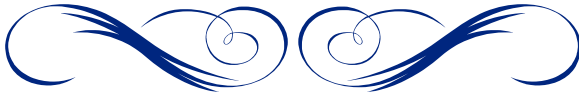


Creighton University
College of Arts and Sciences

11th Annual Honors Day

Program of Research Presentations



Wednesday, April 15th, 2015

2:00-5:00 PM

Harper Center, 3rd Floor

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Welcome from the Dean

Welcome to Honors Day, 2015.

Today we recognize the innovation, creativity, and dedication of Creighton's College of Arts and Sciences Honors students. We celebrate the range of their academic accomplishments. These presentations, posters, and artwork 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 2015 presenters!

Dr. Bridget Keegan, Ph.D.

Professor of English and Interim 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 Haitian perspectives on biomedical intervention, sustainable and intentional communities in the Midwest, and investigations into substrate binding mechanisms in proteins. Like all the best research, your work contributes not only to our understanding of the world, but likewise to our admiration and wonder.

The ambitious projects you are presenting today were born not just of your intellectual powers, but of your diligence, patience, courage, and steadfastness. It was hope that inspired you, resolve that carried you through, and conscientiousness that led to completion. Not only your projects, but you yourselves serve as models for the Creighton community to follow. Therefore, we gather to celebrate not just Honors research, but Honors researchers. Congratulations on your hard-won accomplishments.

Dr. Jeffrey Hause, Ph.D.

Honors Program Director

Oral Presentation Schedule

| Time: | Room: | Presenter: | Title: |
|--------------|--------------|-------------------|--|
| 2:05 p.m. | 3026 | Michael Kotrous | “The Effects of Non-Neutral Network Management Policies on Broadband Prices in the Developing World” |
| 2:05 p.m. | 3027 | Josh Bucy | “The Portfolio and Work of Josh Bucy” |
| 2:05 p.m. | 3027A | Anna Hensel | “Men and Women at their Best: Men’s Magazines, and the People Who Create Them” |
| 2:05 p.m. | 3029 | Ryan Jones | “The Courage of Your Convictions: The Life and Governorship of Nels Smith of Wyoming” |
| 2:05 p.m. | 3029A | Jacquelyn Wagner | “A Fuzzy Mathematical Model of Social and Environmental Health in Kansas” |
| 2:30 p.m. | 3026 | Kelli Ann Ifuku | “What is the Experience of Having a Child with Cerebral Palsy?” |
| 2:30 p.m. | 3027 | Joseph Baronovic | “Explaining the Art Market, Restoration, and ‘Portrait of a Roman Boy’” |

Oral Presentation Schedule

| Time: | Room: | Presenter: | Title: |
|-----------|-------|-----------------|---|
| 2:30 p.m. | 3027A | Krysta Larson | “Exploring Learning Methods in a Sorority through the Habits of Mind” |
| 2:30 p.m. | 3029 | Sofia Paz | “Did You do it Intentionally? Explaining an Asymmetry through Experimental Design” |
| 2:30 p.m. | 3029A | Megan Kangiser | “Effects of Varenicline and GZ-793A on Methamphetamine and Food Self-Administration under a Multiple Schedule of Reinforcement in Rats” |
| 2:55 p.m. | 3026 | David Martin | “Our Lady of Guadalupe: Cultural Bridge” |
| 2:55 p.m. | 3027 | Elenore Leonard | “John Pierpont Morgan and the Metropolitan: The Changing Face of Art Museums in the Period 1880-1940” |
| 2:55 p.m. | 3027A | Markus Pfaff | “Effects of Amphetamine and Ketamine on Rat Behavior under a Differential-reinforcement-of-low-response-rate Schedule” |

Oral Presentation Schedule

| Time: | Room: | Presenter: | Title: |
|-----------|-------|------------------|--|
| 2:55 p.m. | 3029 | Mary Hanten | “How the Built and Natural Environment Came to be and its Resulting Consequences: A Behavioral and Philosophical Approach” |
| 2:55 p.m. | 3029A | Austin Spillane | “Of Rent-Seekers & Ridesharers: An Analysis of Uber & Lyft’s Impact on the Taxicab Industry” |
| 3:20 p.m. | 3026 | Cole Crawford | “Transforming Robert Tannahill” |
| 3:20 p.m. | 3027 | Danielle Desa | “Ototoxic Aminoglycosides Increase Reactive Oxygen Species while Decreasing NADH Reduction Capacity at Complex I” |
| 3:20 p.m. | 3027A | Dominic Dongilli | “Lions and Tigers and Environmental Discourse in Zoos. Oh my!” |
| 3:20 p.m. | 3029 | A.J. Hagen | “Mid-Infrared Spectral Analysis of Active Galactic Nuclei” |
| 3:20 p.m. | 3029A | Katie Truitt | “Comparison of Dicer1 and Dgcr8 knockout in sensory hair cells of the inner ear” |

Oral Presentation Schedule

| Time: | Room: | Presenter: | Title: |
|-----------|-------|-------------------|--|
| 4:00 p.m. | 3026 | Laura Levy | “The Letters of Anne Boleyn” |
| 4:00 p.m. | 3027 | Christian Andreen | “The Effects of Cross Sectional Area on Fatigue during Cycle Ergometry” |
| 4:00 p.m. | 3027A | John McCoy | “The Illicit Financial Flow Global Network: Explaining Connections with State Characteristics” |
| 4:00 p.m. | 3029 | Maria Benevento | “Living the Change, Sharing the Message: Northeast Missouri’s Sustainable Intentional Communities” |
| 4:00 p.m. | 3029A | Emily Dowdle | “True Midwesterner: Deconstructing Race at the Heartland State Fair” |

Poster Presentation Schedule

| Time: | Room: | Presenter: | Title: |
|-----------|-------|-----------------|--|
| 2:05 p.m. | 3023B | Daniel Poston | “Biochemical Engineering and Optimization of the glmS Riboswitch for Use as a Synthetic Genetic Device.” |
| 2:05 p.m. | 3023B | Erin Rossiter | “Testing the Proposed Effect of Judicial Performance Evaluations: Do Voters Use This Information?” |
| 2:05 p.m. | 3023B | Leah Schaffer | “Developing a Detection Method for Biogenic Amines” |
| 2:05 p.m. | 3023B | Eric Villanueva | “Age-Related Changes in the Inner Ear of the Adult Zebrafish (<i>Danio rerio</i>)” |
| 2:05 p.m. | 3023B | Amy (Ruomei) Wu | “Toy Story: Where do Children Draw the Line Between Blue and Pink?” |
| 2:05 p.m. | 3023B | Anton Yanchilin | “Synthesis of Copper Sulfide Thin Films for Photovoltaic Applications” |
| 2:05 p.m. | 3028 | Dhwani Shah | “Prevention of Cardiac Myocyte Loss via Reversal of Apoptosis” |
| 2:05 p.m. | 3028 | Jakob Dovgan | “Hydrothermal Synthesis of Lanthanide Sulfites” |

Poster Presentation Schedule

| Time: | Room: | Presenter: | Title: |
|-----------|-------|-------------------|--|
| 2:05 p.m. | 3028 | Matthew Goldsmith | “Protective Capability of Pigments in Gemmata obscuriglobus” |
| 2:05 p.m. | 3028 | Jennifer Hartjes | “Enamel Fluoride Uptake Determination from Dental Materials Containing Encapsulated Remineralizing Agents” |
| 2:05 p.m. | 3028 | Carissa Hernandez | “Prolonging Peace: External Intervention after Civil War” |
| 2:05 p.m. | 3028 | Emma Hoppe | “Expansion of the Tissue Inhibitors of Metalloproteinase (TIMP) and the Synapsin Multigene Families” |
| 2:05 p.m. | 3028 | Katherine Johnson | “Exploring the Relationship between Medicaid Expansion and Hospital Readmission Rates” |
| 2:05 p.m. | 3028 | Daniel Kresock | “Mechanistic Investigation of a Spermine-Binding Riboswitch to Potential Anti-Cancer Drugs” |
| 2:05 p.m. | 3028 | Elizabeth Lievens | “ICT Diffusion and the Causes of Modern Protest Trends” |

Poster Presentation Schedule

| Time: | Room: | Presenter: | Title: |
|-----------|-------|-----------------|---|
| 2:55 p.m. | 3023B | Katherine Bauer | “Investigation of Conversion Efficiency between Natural and In Vitro-Generated Prions” |
| 2:55 p.m. | 3023B | Mark Byrne | “Network Diffusion: Strategic Influence in the International System” |
| 2:55 p.m. | 3023B | Caitlyn Ewers | “Artemis in Athienou-Malloura: Revealing Gendered Relationships among Cypriot Deities” |
| 2:55 p.m. | 3023B | Renner Fujiwara | “Investigating Dynamics of Proteins in Sugar Solutions by Fluorescence Correlation Spectroscopy” |
| 2:55 p.m. | 3023B | Augusta Herman | “ <i>Nanpwen Maladi Ki Pa Gen Remèd</i> (‘There is No Illness that Does Not Have a Cure’): How Biomedical Intervention Fits into the Haitian Context” |
| 2:55 p.m. | 3023B | Sarah Kelly | “Energy Consumption in Creighton University Residence Halls: Comparing Attitudes and Behaviors” |
| 2:55 p.m. | 3028 | Rachel Berry | “Micro-loans and ITN Deliveries in India” |
| 2:55 p.m. | 3028 | Sarah Budney | “RNase 4 in the Little Brown Bat” |

Poster Presentation Schedule

| Time: | Room: | Presenter: | Title: |
|-----------|-------|----------------|---|
| 2:55 p.m. | 3028 | Ryan Ford | “Form Factors from Theoretical Hartree-Fock Calculations and Dark Matter Detection” |
| 2:55 p.m. | 3028 | Mary McGlynn | “The Pollen Tube Pathway in Victoria: Implications for Flower Evolution in Water Lilies (Nymphaeaceae)” |
| 2:55 p.m. | 3028 | Ashley Nolting | “Intestinal Tight Junction Integrity may not be Compromised in Healthy Individuals with Obesity” |
| 2:55 p.m. | 3028 | Alex Shepherd | “A Fuzzy Mathematical Model Determining the Risk for Carotid Intima-Media Thickness in Recently Menopausal Women Enrolled in the KEEPS Study” |
| 2:55 p.m. | 3028 | Nicole Strawn | “Effects of Salt Osmolarity on <i>Arthrobacter globiformis</i> Uptake of Phosphorous and Sulfur” |
| 2:55 p.m. | 3028 | Alex Tymkowicz | “Intestinal Enterocyte Damage is not Increased with Obesity in Healthy Individuals” |

Poster Presentation Schedule

| Time: | Room: | Presenter: | Title: |
|--------------|--------------|-------------------|--|
| 2:55 p.m. | 3028 | Haley Warren | “The Knowledge Level of Healthful Lifestyle Practices of the Students, Faculty, and Staff at Creighton University” |
| 3:45 p.m. | 3023B | Patrick Bruck | “Investigating the mechanism of Ste6 export in <i>S. cerevisiae</i> ” |
| 3:45 p.m. | 3023B | Jon Ermer | “Survey of Bobcat Intestinal Helminths on the Pine Ridge Reservation, SD” |
| 3:45 p.m. | 3023B | Nicholas Fischer | “Comparison of Atomic Force Microscopy and Optical Profilometry in Enamel Etching: Can Seemingly Identical Measurements Really be Compared?” |
| 3:45 p.m. | 3023B | Christopher Lyons | “The Social Network: Locating Online Communities” |
| 3:45 p.m. | 3023B | Michael Rezich | “Development of Elvitegravir Nanoparticles For Long-Term Prevention of HIV Infection” |
| 3:45 p.m. | 3023B | Deidre Richard | “Efficacy of Implemented Care Bundle in Decreasing the Incidence of Central Line Associated Bloodstream Infections” |

Poster Presentation Schedule

| Time: | Room: | Presenter: | Title: |
|-----------|-------|------------------------|---|
| 3:45 p.m. | 3028 | Suna Akkoseoglu | “The Effects of Clonidine and Yohimbine Injections in Mouse Strains Selectively Bred for High and Low Fear Responses” |
| 3:45 p.m. | 3028 | Julianna Diddle | “Development of Artificial Agonists as Candidate Antibiotics for a Bacterial Riboswitch” |
| 3:45 p.m. | 3028 | Michael Grzelak | “The Co-Development of Lorentz Force and Solenoid Pulsed Nozzles in an Effort to Create a Supersonic Molecular Beam” |
| 3:45 p.m. | 3028 | Steffen Lake | “Simulating Electron Positron Production in STAR detector at RHIC” |
| 3:45 p.m. | 3028 | Cassidy Plunkett | “Epidermal growth factor receptor regulation of Stathmin 1 in mouse skin cancer” |
| 3:45 p.m. | 3028 | Kalley Quandt | “Olfactory and Vomeronasal Systems are Both Present in a Cartilaginous Holocephalian Elephant Shark, <i>Callorhynchus milii</i> ” |
| 3:45 p.m. | 3028 | Andres Rodriques-Burns | “An Analysis of Solar Potential for Creighton University” |

Poster Presentation Schedule

| Time: | Room: | Presenter: | Title: |
|--------------|--------------|-------------------|---|
| 3:45 p.m. | 3028 | Sravani Singu | “Effect of Size on In Vitro Activation of Murine BMDCs by C5aR Targeted PLGA Particles” |
| 3:45 p.m. | 3028 | Colin Bertsch | “Driving Forces of the Stability of Alzheimer’s Ab Aggregates in Model Membranes” |

Schedule of Speakers

Welcome and Introduction, 2:00 p.m., Harper 3023

Dr. Lydia Cooper, Assistant Director of the Honors Program

Closing Ceremony, 4:30 p.m., Harper 3023

Introduction to the Dean:

Dr. Lydia Cooper, Assistant Director of the Honors Program

Congratulations from the Dean:

Dr. Bridget Keegan, Interim Dean, College of Arts and Sciences

Congratulations from the President:

Dr. J. Chris Bradberry, Interim President of Creighton University

Closing remarks:

Dr. Jeffrey Hause, Director of the Honors Program

Abstracts

Suna Akkoseoglu

Major: Biology

Faculty Sponsor: Dr. Deniz Yilmazer-Hanke

3:45 -4:25 p.m. // Harper 3028

“The Effects of Clonidine and Yohimbine Injections in Mouse Strains Selectively Bred for High and Low Fear Responses”

Fear and anxiety are evolutionarily behaviors in response to anticipated threats. Pathological forms lead to anxiety disorders like posttraumatic stress disorder (PTSD). Here we investigate a novel C3H-like recombinant inbred (C3HLRI) line obtained by backcrossing fearful C3H/HeJ mice onto DBA/2J mice with low fear responses. Because PTSD patients have a blunted growth hormone (GH) response when treated with the alpha2-adrenergic agonist clonidine, we hypothesize that C3HLRI mice will present a blunted GH response after clonidine challenge. Likewise, the alpha2-adrenergic antagonist yohimbine that provokes panic attacks in PTSD patients will cause exaggerated fear in the open field test in C3HLRI mice.

Christian Andreen

Major: Exercise Science

Faculty Sponsor: Dr. Jorge Zuniga

4:00-4:20 p.m. // Harper 3027

“The Effects of Cross Sectional Area on Fatigue during Cycle Ergometry”

This study examined the effects of estimated quadriceps cross-sectional area (CSA) on the assessment of the mean power frequency at the fatigue threshold (MPF_{FT}) during incremental cycle ergometry. Subjects were divided into groups of large and small quadriceps CSA. Sixteen adults performed incremental cycle ergometry tests to exhaustion while electromyographic (EMG) signals were measured from the vastus lateralis (VL). Fatiguing power outputs were found by statistically examining slope coefficients for the EMG mean power frequency (MPF) versus time

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relationship. There were no significant mean differences ($p = 0.076$) in the mean MPF_{FT} for groups, indicating that the MPF_{FT} can be used to assess fatigue independent of quadriceps CSA.

Joseph Baronovic

Majors: Classical Languages and Classical and Near Eastern Civilizations

Faculty Sponsor: Dr. Gregory Bucher

2:30-2:50 p.m. // Harper 3027

“Explaining the Art Market, Restoration, and ‘Portrait of a Roman Boy’”

For my project, I had the opportunity to research an unpublished, ancient bust from the Joslyn Art Museum. Initial inspections of the piece revealed several issues that displayed stylistic and dating incongruities. Closer examination of the portrait determined that the piece is a pastiche, assembled from disparate elements, either ancient or modern. Focusing on the piece’s place in the greater context of antique restoration and the art market, my project will discuss the “Portrait of a Roman Boy” and demonstrate that – far from being a worthless fake – it represents an opportunity to investigate the evolution of aesthetics and antique restoration.

Katherine Bauer

Majors: Biochemistry and Physics

Faculty Sponsor: Dr. Jason Bartz

2:55-3:35 p.m. // Harper 3023B

“Investigation of Conversion Efficiency between Natural and In Vitro-Generated Prions”

Prion diseases are fatal, transmissible neurodegenerative diseases. The infectious agent in prion diseases consists mainly of PrP^{Sc} , a misfolded isoform of PrP^C . When PrP^{Sc} and PrP^C come into contact, PrP^{Sc} converts PrP^C to the misfolded conformer. We can recapitulate this process in vitro using protein-misfolding-cyclic-amplification (PMCA). We have generated prions with a titer that

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is similar to brain-derived prions. However, the incubation period of the PMCA-generated sample is lengthened. We hypothesize this extension is due to a reduction of PrP^{Sc} conversion efficiency of PMCA-generated prions. To test this hypothesis, we determined the PMCA conversion efficiency of brain-derived and PMCA-generated prions.

Maria Benevento

Majors: Theology and American Studies

Faculty Sponsor: Dr. Tracy Leavelle

4:00-4:20 p.m. // Harper 3029

“Living the Change, Sharing the Message: Northeast Missouri’s Sustainable Intentional Communities”

The northeastern corner of Missouri contains five sustainable intentional communities. Their members intend to separate themselves from harmful aspects of mainstream society while making stronger positive connections with other people, nature, or God. However, the question of their success, a typical concern of scholarly literature on intentional communities, is complicated because each community’s theoretically compatible ideals sometimes interfere with each other in practice. While the five communities largely agree about their basic goals, participant observation and interviews revealed that the different strategies, compromises, and priorities they choose in response to similar dilemmas can lead to very diverse lifestyles.

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Rachel Berry

Major: Economics

Faculty Sponsor: Dr. Kristie Briggs

2:55-3:35 p.m. // Harper 3028

“Micro-loans and ITN Deliveries in India”

Using survey data gathered by Alessandro Tarozzi, et al. (2014) on the prevalence of insecticide treated bed net (ITN) deliveries to rural villages in Orissa, India, I plan to perform regression analysis to assess factors impacting the delivery of ITNs to these villages. A preliminary analysis revealed that there is a statistically significant connection between the ITN deliveries to Indian villages and the prevalence of micro-loans in the region. Including census data for the area into the survey, I plan to conduct a more robust analysis of economic influences on ITN deliveries.

Colin Bertsch

Major: Applied Physical Analysis

Faculty Sponsor: Dr. Patricia Soto

3:45-4:15 p.m. // Harper 3028

“Driving Forces of the Stability of Alzheimer’s Ab Aggregates in Model Membranes”

Alzheimer’s disease affects about 5 million people. Data links the disease to the misfolding and clumping of the Ab peptide. Recent findings suggest that cell membrane disruption induced by Ab aggregates triggers cytotoxicity. The goal of our project is to gain insight into the mechanism by which Ab aggregates perturb the local environment of model plasma membranes. We use coarse grain molecular dynamics simulations to monitor the interactions of the aggregate. Our preliminary results suggest that the aggregate’s motion is modulated by the relative orientation and surface electrostatics of the protofilaments. These observations shed light on the stability of the aggregate’s insertion mode and the mechanism of membrane disruption.

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Patrick Bruck

Major: Biology

Faculty Sponsor: Dr. Rachelle Gaudet

3:45-4:15 p.m. // Harper 3023B

“Investigating the mechanism of Ste6 export in *S. cerevisiae*”

ATP-Binding Cassette (ABC) transporters constitute a highly conserved class of proteins that transport a wide variety of substrates across biological membranes. We intend to investigate the poorly understood mechanisms of these transporters using Sterile-6 (Ste6), an ABC transporter that exports a mating pheromone, α -Factor (α F), in the yeast *Saccharomyces cerevisiae*. By expressing mutated Ste6 as well as phylogenetic homologues of Ste6 in specific strains of *S. cerevisiae* and measuring α F export, we hope to learn more about the substrate binding mechanisms and subsequent effects on the protein.

This work was supported through funding from Summer Research Opportunities at Harvard.

Josh Bucy

Major: Digital Design and Development

Faculty Sponsor: Prof. Betni Kalk

2:05-2:25 p.m. // Harper 3027

“The Portfolio and Work of Josh Bucy”

One of the joys of being an artist is being able to use your imagination and make your thoughts come to life. Beauty can take many different forms, not just aesthetically. Beauty can be in the code for a mobile app or the poster for a philanthropy event. The creation of my personal logo, my personal website, and a portfolio of my work is the culmination of four years of hard work. Combining what I have learned in my photography, graphic design, web programming, interactive multimedia, and computer science classes into a portfolio demonstrates my growth since arriving at Creighton.

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Sarah Budney

Majors: Biology and Medical Mathematics

Faculty Sponsor: Dr. Soochin Cho

2:55-3:35 p.m. // Harper 3028

“RNase 4 in the Little Brown Bat”

The ribonuclease (RNase) A superfamily is a vertebrate-specific gene family which underwent a massive expansion during mammalian evolution. While the function of many RNases has been defined, the function of RNase 4 is unknown. This is surprising because RNase 4 has about 90% similarity between species. A recent study revealed that RNase 4 has undergone a gene expansion in *Myotis lucifugus*, the little brown bat. Bats are interesting subject as they are known reservoirs for pathogens. In this study, we will elucidate the phylogeny of RNase 4 in the little brown bat and determine candidate genes for functional studies.

Mark Byrne

Majors: Computer Science and Digital Design and Development

Faculty Sponsor: Dr. Mark Wierman

2:55-3:35 // Harper 3023B

“Network Diffusion: Strategic Influence in the International System”

We develop a new approach to determining the influence of actors in networks on diffusion in the international system. We construct a dynamic diffusion model that represents the interactions and evolution of the current international network and determines the rate of the diffusion of Islamism based on external and internal pressure exerted on states. We find that, given the current structure of the international system, the overall level of Islamism will decrease. Using this method, we are also able to study the most effective strategy for influencing another state, or targeting paths to reduce a given state’s influence.

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Cole Crawford

Majors: Computing Science and Information and English (British Literature)

Faculty Sponsor: Dr. Bridget Keegan

3:20-3:40 p.m. // Harper 3026

“Transforming Robert Tannahill”

Robert Tannahill (1774-1810) was a Scottish laboring-class poet. His work was widely celebrated shortly after his tragic suicide, but his poems and songs have been largely neglected since the late nineteenth century. This digital edition rehabilitates Tannahill's work by presenting his first edition of poems and songs alongside a new transcription of his correspondence. The edition presents several letters for the first time and includes a sonnet lost for decades. These texts are enhanced by digital humanities tools such as ArcGIS maps and textual visualizations which transform Tannahill's work into an even more engaging reading experience.

Danielle Desa

Majors: Physics and Mathematics

Faculty Sponsor: Dr. Heather Jensen Smith

3:20-3:40 p.m. // Harper 3027

“Ototoxic Aminoglycosides Increase Reactive Oxygen Species while Decreasing NADH Reduction Capacity at Complex I”

Aminoglycosides (AGs) are widely used antibiotics known to cause permanent hearing loss. Cell-damaging reactive oxygen species (ROS) form during AG treatment but the source is poorly understood. These studies assessed putative mitochondrial dysfunction in AG-treated cochlea. Gentamicin (GM), a representative AG, caused a rapid increase, then decline in mitochondrial membrane potential and the metabolic intermediate, nicotinamide adenine dinucleotide. Superoxide production in the mitochondrial electron transport chain (ETC) was assessed. GM pre-treatment decreased ROS at complex I of the ETC. This project provides a base for understanding the underlying mechanisms of

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mitochondrial ROS production in cochlear cells during exposures to ototoxins.

Julianna Diddle

Major: Biology

Faculty Sponsor: Dr. Juliane Strauss-Soukup

3:45-4:25 p.m. // Harper 3028

“Development of Artificial Agonists as Candidate Antibiotics for a Bacterial Riboswitch”

The bacterial *glmS* ribozyme is a mechanistically unique functional RNA among both riboswitches and RNA catalysts. Its self-cleavage activity is the basis of riboswitch regulation of glucosamine-6-phosphate (GlcN6P) production. In catalysis, the *glmS* riboswitch binds to coenzyme GlcN6P and undergoes self-cleavage resulting in inactivation of the RNA. Modulation in gene expression occurs through an efficient feedback mechanism. This project intends to determine whether artificial riboswitch agonists compare to the natural ligand. We will also analyze the effect of Mg²⁺ in the reaction. Two ligand analogs show promise as candidate antibiotics: these ligand analogs may disrupt normal cell metabolism in a variety of bacterial pathogens that harbor the *glmS* ribozyme.

Dominic Dongilli

Major: Biology

Faculty Sponsor: Dr. Erin Walcek Averett

3:20-3:40 // Harper 3027A

“Lions and Tigers and Environmental Discourse in Zoos. Oh my!”

Contemporary zoological institutions create immersive exhibits to “transport” visitors to ecosystems with a constructed conservation narrative. However, adequate environmental discourse in zoos must include explanation of unpleasant environmental phenomena, environmental politics and conflict, and human modification of the environment, which are often in opposition to visitors’ desire for recreation and the zoo’s romanticized portrayal of nature. Analysis

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of physical space, educational signage and visitor behavior indicate that immersive exhibits and their constructed messages ultimately simplify the complexities of the natural world and humanity's environmental impact.

Jakob Dovgan

Major: Biochemistry

Faculty Sponsor: Dr. Eric Villa

2:05-2:45 p.m. // Harper 3028

“Hydrothermal Synthesis of Lanthanide Sulfites”

The sulfite anion contains a stereo-active lone-pair, which can form non-centrosymmetric structures with potentially useful properties. Here we are employing lanthanides as a metal source due to their extensive areas of application. Four new neodymium (III) compounds were hydrothermally synthesized containing sulfite, mixed sulfate-sulfite or sulfate ligands. These phases were generated by employing Na₂SO₃ and NaHSO₃ as both anion sources and pH buffers. The sulfite containing compounds were formed at near-neutral pH, whereas the sulfate compound was formed at a more alkaline pH. The resulting products presented here were strongly influenced by both the pH conditions and the cooling rates.

Emily Dowdle

Majors: English (American Literature) and American Studies

Faculty Sponsor: Dr. Heather Fryer

4:00-4:20 p.m. // Harper 3029A

“True Midwesterner: Deconstructing Race at the Heartland State Fair”

Utilizing the State Fairs of Nebraska, Missouri, Kansas, and Iowa as cultural artifacts that represent the social culture of the metaphorical “Heart of America,” the ways in which racial hierarchies are constructed and represented within the Heartland can be understood. Through presentations, exhibits, and rhetoric enables the fair visitor to perform as the quintessential

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“Heartlander” - an exclusionary identity that renders the non-white narratives and histories of the Heartland invisible.

Jon Ermer

Majors: Biology and Spanish
 Faculty Sponsor: Dr. John Shea
 3:45-4:25 p.m. // Harper 3023B

“Survey of Bobcat Intestinal Helminths on the Pine Ridge Reservation, SD”

Because state and federal agencies do not survey Native American Reservations, they have been referred to as “black holes” of biological knowledge. One gap in our knowledge is in bobcat (*Lynx rufus*) intestinal helminths. A survey of bobcat intestinal helminths was conducted in early January 2015 on the Pine Ridge Reservation in South Dakota. A significant snowstorm impacted the area the previous winter killing much of the wildlife, including thousands of cattle. We wanted to see if this had an effect on the parasite diversity in bobcats. Results will be compared to helminths found in other specimens from the Upper Midwest.

Caitlyn Ewers

Majors: Art History and Classical and Near Eastern Civilizations
 Faculty Sponsor: Dr. Erin Walcek Averett
 2:55-3:35 p.m. // Harper 3023B

“Artemis in Athienou-*Malloura*: Revealing Gendered Relationships among Cypriot Deities”

The Athienou-*Malloura* sanctuary in south-central Cyprus, in use from the Geometric through Roman periods, has yielded over three thousand votive sculptures. About 90% of these depict males; of the comparatively few female votives, most are thought to depict the goddess Artemis, the *potnia theron* (mistress of animals) whose cult was imported from Greece in the mid-fifth century BCE. Significant in part because of their rarity, these statuettes represent a largely unexplored aspect of worship at Malloura. The imagery

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examined by this project reveals the associations between the goddess and the male deities represented at the site as well as the gendered aspects of their depiction and worship.

Nicholas Fischer

Majors: Environmental Science and Biology

Faculty Sponsor: Dr. Andrew Baruth

3:45-4:25 p.m. // Harper 3023B

“Comparison of Atomic Force Microscopy and Optical Profilometry in Enamel Etching: Can Seemingly Identical Measurements Really be Compared?”

Evidence-based dentistry collects and analyses data to support, alter, or disprove time-honored techniques. Atomic Force Microscopy (AFM), a nanoscopic imaging technique, utilizes an atomically sharp tip and cantilever while Optical Profilometry, a common dental imaging technique, uses white light interference. Both record roughness values (Ra), but at unique lateral scales. We have analyzed extracted third molars etched with four commercial products (n=10) at three etch times, collecting the Ra values from both AFM and Optical Profilometry. By merging the two disparate imaging techniques, the correlation between AFM and Optical Profilometry Ra values can potentially be rectified.

Ryan Ford

Major: Applied Physical Analysis

Faculty Sponsor: Dr. Gintaras Duda

2:55-3:35 p.m. // Harper 3028

“Form Factors from Theoretical Hartree-Fock Calculations and Dark Matter Detection”

The search for dark matter is integral to scientists’ understanding of the universe. Direct dark matter detection experiments search for collisions between dark matter particles and nuclei in a detector, however a major source of uncertainty in these searches is nuclear form factors which describe how mass is distributed inside nuclei.

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Improving nuclear form factors allows scientists to place tighter bounds on properties such as mass and cross section. This work applies theoretical Hartree-Fock calculations to the direct dark matter detection experiments. Using the FORTRAN code DarkSUSY, we have generated exclusion curves using the Hartree-Fock calculations which we can then compare with exclusion curves generated from Helm form factors.

Renner Fujiwara

Majors: Chemistry and Biology

Faculty Sponsor: Dr. Eric Haas

2:55-3:35 p.m. // Harper 3023B

“Investigating Dynamics of Proteins in Sugar Solutions by Fluorescence Correlation Spectroscopy”

The preservation of engineered human tissue is necessary for making whole organs immediately available to transplant recipients. Although simple sugar solutions have proven to be effective in cryopreservation, methods to preserve whole organs for later transplants have not generally been developed. This is due in part to a lack of understanding the mechanism by which sugars function as cryopreservatives. In this study, we used Fluorescence Correlation Spectroscopy with a two-photon excitation approach to investigate the dynamics of protein molecules in sugar solutions as surrogates for tissues.

Matthew Goldsmith

Major: Biology

Faculty Sponsor: Dr. Josef Franke

2:05-2:45 p.m. // Harper 3028

“Protective Capability of Pigments in *Gemmata obscuriglobus*”

The evolution of pigments as a means of protection for genetic information in nucleic acids is an adaption developed by many organisms. The freshwater bacteria *Gemmata obscuriglobus*, a prokaryotic organism, is an evolutionary point of interest in that it

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displays many characteristics traditionally associated with eukaryotic cells. The bacteria show a vibrant pink color due to the presence of carotenoid pigments. Interestingly, when cultivated without light, a colorless phenotype results. By comparing the protective capability of *Gemmata obscuriglobus* pigments in both phenotypic states to known model organisms, we can gain insight into role and mechanisms of pigment protection in nature.

Michael Grzelak

Major: Biochemistry

Faculty Sponsor: Dr. Bradley Parsons

3:45-4:25 p.m. // Harper 3028

“The Co-Development of Lorentz Force and Solenoid Pulsed Nozzles in an Effort to Create a Supersonic Molecular Beam”

The pulsed valve is a crucial component of many gas-phase experimental setups. These valves are used to expand a gas from a high-pressure region to a low-pressure region through a small orifice, which cools the gas. This cooling allows for the formation of weakly bound clusters such as I₂-Ar. These gas-phase clusters may then be studied by standard spectroscopic techniques. Although pulsed nozzles are useful, they are typically expensive. In this paper I will describe the co-development of two inexpensive nozzles to expand gases and create a molecular beam.

AJ Hagen

Majors: Physics and Mathematics

Faculty Sponsor: Dr. Jack Gabel

3:20-3:40 p.m. // Harper 3029

“Mid-Infrared Spectral Analysis of Active Galactic Nuclei”

Active Galactic Nuclei (AGN) occur in a significant portion of observed galaxies. NASA's Spitzer Space Telescope has observed many AGN, and has given us highly detailed spectral data, particularly in the Mid-Infrared. These MIR spectra can tell us about the composition of the AGN, and makeup and form of

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any obscuring medium. We examine features exclusive to AGN populations with and without mass outflows by comparing their respective spectra. From this, we create physical models describing the AGN and enshrouding material, particularly focusing on the differences between an evolutionary model and an orientation model.

Mary Hanten

Major: Biology

Faculty Sponsor: Dr. Anne Ozar

2:55-3:15 p.m. // Harper 3029

“How the Built and Natural Environment Came to be and its Resulting Consequences: A Behavioral and Philosophical Approach”

The extent of environmental and social problems faced today calls to question how such an unstable system came to be. By examining the dominant paradigms held throughout the contemporary culture of the United States, and their construction, the system’s evolution takes shape. Its resulting built and natural environment has numerous consequences for all species that live within it. Particularly in the way it shapes people’s values and ethical decision-making processes. Utilizing empirical evidence, the current paradigms, and an examination of the patterns of ecology and biodiversity, the behaviors of humans emerges as simply a consequence of how one responds to their surrounding environment.

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Jennifer Hartjes

Major: Biochemistry

Faculty Sponsor: Dr. Stephen Gross

2:05-2:45 p.m. // Harper 3028

“Enamel Fluoride Uptake Determination from Dental Materials Containing Encapsulated Remineralizing Agents”

Despite advances in oral healthcare, the occurrence of dental caries still poses a significant challenge. Preliminary results have demonstrated the efficacy of the controlled release of remineralizing agents using encapsulated aqueous solutions of calcium, phosphate and fluoride containing salts. This current proposal aims to study the in vitro enamel fluoride uptake from an orthodontic cement containing the encapsulated remineralizing agents and to study if bioavailable calcium and phosphate ions promote a greater uptake of fluoride.

Anna Hensel

Major: Journalism (News Track)

Faculty Sponsor: Dr. Eileen Wirth

2:05-2:25 p.m. // Harper 3027A

“Men and Women at their Best: Men’s Magazines, and the People Who Create Them”

With taglines like “the authority on men” and “man at his best,” men’s lifestyle magazines attempt to define manhood. Editors of these publications hope to create content that their target male demographic will eagerly read. But what happens when the writers and editors are female? My research involves content analysis of men’s magazines, and what content female editors and writers are involved in creating. With a higher number of women working at men’s magazines, and Maxim magazine attempting to rebrand by hiring a female editor-in-chief amidst decreasing circulation, how do women help define manhood in these publications?

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Augusta Herman

Major: Medical Anthropology

Faculty Sponsor: Dr. Laura Heinemann

2:55-3:35 p.m. // Harper 3023B

“*Nanpwen Maladi Ki Pa Gen Remèd* (“There is No Illness that Does Not Have a Cure”): How Biomedical Intervention Fits into the Haitian Context”

Haiti is home to some of the poorest and most vulnerable populations, making it a hotspot for non-governmental organizations (NGOs) and foreign-aid supported health clinics. Haitians welcome both biomedicine and traditional healing. Yet, health-focused NGOs tend to offer biomedicine while ignoring important aspects of traditional voodoo-influenced medicine. My research highlights Haitian perspectives on foreign biomedical treatment from interviews and observations at a local hospital in Fermathe. Findings suggest that patients harbor complicated feelings about biomedicine and traditional healing and do not readily separate the two, but rather incorporate them within a larger pluralistic worldview.

Carissa Hernandez

Major: International Relations

Faculty Sponsor: Dr. Richard Witmer

2:05-2:45 p.m. // Harper 3028

“Prolonging Peace: External Intervention after Civil War”

Over the past twenty years, peacekeeping has become an important staple of the international response to civil war. Non-United Nations peacekeeping is uniquely suited to post-conflict challenges due to institutional make-up and characteristics. Variables such as death count, fragmentation, and conflict type are included in this analysis to account for inherent selection bias and degree of difficulty. Three models are used to explore these and other factors in relation to the duration of peace after civil war. Implications of the results for research and policy include a better understanding of intervention and the role it plays in the post-conflict landscape.

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Emma Hoppe

Major: Biology:

Faculty Sponsors: Dr. Soochin Cho and Dr. Mark Reedy

2:05-2:45 p.m. // Harper 3028

“Expansion of the Tissue Inhibitors of Metalloproteinase (TIMP) and the Synapsin Multigene Families”

Tissue inhibitors of metalloproteinases (TIMPs) have been shown to play diverse roles in biochemical and physiological functions, particularly in embryogenesis, and exist in up to four paralogs (TIMP1 through TIMP4), three of which are nested within members of the synapsin gene family. Previous work demonstrated deletion events in the TIMP lineage that lack parsimony given the evolutionary relationship suggested by the gene sequences. Here we generate a compendium of eukaryotic TIMP and synapsin genes available in public databases to elucidate the driving force behind the expansion of both gene families and to explain this incongruity.

Kelli Ann Ifuku

Majors: Biology and Psychology

Faculty Sponsor: Dr. Jill Brown

2:30-2:50 p.m. // Harper 3026

“What is the Experience of Having a Child with Cerebral Palsy?”

The Center for Disease Control cites cerebral palsy as the “most common motor disability in childhood.” This study looked at the journey of having a child with cerebral palsy—from birth to diagnosis to where these children are today. This qualitative study was achieved through interviews with families and their children with cerebral palsy. After speaking with the whole group, parents were invited to remain in conversation so that they could speak freely about sensitive subjects. Generally, participants were positive about the whole experience. Having a child with cerebral palsy is a blessing in disguise.

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Katherine Johnson

Major: Health Administration and Policy

Faculty Sponsor: Dr. Barbara Dilly

2:05-2:45 p.m. // Harper 3028

“Exploring the Relationship between Medicaid Expansion and Hospital Readmission Rates”

Healthcare professionals are striving to discover innovative ways to increase the quality of healthcare while decreasing costs. One of the known ways hospitals can increase quality and decrease cost is by producing low readmission rates. Most of the literature on hospital readmission rates focuses on what hospitals can do to lower readmission rates. But readmission rates are not merely dependent on what happens within the walls of a hospital. There are external factors called health determinants that affect readmission rates. This project explores the relationship between Medicaid expansion—a policy choice that influences health determinants—and hospital readmission rates.

Ryan Jones

Major: Biology

Faculty Sponsor: Dr. Heather Fryer

2:05-2:25 p.m. // Harper 3029

“The Courage of Your Convictions: The Life and Governorship of Nels Smith of Wyoming”

Often in history, a certain personal element is overlooked when examining the figures that shaped the past. Real people are simplified to one-dimensional figures, remembered for a handful of deeds rather than an attempt being made to truly understand them. Nels Smith was governor of Wyoming from 1939 to 1943, during which time he was instrumental in the implementation of New Deal policy, but was not re-elected. This presentation analyzes the life of Smith to account for the personal, political, and historical complexities that form political decision-making, yet are often overlooked in favor of casting historical figures as caricatures.

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Megan Kangiser

Major: Psychology

Faculty Sponsor: Dr. Dustin Stairs

2:30-2:50 p.m. // Harper 3029A

“Effects of Varenicline and GZ-793A on Methamphetamine and Food Self-Administration under a Multiple Schedule of Reinforcement in Rats”

There is no FDA-approved pharmacological treatment for methamphetamine addiction. This study tested two potential pharmacotherapies with different mechanisms of action (GZ-793A, a VMAT2 inhibitor; and varenicline, a nicotinic acetylcholine receptor (nAChR) agonist), using a rodent self-administration paradigm to ascertain which neural mechanism best attenuates methamphetamine self-administration without affecting food responding. In addition to undergoing catheterization surgery, rats were trained to respond for both food and methamphetamine rewards under a multiple schedule of reinforcement and received pretreatments of varying doses of the potential pharmacotherapies. Both compounds lowered methamphetamine self-administration, but GZ-793A did so more successfully and without affecting food responding.

Sarah Kelly

Majors: Medical Anthropology and Justice and Society

Faculty Sponsor: Mr. James Ault

2:55-3:35 p.m. // Harper 3023B

“Energy Consumption in Creighton University Residence Halls: Comparing Attitudes and Behaviors”

“On U.S. college campuses, growing concerns since the 1960s have demanded that we become more knowledgeable about our impact on the environment” (Ruckleshauss 455). This research aims to understand attitudes as compared to behaviors of energy consumption in Creighton University Residence halls by employing quantitative data gathering methods and analysis of

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campus energy use. A comparison will be conducted with the Stata program. The findings of this research will allow Creighton University officials to understand student energy consumption habits and interest allowing for better energy consumption practices in the future.

Michael Kotrous

Majors: Economics and Journalism (Advertising)

Faculty Sponsor: Dr. James Bailey

2:05-2:25 p.m. // Harper 3026

“The Effects of Non-Neutral Network Management Policies on Broadband Prices in the Developing World”

Increased access to the Internet is vital to the advancement of developing economies. One important factor in increasing Internet access is affordable broadband prices (Tajiri, 2009). Research is lacking that analyzes how the network management policies of broadband providers affect prices. Cross-sectional data surveying 1,590 broadband plans from 94 countries in 2013 is used to analyze the effects of one such network management policy—bandwidth caps—on broadband prices. This paper finds equal decreases in the size of bandwidth caps have greater than twice the effect on decreasing broadband prices in developing countries than developed countries.

Daniel Kresock

Major: Biochemistry

Faculty Sponsor: Dr. Juliane Strauss-Soukup

2:05-2:45 p.m. // Harper 3028

“Mechanistic Investigation of a Spermine-Binding Riboswitch to Potential Anti-Cancer Drugs”

To further investigate the mechanics of spermine-RNA binding, a biophysical approach has been taken. Isothermal Titration Calorimetry (ITC) accurately measures the change in heat associated with the RNA-ligand binding. Instruments used to

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perform ITC are extremely precise and must be calibrated with a variety of factors in mind. This year has been used to fine-tune the preparation of samples used in ITC. The dialysis process to prepare RNA in ITC has been greatly. Similarly, the concentrations and volumes of both the ligands and RNA used in ITC are being optimized to produce more consistent results.

Steffen Lake

Major: Physics

Faculty Sponsor: Dr. Janet Seger

3:45-4:25 p.m. // Harper 3028

“Simulating Electron-Positron Production in STAR detector at RHIC”

STARlight was originally designed to model the same type of collisions that the STAR experiment would be studying with their Relativistic Heavy Ion Collider (RHIC), using Monte Carlo simulations. The Solenoid Tracer at RHIC (STAR) studies Ultra-Peripheral Collisions of ions, which occur when ions collide at impact parameters greater than twice the nuclear radius. These models, or simulations, are used to calculate an expected rate of collisions, which can then be used to estimate the efficiency of the detector. Additionally, they allow data to be corrected for the fact that detectors cannot be 100% efficient.

Krysta Larson

Majors: English and Journalism

Faculty Sponsor: Dr. Faith Kurtyka

2:30-2:50 p.m. // Harper 3027A

“Exploring Learning Methods in a Sorority through the Habits of Mind”

Popular culture suggests that sororities are perceived as social clubs and are rarely valued as possible learning opportunities. I used the online analytic tool Dedoose to study data taken from sorority alumni interviews and investigated how women learn from their

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experiences in sororities. Using the eight habits of mind proposed by the *Framework for Success in Postsecondary Writing*, I coded narratives, created and implemented a weighting system for the codes, and analyzed this data with Dedoose. The data showed that women learn skills in metacognition and responsibility from sorority participation, demonstrating that these experiences are beneficial in the long term.

Elenore Leonard

Major: History

Faculty Sponsor: Dr. Heather Fryer

2:55-3:15 p.m. // Harper 3027

“John Pierpont Morgan and the Metropolitan: The Changing Face of Art Museums in the Period 1880-1940”

This paper examines the art collection of John Pierpont Morgan from 1879 to 1913 as representative of the art collection and museum world of the United States from 1880 to 1940. Morgan’s collection was believed to cover over 3000 years of art history and reveals the grandiose largess of America’s money barons as they attempted to overcome the perceived cultural gap between the fledgling United States and Europe. Morgan, like other collectors, used his art to impose his views and desires on the Metropolitan Museum of Art during his lifetime, leaving a visible impact on the museum’s function seen today.

Laura Levy

Major: Exercise Science

Faculty Sponsor: Dr. Greg Zacharias

4:00-4:20 p.m. // Harper 3026

“The Letters of Anne Boleyn”

I will be collecting copies of all known letters written by Anne Boleyn, transcribing them and comparing them to the infamous “Lady in the Tower” letter that is highly controversial within certain circles as to its authenticity. I will compare their content, style and penmanship to the end of determining how likely it is that Anne wrote this letter given all the social and political upheaval of the time, upon which a research paper will be included.

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Elizabeth Lievens

Major: International Relations

Faculty Sponsor: Dr. Terry Clark

2:05-2:45 p.m. // Harper 3028

“ICT Diffusion and the Causes of Modern Protest Trends”

The dissemination of information and the presence of technology infrastructure are the most important predictors of protest movements. This paper analyzes protest trends in the years 1994-2004 across 160 nations to examine the effects of increasing Information and Communication Technology (ICT), as well as those of Internet use, censorship, democracy, education, and economic situation. Ability to protest, rather than grievances themselves, is shown to more accurately predict protest trends; however, Internet use did not increase the number of protests, likely because its use at the time had not yet become widespread enough to organize and incite dissent on a societal level.

Christopher Lyons

Major: Computer Science

Faculty Sponsor: Dr. Mark Wierman

3:45-4:25 p.m. // Harper 3023

“The Social Network: Locating Online Communities”

An emerging research area within data science is knowledge discovery and analysis in online social networks. However, before data from an online community can be collected or analyzed, a programmatic algorithm must be devised for building up community networks of members on online social networks. This project applies heuristic rules to the connections between individuals in an online social network to find a degree of closeness between each person, locates key individuals determined to have high degrees of closeness with other individuals within the larger network, and builds community structures around those key individuals. The result is a set of online communities constructed by the virtual proximity between individuals in each community.

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David Martin

Majors: Theology and Psychology

Faculty Sponsor: Dr. Wendy Wright

2:55-3:15 p.m. // Harper 3026

“Our Lady of Guadalupe: Cultural Bridge”

Our Lady of Guadalupe emerged out of the struggle of the Spanish conquest and provided an avenue towards personhood that originated from the indigenous self. The persecuted natives of New Spain were able to find a source of identity that resonated with their own people and culture instead of being placed into a social order of Spanish origin. The image accredited to the appearance contains elements that resonated with both the Spanish colonizers and the conquered indigenous, providing common ground on which to meet. This essay examines how Our Lady of Guadalupe bridged the divide between two radically dissimilar cultures and provided a Christian identity for the indigenous of New Spain.

John McCoy

Majors: International Relations and Economics

Faculty Sponsor: Dr. Terry Clark

4:00-4:20 p.m. // Harper 3027A

“The Illicit Financial Flow Global Network: Explaining Connections with State Characteristics”

International Relations scholars have begun to re-conceptualize the previously held notions of global structure and interaction using the tools of social network analysis. Thus far, much study has focused on illegal global networks, primarily in terrorism and narcotics trade. Fewer studies have focused on the connections between illicit activities and how they are financed. Illicit financial flows capture one way illicit organizations receive resources. Within the illicit financial flow network, I ask what explains the presence of a connection in this network and hypothesize that states with lower economic and political development levels feature a greater number of connections.

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Mary McGlynn

Majors: Biology and Philosophy

Faculty Sponsor: Dr. Mackenzie Taylor

2:55-3:35 p.m. // Harper 3028

“The Pollen Tube Pathway in Victoria: Implications for Flower Evolution in Water Lilies (Nymphaeaceae)”

Flowers facilitate pollen tube (PT) growth from the stigmatic surface to the ovule. The water lily *Victoria* has evolved large flowers. We characterized PT growth and pathway in *Victoria* and compared our findings to other water lily genera (*Nymphaea*, *Nuphar*). *Victoria* PTs grew laterally to the zone of postgenital fusion, where they penetrated stigmatic tissue. PTs then grew through the substigmatic transmitting tissue to reach the ovarian cavity and ovules. Average shortest distance to the first ovule was 5.9 mm in *Victoria* vs. 2.0 mm in *Nymphaea*. *Victoria*'s time to ovule entry is longer due to slower PT growth rates and a longer PT pathway.

Ashley Nolting

Major: Exercise Science

Faculty Sponsor: Dr. Patrick Lambert

2:55-3:35 p.m. // Harper 3028

“Intestinal Tight Junction Integrity may not be Compromised in Healthy Individuals with Obesity”

Intestinal permeability due to intestinal barrier dysfunction is the passage of immunogenic substances into the internal environment causing inflammatory reactions, and is positively correlated with obesity. The intent of this study was to determine if healthy individuals with obesity show a change in a urinary marker of intestinal tight junction dysfunction (claudin-3) before, during, and after a weight-loss program. The results indicated that claudin-3 was not greater in healthy individuals with obesity compared to control subjects indicating this may not be a sensitive enough measure to assess possible intestinal barrier dysfunction in healthy subjects with obesity.

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Sofia Paz

Major: Philosophy

Faculty Sponsors: Dr. Anne Ozar and Mr. Chris Pliatska

2:30-2:50 p.m. // Harper 3029

“Did You do it Intentionally? Explaining an Asymmetry through Experimental Design”

Suppose you do something you know has certain side effects. Did you intentionally cause them? In a series of experiments, philosopher Joshua Knobe asks this question, hoping to illuminate our concept of intentional action. Distinguishing between good and bad side effects, Knobe argues his experimental results suggest we typically suppose people cause only the latter intentionally, not the former. Yet an ambiguity infects Knobe’s work: What kind of “bad” side effects matter? In my presentation, I distinguish between two different kinds of bad side effects. I suggest that only one kind matters and propose an experiment to test my hypothesis.

Markus Pfaff

Major: Biology

Faculty Sponsor: Dr. Dustin Stairs

2:55-3:15 p.m. // Harper 3027A

“Effects of Amphetamine and Ketamine on Rat Behavior under a Differential-reinforcement-of-low-response-rate Schedule”

Impulsivity—a deficit in behavioral inhibition—is a key determinant of drug abuse. Previous literature indicates that behavioral inhibition can be studied by using a differential-reinforcement-of-low-response-rate (DRL) schedule. The goal of the current study was to establish stable behavior using a DRL schedule in rats, then pharmacologically manipulate their behavioral inhibition. Once DRL responding stabilized at a 7-second DRL schedule, the animals received d-amphetamine and ketamine pretreatments. Our results indicate that stable behavior on a DRL schedule can be established and the behavior is sensitive to pharmacological manipulation. Furthermore, results indicate that increasing the difficulty (to 14-second DRL) confers increased sensitivity to pharmacological manipulation.

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Cassidy Plunkett

Major: Biology

Faculty Sponsor: Dr. Laura Hansen

3:45-4:25 p.m. // Harper 3028

“Epidermal Growth Factor Receptor Regulation of Stathmin 1 in Mouse Skin Cancer”

One in five Americans will develop skin cancer. Epidermal growth factor receptor (EGFR) expression is increased in many skin cancers. From preliminary data using skin, we hypothesized that EGFR suppresses the mitotic regulators *Stmn1* and *RCC2* to increase skin carcinogenesis. 7,12-dimethylbenz[a]anthracene and 12-O-tetradecanoyl phorbol-13-acetate treatment induced 0.33 ± 0.13 and 2.00 ± 1.26 tumors per mouse in skin-targeted *Egfr* mutant and control mice, respectively. Immunohistochemistry for *Stmn1* was increased in *Egfr* mutant tumors compared to control tumors, but *RCC2* was not different. From these data, we conclude that EGFR down-regulation of Stathmin 1 may be a mechanism through which EGFR contributes to skin tumorigenesis.

Daniel Poston

Major: Biochemistry

Faculty Sponsor: Dr. Juliane Strauss-Soukup

2:05-2:45 p.m. // Harper 3023B

“Biochemical Engineering and Optimization of the *glmS* Riboswitch for Use as a Synthetic Genetic Device”

While many advances have been made in engineering synthetic bacterial constructs, much work is needed with mammalian systems, which could be translated to therapies for infectious diseases and cancer, vaccine development, and regenerative medicine. Riboswitches offer a unique set of “devices” for achieving synthetic gene regulation in mammalian systems. This presentation describes results of the first investigation exploring the possibility of controlling mammalian gene expression via engineered insertion of the bacterial *glmS* riboswitch. Further research will involve improved design and operation of

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riboswitches as synthetic genetic devices, paving the way for future use of riboswitches to control mammalian genes.

Kalley Quandt

Major: Biology

Faculty Sponsor: Dr. Laura Bruce

3:45-4:25 p.m. // Harper 3028

“Olfactory and Vomeronasal Systems are Both Present in a Cartilaginous Holocephalian Elephant Shark, *Callorhinchus milii*”

In the experiment, we labeled the olfactory sensory neurons (OSNs) of both the general olfactory system and the vomeronasal system in the olfactory epithelium of elephant sharks using antibodies. Anti- $G\alpha_{s/olf}$ was used to identify olfactory neurons, anti- $G\alpha_o$ and anti-calbindin were used to identify OSNs of the vomeronasal system, and anti-calretinin was used to identify a mixed population. We found that the vomeronasal and main olfactory neurons are intermingled throughout the olfactory epithelium, which is consistent with previous suggestions that the presence of two discrete olfactory systems in the nasal cavity developed as an adaptation to air breathing. In addition, this study was the first to show separation of main olfactory and vomeronasal targets in the forebrain of the elephant shark, which was determined through labeling with NADP, anti-tyrosine hydroxylase, anti-calbindin, and anti-calretinin. Because of this, we conclude that distinct olfactory systems were present in the common ancestor of jawed vertebrates.

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Michael Rezich

Major: Biology

Faculty Sponsor: Dr. Annemarie Shibata

3:45-4:25 p.m. // Harper 3023B

“Development of Elvitegravir Nanoparticles For Long-Term Prevention of HIV Infection”

Human Immunodeficiency Virus-1 (HIV-1) is a global issue with over 80% of infections contracted via sexual transmission. Therefore, development of pre-exposure prophylactic (PrEP) modalities delivered vaginally or rectally to provide long-term prevention of HIV infection is of great interest. Elvitegravir (EVG), an FDA approved integrase inhibitor, is a candidate for prophylactic treatment. We hypothesize that elvitegravir-nanoparticles (EVG-NPs) will increase prophylactic efficacy of EVG when incorporated into a thermosensitive gel. Cytotoxicity assays were performed on several human cell lines, primary human peripheral blood mononuclear cells (PBMCs), and MatTek's 3-D EpiVaginal™ system. Sustained drug delivery was examined using high-performance liquid chromatography (HPLC).

Deidre Richard

Major: Nursing

Faculty Sponsor: Dr. Maribeth Hercinger

3:45-4:25 p.m. // Harper 3023B

“Efficacy of Implemented Care Bundle in Decreasing the Incidence of Central Line Associated Bloodstream Infections”

Central line associated bloodstream infections (CLABSIs) attest for approximately 10% of hospital acquired infections yearly in the United States, yet are considered to be preventable. The purpose of this project was to monitor the current CLABSI incidence rate at a Midwest hospital, compare the CLABSI trends over the past seven years, and determine the etiology of policy implementation variances. Retrospective hospital data on CLABSI incidence rate, current monthly chart audits, and interviews with clinical stakeholders were

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collected. Descriptive statistics were used to represent the results of the project, suggesting environmental factors were responsible for the recent increase in incidence.

Andres Rodriquez-Burns

Majors: Energy Technology and Spanish and Hispanic Studies

Faculty Sponsor: Mr. Larry Hopp

3:45-4:25 p.m. // Harper 3028

“An Analysis of Solar Potential for Creighton University”

In a world dominated by non-renewable fossil fuels, a new interest has arisen for cleaner, more sustainable energy alternatives. These alternatives seem appealing, but why do public and private sector companies still oppose innovations such as photovoltaic panels and wind power generation? Using Creighton University as a microcosm for that larger paradox, I studied whether installing solar panels on commercial buildings would be worthwhile investments. Using solar siting techniques, weather analysis, and engineering applications, I diagnose some of the environmental, economic and social implications to determine if a solar installation is economically feasible, and if not, what will have to change to make it a sensible investment.

Erin Rossiter

Majors: Political Science and English

Faculty Sponsor: Dr. Scott Hendrickson

2:05-2:45 p.m. // Harper 3023B

“Testing the Proposed Effect of Judicial Performance Evaluations: Do Voters Use This Information?”

Democratic theory argues citizens are to be informed voters; however, research has repeatedly revealed the uninformed reality of the voting public. Judicial performance evaluations are purported to be an unbiased means to assess state judges. The results of such evaluations are then publicized under the assumption that voters will consult the information when casting their vote. I test whether the suggestions contained within these evaluations impact the results of

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state Supreme Court retention elections. I find judicial performance evaluations have no effect on the outcomes of such elections, and thus, are not utilized by the judicial voter.

Leah Schaffer

Major: Chemistry

Faculty Sponsor: Dr. Erin Gross

2:05-2:45 p.m. // Harper 3023B

“Developing a Detection Method for Biogenic Amines”

Developing methods for the detection of biogenic amines is important because they cause food spoilage. In electrogenerated chemiluminescence (ECL), a reaction between biogenic amines and a chemiluminescent reagent produces photons, which are measured to quantitate the amine. We are developing a microchip capillary electrophoresis separation and detection method, which will separate a mixture of biogenic amines using an electric field and then detect the chemiluminescence of each biogenic amine. This method offers the advantages of portability, quick analysis times, and cost effectiveness. This research began the experimental setup of the microchip capillary electrophoresis method for the detection of biogenic amines.

Dhwani Shah

Majors: Biology and Business Administration

Faculty Sponsor: Dr. Alistair Cullum

2:05-2:45 p.m. // Harper 3028

“Prevention of Cardiac Myocyte Loss via Reversal of Apoptosis”

The etiology of cardiac failure involves the loss of cardiac myocytes via apoptosis. The possibility of limiting cardiac myocyte loss by inhibiting apoptosis may prevent heart failure. The results of this project will determine whether surface area makes a difference in the rate or reversal of apoptosis. For this project, calcium ionophores will be used to promote hypertrophy in rat cardiac myocytes using the techniques of Li et al. (2015). Apoptosis promoters will be added

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afterwards, followed by IAPs (inhibitors of apoptosis) to determine whether apoptosis can be prevented. Imaging and fluorescent staining will be used to determine cell growth.

Alex Shepherd

Major: Biology

Faculty Sponsor: Dr. John Mordeson

2:55-3:35 p.m. // Harper 3029

“A Fuzzy Mathematical Model Determining the Risk for Carotid Intima-Media Thickness in Recently Menopausal Women Enrolled in the KEEPS Study”

Using fuzzy logic techniques, we created a model for calculating risk for Carotid Intima Medial Thickness (CIMT) in menopausal women enrolled in the KEEPS Study, a four year study assessing hormone therapy. Using expert opinion and various factors associated with CIMT, this fuzzy mathematical model uses three fuzzy logic methods to calculate CIMT risk: the Guiasu method, Yen method, and AHP method. All three methods were correlated to each other according to the Pearson Ranking method. Results showed that after 48 months of treatment, oral and transdermal menopausal replacement therapy lowered the calculated risk for CIMT as compared to placebo.

Sravani Singu

Major: Biology

Faculty Sponsor: Dr. Shashank Dravid

3:45-4:25 p.m. // Harper 3028

“Effect of Size on In Vitro Activation of Murine BMDCs by C5aR Targeted PLGA Particles”

The generation and maintenance of antigen-specific T cells is essential for the development of long-lived, protective immunity against diseases. The development of more effective vaccines, therefore, relies on delivering antigens to the antigen presenting cells (APCs) and stimulating them to initiate immune responses. Activation of APCs requires the use of ligands and immunostimulants in the vaccine

Abstracts

formulation. EP67, a decapeptide derived from the C-terminal region of human complement component C5a, is an agonist of the human C5a receptor that binds and activates APCs. We encapsulated model antigen Ovalbumin in various sizes of poly(lactide-co-glycolide) particles to target and activate APCs in order to determine whether different sizes of the C5aR particles affect in vitro activation of dendritic cells.

Austin Spillane

Majors: Philosophy and Economics

Faculty Sponsor: Dr. Diana Thomas

2:55-3:15 p.m. // Harper 3029A

“Of Rent-Seekers & Ridesharers: An Analysis of Uber & Lyft’s Impact on the Taxicab Industry”

The rideshare companies Uber & Lyft have frequently been cited as a threat to the viability of the cartel status gained by the taxicab industry through the implementation of government regulation. Utilizing Public Choice analysis, this paper investigates the potential impact of ridesharing on the taxicab cartel. I examine the origins of regulation in the taxicab industry, the current transitional gains trap, and the incentive of current owners and other interest groups to maintain the status quo. I then identify the conditions under which we may expect this disruptive innovation to force deregulation of the taxicab industry. An examination of 15 representative cities finds that this proposed model offers a great deal of descriptive potential, if little predictive power at the present.

Abstracts

Nicole Strawn

Major: Biology

Faculty Sponsor: Dr. Charles Deutch

2:55-3:35 p.m. // Harper 3028

“Effects of Salt Osmolarity on *Arthrobacter globiformis* Uptake of Phosphorous and Sulfur”

Phosphorous is found in many products today, from agricultural fertilizer to laundry detergent, and its current environmental balance is being disturbed. Sulfur also is an important nutrient with levels being affected. This experiment looks at how the uptake of phosphorous and sulfur, by the bacteria *Arthrobacter globiformis*, is affected by the bacteria being grown in varying salt concentrations. Biolog plates containing different forms of phosphorous and sulfur compounds show the uptake differences. Effects on the bacteria's ability to use these compounds in salt-induced stress are seen, helping us understand how these nutrients are used in the environment.

Katie Truitt

Major: Biology

Faculty Sponsor: Dr. Garrett Soukup

3:20-3:40 p.m. // Harper 3029A

“Comparison of Dicer1 and Dgcr8 knockout in sensory hair cells of the inner ear”

Hearing loss affects millions of Americans and typically involves loss of sensory cells in the inner ear termed hair cells (HCs). MicroRNAs (miRNAs) are regulators of gene expression and are required for normal maintenance and function of HCs. We compared HCs in the inner ear of mice from two different models in which miRNAs are depleted by conditional knockout of Dicer1 or Dgcr8 genes that are required for miRNA production. Immunostaining for MyoVIIa, a HC marker, shows HCs are more affected in Dgcr8 versus Dicer1 conditional knockout. Results demonstrate there are slight nuances to miRNA depletion effects in HC development.

Abstracts

Alex Tymkowicz

Major: Exercise Science

Faculty Sponsor: Dr. Patrick Lambert

2:55-3:35 p.m. // Harper 3028

“Intestinal Enterocyte Damage is not Increased with Obesity in Healthy Individuals”

Obesity is related to increased intestinal permeability which is caused by loss of intestinal mucosal integrity and may cause bodily inflammation. This study explored whether a urinary marker of intestinal mucosal breakdown, intestinal fatty acid binding protein (I-FABP), is higher in individuals with obesity compared to control subjects before, during, or after a weight loss program. The results indicated that I-FABP was not higher in subjects with obesity at any point during the study. It is concluded that healthy subjects with obesity may not have altered intestinal mucosal integrity and/or that I-FABP is not a sensitive measure of intestinal mucosal integrity in such subjects.

Eric Villanueva

Majors: Biology and Journalism (News Track)

Faculty Sponsor: Dr. Ken Kramer

2:05-2:45 p.m. // Harper 3023B

“Age-Related Changes in the Inner Ear of the Adult Zebrafish (*Danio rerio*)”

Hair cells in the vertebrate inner ear are sensory receptors for sound and movement. In adult humans and mice, hair cells cannot regenerate and decrease in number as the organism ages, leading to hearing loss and imbalance. Zebrafish hair cells are able to regenerate, yet previous estimates suggest that hair cell number decreases in the aging zebrafish. In this study, we sought to accurately determine if hair cell number decreases in older zebrafish. Immunostaining hair cells paired with confocal imaging were used to generate an accurate hair cell count in the inner ears of one and two year-old zebrafish.

Abstracts

Jacquelyn Wagner

Majors: Biology and Environmental Science

Faculty Sponsor: Dr. John Mordeson

2:05-2:25 p.m. // Harper 3029A

“A Fuzzy Mathematical Model of Social and Environmental Health in Kansas”

The current definition of medically underserved areas in Kansas focuses heavily on the physician-to-population ratio, neglecting many other important determinants of health. This greatly impacts the division of resources. This research examines other social and environmental effects on the health of communities. Using fuzzy mathematics, state data, and expert testimony, a calculated model will be constructed and analyzed to represent the correlations between health outcomes and social and environmental influences in Kansas. This will be paired with personal interviews from health department facilitators across the state to develop a comprehensive view of the most influential determinants of health in Kansas.

Haley Warren

Majors: Mathematics and Justice & Society

Faculty Sponsor: Dr. Barbara Dilly

2:55-3:35 p.m. // Harper 3028

“The Knowledge Level of Healthful Lifestyle Practices of the Students, Faculty, and Staff at Creighton University”

This research project is aimed at identifying the lifestyle practices of the Creighton community. The goal is to get an understanding of the awareness that people have, and the actions that they take, with regards to nutrition, exercise, sleep, mental health, and environmental toxins. Through qualitative data analysis it has been found that there is a gap between what students, faculty, and staff believe is healthful and what research has shown to be healthful. There are also patterns that indicate that a majority of people in the Creighton community prioritize school, work, and other activities over their health.

Abstracts

Amy (Ruomei) Wu

Majors: Classical and Near Eastern Civilizations and Art History

Faculty Sponsor: Dr. Isabelle Cherney

2:05-2:45 p.m. // Harper 3023

“Toy Story: Where do Children Draw the Line between Blue and Pink?”

Children’s toys preferences are gender-typed and influence their memory, attitudes, and behaviors. These gender-typed preferences may be based on gender roles, schemas, or other characteristics acquired through socialization. It is unclear, however, how the color of toys influences children’s reasoning and gender stereotyping about toys. The present study examined the categorization of boys’ and girls’ gender-typed and ambiguously colored toys. Children were shown 40 pictures of gender-typed and neutral toys as well as four abstract objects that were used as a control. The color of the toys was changed to different hues. The findings showed a complex relationship between the children’s gender associations and gender reasoning.

Anton Yanchilin

Majors: Energy Science and Applied Physical Analysis

Faculty Sponsor: Dr. Andrew Baruth

2:05-2:45 p.m. // Harper 3023

“Synthesis of Copper Sulfide Thin Films for Photovoltaic Applications”

Copper Sulfide (CuS) is a p-type conductor that, as a thin film, is transparent in the visible spectrum and flexible. We use ex situ sulfidation synthesis, where a Cu film (<50nm) and a variable S charge (~5-20mg) are sealed in a vacuum evacuated ampoule. Upon heating, the S sublimates and incorporates into the Cu film via chemical vapor transport and grain boundary diffusion, producing Cu_xS_y with a final thickness of ~100 nm. We are primarily investigating the S charge density and temperature dependence on final stoichiometry via magneto electronic methods.

About the Honors Program

Honors Program Mission Statement

Rooted in the university's Christian, Catholic, and Jesuit traditions, the new 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.

The program is designed for talented imaginative students desirous of participation in small, discussion-oriented classes and in courses on interdisciplinary and topical issues. It provides students with special opportunities and challenges to enhance their undergraduate experience and to contribute to the intellectual and cultural life of the University. The program also offers eligible students the opportunity to pursue a course of study that complements her or his major. Criteria for admission to the Honors Program include academic achievement and demonstrable interest in the program's aims and aspirations. Required application materials include an activities resume and two essays.

About the Honors Program

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About the Honors Program

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*Department of Philosophy and
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*Honors Scholar Community
Resident Director*

Austin Spillane
Student Member

Daniel Poston
Student Member

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Abigail Laudi

Samantha Stoupa

Noah Zetocho



Creighton
UNIVERSITY
**College of Arts
and Sciences**

Program by Michael Kotrous
Program design by Annemarie Weiner