

Creighton University
College of Arts & Sciences

20th Annual Honors Day

Program of Research Presentations



10 April 2024

2:00 – 5:00

(4:30 closing ceremony)

Harper Center 4th Floor



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Welcome from the Dean

Welcome to Honors Day 2024!

Today we recognize the innovation, creativity, and dedication of Creighton's College of Arts and Sciences Honors Program students. We celebrate the range of their academic accomplishments. These presentations and posters demonstrate the very best of what exceptional undergraduates can produce when provided with the combination of freedom of inquiry, disciplinary focus, and mentorship from faculty, all of which are key features of Creighton University's Honors Program. What you see displayed here in the Honors students' projects is a culmination of intellectual curiosity, diligent research, and steadfast commitment to creating new knowledge. I hope you will join me in congratulating the students and their mentors. We are proud of your contributions to Creighton and to your fields. We honor you.

Congratulations, Honors Day presenters!

Dr. Bridget Keegan, Ph.D.

Professor of English and Dean
College of Arts and Sciences

Welcome from the Director

Dear Honors Researchers,

Today, as we do every year, we gather to celebrate Honors research projects. These projects represent disciplines across our curriculum, treating such diverse topics as the impact of cultural/ethnic upbringing on mental health, potential ways to prevent neurodegenerative disease, and Augustine's exegetical principles. Like all the best research, your work contributes not only to our understanding of the world, but likewise to our admiration and wonder.

Congratulations on your hard-won accomplishments.

Dr. Jeffrey Hause, Ph.D.

Honors Program Director

Schedule of Oral Presentations

Session 1A

Harper 4067

Session Chair: Dr. Sherianne Shuler

- | | | |
|------|--------------------|---|
| 2:00 | Christina Driscoll | “This is My Body: Eucharistic Exodus and Revival” |
| 2:20 | Emily Kjendal | “The Delegitimization of Democracy and Perpetuation of Inequality via Felon Disenfranchisement” |
| 2:40 | Stephanie Vergil | “Learning to Navigate and Cope with Fatigue During My Time as a Crisis Text Counselor” |

Session 1B

Harper 4068

Session Chair: Dr. Jonathan Wrubel

- | | | |
|------|------------------|---|
| 2:00 | Chance Persons | “Simulations of Sub-Doppler Cooling in Ultracold Potassium” |
| 2:20 | Jack Diers | “ <i>Lsd1</i> Knockout Promotes ATOH1-mediated Hair Cell Regeneration in the Mouse Cochlea” |
| 2:40 | Callista Gregory | “Stigma: It Says More About You Than It Does About Me” |

Session 1C

Harper 4069

Session Chair: Dr. Matthew Pincus

- | | | |
|------|-------------------|---|
| 2:00 | Nathan Jobalia | “The Ideal American: A Pentadic Analysis of United States World War II Propaganda” |
| 2:20 | Jackson Fuller | “Rooftop Koreans: How Shop Owners Made History and Created Identity” |
| 2:40 | Philip Richardsen | “Apples and Oranges: Comparing Saint Augustine of Hippo to Saint Thomas Aquinas on the Classification and Gradation of Sin” |

Session 2A

Harper 4067

Session Chair: Dr. Mackenzie Taylor

- | | | |
|------|----------------|--|
| 3:05 | Grace Jaworski | “How Proteins Help Organize our DNA” |
| 3:25 | Alayna Ritter | “Beyond the Screen: An Autoethnographic Exploration of Shadowing in the Operating Room & Medical Dramas” |
| 3:45 | Cleo Zagurski | “An Analysis of Transgender Inclusive Language in Medical Education” |
| 4:05 | Kathleen Moran | “Beyond the Wound: An Interdisciplinary Examination of Scarring and Self-Perception” |

Session 2B

Harper 4068

Session Chair: Dr. Carol Zuegner

- | | | |
|------|---------------|---|
| 3:05 | Ellie Simmons | "Our Body Reveals our Personhood:"
Expressions of Authority Within
American Catholic School Gender
Policies" |
| 3:25 | Cori Jobman | "The Effects of SEO Tactics on News
Content Readership" |
| 3:45 | Ethan Wilkins | "The Narrative of Memorials in Post-
Genocide Countries" |

Session 2C

Harper 4069

Session Chair: Dr. Eric Haas

- | | | |
|------|------------------|--|
| 3:05 | Benjamin Jackson | "Monitoring Important Aspects of
Beaver and Wetland Restoration: A
Case Study" |
| 3:25 | Hannah Graff | "On the Generalized Distance Matrix" |
| 3:45 | Brianna Blake | "Structure and Function of Potential
Mammalian Riboswitch Using
SHAPE" |

Schedule of Poster Presentations

Poster Session 1 2:20-3:20 Harper Ballroom

Julia Barbee	"The Role of HNF4alpha in Subacute Liver Injury and Subsequent Regeneration"
Cameron Brookhouser	"Ha-Gao-Ta / Story Teller: Johnny Cash, a Voice for Native Rights"
Janae Car-Buckley	"Janae's Creighton Closet"
Morgan Casetta	"Comparing Degradation of Esters Between Red and White Wines"
Emily Cronin	"Is Vaporized Delta-8 Tetrahydrocannabinol a Reinforcer in Adolescent Rats?"
Darby Durbin	"Evaluation of the Behavioral Effects of Vaporized Delta-8-Tetrahydrocannabinol ($\Delta 8$ THC) in Male and Female Adolescent Rats"
Haydn Fitzgerald	"Determining Important Variables When Studying the Conditioned Rewarding Effects of Delta-8-Tetrahydrocannabinol ($\Delta 8$ -THC) in Rats with Conditioned Place Preference"
Kennedy Haase	"The Determination of HER2 and HIF-1 α Expression in Head and Neck Squamous Cell Carcinoma under Normoxic and Hypoxic Conditions by Immunofluorescence"
Eleanor Hudepohl	"Growing the Game: Mentorship for Female Golfers"

Jonathan Li	“Histological Validation of Nadh Flim Analysis to Non-invasively Detect Skin Cancer”
Matthew Meyer	“Exploring New Treatments for Polysubstance Abuse in Rats”
Kaili Palattao	“Exploration of Pathogen Infection in Bee Colonies of the Southern Hemisphere”
Joseph Poggi	“Behavioral Fever And Humidity Seeking of Horsehair-Worm Infected Crickets”
Brita Quello	“Analysis of Short-Chain Fatty Acids by GC-MS And LC-MS”
Landon Reichmuth	“ <i>K. Lactis</i> Spc42 Fails to Rescue Deletion of Spc42 in <i>S. Cerevisiae</i> ”
Derek Remitar	“Applying Nadh Phasor Flim to Investigate Metabolic Changes in In-Vitro Cancer Cell Lines Grown Under Normoxic and Hypoxic Conditions”
Ramya Rengarajan	“Investigating the Reproductive Impacts of Familiar and Novel Pathogens”
Fabiola Alanoca Rugel	“Determining the Contribution of the PhoPQ Two-component Regulatory System to <i>Salmonella</i> Antioxidant Defenses”
Jakob Teeter	“Metabolic Profiling of Soil Communities in Mead, Nebraska to Find Evidence of Pesticide Bioremediation”
Isabella Thompson	“Feminist Literature of Medieval Europe”
Nicholas Tobin	“Effects of Ink Composition on 3D-Printing Silica Glass via Direct Ink Write”

- Madeline Torbenson "High PD-L1 Expression Enables IPF Mpcs to Escape from Immune Cell Surveillance"
- Adele Varley "American Homecoming: The Process of Researching a Historical Fiction Novel"
- Evan Veltri "Langevin Dynamics to Describe CAF-1 Interactions with PCNA"
- Caroline Voss "The Impact of Retrieval Type and Feedback Form on Students' Learning of Science Terms"
- Amy Wenzel "Intentional Horrors: The Appeal of Horror Film as a Coping Mechanism for Fans with Anxiety"

Poster Session 2 3:30-4:30 Harper Ballroom

Carissa Besonen	"Ketamine Decreases Remifentanyl's Reinforcing Effects"
Ben Budesheim	"Revolutionary Rhetoric in the Mid-19th Century"
Cole Chandler	"Permeability of Hydrogen Sulfide through Isolated Cornea"
Disha Chandra	"I Got it from Mama: Exploring Trans-Generational Effects of Maternal Infection on Offspring Fitness"
Ayden Chavez	"Klotho and the Stria Vascularis"
Shea Corwin	"Solar Power Incentives in the United States"
Emily Daffer	"Determining the Expression of Long Non-coding RNAs in Aminoglycoside Induced Cochlear Ototoxicity"
Angelia D'Souza	"Beyond the Color Lines: An Autoethnographic and Literary Analysis of South Asian American Femininity in Popular Culture"
Bryce Ferguson	"Predicting Out-Migration from Sub-Saharan Africa through a Machine-Learning Lens"
Chris He	"Analyzing How the Public Views Generative Artificial Intelligence on X"
Katie Huisman	"Synthesis and Structures of Novel Lanthanide Mixed Phosphite-Sulfate Structures Formed via In-situ Ligand Reactions"

Andree Kakish	“Structural Studies of an Eukaryotic OAZ1-PK RNA”
Lauren Kettler	“Vibrational Pre-dissociation Leads to Singlet O ₂ from Biomolecular Complexes”
Zade Kidess	“Fabrication of Inexpensive Electrodes for Portable Cyclic Voltammetry System”
Maisie Laughlin	“Genomic Location of a Putative Male Determining Gene in Black Flies”
Riley Link	“On Approximate Solutions for Perturbed Optimal Control Problems”
Owen Madigan	“Quantifying Volatile Compounds in Various Wines Using HS-SPME GC-MS”
Mackenzie Madsen	“The Effects of Mental Health Services on Housing Stability in Omaha Public Housing”
Ian Mettelmann	“Comparison of Lipids from <i>Anasa tristis</i> and a Derivative Cell Line”
Aidan Nguyen	“Promoting Sensorimotor Experience among Adolescents and Young Adults with Cerebral Palsy”
Elyssa Pereyra	“The Role of Inflammation in the Degeneration and Repair of Inner Hair Cell Ribbon Synapses and Afferent Nerve Terminals Following Kainic Acid Excitotoxicity in a Neonatal Mouse Cochlear Explant Model”
Philip Richardsen	“Air Force Relevant Cold Injury Induces Release of Microvesicle Particles which is Downregulated by Treatment with Tricyclic Antidepressant Imipramine”
Lauren Ross	“Inhibition Kinetics of Novel Anti-Tuberculosis Compounds”

Darius Shahbazi

“Amphetamine Shortages May Disproportionally Affect Females: A Case Study of Neural Circuitry Differences by Medication Type in 6-8-year-olds”

Ava Szatmary

“How We Share: Exploring Strategies of Distributive Justice Among Agriculturalist and Forager Children in Namibia, Southern Africa”

Closing Ceremony Program

Harper Ballroom

Opening Address Dr. Erin Walcek Averett Associate Director of the Honors Program	4:35
Congratulations from the Dean College of Arts and Sciences	4:40
Congratulations from the Vice Provost Dr. Juliane K. Strauss-Soukup Vice Provost of Research and Scholarship	4:45
Congratulations from the Provost Dr. Mardell A. Wilson Provost	4:50
Closing Remarks & Awards Dr. Jeffrey Hause Director of the Honors Program	4:55

Abstracts

alphabetical by last name

Fabiola Alanoca Rugel

Major: Biology

Faculty Sponsor: Dr. Travis Bourret

Poster Session 1

“Determining the Contribution of the PhoPQ Two-component Regulatory System to *Salmonella* Antioxidant Defenses”

Nontyphoidal *Salmonella* is one of the four leading causes of diarrheal illnesses globally, with *Salmonella enterica* serovar *Typhimurium* the most common strain. The PhoPQ two-component regulatory system coordinates the response of *Salmonella* to diverse environmental challenges encountered during infection of hosts, including changes in Mg²⁺ concentrations, pH, and antimicrobial peptides. This project tested the hypothesis that PhoPQ promotes the antioxidant defenses of *S. Typhimurium* by regulating the expression of the magnesium transporter MgtA. Strains grown overnight at 37° C in Lysogeny Broth (LB) broth +/- hydrogen peroxide were subcultured 1:100 in fresh LB and allowed to grow to logarithmic phase (Optical Density at 600 nm = 0.5). The bacteria were then diluted in Hepes-Sodium Chloride buffer (HN buffer, pH 7.6) to 10⁵ cells/ml incubated in the presence or absence of hydrogen peroxide for 0, 0.5, 1, or 2 hours. At each time point, the bacteria were serially diluted in HN buffer and aliquots plated on LB agar plates. Plates were incubated overnight at 37° C and colony-forming units were counted to determine percent survival. Experiments were carried out in triplicate. Collectively, these data suggest that the PhoPQ two-component regulatory system plays an essential role in defending *Salmonella* against oxidative and nitrosative stresses encountered during infection.

Julia Barbee

Major: Biology

Faculty Sponsor: Dr. Ann Cavanaugh

Poster Session 1

“The Role of HNF4alpha in Subacute Liver Injury and Subsequent Regeneration”

Following acute liver injury, hepatocytes and biliary epithelial cells regenerate to restore the hepatic mass. Subacute or chronic liver injury impairs this mechanism, delaying or losing this mechanism. Hepatocyte nuclear factor 4 alpha (HNF4 α) is a key regulator and important role in proliferation and differentiation during regeneration. This study investigated the role of HNF4 α in regulating liver regeneration after subacute liver injury. Wild-type (WT) and hepatocyte-specific HNF4 α knockout (HNF4 α -KO) mice were given choline deficient and ethionine supplemented (CDE) diet for one week for an injury model, and a recover model was given one-week CDE diet followed by one-week normal diet. HNF4 α -KO mice showed significant increase in expression of proliferation, inflammation, and fibrosis markers during injury, and expression returned to normal levels in recovery. Progenitor cell markers differed in expression between WT and HNF4 α -KO mice. This data suggests that the CDE diet enhances liver injury, inflammation, and fibrosis in HNF4 α -KO mice as compared to the WT mice. Recovery after the CDE diet ameliorates these effects and promotes regeneration.

Carissa Besonen

Major: Neuroscience

Faculty Sponsor: Dr. Vanessa Minervini

Poster Session 2

“Ketamine Decreases Remifentanyl’s Reinforcing Effects”

Mu opioids are the “gold standard” for treating moderate to severe pain despite the adverse effects of these drugs. An option for avoiding adverse effects might be opioid mixtures such that smaller doses of each constituent are needed for pain relief compared with either drug alone. Our laboratory showed that morphine in mixtures with ketamine has additive pain-relieving effects. This study compared the effects of remifentanyl (0.001-0.01mg/kg/infusion) and ketamine (0.1-0.32mg/kg/infusion), alone and in mixtures to test the hypothesis that

remifentanyl/ketamine mixtures are less reinforcing compared with remifentanyl alone. Rats (n=16) chose (100 trials/session) between a pellet alone and a pellet+intravenous infusion. When choosing between a pellet and a pellet+saline, rats responded approximately equally on both levers. We found that the effects of a mixture containing 0.01 mg/kg/infusion remifentanyl and 0.1 or 0.32 mg/kg/infusion ketamine differed from the effects of the constituent doses but not saline. Reinforcing doses of remifentanyl combined with ketamine yields mixtures that are neither reinforcing nor punishing, offering “proof-of-principle” for using drug mixtures to avoid adverse effects of opioid agonists.

Brianna Blake

Major: Biochemistry

Faculty Sponsor: Dr. Juliane Strauss-Soukup

Oral Presentation Session 2C

“Structure and Function of Potential Mammalian Riboswitch Using SHAPE”

Understanding the secondary structure of RNA can provide insight into the roles that RNA participates in, specifically that of riboswitches. Riboswitches are located in non-coding segments of messenger RNAs with the prime purpose of regulating gene expression through ligand induced conformational changes. Due to its primary function, understanding and achieving accurate structures of riboswitches can lead to unanswered questions behind the role of RNA in cellular processes. Further research into the secondary structure can assist in future development of new anti-biologics agents. One technique used to analyze the secondary structure of RNA is Selective 2'-Hydroxyl Acylation by Primer Extension, SHAPE. SHAPE detects RNA structure changes by modifying the RNA in a structure-dependent manner and then performing primer extension. I am investigating a potential mammalian riboswitch using SHAPE in hope of elucidating information of ligand binding structural changes.

Cameron Brookhouser

Major: History

Faculty Sponsor: Dr. Elizabeth Elliot-Meisel

Poster Session 1

“Ha-Gao-Ta / Story Teller: Johnny Cash, a Voice for Native Rights”

In the collective memory, Johnny Cash is the Man in Black: a drug-addled, rebellious country singer. Critics and friends alike described the 1960s as Cash's "lost decade" because he spent those years wrestling with the depths of his addiction. Though his commercial success dwindled during this time, collective memory has omitted the strides that Cash made in promoting Christian and socially progressive ideals and expressly tying them to his public persona through song. A path from empathy to advocacy led him to champion the subaltern in his Concept Albums of the 1960s and to promote social change. This exhibit investigates the theological and political tenets that fueled Cash's crusade for social justice and his alternative measure of success. It highlights Cash's specific dedication to the plight of Native Americans through an examination of Cash's folk-based concept album, *Bitter Tears*, and illustrates the album's impact on Cash's artistic development.

Ben Budesheim

Majors: Computer Science and Graphic Design

Faculty Sponsor: Dr. Simon Appleford

Poster Session 2

“Revolutionary Rhetoric in the Mid-19th Century”

1848 marked the outbreak of labor revolutions all across Europe. In the lead up, during, and after various writers published their beliefs about the state of the working class in Europe. While in England, no such revolution occurred, however the working-class movement was prevalent through the Chartists, who organized strikes and protests. This research examines the link between the political publications and four novels published after the events of 1848. The publications were selected based on their relation with working-class, revolutionary, and socialist rhetoric. The novels selected were two works each by Charles Dickens and Elizabeth Gaskell, who commented on these issues in their novels, specifically, *A Tale of Two Cities*, *Barnaby Rudge*, *North and South*, and *Mary Barton*. The political publications were the works of

Karl Marx, Friedrich Engels, Thomas Carlye, Auguste Blanqui, Pierre-Joseph Proudhon, and Felix Pyat. This analysis was done using topic modeling via BERTopic, a text analysis package for Python.

Janae Car-Buckley

Major: Theatre (Performance Track)
Faculty Sponsor: Professor Lora Kaup
Poster Session 1

“Janae's Creighton Closet”

Contemporary collegiate culture is known for overconsumption and careless disposal of clothing and textiles to keep up with constantly changing fashion trends. The research conducted during the Janae's Creighton Closet event analyzed the purchasing habits and trends of overconsumption among Creighton college students, the harmful effects of fast fashion on the environment, and how creative textile recycling can make a positive impact in decreasing the carbon footprint of the fast fashion industry. This research noted that over 80% of students buy from fast fashion websites more than once a week, with over 70% admitting to throwing away lightly worn items that are not currently trendy. This research supports the need for a concept like Janae's Creighton Closet as an original textile collection initiative to keep clothing out of landfills and in circulation.

Morgan Casetta

Major: Biochemistry
Faculty Sponsor: Dr. David Dobberpuhl
Poster Session 1

“Comparing Degradation of Esters Between Red and White Wines”

Esters are organic compounds that comprise only a small fraction of the complex mixture of wine compounds but play a critical role in creating wine's fruity flavors and aromas. This project explores the hypothesis that the decomposition of esters due to oxidation upon opening a bottle of wine is responsible for the spoilage over several days. We propose that the degradation of esters and acetates occurs faster in red wines than whites, causing red wines to go bad sooner after opening and exposure to oxygen. To measure changes in ester levels, we used head-space solid-

phase microextraction with gas chromatography with mass spectrometry to analyze samples of wine immediately after uncorking and subsequently at 24-hour intervals over 3-5 days. The results reveal that different wines, regardless of color or origin, had unique initial concentrations of each ester. Furthermore, the ester concentrations in the red wines showed a greater proportional decline over time than in the white wines, supporting our hypothesis. Future studies might explore how concentrations of other components of wine change after uncorking, specifically the potential products of the ester degradation.

Cole Chandler

Major: Biology

Faculty Sponsor: Dr. Catherine Opere

Poster Session 2

“Permeability of Hydrogen Sulfide through Isolated Cornea”

Hydrogen sulfide, an endogenous gasotransmitter, is reported with therapeutic potential in unmet needs of glaucoma treatment. For any ocular formulation, topical administration is the most convenient route. However, ocular anatomical and physiological barriers pose a major hurdle in desired bioavailability in the posterior section of the eye for topically administered drugs. The posterior section is a critical requirement for neuroprotection of retinal ganglionic cells in glaucoma treatment. The cornea is the first barrier which topically administered ocular drugs encounter. Although there is abundant literature for permeation of aqueous solutions of small molecules, not much is known about the permeation of gaseous molecules such as hydrogen sulfide through the cornea. In this study, we evaluate the permeation of hydrogen sulfide through isolated bovine cornea.

Disha Chandra

Majors: Biology and Environmental Science

Faculty Sponsor: Dr. Theodore Burk

Poster Session 2

“I Got It From Mama: Exploring Trans-Generational Effects of Maternal Infection on Offspring Fitness”

Investment of energy into reproduction and immunological function is a delicate balance that is essential to an organism obtaining maximum fitness. These systems require a strategic allocation of nutrients, which is easily disrupted upon becoming infected with a pathogen or parasite. While it is well-documented that infection can negatively impact proper investment in reproduction within an individual, we are only just beginning to understand that infection may result in long-term consequences for the fitness of the resulting offspring. Here, we explore the effect a long-lived parasitic infection has on the reproductive fitness of female sand crickets, *Gryllus firmus*, and quantify the trans-generational impacts maternal infection has on their offspring. Specifically, we quantified the following traits for maternal crickets: mating success, number of eggs produced, number of eggs laid, average egg size, hatchling success of laid eggs, total number of offspring hatched, and average hatchling size.

Ayden Chavez

Major: Neuroscience

Faculty Sponsor: Dr. Gwendalyn King

Poster Session 2

“Klotho and the Stria Vascularis ”

Klotho-deficient mice rapidly develop premature aging-like phenotypes which shortens lifespan. Originally the phenotype was labeled as “aging-like” because the combination of disorders is not seen together outside of older humans. Subsequently klotho-deficiency was shown to induce hearing loss although no mechanistic information explains why. The presence of klotho plays an important role in transporter protein expression within the brain’s choroid plexus. To determine whether a common mechanism might cause hearing dysfunction in both tissues, we looked at the cochlea’s stria vascularis, which secretes the endolymph fluid needed for hearing. Stria vascularis’ functional measurement

showed no change between genotypes, however H and E stain detected increased thickness of the klotho-deficient cochlea. Since klotho-deficient mice die early in life, what we first observe in thickness could lead to long-term loss of function. In seeking more evidence for why the stria is thicker, we are examining protein expression of cochlea at different ages to determine whether these might explain loss of hearing.

Shea Corwin

Major: Political Science

Faculty Sponsor: Dr. Richard Witmer

Poster Session 2

“Solar Power Incentives in the United States”

This study examines the factors that influence a state’s proposal and passage of pro-solar power bills. Explanatory factors include political party control, professionalism, carbon monoxide production, the number of power plants in the state, wealth, the amount of sun in the state, and diffusion. While no explanatory factors were significant in the proposal model, political party and wealth were significant in the passage model.

Emily Cronin

Major: Psychology

Faculty Sponsor: Dr. Dustin Stairs

Poster Session 1

“Is Vaporized Delta-8 Tetrahydrocannabinol a Reinforcer in Adolescent Rats?”

Delta-8-Tetrahydrocannabinol (THC) had the largest growth in sales in the 2021 cannabinoid market, thus understanding its reinforcing effects is paramount. The development of a rodent vapor self-administration paradigm may advance our understanding of the abuse potential of these compounds when used in common vaping devices. The current study was designed to determine whether response-contingent vapor deliveries of delta-8 THC resulted in reinforcing effects using a rodent self-administration procedure. Eight male Sprague Dawley rats had daily 75-minute sessions for aerosolized concentrations of delta-8 THC or vehicle (ethanol). Customized operant conditioning chambers were fitted with a vapor nozzle, through which 3.6-second vaporized delta-8 THC “puffs”

were delivered into the chamber. A maintenance dose of 10mg/300µl of delta-8 THC was first used before a full dose-effect curve was established. Results indicated that the 5mg/300µl dose of delta-8 THC resulted in significant levels of intake compared to all other doses including ethanol. The current results indicate that vaporized delta-8 THC can maintain significant levels of self-administration in rats.

Angelia D'Souza

Majors: English and Cultural Anthropology

Faculty Sponsor: Dr. Surbhi Malik

Poster Session 2

“Beyond the Color Lines: An Autoethnographic and Literary Analysis of South Asian American Femininity in Popular Culture”

Although portrayals of South Asian American femininity in popular culture have gained more visibility in the last decade, these narratives often perpetuate harmful model minority stereotypes, which refer to Asian Americans as obedient, hardworking minorities who never need assistance in comparison to other marginalized racial groups. These representations of affluent, cisheterosexual Hindu women demonstrate how the model minority myth distorts our perceptions of identity, community, and nation. The stories of the South Asian women who do not fit these molds never get told. This project analyzes several prominent popular culture portrayals of South Asian American women and integrates it with an autoethnographic account and self-reflexive framework. Weaving cultural analysis with autoethnography highlights how the texts speak to my life and how my life speaks back to these stories. This project highlights my life as a queer South Asian writer on the fringes of the model minority and underscores the importance of respectful and empowering storytelling for women of color.

Emily Daffer

Majors: Biology and Classical and Near Eastern Studies

Faculty Sponsor: Dr. Annemarie Shibata

Poster Session 2

“Determining the Expression of Long Non-coding RNAs in Aminoglycoside Induced Cochlear Ototoxicity”

Ototoxicity and permanent hearing loss occur in 20-50% of patients treated with aminoglycoside antibiotics for bacterial ear infections. Inflammatory responses in the cochlea enhance the ototoxicity of aminoglycosides. The mechanism by which inflammatory responses potentiate aminoglycoside ototoxicity is not well understood. Preliminary data shows that inflammatory responses in the cochlea and brain of animal models and auditory cell lines involve the upregulation of proinflammatory long noncoding RNAs (lncRNAs). In LPS-induced endotoxemic mice, several lncRNAs, including lncRNA Nostrill, lincRNA-Cox2, and lincRNA-Tnfaip3, were significantly upregulated. Proinflammatory genes *ccl2*, *iNos*, *Tnf- α* , *Cxcl2*, *Il-1 β* were significantly upregulated in cochlea tissue 24 hours after LPS injection. RT-qPCR and in situ were used to validate and localize differentially expressed lncRNA in the nervous system of the in vivo mouse model. Additionally, in vitro studies in auditory cell lines are currently underway to investigate the mechanisms by which lincRNAs regulate endotoxemia and increased aminoglycoside-associated ototoxicity.

Jack Diers

Major: Neuroscience

Faculty Sponsor: Dr. Litao Tao

Oral Presentation Session 1B

“*Lsd1* Knockout Promotes ATOH1-mediated Hair Cell Regeneration in the Mouse Cochlea”

ATOH1 is the master regulator dictating hair cell fate in the cochlea during development, and *Atoh1* overexpression induces supporting cell transdifferentiation in mouse cochleae at neonatal ages. However, *Atoh1* fails to exert fate conversion in mature supporting cells in terms of conversion rate and transcriptome profile, suggesting potential epigenetic barriers blocking the transcription activation of *Atoh1* target genes. Lysine specific demethylase 1 (LSD1) is a histone

demethylase that is known to play a key role in cell fate determination by silencing lineage-specific genes. Previously, we knocked out *Lsd1* while simultaneously overexpressing *Atoh1* in Lgr5+ supporting cells at P0/P1 and found that *Lsd1* knockout led to significantly more induced hair cell-like cells compared to *Atoh1* overexpression alone. Here, we elucidate the phenotype of hair cell-like cells and the underlying molecular mechanism using scanning electron microscopy, immunohistochemistry, and Cut&Run sequencing.

Christina Driscoll

Majors: Biology and Theology

Faculty Sponsor: Fr. Christopher Krall, SJ

Oral Presentation Session 1A

“This is My Body: Eucharistic Exodus and Revival”

Vatican II (1960s) developed *Sacrosanctum Concilium* and *Lumen Gentium*, radically altering how the Eucharist is embodied in the Catholic Church. The council emphasized the full, active, and communal participation in the Eucharistic liturgy. However, the subsequent universal implementation of these renewals varied drastically by deviating from the council’s intentions. Active participation in and reverence for the Eucharist plummeted. Because the cornerstone of the Church was displaced, secular societal shifts and mistrust in traditional values infiltrated the life of the Church causing declining attendance, polarization, and diminishing catechesis. This destructive shift necessitates a revival—a return to the Eucharist’s centrality in Christian life. Without the source and summit of the faith, personal dignity is lost and generalized apathy ensues. This Ressourcement and Aggiornamento of Vatican II’s documents reveal where Church identity was weakened and the need for potential revival in the Church today.

Darby Durbin

Major: Neuroscience

Faculty Sponsor: Dr. Dustin Stairs

Poster Session 1

“Evaluation of the Behavioral Effects of Vaporized Delta-8-Tetrahydrocannabinol ($\Delta 8$ THC) in Male and Female Adolescent Rats”

While extensive research has assessed the abuse potential of delta-9 THC, minimal research has been conducted on federally legal delta-8 THC. Despite the ease of accessibility for adolescents, the behavioral effects of delta-8 THC and its impact on adolescent users remain unexplored. The current study aimed to characterize the rewarding effects of vaporized delta-8 THC using the Conditioned Place Preference (CPP) paradigm in male and female adolescent (PND 21) rats. Animals were exposed to vehicle (PG) or delta-8 THC. Delta-8 was administered at doses of either 10 mg or 20 mg/0.300ml. Following two rounds of eight conditioning trials, a total of two drug-free test days were completed to determine if subjects displayed a CPP response to the drug-paired side. Results indicate female adolescent rats displayed a significant delta-8 THC CPP effect for both the 10 and 20 mg doses by the second test day, while male rats failed to show a significant CPP effect following conditioning with either dose of delta-8 THC. Interestingly, following 4 days of extinction male rats displayed a significant reinstatement of the CPP effect for the 10 mg dose while females did not. Future studies should further explore this sex difference in sensitivity to delta-8 THC in comparison to adult subjects.

Bryce Ferguson

Major: International Relations

Faculty Sponsor: Dr. Stephen Fernandes

Poster Session 2

“Predicting Out-Migration from Sub-Saharan Africa through a Machine-Learning Lens”

In light of increasing global interconnectivity, global health, and ecological crises, out-migration from MENA (the Middle East and Northern Africa) has steadily increased since the turn of the century. Specifically, Sub-Saharan Africa has experienced a doubling of out-

migration totals since 1990, with about 20 million people leaving in 2013. As desertification, war, and political instability increase, social scientists project not only a destabilization of and mass migration from the region, but they further contend that Europe and North America will experience record-breaking numbers of migrants that will permanently, and perhaps detrimentally, restructure the sociopolitical landscapes that formerly existed. While typical linear regressions attempt to explain the variation in migration regionally, nationally, and annually, many of the understood factors of migration are nonlinear in their interactions. For example, while poverty, violent conflict, and climate change may incentivize populations to emigrate, these phenomena simultaneously operate as hindrances to this effort. While interaction effects can be included in linear regressions, it is highly unlikely that one could include all of the potentially relevant interactions between variables. Machine-learning modes provide solvency to this issue through their function to both self-train, adapt, and ultimately discover complex nonlinear patterns and relationships in the data that would not be immediately apparent or previously identified.

Haydn Fitzgerald

Majors: Biology and Spanish and Hispanic Studies

Faculty Sponsor: Dr. Dustin Stairs

Poster Session 1

“Determining Important Variables When Studying the Conditioned Rewarding Effects of Delta-8-Tetrahydrocannabinol ($\Delta 8$ -THC) in Rats with Conditioned Place Preference”

For the past three years, our lab has utilized the Conditioned Place Preference (CPP) paradigm to study the conditioned rewarding effects of vaporized delta-8 THC in rodents. We utilize a three-chamber apparatus with a white side, black side, and neutral gray compartment in the center. delta-8 THC is paired with one side (black or white) while a vehicle, propylene glycol, is paired with the other. Following each of the two rounds of eight days of conditioning, during which rats learn to associate the cannabis drug with a particular side of the CPP chamber, test days are performed to see if the rats' time spent in the different chambers has changed from a baseline assessment completed prior to conditioning. Our previous CPP data showed an unforeseen trend in which stronger CPP effects were generally observed when delta-8 THC was paired with the black side. This project aimed to explore the interactions between

different CPP variables to more systematically study this finding and to inform our future experiments with CPP. Results indicated that at higher doses of delta-8 THC, drug-pairing with the white side led to a weaker to no conditioned place preference. Additionally, males demonstrated higher sensitivity to the effect of side compared to females.

Jackson Fuller

Major: History

Faculty Sponsor: Dr. Elizabeth Elliot-Meisel

Oral Presentation 1C

“Rooftop Koreans: How Shop Owners Made History and Created Identity”

The project is a detailed examination of how the “rooftop Koreans” fought back against the 1992 LA riots and managed to protect their businesses from the looting. The project will also cover the bravery and cooperation that contributed to the Korean American identity. I will use maps to show the logistics of the riots and the defended businesses as well as how the Korean radio stations shared critical information for the shop owners. I will use the published and recorded interviews about the events and how the riots shifted what it means to be a Korean American.

Hannah Graff

Majors: Math, Data Science, Musical Theatre (BFA)

Faculty Sponsor: Dr. Nathan Pennington

Oral Presentation Session 2C

“On the Generalized Distance Matrix”

Given a graph G and a function f , the generalized distance matrix $D(G, f)$ has rows and columns indexed by the vertices of G with the (u, v) entry being $\text{dist}(u, v)^f$, where dist is the distance between vertices u and v . Two graphs G and H are said to be strongly distance cospectral if $D(G, f)$ and $D(H, f)$ have the same characteristic polynomial for all f . We give a sufficient condition for two graphs to be strongly distance cospectral in terms of simultaneous similarity of related 0-1 matrices. Moreover, we give a sufficient condition in terms of a block similarity matrix for two strongly distance cospectral graphs to remain strongly distance

cospectral after gluing arbitrary graphs on to subsets of the vertices (i.e., coalescing).

Callista Gregory

Major: Cultural Anthropology

Faculty Sponsor: Dr. Laura Heinemann

Oral Presentation Session 1B

“Stigma: It Says More About You Than it Does About Me”

The purpose of this project is to examine and critically analyze the structure of the stigma surrounding mental health. Throughout the study, I consider how, generally, stigma tends to reflect what is most at stake for those who enforce it. Using retrospective autoethnographic methods, I analyze my experience understanding my own mental health before I was able to conceptualize stigma and how my awareness of stigma eventually altered the way that I viewed myself and others. My experiences as an observer in others’ mental health crises will also be analyzed to provide a more well-rounded perspective. Additionally, I will draw upon anthropological and sociological theories regarding stigma, which understand stigma within a socio-cultural context. Ultimately, this project will illustrate stigma as a mode for further understanding the local moral worlds and values that shape the identities of people.

Kennedy Haase

Majors: Biochemistry and Spanish and Hispanic Studies

Faculty Sponsor: Dr. Michael Nichols

Poster Session 1

“The Determination of HER2 and HIF-1 α expression in Head and Neck Squamous Cell Carcinoma Under Normoxic and Hypoxic Conditions by Immunofluorescence”

The diagnosis and treatment of cancer requires an understanding of molecular mechanisms to provide targeted and effective therapy. Cancers that overexpress human epidermal growth factor receptor 2 (HER2) are known to be more aggressive. However, aggressively proliferating cancers do not have the vasculature to receive oxygen, which creates a hypoxic environment within a tumor. Hypoxia is known

to affect multiple metabolic pathways, including glycolysis and oxidative phosphorylation, as well as stimulate cell signaling pathways including hypoxia inducible factor 1 α (HIF-1 α) synthesis, which is also stimulated by the HER2 pathway. I hypothesized that there would be a significant difference in HIF-1 α expression based on the level of HER2 expression and the level of oxygen in the environment. I cultured two head and neck squamous cell carcinoma cell lines with differing levels of HER2 expression, SCC74A and SCC74B, grown at 21% and 2% oxygen levels then quantified the amount of HER2 and HIF-1 α protein in each of the four conditions.

Chris He

Major: Computer Science

Faculty Sponsor: Dr. Samer Al-khateeb

Poster Session 2

“Analyzing How the Public Views Generative Artificial Intelligence on X”

With the recent widespread adoption of Generative Artificial Intelligence solutions across a wide variety of companies, it is important to understand how the general public views Artificial Intelligence (AI) topics given how its general prevalence and usage have seeped into everyday life. Social media usage is ubiquitous in today’s digital era. This research investigates the sentiments, topics, and networks extracted from social media posts related to different AI keywords. The goal of this research is to better understand how the public views this disruptive technology. By analyzing data gathered from the X platform (formerly known as Twitter), we will be better equipped to gauge public sentiments of the AI space on social media, identify influential figures in the sphere of AI, analyze the different types of networks, as well as recognize prominent topics discussed in this rapidly evolving field.

Eleanor Hudepohl

Major: Economics

Faculty Sponsor: Dr. Tricia Ross

Poster Session 1

“Growing the Game: Mentorship for Female Golfers”

Since 2019, female participation in golf has increased over 15% and nearly 40% of this growth has occurred in girls under 18. In order to identify ways to encourage female long-term participation and success in the sport, this project collects and analyzes data on the number of junior golf invitational participants who have played collegiate or professional golf. This analysis demonstrates the necessity of promoting the game of golf among girls as a lifelong sport and that strong mentorship is vital due to its impact on long-term career trajectory. This research utilizes data gathered from over 2,000 participants from global tournaments led and managed by one of the most successful female golfers in history. The data provides evidence of the impact that mentors have on young female golfers and reveals the direct correlation between mentorship via tournament events and specialized instructional clinics and continued competition either in college or a professional tour. The outcome of high matriculation rates from invitational golf tournaments to college and professional tours demonstrates the importance of quality mentorship for females in the game of golf.

Katie Huisman

Majors: Chemistry ACS and Economics

Faculty Sponsor: Dr. Eric Villa

Poster Session 2

“Synthesis and Structures of Novel Lanthanide Mixed Phosphite-Sulfate Structures Formed via In-situ Ligand Reactions”

Phosphorous acid (H_3PO_3) is a water-soluble acid and reducing agent. In solution, it easily deprotonates to become phosphite (HPO_3^{2-}), which will bind to metals. Phosphites are used as plant fertilizers and can double as a fungicide and pesticide against various pathogens. Likewise, sulfamic acid (H_3NSO_3) can also be used as an herbicide and a generalized cleaning agent. The presence of either or both within soil matter allows for potential complexation to various metal ions, which greatly influences their stability and mobility within the environment. With an

interest in understanding the ways metals and these ligands can interact, we continue our lanthanide phosphite studies by incorporating a secondary ligand in sulfamic acid. Interestingly, sulfamic acid hydrolyzes during these reactions to form bisulfate and ammonium cations, the latter of which become the charge balancing cations for the anionic lanthanide phosphite-sulfate network. In this presentation, we present the syntheses and structures in this unique system.

Benjamin Jackson

Majors: Biology and Certificate of Business Administration

Faculty Sponsor: Dr. Theodore Burk

Oral Presentation Session 2C

“Monitoring Important Aspects of Beaver and Wetland Restoration: A Case Study”

Wetlands are becoming increasingly valued for their roles in supporting biodiversity, wildfire and drought resilience, climate resilience, water quality, fish and wildlife habitat, and a myriad of other ecosystem services. Process-based restoration of degraded beaver wetland ecosystems at specific sites of degradation is becoming an accepted strategy for restoring watershed health in Colorado and across the western states. Objective, repeatable scientific data on the effects of current beaver wetland restoration projects are needed to better understand the nature and magnitude of both benefits and potential implications of this emerging restoration approach. In this talk, I present monitoring studies that were employed on one beaver restoration project in Park County, Colorado, briefly explaining the methods, rationale, and initial results over a three-year time frame. The aim is to bolster the overall effectiveness of scientific monitoring by assuring the most important data are collected in a particular and effective manner.

Grace Jaworski

Major: Biology

Faculty Sponsor: Dr. Lynne Dieckman

Oral Presentation Session 2A

“How Proteins Help Organize our DNA”

DNA must be highly packaged to fit inside the cell nucleus. The process of packaging DNA immediately following its replication is called replication-coupled nucleosome assembly. This process requires two major proteins: proliferating cell nuclear antigen (PCNA) and chromatin assembly factor 1 (CAF-1). The interaction between CAF-1 and PCNA is critical for proper DNA packaging, but it is unknown how these two proteins interact during replication-coupled nucleosome assembly. The goal of my work is to characterize the thermodynamics of the interaction between CAF-1 and PCNA using isothermal titration calorimetry (ITC). Thus far, I have measured the thermodynamics of a known interaction between PCNA and CAF-1. I have also identified a novel interaction site on each protein using a qualitative protein-protein binding assay. I am currently working toward determining the thermodynamics of this novel interaction. Understanding how PCNA and CAF-1 interact at the thermodynamic level will provide insight into how the recruitment of CAF-1 to the replication fork by PCNA mediates nucleosome assembly.

Nathan Jobalia

Major: History: International Relations Specialization

Faculty Sponsor: Dr. Erika Kirby

Oral Presentation Session 1C

“The Ideal American: A Pentadic Analysis of United States World War II Propaganda”

My research applies Burkean pentadic criticism to analyze the organizational rhetoric of the United States' Office of War Information via its propaganda produced during World War II. Specifically, I examine six representative propaganda posters that aim to recruit people to fight as soldiers or to help make machinery, as well as ask everyday Americans to remain vigilant and act in favor of the U.S. war effort through service, support, and loyalty. In this analysis, the constituent elements of “agent,” “act,” “agency,” “scene,” and “purpose” are identified and quantified in terms of their ratios to other constituent elements. This application of the

pentad helps elucidate the physical, mental, and spiritual characteristics of the perceived “ideal” American to contribute to the war effort in the eyes of the United States government, with traits such as Whiteness and (predominantly) maleness. This implied, idealized individual simultaneously included and excluded various different groups of individuals and its legacy can still be seen today.

Cori Jobman

Major: Journalism

Faculty Sponsor: Dr. Carol Zuegner

Oral Presentation Session 2B

“The Effects of SEO Tactics on News Content Readership”

As news production has moved increasingly online, even for television, newspaper and radio networks and journalistic organizations have been trying to figure out the most effective ways to reach audiences with their content, with one of the major methods search engine optimization (SEO). It is generally understood that using SEO tactics, including keywords, SEO-specific titles and descriptions, and specific URLs are all strategies that can work, but the specific effectiveness of any of these tactics isolated is fairly unknown. Using the men’s and women’s basketball content on the website of the Creightonian, I analyzed the impacts of each of these tactics on pageviews of individual articles. The most impactful tactic was an increase in the number and specificity of keywords. I argue that this is due to ease of use, allowing for more effective use of the tool, and user visibility, leading more directly than other tactics to an interaction.

Andree Kakish

Major: Biochemistry

Faculty Sponsor: Dr. Juliane Soukup

Poster Session 2

“Structural Studies of an Eukaryotic OAZ1-PK RNA”

Riboswitches are elements found within noncoding regions of messenger RNAs (mRNAs) that regulate gene expression via metabolite binding. Upon binding to the riboswitch, the metabolite induces a conformational change in the RNA, resulting in modulation of expression of a nearby

gene. Most riboswitches are found in bacteria, although the Soukup lab has been investigating a highly conserved eukaryotic RNA sequence that exhibits characteristics of a bacterial riboswitch. The lab's previous results demonstrate riboswitch function of a mouse RNA element that is highly conserved among vertebrate genes required for polyamine biosynthesis. Most biological organisms can synthesize natural polyamines which are essential for normal cell growth. Halting the production of polyamines prevents cell growth. Because of its unique regulatory function, this putative riboswitch RNA has potential biomedical applications, including anticancer pharmaceuticals. The main goal of my research project is to examine the structure and function of the Ornithine Decarboxylase Antizyme Pseudoknot (OAZ1-PK) RNA, a putative riboswitch, using X-ray crystallography. My progress includes large scale in vitro transcription of RNA, size-exclusion chromatography to purify RNA, dynamic light scattering to analyze the RNA, and manual setup up of crystallography trays to test a wide array of chemical conditions for crystal growth.

Lauren Kettler

Major: Chemistry

Faculty Sponsor: Dr. Bradley Parsons

Poster Session 2

“Vibrational Pre-dissociation Leads to Singlet O₂ from Biomolecular Complexes”

In the ground state, O₂ has two unpaired electrons making it a triplet state. When O₂ is excited to the lowest singlet state, all electrons are paired and it is *cytotoxic*. Singlet O₂ can be utilized in solar water disinfection and photodynamic cancer treatments. For these applications, a photosensitizer excited by light is quenched to give singlet O₂ with a maximum quantum yield of one. We are interested in a novel paradigm also involving a photosensitizer, like acridine or phenalenone, complexed with triplet O₂ and absorbing a photon from a laser, resulting in an excited complex containing the triplet photosensitizer and singlet O₂, which then dissociates. The triplet photosensitizer molecule can then form another singlet O₂ molecule via collisional quenching, potentially increasing the quantum yield to two. We investigate the mechanism through which the bimolecular complex falls apart by presenting and analyzing experimental data. As we increase energy above the threshold to dissociate the excited complex, we

observe that a smaller-than-expected amount of energy is partitioned into translation, indicating a vibrational pre-dissociation mechanism is more likely than a statistical one.

Zade Kidess

Major: Biochemistry

Faculty Sponsor: Dr. Erin Gross

Poster Session 2

“Fabrication of Inexpensive Electrodes for Portable Cyclic Voltammetry System”

Electroanalytical methods are very useful analytical techniques, but the instrumentation can be somewhat expensive. Vernier Instruments sells an inexpensive, portable cyclic voltammeter, but it requires the use of more expensive electrodes, around four dollars each. Using stencil printing with a carbon ink, electrodes were fabricated that are a fraction of the price of the commercial electrodes. Testing using cyclic voltammetry and electrochemiluminescence have shown that these lab made electrodes perform similarly to commercial electrodes in regard to both precision and accuracy. Testing has been done to determine a more resilient substrate to make these inexpensive electrodes on, but they are still less durable than the commercial electrodes. This downside comes with the benefit of being able to alter the size and shape of the electrode to fit the requirements of any situation.

Emily Kjendal

Major: Philosophy

Faculty Sponsor: Dr. Kevin Graham

Oral Presentation Session 1A

“The Delegitimization of Democracy and Perpetuation of Inequality via Felon Disenfranchisement”

In this essay, I examine the problem and philosophical implications of the disenfranchisement of voting rights for individuals convicted of a felony offense. In his 2002 article, “Political Legitimacy and Democracy,” Alan Buchanan argues that democratic legitimacy and civil buy-in are contingent on the right of citizens to have a fair say in democratic processes. I argue that using Buchanan’s philosophy, the

restriction of felon voting rights reduces democratic legitimacy and therefore these rights should not be infringed upon by any democratic society. At present, there are 48 states in the U.S. that restrict felons' right to vote. This fact, coupled with our country's history of racial slavery and mass incarceration that disproportionately affects Black and Brown men, creates extremely problematic and unethical effects that exacerbate the problem of felon disenfranchisement. I argue that it is undemocratic to restrict the voting rights of individuals convicted of a felony in any capacity, and that this problem is amplified by the disproportionate racial dynamics in the U.S. prison system.

Maisie Laughlin

Major: Biology

Faculty Sponsor: Dr. Charles Brockhouse

Poster Session 2

"Genomic Location of a Putative Male Determining Gene in Black Flies"

This study investigates a candidate sequence of the primary male determining factor of two *Simulium* species: *Simulium tribulatum* and *S. vittatum*, which differ only in the chromosomal location of the male determiner. Commonly known as the black fly, this family is of substantial interest to the scientific community due to the ability of adult females to transmit an array of pathogens, including the causative agent of Onchocerciasis, commonly referred to as River Blindness. The World Health Organization identifies Onchocerciasis as a Neglected Tropical Disease (NTD) due to its significant effects on global health and economic affairs. Preliminary work by the Brockhouse lab has identified a candidate for the primary male determiner to be similar to the sex-specific splicing protein Transformer-2 (TRA-2), which we have further analyzed through bioinformatic work. We anticipate that the completion of this study will lay the foundations for future research to investigate the ability to transform *Simulium tribulatum* and *S. vittatum* females into pseudo-males.

Jonathan Li

Major: Biology

Faculty Sponsor: Dr. Michael Nichols

Poster Session 1

“Histological Validation of NADH Flim Analysis to Non-invasively Detect Skin Cancer”

Squamous cell carcinoma is a common form of nonmelanoma skin cancer that can be caused by damage to DNA and DNA repair mechanisms by UV light. Carcinomas are known to exhibit differences in cellular metabolism, allowing for diagnosis using endogenous biomarkers. Our lab focuses on developing a method to detect skin cancer non-invasively using optical biomarkers within cells. Our technique involves fluorescence lifetime imaging microscopy (FLIM) of NADH, a molecule crucial to energy metabolism of the cell, to examine the transition from healthy (oxidative favored) to cancerous cells (glycolytic favored). Hairless mice were exposed to UV radiation for five days a week and imaged weekly to examine the changes in cellular structure, collagen structure, and cellular metabolism over time. We examined changes in tissue morphology using histological methods to analyze differences in skin thickening and cancer morphology. All mice exposed to UV radiation developed skin lesions, with most also developing tumors. UV treated mice also showed significantly thicker epidermal thickness at both 13 and 25 weeks, with males exhibiting thicker epidermis than females.

Riley Link

Major: Math

Faculty Sponsor: Dr. Nathan Pennington

Poster Session 2

“On Approximate Solutions for Perturbed Optimal Control Problems”

We consider the optimal control of a space shuttle trajectory where we seek to maximize longitudinal range as the shuttle descends into the atmosphere. The optimal trajectory depends on parameters, such as aircraft shape, whose importance we determine by derivative-based global sensitivity measures. Parameter uncertainty limits the applicability of control trajectories computed prior to flight and often begets a need for new solutions mid-flight. However, it is often prohibitive or

impossible to recalculate the optimal control mid-flight due to strict time constraints. Instead, we approximate new trajectories using post-optimality sensitivity information. We test the accuracy of these approximations to determine the best method of approximating perturbed solutions of optimal control problems.

Owen Madigan

Major: Chemistry

Faculty Sponsor: Dr. David Dobberpuhl

Poster Session 2

“Quantifying Volatile Compounds in Various Wines Using HS-SPME GC-MS”

There are hundreds of volatile compounds within the matrix of any given wine that contribute to its aroma and thus flavor profiles. Whether over years of storage or within days of being opened, degradation of these compounds due to oxygen exposure over time correlates with the perceived degradation of a wine’s quality. This study aimed to monitor concentration changes in fusel alcohols, organic acids, and straight and branched-chain ethyl esters over time in red and white wines using headspace solid phase microextraction (HS-SPME) coupled with gas chromatography–mass spectrometry (GC-MS). Various quantitation strategies were tried, with multiple standard addition deemed to be the most reliable. Ultimately, this study determined that the concentration of ethyl esters degraded far more rapidly than any of the other compounds analyzed, which suggests that it is a key signifier in the quality of a wine.

Mackenzie Madsen

Major: Neuroscience

Faculty Sponsor: Dr. Michelle Roley-Roberts

Poster Session 2

“The Effects of Mental Health Services on Housing Stability in Omaha Public Housing”

Through a partnership with the Omaha Housing Authority (OHA), we created mental health clinics in public housing towers. We provided mental health screenings, evidence-based psychotherapy, and community resource referrals for adult tenants residing in OHA public

housing to address mental health in an effort to increase housing stability and decrease evictions. This feasibility study placed a licensed clinical psychologist at two housing towers accessible to tenants to reduce structural barriers in seeking mental health care. Our hypothesis was that the tenants and staff in the housing towers would be receptive to these mental health clinics. Tenants were overall responsive to the access to mental health care and information, and the staff noticed an increase in participation, vulnerability, curiosity, and receptiveness to mental health services with time. In conclusion, providing a mental health clinic to tenants in public housing does appear to reduce structural barriers, but can increase stigmatic barriers that require additional forethought.

Ian Mettelmann

Major: Biochemistry

Faculty Sponsor: Dr. Eric Haas

Poster Session 2

*“Comparison of Lipids from *Anasa tristis* and a Derivative Cell Line”*

This study compares the lipid composition of various squash bug tissues and a squash bug derived cell line to control organisms. We have previously quantified the lipids present in different insect cells. This project will allow us to compare the lipids in the cells directly with those in the same organism. We will compare the lipids of the whole organisms as well as various tissues, such as those from which the cell line is derived. Along the way, squash bugs will be infected with the pathogenic organism *S. marcescens*. Comparing lipids in control versus infected organisms will help dissect the pathways of the inflammatory and immune response. We know that eicosanoid levels increase after infection, but we do not yet know where the lipid precursors are taken from. We will sample several time points along the way to track the development of the immune response.

Matthew Meyer

Majors: Biology and Musical Theatre

Faculty Sponsor: Dr. Vanessa Minervini

Poster Session 1

“Exploring New Treatments for Polysubstance Abuse in Rats”

Opioids are the “gold standard” for treating pain. While effective, opioids can have many adverse effects, such as substance abuse. The co-abuse of opioids and stimulants is especially problematic; there are currently no FDA approved treatments for polysubstance abuse, but certain candidate medications include the orexin antagonist suvorexant and the GLP1 agonist semaglutide. This project tested treatments for polysubstance abuse. To do so, rats chose between a food pellet alone or a food pellet plus an intravenous infusion. In different conditions, the infusion was either the opioid remifentanil (0.001–0.01 mg/kg), the stimulant methamphetamine (0.032–0.32 mg/kg), or aremifentanil/methamphetamine mixture. Data was collected on the preference for each drug and drug mixture as well as the effects of prior exposure to opioids on stimulant choice (and vice versa). Ultimately, this project will test different new medications as possible treatment options for polysubstance abuse.

Kathleen Moran

Majors: Medical Anthropology and Spanish and Hispanic Studies

Faculty Sponsor: Dr. Laura Heinemann

Oral Presentation Session 2A

“Beyond the Wound: An Interdisciplinary Examination of Scarring and Self-Perception”

From scarification rituals to surgery, humans have a long history with scars, and their significance has been etched into our societies and cultures for thousands of years. However, contemporary American society is bombarded with media advertising for the “improvement” of scar appearance; in other words, scars are deemed undesirable and as something to be “fixed.” Biological research on scar treatment often utilizes white subjects in these studies. While the psychological and social impacts of scars are briefly noted as reasoning for scar improvement, this sentiment is lost in the research. Scar assessments used by medical professionals utilize both physician and patient observations.

Understanding the lived experience of those with scars is necessary when approaching scar research and health outcomes. Using medical anthropology as a lens is vital when delivering care and developing research within the medical field. Therefore, interviews with medical professionals, people with scars, and those without scars create a variety of scar narratives that can be used to bridge the gap between scientific research and the patients who live with scars.

Aidan Nguyen

Major: Exercise Science

Faculty Sponsor: Dr. Kimberley Scott

Poster Session 2

“Promoting Sensorimotor Experience among Adolescents and Young Adults with Cerebral Palsy”

Somatosensory processing for people with cerebral palsy (CP) is impaired. The purpose of this study was to quantify Experience for an 8-week PT intervention and investigate differences in Experience (defined as the therapist explicitly emphasizing the participant’s perception of motor tasks) across levels of motor ability (GMFCS level) and between therapists. There were 17 participants in the study. All participants had GMFCS levels of I, II, or III. Video-recorded intervention sessions were analyzed using behavioral coding software (Datavyu). Non-parametric testing compared average Experience rates between GMFCS levels (I and III) and between therapists. The mean session duration was 46.7 minutes. Median Experience Rate (Exp/min) was 0.25 for Therapist 1; 0.24 for Therapist 2; 0.19 for GMFCS level I; 0.68 for level II; and 0.28 for level III. No significant differences were found between therapists ($p=.724$) or across GMFCS levels ($p=.100$). Results show that promoting sensorimotor experience can occur among multiple therapists and individuals with different levels of motor function during PT intervention for adolescents and adults with CP. Future studies can assess variables that may account for differences in Experience rate, such as the novelty of training tasks.

Kaili Palattao

Majors: Biology and Spanish and Hispanic Studies

Faculty Sponsor: Dr. Carol Fassbinder-Orth

Poster Session 1

“Exploration of Pathogen Infection in Bee Colonies of the Southern Hemisphere”

The Global Bee Project experimentally investigated the variability in pathogen presence from honey bee populations across the world. The present study compared samples from honey bee apiaries in French Polynesia (n=12) and Chile (n=25). Following RNA extraction, purification, and the synthesis of complementary DNA (cDNA), pathogen levels were detected through the use of droplet digital polymerase chain reaction (ddPCR). Approximately 12 pathogens were tested, including bacteria, viruses, protists, and fungi. Through a comparative analysis of colonies around the world, our work contributes to the global understanding of honey bee health, with a focus in some remote and understudied areas of the world.

Elyssa Pereyra

Majors: Neuroscience and Biology

Faculty Sponsor: Dr. Tejbeer Kaur

Poster Session 2

“The Role of Inflammation in the Degeneration and Repair of Inner Hair Cell Ribbon Synapses and Afferent Nerve Terminals Following Kainic Acid Excitotoxicity in a Neonatal Mouse Cochlear Explant Model”

Noise-induced cochlear excitotoxic trauma is a result of an excessive release of excitotoxic glutamate from inner hair cells (sensory cells of the inner ear) and leads to the degeneration of inner hair cells synapses and loss of spiral ganglion neurons. Such damage can lead to degradation of transmission of auditory information and hamper understanding of speech in noisy environments. During kainic acid (KA, glutamate analog)-induced excitotoxic trauma there is an upregulation of inflammatory genes in areas near inner cell synapses. However, the precise role of inflammation in KA-induced cochlear excitotoxicity and ribbon synapse degeneration and/or repair is unknown. We hypothesized that inflammation plays a detrimental role, and inhibition of inflammation with glucocorticoid prevents the degeneration of IHC

synapses during KA-induced excitotoxicity. Our data suggest that inflammation may promote KA-induced synaptic and neuronal loss and that anti-inflammatory drugs, such as steroids, could prevent such cochlear damage.

Chance Persons

Majors: Physics and Chemistry

Faculty Sponsor: Dr. Jonathan Wrubel

Oral Presentation Session 1B

“Simulations of Sub-Doppler Cooling in Ultracold Potassium”

A Bose Einstein Condensate (BECs) is a very cold phase of matter - less than a millionth of a degree above absolute zero - in which all atoms occupy the quantum mechanical ground state. Because of this, the synthesis and study of BECs is a significant area of interest in quantum mechanics. Dr. Wrubel’s lab uses sub-Doppler laser-cooling processes to cool potassium-41 atoms to near-absolute zero temperatures to attempt to create a BEC. My research uses a python package called pyLCP (python Laser Cooling Physics) to model lab conditions and simulate the physics of these laser-cooling processes to predict outcomes in our lab. The results of my simulations are force profiles that show the cooling forces for various levels of cooling and repump laser frequencies. These force profiles are found to differ from previously published results.

Joseph Poggi

Majors: Biochemistry and Spanish and Hispanic Studies

Faculty Sponsor: Dr. John Shea, S.J.

Poster Session 1

“Behavioral Fever and Humidity Seeking of Horsehair-worm Infected Crickets”

The horsehair worm (*Paragordius varius*) is well-known for its ability to infect and manipulate the behavior of their cricket hosts (*Acheta domesticus*), forcing it into open water where the worm then leaves its host to mate and reproduce. However, relatively little is known about the horsehair worm, including how or even if crickets can defend against the parasite. One of the most common ways ectotherms such as crickets ward off infection is behavioral fever, in which hosts seek out warmer

environments to artificially raise body temperature. Unlike the less discriminate fevers of many endotherms, behavioral fever is typically a more selective response. This is possibly due to higher temperatures posing a risk of desiccation to hosts, disincentivizing the response. Our findings indicate that infected hosts show a preference for higher humidities, but not higher temperatures. It is possible that this humidity preference is a response to infection or a redundancy mechanism by which the parasite manipulates its host into seeking water.

Brita Quello

Major: Biology

Faculty Sponsor: Dr. Eric Haas

Poster Session 1

“Analysis of Short-chain Fatty Acids by GC-MS and LC-MS”

The quantity and composition of short-chain fatty acids (SCFAs) in the alimentary canal of honeybees play a vital role in maintaining the health of the organism. We are attempting to isolate and quantify SCFAs from honeybees (*Apis mellifera*) due to SCFAs' role in resistance to colony collapse disorder (CCD). SCFAs, which are distinct from their long-chain counterparts, are known to be volatile compounds with lower boiling points. To gain more insights into the composition and abundance of SCFAs, we employed both Gas Chromatography-Mass Spectrometry (GC-MS) and Liquid Chromatography-Mass Spectrometry (LC-MS) techniques. We analyzed SCFAs in their native form, without derivatization, as well as methyl ester derivatives and trimethylsilyl derivatives to capture a comprehensive profile of these compounds. We are employing a variety of analytical techniques, using GC-MS and LC-MS, to identify the most effective way to isolate and quantify SCFAs in the guts of honeybees.

Landon Reichmuth

Majors: Biology and Spanish and Hispanic Studies

Faculty Sponsor: Dr. Ann Cavanaugh

Poster Session 1

“K. lactis Spc42 Fails to Rescue Deletion of Spc42 in S. cerevisiae”

Spindle pole bodies (SPBs) are the microtubule organizing centers in most species of yeast and are essential for cell division. SPBs are evolutionarily unstable and have undergone rapid protein evolution structurally. Iterative search algorithms were used to identify the *Kluyveromyces lactis* homologue of the central SPB protein, known as Spc42 in *Saccharomyces cerevisiae*. To understand how interdependent components of a rigid, geometric complex like the SPB evolve as a group, we replaced one endogenous copy of *S. cerevisiae* Spc42 with *K. lactis* Spc42 (KISpc42) to determine the effectiveness of KISpc42 to functionally rescue the *S. cerevisiae* SPB. To do so, *S. cerevisiae* diploids containing a deletion of Spc42 were transformed at the LEU2 locus with *S. cerevisiae* expression vectors substituted with KISpc42-GFP. Haploid survival rates following tetrad dissection and diploid imaging indicate that KISpc42-GFP cannot integrate into the *S. cerevisiae* SPB and therefore fails to replace deletion of endogenous Spc42 in *S. cerevisiae* despite its central structural role.

Derek Remitar

Major: Neuroscience

Faculty Sponsor: Dr. Michael Nichols

Poster Session 1

“Applying Nadh Phasor Flim to Investigate Metabolic Changes in In-Vitro Cancer Cell Lines Grown Under Normoxic and Hypoxic Conditions”

Non-melanoma skin cancer, including squamous cell carcinoma, represents the most common type of skin malignancy. Development of non-invasive diagnostic measures may aid in detection and improve outcomes. The Warburg Hypothesis (1913) posits that cancer cells shift from oxidative phosphorylation towards glycolysis. Previous research has elucidated cellular pathways that underlie changes in cancer cells, such as binding of growth factors to human epidermal growth factor receptor 2 (HER2). Pham and colleagues observed metabolic shifts

through changes in the protein-bound: free ratio of NAD(P)H with the imaging method of fluorescence lifetime imaging microscopy (FLIM); however, cell lines were cultured in atmospheric oxygen levels (21%). This study aimed to further apply FLIM to changes in cancer metabolism with squamous cell carcinoma cell lines, each with high or low expressions of HER2 respectively in differential oxygen environments (21% and 2% oxygen). This study also observed the effect of HER2 expression on the activity of the electron transport chain (ETC) evaluated through mitochondrial uncouplers and inhibitors, under both oxygen conditions. We hypothesized that growth in hypoxic conditions would result in a shift towards anaerobic glycolysis with less involvement of the ETC. Our results suggest NADH Phasor FLIM reveals metabolic changes associated with these factors.

Ramya Rengarajan

Majors: Biology and Medical Anthropology

Faculty Sponsor: Dr. Amy Worthington

Poster Session 1

“Investigating the Reproductive Impacts of Familiar and Novel Pathogens”

Immune memory provides organisms significant advantages when re-encountering the same pathogen, although the presence of and mechanism behind invertebrate immune memory is not well understood. Research has found confounding evidence regarding the existence and specificity of invertebrate immune memory and what benefits individuals might gain from maintaining this memory. To better understand the impacts of immune memory on investment into reproduction, I infected adult crickets with a novel or familiar pathogen at two sequential time points and compared multiple measures of their overall reproductive potential. For male crickets, I quantified sperm viability, mating behavior, mating success, and total offspring sired. For female crickets, I quantified ovary size, mating behavior, mating success, stored sperm viability, and the number of viable eggs laid. Ultimately, this experiment will directly test hypotheses of the costs and benefits of immune memory in insects and will provide further insight into the complex trade-offs that exist between the immune and reproductive systems.

Philip Richardsen

Majors: Biochemistry and Biomedical Physics

Faculty Sponsor: Dr. Gwendalyn King

Poster Session 2

“Air Force Relevant Cold Injury Induces Release of Microvesicle Particles Which is Downregulated by Treatment with Tricyclic Antidepressant Imipramine”

The Department of the Air Force has the greatest United States Military presence in the Arctic region with assets in Alaska, Greenland, and around the world, and the Air Force continues expansion and development of operational capabilities in the Arctic region in pursuit of vigilance, deterrence, and defense from foreign threats. Warfighters in the Arctic region and other subarctic regions are at high risk for cold injury including frostbite and hypothermia. One of the most significant pathologies associated with frostbite is inflammation and its consequences, including ischemia, necrosis, and self-amputation. Previously, the Travers group has shown that the lipid mediator Platelet-activating factor (PAF) was biosynthesized and released by cells undergoing cold injury. Moreover, many environmental stressors (heat, UVB radiation) which also produce PAF also generate subcellular microvesicle particles (MVP). The goal for these studies was to define if cold injury results in MVP generation and release and whether cold injury effects on MVP release were PAF-Receptor (PAFR)-dependent or -independent. Using the human keratinocyte-derived cell lines HaCaT, KBM (PAFR-), and KBP (PAFR+) we find that cells undergoing Air Force relevant cold injury released MVPs consistent with the release of PAF and that MVP release appears to be PAFR-independent (though more studies need to be carried out to confirm this). We also tested if experimental cold injury to porcine skin explants resulted in MVP release, and if tricyclic antidepressant imipramine which blocks MVP releasing enzyme acid sphingomyelinase is a down-regulator of MVP release. Ultimately, these studies provide the first evidence that cold injury results in MVP release. Future studies will define roles of PAFR and acid-sphingomyelinase in MVP release as well as the pathologic consequences of MVP release in the setting of cold injuries.

Philip Richardsen

Majors: Biochemistry and Biomedical Physics

Faculty Sponsor: Dr. Jeffrey Hause

Oral Presentation Session 1C

“Apples and Oranges: Comparing Saint Augustine of Hippo to Saint Thomas Aquinas on the Classification and Gradation of Sin”

As the adage tells us, “Don’t compare apples and oranges.” Hence, when we classify items, we divide them into species that share a common genus. Not just metaphysicians like Aristotle or biologists like Linnaeus, but also theologians apply rational principles of classification. This study focuses on Aquinas’ and Augustine’s efforts to classify sins and determine their various levels of severity. Synthesis of these taxonomies established by Aquinas and Augustine allows for a systematic rational approach to self-reflection on one’s sin and carrying out penance.

Alayna Ritter

Major: Exercise Science

Faculty Sponsor: Dr. Sherianne Shuler

Oral Presentation Session 2A

“Beyond the Screen: An Autoethnographic Exploration of Shadowing in the Operating Room & Medical Dramas”

My project is an autoethnographic account of my first experience in the operating room as a pre-medical undergraduate student shadow. I condensed the most impactful moments of the 50 hours I spent shadowing in the operating room into a single day. My goal is that by writing about my own experience, other pre-medical students will be better able to anticipate what they may encounter while shadowing in an operating room. I exemplify the impact that shadowing can have on students' medical journeys and highlight how the lack of exposure to realistic operating rooms and hospital dynamics has resulted in a reliance on popular culture to discern what a career in medicine is like. Medical television shows have become a major, often inaccurate, form of vocational anticipatory socialization, as shows like *Grey's Anatomy* have become the source of inspiration for adolescents aspiring to practice medicine.

Lauren Ross

Major: Neuroscience

Faculty Sponsor: Dr. Lynne Dieckman

Poster Session 2

“Inhibition Kinetics of Novel Anti-Tuberculosis Compounds”

Tuberculosis (TB) is a disease originating from the slow-growing bacteria *Mycobacterium tuberculosis* (*M.tb*). An increasing number of TB strains are unresponsive to the most commonly administered medications, creating demand for a new TB treatment method. My project aims to synthesize new anti-TB compounds that target the less-studied enzyme FadD32. FadD32 is an enzyme unique to *M.tb* and is required for the synthesis of mycolic acids, large fatty acids that maintain the integrity of the *M.tb* cell wall. The inhibitors I study are modified from coumarin-based compounds, which possess inhibiting properties on FadD32, but have a short half-life in vivo. We located areas of instability on the original coumarin-based molecules and performed modifications to synthesize more stable inhibitors. Using these inhibitors, I performed enzyme inhibition kinetics to determine if FadD32 inhibitory activity was maintained. My results lead to the conclusion that all inhibitors, despite modifications, retained inhibitory activity toward FadD32. With further research, these compounds may inform new resources for TB therapeutics.

Darius Shahbazi

Major: Neuroscience

Faculty Sponsor: Dr. Annemarie Shibata

Poster Session 2

“Amphetamine Shortages May Disproportionally Affect Females: A Case Study of Neural Circuitry Differences by Medication Type in 6-8-year-olds”

National shortages of amphetamine medications have led physicians and psychiatrists to prescribe alternative medications to individuals suffering from the profoundly distracting symptoms of ADHD, yet little research has been done to prove that these alternative medications are effective. Most studies are conducted on male participants. Thus, we recruited both males and females in order to test the interaction between sex and clinical status on neural connectivity at rest. Results revealed distal

connections are weaker in males versus females. Within the clinical group, females demonstrated weaker local connections and less distal connections overall compared to clinical males. In contrast, clinical males demonstrated weaker distal and local connections compared to clinical females. Distal connectivity is primarily related to greater dysfunction in females, but both distal and local connectivity is related to greater dysfunction in males. Based on sex differences in neural circuitry at rest, the national shortages of amphetamine medications may directly impact females more than males, as females seem to respond in unintended and different ways to secondary medications. The long-term mental outcomes of females are discussed.

Ellie Simmons

Majors: Sociology and Justice and Society

Faculty Sponsor: Dr. Sabrina Danielsen

Oral Presentation Session 2B

“Our Body Reveals our Personhood:’ Expressions of Authority Within American Catholic School Gender Policies”

Previous studies of Catholic school gender policies have suggested that regardless of the surrounding political context, policies overwhelmingly support conservative conceptualizations of gender and emphasize the importance of Church authority in determining norms. However, there has been no comprehensive analysis of Catholic school gender policies across the United States. To examine these policies in light of their surrounding political and ideological contexts, I contacted all 177 U.S. Catholic dioceses and compiled a novel dataset of all known diocesan school gender policies (N=52). From this, I found no significant difference in policy rationale or content based on the political context of the diocesan office. This lack of variation and similar origins points to an intentional effort to make policies similar across different dioceses in order to distinguish the view of the Church from that of the secular world. This has a significant impact on how children are taught to perceive variations in gender expression through the lens of Church authority.

Ava Szatmary

Major: Psychology

Faculty Sponsor: Dr. Jill Brown

Poster Session 2

“How We Share: Exploring Strategies of Distributive Justice Among Agriculturalist and Forager Children in Namibia, Southern Africa”

As the world finds itself in a dire state due to increasing wealth inequality, it is critical to look cross-culturally at resource distribution. The youngest members of cultures can illuminate how sharing strategies are developmentally and culturally acquired. This study explored what strategies children in Namibia use to share, and how culture affects perceptions of sharing. The Solomon Distributive Justice Task (1997) and supplemental qualitative methods were utilized. Hypotheses included 1) that children from agriculturalist and forager communities share differently, with forager children focusing on equality and agriculturalist children focusing on merit; 2) that merit as a strategy increases in prevalence with age and education level; 3) that children from both agriculturalist and forager communities will use equality more than the adults of their communities. Findings showed that strategies differed across cultural groups, that merit increased with education level, and that children mirrored the strategies of adults from their respective cultural groups.

Jakob Teeter

Major: Biology

Faculty Sponsor: Dr. Marie Adomako

Poster Session 1

“Metabolic Profiling of Soil Communities in Mead, Nebraska to Find Evidence of Pesticide Bioremediation”

The ethanol producer AltEn, LLC contaminated waterways near Mead, Nebraska with neonicotinoid pesticides through wastewater spills and wet distillers grains (wet cake) application on fields. Neonicotinoids are toxic to invertebrates and humans, with the potential to cause significant damage to pollinators and aquatic invertebrate communities. Certain species of soil bacteria are capable of metabolizing thiamethoxam, imidacloprid, and clothianidin, the three neonicotinoids of concern released from AltEn. We used Biolog EcoPlates to assess the metabolic

profiles of soil communities from sites in Mead presumed to be affected by neonicotinoids. These metabolic profiles can be used as a tool to identify a microbial response to contamination and if bioremediation is occurring. Beyond the AltEn contamination, if a consistent metabolic fingerprint indicative of neonicotinoid metabolism is established it can be used to surveil other locations for pesticide contamination.

Isabella Thompson

Major: Biology

Faculty Sponsor: Dr. Jeffrey Hause

Poster Session 1

“Feminist Literature of Medieval Europe”

The 12th-14th centuries are thought of as a time when women’s social roles and responsibilities were strictly limited. Nevertheless, feminist or proto-feminist works were created and shared throughout this period. This research aims to analyze societal expectations for women in this period and the feminist literature that arose in response. Through analyzing the arguments and literary elements (themes, motifs, and symbols) used in various philosophical and literary works, I aim to explain the lasting value of these specific works that have lasted the test of time and what can we learn from them in the way we frame conversations in the modern world.

Nicholas Tobin

Majors: Physics and Chemistry

Faculty Sponsor: Dr. Joel Destino

Poster Session 1

“Effects of Ink Composition on 3D-Printing Silica Glass via Direct Ink Write”

Glass additive manufacturing (AM), or 3D printing, enables improved precision and compositional control not viable by melt quench techniques. Direct ink writing (DIW) is a glass AM method by which sol-gel-derived silica nanoparticles or commercial fumed silica particles are suspended in a colloid slurry and extruded through a nozzle to print a gel preform that can be consolidated into a fully-dense glass component by ceramic processing. In this presentation, we seek to resolve challenges

and inconsistencies with DIW by studying how ink composition influences printability (i.e., rheology) and network consolidation (i.e., microstructure and optical transparency). Rheology was modified by varying ink solvent formulation, specifically, the relative ratios of conventional DIW solvents (propylene carbonate and tetraglyme) and silica particle surface area, chemistry, and charge. Qualitatively, ink formulations were screened based on the maximum solids loading achievable and the ability to extrude through an 18-gauge nozzle under 200 N. From these results, the rheology of select formulations was characterized. Initial results indicate that polar silica particles disperse best (i.e., achieve a higher solid loading) in majority propylene carbonate solvent mixtures, and non-polar silica particles disperse best in majority tetraglyme solvent mixtures. Furthermore, particles with a greater surface area more readily sinter to transparency.

Madeline Torbenson

Majors: Biology and English

Faculty Sponsor: Dr. Alistair Cullum

Poster Session 1

“High PD-L1 Expression Enables IPF MPCs to Escape from Immune Cell Surveillance”

Idiopathic Pulmonary Fibrosis (IPF) is a disease that progresses in a stereotypic manner. IPF mesenchymal progenitor cells (MPC) are involved in the progression. IL-8 causes the expression of PD-L1 ligands in both an autocrine and endocrine manner. Our hypothesis is that these MPCs are secreting more IL-8 than non IPF MPCs, causing IPF MPCs to express PD-L1. PD-L1 is an important ligand in programmed cell death, causing immune cells to not recognize cells that otherwise would have been destroyed. We hypothesize that the IPF MPCs will have more PD-L1 mRNA, more PD-L1 protein, and will escape death more efficiently than control cells in a cytotoxic assay with natural killer (NK) immune cells.

Adele Varley

Majors: English and Spanish and Hispanic Studies

Faculty Sponsor: Dr. Faith Kurtyka

Poster Session 1

“American Homecoming: The Process of Researching a Historical Fiction Novel”

I am writing a full-length novel inspired by the story of my great-great-grandparents who immigrated from Italy to the United States in the early 20th century. To gain a historically accurate understanding of this time I focused on multiple areas of research, namely life in rural northern Italy, transatlantic travel, cultural and religious attitudes to divorce, and Italian-American immigration patterns in San Francisco and Omaha. I also conducted two interviews with my cousin Rita who visited the areas where my grandparents grew up in Italy and is knowledgeable about our family history. As a result, the novel is a blend of scholarly research and oral history, which informs the perspectives of each character and builds a realistic world in which to set their story.

Evan Veltri

Major: Chemistry

Faculty Sponsor: Dr. Lynne Dieckman

Poster Session 1

“Langevin Dynamics to Describe CAF-1 Interactions with PCNA”

DNA must be condensed to fit inside the nucleus of the cell. Proteins called histones are wrapped by DNA after replication to form nucleosomes. The interactions between nucleosomes are critical for both gene silencing and expression. The process of DNA replication followed immediately by histone deposition is known as replication-coupled nucleosome assembly. This process is partially accomplished by the sliding clamp protein proliferating cell nuclear antigen (PCNA), which recruits a histone chaperone protein, chromatin assembly factor-1 (CAF-1), to the replication fork. CAF-1 then deposits histones onto the DNA to begin nucleosome formation. The structure of the interaction between PCNA and CAF-1 is unknown. We aspire to determine the structure and dynamics of this interaction using small angle X-ray scattering (SAXS) experiments and molecular simulations. We have carried out preliminary SAXS experiments and Langevin-based molecular simulations with wild

type and mutant forms of PCNA and CAF-1. Initial data suggests that there are multiple transient interaction sites between PCNA and CAF-2, which may play important roles during nucleosome assembly.

Stephanie Vergil

Major: Psychology

Faculty Sponsor: Dr. Sherianne Shuler

Oral Presentation Session 1A

“Learning to Navigate and Cope with Compassion Fatigue During My Time as a Crisis Text Counselor”

With the growing mainstream awareness of mental health in recent years, an increasing number of individuals have sought some form of mental health support during times of need. This includes mental health services that are both in-person and online. Most of the research studying online crisis text lines has looked at their effectiveness or the amount of texters they receive, but there is hardly any research or experience shared by those who are crisis text counselors. For this project, I decided to write an autoethnography to talk about my experience as a crisis text counselor. I explored the different aspects of being in this emotionally labored volunteer position, such as what encouraged me to apply for this position and the effects it has had on my life. By reflecting on my experiences, I have identified how I have come to the point of being able to support texters while not allowing this to interfere with my daily life. I argue that it is a mixture of learning how to cope with my own emotions while also understanding the limits of my role and an “on/off switch” that I control.

Caroline Voss

Major: Psychology

Faculty Sponsor: Dr. Amber Witherby

Poster Session 1

“The Impact of Retrieval Type and Feedback Form on Students’ Learning of Science Terms”

Self-testing is a highly effective study method. Students can self-test using any method that brings a concept to mind. Many studies, however, focus solely on overt retrieval (overtly producing an answer), whereas students

often rely on covert retrieval (silently thinking about an answer) when studying. The aim of the present study was to determine whether these differentially impact memory for science key-terms, and whether the type of feedback participants get during practice tests impacts the effectiveness of self-testing. Participants studied a list of key-terms and definitions. Next, during a learning phase they covertly retrieved some terms, overtly retrieved some terms, or restudied some terms. Following retrieval, participants were given feedback (half of the participants got whole definition and half got idea unit). Two days later they were retested. It was found both overt and covert retrieval produced better learning, while there was no difference according to feedback type. Overall, these results will inform effective learning techniques.

Amy Wenzel

Major: English

Faculty Sponsor: Dr. Faith Kurtyka

Poster Session 1

“Intentional Horrors: The Appeal of Horror Film as a Coping Mechanism for Fans with Anxiety”

With an increase of interest in horror as a genre and the ever growing conversations about mental health, researchers have started to look into correlations between the two. One such find is that people with anxiety disorders tend to lean more towards the horror genre, especially horror films. This has become a topic of quantitative research due to the fact that horror movies are by nature meant to increase feelings of anxiety and fear rather than ease them, and yet horror fans with anxiety are not a small population. My research project investigated this information qualitatively, interviewing fans of horror films who also identify as or have been diagnosed with anxiety and attempted to discern the appeal of horror films for this group. Using the lens of Reader Response Theory, I studied how horror affects said individuals on a personal level in order to determine any similarities or correlations in how people with anxiety disorders interact with the horror genre.

Ethan Wilkins

Major: Biology

Faculty Sponsor: Dr. J.J. Carney

Oral Presentation Session 2B

“The Narrative of Memorials in Post-Genocide Countries”

Inspired by my pilgrimage to Rwanda in fall of 2022, I wanted to further explore the extent of reconciliation in Rwanda after the Tutsi genocide. I was struck by the extent of memorials that are scattered around Rwanda. I am interested in the ways that memorials reflect reconciliation and political efforts in Rwanda as well as in Bosnia, both countries that experienced genocide and civil war in the 1990s. To explore the politics of memorialization, I will examine what is being remembered, who the memorials are engaging, what information is being omitted, where inspiration for these memorials were drawn, and the degree of governmental regulation. I argue that while memorials in these places are established to honor the dead, they also reinforce the narratives provided by the dominant party or ethnic group.

Cleo Zagurski

Majors: Health Administration and Policy and Public Health

Faculty Sponsor: Dr. Kevin Estep

Oral Presentation Session 2A

“An Analysis of Transgender Inclusive Language in Medical Education”

Inclusivity expectations within medical settings have evolved significantly over the past three decades in response to changing social norms. Influences from the broader social sphere have driven the incorporation of additional content into medical educational materials. Discussions surrounding equity for individuals who identify with marginalized social constructs such as race, gender, and sexual orientation have gained prominence, reflecting shifting social norms. While navigating these changes, we must consider various avenues of preparation for providing LGBTQIA+ designated care. I have analyzed the content of five primary care textbooks, which each had at least 2 issued editions totaling 21 books and 913 chapters, to identify changes in transgender-related language occurrences. I found that between 2003 and 2022 there was an increase in language referring to diversity, LGBTQIA+, and transgender patients within the selected primary care

textbooks. In phase two, I am conducting semi-structured interviews with current fourth-year medical students to develop a qualitative understanding of the current culture.

About the Honors Program

Honors Program Mission Statement

Rooted in the Creighton University's Christian, Catholic, and Jesuit traditions, the Honors Program relies on the belief, articulated by Pope John Paul II, that "the united endeavor of intelligence and faith will enable people to come to the full measure of their humanity." Its goal is to foster a community committed to the ongoing education of students and faculty members as fellow seekers for truth. The program seeks individuals of all faiths and backgrounds who are intelligent, well prepared academically, highly motivated, and academically adventurous. The curriculum then immerses these students in an academically rigorous but flexible program of study guided by a faculty mentor who is charged with paying special attention to the personal dimension of learning. The program ultimately understands itself as a fellowship of inquiry whose individual members have dedicated themselves without reserve to love of learning.

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Dr. Bridget Keegan, Dean of the College of Arts & Sciences
Professor of English
Eppley 214
bridgetkeegan@creighton.edu

Dr. Jeffrey Hause, Honors Program Director
Michael W. Barry Professor
Hitchcock Communications Center 303
jeffreyhause@creighton.edu

Dr. Erin Walcek Averett, Honors Program Associate
Director
Professor of Art History and Classical & Near Eastern Civilizations
Lied Educational Center for the Arts 114
erinaverett@creighton.edu

Dr. Matthew Pincus, Honors Program Resident Assistant
Professor
Hitchcock Communications Center 304C
matthewpincus@creighton.edu

Ms. Joi Katskee, Program Coordinator
College of Arts and Sciences
Hitchcock Communications Center 209
joikatskee@creighton.edu

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