - may be located in areas with varying levels of toxic exposure. These exposures come from external pollutants, such as proximity to superfund or brownfield sites, and internal hazards like lead, mold, or asbestos. This study examines environmental pollutants and indicators across these four school types. It is hypothesized that public and for-profit charter schools, due to disinvestment and profit motives, will be in older buildings and more polluted areas in Detroit, Hamtramck, and Highland Park. Indicators including superfund and brownfield sites and TRI (Toxic Release Inventory) data were geospatially joined to a one-mile buffer surrounding the schools. Mean Blood Lead Levels (BLL) were also assessed within the buffers to relate the variation of lead in children's blood. School building age was analyzed to estimate internal toxic exposures. The spatial relationship between racial segregation and school types was also assessed. Public and for-profit charter schools show greater internal and external pollution exposure within a one-mile buffer. Public policies such as siting guidelines and school maintenance should reduce exposure hazards and prevent worsening inequalities. Addressing them is important to prevent further disadvantages for already vulnerable children.

HENRY HALL ATRIUM 028

The Effects of Cannabinoids on Eating Behaviors in Rodents

Participants attending 3:00 PM - 4:00 PM
Presenter: Ethan Schroeder
Mentor: Natashia Swalve

Ethan Schroeder

Cannabidiol (CBD) and tetrahydrocannabinol (THC) have been studied for their influences of eating behaviors and food motivation. Research suggests CB_1 and CB_2 receptor interactions with these substances can stimulate overeating. WIN55,212-2, a CB_1 and CB_2 receptor agonist that produces similar effects to THC, was used to study motivation for self-administration of sucrose. Sprague-Dawley rats were trained with a variable ratio schedule starting at one sucrose administration every 45 seconds, doubling every day for three days. Rats were then randomly assigned into one of four treatment groups: WIN55,212-2 alone (1.2 mg/kg), CBD alone (10 mg/kg), the combination of WIN55,212-2 and CBD, or a saline control. Every day the number of presses for a reward would increase until motivation for a reward was no longer observed, this was described as the breakpoint. Each rat would receive a daily injection prior to one hour of free sucrose self-administration until the breakpoint was reached. The individual drug groups and control groups showed non-significant changes in sucrose self-administration, whereas the combination group showed increased motivation. These findings suggest these substances could be used as a counterbalance for appetite-inhibiting treatments like radiation or chemotherapy in cancer patients, or patients with severe ADHD that are prescribed stimulants.

HENRY HALL ATRIUM 029

The Role of Cross-Department Communication in Enhancing Clinical Laboratory Efficiency and Patient Outcomes, Diagnostic Error Reduction and Workflow Optimization

Participants attending 11:00 AM - 12:00 PM
Presenters: Olivia Doerr, Chloe Jones, Nicole Miller
Mentor: Lilianne Nelson

Effective communication is vital for optimizing clinical laboratory efficiency and patient outcomes. When clear communication channels are established among laboratory staff, clinicians, and other healthcare professionals, patient care becomes more coordinated, reducing misunderstandings and the potential for diagnostic errors. Through research of peer-reviewed articles, this literature review examines how cross-department communication reduces diagnostic errors and streamlines workflow within clinical laboratories. Studies published within the last decade were selected to enhance the relevancy of clinical laboratory communication. Key factors such as effective information sharing, the use of preferred communication methods, and overall interdepartmental collaboration are evaluated to enhance patient care. These insights can inform strategies for institutional policy development and staff training programs. The findings underscore the importance of fostering open communication to minimize delays, misinterpretations, and errors in test results, ultimately enhancing patient safety and the overall healthcare work environment.

HENRY HALL ATRIUM 030

Using Next-Generation Gene Sequencing for Enhanced Surveillance and Treatment of Multi-Drug Resistant Microorganisms

Participants attending 10:00 AM - 11:00 AM
Presenters: Claire Bryant, Olivia Doctor, Bryan Mazey
Mentor: Lilianne Nelson

This literature review examines the role of next generation gene sequencing (NGS) in monitoring and treating infections caused by highly resistant microorganisms. Advancing antimicrobial resistance (AMR) surveillance through improved techniques is critical for public health. Pathogens are becoming more resistant to commonly used antimicrobials, and engineering new antimicrobials is proving to be more challenging, complicating treatment options for healthcare professionals and patients. Technologies such as rapid diagnostic sequencing, gene tracking, and artificial intelligence are enabling more effective monitoring of patients in hospital settings. These tools aid in the identification of niches, reservoirs and transmission routes of AMR pathogens. By providing real-time genomic data, NGS allows for better outbreak containment, personalized treatment approaches, and improved antibiotic stewardship. Next

generation sequencing could be the answer to improving current antibiotics and discovering new ones to combat the emergence of these highly resistant pathogens.

HENRY HALL ATRIUM 031

Artificial Intelligence in Hematological Diagnostics: Advances and Challenges

Participants attending 11:00 AM - 12:00 PM
Presenters: Aileen Botello, Danielle Howell, Mirka Osorio
Mentor: Lilianne Nelson

Artificial intelligence (AI) has become increasingly integrated into medical science, significantly enhancing diagnostic accuracy, efficiency, and standardization. This literature review examines AI's growing role, focusing on its advancements and challenges in data access and integration. Through a systematic review of primary research articles written within the last decade, research has shown that AI's role in automating tasks such as recognizing normal patient result ranges and identifying cell types, has shown its potential in surpassing traditional manual methods. While searching for key traits amongst developing AI technologies, Convolutional Neural Networks (CNNs), a form of deep learning (DL), has stood out to be a primary enhancement within hematological diagnostics. CNNs have proven to be especially effective in medical imaging, as these networks excel in image classification based on morphological features like shape, color, and size. By minimizing inaccuracies inherent in manual classification, CNNs offer a more robust and consistent approach. A notable example is the Shonit system, a cloud-based AI analyzer that has outperformed manual methods in identifying nucleated red blood cells (nRBCs). However, the effectiveness of such models is contingent on access to extensive databases, posing a challenge. This review highlights AI's benefits and data-related challenges in hematological diagnostics.

HENRY HALL ATRIUM 032

The Impact of an ATG8-Like Gene on Regeneration in *Schmidtea mediterranea*

Participants attending 1:00 PM - 2:00 PM
Presenter: Luke Filthaut
Mentor: Matthew Christians

Regeneration is a fascinating process important for human health, often studied with planaria due to their ability to regenerate their entire body. This is made possible through pluripotent stem cells, which can differentiate into any cell type in planaria. The scientific community is working to determine what genes are involved in regeneration in planaria with the hope of being able to apply this knowledge to humans. However, all of the genes involved in planarian regeneration have not yet been determined because regeneration is a highly complex process. In this project, we examined the involvement of an ATG8-like gene in planarian regeneration by knocking it down in planaria with RNAi, amputating the planaria, and observing regeneration. We found that when our target gene was knocked down there was an increased amount of regeneration. These results suggest that an ATG8-like gene negatively regulates regeneration in planaria and should be investigated further.

HENRY HALL ATRIUM 033

Physiologic Effects of Beetroot on Pulmonary Arteries

Participants attending 9:00 AM - 10:00 AM
Presenters: Tejaswini Balla, Carter Bechtel, Jerrome Kue, Daniel Nichols, Genevieve Osowski, Caleb Porter, Drew Smith, Luis Vidal
Mentor: Francis Sylvester

Cardiovascular disease (CVD), the leading cause of death in the United States, poses a significant threat to public health, underscoring the need for more research on novel ways to improve cardiovascular health. Risk factors including hypertension exacerbate the likelihood of developing CVD. Uncontrolled high blood pressure leads to issues that reduce the patient's quality of life and increase healthcare costs. Recent studies suggest that beetroot juice consumption reduces blood pressure. Beetroot contains a variety of physiologically beneficial molecules, including nitrate (NO_3), which is proposed to support hypertension

management by increasing the availability of nitric oxide (NO), a known vasodilator. This study aims to test the hypothesis that beetroot powder will induce vasodilation in porcine pulmonary arteries. Pulmonary arteries were dissected from porcine lungs obtained from a local abattoir. Arteries were coupled to calibrated force transducers to measure changes in tension and submerged into an organ bath. To mimic *in vivo* conditions, the vessels were equilibrated for 30 to 45 minutes before experimentation. After equilibration, a known vasoconstrictor was applied to induce vasoconstriction, followed by a vasodilator to confirm responsiveness. Beetroot extract was added to the bath and resulting changes in vascular tone were measured to assess the extract's vasodilatory effects.

HENRY HALL ATRIUM 034

Ethical Leadership in Relation to Perceived Organizational Support and Job Satisfaction

Participants attending 9:00 AM - 10:00 AM
Presenter: Logan Darling
Mentor: Benjamin Walsh

Ethical leaders have high integrity, act fairly and inspire followers to make similar decisions. The goal of our study was to explore how ethical leadership makes a significant impact on employees and how they feel about their jobs. Perceived organizational support (POS) is an employee's feelings about whether the organization values and respects their opinions and individual roles. We hypothesized that employees who work for an ethical leader would experience greater POS. In addition, we hypothesize that employees who experience greater POS will also report higher job satisfaction. Broadly speaking, we hypothesize that ethical leaders will promote greater job satisfaction among their employees, due to their ability to generate increased POS, consistent with POS operating as a mediating variable between ethical leadership and job satisfaction. Anonymous survey data were collected from 215 employees of childcare organizations in a Midwestern state, who completed validated measures of ethical leadership, POS, and job satisfaction. We analyzed the data using Baron and Kenny's (1986) mediation approach to regression analysis. The results indicate that POS partially mediates the positive relationship between ethical leadership and job satisfaction. The poster presentation will highlight the effects an ethical leader has on subordinates and organizational support.

HENRY HALL ATRIUM 035

Understanding the Role of AI in Job Crafting - Literature Review and Proposed Model

Participants attending 9:00 AM - 10:00 AM
Presenter: Zachary Spencer
Mentor: Benjamin Walsh

The use of generative artificial intelligence (AI) has rapidly expanded after the release of ChatGPT in November of 2022. Generative AI models can produce new information whereas previous AI models were largely used for predictive purposes (e.g., locating a pattern in data) (Hasem *et al.*, 2024). This review focuses on how generative AI at work interacts with how an individual engages in job crafting, which is the self-initiated practice of personnel altering their work tasks and environment to align with their self-interests (Zhang & Parker, 2018). Within organizational psychology literature, job crafting has been difficult to measure due to the number of opposing theories. However, the recently grounded "approach versus avoidance" framework by Bruning and Campion (2018) encapsulates the competing ideologies. Approach crafting covers proactively solving issues and improving one's work environment, whereas avoidance crafting captures the reduction of demands/stressors or the withdrawal from aspects of the job entirely. This presentation builds on the approach-avoidance framework by integrating generative AI into the previous hierarchical model. Understanding the role of AI within job crafting will benefit organizations by influencing future job design and workplace training, and foster a productive, healthy, and responsible approach to AI integration.

HENRY HALL ATRIUM 036

Understanding How the Components of Perceived Overqualification Impact Job Satisfaction

Participants attending 9:00 AM - 10:00 AM

Presenter: Lauren Andrews
Mentor: Benjamin Walsh

Perceived overqualification (POQ) is defined as a perceived mismatch in an individual's beliefs about their qualifications (in education, in experience, and in knowledge, skills, and abilities [KSA's]) and the job they hold. Various factors, such as career goals and opportunities for growth, can influence POQ and inhibit the ability of individuals to find meaning in their work. Studies show that individuals who perceive themselves as overqualified for their position are significantly less satisfied with their work, and experience feelings of frustration in their role. The goal of our project is to understand how the three dimensions of POQ influence job satisfaction in individuals. Anonymous survey data were collected from 936 employed individuals. Ordinary least squares regression analysis was used to test relations between dimensions of POQ (measured at Time 1) and job satisfaction (measured approximately 2 months later). Results showed that POQ-experience had the greatest negative impact on job satisfaction. POQ-education was also modestly and negatively associated with job satisfaction, but POQ-KSA's demonstrated a non-significant relationship. The presentation will further discuss these findings and their implications for how managers and organizations should account for POQ when selecting and placing employees in positions within the organization.

HENRY HALL ATRIUM 037

Do Big-Five Personality Traits (Conscientiousness and Agreeableness) Predict Perceived Work Ability Above and Beyond Job Stress?

Participants attending 9:00 AM - 10:00 AM
Presenter: Paige Gutzeit
Mentor: Benjamin Walsh

Perceived work ability is a worker's evaluation of their capacity to continue to do their job effectively. Understanding factors influencing perceived work ability can help organizations reduce turnover and improve employee well-being. While job stress influences perceived work ability, the big-five personality traits may better predict workers' perceptions. Conscientiousness, a known element of job performance, is characterized by organization and reliability. Agreeableness is characterized by cooperativeness, altruism, and other prosocial behaviors. We hypothesized that conscientiousness and agreeableness positively predict perceived work ability, even after accounting for job stress. Anonymous survey data were collected from 407 employed individuals in various jobs and industries. Results from a regression analysis showed that both conscientiousness and agreeableness were significant positive predictors of perceived work ability, even when controlling for job stress. The poster presentation will cover the implications of these findings for organizations and future research on big-five personality traits and perceived work ability.

HENRY HALL ATRIUM 038

Rescuing *Candida albicans A*dhesion and Stress Resistance Defects in Yeast-Locked Strains

Participants attending 1:00 PM - 2:00 PM
Presenter: Chad Britton
Mentors: Ian Cleary, Derek Thomas

When the fungal pathogen *Candida albicans* changes between yeast and hyphal forms the cell wall organization and composition changes. We have previously shown that expressing a hyphal wall protein in strains that are locked in the yeast form improves their ability to adhere to each other and to surfaces. Here we show that two other hyphal proteins have limited effects on adhesion, but that expressing one of them can increase resistance to a cell wall stressor. Taken together this reinforces the idea that in spite of structural similarities, hyphal surface adhesions have specialized functions.

HENRY HALL ATRIUM 039

Evaluation of Restoration Efforts on a Lake Superior Coastal Wetland

Participants attending 10:00 AM - 11:00 AM

Presenter: Eden Hodgson
Mentor: Matthew Cooper

In 2018, the Town of Port Wing, Wisconsin, and the Wisconsin Department of Natural Resources set out to restore a portion of degraded wetland in the Flag River estuary. This 495-acre freshwater estuary lies along the south shore of Lake Superior and provides critical habitat for waterfowl, fish, amphibians, and reptiles. However, a 10-acre portion of this wetland ecosystem had been converted to a sewage-setting lagoon in 1968, and with funding from the Great Lakes Restoration Initiative, the town and WDNR successfully restored the 10-acre lagoon back to functioning coastal wetland habitat. The purpose of the project is to compile and analyze available monitoring data collected before and after the restoration occurred to evaluate the ecological outcomes of the restoration. The project aims to provide an assessment for one Lake Superior wetland that both WDNR and the US EPA consider a model restoration project. Analyses conducted as part of this project will determine whether this restoration project achieved its intended ecological objectives. This information may be used to inform future coastal wetland restoration projects and support improvements in the ecological, economic, and recreational benefits that restored wetlands offer.

HENRY HALL ATRIUM 040

Effects of Oxidative Stress on the Generation of ATP by *Galleria mellonell*

Participants attending 9:00 AM - 10:00 AM
Presenter: Daniel Molette
Mentor: Babasola Fateye

The greater wax moth, *Galleria mellonella,* is a strong candidate for replacing the current research gold standard subject, mice. Generally cheaper and easier use of these organisms can allow for more efficient research in the future. Insect Malpighian tubules (MT) perform excretory functions similar to the human nephron. MT principal cell have a high mitochondrial density, which makes it more susceptible to oxidative stress. This study assesses *G mellonella* acute toxicity of energy disruptors (2 deoxyglucose & sodium cyanide) and effect on ATP generation in the MT & fat body of *G. mellonella.* Preliminary studies show that larvae are not acutely susceptible to sodium cyanide.

HENRY HALL ATRIUM 041

Exploring Selenium Chemistry: Synthesis and Characterization of Novel Organoselenium and Phosphorus Compounds

Participants attending 9:00 AM - 10:00 AM, 2:00 PM - 3:00 PM
Presenters: Jaden Baldwin, Parker Van Ess
Mentor: John Bender

This research aims to investigate the chemistry of selenium and novel phosphines through the synthesis of organoselenium compounds. We began by creating an aryl Grignard reagent from a substituted bromobenzene, confirming its successful formation. Building on this, we proceeded with the preparation of an organoaryl selenide anion, which was then oxidized to form a R_2Se_2 diselenide compound, establishing a new Se-Se bond. By using substituted Grignard reagents, novel phosphenes were tested with various metallic centers to investigate coordination trends and affinities. Further work will explore selective synthesis techniques, including distillation, to generate polysiloxane cyclic structures, and additional selenium-based chemistry. Characterization and verification of the synthesized compounds were carried out using H-NMR, P-NMR, Se-NMR, and C-NMR, ensuring the accurate identification of chemical structures.

HENRY HALL ATRIUM 042

Short-Term Changes in Soil Organic Carbon Fractions Due to Prescribed Sheep Grazing

Participants attending 9:00 AM - 10:00 AM
Presenter: Julia Shreve
Mentor: Tara Kneeshaw

The impact of prescribed sheep grazing on soil organic carbon (SOC) was assessed by comparing a 2-acre grazed plot to a 2-acre non-grazed control on redeveloped pastureland in Southwest Michigan. This study quantified SOC changes by analyzing particulate organic matter (POM) and mineral-associated organic matter (MAOM), alongside soil physical and chemical properties (e.g., bulk density, infiltration rate, moisture content, pH, conductivity). Soil cores were collected diagonally from five locations per plot over one grazing season (Spring 2024), segmented into 6-inch increments (to 24 inches), and fractionated via chemical dispersion for elemental analysis. Preliminary observations revealed ecological differences between sites, including vegetation, drainage, and wildlife habitat. Initial results suggest lower bulk density and improved infiltration in the grazed plot, with higher POM mass in the upper 0–6 inches of some control locations. These findings indicate that prescribed grazing influences SOC distribution and depth of storage over months. Additionally, grazing may enhance habitat sustainability and contribute to greenhouse gas mitigation if deeper SOC fractions are retained. Ongoing monitoring will further assess these effects and long-term implications.

HENRY HALL ATRIUM 043

Isoforms of GAP-43: Making Connections to Alzheimer's Disease

Participants attending 9:00 AM - 10:00 AM, 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM
Presenters: Kates Krasin, Jacob Reed, Jamie Valkenburg, Cleary Welsh
Mentor: Jerry Keeney

Alzheimer's disease (AD) is a neurodegenerative disorder characterized by cognitive and behavioral impairment. Efforts to identify biomarkers of AD pathogenesis largely focus on examining levels of beta-amyloid (A-beta) plaques and neurofibrillary tangles. As a result, additional primary pathogenic factors of AD potentially contributing to neuronal death and synaptic dysfunction have been less appreciated. Our focus is to examine the phosphorylated and non-phosphorylated isoforms of GAP-43, a growth associated protein widely expressed in neurons. Previous reports demonstrate the phosphorylated isoform increases during learning and memory formation. We believe the relative ratio of these two isoforms may serve as a novel biomarker for AD and, potentially, a new target for drug therapy. This poster presents the results of the first step of our research, which is to enhance resolution of GAP-43 isoforms using 2D-SDS-PAGE.

HENRY HALL ATRIUM 044

Advanced Practice Nursing Competencies, Roles and Outcomes: A Global Assessment

Participants attending 10:00 AM - 11:00 AM
Presenter: Dancun Juma
Mentor: Katherine Moran

Today's healthcare is changing dynamically, and with the increasing complexity of patients' needs and the growing expectations from the healthcare system, the role of APNs in delivering healthcare is crucial. This project focuses on seeing how APNs contribute to improving the population's health, increasing access to care, and addressing existing and emerging issues such as disparities and health human resources shortages. Hence, this study aims to establish the actual role of APNs in today's world based on the skills and responsibilities of APNs and the impact of their effectiveness.

APNs would lead to better patient outcomes, a decrease in the overall cost of the healthcare delivery system, and an increase in patient satisfaction with the services being rendered. However, there are still areas of concern in the utilization as well as integration of APNs in different healthcare systems across countries.

This study analytically offers practical recommendations for policymakers, educators, and healthcare leaders to create consistent standards for APN training and practice. By fostering global collaboration, the aim is to strengthen the role of advanced practice nursing as a critical part of building healthier, more sustainable healthcare systems for everyone.

HENRY HALL ATRIUM 045

Modeling Molten Lithium Carbonate

Participants attending 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM, 2:00 PM - 3:00 PM, 4:00 PM - 5:00 PM
Presenter: Samuel Owen
Mentor: Christopher Lawrence

Lithium carbonate is useful as a result of its capability to remove SO_2 waste in coal-burning power plants. Due to coal's high concentration of chlorine, HCl is released during its burning which has the potential to react with carbonates. When carbonates are in the molten state, they provide an interface for HCl to interact with. The available literature on this subject that simulates molten alkali carbonate molecular models and the experimental observations differ significantly from one another in important ways that we would expect to be similar. Using new modeling techniques such as molecular dynamics, we plan to explore the dissociation of HCl in the presence of lithium carbonate and analyze how the surface of the carbonate solution behaves. We plan to use empirical valence bond models and quantum chemistry to explore the possible reactions that occur within the limits of the surface itself.

HENRY HALL ATRIUM 046

Diel Dissolved Oxygen Fluxes in Littoral and Open-Water Habitats of Muskegon Lake

Participants attending 1:00 PM - 2:00 PM
Presenter: John Lawrence
Mentors: Bopaiah Biddanda, Carl Ruetz

We assessed spatiotemporal dissolved oxygen (DO) fluxes in littoral and open-water habitats of a drowned-river mouth lake along eastern Lake Michigan, hypothesizing that the magnitude of DO fluxes is affected by season, submerged aquatic vegetation (SAV), and habitat (open water versus littoral). Sampling focused on four littoral sites and an open-water site in Muskegon Lake (2022-2024). Each littoral site was sampled May, July, and Sept each year over a single day-night cycle and SAV coverage was visually estimated. At the open-water site, continuous observations were collected during the ice-free season. We assessed the relationship between SAV and DO fluxes using Spearman correlation tests, and tested seasonal, inter-site, and inter-annual differences in DO fluxes using analysis of variance. We found at the littoral sites that: (1) SAV was positively associated with diel DO fluxes, (2) low DO conditions were not detected during the time periods of our observations, although supersaturation was detected, and (3) SAV and diel DO fluxes varied along a gradient from the Muskegon River to Lake Michigan. Finally, diel DO fluxes varied strongly between littoral and open-water habitats. Our observations provide a basis for better understanding the ecology of littoral and open-water habitats in temperate lakes.

HENRY HALL ATRIUM 047

Influences of Unionid Mussels on Aquatic Benthic Macroinvertebrate Community Structure at Confluences in the Lower Grand River

Participants attending 11:00 AM - 12:00 PM
Presenter: Denise Gardner
Mentor: Eric Snyder

Unionid mussels and aquatic benthic macroinvertebrates serve as bioindicators of water quality and ecosystem health, yet their interactions at tributary confluences remain understudied. This study examines the relationship between unionid mussels and macroinvertebrate community structure at confluences in the Lower Grand River. Surveys of mussel density, diversity, and macroinvertebrate composition above and below confluence sites revealed that downstream sites exhibited higher macroinvertebrate taxa richness and diversity. Simpson's and Shannon's diversity indices were highest at downstream sites, particularly at Thornapple DN (7.80 and 2.21, respectively). Live mussel density varied significantly, with Honey UP having the highest density (6.13 individuals/m^2) and Plaster DN the lowest (0.05 individuals/m^2). A positive correlation was observed between mussel density and macroinvertebrate diversity, with downstream sites showing stronger relationships between mussel presence and macroinvertebrate richness and evenness. These statistical findings were not significant ($p > 0.05$).

Further studies are needed to understand the relationship between mussels and macroinvertebrates at confluence sites.

HENRY HALL ATRIUM 048

U.S. Mental Maps of Northern Lower Peninsula Michiganders: Mapping Perceptions of the U.S. South

Participants attending 9:00 AM – 10:00 AM, 10:00 AM – 11:00 AM, 11:00 AM – 12:00 PM, 12:00 PM – 1:00 PM
Presenter: Alexandra Jorns
Mentor: Kin Ma

An emerging focus in linguistic geography is language regard, or attitudes and beliefs about language variation. Research has suggested that language regard is shaped by the participant's proximity to a region and the degree of urbanization. This study aims to revisit perceptions of the U.S. South from the perspective of different communities in Lower Michigan. This paper examines a Summer 2024 study consisting of a 28-participant corpus from Grand Traverse County in Michigan's Lower Peninsula (LP). This dataset is stratified by age groups and gender. This talk explores the interview process and participants' responses obtained through the U.S. and Michigan mental map tasks, which sought to elicit attributes related to the "South" and U.S. geospatial boundaries. This study also compares the rural community's language regard of the "South" with residents in St. Clair County and Muskegon County, providing a comparison of the northern LP with the western and eastern parts of the southern LP. For the mapping portion, all mental map geospatial boundaries were digitized and analyzed using ArcGIS Pro 3.1. Overall, this study explores how different regions in Michigan's LP perceive linguistic variation, particularly in relation to the U.S. South.

HENRY HALL ATRIUM 049

A Diatom Voucher Flora of Pierce Ponds

Participants attending 9:00 AM – 10:00 AM
Presenter: Olivia Sandman
Mentor: Sarah Hamsher

Diatoms are a diverse group of microalgae with silica cell walls that produce ~ 25% of the Earth's oxygen. Due to their diversity and sensitivity to changes in water quality, diatoms are often used to monitor aquatic ecosystems. One such ecosystem is the Pierce Ponds, a series of small, constructed wetlands located southwest of the GVSU campus that were designed to limit erosion and remove contaminants from runoff and precipitation before entering the Lower Grand River Watershed. To explore the diatom populations of these ponds, we are creating a voucher flora to document the taxa present. In November, algal samples were collected from aquatic plants from four ponds and processed in nitric acid. Resulting rinsed materials were mounted on permanent slides to document the diatoms present. To date, common diatoms found include *Cocconeis placentula*, *Navicula veneta*, and *Gogorevia exilis*. A size series of each diatom taxon will be documented in a flora to assist future researchers in identification and allow them to more closely monitor the water quality of the Pierce Ponds to ensure that the constructed wetland is functioning. Diatoms of the Pierce Ponds have not been documented previously, so this flora may also uncover new taxa to science.

HENRY HALL ATRIUM 050

Petrographic and Whole Rock Analysis of Recent Icelandic Eruptions on the Reykjanes Peninsula
Participants attending 10:00 AM – 11:00 AM, 11:00 AM – 12:00 PM, 12:00 PM – 1:00 PM
Presenter: Jacob Dunwoody
Mentor: Ginny Peterson

Iceland's geodynamic setting at the intersection of the Mid-Atlantic Ridge and a mantle plume provides a unique setting for studying magmatic processes and mantle-crust interactions. This study investigates the petrology and geochemistry of Icelandic volcanic rocks to determine their formation and evolution.

Thin sections of collected samples were analyzed using polarized light microscopy to determine mineralogical composition and textural relationships. Major and trace element concentrations were quantified via X-ray fluorescence (XRF) spectrometry. Expected results will indicate that the samples are predominantly basalts with mineral assemblages of olivine, plagioclase, and clinopyroxene. Geochemical data suggest varying degrees of fractional crystallization.These findings contribute to understanding mantle plume dynamics, crustal accretion, and the geochemical variability of Icelandic basalts. The research has broader implications for plate tectonics, mantle geochemistry, and volcanic hazard assessment. Future work will incorporate isotopic analyses to further refine source contributions and melt generation processes.

HENRY HALL ATRIUM 051

Investigating Sensory Processing: an In-Depth Look into the Synaptic Connectivity between Layer I Single Bouquet Cell (SBC) and Neurogliaform Cell (NGFC) and the Pyramidal Neurons They Target

Participants attending 10:00 AM - 11:00 AM
Presenter: Karis Gillen
Mentor: Gülcan Akgül

Early maturation of somatosensory GABAergic interneurons is imperative for sensory processing development. Dysfunction in these interneurons can contribute to neurodevelopmental disorders like Autism Spectrum Disorders. Layer I single bouquet cells (SBC) and neurogliaform cells (NGFC) are abundant in the somatosensory cortex and are the primary focus of this project. Although these interneurons are crucial, minimal research has been conducted on the neuronal circuitry they are involved in. Our research aims to investigate what the postsynaptic targets layer I SBC and NGFC synapse on. And of potential various connections which connection has the strongest electrical activity, and determine the morphology of the postsynaptic neurons. We hypothesize that layer I SBC and NGFC interneurons make synaptic connections with the pyramidal neurons as deep as layer VI. Using optogenetics in transgenic mouse lines, we will conduct electrophysiology recordings and biocytin labeling in the somatosensory cortex to apprehend the synaptic activity and examine the morphology. Preliminary results provide support for our hypothesis. Future implications of this research will support our understanding of the neuronal circuitry of sensory processing, which may help to determine the cause of neurodevelopmental disorders.

HENRY HALL ATRIUM 052

Yoga Intervention on Sleep Quality and Stress in Nurses

Participants attending 11:00 AM - 12:00 PM
Presenters: Kenzie Henson, N'Diah Robinson, Kate Sadowski, Peyton Volk
Mentor: Leigh Anne DeNotto

Nursing school can be a stressful time for students. There are often economic, academic, social and other stressors that students face simultaneously while completing nursing school. The purpose of this literature review is to explore and synthesize literature about the effects of yoga on sleep quality in nurses. A search of three databases was conducted including Google Scholar, Pubmed and CINAHL. Studies were screened for the following inclusion criteria: Nurses, yoga, sleep quality, and within the past five years. Four articles that met the inclusion criteria were critiqued and the findings were synthesized to provide information related to support for change, barriers to change, and recommendations for incorporating yoga into practice.

HENRY HALL ATRIUM 053

Animal Assisted Therapy Effects on Nursing Students' Test Anxiety

Participants attending 9:00 AM - 10:00 AM
Presenters: Kailey Bombe, Sydney Butts, Elizabeth Crowley, Zoey Czyzewski
Mentor: Leigh Anne DeNotto

Nursing school can be a stressful time for students. There are often economic, academic, social, and other stressors that students face simultaneously while completing nursing school. The purpose of this literature review is to explore and synthesize literature about the effects of animal assisted therapy on test anxiety in nursing students. A search of two databases was conducted including PubMed and Google Scholar. Studies were screened for the following inclusion criteria: a."nursing students", b."animal assisted therapy", c."pet therapy", d."test anxiety". Four articles that met the inclusion criteria were critiqued and the findings were synthesized to provide information related to support for change, barriers to change, and recommendations for incorporating animal assisted therapy into practice.

HENRY HALL ATRIUM 054

Impact of Physical Activity on Nursing Students' Mental Health

Participants attending 12:00 PM - 1:00 PM
Presenters: Hannah Duclos, Emma Hyzer, Ryan Reynolds, Mallory Shustock
Mentor: Leigh Anne DeNotto

Exercise and physical activity can have an impact on anxiety for nursing students. There are often economic, academic, social, and other stressors that students face simultaneously while completing nursing school. The purpose of this literature review is to explore and synthesize literature about the effects of exercise and physical activity on anxiety in nursing students. A search of 2 databases conducted including CINAHL and GVSU Library Database. Studies were screened for the following inclusion criteria within the last 5 years, physical activity, nursing students, anxiety. Four articles that met the inclusion criteria were critiqued and the findings were synthesized to provide information related to support for change, barriers to change, and recommendations for incorporating exercise and physical activity into practice.

HENRY HALL ATRIUM 055

Macroinvertebrate Beta Diversity Across Wetlands in a Lake Michigan Freshwater Estuary

Participants attending 2:00 PM - 3:00 PM
Presenters: Alexis Deephouse, Brenden Reid
Mentor: Matthew Cooper

The Grand River Estuary (GRE) is located along the eastern shore of Lake Michigan and includes the lower main stem of the river along with a connected system of bayous, wetlands, and tributary streams. Macroinvertebrates within this freshwater estuary comprise a significant portion of diets for native fish and waterfowl and can serve as biological indicators to estimate the ecological health of the system. We assessed macroinvertebrate community structure at 20 wetland sites within the GRE using standardized protocols. Specimens were identified to genus in the laboratory and water chemistry and subwatershed land cover were also determined for each of the 20 wetlands. We found that macroinvertebrate beta diversity among GRE wetlands was primarily controlled by turnover, where bayou wetlands had different macroinvertebrate assemblages than river-adjacent wetlands. The community assemblages in bayou wetlands were more rich in taxa and dominated by the families *Belostomatidae, Libellulidae*, and *Dytiscidae*, while river-adjacent sites were less rich and dominated by *Chironomidae* and amphipods. Additionally, river-adjacent wetlands had more urbanized watersheds and higher water column nutrients, which may have influenced community patterns. Results suggest that a combination of natural and anthropogenic factors affect macroinvertebrate community structure within this large freshwater estuary.

HENRY HALL ATRIUM 056

Macroinvertebrate Beta Diversity Across Wetlands in a Lake Michigan Freshwater Estuary

Participants attending 3:00 PM - 4:00 PM, 4:00 PM - 5:00 PM
Presenter: Alexis Deephouse
Mentor: Matthew Cooper

The Grand River Estuary (GRE) is located along the eastern shore of Lake Michigan and includes the lower main stem of the river along with a connected system of bayous, wetlands, and tributary streams.

Macroinvertebrates within this freshwater estuary comprise a significant portion of diets for native fish and waterfowl and can serve as biological indicators to estimate the ecological health of the system. We assessed macroinvertebrate community structure at 20 wetland sites within the GRE using standardized protocols. Specimens were identified to genus in the laboratory and water chemistry and subwatershed land cover were also determined for each of the 20 wetlands. We found that macroinvertebrate beta diversity among GRE wetlands was primarily controlled by turnover, where bayou wetlands had different macroinvertebrate assemblages than river-adjacent wetlands. The community assemblages in bayou wetlands were more rich in taxa and dominated by the families *Belostomatidae, Libellulidae a*nd *Dytiscidae*, while river-adjacent sites were less rich and dominated by *Chironomidae* and amphipods. Additionally, river-adjacent wetlands had more urbanized watersheds and higher water column nutrients, which may have influenced community patterns. Results suggest that a combination of natural and anthropogenic factors affect macroinvertebrate community structure within this large freshwater estuary.

HENRY HALL ATRIUM 057

Predicting and Learning in the Chemistry Classroom

Participants attending 1:00 PM - 2:00 PM
Presenter: Lilly Helsel
Mentor: Brittland DeKorver

Chemistry demonstrations are a popular method that teachers use to help students to learn concepts. During a demonstration, a teacher may show a reaction with a dramatic color change, an explosion or another visually spectacular result. Both students and teachers find these demonstrations fascinating. But the intention of demonstrations is learning; therefore, we should collect and examine evidence to determine whether students are learning the intended science concepts. In this study two demonstrations were performed for 10th and 11th-grade high school students in a chemistry class at a public Montessori school. Students were asked before and after the demonstration to answer the same chemistry question about the target learning objective or concept. These data were collected to answer the question: are these demonstrations effective in teaching how particle size relates to kinetics and how chemical structure relates to intermolecular forces? To find out if there was a significant change in the students' understanding of these topics, we will use a McNemar analysis. The results of the analysis will tell us if the demonstrations were effective or if further modifications are needed to meet the desired learning goals.

HENRY HALL ATRIUM 058

Effect of Polar Mutations in *Salmonella enterica* Serovar Typhimurium Specific Genes on Fitness and Biofilm Formation

Participants attending 1:00 PM - 2:00 PM
Presenter: Chelsea Aiken
Mentor: Aaron Baxter

Salmonella enterica serovar Typhimurium is clinically relevant as a common food borne pathogen that can be maintained in a wide variety of animal hosts. As a pathogen, it regulates many genes that respond to environmental signals within the host to control motility, adherence, biofilm formation, invasion, and macrophage survival. Many of these virulence genes congregate in chromosome regions called pathogenicity islands. This research created a series of polar mutations in a 40 kb region that has characteristics of a pathogenicity island to determine the effect on fitness and biofilm formation under various environmental conditions meant to simulate different host environments. The focus was specifically on evaluating the impact of each deleted gene on the bacteria’s ability to form a biofilm or survive in these environments.

HENRY HALL ATRIUM 059

Debriefing Tools Within the Critical Care Setting

Participants attending 9:00 AM - 10:00 AM
Presenter: Lauren Atwell

Mentor: Elizabeth Davis

This project is a research study that involves the comparison of current debriefing tools and policies that critical care floors are using across west Michigan, particularly in the Grand Rapids area, and reviewed literature on evidence-based debriefing tool policies and practices. This will be done through the critical care setting to see what tools hospitals have (if any) to help their nurses on the critical care floors after traumatic patient cases occur. Emails will be sent to five different critical care nurse management teams, asking for their permission to review their policies and current practices, and if they would be willing to participate in the study for comparison to evidence based literature. After the policies and practices are sent regarding debriefing tools, they will be explored in a comparative way to see if nurses are receiving adequate opportunity for debriefing in the critical care setting.

HENRY HALL ATRIUM 060

Synthesis of a Biogenic Amine

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM
Presenter: Chloe Spradlin
Mentor: Matthew Hart

It is believed that certain bacterial strains found in the gut microbiome of various animals can alter insulin signaling. The Burton lab at the Van Andel Institute (VAI) has identified various genes in these bacterial strains that do not impact insulin signaling. The speculated role of these genes is to regulate the production of biogenic amines, so it has been hypothesized that the biogenic amines in question may have adverse effects on animal physiology. This research project has aimed to synthetically produce one of the biogenic amines known as N1-aminopropyl agmatine. This synthesis will allow the VAI to investigate its impact on animal physiology to further the knowledge about the gut microbiome's impact on metabolic diseases such as diabetes. The production of N1-aminopropyl agmatine was to be achieved through a multi-step synthesis using synthetic organic chemistry techniques starting from 1,3-diaminopropane. Each stepwise reaction was analyzed via HNMR to confirm the desired intermediate and final products. The results of the synthesis are reported herein.

HENRY HALL ATRIUM 061

Evaluating Preconditioner Performance of Quantum Many-Body Systems

Participants attending 10:00 AM - 11:00 AM
Presenter: Alaina Hogan
Mentor: Erin Carrier

In practice, many problems in science and engineering rely on solving mathematical problems numerically using computers. One common class of problems, eigenproblems, are crucial in computational disciplines such as structural analysis and quantum mechanics. For a given nxn matrix A, the standard eigenvalue problem finds a scalar eigenvalue λ and a nonzero eigenvector x such that $Ax=\lambda x$. We look at eigenproblems arising in many-body simulations of quantum systems. Processes known as iterative methods can solve these eigenproblems numerically, such as Locally Optimal Block Preconditioned Conjugate Gradient (LOBPCG); however, the speed at which they settle on a solution (i.e. converge) can vary drastically. Preconditioners are a technique commonly used to help iterative methods converge more quickly. We compare the performance of multiple preconditioners with LOBPCG on our eigenproblem. To further increase the speed of convergence, we also analyze the best "starting guess" (i.e. initial approximate eigenvectors). We compare to the current standard choices for the preconditioner and initial approximate eigenvectors with LOBPCG for solving these eigenproblems.

HENRY HALL ATRIUM 062

Suicidality in Autistic College Students

Participants attending 9:00 AM - 10:00 AM
Presenter: Sam Fisher
Mentor: Jamie Owen-DeSchryver

Autistic college students are significantly more likely to experience suicidal thoughts and behaviors than the general college student population. Jackson et al. (2018) found that 75% of autistic college students experienced some form of suicidal behavior at some point in their lives. Autistic college students are also more likely to successfully complete suicide on the first attempt. Suicide death is 3-7 times more common among autistic people than the general population (Cervantes et al., 2022). Co-occurring mental health conditions are also extremely prevalent among autistic people and elevate suicide risk. Yet, college campuses are often uninformed or under-informed on how to best support autistic students and provide resources to help them navigate college life. University faculty are also often unaware of how to support autistic students and university counseling centers may not understand the types of services that should be implemented to reduce suicide. Through a narrative literature review, we analyze autistic college students' experiences with suicidality, emerging adulthood, and college life. Within this review, we will uncover how post-secondary autistic students navigate the university environment and how to improve support services to reduce suicide risk.

HENRY HALL ATRIUM 063

Fine Dining Restaurants Market

Participants attending 11:00 AM - 12:00 PM
Presenter: Kylah Allman
Mentor: Mohammed Lefrid

Social media has emerged as an effective tool for marketing communication in the foodservice sector, particularly for fine dining restaurants which seek to enhance brand positioning and encourage consumer engagement. This study explores the use of social media in the fine dining segment through focusing on the deployment of influencers, interactive digital content, and visually curated narratives to attract and engage Gen Z customers. Additionally, this inquiry examines how social media strategies foster customer loyalty and encourage electronic e-word of mouth. This study follows a mixed-methods approach, including interviews and online surveys, to investigate the proposed concepts. This study's findings provide valuable theoretical and practical contributions by offering fresh insights into fine dining restaurant marketing and Gen Z's behavioral intentions. Furthermore, this study expands the existing literature on restaurant dining, social media marketing, Gen Z' attributes. Limitations and directions for future research are also discussed to further understand digital media marketing and consumer behavior in the fine dining sector.

HENRY HALL ATRIUM 064

Synthesis of Antibiotics to Treat Tuberculosis with Electron Donating Groups and Ester Substitutions

Participants attending 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM
Presenters: Olivia Ignasiak, Ishmael Nash, Zachary Schafer, Ava Stefanski
Mentor: Matthew Hart

In 2024, tuberculosis (TB) re-emerged as the leading cause of death by an infectious agent, according to the World Health Organization (WHO). Since 2021, tuberculosis infections have steadily increased, with over 10 million cases reported in 2024. As *Mycobacterium tuberculosis* continues to evolve antibiotic-resistant strains, the need for new antibiotics and treatments remains vital. This study explores the applications of synthetic organic chemistry to improve the performance of proposed TB drugs through structural modifications. These modifications include butyl ester substitutions at the meta and para positions to investigate their impact on antibacterial activity. As well as the introduction of para-methoxy and 3,4-Dimethoxy on the opposite ring, to discover the impact of Electron Donating Groups on the drug's effectiveness. The structure of the synthesis products will be confirmed and investigated using infrared (IR) spectroscopy, carbon-13 nuclear magnetic resonance (C-NMR), proton nuclear magnetic resonance (H-NMR), and mass spectrometry. The 4 synthetic drug variations will be tested on bacteria related to *M. tuberculosis* in order to determine their antibiotic drug potential for application in TB treatments.

HENRY HALL ATRIUM 065

From Curiosity to Discovery: Development of a Course-Based Research Experience

Participants attending 9:00 AM - 10:00 AM, 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM
Presenter: Mark Crossen
Mentor: Amanda Karsten

This presentation will describe the development of a course-based undergraduate research experience (CURE) and lessons learned to date. The availability of research experiences for undergraduate students is exceeded by the demand for these experiences at many universities. A CURE integrates research experiences into an existing course by involving students as experimenters and participants. In the current project, students enrolled in Psy 310 – Behavior Modification participated in developing a research question, selecting a target behavior and measurement system (i.e., daily water intake), setting general parameters for intervention, and interpreting results. Students also tracked and reported their daily water consumption during baseline and an app-based intervention period, the introduction of which was staggered across randomly assigned groups of students within the same section of the course. The presenter will describe results from pilot semesters of this CURE, as well as discuss data-informed recommendations for measuring and enhancing purported benefits of CUREs for future student-researchers.

HENRY HALL ATRIUM 066

Falcon to Falcon: Soaring Toward Peace with Peer Mediation

Participants attending 12:00 PM - 1:00 PM
Presenter: Keylaiha Brown
Mentor: Jamie Langlois

Recent data showed that 857,500 violent incidents and 479,500 nonviolent incidents were recorded by public schools. These incidents result in children feeling unsafe at school, exacerbate mental health issues, and increase disciplinary action being taken against the perpetrators of violence. The Falcon to Falcon peer mediation program at Explorer Elementary (Kentwood Public Schools) was created to reduce the number of disciplinary referrals at the school. Grounded in research and collaboration, high schoolers at East Kentwood High School were trained to facilitate the program and mentor 14 elementary students in effective peer mediation skills. These roles allowed the students to hone their leadership skills, make a positive impact in their community, and learn conflict resolution skills. By having high schoolers lead the program, the peer mediation program is expected to have longevity. This program intends to decrease disciplinary referrals and increase conflict resolution skills. It is time to help our students soar. Go Falcons!

HENRY HALL ATRIUM 067

Creating Chemistry Learning Materials for Use in GVSU Tutoring Centers

Participants attending 10:00 AM - 11:00 AM
Presenter: Gabriella Palombo
Mentor: Thomas Pentecost

The purpose of this project is to survey students who have previously taken introductory and general chemistry courses at GVSU in Fall 2024 to identify the topics they struggle with most. This information will help the Tutoring and Reading Center and Chemistry Success Center improve the resources currently available for students.

HENRY HALL ATRIUM 068

Promoting Paraphernalia in Peru

Participants attending 1:00 PM - 2:00 PM
Presenters: Amanda Anka, Maxwell Ritchie, Ruth Yeboah
Mentor: Anthony Spencer

As global agriculture shifts toward sustainability, the demand for eco-friendly equipment continues to grow. Our campaign focuses on marketing sustainable agricultural paraphernalia to cannabis growers, who are our main target, fruit growers, and flower growers in Peru. By researching the most suitable ports for transporting equipment and understanding client preferences, we craft targeted advertisements that resonate with our audience and the new market.

Our strategy integrates a multi-channel approach, leveraging radio, social media, and billboards to maximize reach and engagement. Additionally, we enhance brand visibility through the distribution of branded promotional items, fostering direct connections with potential clients. This poster outlines our research-driven approach to market entry, logistics and consumer engagement, highlighting the role of sustainability in modern agriculture.

HENRY HALL ATRIUM 069

An Investigation of Chalcone Reactivity on Synthesized Epoxides and Episulfides: Characterizing Stereoselectivity

Participants attending 12:00 PM - 1:00 PM
Presenters: Elena King, Makalah Pearson
Mentor: John Bender

The mechanism for the substitution of an episulfide for an epoxide is relatively unestablished. Using reactants with differing reactivity could reveal information about this mechanism. In this project, the multi-step synthesis of 2-MethoxyBenzaldehyde will provide a deeper understanding of the epoxide to episulfide mechanism. 2-MethoxyBenzaldehyde will be synthesized with two different Acetophenones, 4-Methyl-Acetophenone and 4-Chloro-Acetophenone, creating stereospecific trans alkenes. This product will be epoxidized to develop an optically active racemic starting material. The product will then go through an epoxide-episulfide exchange to reveal differences in optical properties. Finally, the Chalcone product will go through a Diels-Alder reaction with Cyclopentadiene to explore the production of four new chiral centers. Findings will be confirmed by 1HNMR, 13CNMR, Infrared spectroscopy, melting point analysis, and polarimeter. Conclusions on stereochemical outcomes will be reported to determine if Acetophenone reactivity leads to a retention of configuration.

HENRY HALL ATRIUM 070

Presentation

Participants attending 9:00 AM - 10:00 AM
Mentor: Brynn Buschle

HENRY HALL ATRIUM 071

Awe and Metaphor

Participants attending 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM
Presenters: Marwah Al-Mashhadani, Joseph Bombassei, Morgan Braddock, Ian Wilson
Mentor: Brian Bowdle

Awe is a complex and powerful emotion that has received a substantial amount of attention in the social sciences over the past two decades. We review recent literature in which awe is approached as a “meaning-making” emotion that enhances creativity by challenging how we conceptualize the world. We then propose that awe may be linked to the use of metaphors in language and thought. Metaphor has not yet been studied in relation to awe, but metaphor is widely recognized as a “meaning-making” device that allows us to understand abstract and unfamiliar concepts in terms of concrete, familiar ones. We believe that metaphoric creativity may be a common response to the cognitive challenges posed by awe. After describing several specific ways in which awe and metaphor could be psychologically related, we lay out some methods for empirically testing these ideas.

HENRY HALL ATRIUM 072

The Composition of the Gut Microbiome Modulates *C. elegans* Fitness in the Face of Viral Infection and Drug Exposure

Participants attending 3:00 PM - 4:00 PM
Presenter: Cayden Steinebach
Mentor: Doug Graham

This project looks at how differences in microbial composition of the gut A) impact virus-induced changes in host fitness, and B) correlate with differences in host gene expression in the face of viral infection. The host in this case was the soil nematode *Caenorhabditis elegans*. Five different bacterial species that naturally colonize the *C. elegans* intestinal tract constituted the microbiome, and Orsay Virus served as the viral pathogen. We also investigated whether the microbiome composition had any impact on fitness if the nematodes were exposed to sublethal concentrations of the deworming compound benzimidazole. In both cases (exposure to virus and drug) the impact on fitness was not uniform: certain microbiome species resulted in statistically significant differences in worm fitness and gene expression.

HENRY HALL ATRIUM 073

Exploring the Mechanisms of Neurogenesis in the Adult Pig Eye Using a Multiple Cell Culture System

Participants attending 10:00 AM - 11:00 AM
Presenters: Esther Bard, Taylor Saber, Stephen Warner, Rachel Zarb
Mentor: David Linn

Work has focused on the effects of activating a specific type of nicotinic acetylcholine receptor (nAChR), the alpha7 subtype, in adult pig retina. Recent work has shown we can obtain results with a dual cell culture system that replicates results seen in intact rodents. The mechanism involves activation of alpha7 nAChRs (with PNU-282987) on retinal pigment epithelial (RPE) cells in one culture to induce the release of substances that cause retinal Muller glia (MG) in a different cell culture to re-enter the cell cycle and produce new retinal cells. Previously, we had shown that unstimulated RPE could induce the proliferation of new retinal cells, presumably due to the release of ACh from the cholinergic cells in the retinal cell culture. We found evidence for the dose-dependent stimulation of new retinal cells in response to stimulation by PNU-282987 on RPE cell cultures two days prior to exposure to retinal cell cultures. Most recent efforts have been to complete the dose-response curve for the effects of PNU-282987 on the proliferation of new retinal cells. Also, we have examined the effects of selective alpha7 nAChR blockers and compounds which block neuroprotective pathways in retinal cells in order to isolate the proliferative effect.

HENRY HALL ATRIUM 074

Influence of Redox Species Identity on Analyte Particle Transport in Single Entity Electrochemical Collisions

Participants attending 10:00 AM - 11:00 AM, 4:00 PM - 5:00 PM
Presenter: Robert Dean
Mentor: Scott Thorgaard

Single-entity electrochemistry works to characterize species such as single cells, viruses and nanoparticles individually in liquid samples. In a blocking electrochemical collision experiment, collisions of analyte particles at an ultramicroelectrode (UME) produce decreasing current transients which can be used to obtain particle concentration, size, or chemical information. Here, collisions of polystyrene microspheres (PSMS) at Au disk UMEs were recorded where the electrode reaction was two-electron oxidation of either N, N, N', N'- tetramethyl-*p*-phenylenediamine (TMPD) or N, N-dimethyl-*p*-phenylenediamine (DMPD). Cyclic voltammetry of TMPD showed evidence of a comproportionation process. Collision experiments found that the frequency of PSMS-electrode collisions decreased by nearly a factor of 7 when the redox species was switched from TMPD to DMPD. This suggests an impact of the electrode reaction mechanism on particle transport. Finite element method (FEM) simulations of these experiments found significant differences in the electric field near the UME depending on the redox species identity. Our hypothesis is that this difference in the electric field produces the observed

difference in collision frequency between DMPD and TMPD. These findings are relevant for the development of next-generation sensors that use the electrode mechanism to improve measurement selectivity.

HENRY HALL ATRIUM 075

Michigan Tri-Share Policy Analysis and Evaluation

Participants attending 9:00 AM - 10:00 AM, 3:00 PM - 4:00 PM, 4:00 PM - 5:00 PM
Presenters: Madalyn Fuhr, Lacey Jones, Michael Luke, Jackson Richmond, Lauren Robar
Mentor: Raymond Higbea

The policy selected was Michigan's Tri-Share, a program that splits the cost of childcare between the child's parent, their employer, and the state of Michigan. Michigan Tri-Share was introduced in 2021 by Governor Gretchen Whitmer to combat the rising cost of childcare and the barriers that these rising costs put on families. The problem Tri-Share was created to address is the increase in the number of women leaving the workplace and eliminating barriers to allow them to reenter the workforce. Childcare costs have continued to rise throughout the last few decades, and now the price of high-quality childcare costs families most of their paychecks. This has caused many families to decide for one of the parents to leave the workforce. Typically, the parent that leaves the workforce is the mother, leading to a decrease of women in the workforce and the talents these women possess. This presentation will look into Michigan's Tri-Share program, evaluating similar programs, challenges, and successes of the program aimed at allowing parents to remain in the workforce.

HENRY HALL ATRIUM 076

Identifying the Key Amino Acids within DUSP8 Protein that Determine its Activity

Participants attending 10:00 AM - 11:00 AM
Presenters: Annabel Maag, Bryson Marinich
Mentor: Ruijie Liu

Dual-specificity phosphatases (DUSPs) are a family of functionally similar proteins that oppose the phosphorylation of target proteins. A previous pulse-chase analysis in our laboratory has demonstrated that mouse DUSP8 protein is degraded over time, however the molecular mechanism underlying DUSP8 stability is unknown. Bioinformatic analysis of mouse DUSP8 protein sequence has identified two regions (426-452, 544-603) that contain unique PEST sequences which are rich with proline [P], glutamate [E], serine [S], and threonine [T] amino acids. The goal of this study was to experimentally determine whether these two PEST regions play any role in DUSP8 stability. Using an In-Fusion Cloning system from Takara, two DUSP8 mutants have been generated that lack one of the two PEST regions. The expression of two mutants have been validated in human embryonic kidney cells (HEK293). In addition, the effect of PEST deletion on DUSP8 degradation is also determined. In conclusion, this study will provide a novel mechanism of DUSP8 activity regulation through the PEST sequences.

HENRY HALL ATRIUM 077

Characterization of ADC-218: Kinetic Profiling and Comparative Analysis with ADC-212

Participants attending 12:00 PM - 1:00 PM
Presenter: Harrison Smith
Mentor: Rachel Powers

Acinetobacter baumannii presents a challenge to the healthcare community due to its ability to resist treatments from many antibiotics. Much of the resistance in *A. baumannii* is derived from β-lactamases, which hydrolyze the cyclic amide bond of β-lactams. Among these are ADC-218 and ADC-212, characterized by a P223A mutation and an alanine duplication. Compared to ADC-212, ADC-218 shows higher minimum inhibitory concentrations with ceftazidime and cefotaxime. The primary sequence of ADC-218 differs by two amino acids from its parent enzyme, a N318T mutation at the perimeter of the active site and a K362E mutation of the terminal residue. Kinetics assays were performed to determine the role of these residues in the enzyme's activity. ADC-218 hydrolyzed six cephalosporins, and the k_{cat}/K_M

for ceftazidime and cefotaxime in ADC-218 (0.0382 $\mu M^{-1}s^{-1}$ and 0.454 $\mu M^{-1}s^{-1}$, respectively) were higher than in ADC-212 (0.0076 $\mu M^{-1}s^{-1}$ and 0.162 $\mu M^{-1}s^{-1}$, respectively). ADC-218 shows weak binding to cephalosporins, but improved binding affinity for cefotaxime five-fold compared to ADC-212. The change in ADC-218 activity indicates that the described mutations may have emerged to optimize the enzyme for reactions with ceftazidime and cefotaxime-like β-lactams. Characterization of ADC variants may help combat antibiotic resistance by providing insight into the design of new antibiotics.

HENRY HALL ATRIUM 080

Synthesis of TB Antibiotics: Cinnamamide Derivatives

Participants attending 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM
Presenters: Wesley Barnes, Lucian Forestieri, Evan Mann, Dale VanBaren
Mentor: Matthew Hart

As of 2023, the World Health Organization reported that Tuberculosis killed 1.25 million people. While antibiotics work on most strains of TB, a subclass of TB called Multidrug-resistant TB (MDR-TB) is resistant to the most common antibiotics used to combat TB. Novel antibiotics need to be developed to combat these increasingly threatening MDR-TB strains. This research aims to develop four new potential drugs to treat TB. A diphenyl amide core will be modified by comparing the meta/para configuration of ester groups on one ring as well as creating a cinnamamide. The cinnamamide will allow us to increase conjugation across the entire molecule to see if these changes create an effective drug. Molecular structures will be confirmed using IR, NMR, and mass spectroscopy and drugs will be tested on TB-related bacteria. This presentation will share the results of the effectiveness of these new compounds in fighting TB-related bacteria.

HENRY HALL ATRIUM 081

Synthesis and Analysis of Chalcones to Explore Potential Mechanisms in Episulfide Formation

Participants attending 1:00 PM - 2:00 PM
Presenters: Lucas Anderson, Zachary Glovier
Mentor: John Bender

This study explores the presumed Scalar relationships of the Hammett Hypothesis, using the synthesis and characterization of chalcones to explore new potential mechanisms of Episulfide formation. The types of processes we will explore are: the preparation of various chalcones, epoxidation of chalcones, identification of the stereoselective synthesis of epoxide products, preparation of a triphenylphosphine sulfide, analysis of the episulfide's optical activity and investigation of the reactivity of our derived chalcone with cyclopentadiene through a Diels-Alder reaction. In our experiment, we reacted 3,4-dimethoxybenzaldehyde and para-Halo substituted acetophenones, specifically, 4-chloro and 4-bromo acetephenone. The chalcones were prepared via aldol condensation and characterized via ^{1}H-NMR, ^{13}C-NMR, and IR spectroscopy. Variation of -OCH3 methoxy-group substitution aids in identifying the regioselectivity of the formed chalcone product. This allowed for the determination of the regioselectivity of our products. These processes are important as they can generate greater insight into the possible mechanisms of episulfide formation. Our results and conclusions will be reported, and further research on the subject may continue in another semester.

HENRY HALL ATRIUM 082

Characterization of Luminescent Lanthanide Complexes through Coordination Chemistry

Participants attending 1:00 PM - 2:00 PM
Presenter: Evelyn Schab
Mentors: John Bender, Shannon Biros

The *f*-block elements of the periodic table exhibit chemical properties that lead to various applications such as bioprobes, magnets, LEDs, alternative energy sources, and key components in MRI contrast agents. This project studies the ability of diphenyl(2-thienyl)phosphine oxide to induce the luminescence

of lanthanide triflates which may enhance its potential for various applications. Through a series of systematic experiments, we synthesized and characterized the ligand and its oxide derivative while evaluating its coordination chemistry with various lanthanide ions. We used NMR and IR to characterize the ligand's structure and to confirm its coordination mode, as well as to analyze the complexes formed. We will also utilize techniques such as MS and X-Ray crystallography to characterize the metal-ligand complexes. The results will provide insight into the luminescent properties of the lanthanide complexes, contributing to the broader understanding of *f*-block coordination chemistry.

HENRY HALL ATRIUM 083

Alpha-Synuclein and Septin 1 in a *Drosophila* Ovarian Follicle Cells Model: Exploring Synucleins Beyond Neurodegeneration

Participants attending 11:00 AM - 12:00 PM
Presenter: Molly McGuire
Mentor: Georgette Sass

Alpha-synuclein (α-syn) is a small, aggregating protein most commonly associated with synaptic function and neurodegenerative diseases in humans. However, increasing evidence suggests that α-syn may also have roles outside the nervous system, including potential contributions to cancer. Altered expression levels of α-syn have been observed in breast and ovarian tumors, yet its role remains unclear. One possible mechanism is through its interaction with the cytoskeleton, which regulates processes such as cell division and migration - key features of cancer progression. Septins, a family of GTP-binding proteins, are critical for these processes, and Septin 1 (Sep1) has already been shown to be essential in *Drosophila melanogaster* oogenesis with a role present in follicle cells. In this study, we investigate the potential interaction between Sep1 and exogenous α-syn in ovarian follicle cells of *D. melanogaster*. Using a follicle cell-specific GAL4 driver, we co-express transgenic UAS-α-syn and endogenous UAS-Sep1-GFP to assess their localization and potential interaction. Confocal microscopy is employed to analyze protein distribution, and fertility assays are performed to examine functional outcomes of altered expression on ovarian development and integrity. This project aims to provide translatable insights into α-syn's broader physiological roles, including its potential contributions to cancer-related dysregulation of cytoskeletal function.

HENRY HALL ATRIUM 084

Investigating Shared and Unique Associations on People-related Terms in School-aged Children and Large Language Models (LLMs - ChatGPT)

Participants attending 10:00 AM - 11:00 AM, 12:00 PM - 1:00 PM, 2:00 PM - 3:00 PM
Presenters: Landon Bartlett, Natalie Cleary, Andrea Essmaker
Mentor: Josita Maouene-Cavin

This study aims to investigate how children associate words with people while also looking at how children's associations compare with simulated associations in large language models (LLMs). Do children share more or fewer words as they form more associations with a word and do large LLMs share any comparisons to the words children come up with? Our demographic is 7-10-year-olds identified as male or female from the greater Grand Rapids school systems. Thirty-one children were prompted with 21 words from a list of early-learned words for people and asked to associate each word three times with the given prompt. Large language models were fed the same list with two orders and given the same requests, simulating both children's and adult responses. The results indicate that children produced significantly more shared responses for response 1 than response 2 or 3, such that the diversity increased with the third response being the most unique. The findings suggest that children tend to use a more conventional language in their first responses although we could not find such a distinction between conventional and unique language use in LLMs.

HENRY HALL ATRIUM 085

Transitioning New Graduate Nurses into the Emergency Department

Participants attending 9:00 AM - 10:00 AM

Presenter: Alexis Hazen
Mentor: Elizabeth Davis

The transition of new graduate nurses into the emergency department (ED) is a critical process that influences job satisfaction, retention and patient care outcomes. Due to the high-acuity and fast-paced nature of the ED, structured transition programs, including preceptorships, mentorships and residency programs, are essential in supporting new nurses during this transition. This project examines existing transition programs and their effectiveness in preparing nurses. A key component of this research is a survey of ED nurses to gather insights into their experiences with current programs, including strengths, limitations and areas for improvement. By synthesizing literature on best practices and evaluating firsthand perspectives from practicing ED nurses, this study aims to identify strategies that enhance nurse confidence, competency and job satisfaction while reducing stress and burnout. The findings will provide recommendations for optimizing transition programs to better support new graduate nurses in the ED setting.

HENRY HALL ATRIUM 086

Lanthanide and Actinide Coordination Chemistry Using Butyl-substituted Multidentate CMPO Compounds

Participants attending 9:00 AM - 10:00 AM
Presenter: Brianna Gordon
Mentor: Shannon Biros

Nuclear power remains a viable option as an alternative energy source. However, a significant drawback is the production of radioactive metals as part of nuclear waste. Currently, this waste is remediated by using organic ligands to separate these metals through a liquid-liquid extraction protocol. An active research area involves synthesizing new organic ligands to enhance extraction efficiency while simultaneously deepening our understanding of f-element coordination chemistry. Toward this end, our group has developed a series of tripodal carbamoylmethylphosphine oxide (CMPO) ligands. The effectiveness of these ligands at extracting all lanthanide ions (excluding Pm^{3+}), Th^{4+}, and UO_2^{2+} out of aqueous solutions will be reported, along with luminescence and NMR investigations.

HENRY HALL ATRIUM 087

Literature Review of Bedside Report in the Nursing Role

Participants attending 10:00 AM - 11:00 AM
Presenters: Justin Matthews, Hannah Ruff, Megan Supernaw, Jurrien Wilson
Mentor: Madison Goodyke

During shift change for nurses, the handover report from the outgoing nurse explaining the health and care of the patient during their shift to the incoming nurse is vital. This report can take place at the patient's bedside, and proper communication is necessary to reduce hospital errors. The purpose of this literature review is to explore and synthesize literature about bedside report for nurses and how it reduces hospital errors. A search of two databases was conducted, including CINAHL and PubMed. Studies were screened for the following inclusion criteria: (a) written in English, (b) studied nurses, (c) measured and reported on results of bedside report and its relationship to hospital errors, and (d) published within the last seven years. Four articles that met the inclusion criteria were critiqued and the findings were synthesized to provide information related to support for change, barriers to change, and recommendations for incorporating proper bedside report into practice.

HENRY HALL ATRIUM 088

Anatomical and Clinical Implications of an Eye Removal Surgery: A Case-Study

Participants attending 10:00 AM - 11:00 AM
Presenter: Lucy Groothuis
Mentors: Natalie Laudicina, Chris Reed, Dawn Richiert, Laura Stroik

Eye removal is a complex surgery reserved for cases involving traumatic injury to the eye, intraocular tumors, severe eye pain, or severe eye infection. Three different eye removal procedures are considered depending on criteria such as the underlying condition, degree of ocular involvement, and therapeutic goals of the patient. Exenteration is the most invasive procedure, involving the complete removal of orbital contents, including the muscles, lacrimal gland, optic nerve, and various bones around the eye. A split-thickness skin graft is often used to enhance the blood supply and promote healing of the disrupted orbital tissue. Dissection of a female cadaver aged 77, who died of a pathological hip fracture and multiple myeloma, revealed a missing left eye. The absence of the left eyelid and the presence of a skin graft over the left orbit are consistent with exenteration surgery. A complete orbital dissection will reveal the extent to which the surgery impacted the muscles, nerves, and vascular structures of the left orbit. As orbital exenteration is reserved for cases involving aggressive tumors that necessitate the removal of the eyelid and surrounding tissues, this project will also explore the possible relationship between multiple myeloma and reason for eye removal.

HENRY HALL ATRIUM 089

The Identification of Phenotypes Associated with Mutations in the *AANATL-7* Gene in *Drosophila melanogaster*

Participants attending 9:00 AM - 10:00 AM
Presenters: Daan Louwerse, Madeline Skym
Mentor: Martin Burg

The purpose of this study is to identify phenotypes that may be caused by the absence of N-acetylhistamine, as a result of mutations in the *AANATL-7* gene of *Drosophila melanogaster*. The *AANATL-7* gene encodes the enzyme arylalkylamine N-acetyltransferase like-7, which is involved in the metabolism of histamine, acetylating it to produce N-acetylhistamine (NAH). Mutations in the *AANATL-7* gene have been shown to eliminate NAH synthesis, determined through histamine immunostaining experiments of the male accessory (prostate) gland. The secondary cells of the accessory gland, which normally contain the NAH identified through histamine immunostaining, have been shown to be critical for male courtship behaviors. It is therefore critical to determine whether there are any male courtship-related behaviors that are altered as a result of the absence of NAH in these cells. Secondly, it is of interest to establish whether uptake of NAH can occur in secondary cells, which may identify how NAH gets into these cells and stored for later use. The uptake of N-acetylhistamine in *AANATL-7* mutant accessory glands will be examined by feeding flies 250 mM NAH in a 5% sucrose solution. After feeding, histamine immunostaining of the accessory gland will be conducted and N-acetylhistamine uptake will be determined.

HENRY HALL ATRIUM 090

Breast Cancer Staging and the Importance of Early Detection

Participants attending 9:00 AM - 10:00 AM
Presenter: Sydney Zimmerman
Mentors: Natalie Laudicina, Chris Reed, Dawn Richiert, Laura Stroik

Breast cancer is one of the most prevalent malignancies worldwide, with early detection significantly improving curability and survivability outcomes. According to the American Joint Committee on Cancer (AJCC) TNM staging system, the four stages of breast cancer are based on factors contributing to disease progression, including tumor size, lymph node involvement, and metastasis. Regular clinical and self-exams, along with mammograms, are essential for early detection. Additionally, research has shown certain genes, such as BRCA1, increase risk of breast cancer and the American Cancer Society recommends those at high risk get MRI screening and mammograms yearly. A large tumor was found in the left breast and attached underneath to the pectoralis major muscle of a seventy-six year old female cadaver – breast cancer was determined to be the cause of death. Here we discuss the factors used to determine the stages of breast cancer as applied to this cadaver and ways to detect breast cancer early to increase chances of remission.

HENRY HALL ATRIUM 091

In Silico Analysis of Echinocandin Binding Modes to FKS1, 1,3-β-Glucan Synthase

Participants attending 4:00 PM - 5:00 PM
Presenter: Devin Chung
Mentors: Jack Sanford, Agnieszka Szarecka

Fungal infections by *Candida or Aspergillus* species can be life-threatening to immunocompromised patients, as they may lead to candidemia and aspergillosis. Echinocandins class antifungal drugs, Caspofungin, Rezafungin, Micafungin, and Anidulafungin, act by inducing fungal cell death through the inhibition of the 1,3-β-glucan synthase. However, the rising resistance of *Candida* underscores the need for improved drug derivatives. This research aims to deepen the understanding of how the echinocandins bind to two experimental structures of the *S. cerevisiae* 1,3-β-glucan synthase - 8JZN (wild type) and 7YUY (resistant mutant). Both structures were used as targets for all four ligands, focusing on the hotspots reported in the literature and using the AC algorithm in SwissDock. The estimated binding affinities of echinocandins to the WT protein are higher than to the mutant protein. However, the presence of ergosterol affects the binding affinity of the echinocandins to both proteins, and no echinocandin emerged as the strongest binder consistently. The presence of ergosterol also affects the interactions between each drug and the three distinct hotspot regions in the synthase's transmembrane domain. This study contributed to our understanding of echinocandins' binding modes and drug-ergosterol interactions. Future research could further explore these interactions.

HENRY HALL ATRIUM 092

Preoperational Thinking and Conspiratorial Belief

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM, 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM
Presenters: Elias Ghazal, Mya Hanna, Tessa Kramer, Kendall Shattuck
Mentors: Brian Bowdle, Mario Fific

Conspiracy theories are widespread in today's society, causing various forms of interpersonal harm such as discrimination, politically motivated violence and mistrust among society members. Existing research shows weak correlational links between conspiratorial belief and personality traits. This study takes a different approach by examining cognitive mechanisms, focusing on preoperational thinking. Preoperational thinking is typically seen as an egocentric and prelogical mentality. This cognitive style has been linked to the misinterpretation of cause-and-effect relationships. Based on Piagetian theory, the current study tests animism, reversibility, and transductive thinking in adults. Our findings suggest that such cognitive thinking styles may be linked to conspiratorial beliefs. This association indicates that gaps in certain mental processes might predispose people to interpret causal chains in ways that reinforce conspiracy beliefs, thereby contributing to the broader social impact of such beliefs.

HENRY HALL ATRIUM 093

Examination of How Expression of the dj-1beta Gene Impacts Oxidative Stress Levels and the Phenotype of the Adult Eye in *Drosophila melanogaster*

Participants attending 9:00 AM - 10:00 AM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM
Presenter: Jackelyn Palmas
Mentor: Georgette Sass

The dj-1beta protein coding gene acts as an oxidative stress sensor in the mitochondria of *Drosophila melanogaster*, playing an essential role in protecting cells from oxidative stress. It's also a homolog of the *Homo sapien* gene PARK7, defects of which are associated with autosomal recessive, early-onset Parkinson's disease. dJ-1beta is expressed in the sensory system, such as the eye in *D. melanogaster*. Levels of the dJ-1beta gene will be overexpressed using the GAL4/UAS system and analyzed in the eye of the *D. melanogaster* via a genetic knock-in scheme.

HENRY HALL ATRIUM 094

PDK1 Knockdown in the Presence of Alpha-Synuclein in *Drosophila*

Participants attending 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM
Presenter: Jade Dawson
Mentor: Georgette Sass

Parkinson's Disease (PD) is a progressive neurodegenerative disorder characterized by the accumulation of alpha-synuclein aggregates, leading to cell dysfunction and death. While PD primarily affects the nervous system, alpha-synuclein has been detected in non-neuronal tissues, including the testes. The role in these tissues remains unclear. Additionally, metabolic regulator 3-Phosphoinositide-Dependent Protein Kinase-1 (PDK1) is known to play a crucial role in cell survival and apoptosis, though its function in the reproductive tissues and sperm development is not well understood. In this study, I investigate the role of PDK1 knockdown in the presence of alpha-synuclein using a *Drosophila melanogaster* model. A bam-gal4 driver will be used to induce RNAi mediated knockdown of PDK1 in the testes and assess its effects on the germ cell development. Fluorescent tagging of PDK1 with GFP allows visualization of the knockdown efficiency. Additional analysis will be carried out to quantify the protein expression changes in response to the knockdown. Given PDK1's role in apoptosis & survival, I hypothesize the reduction may disrupt spermatogenesis and affect fertility. The study aims to expand understanding of how PD related metabolic dysfunction extends beyond the nervous system to reproductive health, and offer insight into the broader systemic effects of alpha-synuclein pathology.

HENRY HALL ATRIUM 095

Impact of Mentoring and Intergenerational Programs at GVSU on Older Adults

Participants attending 10:00 AM - 11:00 AM
Presenter: Katherine Brennen
Mentor: Jing Chen

Recent research has shown that intergenerational programs positively impact older adults by fostering social connections, enhancing their sense of purpose and engagement and leading to improved cognitive and mental function as well as overall well-being (Martins et al., 2018; Gualano et al., 2017). The current project investigates the impact of a one-on-one co-mentoring and intergenerational program on older adults through semi-structured interviews. Older adults are surveyed about their experiences of working with college students as a mentor. Specific perceived changes in their sense of purpose, community and point of view are examined. The patterns and themes reflected in the responses as well as suggestions for more effective intergenerational integration programs will be discussed in this presentation.

HENRY HALL ATRIUM 096

Advancing Microfossil Processing Techniques and Faunal Analysis from the Duchesne River Formation, Uinta Basin, Utah

Participants attending 9:00 AM - 10:00 AM
Presenters: Michael Baldus, Selah Bollinger, Jaclyn Driesenga, Jessica Frielink, Samantha Hacker, Andrew Kelley, Dylan Ruiter
Mentor: Laura Stroik

The Vertebrate Microfossil Lab at Grand Valley State University focuses on discovering new fossil specimens in the sedimentary localities of the Uinta Basin, Utah. The sediment retrieved from these localities is from the middle Eocene (ca. 40 Ma), which simultaneously records a large climatic warming event known as the Middle Eocene Climatic Optimum (MECO). Our work involves a multistage process of removing excess sediment by dry sieving, wet sieving, and chemical washing. Fossils are then extracted, identified, and catalogued. Here we present two new findings from this work. First, recent experimentation has shown that acetic acid may be a viable alternative to our ongoing mineral spirits chemical wash for sediment removal. Second, we identified an aquatic locality ("Tony's Pond") - these are relatively uncommon at this site. Specimens from Tony's Pond include a collection of vitreous elliptical structures that resemble osteichthyan teeth from species of either *Lepisosteus* or *Albula*. Overall, our research aims to advance the understanding of the Uinta Basin's environment before, during, and after

the MECO and determine how drastic climate change influenced local vertebrate fauna. These new findings will be discussed within this larger context.

HENRY HALL ATRIUM 097

Histological Analysis of *Macaca mulatta* Dura Mater Collagen Fiber Organization

Participants attending 9:00 AM - 10:00 AM
Presenter: Hope Fischer
Mentor: Chris Reed

This research presents a histological analysis of collagen fiber orientation in the dura mater of non-human primates to understand its influence on cranial suture closure. Using the dura extracted from rhesus macaque (*Macaca mulatta*), we calculated the relative anisotropy (degree of regular organization) of collagen fibers. Sections of dura mater were embedded in paraffin and mounted on charges. Following specimen mounting we stained the tissue with Picrosirius red and completed photomicroscopy analysis using the Fibritool plugin for ImageJ photoanalytic software. A result showing significant parallel organization of collagen fibers may indicate mechanical forces help shape the skull during growth and development.

HENRY HALL ATRIUM 098

Comparison of Pituitary Gonadotropin Concentrations Between Three Strains of Mice

Participants attending 10:00 AM - 11:00 AM
Presenter: Madysen Gohl
Mentor: Chris Pearl

Male reproduction is dependent on adequate production of mature sperm, a process regulated by pituitary and steroid hormones. The most commonly used research mammal is mice, yet there is a lack of research that outlines the potential similarities and differences in male reproductive traits among different strains of mice. Therefore, this study was designed to compare pituitary gonadotropin concentrations between three different strains of male mice. The three mouse strains include two that are inbred (C57, Balb/c) and one outbred (Swiss). Pituitaries were collected from 12 mice of each strain and frozen for later analysis. Gonadotropin concentrations (LH and FSH) were determined from mouse pituitary homogenates by ELISA and normalized to protein concentration. LH was similar between Balb/c and Swiss mice, but both were higher than C57 mice. LH stimulates testosterone secretion and correspondingly, serum testosterone levels were highest in Swiss mice. FSH was different between all groups with the highest concentration in C57 mice and lowest concentration in Swiss mice. FSH stimulates spermatogenesis and correspondingly, sperm/mg testis was highest in C57 mice. Collectively, these data suggest that differences in testosterone and sperm production between mouse strains derives from differences in pituitary hormone secretion.

HENRY HALL ATRIUM 099

Icelandic Volcanic Eruptions 2019-2023 and Impacts on Respiratory Health

Participants attending 12:00 PM - 1:00 PM
Presenters: Jennie Golaszewski, Aliya Huizinga
Mentor: Kin Ma

Iceland is a country located on a tectonic plate. The people there are reliant on geothermal energy. Tectonic plate activity causes hotspots and magma to build up from the earth's crust and volcanoes to form. Within the past 5 years, Iceland has had multiple volcanic eruptions in close proximity to the capital, Reykjavik, located in the Reykjanes Peninsula. These eruptions can cause various respiratory health effects on the people.

We collected data sets including population density, volcanic eruption and lava flow sites, air quality, and health. We focused on volcanic eruptions in the years 2019-2023. We acquired data from ArcGIS Online, Living Atlas, Landsat and World Health Organization (WHO). We also downloaded Icelandic government

data. We mapped different eruption related factors and connected the Icelandic quality of life, and displayed heatmaps of population density, lava flow concentration and particulate matter distributions. Continuous eruptions cause various health concerns and can jeopardize people's very foundation of life. According to WHO, there was a 1.47 percent increase in deaths caused by respiratory diseases from 2019 to 2023. Worsening air quality from sulfates, carbon and particulate matter has shown some correlation with increased respiratory effects; mainly, Asthma and Chronic Obstructive Pulmonary Disease (COPD).

HENRY HALL ATRIUM 100

The Motivations and Practices of West Michigan Anglers

Participants attending 9:00 AM - 10:00 AM
Presenters: Amanda Francis, Steven King
Mentors: Amanda Buday, Carl Ruetz

This project examines the motives and attitudes of anglers along eastern Lake Michigan drowned river mouth (DRM) lakes. As the gateway between Lake Michigan and inland tributaries, DRM lakes are important aquatic habitats and provide accessible recreational opportunities. A team of undergraduate students conducted intercept surveys with anglers at Muskegon, Pentwater, and Pere Marquette Lakes to understand why anglers fish, which species they catch, and the importance of angling activities for household food provisioning.

HENRY HALL ATRIUM 101

Ghrelin and Stress-Related Behavior Following Long-Term Alcohol Withdrawal

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM, 4:00 PM - 5:00 PM
Presenters: Patrick Baumann, Jemilee Corona, Isabelle La Framboise, Jack Lipscomb, Alleigh Michalek, Arnica Sheaffer, Lauren Wilmore
Mentor: Glenn Valdez

Alcohol withdrawal can create long-term changes in brain physiology, which may lead to mood disturbances. Recent studies suggest that changes in gut-brain peptides, such as ghrelin, may influence these changes in mood. The current study examined the role of the ghrelin hormone secretagogue receptor type 1 (GHSR1) on anxiety-like behavior during long-term withdrawal from alcohol. Wistar rats were placed on an ethanol or control liquid diet for approximately four weeks and then observed for physical signs of withdrawal 24 hours after its removal. Six weeks later, rats received injections of saline or 3.0 mg/kg JMV2959, a GHSR1 antagonist, and were subjected to ten minutes of immobilization stress. Immediately following this brief stressor, exploratory behavior was examined in the elevated plus maze, an animal model of anxiety. Early results indicate that JMV2959 may attenuate the increase in anxiety-like behavior observed in rats with a history of alcohol dependence. However, these data are still preliminary, and ongoing experiments are being conducted to increase the sample size and statistical power. The results of this experiment should provide further insight about the role of ghrelin on the long-term behavioral changes associated with alcohol withdrawal.

HENRY HALL ATRIUM 102

Does Rejection and Ignoring Impact an Individual's Feeling of Physical Safety?

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM
Presenters: Liam Knisley, Paige Pulter
Mentor: Kristy Dean

Past research finds that social exclusion has significant impacts on many aspects of our psychology, especially emotional and behavioral reactions. Additionally, social exclusion threatens many needs (e.g., belonging, self-esteem), including the need for physical safety. The current study seeks to understand how different types of exclusion experiences - rejection vs. ignoring - affect our experiences regarding safety. Some evidence suggests that rejection and ignoring have different implications for emotions (e.g., anger), motivational mindsets, and how individuals cope with exclusion. We examine rejection vs.

ignoring differences in conspicuousness (e.g., self-consciousness about social attention). Participants (N=170) were randomly assigned to write about a past acceptance, ignoring, or rejection experience. Then, they responded to two scenarios involving potentially dangerous situations in familiar environments, reporting their feelings of safety and self-protective actions. Data analysis is ongoing. However, we predict that reliving a social rejection (vs. ignoring or acceptance) will heighten feelings of conspicuousness, which will lead to greater perceptions of danger in familiar environments and more self-protective behaviors. Discussion will center on interpreting results and their implications for how people cope with feelings of disconnection and ensure their physical safety in lived environments.

HENRY HALL ATRIUM 103

Transfer of Cellulolytic Gene Cel7a into *E. Coli*

Participants attending 2:00 PM - 3:00 PM
Presenter: Cayden Steinebach
Mentor: Doug Graham

Cellulose, a polysaccharide commonly found in plant cell walls, is composed of glucose monomers that could provide significant energy. However, humans cannot digest cellulose. Certain species, such as cows, termites, and various microbes, can break down the beta 1-4 linkages between cellulose monomers. This research aims to develop a method for human cellulose digestion using genes from other species. Specifically, we are utilizing the cellulolytic fungus *Trichoderma reesei* to extract its cellulase-producing gene, cel7a. This gene is then incorporated into a plasmid with antibiotic resistance and introduced into a strain of *E. coli* that can also be found in the human digestive tract. The success of this gene transfer will be measured using quantitative Benedict's solution to detect reducing sugars in the transformed *E. coli* population. These sugars will indicate successful gene transfer and protein production. If the cel7a gene can be successfully transferred to *E. coli* and these bacteria can be introduced into the human digestive tract, it may enable humans to digest cellulose, provided the *E. coli* continues to produce the cellobiohydrolase enzyme in vivo. Results are still pending.

KIRKHOF CENTER GRR 001

Neurodivergence: The Divergence of a Term

Participants attending 12:00 PM - 1:00 PM
Presenter: Emily Seburn
Mentor: Coeli Fitzpatrick

Mental differences have manifested throughout history though categorizations have varied. Through intensive literature review, we sought to determine how Western European Medieval (500-1500 CE) society viewed what, in modern times, we call “neurodivergence.” Developmental and intellectual disabilities were grouped with mental illnesses and the terms “mad, idiot, frenzy, not of sound mind, and out of his mind” were typically used to describe them, while “insane” was typically used in more recent years. The mentally and intellectually disabled were rarely viewed as possessed or influenced by the devil, but rather seen as worthy of pity and care. People were supported by their communities while those with legal or religious responsibilities would be assigned a guardian who watched over them. Diagnoses were not made based on objective criteria, but instead a comparison of ability versus responsibilities. If one’s responsibilities were greater than their mental ability, they were considered “mad.” The subjective and context-dependent diagnoses makes it likely that modern day “high-functioning” diagnoses may not be present or identifiable in historical records. However, people who required support often received care from their communities, and were safeguarded by laws of protection. While present, there is less evidence of cruelty towards the intellectually disabled than often assumed.

KIRKHOF CENTER GRR 002

Dogs 'n' Roses

Participants attending 3:00 PM - 4:00 PM
Presenter: Summer Selles
Mentor: Dawn De Vries